From Wednesday June 29th
to Friday July 1st

15TH

CONFERENCE OF THE INTERNATIONAL FORUM ON URBANISM (IFo U)

AT THE BORDEAUX NATIONAL SCHOOL OF ARCHITECTURE AND LANDSCAPE IN 2022

Conference theme
Internationalizing Education for the
Ecological Transition Challenge :
New Stakes for Sharing Knowledge and
Acting in a Changing World

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INTERNATIONAL FORUM ON URBANISM

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INTERNATIONALIZING EDUCATION FOR THE ECOLOGICAL TRANSITION CHALLENGE:

New Stakes for Sharing Knowledge and Acting in a Changing World

As societies all over the world face the challenges of global change, the paradigms for spatial intervention are evolving. New attitudes for action are emerging, departing from the perspective of unlimited growth that has proven detrimental to the environment and putting forth the postulate of an ecological transition. In the realm of urban and architectural design, rampant productivism appears outdated and is progressively being replaced by an attitude that is more attentive to local environments and cultures. Different methods for space design at all scales are emerging locally, adopting new postulates in order to address global challenges.

In this context, the internationalization of higher education stands out as a powerful tool for helping our societies address current questions about the evolution of territories all over the planet in a spirit of complementarity and solidarity. As the internationalization of education has garnered widespread approval through its promotion of sharing knowledge between a wide diversity of countries, today it is a priceless vector for fostering the exchange of ideas and experiences about the ecological transition.

Broadly addressing these matters by studying what is done in different contexts would seem to be a fundamental task for higher education in architecture, urban design, planning, and spatial work in general carried out at all scales.

The 15th Conference of the International Forum of Urbanism (IFoU), to be held at the Bordeaux National Higher School of Architecture and Landscape Architecture in 2022, aims to present different approaches, methods, and experiments in teaching and research implemented in higher education institutions for architecture, urban design, planning and landscape architecture all over the world, with a focus on how internationalization contributes to meeting the challenge of the ecological transition.

FIVE DIFFERENT THEMES WILL BE ADDRESSED IN THIS INTERNATIONAL CONFERENCE:

1 / NEW INTERDISCIPLINARY AND INTERCULTURAL APPROACHES FOR FACING GLOBAL CHANGES AND THEIR LOCAL IMPACT.

2 / ELABORATING AND TEACHING NEW PARADIGMS PROMOTING LOCALNESS IN LIGHT OF THE CRISIS OF GLOBALIZED MODELS FOR ACTION.

3 / NEW IDEAS ABOUT "NORTH-SOUTH" RELATIONS FOR STUDYING PLACES IN TRANSITION.

4 / NEW APPROACHES TO TECHNICAL DIMENSIONS FOR THE BENEFIT OF LOCALITIES.

5 / INTERNATIONAL EDUCATION POLICIES AND THE ECOLOGICAL

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JANA REVEDIN

Born in Constance (Germany), Jana Revedin is an architect, theorist and writer. The holder of a PhD in architectural and urban sciences and a full professor of architecture and urbanism, studied architecture and urbanism at Belgrano University Buenos Aires, Princeton School of Architecture and Milan Polytechnic University and taught at IUAV University in Venice as an assistant to Aldo Rossi. It was here that she presented her doctorate on the role of public space in the development of a democratic civic identity during the early German reform movement of the Bauhaus. Since receiving her authorisation to direct scientific research from the Ministry of Universities and Scientific Research in Rome in 2000 she has been appointed an associate professor of architecture and urbanism at Beuth University in Berlin and the University of Umeâ in Sweden and a full professor at Blekinge Institute of Technology in Karlskrona, Sweden. In 2016, she was appointed a full professor of architecture and urbanism at the Ecole spéciale d'architecture in Paris. She is a member of the LAURE Research Laboratory of the National Centre for Scientific Research (CNRS), the founding president of the world-widely recognized Global Awards for Sustainable Architecture and serves as the UNESCO delegate to the UIA commission of research and education as much as a member of the Board ofDirectors of ENSAP Bordeaux. In 2022 she is the curator of the first international exposition of the Architecture and Landscape Biennale of the Ile de France held at the Castle of Versailles: "Land in Sight!". Her biographical novels on women in architecture and design are internationally renowned bestsellers.

https://www.youtube.com/watch?v=FrZIyDU_gSA

JIN YEU TSOU

Professor TSOU Jin Yeu is the Raymond Hu Professor of Architecture in the Department of Architecture and Civil Engineering of the City University of Hong Kong and the Emeritus Professor of Architecture, School of Architecture, Chinese University of Hong Kong.

He is the Founder and Founding Director of the Center for Housing Innovations; the Senior Fellow of the Architectural Society of China; Board of Directors and Chairman of China Green Building (HK) Council and Director of Board of Certification; Board of Directors of International Society for Computing in Civil and Building Engineering (ISCCBE); Senior Fellow of International Forum of Urbanism (IFoU); Advisory Board member of Greater Bay Area (GBA) Carbon Neutrality Association.

He received the SASADA Award 2016 by the Association for Computer-Aided Architectural Design Research in Asia (CAADRIA). He assisted HKSAR in researching the impact of architectural design (e.g., Amoy Garden) on the spread of the virus in the air during SARS in 2003, and submitted the works to WHO as supporting documents.

His interdisciplinary research interests cover the areas of sustainable architecture design, performance-based simulation, evidence-based design, green building, remote sensing, and urban planning. His recent research projects include: applying CFD simulation to design D.I.Y. negative pressure air shield device against airborne COVID spread in crowded elderly homes in HK; establishing a multi-source remote sensing data fusion big data system for evaluating GBA coastal cities' carbon sequestration under different development strategies.

https://www.youtube.com/watch?v=MNUD2H82_Ro

DOMINIQUE GAUZIN-MÜLLER *

Dominique Gauzin-Müller is a French architect living in Germany since 1986 who since her studies, specialized in the multiple facets of eco-responsible land-use planning: materials, energy, social and cultural implications. She collaborates with numerous architecture journals and international publishing houses. She has published 21 books which were translated into several languages, and directs the "Ecological transition" collection at MUSEO editions.

Dominique Gauzin-Müller has curated several exhibitions, including "ecological living" (Cité de l'architecture, Paris, 2009). She initiated and coordinated the TERRA Award 2016, the first world prize for contemporary architecture in raw earth, then the FIBRA Award 2019, for contemporary architecture in plant fibres. Both awards were combined in 2021 in the TERRAFIBRA Award. Each of these prizes gave rise to a book and a traveling exhibition highlighting the finalists.

From 2007 to 2016, Dominique was editor-in-chief of EcologiK/EK, a magazine dedicated to eco-responsible architecture and urban planning. Honorary Associate Professor of the Unesco Chair "Earth Architectures, Constructive Cultures and Sustainable Development", she works in several universities around the world. She is also a member of the Compagnie des négaWatt, a group of independent experts working on energy transition scenarios for France.

In January 2018, Dominique Gauzin-Müller launched with Alain Bornarel and Philippe Madec the "Manifesto for happy and creative frugality in architecture and the management of territories", which has already collected more than 14,000 signatures from 85 countries, creating an international movement for a paradigm shift in the building sector.

*key note speaker from the 23th APERAU conference, shared with Bordeaux IFoU Conference

https://youtu.be/BtRNUy2KfOg

BERNARD BLANC *

Bernard Blanc is an urban planner, doctor of management and member of the Academy of Architecture. For 27 years, he was manager of public development and construction organisations in Paris, Nancy, Saint-Nazaire and then Bordeaux, where he served as managing Director of Aquitanis, the public housing office of the metropolis, from 2008 to 2019. As such, he received the Mies van der Rohe Award as contracting authority for the Grand Parc GHI project in 1999.
Founder of the New Paradigms transition consultancy, he is the author of books on Corporate Social Responsibility (CSR) and on citizen participation in the making of the city.
Since 2020, he is deputy for urban planning in the city of Bordeaux. In 2021, he led the creation of the Bordeaux Frugal Building framework, which aims to support the production of housing in an environmental, urban and architectural quality approach that meets the contemporary challenges of ecological, energy and societal transitions.
*key note speaker from the 23th APERAU conference, shared with Bordeaux IFoU Conference

https://youtu.be/BtRNUy2KfOg

TATJANA SCHNEIDER

Tatjana Schneider is a Professor for Architectural Theory and Head of the Institute for the History and Theory of Architecture and the City (GTAS) and the Architecture and Engineering Collection (SAIB) at the Technische Universität Braunschweig.

In the face of the climate emergency, wider epochal transformations and increasing socio-spatial inequalities, his work is concerned with case studies that promote principles of common good and justice. It focuses on how we can resist violent—exploitative, speculative, and exclusionary—productions of architecture, city, and space.

It is important to her to address the impact of these changes on the profession, practice and education of spatial planners, architects, and city makers to shape other forms of organizing, working and producing. She is particularly concerned with the social, economic, and political parameters within and through which architectures and cities emerge, as well as the tools and methods that enable people to intervene transformatively in the production of space. She is (co-)author or (co-)editor of books such as Flexible Housing (2007), Agency (2009), A Right to Build (2011), Spatial Agency (2011, 2016), Living the City. Of Cities, People and Stories (2020) and Making Futures (Spring 2022); currently working on a series of research projects that focus on spatial practice in the face of the climate emergency, most notably: Architecture after Architecture. In 2021, she ran for mayor of the Braunschweig, city where she lives.

https://youtu.be/MhyJ8oaIxms

PAOLA VIGANÒ

Paola Viganò architect and urbanist, is Full Professor in Urban Theory and Urban Design at the EPFL (where she directs the Habitat Research Center and the Lab-U) and at IUAV Venice. She received the French Grand Prix de l'Urbanisme in 2013, the title of Doctor Honoris Causa by the UCLouvain in 2016 in the frame of "Utopia for our Time", the Flemish Culture Award for Architecture in 2017, and the Golden medal to the career of Milano Triennale in 2018. Together with Bernardo Secchi, she founded Studio (1990-2014) working on numerous projects and visions in Europe. Since 2015 StudioPaolaViganò works on the ecological and social transition of cities, landscapes and territories designing urban and territorial projects and realizing public spaces in Europe. In 2019 her work has been exhibited at the Shenzen Biennale and in 2021 at the Venice Biennale.
Among her recent publications:
Viganò Paola (2022), «Life as a Common: Space for a New Biopolitical Project» in New Geographies 12, Commons, Mojdeh Mahdavi and Liang Wang, eds., Harvard University Press.
Cavalieri Chiara & Viganò Paola (2019), eds., The Horizontal Metropolis. A Radical Project, Zürich: Park Books.
Viganò Paola (2016), Territories of Urbanism. The Project as knowledge Producer, Routledge-EPFL Press.
Viganò Paola, Secchi Bernardo and Fabian Lorenzo, (2016), eds., Water and Asphalt. The Project of Isotropy, Zürich.

https://youtu.be/MhyJ8oaIxms

This part of the 15th IFoU conference was devoted to the presentation by representatives of the highest ranked universities in QS Worlds University Ranking, how these universities approach the pedagogy related to the question of the issues of ecological transition in an international perspective. These presentations were followed by a debate with representatives with the other schools present who are members of the IFoU as well as exchanges with the participants.
It was divided into two sessions in which the representatives of universities from various continents intervened:

SCHOOLS OF EXCELLENCE INTERNATIONAL FORUM 1

Delft University of Technology (TU Delft): Machiel VAN DORST

National University of Singapore (NUS): Chye Kiang HENG

https://youtu.be/I8rkorxjnZ0

SCHOOLS OF EXCELLENCE INTERNATIONAL FORUM 2

Tsinghua University (THU): Li ZHANG

Swiss Federal Institute of Technology (ETH Zurich): Christophe GIROT

https://youtu.be/RNmDXGlhyag

MACHIEL VAN DORST

Machiel van Dorst is full professor Environmental behaviour & Design at the department of Urbanism. His research field is on the crossroad of environmental psychology and urban design and including topics as: liveability, sustainability & behaviour, territorial behaviour, design & research methodology, design education, sustainable urbanism, health & the built environment.

Machiel van Dorst has 140 publications and has a long-standing reputation in education (mentoring over 180 graduation MSc students). Machiel was (and still is) promotor of more than 20 PhD candidates. Van Dorst is the chair of the scientific board of the International Forum on Urbanism, the worldwide network of top universities in the field of Urbanism. Machiel van Dorst was vice dean of the faculty of Architecture, Delft University of Technology, and chaired different departments the last 12 years. The faculty has the second position in the world ranking according to QS World University Rankings by subject.

CHYE KIANG HENG

Professor Heng Chye Kiang, PhD (UC Berkeley) is the Provost's Professor and Deputy Dean at the College of Design and Engineering, National University of Singapore. He was the former Dean of the School of Design and Environment (2007 to 2016) and the Head of its Department of Architecture prior to his deanship. He teaches and researches urban history, sustainable urban design and planning, and publishes widely in these areas. Professor Heng has served on the boards of government agencies including the URA, HDB, CLC, JTC, BCA and advises academic institutions like Singapore Institute of Technology, Nanyang Academy of Fine Arts, Chinese University of Hong Kong and Hong Kong University. He is currently appointed Honorary Professor at CUHK and has been appointed Visiting Professor at Hanyang University (Korea), Keio University (Japan), Southeast University, Chang'an University, Xiamen University and Tongji University (China) and EAVT (France). He has served as a jury member in numerous international design competitions locally and overseas and on several editorial boards of international journals. He is also planning consultant to numerous award-winning urban planning and design projects in Asia. Some of the awards include Architecture MasterPrize 2020 (urban planning) and Cityscape Global Master Plan Project 2018. His books include Singapore Chronicles: Urban Planning (2017), 50 Years of Urban Planning in Singapore (2016); Re-Framing Urban Space: Urban Design for Emerging Hybrid and High-Density Conditions (2015), On Asian Streets and Public Space (2010), A Digital Reconstruction of Tang Chang'an (2006) and Cities of Aristocrats and Bureaucrats: The Development of Medieval Chinese Cityscapes (1999).

LI ZHANG

Zhang Li is the Dean / Professor of Architecture in the School of Architecture, Vice Principal THADI, Tsinghua University, China. He founds the award-winning design laboratory TeamMinus in THADI. In late 2021, he has been elected to the Hall of National Masters in Survey, Engineering and Design.

Zhang Li is currently a Council Member [Region IV] of UIA, a standing board member of the Architectural Society of China, and the Editor-in-Chief of the leading Chinese magazine World Architecture.

Zhang Li's is the founder and a main advocator of Urban Ergonomics, an inter-disciplinary domain focusing on human body and space, and the design of active urban spaces.

Zhang Li's design works cover a wide range of scales, from urban designs, buildings to micrososm interventions. He and TeamMinus has won over thirty national and international awards in the past decade. He is currently the Architect-in-Chief of Zhangjiakou Zone, and Shougang Big Air, both for Beijing 2022 Olympic Winter Games. He is also the curator of China Pavilion in Venice Architecture Biennale 2020[2021].

CHRISTOPHE GIROT

Christophe Girot is Professor and Chair of Landscape Architecture at the Department of Architecture of the ETH in Zürich since 2001. He has directed the Institute of Landscape Architecture since 2005 and received the ETH Golden Owl award for teaching excellence in 2016. His research cover three domains:
– Methods in landscape architecture and topology
– New media in landscape analysis and perception
– History and theory of Western landscape architecture.
Emphasis at the Chair is given to large scale landscape design and modelling methods with particular attention to the topology of nature in and around cities. The LVML (landscape visualising and modelling laboratory) of the ETH and ongoing research with the NCCR in Digital Fabrication, the Kyoto Institute of Technology, CTI and SNF grants has yielded ground breaking results in point cloud design, modelling and acoustic sensing.
Christophe Girot received a double Masters of Architecture and Landscape Architecture from U.C. Berkeley (1986-1988) and a Bachelor of Science in Environmental Planning from U.C. Davis (1981). He was Professor and Chair of Landscape Architecture at the Versailles School of Landscape Architecture in France from 1990 to 2000 until he joined the ETH. He holds a practice in Zürich with projects in Europe and in Asia.

SUMMARY OF PAPERS

TOPIC 1 / NEW INTERDISCIPLINARY AND INTERCULTURAL APPROACHES FOR FACING GLOBAL CHANGES AND THEIR LOCAL IMPACT

■ **(A) STUDY THE COMPLEXITY OF CROSS-BORDER AND CONSTANTLY CHANGING TERRITORIES**

For an inclusive and multi-benefit flood risk management overview of existing tools, preamble of an action methodology for a french-belgian cross-border case study
Emeline Coszach, Vincent Becue, Jérémy Cenci, Isabelle De Smet, Patrizia Laudati, Cédric Rivière

Practice of planning coordination for cross-border spatial governance in the Yangtze River Delta Region, a transformative analysis in meta-governance
Dong Su, Jian Liu

A multidisciplinary approach to the cross-border project
Julie Martin, Fréderic Dellinger

Spatialising runoff water across Belgian territories
Thaïs Delefortrie

An academic reflection on urban reconstruction in contexts of post-disaster
Carmen Mendoza Arroyo

■ **(B) REVIEWING TERRITORIAL PRACTICES THROUGH CROSS-SCALE AND CROSS-CULTURAL APPROACHES**

Territorial logics of marginalisation
Lucas Lerchs

Systemic and holistic territorial approach
Tewfik Hammoudi

Urban regeneration, publicness and participation in spatial planning : a case of Taipei
Hsinko Cinco Yu

Transversal teaching of architecture and urbanism and local impact in two countries
Velia Ordaz, Carlos Gotlieb

Stuttgart meets superblocks: rediscovering streets as urban living rooms through a transdisciplinary and intercultural teaching approach
Astrid Ley, Leonie Fischer, Solène Guenat, Franziska Schreiber

SUMMARY

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TOPIC 1

NEW INTERDISCIPLINARY AND INTERCULTURAL APPROACHES FOR FACING GLOBAL CHANGES AND THEIR LOCAL IMPACT

The environmental and social consequences of global changes involve aspects as diverse as the climate, migration, food resources and health. The knowledge necessary to address resulting problems is evolving, favoring transdisciplinary work and promoting situated action for best results. The socio-ecological approaches that are emerging alongside more established knowledge and professional practices are an example of this. The aim here is to gather examples of experiences, pedagogical methods or new doctrines that reflect such phenomena, in a broad sense and in a global perspective while also grounded in concrete territorial situations.

FOR AN INCLUSIVE AND MULTI-BENEFIT FLOOD RISK MANAGEMENT OVERVIEW OF EXISTING TOOLS, PREAMBLE OF AN ACTION METHODOLOGY FOR A FRENCH-BELGIAN CROSS-BORDER CASE STUDY

1-A-1

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ABSTRACT:

For a long time anchored under the acronym of resistance, our global flood risk management strategy is essentially based on civil engineering measures: dams, pumping stations, outlets, pipelines, ... Although they have proven their worth on many occasions, they are not without consequences and tend to reach their limits. They have an environmental, social and economic impacts on our societies and also contribute to the loss of the culture of risk within populations.

The sad events that have occurred recently, particularly in Europe, show that these infrastructures, legacy of our past, are no longer adequate with the new ecological and climatic challenges of the 21st century. How then can we adapt our flood risk management strategy in order to reconcile society, environment and risk? Wouldn't the answer be in the erasure of these robust infrastructures, all concrete clad, in favour of softer measures, reconciling flood risk management and the development of biodiversity, which is essential to the survival of humanity and provides ecosystem services?

Some politicians are already initiating action plans to adapt their territories. An overview of existing tools in this field and the scales of action for flood risk management will be carried out. Firstly, it will provide an overview of the possibilities of operations and secondly, to see to what extent these actions are transferable from one territory to another. In a second step, this study would allow us in a second step to determine, in the more specific case of the cross-border territory formed by the arrondissements of Mons and Valenciennes, which tool could be developed for flood risk management through the absorption and nature.

KEYWORDS : *Risk, Flood, Resistance, Adaptation, Nature, Biodiversity, Valenciennes, Mons.*

Since time immemorial, civilizations have naturally settled near streams, rivers and seas. For cause, these territories offer a strategic position for the development of trade and transport, an ideal relief for the development of cities and rich soils, favourable to crops. An idyllic picture if we forget their strong vulnerability to rising waters. By this choice of location, Man is also subject to the risk of flooding.

Highly variable in nature, flooding is nonetheless the result of phenomena of meteorological origin and is therefore difficult to predict in terms of its timing, duration and intensity. Human societies have had no choice but to develop adaptation strategies as disasters have been experienced, allowing them to enjoy the proximity of water while ensuring their own safety (Terrin, 2014).

Initially rather rudimentary and developed using stone, embankment and sand dikes, this flood risk management strategy benefited from a real springboard during the industrial revolution (Cfbr, 2013). Civil engineering works will then see the light of day exponentially such as dams, dykes, pumping stations, pipes, outlets, and so on. A very strong strategy of water resistance will then see the light of day and increasingly restrict the place of water on the territory.

This strategy of water resistance, based essentially on technical control of natural events, is still applicable today (Bauduceau, 2014). However, it has serious consequences on the landscape, human societies, the water cycle and biodiversity. In fact, by taking place on the territory, these civil engineering works will create physical and visual barriers completely cutting off access to water. By being disconnected from water, we forget its presence and, by extension, the risks associated with it. A feeling of omission of the risk and excessive confidence in the technology of both political actors and populations will therefore interfere, in a subtle and treacherous way over the generations. This phenomenon is all the more worrying as the infrastructures, which are extremely energy-intensive in terms of human and financial resources for their maintenance, are largely in a degraded state, no longer meeting their initial objective of protecting the population (Bauduceau, 2014). At the same time, the structures, themselves all concrete clad, will greatly contribute to the phenomenon of soil sealing. The objective of these infrastructures being to be able to develop agriculture, towns and villages, at the moment a portion of the territory will be saved from the waves, it will be invested or urbanized. As the nature of the soil has changed, water will no longer be able to infiltrate it to fill the water table and the water cycle will be disrupted. In addition, the wetlands being dried up, the particular associated biodiversity will be impacted and, no longer finding refuge there, will eventually desert the place (Scarwell & Franchomme, 2005).

We therefore realize that these infrastructures, imagined decades ago on the basis of data that are now obsolete, are no longer commensurate with the risks and challenges of the 21st century, especially in a context of climate crisis. Two options are available to us. Either, the choice to continue, against all odds, to develop this water resistance strategy is made. We have the technical capacity to tirelessly build and reinforce our dikes in order to make them reach ever greater heights, but at what cost? For what quality of life? Either, a new flood risk management strategy is developed to reconcile society, environment and risk. Wouldn't the answer ultimately lie in the removal of these robust infrastructures, all concrete clad in favour of softer measures, reconciling flood risk

management and the development of biodiversity, essential to the survival of humanity and provider of ecosystem services?

Some politicians are already initiating action plans to adapt their territories. But how did we first get here? What have been the trends in terms of flood risk management over time? And in Europe more specifically? What tools exist in this area? How to reverse the trend? And finally, what about the specific territory formed by the arrondissements of Mons and Valenciennes?

To answer these questions, we will first try to provide a generic history of the flood risk management strategies that have been developed over time. The example of the Netherlands will be chosen to illustrate the paradigm shift to be made and the possible courses of action for the development of inclusive flood risk management. Secondly, a focus on the cross-border territory of the arrondissements of Mons and Valenciennes and the tools developed will be carried out. The objective is to be able to propose a first draft methodology to ensure the transition of this territory towards flood risk management through absorption and nature.

1. OVERVIEW OF EXISTING TOOLS FOR FLOOD RISK MANAGEMENT

Flooding is not a problem in itself. Natural phenomenon, it is completely normal for a river to repeatedly occupy its major bed (SPW, s.d.). In some cases, it is even desired or even essential for the fertilization of agricultural land. Yet, when an episode of flooding is mentioned, it is generally related to a lot of damage and loss.

It is when the hazard (flood) is combined with the stakes (populations, infrastructures, goods, etc.) that the notion of risk appears. It is therefore human societies and activities which, by their establishment on the territory, create vulnerability and inherent risk (Peil, 2014). Over time, with the development of agriculture, increase in population and urban development, the need to react in order to ensure the safety of communities and thus reduce their vulnerability has been felt. It is in this context that flood risk management has gradually developed.

1.1 Genesis of flood risk management

Flood risk management as it is known today is quite recent. Traditionally, no strategy per se was developed. Flood management, which then consisted more of adapting to the water and « directing and enhancing the floods in order to be able to take advantage of the rich alluvium of the river » (Rossano, 2021, p. 44), was essentially made up of isolated acts from individuals or communities. While the first artisanal levees, called turcies, emerged in the 8th century with the aim of « slowing down the current in times of flooding, mitigating its effects and promoting the deposit of fertile alluvium on the flooded lands » (Fournier, 2008, p. 9), the emergence of large landowners and the development of river transport in the 12th century marked a turning point in flood management. Turcies are gradually being replaced by more resistant, continuous and permanent levees allowing the regulation of the profile of the rivers and their level in order to ensure optimal navigability. Often carried out to the detriment of the local communities who suffer the consequences of the pipeline works, this transition is ultimately only « the consequence of an economic evolution rather than the expression of technical progress » (Rossano, 2021, p. 45). It marks the beginning of a frantic race towards unsinkability which will continue for several centuries with the help of dykes and discharge basins.

Despite the great floods of the 15th century in Europe, the scheme was not called into question and the figures of public authority, under the lobby of the commercial bourgeoisie, relaunched successive raising campaigns until the second half of the 17th century. A paradoxical and vicious phenomenon since, by tightening and raising the dykes, the water level and its speed are increased, making it more devastating during episodes of flooding, themselves causing a new raising of the dykes... (Barraqué & Gressent, 2004) Despite everything, these major works orchestrated by qualified engineers, have enabled the pooling of defense infrastructures against floods where until now, they were essentially aimed at the short term interests of builders and landowners (Rossano, 2021). Although local communities and their needs are still generally harmed, these vast, more coherent projects now ignore « the corruption, divisions and incompetence » (Rossano, 2021, p. 55) that could rule the work done so far.

These vast water resistance projects flourished again during the 18th century, Enlightenment century, where man dominates nature and must adapt the world to his needs, and the 19th century, characterized by hygienism as well as technical and technological developments. Vast campaigns of drainage of wetlands, correction of rivers and embankments will be carried out, impoverishing in their wake the landscapes made standardized for cultivation. The channeling of water made it possible to erase the fluvial fluctuations which « destabilized not only the borders between communities but also the international borders for which a coordinated action proved even more difficult to put in place » (Rossano, 2021, p. 61). The dikes thus made it possible to freeze but also to secure the borders, limits made more difficult to palpate once they found themselves under water during a more or less long period of time.

In the 20th century, a new aspect completes the technical, economic and aesthetic characteristics to be taken into account when developing watercourse development projects, that of ecology (Rossano, 2021, p. 77). The emergence of an environmental awareness instilled by the first European action program on the environment established in 1973 (Union Européenne, 2015) is timidly interfering with water management. Confirmed in 1992 with the Helsinki International Convention on the prevention of pollution of international rivers and lakes (Union européenne, 2020), this ecological and environmental awareness continues to develop over time.

1.2 Flood risk management in the 21st century

The 21st century will be the scene of many advances in terms of flood management.

The question relating to the scale of water management took on a new dimension with the adoption in 2000, at European level, of the Cadre sur l'eau [water framework] Directive. Resulting from the desire to have more coordinated regulations following the range of legislation that has emerged since the 1970s, the key objective of this directive is no longer to organize and manage water at the scale of the administrative limits but rather on the natural geographical limits, the hydrographic basins (SPW, s.d.). International and national hydrographic districts have thus been defined at the scale of the river basins, covering approximately sixty percent of the European territory. This directive obliges member states to establish Plan de gestion de District Hydrographique (PGDH) [hydrographic district management plans] for each of the 110 European hydrographic districts (Comission Européenne, 2014).

This pooling of water management will then be supplemented in 2007 by the Inondations [floods] Directive which will give a major impetus in terms of flood management. It « establishes a framework for assessing, mapping and reducing flood risk in Europe » (Union Européenne, 2015). Thus, the directive requires member countries to assess the risks of flooding using, in particular, a history of past floods; produce maps to identify areas exposed to significant flood risks according to several probability scenarios (low, medium, high) which are to be reviewed every six years; and finally, to establish flood risk management plans at hydrographic district level, also reviewed every six years (Union Européenne, 2015).

This evolution of European flood management policy comes after a rather dark period. While at the international level, Hurricane Katrina erupted in the United States in 2005, creating a stir and shaking consciences around the world (Terrin, 2014), natural disasters also impact Europe. « Between 1998 and 2009, Europe suffered more than 213 major floods, including the catastrophic floods along the Danube and the Elbe in the summer of 2002, some 1126 deaths, the displacement of around half a million people and at least 52 billion euros of insured economic losses » (EEA, 2010, p. 25). Floods are certainly the consequence of natural phenomena, but their probability and their impacts on communities, property and the environment are man-made and can be limited by taking the right measures (Commission Européenne, s.d.). These various climatic events combined with the emergence of the two European directives will give rise to the gradual development of a completely different risk management, more based on the adaptation of the territories, gradually freeing itself from a binding and technical policy until then advocated.

Even if the construction of new infrastructures and the reinforcement of existing works are not totally excluded from European policy, other means taking advantage of nature's capacity to absorb are put forward for a sustainable management of flood risks (Comission Européenne, s.d.). Green and blue networks, ecological restoration, ecological engineering, integrated management, adaptation to climate change based on ecosystems, ... so many concepts and projects with the common objective « to further integrate nature and bring benefits to biodiversity and human well-being » (CEPRI, 2022, p. 10). Developing in parallel with other European directives and strategies relating to the environment and biodiversity, all these initiatives are part of the more global desire to deploy "nature-based solutions". This new concept appeared on the international scene during the World Conservation Congress in 2016 and is defined as « actions aimed at protecting, sustainably managing and restoring natural or modified ecosystems to directly address societal challenges in an effective and adaptive way, while ensuring human well-being and producing biodiversity benefits » (UICN, 2016). By protecting and restoring these ecosystems, the related ecosystem services will also be enhanced. Divided into four large families, they are essential to human life. They consist in producing food, water or even materials; to participate in the mental and physical well-being of Men; to offer a quality living environment; and finally, to mitigate and regulate extreme and climatic events (Commission Européenne, 2020).

Nature-based solutions can indeed contribute in particular to the reduction of flood events. They generally have an effect on the hazard itself, i.e. « on the height and speed of the water, but also on the duration of the flood » (CEPRI, Centre Européen de Prévention du Risque d'Inondation, 2022, p. 14) but they can also contribute to reducing the vulnerability of territories. By instilling a new way of conceiving the territory, they will make it possible to limit the exposure of inhabitants, buildings and infrastructures by giving more space to nature and water (CEPRI, Centre Européen de Prévention du Risque d'Inondation, 2022, p. 16). Particular attention must however be paid to the phenomenon of greenwashing, which is unfortunately increasingly present at the present time: the introduction of nature does not necessarily result in a nature-based solution. Particular attention must be paid to ecosystems and to benefits which can be generated for biodiversity (CEPRI, Centre Européen de Prévention du Risque d'Inondation, 2022). This is the whole point of these new initiatives.

2. ANALYSE OF THE SCPECIFIC CASE OF THE NETHERLANDS

Due to its position on the delta formed by the Rhine, the Meuse and the Scheldt, the Netherlands finds itself confronted both with « storm tides caused by the North Sea and with extreme river flows » (Nillesen, 2014, p. 60). More than sixty percent of the territory is threatened by the waters of the sea or rivers. Combined with the fact that twenty-six percent of its territory is below sea level (Slomp, 2012), the Netherlands had no choice but to quickly develop means of protection against floods, which is why they are often presented as pioneers in flood management.

In line with the genesis of flood management, the Netherlands first developed adaptive measures using terps which consisted of a one-off elevation of land to shelter a group of buildings, a farm or a small community. After having had to endure many terrible disasters, the country decided to implement a very strong water resistance strategy: *the Delta plan*. Nearly fifty years later, the Netherlands has made a change in mentality and policy regarding flood management. A softer water management, leaving more room for water will be highlighted with the *Ruimte voor de rivier* project.

2.1 The delta plan

At the end of January 1953, the Netherlands were hit by a huge storm which, through the combination of a spring tide and strong winds, caused an exceptional rise in sea level. Under the force of waves of up to 4 .5 meters high, the dikes break over almost twenty kilometers and vast areas of the Netherlands, almost sixty percent of the territory, are flooded. No warning system being developed at the time and taking the population by surprise in the middle of the night, this event will be the worst disaster that the Netherlands will know with more than 1,800 dead and 70,000 people evacuated (Delta works online Foundation, 2004; Nederlands Bureau voor Toerism & Congressen, s.d.).

The Netherlands has faced many floods over time but none of them had the same impact as this one. For good reason, in response to this disaster, the ambitious and daring *Delta plan* was created. (Figure 1)

Figure 1 – The Delta Plan works (Source: personal map made on a base map of the Rijkswaterstaat - Ministerie van Infrastructuur en Waterstaat)

Considered by some to be one of the Seven Wonders of the Modern World and the largest flood protection system in the world (Nederlands Bureau voor Toerism & Congressen, s.d.), it results in the closure of all estuaries in the arms of sea using a network of dams, dikes, locks and storm barriers. Vast offensive and technical strategy, unique for the time, the implementation of dams as barriers against sea waters made it possible to considerably shorten the direct border between sea and land. From a fragmented coastline of seven hundred kilometers, to a more or less straight coastline of only eighty kilometers (Ministerie van Infrastructuur and Waterstaat, s.d.). This reduces the number of flood protection structures needed and by extension the maintenance and upkeep required to sustain them. More than just an element of flood management, the Delta works also contribute to « better water management and the supply of fresh water » and « improve the accessibility of Zeeland » (Ministerie van Infrastructuur and Waterstaat, s.d.).

Forty-three years later, in 1997, the many works of the Delta plan were completed. Although it is the expression of the knowledge and know-how of Dutch engineers, they have raised « many questions and strong disputes as to the ecological and economic consequences and environmental sustainability » (Gueben-Venière, 2015). But that was without counting on the remarkable Dutch ability to be able to question its own practices.

2.2 Room for the river

Climate change will undermine the resistance strategy developed via the Delta plan. In particular, the more frequent periods of rain and melting water cause the water level of the rivers to rise. The extremely high-water levels recorded in 1993 and 1995 led to a realization that the dykes are not strong enough. Rather than just reinforcing and raising the dikes and with a goal to offer an attractive quality of life for its population, the Netherlands decided to develop its flood risk management with a new philosophy, by giving more space to the rivers. « Nature and water go hand in hand » (Jan Goossen, 2018). It is from this premise that the Ruimte voor de rivier project was born, encompassing nature-based solutions such as the restoration of natural flood zones, wetlands or de-polderization.

The Ruimte voor de rivier strategy is a vast plan made up of thirty-nine operations (Figure 2) that take place all along the rivers that cross the country. Their common objective is to increase the drainage and storage capacity of rivers. After discovering that by increasing the volume of water in

the river, the flow decreased, the infernal circle of constantly raising the height of the dikes could be tempered (Jan Goossen, 2018). Where in past centuries, height was sought to be able to contain the water, henceforth, it will be the width which will be favoured in order to allow the water to spread. However, to be able to achieve this objective of creating additional space for water, it is essential to develop coherence between water policies, land-use planning and the environment (Rossano, 2021, p. 183).

Figure 2 - The 39 projects of the Ruimte voor de rivier's strategy

(Source: personal map made on a base map of the Rijkswatrestaat - Ministerie van Infrastructuur en Waterstaat)

Nine types of measures (Figure 3), to be combined, are possible to « make room for the river »: « eliminate obstacles built in the major bed, lower the level of the major bed, lower the groynes, create flood evacuation channels parallel to the river, move back the dikes, store water in existing lakes or in agricultural polders reopened to floods, widen or deepen the minor bed or even reinforce or raise the existing dikes » (Rossano, 2021, p. 189). The various projects will have to ensure that they combine three main criteria: « hydraulic functionality in terms of lower flood levels, environmental sustainability in terms of the robustness of living environments and finally, being culturally and aesthetically significant » (Rossano, 2021, p. 190). The management of its spaces through nature allows the creation of leisure spaces, beneficial to the population and creator of added value on the territory.
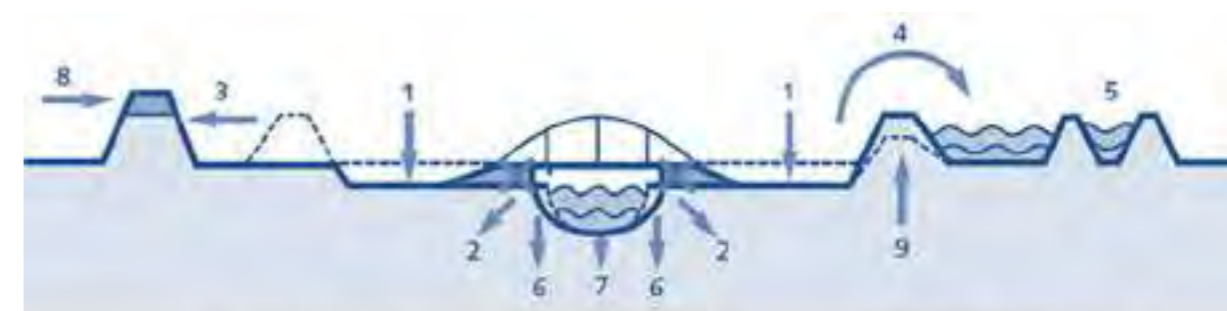
Figure 3 – The nine nine possible measures to ''make room for the river ''
(Source: Projectorganisatie Ruimte voor de Rivier, 2006)

As the project ended in 2019, the water authorities carry out constant research for the continuous adaptation of the territory in response to the challenges of global warming (Jan Goossen, 2018). « It is difficult and generally undesirable to establish measures for the next 50 to 100 years » (Ministerie van Infrastructuur and Waterstaat, s.d.), the key words being: adaptive management and systems approach, as new data are discovered.

3. FOCUS ON THE DISTRICTS OF MONS AND VALENCIENNCES

3.1.Presentation of the study area

The district of Mons, located in the Walloon Region in Belgium, and the district of Valenciennes, located in the Hauts-de-France Region in France, are both integral parts of the Scheldt International River Basin District (DHI Escaut). The main waterways crossing them are the Scheldt for the district of Valenciennes, the Haine and the Nimy-Blaton-Péronnes canal for the district of Mons. In accordance with the history of flood management, most of the territory has heavily modified or artificialized surface water bodies. Where a large part of them are restricted, channelled or buried, a few secondary ones still exist in their natural state. (Figure 4) Despite everything, the ecological state of almost all the entire hydrographic network leaves more than to be desired by being included in the categories "poor" and "bad". (Figure 5)

The cross-border territory formed by the arrondissements of Mons and Valenciennes is considered for the most part as "presenting a significant potential risk of flooding" (Figure 5) and is mainly subject to flooding by overflow of watercourses and runoff. (CIE, 2022) Being part of the mining basin, one of the great particularities of the territory lies in the fact that it is subject in several places to the phenomenon of subsidence. (Figure 4) Irreversible, it is characterized by "movements of withdrawal and swelling of the soil following their drought and rehydration" (DDTM, 2011) making the territory all the more vulnerable to flooding.

3.2 Presentation of the developed tools on the territory

The strategies developed in each of the two cross-border countries, although they have the same European roots, will present certain divergences only in their names. A correlation of these tools will

be carried out according to the scales of application. (Figure 6)

Located on the course of the Scheldt and following the European Cadre de l'eau Directive of 2000, part of the Be
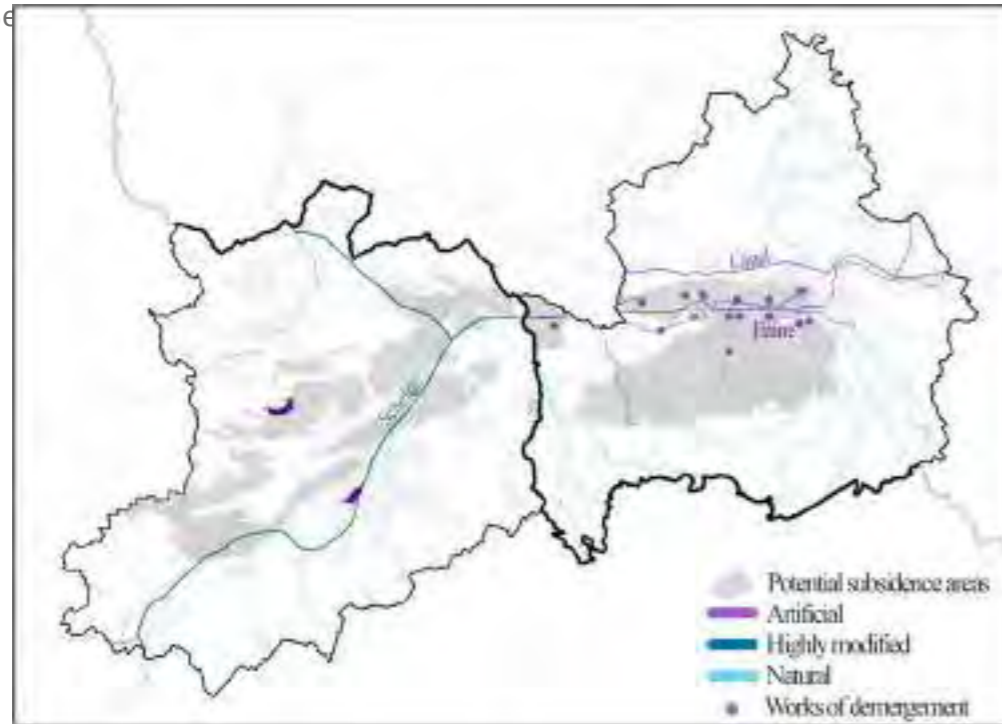
Figure 4 - Status of surface water in the districts of Mons and Valenciennes
(Source: Personal map based on data from the ISC-CIE, the DREAL and from Delmer A., 1977)
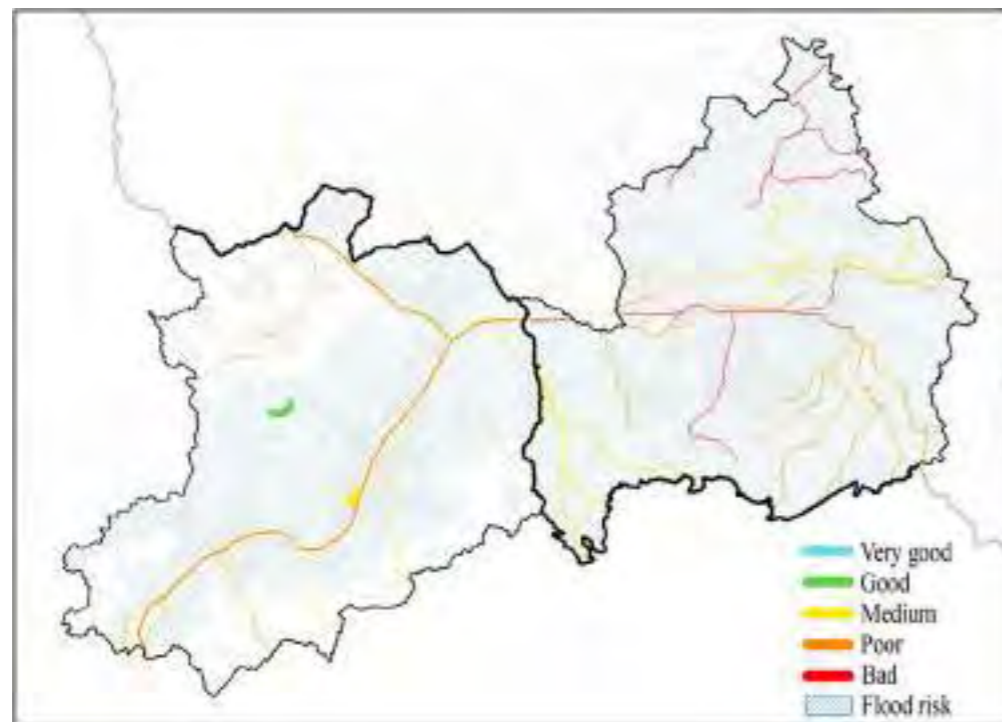
Figure 5 - Flood risk and ecological status of surface waters in the districts of Mons and Valenciennes (Source: Personal map based on data from the ISC-CIE)

the working group of the international hydrographic district of the Scheldt: the International Scheldt Commission. Resulting from the European Inondations Directive of 2007, Plans de Gestion des Risques d'Inondations (PGRI) [flood risk management plans] will also be drawn up at the level of the river basin area, for their apex part, before being deepened at the regional or national level.

Figure 6 - The different tools and their scale of application for flood
risk management in Belgium and France (Source: Personal illustration)

Belgium had already taken a bit of a lead in flood management at regional level in 2003, but it was the Inondations Directive that gave real impetus to the development of the various tools. For both countries, it marks the emergence of several maps, historical databases and PGRIs. It also stimulates for the first time on the French side the development of a national strategy for flood management. In 2018, with the update of the Code de l'eau in Belgium, a new tool that promises to be operational appears, the P.A.R.I.S. They have the particularity of combining the environmental objectives linked to the hydromorphology of the PGDH and those linked to the risk of flooding of the PGRI. The multifunctional aspect of watercourses takes on a new dimension through the integrated management that is advocated there. (SPW, 2021; Ministère de la Transition Ecologique, s.d.)

Alongside these global strategies, other tools will emerge in a more disparate manner, responding gradually to the needs of managers and the problems encountered. Public awareness, alert and monitoring tools will complete the arsenal in both France and Belgium. Except the PA.R.I.S. which promise to be so to a greater extent, none of these tools allow operational planning of a project.

3.3. Methodology proposed for a flood risk management strategy under the acronym of absorption in the study area

Many dams, dykes, banks today mark the cross-border territory of study as well as our current risk management, like a legacy of the past. In view of the consequences and limits that this type of infrastructure generates, our desire is to emancipate ourselves from these strategies of constraint and resistance in favour of a softer management of the flooding risk allowing the adaptation of the territories. It should make it possible to pass from these measures which separate (territories, people) to the measure which henceforth integrates the living and the multi-benefits; to go from pebble towns to sponge towns. Currently, no tool makes it possible, from a practical point of view, to support the actors of the architecture and urban planning community in this transition. As the research is still in its early stages, the current state of progress includes a proposed methodology. It then only asks to be developed, deepened and enriched as research progresses. The ultimate objective being to be able to offer a support tool for inclusive flood risk management under the acronym of absorption.

How then to develop such an absorption strategy, how to manage water in the territory? Nature is a very good example. By simply taking the water cycle, we observe that water can be managed in four different ways when it arrives on the ground: it can be evaporated, infiltrated, stored or streamed. (Figure 7) In the context of flood risk management, we will determine the absorption by three of these four actions, evaporation proving to be rather anecdotal in the context of flood management. Another action will come to replace it, that of temporization. An important concept in the field of flood management, temporization differs from storing in the fact that the occupation by the waters will only be temporary where in the case of storing, it will be permanent.
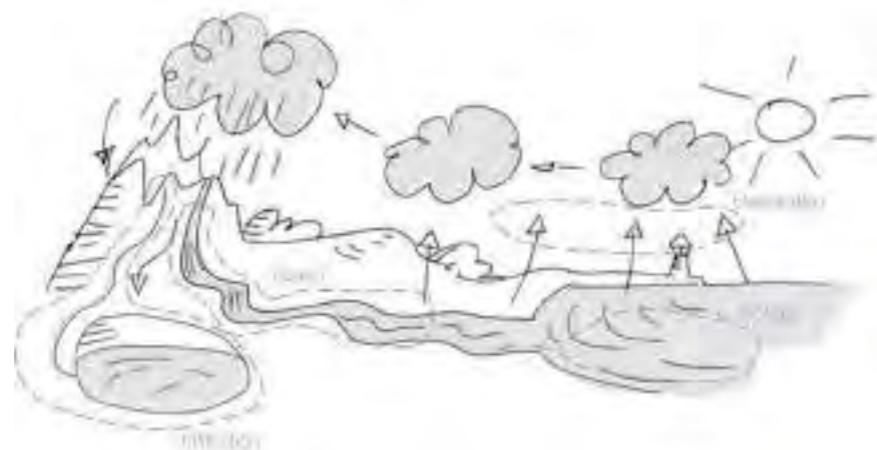
Figure 7 - Water management according to its cycle
(Source: Improved illustration from « Les cahiers du Développement Durable », 2022)

Each of these actions will translate into possibilities for concrete development in the territory. (Figure 8) For example, to promote temporization, basins, valleys, ditches, trenches or even cisterns can be put in place. The streaming action will take place via rivers, watercourse, streams and pipelines. The desire being to promote softer measures, in connection with nature; engineering elements, waterproofing factors, will be avoided.

As the tool has a dual purpose, the biodiversity filter will inevitably in turn influence the various indicators. For example, if the choice is made to develop a meadow in order to facilitate infiltration, this meadow can have several shapes: rectangular, round, triangular. In terms of biodiversity, it is advisable to develop spaces of nature with compact shapes allowing them to have a heart as large as possible and sheltered from external disturbances. (Audap, 2016) To meet the two criteria combined, it should therefore be the circle shape that will be favoured.
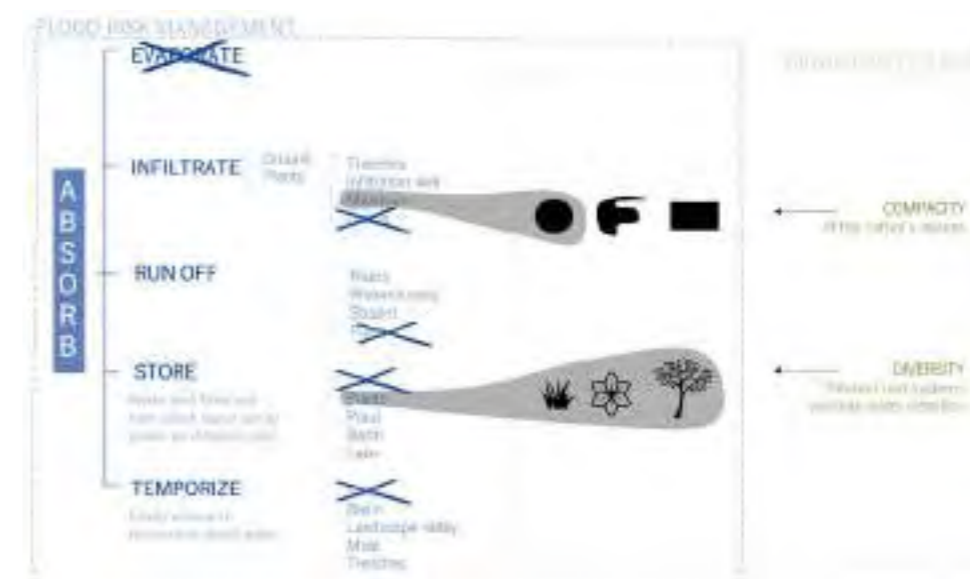
Figure 8 - Illustration of the proposed methodology for a flood risk management strategy under the acronym of absorption (Source: Personal illustration)

Water in the territory passes through different places: urban, peri-urban, rural, industrial, forest, etc. It seems likely that the possibilities of managing water will not be the same from one place to another. Action sheets will be developed according to the different typo-morphologies of the territory allowing to have a clearer vision of the possible actions to be carried out. These typo-morphologies will be specific to the study area. The action sheets, although their principle of development can be reproduced in other places, will therefore be specific to the territory of application.

CONCLUSION

Finally, flood management is a concept that has always been rooted in communities. First by means of rudimentary and sober measures, then by robust, restrictive and sometimes violent infrastructures, erasing water from the landscape so much that we often forget its presence and the associated risk: a gradual slip is observed passing « from 'decentralised, rural and adaptive social organizations to urbanized organizations with a capitalized economy, seeking to secure and intensify production and transport, possibly at the expense of local uses » (Rossano, 2021). Fortunately, these developments will subsequently be questioned with the emergence of environmental awareness at the end of the 20th century. However, it will be necessary to wait until the 21st century before real progress can be seen: pooling of flood management at European level on the scale of river basin areas, real revolution in the discipline; gradual placing of nature and water at the center of developments; search for more sober measures inspired by nature-based solutions. It is at this time that the main tools for managing the risk of flooding will see the light of day.

Capable of being variable in nature (surveillance, alert, directives, strategies, operational tool, etc.), very few tools exist for planning. We therefore propose a methodology for the development of a tool to help manage the risk of flooding. The desire being to emancipate oneself from the robust infrastructures of the past, absorption will be sought and favoured. In addition, with the objective of multifunctionality and multi-benefits, particular attention will be paid to promoting the development of biodiversity, essential to human life.

What better than nature to inspire a tool as described? The water cycle and the different actions that compose it will serve as a basis for the development of this tool. A "biodiversity" filter will then be added to it in order to be able to develop measures combining both hydrological and living criteria. Although soft measures will be preferred, it is obvious that all the "grey" infrastructures that make up the legacy of flood risk management cannot be replaced. As the cross-border territory under study is part of the mining basin, subsidence is present in certain parts of the territory, making it very difficult to keep them above water. The aim pursued is therefore not to completely erase the artificial structures on the entire territory, which are nevertheless physical, visual, social and biological barriers. The aim is rather, as in the case of the Netherlands, to design flood risk management that reconciles human societies in their relationship with water and natural ecosystems. This proposed methodology, which follows a questioning initiated within the framework of the CoMod project, will then be applied to the territory of study of the research.

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PRACTICE OF PLANNING COORDINATION FOR CROSS-BORDER SPATIAL GOVERNANCE IN THE YANGTZE RIVER DELTA REGION: A TRANSFORMATIVE ANALYSIS IN META-GOVERNANCE

1-A-2

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Abstract

Nowadays, city clusters have become an important spatial form in the process of global urbanization, characterized by contiguous development across provincial, municipal, and county administrative boundaries, given all-around cross-border circulation of socio-economic factors at the regional scale has become the trend. In order to pursue their own interests, neighboring administrative regions are driven by localism and often deliberately ignore regional level neighborhood issues, especially ecological and environmental issues regarding "public goods", coupled with weak cross-border spatial governance at the regional level, this has led to prominent negative externalities and constant conflicts in the development of cross-border areas, seriously affecting the developing quality of the region as a whole. This paper attempts to challenge the traditional technical concept of spatial planning, and introduce the meta-governance theory of public administration discipline. The study empirically demonstrates the Yangtze River Delta(YRD), the representative of China's regional development and pioneer in cross-border ecological governance as an example, and identifies the evolution of the three-stage regional coordination model in the YDR region since the reform and opening up in China, and the successes and failures of planning meta-governance in the cross-border area under different goal-oriented approaches. This paper summarizes a regional planning meta-governance model with Chinese characteristics, to explore the mechanism of spatial planning, as a policy and technical tool for spatial governance, in responding to the ecological governance of cross-border space, and measures how it can effectively play a synergistic role in the regional scale.

Key words

Yangtze River Delta cross-border spatial governance meta-governance regional planning coordinationspatial planning

1. INTRODUCTION

Under the global sustainable development goals, how to balance economic development and ecological protection in highly urbanized areas is a development problem faced by all countries in the world. After witnessing many environmental problems caused by the rapid economic development and rapid urbanization after the reform and opening up, China is gradually undergoing a governance transformation at the institutional level. In 2007, the Seventeenth National Congress of the Communist Party of China proposed to build an ecological civilization. In 2017, the Nineteenth National Congress of the Communist Party of China proposed the goal of high-quality development. In the past two years, the Party Central Committee and the State Council have successively emphasized that the 14th "Five-Year Plan" period should be based on a new stage of development, implement the new development concept and build a new development pattern. The continuous deepening of social awareness has promoted the new agenda of focusing on the symbiosis of development and protection, and call for a new round of spatial governance system reform and supporting mechanism conversion (ZHANG Junkuo, et al.,2019). Combined with regional resources and environmental carrying capacity and high-quality protection mechanisms. high-quality new urbanization (Fang Chuanglin, 2019) take ecological civilization as the logical starting point for planning reform in the new era, take ecological disease management as the core targe for optimizing the territorial space planning system (Zhuang Shaoqin, 2019; Yang Baojun et al., 2019) and promotes spatial governance towards the harmonious collaboration between man and nature.

At the same time, the development of regionalization across provinces, cities and counties represented by urban agglomerations and metropolitan circles has become an important feature in the process of urbanization in the world(Gottmann, 1957; Hall & Pan, 2006). Today, "developing and expanding urban agglomerations and metropolitan circles" and "promoting coordinated regional development" are included in China's new round of five-year development plans, and improving the system of coordinated regional development become inevitable requirements for building China's high-quality developed space layout and its support mechanism.

However, due to the "fence effect" across administrative borders, transboundary areas always involve differentiated stakeholders, multi-dimensional temporal and spatial scales, and limited human society's cognition of complex ecosystems. Therefore, to achieve common regional development goals, cooperation and coordination are often considered the preferred method to solve regional problems (BODIN Ö, 2017).

Over the years, the problem of coordination has always existed, and the issues are highly similar: the contradiction between the administrative subjects is difficult to solve, coordination policies and coordination institutions are facing failure. Especially under the framework of national governance, the institutional goals of focusing on ecological protection are significantly different from those of traditional Chinese economic growth. This makes the spatially integrated ecological environment issues, with externalities in areas that cross administrative boundaries, a "public goods" governance topic. Since the 1980s, spatial planning has played invisible coordination role in solving cross-border space governance problems, such as boundary pollution agglomeration and environmental governance contradictions in the upstream and downstream of rivers. This implies that it is particularly urgent to strengthen the research on regional planning and enrich the knowledge system of regional planning.

In response to regional environmental issues, how has China's planning and governance structure changed, and what explorations and challenges exist? This paper attempts to jump out of the technical concept of traditional spatial planning, from the perspective of planning meta-governance, combined with policy and planning text analysis, as well as inspections and interviews with local governments, and then analyzes typical regional cases in China, and explores cross-border regional planning and space collaborative governance for the purpose of environment conservation.

2. THE GOVERNANCE PERSPECTIVE OF PLANNING COLLABORATION

For the governance structure, existing research has constructed a corresponding explanatory framework, that is, with the three elements of institutions, functions and management tools, deconstructing the internal structure from the institutional system of governance to the internal structure of governance efficiency (Figure 1).
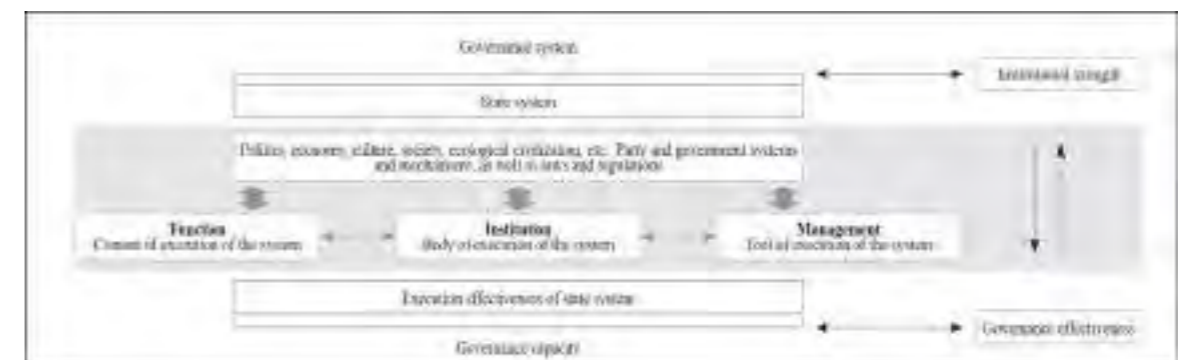
Figure 1 Analysis Model of "National Governance Structure"

Source Su D.& Liu J 2021

In order to further dissect the planning governance mechanism, this paper introduces the meta-governance theory. In the mid-1990s, the concept of meta-governance, 'governance of governance', first appeared in public administration and political science research, and has become a theory that has received considerable attention in the governance literature in recent years Gjaltema, 2020. Foreign scholars' research on meta-governance theory has been relatively mature, and in recent years, it has begun to appear in the fields of space governance and urban emergency management.

But scholars argue that the meaning of meta-governance and how it actually works are still vague Bell and Hindmoor 2009 Torfing and Triantafillou 2011 . Meta-governance theory is often referred to only in very general terms (Jessop, 1998; Kooiman, Jentoft, 2009; Sørensen, Torfing, 2009), and its lack of operationalization in governance practice has created obstacles for further theoretical development (Gjaltema, 2020).

The connotation of meta-governance mainly has two aspects. First, it emphasizes the main role of the "axis". Since the parties to the governance have different positions and positions and different interest considerations in the process of negotiation and collaboration, it is likely that the common governance goals cannot be achieved, which becomes the main source of governance failure. In order to coordinate the positions and interests of different organizations and make them tend to a common goal, a starting point and axis of "governance" is needed, and the state/local government should play the role of coordinating the interests of all parties and ensuring the orderly governance process. "Meta-governor" means that the government should become the "coordinator" and "convener" in urban and regional governance, rather than the "regulator" and "discipline" (Li Xiaofei, 2021). Meta-governance refers to a practice in the public sector that needs to overcome the failures of traditional governance through the use of different tools, methods, and strategies to coordinate one or more modes of governance by integrating the three systems of hierarchy, network, and market (Gjaltema, 2020). Second, it emphasizes the coordination role of the "platform", that is, the meta-governance subject formulates specific agendas and rules for dialogue and negotiation for each governance subject, becoming a "balancer" in the game of social interests, and achieving common governance through dialogue, coordination and executive supervision.

Since the 21st century, in the context of the continuous reshaping of spatial planning systems at home and abroad, existing research has revealed the importance of planning combined with the meta-governance process, so that spatial planning can operate in a new governance network and penetrate deep into the governance system at all levels. middle. Building a local spatial governance network featuring multiple participation, overall coordination, interaction and cooperation, and equal sharing will not only prevent local governments from "crowding out" spatial governance, but will instead help enhance their "meta-governance" capabilities (Li Xiaofei, 2021). As a result, spatial planning is to some extent an expression of both traditional government "management" and a new type of "governance", becoming an "interesting hybrid" (Allmendinger, P. and G. Haughton, 2009). As a policy tool for coordinating the relationship between various elements under the leadership of the government, planning is essentially a comprehensive platform that undertakes the functions of the governance axis and coordinates the interests of all parties in the same space, and is an interpretive tool for meta-governance theory. With the construction of China's territorial spatial planning system, spatial planning may become a key platform for realizing meta-governance. Therefore, in order to improve the meta-governance capability of spatial planning, it is necessary to study and discuss the structure and elements of planning meta-governance.

3. The YRD region: a typical cross-border ecological conflict area in China

Take the cross-border region "Yangtze River Delta" as an example. The term "Yangtze River Delta" generally refers to the Yangtze River Delta region in China, which is located in the lower reaches of the Yangtze River in China. It is not only the most affluent region in China, but also a pioneer area for national regional integration. It is one of the six world urban agglomerations recognized internationally. At present, the area includes Shanghai, Jiangsu, Zhejiang, and Anhui provinces, and includes many economically developed large and medium-sized cities such as Nanjing, Suzhou, Wuxi, Hangzhou, Ningbo, and Jiaxing. According to statistics, in 2019, the administrative area of the four

provinces in the Yangtze River Delta urban agglomeration is about 358,100 square kilometers, only 3.73% of China's land area, carrying China's population of more than 210 million and creating nearly a quarter of China's GDP. At the same time, as the alluvial plain before the Yangtze River enters the sea, there are many lakes and rivers in the region, and the cross-border water system is crisscrossed, and the rivers, lakes, farmland resources and natural scenery are very rich (Figure 2).
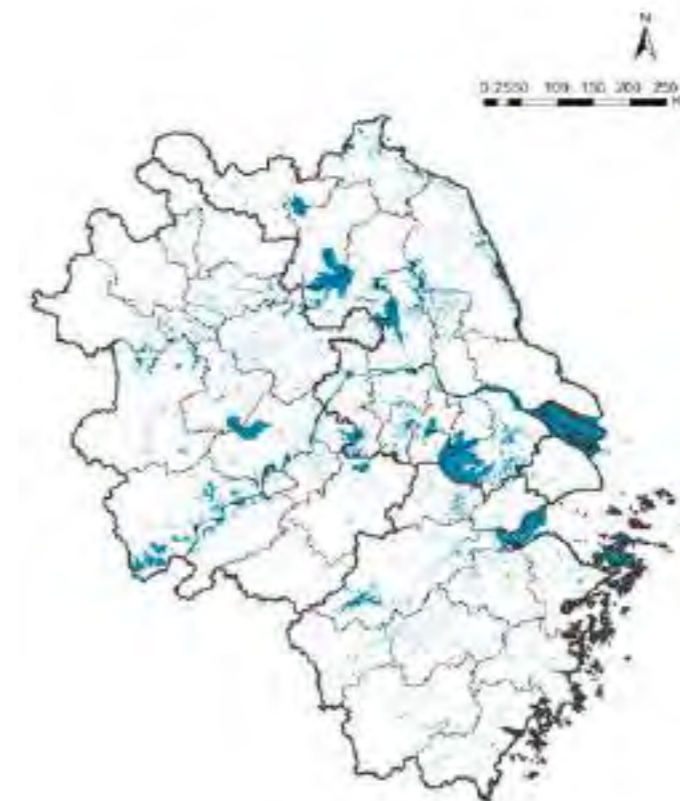
Figure2 Regional water system of the Yangtze River Delta, 2018
Source: drawn from China land use data of 2018

Since China's reform and opening up, the level of urbanization and population agglomeration in the Yangtze River Delta region has increased rapidly. From 1996 to 2020, the total area of the built-up area has nearly quadrupled, and private township and village enterprises have risen rapidly. Disordered human activities have seriously damaged the ecosystem in the region, and the contradiction between urban construction and water competition has become increasingly prominent (Han Longfei et al., 2015), resulting in a decline in river network density and serious ecological pollution. In addition, due to factors such as watersheds and wind directions, industrial layouts in urban planning are often concentrated on the edges of administrative regions, resulting in cross-border water pollution agglomeration (Gu Huashan, 2020), environmental governance conflicts in the upstream and downstream of rivers, and even social conflicts in adjacent areas. For example, in the 1990s, due to the gathering of a large number of small and medium-scale printing and dyeing industries in southern Jiangsu (Figure 3), the contradiction of industrial water pollution at the border of Jiangsu and Zhejiang was triggered, causing people in downstream cities to build dams, diarrhea, fishermen petitioning, and dead pigs drifting incidents. In the Yangtze River Delta

region with rapid development, intensive land, and vertical and horizontal water systems, the problem of collaborative governance for ecological goals is particularly prominent and acute, which is a very typical cross-border regional space.

Figure3 Land use planning of Wujiang District and Lili Town, Suzhou, Jiangsu Province

(red spots are planned building sites)

Source: Local government websites

4. CHARACTERISTICS OF PLANNING GOVERNANCE OF THE YRD REGION

First, synthesizing the important policy documents and leading models in the process of regional coordinated development in China's Yangtze River Delta since the 1950s (Table 1), the regional coordinated process has the following meta-governance characteristics: 1) In terms of governance goals, economic cooperation has shifted to ecological protection. 2) In terms of the main body of the axis, local cooperation takes precedence over the central authority. The collaborative process of the Yangtze River Delta is often dominated by the spontaneous promotion of local governments, and the combination of "bottom-up" and "top-down", and the role of the central government is more empowerment and support. 3) In terms of coordination platforms, in addition to planning coordination platforms, diversified coordination mechanisms such as temporary institutions, meeting mechanisms, high-level dialogues, and social cooperation platforms have also been formed. 4) On the governance scale, the overlapping scope of planning circles brings challenges to the boundaries of powers and responsibilities of regional planning entities. The Yangtze River Delta region has different concepts in different coordination mechanisms and corresponds to different administrative space ranges. It also means that there is a certain overlap and conflict between spatial governance under the leadership of different governance subjects.

Table 1 Spatial and lead model changes in cross-border synergy in the YRD region

Source by author

In addition, the planning meta-governance in the cross-border area of the Yangtze River Delta shows the characteristics of stages, and the meta-governance elements (axis main bodies, coordination platforms) and governance structures (cross-border planning agencies, planning texts and planning tools) at each stage are different (Table 2). However, the main body of the planning meta-governance has been gradually clarified, the coordination platform is being built, and the cross-border planning institutions, planning texts and planning tools have been gradually improved, which has laid a certain foundation for the improvement of the planning meta-governance capability of the cross-border area.

Table 2 Elements and structural features of Planning Meta-governance in the YRD

Source by author

5. REFLECTIONS AND CONCLUSIONS

In the context of ecological civilization, regional-scale spatial governance and planning coordination are issues of common concern to urban and rural planning and management disciplines. Based on the chaos of planning at the regional scale, the decentralized multi-governance governance model is not enough to adapt to the planning problems under the management system of my country's administrative regions. The meta-governance perspective emphasizing the "axis subject" and "coordination platform" can provide ideas for planning at the cross-border regional scale.

On the one hand, the market entities and planning systems involved in the regional scale are complex, and it is necessary to rely on the authority of the national government and regional institutions as the axis of planning and the regulator of the interests of all parties to combine various forms of governance, make institutional arrangements, and regulate planning framework. Especially in the context of ecological environment issues, the historical experience of the Yangtze River Delta reminds us that in the context of relying on market-oriented regulation and lack of government authority guidance, planning will have no effect on the protection of regional ecological space. But at the same time, the government can only act as a regulator, and cannot forcefully intervene and break the rules of governance.

On the other hand, planning synergy and a blueprint does not mean creating a large and comprehensive plan, nor does it mean all-encompassing. At the cross-border regional level, a completely unified and all-encompassing planning system will break the existing interest balance and conflict coordination mechanism, and become a tool for the power expansion of the higher-level government. The challenge today is not for planners to have expertise in every thematic area that needs to be engaged in a plan, but to work productively with other professionals, with various groups representing different aspects of the public, lobby groups, Cooperation with interest groups, etc. (Allmendinger, P., G. Haughton, 2009). In the rapidly developing cross-border regional space such as the Yangtze River Delta, planners need to find and coordinate the best combination of governance models according to the governance situation, build platforms and design interfaces for cross-border subjects, and connect and coordinate with various majors and disciplines.

Among them, spatial planning should become an important coordination platform at the transboundary regional scale. At present, China's planning on the scale of cross-border areas is mainly based on development planning and special department planning, and spatial planning still mostly uses the boundaries of administrative regions as the planning unit. In recent years, the Yangtze River Delta Ecological Green Integration Demonstration Zone, as China's first cross-border territorial space planning pilot, is gradually revealing the role of spatial planning on the scale of cross-border areas. Spatial planning can bring a clearer spatial dimension to the integration of various policy sectors such as economic development, health and education, and transportation, and play a key role in how various elements interact and manifest in different spaces (Kidd, 2007). Transboundary areas may become the most appropriate scale of intervention for spatial planning: joint agencies established by the state or relevant localities as the main body, relying on the coordination platform of regional spatial planning, unify planning, implement planning, formulate coordination rules, and enhance regional network stickiness, improving current territorial and spatial planning system, and achieve the coordination goal of planning meta-governance.

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A MULTIDISCIPLINARY APPROACH TO THE CROSS-BORDER PROJECT

1-A-3

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Abstract :

The teaching team of the first year of the master Aedification, grands territoires, villes of the Grenoble School of Architecture has been developing a pedagogy in which the architectural project would also be the demonstrator of a European cross-border territory project. These interventions are carried out in partnership with the schools of architecture of Saint-Etienne and Strasbourg and local actors. Our teaching team is composed of architects, an urban planner, a landscape architect, a professor of architectural history, a visual artist and a mobility engineer.

We begin the year with an analysis of the history of the border region. It shows how the people of these spaces have managed to overcome their differences and live together today. We then move on to a functional, environmental and socio-economic analysis of the region. Although quite close to our Grenoble situation (a temperate country in the heart of Europe), these territories are nevertheless sufficiently different to take the necessary distance and approach contemporary issues of architecture and urbanism with sensitivity. Each of the teachers, with his or her personal experience and skills, helps students to identify these differences, and then to draw inspiration from them in order to reinterpret their daily practice of architecture.

Based on this geographical shift, our teaching team trains students to be rigorous and precise in their methods and in their projects. We are particularly attentive to issues related to heritage, urban comfort, biodiversity, mobility, natural hazards, or the reception of populations in difficulty. Group work trains them in collective intelligence; the temporal and geographical leaps of scale, from the elaboration of a territorial strategy to an urban project, then to a building, help them to better understand the interdependence of situations, and consequently, to question their responsibilities, at different geographical scales, in the act of designing and building.

Keywords:
Cross-border, multidisciplinary, interdisciplinary

INTRODUCTION: EDUCATIONAL CONTEXT

In the first year of the Aedification Grands Territoires Villes master's programme at the Grenoble School of Architecture in the French Alps, the students' work and reflection focuses on the projection of a desirable future for a cross-border territory; the project is embodied at different scales, with a territorial strategy, but also at the scale of the buildings, in their specific urban or rural context. The issues, specific to the territory, present and future, to which this project must respond, are defined by the students. They question and formalise how the major issues associated with the climate transition and the reduction of resources, including biodiversity, transform a territory in its specificities.

Our approach is part of a desire to "branch out"[1] , and is based both on the methodologies of our master's degree, in which the territory is posited as the primary parameter for thinking about the architectural project[2] , as well as on projects which, in our view, have already initiated this change. This is the case, for example, with the IBA Emscher-Park project (1989-1999) or the guide plan for the Ile de Nantes initiated by Paul Chemetov. The question of the possibilities of ecological and economic restructuring of old industrial regions through territorial landscape planning is raised. The development issues no longer focus solely on the built-up areas. They open up the articulation of skills between urban planners, landscape architects, ecologists and architects and demonstrate the need for a multiplicity of views. It was also at this time that the *New Architecture Programme* (NAP), which focused on housing experimentation, was extended under the name of Europan; it aimed to encourage experimentation on lifestyles on a European scale.

The aim here is to share a critical point of view on this pedagogical approach based on the role of the territory in a project process in a school of architecture, through its analysis (historical, geographical, cultural, environmental, heritage, architectural, urban and landscape) as a first major step in the development of an architectural project.

The teaching takes place over two semesters, supervised by a multidisciplinary teaching team; partnerships are set up with local actors in the area of study and with other French schools. Our objective, as teachers, is to prepare these students to face the complexity of the world in order to tackle the major issues (global warming, migration, extinction of biodiversity, depletion of resources, etc.) in which they will have to take part.

Inheritance, the pedagogy is based on the different knowledge bases and methodological approaches specific to the disciplines of the teaching team and partners, but also on the specificity of sites "out of sync" with the situation of our school, namely on issues of the European cross-border territory.

1. Bifurquer, il n'y a pas d'alternatives, Collectif Internation coordonné par Bernard Stiegler, 2020, 416p.

2. COMOLI V., FASOLI V., VERY F., (sous la direction de) 1997, Le Alpi. Storia e prospettive di un territorio di frontiera. Les Alpes : histoire et perspectives d'un territoire transfrontalier, Celid, Turin, 574 pages.

These territories are particularly rich in terms of tackling the contemporary issues that we all have to face. The character of their geography (mountain, river, plain...) associated with a double or triple culture (cultures in balance as well as in competition) which animates the daily life, as well as the governance of these territories, offer a great diversity of research problems for a good habitability of the territory.

In these territories, it is these encounters with the "other and elsewhere" that offer the necessary distance and lead to redoubled attention to the strengths and weaknesses of these territories. This requires us to go beyond the obvious, even if it is right next door.

To illustrate this point, we will look in particular at two emblematic cross-border territories in Europe, that of Greater Geneva, on the Franco-Swiss border, and the Belgian-German-Dutch region of the Liège-Maastricht-Aachen triangle.

State of art: presentation of the teaching team and its organization

Our teaching team is multidisciplinary. We (a practising architect, a doctoral student and a landscape designer and ecologist) coordinate it, ensuring both the stewardship and the pedagogical continuity, but also the coherence and the dialogue throughout the year between the different geographical and temporal scales of the project. On a daily basis, we rely on a team comprising a professor of architectural history, a visual artist and an architect. But the team can also count on occasional interventions from a "mobility" engineer, an urban planner and doctoral students. We can also count on the pedagogical support of our French partner schools (Strasbourg and Saint-Etienne), as well as that of the territories where we work. We worked on the Genevois region with the CAUE74 and then the Braillard Foundation from 2016 to 2018, with the Faculty of Architecture of Liège from 2019 to 2021 and this year we are working on the Saar Valley with the Schools of Architecture of Saarbrucken and Cottbus.

In our multidisciplinary team, we work on an interdisciplinary pedagogy where the objective is to develop **new forms of pedagogy** located at the meeting point of pedagogical approaches already present in our different disciplines of origin. It is about going beyond the simple juxtaposition of pedagogies taken independently. As our referent for thinking about the project is the territory, we cross, for example, tools of choice from the ecological sciences (iterative approach) with tools from architecture (multi-scalar approach) or research methods practiced in history (critical analysis) and heritage (déjà-la). This pedagogy is not fixed either, it continues to evolve. Each year, we meet within the team to exchange, discuss, criticize, readapt to a new generation of students, learn from a new territory. In this continuous work, we find approaches based on collective intelligence, creative design and the alternation of temporalities and pedagogical dynamics in the semester.

We defend the idea that groups have their own intelligence, which requires listening, humility, trust and sharing. We believe in this, as a group of teachers, but we also try to transmit it, each year, to the group of students (15) who enrol in our course.

Emile Servan-Schreiber, in his book: *Supercollectif, la nouvelle puissance de nos intelligences,* ed. Fayard 2018 specifies in particular when speaking of collective intelligence that: "Collective intelligence is organised. [...] Two factors are decisive: the social sensitivity of the group members and the equality of speaking time. [...] "the flow of communication must go as much from the bottom to the top, as from the top to the bottom".

In 2021-2022, this work organised around collective intelligence went a step further. The study area is the Saar Valley, on the French-German border. The local partner, the director of the Pré-IBA Grande Région (a cross-border research organisation in architectural, urban and landscape planning) organised an inter-school workshop (five groups of masters students, two German schools, Saarbrucken and Cottbus, and the three French schools already mentioned) to tackle the faience factory wasteland in Sarreguemines; three days in situ of visits, sketches and models, then presentations to the elected representatives.

Fig. 1 and 2: workshop in progress in Sarreguemines
and presentation at the university
(Picture F. Dellinger)

Why a cross-border situation as a study area?

In our design culture, "travel" plays an important role, from the expeditions of Humboldt or Elisée Reclus, to the initiatory journey of Le Corbusier. In particular, they allow us to go and meet other territories and their inhabitants, and through this "side step", by mirror effect, to enrich our vision, to look differently at our way of living, our country and our place in the world.

Cross-border territories in Europe are also particularly rich in a complex history, with changing borders, which welcomes both local populations born on the border, often bi- and tricultural and bi- or even trilingual, but also numerous populations from elsewhere in Europe and elsewhere in the world. These are territories of interbreeding, with great cultural wealth, organisational and functional intelligence, sometimes linked to geography (a mountain, a river, etc.), sometimes to more singular histories (the parish boundaries for the canton of Geneva). They are also places of exchange and mobility, for people, goods, energy, but also fauna and flora.

Going to meet these territories also means seeing, experiencing and understanding how these ways of life, when meeting different cultures, are formed and comparing them with what we know. In these trips, two per year, one per semester, the meeting with local actors, including their reactions when the students present their work, constitutes key moments for their year of training. The contribution to the reflection of the return of the local authorities allows in a first time, obviously, to point out big misunderstandings on the territory, but also to better identify how these actors see their own country. In a second stage, their reactions to the projects presented open both on questions of diversity of approaches to similar problems, but also on the major European convergences on subjects such as the consideration of the commons or of general interest.

We also note that this time lag allows them to improve the practice of architectural and landscape analysis tools, particularly through the survey, or sensitive mental maps, as if this "foreign" situation helped them to refine their gaze, their attention and their listening. To help them understand these situations, we guide them by questioning. In the case of Liège, in the Euroregio "Meuse-Rhine" and its intermediate, peri-urban and inter-urban continuous territories, we questioned them on the specific qualities of this region (historical centres, urban, natural and agricultural green spaces, mobility, commercial and industrial infrastructures, etc.); but also on the basis of broader questions such as the one posed in the framework of the IBA PARKSTADT further north: What future for the "metropolis landscape" in these territories?

All of this contributes **to the construction of an ethic** and helps them to define what kind of architect they want to become.

The territory seen by an architect

As an architect, practitioner and teacher for the past fifteen years, my approach is characterised by the hypothesis that from the building to the territory, in order to be meaningful, design cannot be dissociated from the simultaneous thought of the two extreme scales of the territory and the manufacturing detail.

In a practice between study and project management on sensitive sites, we work with several framings of the subject in front of our eyes, the jump of scale is a method to think and try to build a building as precisely as possible in its environment: the unbuilt counts as much as the built.

These practices have led me to consider the project as a process that is part of a territorial intelligence[3] for which the territory is both the support of thought and action. The working methodology that has been developed is an iterative process between precise competences, developed at multiple scales of reflection.

In the agency's practice, questioning the territory first of all makes it possible to define the framework of the building action more precisely, to understand its particular culture and to conceive the areas of relevance of the project. The small and large scales therefore work together and not in a relationship of interlocking, but rather of resonance, the actors of the project with their own stakes: political, economic, environmental, find their interests in the various forms of the project.

This led me to identify that this perhaps distracted architects from thinking in terms of objects or programmes and led them to reflect on situations; and an invitation to take a particular interest in the intelligences of the architectural project in situations that I identify as "fragilities"[4] : environmental fragilities, resource fragilities, social fragilities of access to housing, fragilities linked to natural and anthropic hazards. They are revealed when the scales of space and time are denied. Within the master's programme, I propose fragility as a filter for reading the territory studied.

3 LUCENTE R., 2016,Territoires de recherche pour le projet d'architecture, in Lucente R., Recchia I., Thépot P., Very F, Feedback, Teritori di riceca per il progeto di architettura, territoires de recherche pour le projet d'architecture, Rome, Gamgemi editore, pp.81- 85

4 La notion de fragile, s'appuie sur la pensée de Paul Ricœur qui au « fragile » associe « l'action dans un lien intrinsèque avec la responsabilité », responsabilité de prendre soin de l'habitat et de l'habiter et qui appelle les architectes à l'action avec attention, sans brutalité. RICOEUR, Paul, 2003, Responsabilité et fragilité, Autre Temps, Cahiers d'éthique sociale et politique, n°76-77, pp.127-141.

More than ever highlighted by the current social crisis, pandemic and climate emergency, fragility questions our ways of conceiving the spatiality of housing, of organising our living space as well as our workplaces, of circulating, of being in contact with nature. The architectural project has an essential role in building links, which means, for me, that the architect must renew his project practice according to the challenge, today, of living in a world with limited resources.

The territory as seen by a landscape, urban and ecological planner

The specificities of the landscape and ecology approach to the territory are based in particular on the singular relationship of these disciplines with time, the living, and more generally the notion of project as frameworks for the development of man and nature.

Each territory has great singularities resulting mainly from its environmental context. This context has conditioned not only the spatialization of human settlements, but also the history and organization of the society that has developed there. Understanding a societal and environmental context, as well as the dynamics that drive them, is essential today in order to approach the project in inhabited territories. Faced with the complexity of the contemporary world and in a context of permanent crises, the response can no longer be solely technological. At the beginning of the 22nd century, reality is reminding us that new low-resource lifestyles are developing everywhere, in search of respect and harmony with the living. It is indeed an ecological approach that is mindful of environmental and societal dynamics that will enable contemporary urbanised areas to develop their resilience in order to prepare for the future.

On a territorial scale, our role is not to draw the future, but, on the contrary, to propose and position the major invariants, the green and blue landscape framework, within which future generations will be able to express themselves. At the scale of the block, faced with the acceleration of socio-economic changes, it is also this student work (which could be assimilated to the tools of tactical and temporary urbanism) which enables local actors to take a step back from their territory, perhaps to slow down, but also to reflect on more accurate and measured responses to better identified needs.

In addition to this, the teaching also aims to demonstrate that the project is not imposed on a user any more than on any other living being, but that the conditions are created (including through pedagogy) for a peaceful cohabitation. The choice of working with and for "the Living" thus forces us to be humble. Of course, success is never guaranteed. But even if we only have a relative hold, this does not mean that we should not push our students to go for it, to dare, to give it time to settle in, and if necessary, to start again.

Methodology: multi-scalar and iterative thinking

The way in which the scales inform each other is part of the environmental design of the project, as is taking into account the dynamic data of the living world as a whole. A piece of territory is like a multiple and non-linear text which offers several possibilities of reading which allow to apprehend serenely contradictory stakes. Each scale has its own tools. These shifts offer the opportunity both to nourish a thought on territorial living (living world) and to act on the right scale with the most possible attention: material sector, constructive choice, building, urban landscape project, re-naturalization, rainwater collection...

In Master 1 we choose a study territory as a team, according to geographical criteria (cross-border territory), with situations of fragility specific to contemporary metropolises, particularly in the Alps and the Rhine: certain situations question a "deterritorialized" mode of living resulting from journeys between housing and places of work or consumption, in territories with disparate standards of living and lifestyles.

The project process is then identified to lead to an open learning of the project. It is an alternation of work at different scales and views fed by the skills of the team, we dissect the project mechanism to train them to find autonomy in the second year of the master.
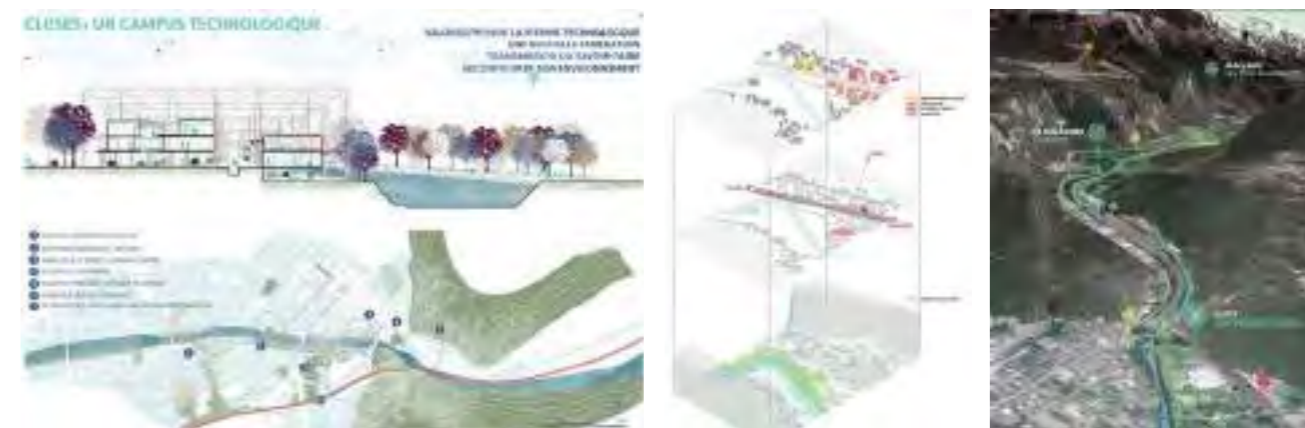
Fig. 3 example of representations of the multiscalar approach and iterative thinking (the Arve Valley 2016-2017)

Seminar: territorial and scopic survey

The seminar is the occasion to explore the potential of cartography for an architect with analogical and digital instruments and techniques which hybridize the representations. The projectual possibilities raised by the territorial analysis will then be tested from criteria such as energy, waste, material channels, mobility, biodiversity, water, life basins.

Fig. 3 picture collage technique (2018) by L. De Bonet d'Oléon, A. Gonzalez Gomez and M. Orlandi

Drawing up territorial maps with an architectural aim forces us to invent original modes of representation. To be able to serve as a 'clutch' for the project and to become prospective guide plans, these maps must relate forms and spaces of a different nature. They must allow for differentiation and not relate everything to a system of metric values that would privilege the quantitative to the detriment of the qualitative and subjective. The work then focuses on the construction of **original representations that** enable a dialogue between subjective dimensions and objective phenomena. In doing so, it also questions the effects of the generalisation of digital technologies in order to identify the components of the hybrid territory in which our societies are settling.

The project

Anticipation is the framework chosen to inscribe it in a dynamic where, initially, the imaginary and the history of the territory occupies an important place. It is an imaginary of this territory and the ways of living in it, in the light of the urgency of the transition, the reduction of resources and the 6th extinction of biodiversity. Individually, it is expressed in collage and then takes shape collectively in a "territorial strategy diagram". The brainstorming sessions borrowed from creative design aim to appropriate the data from the preliminary seminar, the first project and the collages in order to consider them in a hierarchy where the different data work together and draw a new geography of the territory and new associated lifestyles. It is accompanied by a writing process that formulates the problematic and the projected qualities.

In a second phase, hypotheses of transformations, building constructions or developments are represented so that there can be a return between these new visions of the territory and possible levers for action. The "process plan" then gives an account of the insertion of the project into the dynamics of the site: it shows in plan and in inhabited section, how the project settles in over a period of 2 to 6 years by highlighting the qualities of integration into its environment. The "active section" (bioclimatic) shows how the building reacts according to weather conditions (summer comfort, winter comfort) and water management. The objective is to always associate form, meaning and function in the representations in order to keep the issue of discussion around spatial qualities.

Key tools: analysis-project articulation, territorial survey and strategy, prior to the project

Each survey gives rise to a viewpoint and builds a problematic that reveals the possibilities of the territory: the capacity of agriculture to create an inhabited landscape, that of ecosystems to structure the development of the territory, etc. This work is developed in particular around three tools of territorial analysis: dynamic maps, "chorems" and conceptual models of the territory. The elaboration of dynamic maps allows to understand the spatial and/or temporal transformations of the territory (occurrences and levels of floods, seasonal transformations related to agriculture, daily mobilities of the population...). Spatial modelling based on the principles of the "choremes" of the geographer Roger Brunet allows for a schematic description of spatial organisations and social, economic and cultural uses of the territory (Brunet, 2000). They present the complexity of the relationships between physical factors and man. The concept-models, while radicalising the morphology of the territory, provide it with a materiality that will only need to be reactivated to determine the parameters of implementation that could be the levers of action, on the scale of the building, of the territorial project.

These different passages of the survey, from figuration to abstraction, help to identify and prioritise the materials of the territory to be projected as well as to qualify the areas of relevance of the project.

Case study, the cross-border territory of Greater Geneva

From 2016 to 2019, the cross-border project territory was that of the Franco-Swiss metropolis of Greater Geneva extended to the Chablais and the Arve valley (towards Chamonix). The work was developed in partnership with the CAUE (Conseil en Architecture, Urbanisme et Environnement) of the Haute Savoie department, local authorities (Saint-Julien en Genevois, Saint-Gingolph, etc.) and the Braillard Foundation in Geneva.

The Lake Geneva region has to manage one of the most dynamic demographic growths in Europe (+ 2.1% per year on average for the last 10 years in the French territories of the agglomeration). It must ensure a better distribution of housing production and job creation, but must also deal with urban development that puts pressure on the environment and agricultural land, an explosion in mobility with congestion at the borders (550,000 customs crossings per day in 2011 at the borders of the canton of Geneva) as well as major disparities in access to facilities and services for the population (health, culture, training, etc.).

The territory of Greater Geneva is a cross-border territory5 which benefits from numerous studies. Beyond all its assets, it lacks a vision of society to meet the challenges of transitions.

Based on three questions, the students presented three visions of territory, exemplified by their strategies and exemplary buildings. The diversity of the representations made it possible to discuss their desire to create a society, freed from political constraints, since it was in an educational context.

Two examples are presented from the Genevois and Chablais catchment areas

2016-2017 in partnership with the local authority of Saint Gingolph: How to promote the cross-border role of the Chablais between Lake and Mountain?

The students proposed to make the south of Lake Geneva a third metropolis to federate the Franco-Swiss communes and change the dynamics with Geneva and Lausanne, with Lake Geneva taking on the role of an alpine centre. The strategy diagram shows a polycentric metropolis, promoting living together, local resources and new mobility and the undeniable advantage of being between the lake and the mountains

This is embodied on an intermediate scale by the revaluation of the landscape entities: the banks of the lake are becoming accessible again, and with the towns of Thonon, Evian and Le Bouvet a string of attractive points. The Gavot plain is becoming a new generation agricultural entity, the Biot Pass and the Abundance Valley are being revitalised by "contemporary" practices and/or economies, remote work and short circuits. As an example on the scale of the building, the Evian mineral water bottling factories have been converted into a border reception centre for refugees; or the transformation of a mid-mountain ski resort, now with very little snow and a white zone for telephony, into a refuge village for teleworking, people sensitive to electromagnetic pollution; in addition to a hiking tourism activity.
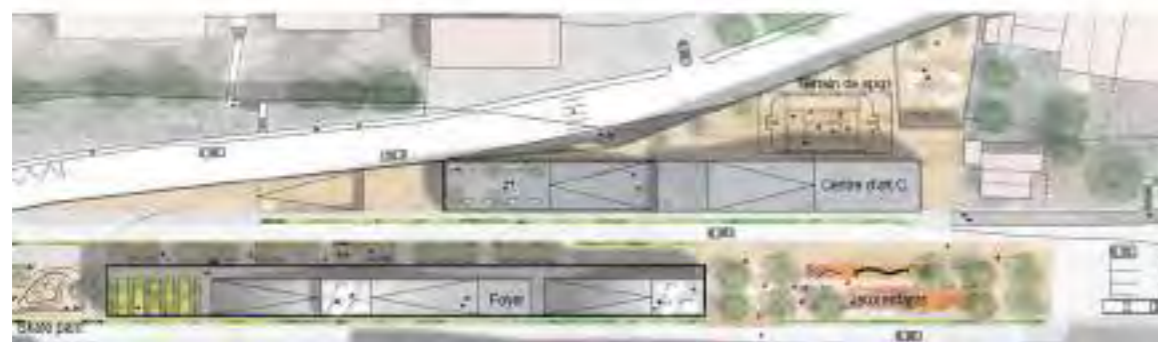
Fig. 4 (front view) and 5 (master plan): a reception centre for refugees, a place of culture and a rebalancing of the town centre around the station Transformation of the Evian bottling plant into a reception centre, integration workshop, recycling centre, museum, café... while opening up the station; project Giret Cécile and Chloé Seguin

Fig. 6 : concept for the station of Le Biot - development of a former ski resort White zone with fibre connection - space for teleworking to complement hiking tourism by Baptiste Haour, Sidali Zentar and Clémentine Fumey

Fig. 7 and 8 : the station of Le Biot - development of a former ski resort White zone with fibre connection - space for teleworking to complement hiking tourism by Baptiste Haour, Sidali Zentar and Clémentine Fumey

Fig. 9 : the station of Le Biot - transformation of a holiday studio building into a mixed building to house and work by Baptiste Haour, Sidali Zentar and Clémentine Fumey

In 2017-2018 with the Communauté de commune du Genevois: What balance within the Geneva metropolis can be created by territorial strategies outside Geneva?

For this territory, they proposed a vision called "Towards a society of slowing down", which has three ambitions: to review our relationship with time, short circuits and intelligent mobility. The strategy revolves around the revision of the tram-train route for a better service and a variation of the relationship between urbanised and agricultural land; close to Geneva it is an attempt at agricultural urbanism or the transformation of a commercial centre into a training centre for the farmers of tomorrow; moving away from Geneva, the strongest idea is to be "tourists at home" both in the way of organising daily travel and for the densification of the towns of Savigny and Jonzier-Epagny.
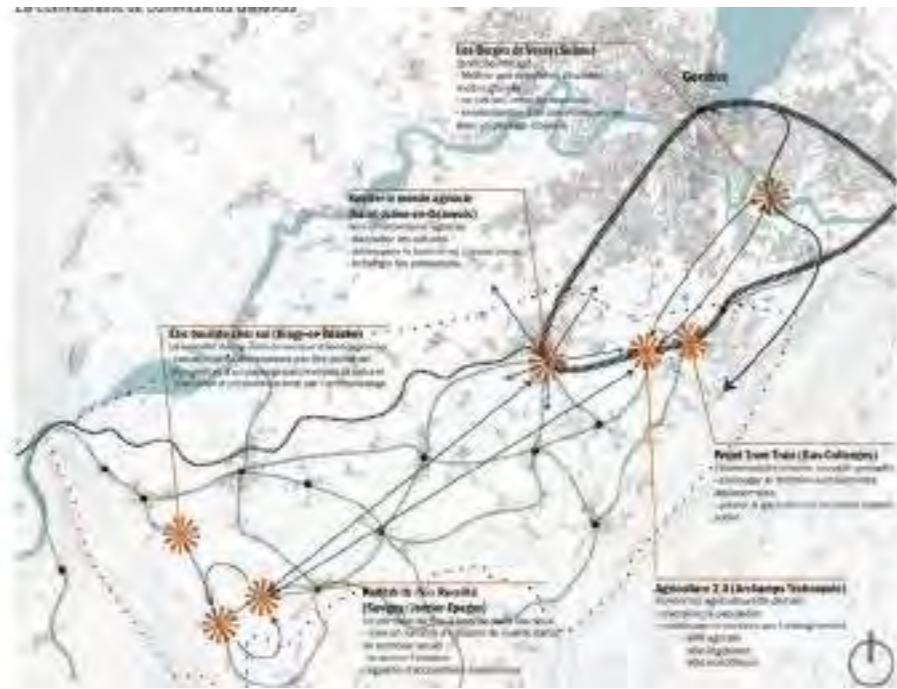
Fig.10 strategic master plan (student group 2017-2018) : for a "slowing down" society

Fig.11 sensitive landscape section of the territory (Louise DE BONET D'OLEON, Alondra GONZALEZ GOMEZ and Marie ORLANDI, 2017-2018-) : for a "slowing down" society

Fig. 12 : Living in the countryside, Develop co-working, teleworking, food truck, "itinerant" public services, etc. in the original town center by L. De Bonet d'Oléon, A. Gonzalez Gomez and M. Orlandi

Case study, the tri-national territory of Maastricht, Aachen and Liège

From 2019 to 2021, we worked on the extended territory of Liège-Maastricht-Aachen, on the border between Belgium (Wallonia), Germany (North Rhine-Westphalia) and the Netherlands (Limburg). We worked there with our partners from the schools of Strasbourg and Saint-Etienne, but also with the Faculty of Architecture of the University of Liège. Liège and its faculty was the main meeting and exchange point.

The reflection carried out by the students is a prospective work on the development of this Euroregio, giving shape to the qualities of life that this territory can develop, as well as to the more sustainable ways of life that could be proposed to its inhabitants.

It is a complex and particularly contrasted territory. The region of Liege, the former industrial capital of the steel industry, is struggling to slow down its decline, while Maastricht has reinvented itself around knowledge (university) and tourism, as has Aachen, the former capital of Charlemagne and now a renowned university. The territory is crossed from south to north by the Meuse and the Albert Canal, linking it to the major ports of Antwerp and Rotterdam.

The major issues identified by the students refer in particular to questions of agriculture (today essentially made up of livestock and field crops), memory and the industrial past (a large number of wastelands, quarries and mines still mark these landscapes), risks (mining subsidence in Lièges has caused the town to sink below the level of the Meuse), mobility (cars are still omnipresent), socio-economic problems (high unemployment, many immigrants), in short, a territory in search of links, meaning and reinvention.

In the first year of intervention, 2018/2019, the students propose a territorial project called "The village metropolis". At the heart of their strategy, they reveal issues of "communities, symbiosis, additivity" and objectives of biodiversity, food autonomy, mobilities, energies, technology, playfulness and security. This has resulted, among other things, in the scenario of local urban vegetable production in greenhouses in a hollow tooth of Liège and on a vast iron and steel wasteland on the banks of
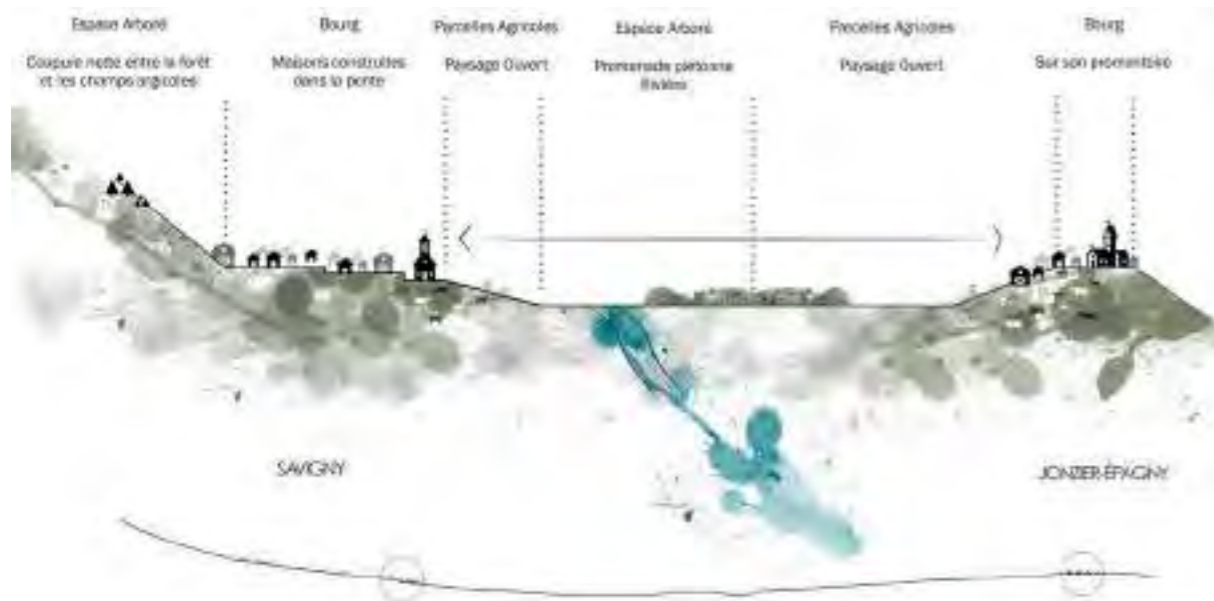
the Meuse. Between Liège and Maastricht, the products are distributed to the inhabited areas by a new infrastructure such as a Tram-Train and river transport. Another project on an urban iron and steel wasteland proposes to transform it into a reception and exchange space for refugees and social populations in crisis; an economic and social activity organises the building around recycling, crafts, reuse and a food court with world cuisine.
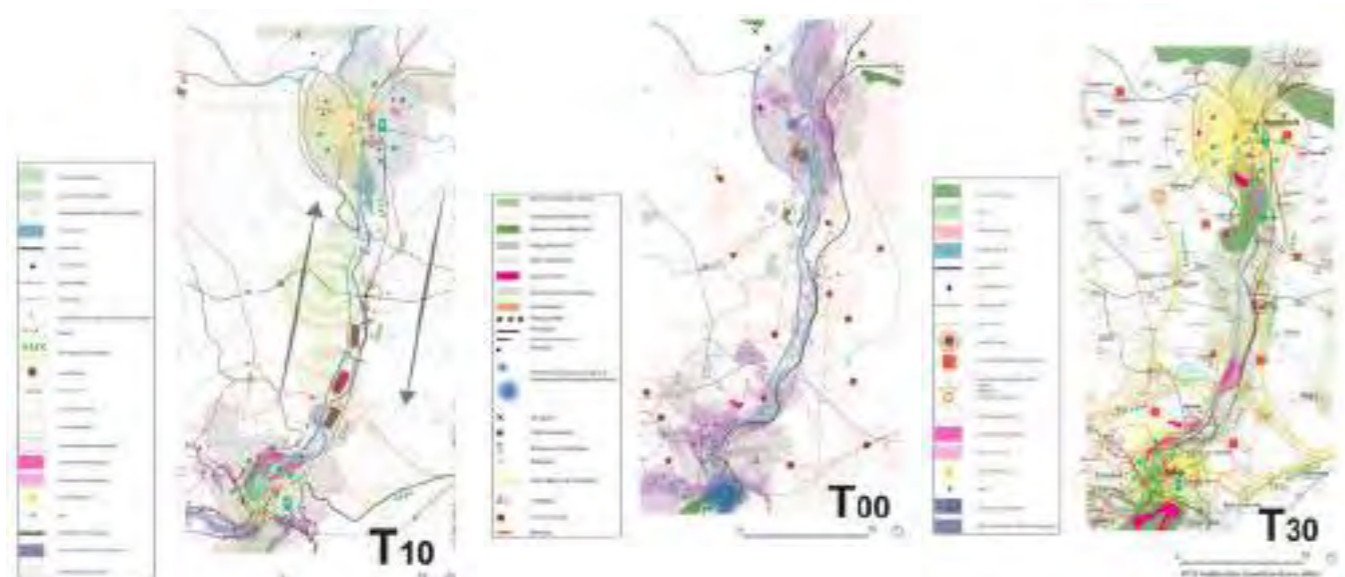
Fig. 13 (current situation), 14 (for the next 10 years) and 15 (in 30 years)

Fig.16: transformation of a rolling mill into an urban farm, project Louise Aimonetto and Oïhana Ngoma

The second year was more interested in the relationship of the Liege-Maastricht axis with the Aachen conurbation. The students focused on the slow time, on the question of "a cross-border knowledge territory", to concentrate their ambitions in 10 years on "the development of a peripheral intercultural network" and to propose, in 30 years, "Aix-Liège, a porous territory thanks to the rehabilitation of its wastelands". This includes the rehabilitation of a transverse railway line, linking Aachen directly to the Meuse. This reactivation of the line offers, for example, an opportunity for the urban development of neglected villages between these cities, or to give new life to the municipality of Visé. Its port is at the mouth of the line and the Meuse. This generation also questioned their

relationship with time in mobility, imagining "slow" journeys on the Meuse, on the railways, to take advantage of the rural landscapes. Amongst other reflections, another pair was interested in quarries; the spatiality of underground galleries, on the banks of the Meuse, on the Dutch border, guided their proposal to develop a singular hotel project.

Conclusions

This progress report on the occasion of our participation in the IFoU allows us to share a number of questions from our teaching team. On the one hand, on interdisciplinary teaching and the margins that remain for us to develop the appetite and skills of our students to work in multidisciplinary teams and face tomorrow's challenges together. On the pedagogical potential of European cross-border situations; in what way could the situation inspire other territories in the heart of Europe or elsewhere in the world? And vice versa, how can we learn from other situations where local intelligences, in "weaker" economies, develop processes and tools that question our ways of developing institutionally organised and rich territories? These questions are conducive to developing in future architects an attitude on the role of the architectural project for society in a world with limited resources; in particular on two themes that condition lifestyles, namely technology and democracy. To continue, we are thinking about a "gap year" in a cross-border territory in the French overseas territories.

We would like to deliver here some summarised lessons from the last six years of the Master 1. The analysis of the first student works/projects would seem to show that these geographical shifts can create spaces of experimentation for these future architects. From these short, medium and long term territorial strategies, embodied in architectural projects, they seem to understand, in particular, how global policies must find flexibility to learn and adapt to local interventions, reservoirs of pragmatic intelligence and alternative solutions. The questions that emerge from the complexity of the starting point provoke, a bit like "elsewhere", the fact of being attentive to the specificities of the territory studied. With a sharp and sensitive eye, these scalar jumps show the balance between the so-called "bottom up" approaches to be transformed into projects and the so-called "top down" approaches which structure but offer too little possibility of adapting to local specificities.

We would like to end with a quote from François Very, architect, one of the teachers who initiated this master's programme, who still reminds us today "How does the exercise of thinking *first of all* about the territory unlock mechanisms to think differently about *the future*? Our generation of teachers extends this approach by opening it up to the more general issues of the living world, in climatic and socio-environmental situations that are themselves in rapid decline.

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The students of the master course Aedification, Grands Territoires, Villes of the Grenoble School of Architecture, from 2016 to 2021

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SPATIALISING RUNOFF WATER ACROSS BELGIAN TERRITORIES

1-A-4

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Abstract:

What happens if we focus on the segment of runoff water in the water cycle that has not been considered so far in water management in the urban environment? Looking at the runoff water infrastructure intertwined in the public domain serves as a starting point for this paper. It develops a systemic view, where multi-scale representations communicate conflicting issues, potentials and where governance alliance, as opposed to fragmentation, could enable unseen synergies. The methodology is applied on two transboundary case studies on the Belgian territory at the scale of the sub-watershed. Maps and drawings are used to interpret, review and comment, aiming to give a full and systemic understanding of the runoff water as an integrated system in the water cycle.

Keywords:

water urbanism, public domain, systemic approach, urban runoff, water management.

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1. INTRODUCTION

According to the latest World Resources Institute Report[1], by 2040 water stress in Belgium will be extremely high; risks such as flooding and drought will become everyday conditions threatening the urban and peri-urban environment. For a long time water has been considered abundant and controllable. Over the years, the combination of increasing population growth and weak urban planning has modified and interrupted the water system to suit urban needs. The lack of spatial planning policy in the past has resulted in a dispersed territory, especially in Flanders. Connections across the territory were created through large infrastructures, leading to extended impermeable surfaces and large runoff water volumes. In this context, water was handled through an administrative approach under the authority of a large number of water managers. Nowadays humankind usually considers water as issued from different systems, namely: (a) surface water and (b) groundwater being part of the natural cycle; (c) sewage water and (d) drinking water being part of the artificial cycle (Cavalieri 2019). We have changed from communities having the knowledge of our water landscapes and the natural water cycle to being completely cut-off from the same (Bobbink and Loen 2020).

A critical tipping point has been reached demanding a shift of paradigm in water management (Vairavamoorthy 2009, Nolf & DeMeulder 2017, Dehaene 2018, Shannon 2018, Bobbink *et al.* 2020). The land substrate and the created infrastructures no longer respond to the current urban conditions and are not able to support the ongoing urbanisation in a sustainable way (Dehaene 2018). There is a need to give back space and rights to water. At the end of the 20th century, recognising this necessity, Belgium adopted different approaches such as 'creating room for water' and 'Integrated Water Resource Management' (IWRM). As stated by the Global Water Partnership (2011), IWRM "is a process which promotes the coordinated development and management of water, land and related resources in order to maximise economic and social welfare in an equitable manner, without compromising the sustainability of vital ecosystems and the environment". In other words, IWRM considers the artificial and natural water flows as resources in an integrated system. Water management being regional in Belgium, each region has their spatial planning tools and water managers divided over three governmental levels (regional, provincial and municipal), in order to realise this shift. However, due to the complex water infrastructures created over time and the large number of water managers handling the water cycle in a sectorial way, the implementation of an integrated approach encounters difficulties (Mees 2020, Everaert 2020, Minette 2021). There is clearly a difficulty in identifying the different water managers and their roles, but also in defining the right manageable scale of implementing IWRM. As Kate Orff (2016) mentions regarding the water scale challenge "water cycles from raindrop to ocean and back again. However, we need to define scales of action, whether governmental, community-based, or personal, in order to revive our water bodies". On top of that, even if the question of drought has been raised, it does not receive the same attention as flooding which is seen as more urgent. Runoff water could play a key role in these two conditions. The question rises whether the challenge of drought could be faced by dovetailing the efforts made for dealing with flooding.

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1   Hofste, R.W., Reig, P., and Schleifer, L., 2019. Quarter of the World's Population, face extremely high water stress.

Which is why this research proposes to investigate runoff water to tackle the above-mentioned issues. When looking at the natural water cycle, its course is mainly vertical: rainwater falls on the surface where (a) one part immediately evaporates, (b) another infiltrates and charges the groundwater table and (c) the other runs off to the nearest outlet in the form of a river, lake etc. The dilemma we are dealing with today is the highly horizontal flow path of the hydrological cycle we have created. Impermeabilisation causes large volumes of runoff water, decreasing the infiltration capacity of the soil, as illustrated in Figure 1 (Karvonen 2011). In addition, rainwater picks up several pollutants when running off these impervious surfaces.

Figure 1: Karvonen Andrew, 2011, preurban and urban rainfall flowpaths, illustration by Shawn Kavon.

On account of water management, if we look at every water system in the water cycle, rainwater appears not to be considered as a proper and separate water system (Cavalieri 2019). It is only 'accounted' when entering any of the above-mentioned water systems, which is usually the underground sewage water network. However, even if not always available, it does represent a resource that should be carefully managed. Recent scholars within the field of Water Urbanism argue the need for reading the territory through the lens of rainwater in its hydrological cycle in order to address the changing climate (Cavalieri 2019, da Cunha 2018).

This brings me to the overall objective of my research, which is to identify the capacity runoff water has before entering one of the managed water systems in the public domain. The public domain represents a leverage in managing runoff water as it gathers all public water managers and authorities who have the power to implement measures in one same urban space. The aim is to visualise and identify the impact the public authorities can have in managing runoff water as a resource in the urban environment. In order to address the growing complexity of the water system this research argues the necessity of a co-production where the urbanist calls for other disciplines, from water related sciences to social sciences. This paper shows that 'research by drawing' can contribute to highlighting the common resource represented by the runoff water system. By representing the entire water cycle in such a way that runoff water becomes visible, it hopes to unravel synergies and cooperation in urban water management.

The first point of order on which this paper focuses is the definition of the public domain. To do so this research applies a multi-scalar approach on two case studies in the Belgian territory by: (1) explaining the location, urban pattern and water dysfunctions on **the watershed** scale; (2) **revealing the public domain**; (3) **unfolding** the obtained **typologies**; (4) and concluding on the **next steps** of the research.

2. Watersheds as unity of observation

In Belgium the drought challenge is not as systematically integrated in urban management as flooding. Runoff water can play a key role. This research proposes to realise the territorial reading at the scale of the watershed. "The watershed is the spatial unit of reference for hydrology" (al. Romnée). Its territorial extent can be defined by each drop of rainwater running off to the same outlet, be this a river, lake, estuary, sea or ocean. As the following drawings illustrate, administrative boundaries do not follow the ecological boundaries of the watershed. Transboundary territories, suffering from fragmented water management, could benefit from an integrated visualisation of the rainwater system. As mentioned by the Eurométropole Lille-Kortrijk-Tournai (2021) (EM): "Water flows right through, above or below state borders, it is a crucial element with the ability to federate territories across administrative boundaries". EM is a European cooperative with the objective of creating a common reading of the territory that goes beyond administrative borders and takes water as a federating element within its project of the Bleu Park. This framework and initiative of the Blue Park of the EM are part of an ongoing and continuous work with local actors, inhabitants and water managers. The two selected case studies, the 'Grande Espierres' and the Mark catchment, regroup the previous mentioned issues Belgium is facing and is increasingly affected by water stress issues.

The following illustrations reveal some relevant situations that will be considered in the identification of the public domain. More precisely, it reveals some situations where runoff water management could play a key role.

Both sub-watersheds can be upscaled to the watershed of the Scheldt. As the drawing illustrates, the Scheldt catchment is a transboundary river crossing 3 countries: France, Belgium and the Netherlands. The shared outlet of the Scheldt watershed is the North Sea (figure 2). As can be observed in Figure 3 the administrative borders do not follow the ecological ones of the watershed. By revealing where the administrative borders are located it already reveals a preview of where the water actors are located. As mentioned before, water management in Belgium is regional, which means there will be twice the amount of water managers when considering both Flanders and Wallonia.

In the Mark watershed there are no navigable water courses. The Mark river has its source in a forest between Silly and Enghien. Originating in Wallonia in the Province of Hainaut, it quite rapidly crosses the regional border after Enghien, over more or less 18 km. Along its course in Flanders it encounters 2 provinces: Vlaams-Brabant and Oost-Vlaanderen before joining the Dender river in Wallonia by the village Deux-Acren. On its way the river encounters a total of 10 municipalities. It is thus clear that the sub-catchment belongs to a shared river system as it spans over these various administrative boundaries.

In the case of the Grande Espierres watershed, there is a navigable watercourse: the Espierre canal. The canal comes from France and cuts the natural topography of the basin. Like the Mark river, the Espierre has a shared river system. Its course starts near the village of Aalbeke in Flanders, crosses the regional border and flows along the cities of Mouscron and Dottignies in Wallonia. The river flows for 5km in Wallonia, before re-crossing the regional border and joining the canal of the Espierre and the Scheldt river in Flanders. On its 13 km long course the river crosses in total 2 regions, 2 provinces and 4 municipalities.

a.   Administrative location

Figure 2: Ecological borders belonging to the Marke and Grand Espierres sub-watersheds_Map made by author.
Source of data: Géoportail, Geopunt

Figure 3: Administrative boundaries of the Grande Espierres and Mark sub-catchment_ Map made by author
Source of data: Géoportail, Geopunt

Both valleys have undergone deep modifications in the water system, each on different levels and different scales.

b. Water and urbanisation

While looking at the urban fabric of the watershed in Figure 4, in the case of the Mark we are looking at a valley of villages where water constitutes the backbone of urbanisation. Except for some houses, most settlements were implemented on the edge of the river bed, making the structure of the blue network still visible today. In the case of the Grande Espierres, an extreme situation occurs. The industrialisation phenomena, being very important in this region, caused a high amount of sewage that had to be evacuated as fast as possible. As a consequence, various smaller water courses became sewage collectors, which is the case of the tributary the 'Petite Espierres' crossing the city of Mouscron (illustrated in the zoom).
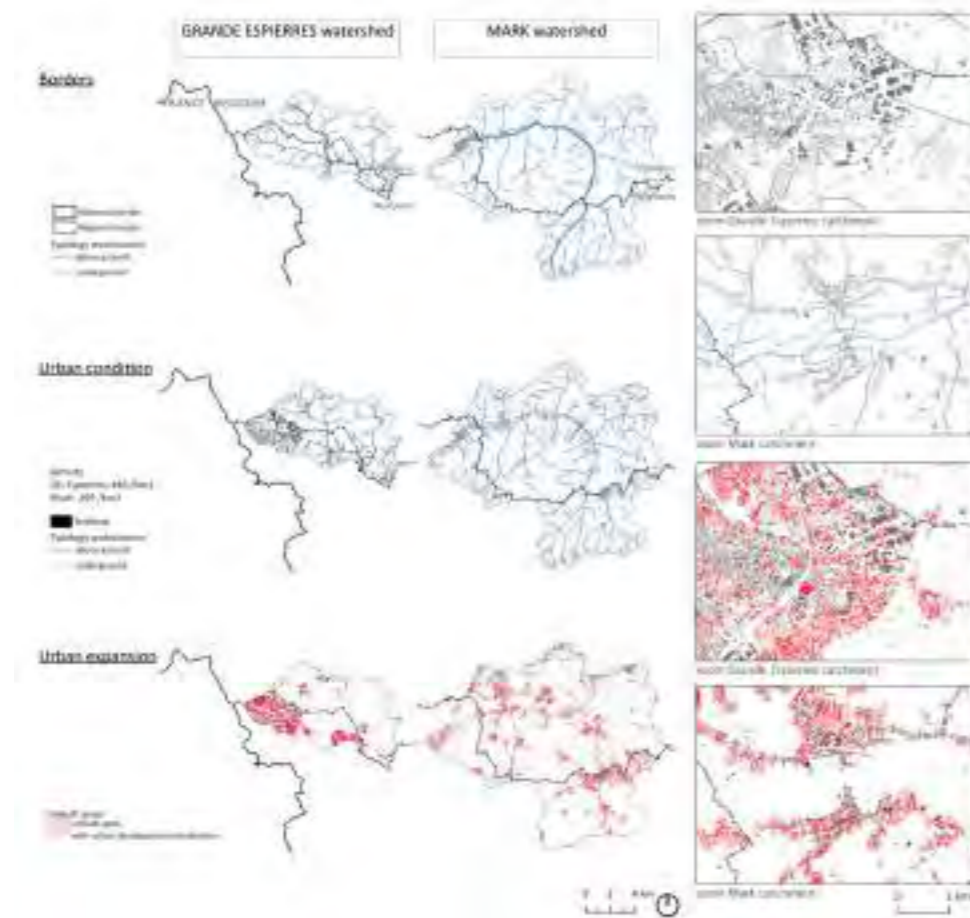
Figure 4: Urban pattern of the Grande Espierres and Mark watershed_Map made by author
Source of data: Géoportail, Geopunt

The fragmentation of water management appears in two different urban conditions. On the one hand, the Grande Espierres watershed is part of the industrial periphery of the metropolis of Lille. The high density and the industrialisation are prominent and result in a high pressure on the open space. On the other hand, the Mark case presents a more rural diffusion. Despite both cases being

close to each other, geographically they present highly different urban conditions.

Both conditions are followed by the future possible urban expansion. According to the urban density, different images are drawn. In Figure 4 we can see how in the Grande Espierres watershed, having a density of 483 inhabitants/km², the focus is on densifying and building every 'unbuilt' plot left in the city centre, this in order to privilege the little open agricultural space left. According to the land use categories of the Corine landcover map, the watershed of the Grande Espierres is: 53.2% impermeabilised, 46.5% taken up by agriculture and 0.4% forest. In the Flemish region there is almost no urban expansion allowed. As for the Mark watershed, having a much lower density, 209 habitants/km², the authorised urban expansion is more spread over the territory. The visualisation of the currently unbuilt plots (categorised as buildable in the sector plan) allows us to envisage critical places on which public authorities still have the power over its future land use, where rainwater management can play a key role.

"Municipal autonomy, dispersed housing policies and extended transportation networks have led to the emergence of a dispersed urban realm. Belgium, in the words of Grosjean, is the product of a process of 'urbanisation without urbanism' (Grosjean 2010)" (Broes 2018). Lack of regulation in urban development in the past has led to the dispersed territory we know today. This urban sprawl occurred in a disconnected manner from the natural hydraulic structure. Consequently, a series of large-scale infrastructures had to be built to serve all inhabitants of the dispersed territory. This was to be done with a modified water system (Shannon 2013).

c. Water dysfunctions

Several modifications of the natural hydrological system such as: urban expansion, increasing impermeable surfaces, upscaling of the small-scale drainage system around the agriculture fields and rectifications of the course of the river causing a higher speed of the water flow, caused various flooding and pollution issues. In addition, since several years, issues of water stress and drought accompany the above-mentioned modifications. At least once a year the landowners of the catchment are prohibited from pumping water from the groundwater table or from surface water. Indeed, rivers know no administrative boundaries, the recent floods touching Belgium, Germany, Luxembourg and the Netherlands in June and July 2021 being a reminder of this.
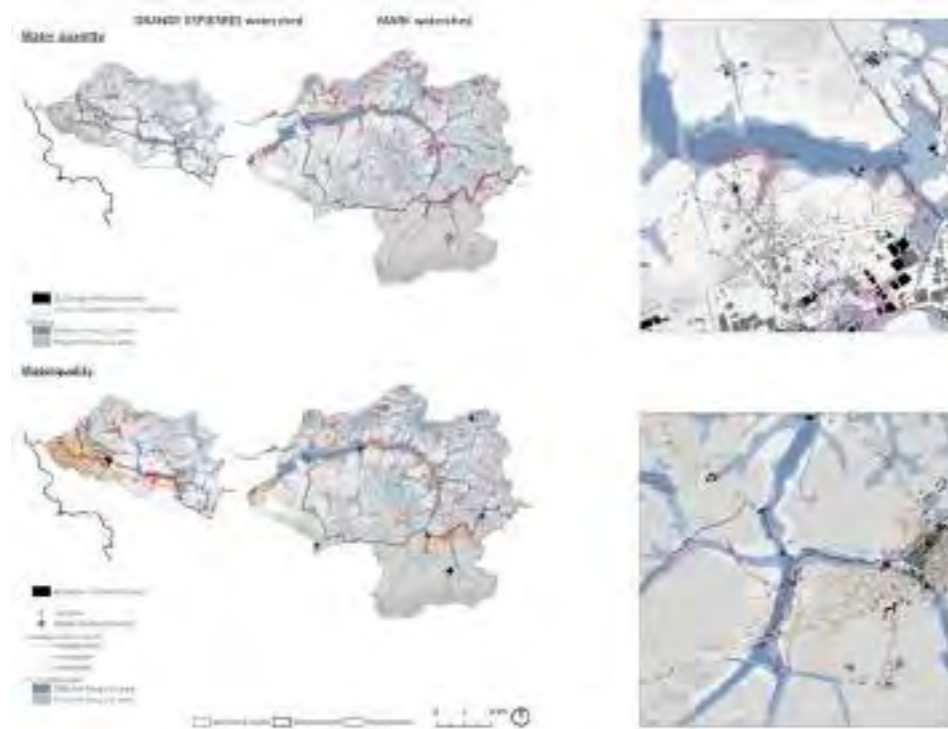
Figure 5: Water risk of the Grande Espierres and Mark watershed_Map made by author

Source of data: Géoportail, Geopunt

The map of the water quantity issue (Figure 5), revealing here the excess of water, illustrates some paradoxes in urban planning. Various buildable plots, currently unbuilt (the red squares on the maps), are situated in flood-prone areas.

As one can observe in the water quality map in Figure 5, the combined sewage network is highly present. This can have a consequence on polluted surface water after extreme rainfall in a short amount of time as the sewage pipes find themselves under pressure. As illustrated in the following pictures, this was the case in a flooding in June 2021 touching the Mark catchment. The untreated waste water mixed with runoff water then spilled over onto the surface. Efforts have been made to separate the two water systems (runoff and sewage) but the integration of runoff water in the urban environment needs to be investigated.

This map also reveals the location of the water treatment plants near the regional borders. Some of them collect sewage water from the neighbouring region. Another aspect is the release of the treated sewage water upstream near the border. The quantity of treated sewage water being released in the rivers upstream also demands an in-depth analysis that might reveal a key situation for rainwater management.

Both case studies represent various water dysfunctions: overexploitation of the groundwater table, a decreasing amount of available drinking water, pollution of water courses, high amount of rainfall in short amount of time. These observations will serve as a basis for unfolding the runoff water capacity in the subsequent steps.

3. Multi-scalar approach

The following operation's aim is to identify the public domain which will reveal typologies in order to look at the space's runoff water intertwines. To do so this research applies a multi scalar approach by: (a) looking into the landscape and revealing the different water urbanisations; (b) identifying the public domain; (c) relocating the role of the public domain within the hydrological cycle. These observations will lead to a first intuition of possible typologies characterising the prototypical condition of both case studies.

The following illustrations were realised based on geoservices such as Geoportail and Geopunt and collected in QGIS which was then translated into mapping interpretations. Not all data and information are readily available or are in the process of being obtained, thus the following series must be considered as a first attempt towards the realisation of a complete synthetic atlas.

a) Prototypical landscape and water urbanisation

Firstly, these operations suggest a look at the landscape and water urbanisation conditions, in order to understand the prototypical condition of both case studies. To do so the first step is to change scale from the sub-watershed into sub-sub-watersheds, to identify the landscape characteristics on a smaller scale. As the mathematical concept of a fractal, a watershed can be subdivided infinitely until the smallest tributary or runoff water axis. This enables the identification of similar sub-basins and the revealing of potential typologies for the next steps.
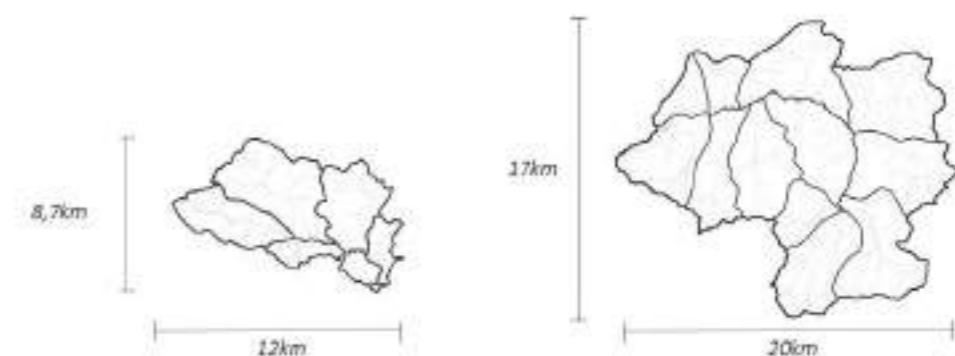
Figure 6: Subdivision watershed_Map made by author
Source of data: Géoportail, Geopunt

The following illustration is made with the land use map composed of: agriculture, grassland, forest, impervious surfaces and surface water. According to the land use, runoff water will have a different flow direction in terms of infiltration capacity. As one can observe both case studies represent different landscapes.
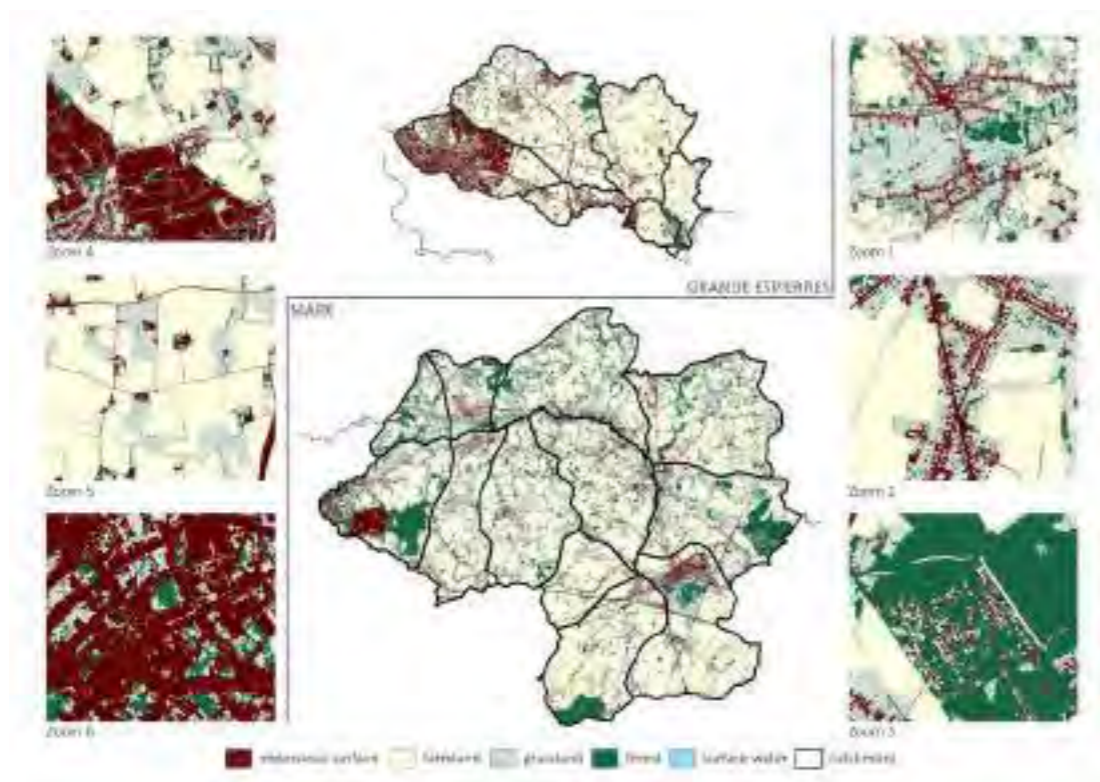
Figure 7: Land use map Grande Espierres and Mark watershed_Map made by author
Source of data: Géoportail, Geopunt

The presence of meadows, woodlands and poplar plantations makes the alluvial plain of the Mark easily recognisable (zoom 1). Upstream, the Mark has a deeply incised valley. The catchment mainly flows through the hilly landscape of the Pajottenland, characterised by a diffuse urbanisation and where agriculture is the main land use. In terms of urban settlements, it is clearly identifiable that water constitutes the backbone of urbanisation. The medium-sized villages are located along the main river, the settlements having been built between the edge of the floodplain and the fertile grounds. This structure is still recognisable today. The villages are quite equally distributed over the catchment, and have been mainly developed at the intersection of roads, parallel and perpendicular to the valley structure (zoom 1). In the case of the Grande Espierres, the water structure is hardly recognisable. This is mainly due to the industrialisation this region has undergone, leading to important modifications of the water structure as mentioned in section 2. The densest urban form here would be that of the city of Mouscron (zoom 6). This catchment suffers from the urban expansion of the Lille Metropole, exercising a high pressure on the open space (zoom 4 and 6). This can also be read by the pressure exercised on the administrative border by the industrial zones upstream on the edge of Mouscron and downstream on the edge of Dottignies.

The dispersed condition of the Mark is mainly recognisable by the linear settlements along the roads that enable the connections between the different villages (zoom 2). It is clear that we are dealing with a rural diffuse region, where the limit between built-up and open spaces is blurred. A part of the catchment is considered to be in the suburbs of Brussels capital. The region surrounding the

city of Brussels is a typical example of the diffuse city (Grosjean 2010). In the Grande Espierres even if the catchment also reveals a diffuse pattern, the contrast between city and countryside is more identifiable with the presence of the city of Mouscron. The diffuse pattern in both cases is revealed at different degrees: (1) in the Mark with dispersed linear settlements, zoom 2; (2) in the Grande Espierres, with more single-family houses dispersed across the territory, zoom 5.

The disappearance of the fragmented bocage landscape, with the surrounding landscape elements having a runoff water drainage role, are the consequences of a highly monoculture farmland. Where in the case of the Grande Espierres, having quite a flat topography, the presence of the water structure in the landscape is quite unreadable.

As one can perceive in the case of the Mark, there is a presence of a few important forest surfaces upstream from the tributaries. Even more so than in the other case study, we can observe that great pressure is exerted on the remaining forest surfaces, that have an important role in the infiltration and retention of rainwater (zoom 3).

The study 'The Language of Water' (2019) categorises two types of road infrastructure, identifiable in both case studies: (1) the rapid connection cutting the topography with highways and railways defined as pipes, where the movement is fast and there is no flexibility in the different directions; and (2) in the second category, comprising the smaller roads and non-navigable watercourses, different directions are possible, allowing various patterns of distribution across the territory.

Both catchments show similarities but also sharp differences in terms of landscape and water urbanisation. The previous illustrations revealed how these two case studies are prototypical, in the sense that to a certain degree they offer a regrouped summary of the various elements constituting the Belgian territory.

b) Revealing the public domain

The starting point is the definition of the public domain, which is obtained via two mapping operations. The first operation (Figure 8) is the result of an overlap between the 'Cadastral Parcels' layer collected on the 'Service Public Fédéral Finances' website, and in negative the spaces that are not considered on that layer. The cadastre plan represents the real estate of the Belgian territory, meaning that all the identified parcels are privately owned. This operation starts out from the hypothesis that the surface not delimited in the cadastre plan, comes under the public domain, falling under public authority.
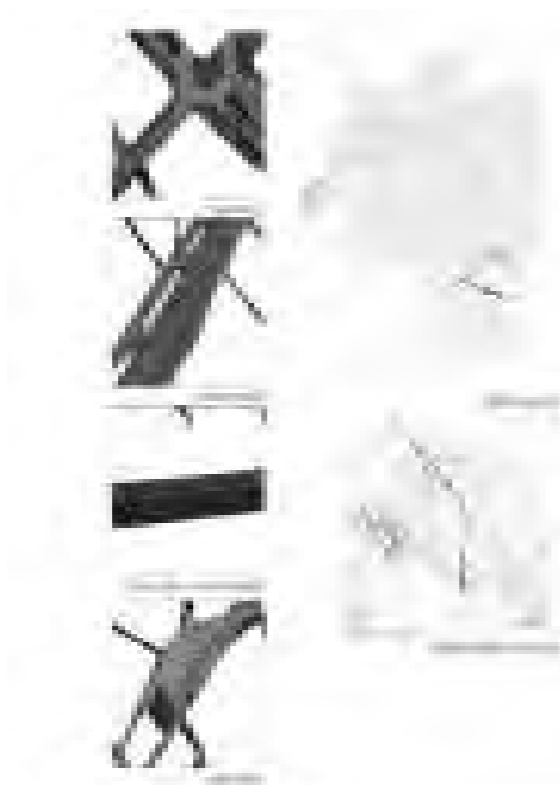
Figure 8: Public domain Grande Espierres and Mark watershed _ Map made by author
Source of data: Service Public Fédéral Finances

The second operation (Figure 9) is obtained by adding the public buildings, in which we have education-, sports-, hospitals, administrative buildings etc. that likewise fall under the authority of public actors.

Figure 9: Public domain and buildings Grande Espierres and Mark watershed _ Map made by author
Source of data: Service Public Fédéral Finances

c) <u>The role of the public domain in the hydrological cycle</u>

Following up on the above, the following image illustrates a schematic representation of the run-off water course in the hydrological cycle and where it interferes with the public domain. Once it reaches the surface, part of the rainwater evaporates, another part infiltrates, and what remains runs off. Following the topography, the water will either run off to the nearest water course, or will be collected in the sewage pipes in the public domain (going from the hypothesis that the sewage network in both case studies are combined). Through this observation we can deduce that the surface water system and the public domain are responsible for receiving most of the catchment runoff water – all this while acknowledging the fact that there are also individual water treatment plants as well as infiltration along the way. In further research a hydraulic modelling will be integrated in order to identify the amount of runoff water entering the public domain.

Figure 10: The role of the public domain in the hydrological cycle _ Drawing made by author

Despite the minimal surface of the public domain (in the Mark: 0.27% and in the Grande Espierres: 9,19%) it represents an important step and space in the trajectory of runoff water. This means that in terms of runoff water management, before entering the sewage network, the public domain could play a key role.

4. Unfolding typologies (results)

From the landscape observations and the reading of the public domain, two main families of typologies emerge: that of the surface and the road, illustrated in Figure 11. The following illustrations are an ongoing research operation and thus must be considered as a preliminary attempt.

made between the administrative scales, such as the highway, national road, residential road, cycle way, pedestrian path etc. It is important to highlight that these categorisations were made with the objective of looking at the different types of soil recovering surface runoff water intertwines. In the future steps, elements of the two typologies will be categorised according to the soil recovery and the percentage of its infiltration capacity. Impermeable, semi-impermeable and permeable surfaces will be used as a starting point to realise this categorisation.—

The typologies are elements identifying the prototypical character of both case studies and represent similarities in both. However, it is important to relocate them in their context (landscape and valley). By doing so, it is then clear that these elements are pieces of different landscapes, highlighted in the sections of Figure 12. According to their context and location in the valley the runoff water capacity of the public domain will change as will its management.
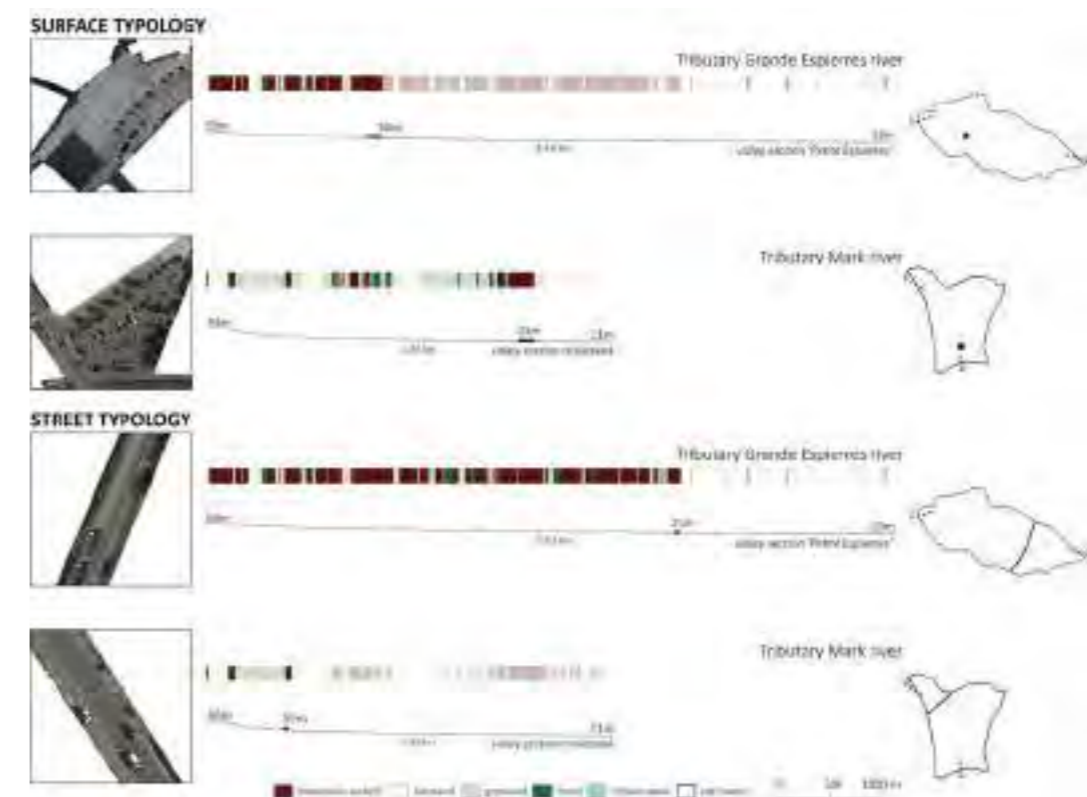
Figure 12: Typologies relocated into their sub catchment_Map made by author

Depending on the element being upstream or downstream different types of water management interventions will occur, namely: infiltration, retention or slowing down. These possible interventions will be discussed in another part of the research.

Figure 11: Families of typologies public domain _ Map made by author
Source of data: Service Public Fédéral Finances

The 'surface' can take the form of a city centre, parking plots, parks, retention zone, roundabout etc. In other words, it is an area where the intersection of different flows occurs or where a flow stops. The linear axes are the infrastructures that connect or run along these surfaces. Here, a difference is

5. Conclusions and next steps

Through inundations and water scarcity are occurring more frequently, we realise even more how close water is related to the effects of climate change and direct life support (Orff 2016). Water being the source of life and shaper of our territories, it does not only cross borders but also different disciplines. Nevertheless, for a long time, water has been seen as the competency of engineers. However, as promoted by the IWRM, there is a strong need for cooperation between the different domain experts: urbanists, landscape architects, engineers, ecologists, administrative bodies in charge of water management, etc. A clear example in Belgium, known as the 'principle of optimal disconnection' are the efforts made for dealing with the separation of the combined sewer system that is over-stressed due to urban expansion: by keeping the runoff water above ground it touches on the competencies of the spatial planners and not only the engineers calculating the underground pipes. Now more than ever, we need to combine the different disciplines in order to face water issues and climate change.

This research addresses this necessity by proposing an interdisciplinary methodology between the urbanist and the engineer. As a next step, the identified typologies will be translated into a hydraulic modelling in order to elaborate hypothesises regarding the capacity the public domain has in managing runoff water. To do so the model SWMM (Storm Water Management Model) will be used, which enables the quantification of runoff water and its quality according to the drainage system. The typologies are then relocated into their catchment to understand the amount of runoff water it intercepts. The public domain is then represented as a catalyst intercepting the runoff water from the surrounding territory.
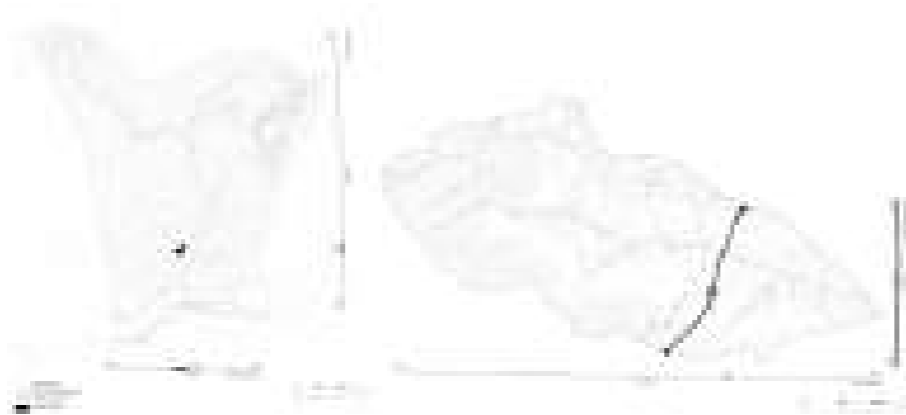
Figure 13: Typologies relocated into their sub catchment_Map made by author

Different hypotheses will be run into the model. The objective is to observe in extreme situations how the amount of runoff water increases or decreases. For example, what if: (a) all parking spaces become retention basins; (b) what happens with a return period of 5, 10, 100 years; (c) what if all streets become urban rivers etc.

In this manner the public domain can play an important role in terms of water management: (1) on the one hand in reducing the growing water quantity and quality issues, and (2) on the other to redesign our urban environment. They are constituted by spaces that accommodate human interaction, but also where human and non-human actions meet. It is a crucial place to establish relations between natural and social systems. The methodology proposed unfolds a fragmented and sectorial management, as a means of considering the runoff water management in the public domain as a common asset.

Acknowledgment

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AN ACADEMIC REFLECTION ON URBAN RECONSTRUCTION IN CONTEXTS OF POST-DISASTER

1-A-5

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Abstract:

How can academia, and specifically master programs training professionals from the built environment, prepare them to face and work in contexts of global challenges such as climate induced disasters? Firstly, we must take into consideration that most of the reconstruction after a disaster is done by families and local builders, therefore, our approach and methodology must aim to create opportunities for capacity building so that local professionals can assume complex processes as a priority to be addressed before disasters take place. Secondly, we must expand the meanings of spatial and social justice, understanding them not only through the re-distribution of physical and economic resources but dependent also on the redistribution of knowledges. Accordingly, the methodology of the urban reconstruction workshops of the Master of International Cooperation Sustainable Emergency Architecture (MICSEA) undertake the challenging issue of setting community action against the background of governance and planning and delve into the importance of the meaning of planning for communities as a guide for local action and strategies. We strongly believe that an investment in an urban pedagogy -the transfer of knowledge across governments and communities- is the fundamental pursuit to construct a civic culture as the basis for an inclusive urbanization and reconstruction. The conventional structures and protocols of academic institutions and urban planning agencies may be seen to be at odds with activist-practices, which are, by their very nature, organic and extra-academic and trans-institutional. However, through our experience we believe that this flexible attitude to face territorial discussion and planning is consistent with the current uncertain condition of territories subjected to pressures for change. When projecting the territory, we project the keys for this transformation, which we understand is essential for a place to evolve from its own identity and respond to new requirements.

Key words :

Emergency Architecture, post-disaster, community-resilience, urban reconstruction

Academic reflections on post-disaster reconstruction

We are facing global challenges because of the current neoliberal socio-economic development which is posing pressure on ecosystems, climate, and people, and generating adaptive challenges to our urban systems. In this context, there is a huge need for professionals from the built environment to be trained and learn new methods and tools to intervene in the field of Emergency Architecture in contexts of post disaster. The first great difference between a 'traditional architecture' and urban practice to that of humanitarian architecture is that most of the reconstruction is done by families and local builders. Therefore, it is this capacity that needs to be developed to achieve safer buildings. In other words, the first and upmost requirement is that local communities in affected regions be seen as active collaborators, rather than 'helpless aid relief beneficiaries. Hence, our work must be to create opportunities for capacity building so that local professional can assume complex processes as a priority to be addressed before disasters take place. Likewise, one of the major challenges of the architecture and urbanism profession is the co-creation of knowledge, knowledge sharing, and its translation into local building codes or reconstruction plans in disaster prone countries, to introduce better and safer repair processes. Architecture and urbanism in these contexts must aim to promote the uniqueness of a place and, by doing this, keep its culture alive. With this perspective, our drivers to create resilience and to adapt to disaster, is to work with the causes, the history, and the cultures in which we intervene. The local culture will facilitate work, or on the contrary, will inhibit it if our work is counter cultural. When a sense of place is reinforced in the efforts to reduce disaster risk and recover from disaster, the possibility for autonomy will emerge, despite the implementation of 'technical top-down concepts'. Therefore, we must establish a relationship which is not of dominance or imposition. Another important point which reinforces the need of drawing social, technical and community aspects into urban based crisis response is that today the architecture and built design professionals must accept that the disaster field is merging with other areas such as climate change adaptation as well as increasing displacement and migration; all which are changing the field substantially. This constitutes a working field which is more and more complex, which requires: a complex view on different scales of the built and natural environment; much more resources, as well as expertise. On the other hand it is important to acknowledge that despite the fact that most of the reports, manuals, etc. in the past have rooted for standardization-they have served their objective of installing safe construction parameters in order to ensure that vulnerability is not rebuilt; right now, lessons have been learned, and recent reports from INGOs acknowledge the failure of culturally alien guidelines, and enhance context-adapted, situated solutions, proclaiming that 'assessment is the foundation for appropriate response' (D. Sanderson and B. Ramalingam,2015:15) both for housing and urban areas. It has become clear that the most important factors for recovery are not to find appropriate technical answers, but to adjust to existing local, social, technical, and financial organizational capacities.

With these parameters in mind, the Master of International Cooperation Sustainable Emergency Architecture (MICSEA) at the Universitat Internacional de Catalunya (UIC Barcelona), offers a one-year official master which prepares architects to develop and rebuild communities affected by rapid urbanization, poverty, conflict, and natural disasters. The program emphasizes that needs assessments need to include capacities assessment, in other words, reconstruction projects must build on a change of perspective achieved by understanding situated social and physical strengths and dynamics as the key ethical approach to design in the humanitarian field. Likewise, it enhances the fact that design is a problem-solving process which cannot happen without an interdisciplinary system thinking, spatial innovation and creativity. However, design thinking is problematic if it ignores important contextual or systemic factors, more so when it comes to reconstruction in places that

were vulnerable before the natural disasters happened. To put in practice and at the same time contribute to the reconstruction process of a real case study, the MICSEA establishes every year a two-week in person workshop which intends to contribute to the efforts and work being developed by local institutions, NGOs, and local academic partners of the country we work in. It introduces the students to a methodological approach, which understands place-making as part of a socio-spatial assemblage that can help identify and build spatial and social ties. The analysis and proposals consist in the classification and prioritizing of certain territorial spaces or layers, which offer more potential to enhance a positive transformation. It means working from the identity of the parts as well as the whole.

Reconstructing with open spaces as catalysts for repair:
Parroquia San José de Chamanga, Ecuador.

Fig. 1 Chamanga Waterfront. 2016
Photo. Jonathan Meier.

During the years 2017 and 2018, the MICSEA'S workshop took place in Ecuador, as on April 16th, 2016, the country was hit by a 7,8-degree Richter scale earthquake which affected the populations along the coast, one of which was the Parroquia of San José of Chamanga. Ninety percent of the houses collapsed, leaving the coastline as ground zero. However, the earthquake also revealed pre-existing social and planning problems which have been occurring for decades and which the natural disaster enhanced such as, the lack of basic public services and housing deficit. In order to contribute to the reconstruction of Chamanga, the MICSEA staff organized the workshops along with colleagues of the local university Pontificia Universidad Católica of Ecuador, the Royal Melbourne Institute of Technology (RMIT), as well as the local government. To contribute to the ongoing reconstruction process of Chamanga, the workshops developed a group of strategies and specific projects related to the open space layer and urban fabric of Chamanga and built on the fieldwork and plans already developed by the various collaborators to the workshop. Our objectives were different each year, but in general we developed an integrated open space, housing (from typology to urban fabric) and socioeconomic diagnosis to deliver specific regenerative proposals in areas which the local government needed alternative solutions. All proposals were developed through a socio-spatial methodology which included a physical urban analysis, observations, mapping and qualitative research developed with the active participation of community leaders and the community of Chamanga.

To get an idea of the scale and types of proposals, here are a couple we started in 2017, and which the community continued with the municipality after the workshop:

(1) the revitalization of the football field (Fig. 2): this project had its roots in two main issues, the first was the fact that the football field site was on a flood-prone zone and below the estimated tsunami level, and the increase of teenage drug use, which became acute with the loss of the arts and cultural center and deterioration of the sporting facilities, which lead to a general disengagement of the community. Second, the fact that the devastation that followed the earthquake required families and housing to be relocated, which divided family bonds and dislocated social networks, weakening the overall community's ability for collective action to solve any crucial problem to recover from the disaster. Considering that the space was not being used exclusively for sports-related activities after the earthquake, but hosted a UNICEF tent used for after school care—and maintained by volunteer children—, as well as a new area for charity, religious purposes and communal laundry, the project proposed to keep these activities running in order to offer a wide range of new opportunities as training programs and activities that would increase community participation from all ages and genders, and improve social bonding activities surrounding daily rituals.

Fig. 2 Proposal for the renewal of the existing football field with a safe circuit incorporating activities of leisure and sports. Chamanga, Ecuador. Plans: Students MICSEA 2016-17

2) proposal on the main vehicular axes, the main street, and high ridge of the town as well as the three perpendicular staircases that cross it. The idea of our project was to make a safe public space of the stairs in a short term (Fig. 3) . After a general cleaning, each step was rebuilt and decorated on the rise using colourful shells (conchas) or broken tiles. Community members as well as children joined us during this process, something we considered important to make the entire community feel owners of their improvement. For the upper part of the staircases, the highest points of the village, the project saw this area as a nodal space and landmark, also in case of emergency providing hanging boards where information of public interest could be displayed.

Fig. 3 Proposal for the staircases as open spaces. Betterment of the staircases. Chamanga, Ecuador. Construction: C. Mendoza, A.. Koornneef, Students MICSEA 2016-17and community of Chamanga.

(3) the new port area, located on the east side of Chamanga where, at the time, an industrial scale governmental project was already on-going, and to which after a detailed analysis of Chamanga's basic economy, opportunities, and limitations, it emerged that the current industry in Chamanga relies on small- scale fishing and had limited opportunities to add value to the product, access transportation or export markets. In spatial terms, the water(front) became the tool for action, able to physically bond the new port, the waterfront, and the mangroves of Las Palmas in a unique system (Fig. 4). The first intervention focused on Las Palmas area. It promoted mangrove restoration and consisted in partnering with existing mangrove restoration groups within Chamanga, the agricultural technical school and Atilio who had worked in mangrove restoration and owned 40,000 mangroves. The second intervention focused on the waterfront and was further developed in the fieldtrip in 2018. The strategy aimed to promote a variety of workshops, training, and education on earthquake-proof construction techniques, to create a system of emergency exits from the town, to promote touristic activities and reactivation of public spaces. A rethinking of mobility paths and the creation of floating docks, able to move with the tide, would become new commercial, social, and environmental nodes, able to connect the city with the water and the past with the future. The third intervention would address the port and its impacts on the local community.

Fig. 4 Proposal for the new port, the waterfront and the mangroves of Las Palmas converting certain urban nodes with activities Chamanga, Ecuador.Plans: Students MICSEA 2016-17

An ongoing process towards recovery

Through the case study of Chamanga we learned that we must involve people and their culture towards making better choices, as well as advocate for laws and planning codes that protect them. In the same way, academic programs which specialize professionals of the built environment to intervene in context of post-disaster must ensure to transmit that capacity development is seen and implemented as a vital form of aid. Community resilience linked to reconstruction must be studied as a necessary complement to the adaptability of built structures. Therefore, as a result of our academic and professional work, we believe that culturally based approaches which embody traditions and practices need to be implemented and understood better regarding risk reduction and applied as the backbone to any sustainable recovery.

Acknowlegements

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TERRITORIAL LOGICS OF MARGINALISATION

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Abstract:

In times of growing social inequality and ecological emergency, the absence of access to housing constrains poor populations to settle in ecological reserves that consequently are degraded by urban expansion. This paper draws on the hypothesis that the presence of 1.5 million squatters on the edge of the Sao Paulo's water reservoirs and the Atlantic Forest reserves is based on a territorial logic of marginalisation.

In Grajaú (South Sao Paulo district), the Atlantic forest's water systems dramatically influence the city's water quality. Additionally, the forest itself, a global biodiversity hotspot (UNESCO, 1994), suffers deforestation through agro-industrial practices and urban expansion (Barbosa & Mantovani, 2000; Dean 1996; Rodrigues & Gandolfi, 2004). Studies in Sao Paulo investigate how urban expansion has become a tool for financial capital expansion by using forced displacements of marginalized populations to 'adjust' land value (Brickell, Fernández, Vasudevan, 2017) and consequently generates 'low-incomes territories' (Rolnik, 2019). Nevertheless, the study of these low-incomes territories focuses mostly on the financial causes generating informal urbanisation without exploring the territorial structures of low-income territories.

Using critical cartography methods, this article aims to expose the territorial marginalizing patterns that emerge from the self-help urbanisation processes of ecological reserves. These cartographies will be complemented by discussions on the notion of 'marginality' and 'socio-territorial movements' (Fernandes, 2012) in order to highlight the inseparability of territory and social movements and how social movement struggle and resist through territory (Haesbaert 2012; Halvorsen, Fernandes, Torres, 2019).

Keywords:

Socio-ecological; marginality; socio-territorial movements; territorial marginalisation

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INTRODUCTION: CONTEXTUALIZATION

Today the limited access to housing constrains millions of poor people to settle in these natural protected areas that consequently are exposed to degradation by urban expansion. The presence of 1.5 million squatters occupying water reserves in the southern periphery of Sao Paulo (Brazil) represent a major socio-ecological crisis. These dense water networks and reservoir provide daily drinking water for millions of Sao Paulo's inhabitants (PDPA, 2018). The quality of the water-systems is also directly influenced by the presence of Atlantic Forest. This areas of forest in the southern region of Sao Paulo are part of the « Mata Atlântica Biosphere Reserve » listed as one of the 36 biodiversity Hotspot from 1994 on UNESCO's World Heritage List. With only 17% remaining of its original surface, the Atlantic Forest contributes to balance the climate, regulates the water cycle and provide food for millions of Brazilians (UNEP, 2018).

Fig. 1. Billings water-reserve, Moreira S. 2005.

This phenomenon finds its origin in the early 20th century, following an electricity crisis, the private company Light initiated a titanic project to build a large reservoir in the southern region of Sao Paulo that would serve to create a large-scale source of electricity to support the growing population. The creation of the Billings Reservoir in 1925 was an engineering challenge that involved diverting the course of several rivers and even reversing the course of the Rio Pinheiro so that they could all be accumulated in a reservoir on the Sao Paulo's plateau and concentrate the descent at the highest point, generating energy (PESBC, 2019). This engineering achievement allowed the generation of more electricity than any other system that existed until then. However, over the years, the Rio Pinheiro became a highly polluted river due to the industrial waste and new neighbourhoods sewage that were rejecting their waste into it. As a result, the degradation of the fauna and flora drastically accelerated.

In 1958, with the rapid growth of São Paulo, the priority was given to supplying drinkable water for

the growing population. The State and the private company then initiated a process of de-polluting the reservoirs. In the early 1970s, the state declared that the areas around these water reservoirs would be part of a new water basin protection zone. The counterpart of this environmental protective legalisation is that by taking these lands « out of the real estate market », their prices dropped drastically (Martins, 2006). In a context of significant urban expansion, this generated a new territorial dynamic, where these lands losing their financial interest where left "empty" areas, became the site of a massive precarious expansion (Polli, 2010).
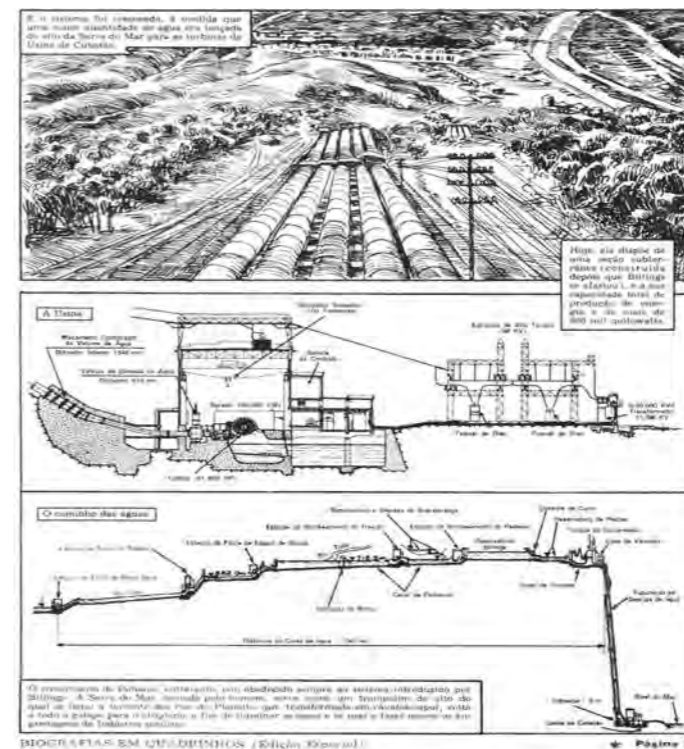
Fig. 2. Figure of system to deviate Rio Pinheiro. Revista Editorial Brasil, 1962.

Nowadays, through precarious urban expansion, the poor and the ecologies find themselves at the forefront of a twofold marginalisation: on the one hand, a social marginalization, where poor population are excluded of the cities and forced to dwell in arduous landscapes; and on the other hand, an ecological marginalisation, where the legislation that are supposed to protect these areas are ineffective in preventing their occupation by the socially excluded.

Following this phenomenon, Brazilian scholars focusing on land-occupation processes investigated «socio-territorial movements» (Fernandes, 2000) to describe how marginalized groups have been resisting *through* territory, using the physical occupation of land as their main revendication. For Halvorsen, the territory is defined as a "space appropriated by a determinate social relation that produces and maintains it through a form of power » (Haesbaert 2012; Halvorsen, Fernandes, Torres, 2019). The authors understand the territory not only as the central object of the community battle, but also as a means of participating in a broader political project. In this sense, the process of building the territory itself changes the identity of the occupants, changing their way of organizing themselves and their way of dwelling and organizing such a territory (Haesbaert 2003; Halvorsen, Fernandes, Torres, 2019).

While these studies form a fundamental basis for highlighting the importance of the *spatial dimension and processes* of marginal urbanity (Wacquant 1996, Lancione 2016, Fernandes, 2005), they have been carried out from the perspective of a social sciences, human geography or environmental

anthropology. In this sense, these studies have not yet explored the *spatial structures* of these territories, the spatial logics that compose these territories and how they participate in generating urban marginality and exclusion (Van Ballegooijen, Rocco, 2013) or, in other words, the logics of territorial marginalisation.

From a financial mechanism perspective, studies in Sao Paulo investigated how the urban expansion has become a major tool for financial capital expansion and by using forced displacement of marginalized population to 'adjust' land value (Rolnik, 2019). For her, the State, influenced by private companies, failed to provide an alternative for adequate housing provision. The author supports that the state abandoned the notion of housing as a social good and instead to stimulate the financial sector. This change has generated a dynamic of social exclusion and has contributed to massive territorial dispossessions and the creation of 'placeless' poor urban populations creating « low-incomes territories ».

Rolnik speaks about « territories » because of the scale of the phenomenon but also of the diversity of components present in it, for her, after many years of investments and consolidation of low-income territories (favelas, irregular settlements located at the urban peripheries, and housing complexes), it became impossible to define the urban development model solely by the duality of 'center versus periphery' (Rolnik, 2019).

While Rolnik's perspective helps to understand the trajectory of the neoliberal market in Sao Paulo, the study of low-incomes territories focused on mostly on the financial causes generating informal urbanization without exploring the territorial structures of these occupied low-income territories. Through empirical case studies in the southern region of Sao Paulo's occupied water reserves, this article aims to explore the logics that generate this socio-ecological marginalisation and how it *produces* and *use* a specific territory.

Case study description[1]: Living out the map

To this end, the article will explore current land-use legislations and some of their effects on the ground; resulting architectural typologies; and the social governance mechanisms emerging.

The southern zone is the region where urbanisation has expanded the most in recent years. In this context, where precarious urbanisation is developing in protected areas, the superimposition of contradictory laws between the protection of poor families and the protection of natural areas generates complex legislative conflicts (Martins, 2006). The land-use of these areas is composed by various minor zoning, however some major land-use patterns allow to explore how these areas are organized and governed by the state and how it conditions their uses.

In terms of environmental protection, all the areas in a vicinity of 6km from the reserves are zoned as APRM-B (Áreas de Proteção e Recuperação dos Manancial Billings). This law regulates land use for the protection of springs, rivers and reservoirs and other water resources of interest to the Greater São Paulo Metropolitan Region (Law 13.579, 2009). This law aims to ensure the improvement of the quality of the reservoirs in the catchment area; to implement participatory management of the reservoirs; to find a balance between local and basin-wide ecosystems; to produce safe drinking water for its beneficiaries; to collect and clean up waste; and to promote the preservation of the mangroves in the basin (Law 13.579, 2009).

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1   Although this research is based on several case studies, in the context of this paper the case study is the Southern Region as a whole. Some more specific cases will be mentioned to give a more concrete example.

To ensure all these goals, this law restricts any occupation that is not in the interest of the protection of water sources and the conservation of natural resources; areas with an interest in consolidating or implementing a rural or urban use that is necessary to produce water or the improvement of its quality; or an environmental recovery area (Law Nº 15.913, 2015).

On the ground, 22% of these areas are occupied by precarious urban areas generating a strong pressure on the reservoirs and water networks through the discharge of sewage and waste. However, there is still a large part that is non-urban, 66.5% of the APRM-B is still covered by diverse vegetation areas, where the Atlantic Forest represents 43.8%, yet due to the violent advancement of urbanization, these data are exposed to daily degradation (PDPA, 2018).

The second most represented zoning is the APP (Area of Permanent Protection) with the environmental function of preserving water resources, landscape, geological stability and biodiversity, facilitating the genetic flow of fauna and flora, protecting the soil and ensuring the well-being of human populations (Law No. 12.651/12).

Areas considered as APP are strongly linked to the presence of water. They considered as APP if they border watercourses; they are close to water areas even artificial ones of a certain size; or if they are close to water sources. There is also a dimension of land morphology as areas with a slope of more than 45° and all vegetation above 1800m are also considered APP (Law nº 12.651/2012).

In contrast to the APRM, the State mentions criteria for a potential de-characterization of APP areas (Table 3). The chosen criteria for re-evaluation are a combination of degree of urbanisation (pavement, concrete sealing, ease of implementing a sewage system); remains of native vegetation (connectivity with other forest remains; continuous conservation area; possibility of reconnection with ecological corridors etc.); and risk factors for a population living on these areas (flooding; soil stability and slope).

In practice, such a re-evaluation occurs when it becomes clear that lost their environmental functions and are considered to have a low environmental impact (DM57.776/17)

APP's environmental function (According to Art. 3 item II of Federal Law 12.651/12)	Indicators to be analyzed to assess the loss of function of the Urban APP
Preservation of water resources	▢ Whether the water body is piped or not piped, rectified or not rectified; ▢ Presence of concrete, soil and/or vegetation; ▢ Existence of a paved road and/or other impermeable area between the development and the water resource.
Geological stability and soil protection	- Slope of the land and the possibility of undermining, erosion and collapse of existing buildings

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Ensuring the well-being of the human population	☐ Historical flooding
	☐ Susceptibility of the area to flooding or risk situation;
	☐ Condition for the implementation of an adequate sanitation solution
	☐ Existence of green/permeable areas nearby

Fig. 3 : Permanent Preservation Area(s) – Decharacterization of APP

For Martins (2006), the loss of native vegetation due to the horizontal urbanisation of these areas is a combination of the insufficient priority and lack of public resources, the superimposition of laws on similar matters, with sometimes conflicting provisions, administrative obstacles, the disarticulation of agendas. These territories therefore remain exposed to continuous degradation and the populations that occupy them are not represented in the official government maps, which the State considers as devoid of urbanisation.

This administrative non-existence does not mean that the state is not present in other forms. This invisibility can play an advantage for some populations that do not wish to be visible, but most of the time it constitutes a structural mechanism of social exclusion, where the poorest are conditioned to remain outside the system.

This can evolve in major consequences, as Thiago (false name), 35 years old and father of a family, who does not own a car and lives in the community of *Toca da Coruja* on the edge of the Billings reserve, experienced. He explained to me how his pregnant wife couldn't receive the visit of a doctor because they don't have an address where the doctor could officially come. Years later when his child was already born, he had to borrow the address of a former colleague in order to register him to the public school of the area. Finally, he expressed how the lack of an address didn't allow him to open a bank account and therefore to be paid legally. This automatically exposed him to the risk of not being able to claim if he had to be exploited by his employers, nor to declare his work in order to receive some form of pension when he would not be longer physically able to work. Thiago's story provides a small insight into the difficult coexistence of visibility and access to fundamental rights.

Architectures of the Margins

These laws also have consequences for the way people build their homes and communities. While each of these areas has its own particularities, the self-built communities of the South region share common geographical conditions: hilly topography, dense patches of Atlantic Forest and, above all, the dense water system that feeds the Guarapiranga and Billings water reserves. This research aims to explore how the way people shape their habitat in these territories.

After studying several of these communities, different architectural typologies appeared to be guided by certain socio-economic logics. Of the three main architectural typologies, the most precarious is the *barraco* (the barrack). This construction made of recycled wooden planks has only a ground floor and its main purposes are to provide shelter for a family and to secure a piece of land, hoping that one day it will be regularized. This first stage of construction is the most precarious because

these barracos are very fragile to local weather and to any type of natural disaster such as heavy rain or strong sunlight that deforms the slabs until they are unusable.

Dona Luisa, 65, who lives in the community of *Terra de Deus*, explained to me how she lost all her valuables the day a heavy storm ripped off her roof and she had to wait a week before she could take out a loan to buy new roof sheets. She told me how she lost everything a second time, the following rain season, when the water stream that runs through the center of their community came out of its bed and rose to one meter, taking everything with it, from the sofa, which it found 300 meters away, to her TV, which is what she misses most. Today, Dona Luisa has built a system of furniture on stilts to avoid over-elevating her house. One of her neighbors has built a low wall one meter high around her house and the other has covered her wooden panels with tarpaulins. Faced with rains that wash away furniture and even people, she says that those who could leave have left and those who still live here have no alternative.
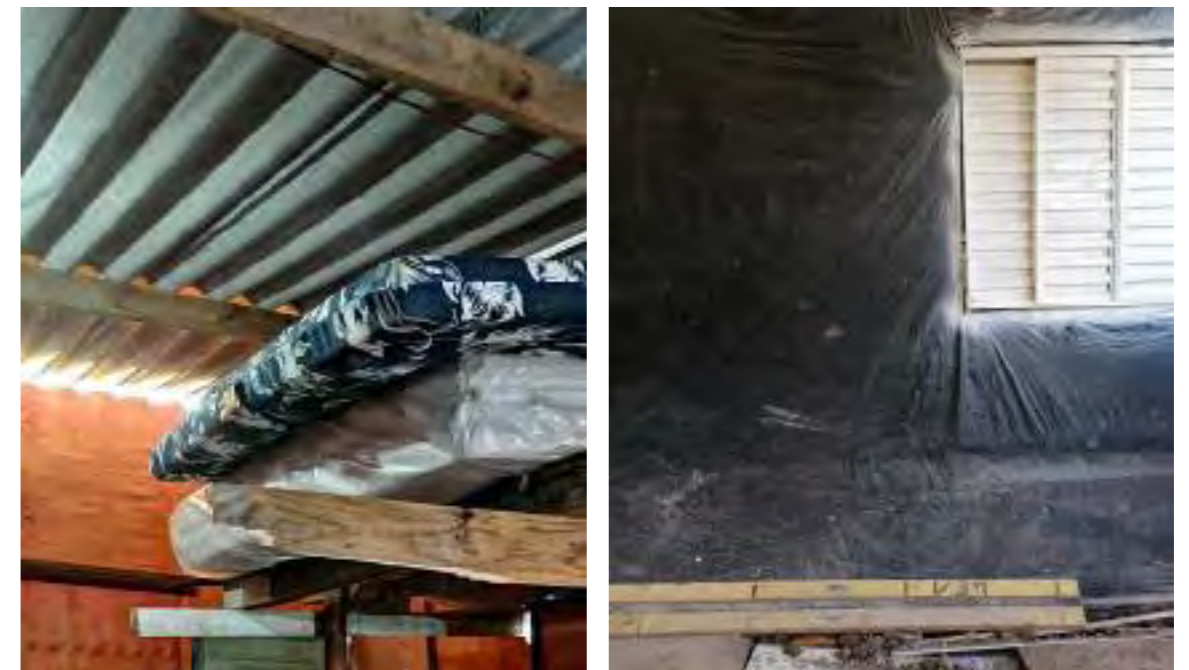
Fig. 4 . Left: furniture of Dona Luisa, bed on stilts; right: house recovered by tarpaulins. 2022

The second typology is the *casa de bloco* (block house), this type of construction is built in areas where the population invests in their properties with concrete blocks, often on several floors, also investing time in designing the layout of the spaces. These dwellings are often incremental and in the event of births, will accommodate new family members by expanding the basic nucleus. They are also often better adapted to the weather and sometimes even designed to make use of the wind or to create shaded areas to buffer the heat of the dry season.

What is most often lacking in these houses is access to infrastructure that connects them to sewage systems or access to drinking water. Dono Miguel explained to me that living in the community of *km47* and having built his house 25 years ago, him and his neighbourhood have no proper access to drinking water. The 10,000 families present today in that community have each dug wells, the depth of which varies according to the means of each one, to get drinking water. However, each of these families has also built septic tanks that do not have a sewer. Over the years the pits have contaminated the water table and today the water coming out of the wells is extremely contaminated. In a neighbourhood of casa de blocos but without water, everyone adapts as they can: some can buy; some filter and the others drink and wash the water directly. Although these are more urbanized ar-

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eas where families tend towards a perspective of permanence, their lack of access to infrastructures and their past actions of a short-term survival put them back in front of their dependence on their natural resources from which they also become the victims.

Finally, the third typology is the *casa consolidada* (consolidated house), made directly from blocks and with a concrete structure ranging from two to four floors, these dwellings are found in areas where people are assured of their longevity in the place in view of the significant investment made. Often these types of houses are found in areas organized by *grilleiros*, informal sellers who pretend to be the owners and sell false land titles to the inhabitants, who in turn invest in the area believing themselves to be landowners. The constructions are much more solid in the face of bad weather and climatic disasters, and sometimes they already come with illegal connections to electricity and drinking water.

The main risk for these families who have staked everything on the long-term is the possibility that one day the State decides to evict them. This happened to Dona Maria in the former Pantanal community, where her family bought their plot of land and every month invested more in their family home. The day they received the eviction order, the family lost everything. Going from a prospect of improvement to a financial loss as immediate and abysmal. They found themselves in a situation where even the denunciation of the false owner was impossible because he was linked to the members of the cartel and denouncing him meant exposing themselves to heavy reprisals.

Fig. 5. Architectural typologies, left: barraco ; center: casa de bloco; right: casa consolidada

These different typologies and their different degree of marginalisation highlight how the fear of eviction forces people to live in conditions of temporary-permanent architectures and to expose themselves to different degrees to the ecological and social dimensions of their territories. In these lands, the relationships with their territories and ecologies are generally difficult. The materialization, the architectures of these places are traces of in-situ resistance processes, anchored in their communities and evolving with the uncertainty.

Socio-ecological governance

Another dimension is how the governance of such territories occurs. At different scales communities must organize themselves to survive in such territories.
The practice of *mutirão* is a community practice of indigenous *Tupi* origin that consists of gathering the whole community to carry out a common task for the good of the community, often related to construction or maintenance tasks (Chiaradia, 2000).
This practice, used throughout Brazil, is fundamental to the process of self-building in order to collectivize the effort and take ownership of the community's urban improvement project while

strengthening social ties through the process of building the project (Pedro Arantes, 2002). This highlights the strength that can be gained by a community uniting for a common cause and demonstrates to external actors the quality of the internal management of a so-called informal environment.

In the case of the occupied reserves, the *Toca* community organized itself to try to cope with the frequent flooding. The community has therefore organized to clean up the stream together as they were convinced that construction and households waste were partly responsible for blocking the water in the stream and causing these destructive overflows. In the *Zona Leste* community, the leaders, with the help of non-governmental funds, have organized to replant areas of Mata Atlantica on previously deforested land. In this case they did so because they are in the process of regularization and therefore it is part of the law to have a percent of the area of dense forest. In the community of Anchieta, the inhabitants deconstructed all the houses that were within 30m of the water source and 50m of its origin in order to respect the dimensions prescribed by the law. This was agreed following negotiation with the owners to ensure that they would not be evicted if they undertook participatory conservation measures to restore the quality of the water.

At the territorial scale, the communities of the South region are also organizing jointly to face these socio-ecological challenges and access their fundamental rights. As a key actor, the União dos Movimentos de Moradia (UMM), is a popular movement that carries out important articulation work. Their aim is to build a network of communities that can learn together and help each other in their common struggle for access to housing. Through weekly visits, they connect and organize the leaders to form a forum, then inform them of the legal tools and their rights and support them in the steps to access these rights. In recent years, the agenda of UMM, which was basically oriented towards access to housing rights, has also opened to include more and more the environmental dimension in their discourse. In their guidance work, they inform leaders of the importance of working with nature in order to prevent future natural disasters.

Fig.6. Process of deconstruction in protected area, Anchieta, 2020.

These practices of *mutirão* highlight the need for collectivity in precarious areas, where collective action becomes a necessity to survive individually in territories hostile to humans. It also seems that most of the time these *mutirão* processes are put in place when there is a perspective of

improvement assured by an immediate beneficial effect or because its asked by an important actor. Finally, it shows the adaptive capacity and potential of the community as a place to learn socio-ecological practices in order to improve daily living conditions (reduction of floods) and in the long-term improvements (reforestation of Atlantic Forest).

Results: Territories at risk of marginalisation

In order to contribute to the local discussions, this empirical study of the different legislative, architectural and social perspectives in theory and in practice allows us to develop hypotheses on what generates the *territorial dimensions* of these 'low-income territories' or 'socio-territorial movements'.

Regarding Rolnik's discussion, the territorial analysis supports her vision in which the State influenced by private companies is producing its margins. This territorial view supports that the legislations in place to protect the ecologies contribute to a certain degree of precariousness due to the insecurity of being evicted from the occupied reserves at any moment and consequently condition these precarious populations to illegality.

The lack of long-term perspective doesn't enable the marginalised populations to invest more in the occupied areas and often leads people to build a city for today with the need to meet immediate needs: securing a plot of land for their family, having a roof, finding an income to feed themselves and provide for their children's medical needs or education.
Nevertheless, these immediate needs come at the expense of the destruction of natural resources. Sometimes guided by the fear of losing a plot due to eviction, the same family will secure several plots in different communities. This observation feeds the hypothesis that marginalised populations in the most unstable situations are the least able to appropriate an area in a sustainable manner and implement a more rapid and radical destruction of the ecologies present. In this sense, these observations support the idea that the legislation that tries to protect these natural areas generates low-income territories and exposes them to further destruction by not offering alternative perspective to the marginalised populations.

Another dimension emerging from this empirical territorial reading is the idea that urbanisation is the solution to all other problems. Living in an urban area gives access to the city and its benefits, and consequently to all the other fundamental rights (infrastructure, social mobility, leisure, etc.). This dimension can be seen in the degree of urbanity present in the architecture, where investment patterns push towards structures made of concrete and blocks, concrete streets and no trees in the streets remaining. This view that 'being part of the city' is equivalent to artificializing the place is a crucial aspect. Here again, the legislation is backing-up that dynamic of urbanisation by considering the revision of land-use if an area has lost all its environmental use. Following that logic, the people might be encouraged to denature as much as possible the occupied areas in order to receive an 'urban area' status.

Unfortunately, this narrative is shared by popular movements, community leaders, and even most academics. This discourse of urbanisation as *the* solution is used in all kinds of informalized areas and in occupied natural reserve it does not consider the particularities of these areas. This research supports that where this double marginalisation occurs, the social aspect should not be addressed without including the ecologies and vice-versa. A megalopolis like Sao Paulo depends

on the quality of its water reservoirs, its vegetation cover that regulates the temperature and its ecologies that ensure soil structures and the production of food among other natural cycles. In this sense, addressing low-income territories should not be a choice between facing social exclusion or solving natural destruction. In such areas, with the most precious ecologies, new models must be found to integrate the populations in these territories and create new models of urbanity that allow the conservation and protection of natural and social ecosystems. In other words, this re-evaluation table should promote the improvement of degraded areas rather than a point of no return to an artificial city.

Socio-ecological movements

The theory of socio-territorial movements (Halvorsen, Fernandes, Torres, 2019) contributed to support the notions that communities and their members are the main actors that compose, decompose and recompose their territories. In that line, the communities of occupied reserves have the potential to redesign through *mutiroes* and block after block generate typologies that construct these territories.
In their notion of a socio-territorial movement, the authors propose to differentiate the 'socio-territorial movement' from the 'socio-spatial movement' by the fact that it appropriates the territory in pursuit of a political project for survival or contestation.
After this field research, this study interrogates that and proposes to move beyond the socio-territorial to a 'socio-ecological movement' where the appropriation of the territory would not only allow a political project of contestation but also a revitalization of the ecological components of the territory itself. Through the protection and appropriation of the ecologies, a community could dwell in ecological lands and integrate in its neighbourhood development. The creation of a new kind of territory, with control over risk factors (of landslide or flood for example) by placing the risk factors at the heart of the community's occupation mechanisms through protective actions (structuring reforestation of soils; or creation of flood zones or planned buffer zones).

By doing so, the community would change its political position and identity, where it would not be categorically against the State and private owners but could hold them accountable for not providing adequate housing and access to basic rights (mobility, health, housing, leisure, etc.), while removing their means of pressure and exclusion (such as risk factors, or the division of the public between environmental and social protection). By taking on this beneficial role in the fight against the climate and social crisis, communities can prepare the foundations of new territories where these areas, which are also precarious because of their ecological degradation, would be the most prepared for future climate crises.

Fig. 7. Anchieta Community, 2020.

Conclusions

In the face of a socio-ecological crisis, Brazilian scholars have demonstrated the need to focus on land-occupation processes and investigated how «socio-territorial movements» enable marginalized groups to resist *through* territory. Additional research explored the existence of « low-incomes territories » created by the State legislations and conditioning the poor to illegality.
To further understand this phenomenon, this research aimed to explore key existing legislations, architectures and governance in these occupied ecological areas in order to explore the territorial structures and logics that generate these low-income territories.

This study hypothesized that the legislation attempting to protect these natural areas is generating low-income territories and exposing the ecologies to further destruction by failing to provide alternative housing solutions for the poor populations. This research also supports that alternative urbanisation models are needed in order to inhabit ecological reserves. Finally, this study proposes the notion of a socio-ecological movement - which builds on the notion of a socio-territorial movement - but adding the dimension of socio-ecological mutual protection. By appropriating the factors that weaken a community (physical risk and illegality in this case), and turning them into tools of defense, this community could convince the state to take responsibility and create the opportunity to develop new models of mutual protection between communities and local ecologies.

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SYSTEMIC AND HOLISTIC TERRITORIAL APPROACH

1-B-2

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Abstract :

Like other professionnals, architects and urban planners may be facing a historical turning point. The complex problems their branches are facing demand new paradigms, tools and organisations. The very foundations of these professions and the way they are practised are questioned by contemporary challenges, in particular those relating to land use planning and the built environment.

It is important therefore to bring together the scientific disciplines, knowledge and know-how that help define architectural form at its multiple scales (architectural, urban, territorial, and landscape) and dimensions (material, mechanical, symbolic, social, economic, etc.). Our aim is to mobilise all points of view through displacement and translation in order to better define forms so that complex knowledge mimics and ultimately becomes homologous to the complex realities it describes. Transdisciplinarity is the way.

Although building a transversal model that goes beyond binary logics and disciplinary divisions is an extensive and difficult task, we believe it is possible and indeed necessary. Elaborating such a model should facilitate the co-construction of a relational and integrative approach that allows for a better understanding of living and artificial systems, environments and appropriate ways of proceeding. Could this be a revival of the Vitruvian project? If so, it would come after a lengthy reductionist interruption of that venture, conscious or unconscious, forced or desired.

Key words:

cartography, holistic, modelling, systemic, territory.

> *"I have always thought, in agreement with the narrow cohort of modern scholars, that man is but a stenographer of brute facts, a secretary of the palpable world; that truth conceived not in a few universalities, but in an immense and confused volume, is only partially accessible to the ascertainable and undeniable scrapers, trimmers, snoopers, commissioners and storekeepers of facts. In a word, that in order to carry one's atom into the infinity of atoms that compose the majestic pyramid of scientific truths one must be an ant, a flour mite, a rotifer, a vibrio, a nothing! To observe, to observe, above all never to think, to dream, to imagine: these are the splendours of the present method."*
>
> *Charles Cros, Poèmes et proses.*

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Description is an apparatus. There is no point in involving 'thought'. Real 'measuring' instruments suffice. In any theory, there is a need to keep a sense of reality even in the most abstract elaborations. There is a paradox however: reality changes according to the theories and means of observation, and according to the tools and devices used to measure and qualify it. Science and epistemology provide examples and demonstrations of this[1]. What will happen then when we stop naming things as the Ancients did because we see them with other eyes and experience them in other ways? Just what is this novel reality that new tools and practices allow us to see and experience?

The paradox is only apparent though, since description is first and foremost an operation, a technique, a *modus operandi*, but one that demands a *modus vivendi*. Ernst Jünger retains and magnifies Goethe's lesson in defining thus any disposition to describe morphology: "When we describe reality, intention must fade away; it would compromise the topography. Furthermore, it should not matter whether a reality is dear or unpleasant to the observer. This presupposes discipline and asceticism in relation to ideal images".[2]

Giambattista Vico once proposed to replace the "critical" method of the Moderns --an "art of true discourse"-- with a "topical" one, "the art of abundant discourse". He thus emphasised the heuristic value and the role played by description in discovering the truth: « But I say much more than this. It is the art by which truth is apprehended, because it is the art of seeing under all the topical heads whatever there is in the matter at issue, which will enable us to distinguish well and have an adequate concept of it. For judgments turn out to be false when concepts are either greater or less than the objects they propose to signify. And we cannot be certain about this, unless we have looked at the object from every angle from which a question can properly be raised. »[3] To perceive the 'forms' and 'experiences' of a territory, as Goethe called them, requires not only excellent optics but also all the necessary equipment, he said.

Entire sections of a territory's reality remain totally inaccessible to the classical approach if only in bits and pieces and scattered among different realms of knowledge. However, this large mass of data, these complex and intertwined phenomena need to be mapped, described, classified, organised, linked and understood in order to become an efficient "material" for the actions and organisation of our territories, for them to be modelled. The work we present here and the modelling we effect are an attempt to lay the groundwork for a theory coherent with the facts to which it applies, and with all the facts of which th**e** territory is the seat.

The approach we take aims to set up an *open model* that describes, comprehends and perhaps even explains the multiple phenomena that organise our territories, from the most rural to the most urban, from the wildest to the most domesticated, from local intimacy to global publicity, from violent collective complicity to contemplation and sinuous individual trajectories... In its very elaboration, our model is an approach to "territory" understood as a complex living reality, indefinite and compact, multiple and mixed, including the living and the non-living, the fleeting and the invariant, the continuous and the discontinuous: this is how we propose to redefine the notion. We conceptualize territory accordingly as a system or a system of systems. Working with territory and inhabiting it thus requires that we understand it (as it is) through a model that takes complexity into account. Therefore, we aim to construct a dynamic modelling process that admits adjustments in real time and welcomes continuous confrontation with reality in order to confirm, improve and demonstrate its falsity. Neither multidisciplinarity nor interdisciplinarity are effective if they are but an addition and accumulation of research that is neither organised nor unified as a systemic vision. The growing

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1   Cf. Daston, L., Galison, P. 2012 [2007]. Objectivité, trad. fr., Dijon, Presses du Réel.
2   Jünger, E. 1992 [1964] Maxima-Minima, trad. fr., Paris, Christian Bourgois, p. 35.
3   G. Vico, De antiquissima Italorum sapientia ex linguae latinae originibus eruenda libri tres [1710], On the Most Ancien Wisdom of the Italians: Unearthed from the Origins of the Latin Language, translated by Jason Taylor, Ithaca: Cornell University Press, 1988, p. 178.

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complexity of reality and knowledge encourages us to stop addressing territory through as disconnected disciplines, but to seek their integration using a transdisciplinary approach.

One of the essential features of the abstract modelling advocated here and applied to the study of cities and territories is that it does not prejudge the nature of the reality it describes. In this sense it is hypothetical and deductive. The modelling process we recommend is non normative whereas the declarative figures of traditional design projects propose 'model configurations' to be followed and replicated (because they are supposedly 'beautiful', 'true' or 'good'). They are therefore ever inductive and tend ineluctably to standardize the environment[4]. Ours is an open conceptual formalization that defines a limit framework against which empirical reality can be confronted and 'measured'. Our modelling process aims to reveal the intelligibility of each territory and a specificity to be explored. These, in turn, inform the modelling process and the further development of its tools.

Anchored in a general theory of built and developed forms rooted in the methodological tradition and concepts of morphology (Goethe, St Hilaire, Thompson, Riegl, Focillon, Koehler, Thom, Ruyer, and others[5]) our modelling process develops a methodological and operational tool. Its rigorously defined categories, scales, gradients and combinatorics give access to the phenomena that organise territories. This approach defines the world as a myriad of events and objects arranged into distinct horizontal spatio-temporal strata by successive classifications and sortings. In a second phase ou approach weaves together the vertical relationships which seem to animate the strata and finally engages in stratigraphic maps that connect all sorts of dimensions. It is important that we draw from all the related knowledge, from its extensions and advanced developments. Based on both practice and experience, abstraction and theory, the aim of this work is to try to understand the *modus vivendi* by which forms of territories have adopted their structural plans over time, have been realised *hic et nunc* in a specific materiality, and have allowed, facilitated or, on the contrary, opposed and prohibited practices, organisations or imaginaries. This is an artificial, constructed montage of course, but its logic and rationality suggest that the theoretical *transparency* it makes us feel and perceive is due to the fact that it is assembled in such a way that the opacity attributed to reality is not substantiated (Fig. 1).

Sorting : Arborescence, Sieves and Filters

Our first step in making this model (Fig. 2) was to elaborate an abstract structure of classification and hierarchization for *all* the phenomena that constitute a territory. We ambition to have people perceive territory as it is and not as it should be: a dense and compact reality, a complex system, perhaps the most complex that we can comprehend and experience. Exhaustiveness of course is unattainable. We believe nevertheless that it is necessary and worth our while to make an encyclopaedic effort in order to gain a subtle, complex knowledge of territorial realities. In this respect, the 18th century has bestowed upon us an incomparable body of work and a way of thinking about describing objects. Making an inventory of all the riches of the three kingdoms of nature (mineral, vegetable and animal), classifying them, ranking them according to their similarities or dissimilarities in genus, species and variety was the plan for the intelligibility of nature and life that the naturalists conceived. The world could be full, individuals abundant and characters innumerable; these thinkers' ambition was to know and name the whole and the parts. The sole purpose

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4   Cerdà already remarked in his Teoria: "with time, the various manifestations of urbanisation have come... to merge. ... If we see one great centre of urbanisation in one country, we have seen all the others... today civilisation is the same in all countries where barbarism does not reign", La Théorie générale de l'urbanisme, trans. Seuil, 1979, p. 96, p. 132, p. 148.
5   We recently discovered the impressive work of philosopher Etienne Souriau. During the early 20th century Souriau sketched out a highly original approach to artistic forms. Over the past years the morphological issues he addressed inspired my colleague Patrice Ceccarini and I to conduct a joint study on the city of Urbino, Italy (publication forthcoming). Patrice also carries out research on other sites based on his own categories.

of this taxonomy or classification (also known as *systematics*) was to organise and decipher the whole to its utmost. Henri Poincaré goes so far as to assert that science itself is nothing but a classification, understood as a system of relations: "a way of bringing together facts that appearances separated, although they were linked by some natural and hidden kinship".[6]

Indeed, our aim is not to deliver an injunction that places forms once and for all in homogeneous, watertight classes, but to define the characteristics of those forms through formal and constituted knowledge, thus allowing them to fit into one set or another. Poly-membership is possible; the emergence of new characteristics does not call into question previous relationships. We do not need a priori categories, but rather formal organisations that the forms infer and that qualify their inclusion in one group or another. An ascending hierarchical classification such as this aims at distributing the forms in homogeneous groups structured by constitutive rules of sets that allow for multi-membership.

Our classificatory tree (Fig. 3) is organised around two modalities: one is *axiomatic* and the other *procedural*. According to the first modality territory encompasses three structural forms. These are defined in the works of authors from the relevant disciplines and bestow its first level of ramification to the tree. The second modality points to this: once the axiomatic step has been established, all phenomena are structured by a "principle of contrariety", *i.e.*: an interval whose terms are antagonistic. The gradual modulation of these terms one by the other enables us to explore the infinite variegations of a same phenomenon.

We therefore posit as a first axiomatic that territory is an intermingling of three branches of forms, as follows :
- *Physical forms*, or what is given, *i.e.*: Environment
- *Cultural forms*, or what is actualised, *i.e.*: Actions
- *Anthropological forms*, or what is inherited, *i.e.*: Origins

In order to define anthropological forms, we borrow a well-known triad from the work of Georges Dumézil: Jupiter, Mars and Quirinus[7]. According to Dumézil the triad defines functions that are at the foundation of all Indo-European societies and structure our social organisation and beliefs: spiritual and intellectual; war-monging and power; production and reproduction. There seems to be a consensus among scholars and scientists to define physical forms by distinguishing between inert (Ge) and living forms (Bios). Or to put it differently, between entropic and negentropic processes[8]. We define cultural forms following the propositions of J. Huxley and T. F. Hoult[9] They comprehend three constitutive elements: Norms, Institutions and Artefacts.

Once this axiomatic has been established, the branches of our arborescence follow a single procedural logic. Any definition of a phenomenon seems to require what we might call the "principle of contrariety". Existence and thought are impossible without the renewed opposition of opposites and the unity of antagonisms. This was already stated by Heraclitus in his *Fragments*. Tarde theorised this principle in his writing on *universal oppositions*: everything comes about via discord and controversy[10]. During the second half of the 20th century these considerations found resonance in the holistic mathematical approach of René Thom. According to

Thom morphogenetic stability is conditional upon the necessity of mechanisms of "struggle", "conflict" and

"opposition"[11]. Thus we posit via this "axiomatic systemic" that all territorial manifestations spring from a dynamic competition between opposites that results in a same reality.

Two categories can be opposed to each other only if they derive from a third distinct category which contains and overflows not only each of them, but also both. *Opposites are the extremes of an interval so to speak, the couple of a variation to which they are attached along with all the phenomena, infinite and impenetrable, that their admixtures and combinatories comprise.* From the interval of which they are the extreme terms the whole richness of reality's variations is freely deployed when observed from a certain perspective. This is in fact a necessary condition for the terms' constitution as the couple of an interval. Opposite terms are not heterogeneous and do not differ in nature: their difference is one of degree. They are in an antagonistic relationship; when one decreases the other necessarily augments. Therefore, they are counterparts of a same reality. The terms emphasise not a contradiction that would cancel out a dimension of a phenomenon but the contrariety that reveals it.

Thus, branches will develop from each axiomatic node into two branches that constitute the interval on several levels of categorisation, from the most general to the most specific. As the definition of the intervals in each category is refined, the arborescence as a taxonomic enterprise should result in a model project for classifying, visualising and mapping phenomena and data. Strictly speaking, the structure is a database template (Fig. 4) and an operational tool for a fundamentally descriptive approach to territory. It provides access, through multiple and re-appraisable indicators, to increasingly detailed knowledge of transdisciplinary phenomena, all while embracing their diversity.

The *arboresence* developed here is classificatory and hierarchical. Its operational purpose is to draw up a list of what we call 'abstract' cartographies (Fig. 5). These are necessary for describing a territory, identifing any gaps in our knowledge of the context, and pointing out blind spots due to technical constraints or situated outside our usual analytical framework. The development of such an arboresence or "ontology" gives meaning to the data and is a guarantee to finding a way through the conglomeration we call Big Data. Indeed, critics have long since moved beyond the speculations they fueled in the 2000s when, faced with the growing importance of digital data in society, they predicted the death of theory and science[12]. Today data scientists are unanimous: we cannot understand nor analyse this mass of data without looking at what is behind it and without knowing what it means and refers to[13]. In this way, an arboresence enables us to associate a meaning to each piece of data. It aims to provide a consensual conceptual basis for all the information characterising a territory, which can be used by the various actors involved in its planning, construction and governance (Fig. 6). It constitutes the core of the management system of a database, be it distributed or non-distributed. In a second phase it allows us to adopt the concept of

6   Poincaré, H. 1905. La valeur de la science, Paris, Flammarion, p. 265.

7   Dumézil, G. 1941. Essai sur la conception indo-européenne de la société et sur les origines de Rome, Paris, Gallimard. Hopefully, applying this categorisation to other territories where it is no longer or only slightly operative should incite us to propose a better generalisation.

8   Schrödinger, E. 1964. Qu'est-ce que la vie, Paris, Seuil ; Brillouin, L. 1959. Vie, matière et observation, Paris, Albin Michel.

9   Hoult, T. F. 1969. Dictionary of Modern Sociology, p. 93; Huxley, J. S. 1955. Evolution, Cultural and Biological, Yearbook of Anthropology, p. 2-25.

10   Tarde, G. 1897. L'opposition universelle, Paris, Hachette.

11   Thom, R. 1980. Modèles mathématiques de la morphogenèse, Paris, Christian Bourgeois, pp. 188-189.

12   See Anderson's provocative article: Anderson, C. 2008. The End of Theory: The Data Deluge Makes the Scientific Method Obsolete. Wired Magazine, June.

13   "Data will never speak for itself, we give numbers their meaning, the Volume, Variety or Velocity of data cannot change that.", J. Poppelars, OR at Work, http://john-poppelaars.blogspot.fr/2015/04/do-numbers-really-speak-for-themselves.html, April 2015. Likewise, Michael I. Jordan of UC Berkeley said: "The challenge of inductive thinking [in data science] is to look behind the data and try to understand the actual phenomenon that gave rise to the data.", http://www.lemonde.fr/sciences/article/2015/12/01/michael-jordan-une-approche-transversale-est-primordiale-pour-saisir-le-monde-actuel_4821327_1650684.html#SjZ17tCAVLwGjheH.99cannot change that.", J. Poppelars, OR at Work, http://john-poppelaars.blogspot.fr/2015/04/do-numbers-really-speak-for-themselves.html, April 2015. Likewise, Michael I. Jordan of UC Berkeley said: "The challenge of inductive thinking [in data science] is to look behind the data and try to understand the actual phenomenon that gave rise to the data.", http://www.lemonde.fr/sciences/article/2015/12/01/michael-jordan-une-approche-transversale-est-primordiale-pour-saisir-le-monde-actuel_4821327_1650684.html#SjZ17tCAVLwGjheH.99

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Ontology-based Databases (OBD)[14] in order to cope with the heterogeneity of the data to be integrated.

Remember that the purpose of an ontological model is to help define a common vocabulary for users who need to share information in a domain. The model includes definitions of the basic concepts of this domain and their relationships that are readable in machine language.

The path we have just described may give the impression of a linear, top-down process. But in reality the model's development is quite different. It is a two-way movement with crossings that cut through the lines. On the one hand, a downward abstract objectification of the phenomena ensures both generativity and connections from the most general to the most specific forms. This process secures the descriptive power of the abstract categories we employ. On the other hand, an upward movement from the phenomena to the categories furthers the development of each interval and ensures the coherence of the lineage. Finally, by a transversal movement from the empirical phenomena, we must ensure that nomination describes a specific attribute to be found nowhere else. At a higher level nevertheless an attribute may belong to several forms. Ultimately an overall coherence is attained (Fig. 1).

Cartographies, stratigraphies

Starting from the last level of abstract categories, we design namelists for maps of empirical phenomena. Each interval allows us to qualify these lists. As often as possible we adopt the common names of empirical phenomena that are prescribed by established disciplines. These lists of cartographic materials retain a degree of abstraction; this enables us to mobilize them in each study of a particular territory or concrete case. At this point they are not yet data, but rather *attributes* or inputs from which we may designate all kinds of data, as well as the maps they are related to (Fig. 7).

The stratigraphic space is a collection of maps. Each one is associated with a well-defined reality and affected by physical or material marks, uses, behaviours, representations, affects, and imaginaries... We pass from one map to another by a number of paths that each refer to meanings of different orders (physical, functional, symbolic, of usage, of value). Each of these multiple maps projects a specific expression in spacetime, but they all only really make sense when linked and assembled. Their *unity-multiplicity* is embedded in the successive interconnected layers. This is a fibred space in the mathematical sense, a basic space where each point, called a fibre, is associated with another space so that it can move from one fibre to another. Fibred space is therefore a bundle of interconnected spaces, namely an A Thousand Plateaus comprising three fundamental forms: physical, anthropological and cultural. These are interrelated; one can translate, transport and make transfers from one fibre to another and from one form to another.

These stratigraphic materials function necessarily at several scales, global and local[15]. One informs the other; the conclusions of the former are reshaped by the latter and vice versa (Fig. 8). However, locality and globality are not absolute values, but an order. An order that can take on a plurality of values and be deployed at different magnitudes. The dynamic[16] of scales that is now possible thanks to Geographic information systems (GIS), gives us the opportunity to see that any territory is the material site of multiple inscriptions, at times solid, resistant and tenacious, at times brief, ephemeral or intermittent. Whatever some people may think or wish, a territory is not limited by enclosures, walls or ramparts, administrative sectorisation, district designs, nor even by a country's borders. Stratigraphy reveals to us that each lot bears traces of both close and distant interactions; it reflects the memory of the circumstances of its foundation and of its incessant mutations.

14   Gruber, T. 1993. A translation approach to portable ontology specification. Knowledge Acquisition, 7, pp. 199-220.
15   One of the fundamental problems currently posed to theoretical reflection, land-use planning policies and urban modelling concerns enveloping scales and redefining the notions of "global" and "local" in the light of new tools for cartography, geographical representation and, on another level, new means of communication and networking.
16   G. Ritchot and G. Desmarais insist a lot on this dynamic which shapes territories on a phenomenological level. See Desmarais, G. and Ritchot, G. Structural Geography. Paris, L'Harmattan.

Integrating all these maps into a global structure requires that we master the science of correlations governing the geometry and topology of the forms. A *theory of the elementary formal singularities* that define a territory in an abstract and objectified way is also required providing it includes the framework for meanings.

Tabulation

The arborescence constructs a combinatorial "table" and allows us to determine cases and seriate variations. As this arborescence reveals the opposite and extreme terms of any reality and their representations by layers of successive maps and through a play of antagonisms, the tabulation encourages the association and differenciation of terms. This concerns *intermediate* and hybrid rather than middle-range terms, as we discriminate gradations and weightings. The resulting tabulation is an operation of operations. Through it we will explore both the extent of the multiple configurations and forms of phenomena and events, but above all their mixtures, imbrications, intrinsic hybridizations and interdependencies; once posed, they are available to our apprehension, better, they are established for our understanding. This polymodal, multi-criteria and multi-dimensional process tells us that in order to understand this complex reality we must vary our points of view and representations. It builds a network of intertwined but intelligible meanings and forms that allow for sufficient explanations and appropriate and coherent actions. Without doubt, it is the guarantee that we can speak about all the constituents of a context, or at least all those that the knowledge we have allows us to collect. These are all the possible parts of a given reality, useful or useless, appreciated or depreciated, necessary or accidental, dominant or dominated. Filters intervene afterword and in a transparent manner.

To do this we had to conceive 'thinking machines'[17]. We arranged the categories of our arborescence on a two-dimensional table, allowing for them to be combined two by two in two simultaneous directions and alternately giving ascendancy to one or the other. The device proceeds level by level and then from one level to another (Fig. 9), disseminating in a cross-order of rows and columns. Words are chosen for their capacity to characterise categories equipped in such a way as to produce new categories themselves by simple juxtaposition or convergence[18]. And we find ourselves discovering new lands, filling in the gaps in our old practices and theories. From mere movement, but by alternating its orientation --forward/backward, before/behind-- results change, meanings differ and the phenomena described diverge. All we have to do then is to systematise the process in order eventually to see and reveal what we do not yet know, to understand and map the whole, the totality[19]. The system is thus revealed in the whole as it is in its parts. The technique is the same throughout the table and therefore invariant, but the tabular results are specialised by table according to their primitives[20]. Accessing the grammar governing the footprints that mark and give form to territory

17   This was our approach before we came upon the work of Patrick Geddes. He encouraged us to continue in this direction while better specifying it. See in particular: Meller, H. M. (ed.) The Ideal City, 1979, Leicester University Press, as well as our article, Hammoudi, T. 2020, Architecture as an Information Machine, Footprint, Delft Architecture Theory Journal, 28.
18   What we present here is a simplified version of the perspective, drawing on the work of linguist Lucien Tesnière. Cf. Tesnière, L. 1953. Esquisse d'une syntaxe structurale, Paris, Klincksieck.
19   Totality mapping projects are increasingly being developed. See for example: Human Cell Atlas, The Human Protein Atlas, Human Brain Atlas.
20   This is reminiscent of the za'irja, a device invented by Arab astrologers and painstakinly described by Ibn Khaldoun in the 14th century. Khaldoun wrote notably about Ramon Llull's "Events' Thinking Machine». On the basis of nascent algebra and the techniques of al-jabr and al-mouqabala, the art of combinations then took shape: sentences, words, letters and numbers were distributed. From then on they faced each other in space and on heuristic devices that no longer allowed any knowledge or practice to escape tabular jurisdiction. We should not deride these practices too hastily as esoteric and solely applying to divination. Contemporary statistical calculations, predictive analyses and big data algorithms are totally indebted to them. Heir to this tradition, which he explicitly admired, 17th century philosopher Leibniz developed his Ars Combinatoria and «alphabet of human thoughts».

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is a means to reunite both laws of individual and infinitesimal facts, and the logic of their intermingling and concurrence[21]. However, a grammar will prove meaningless if it has not been immersed in the pragmatics that engender and animate it. This is the reason we designed an operative tabulation that goes beyond the categories, or more precisely, includes even the facts classified under these categories and the maps that represent them. It is important that we devise tabular operations of the table that can produce all possible combinations. Among these are the phenomena we are looking for; their traces appear in data and maps. The operation poses relationships as a prerequisite and induces them as soon as it is put into action. There is no point in thinking about an operation if no type of relation is feasible; on the other hand, from the moment we consider operating, we begin to question and scrutinise every possible relation.

Two operators seem necessary for this tabulation. One is *semantic*, it operates from and on the conceptual categories organising the data. The other is *geometric* and *topological* and acts on the geometric figures describing the phenomena through cartographic representations. Thus tabulating must allow for both the semantic similarity required in order to constitute classes and access to the lowest and most interesting level of granularity. In its first stage, the geometric-topological component rests existing tools of spatial analysis and Brunet's chorematic diagrams[22]. These two approaches have already been developed in the field of geography and in semiotics, but remain independent and uncombined. One of the future axes that we would like to develop is to make the two methods correspond and articulate them around forms of territory.

Territorial singularities

A deductive theory of the forms and elementary schematizations of territory is certainly necessary for a harmonious integration of these two operators. At present they are targeted to describe and account for the structures that organize territorial realities. Systematized and semantized structural definitions such as these open on to an understanding of territory as a deployment of *singularities* that characterize it. *Territorial singularities* are not elements or independent forms that impose themselves on the other forms by subjugating them as are identities. They are forms among others that are not necessarily interrelated. They make up a network of arrangements that are selected, organised and constructed from the elements belonging to the stratigraphic study undertaken in such a way as to converge (consistency) towards salient and remarkable forms that can be deployed in the form of multiple current realities and diverse and varied projects. These forms are never individual structures, but a multiplicity of ordered structures and coordinated substructures. In the end, they embody, express, present and represent the complexity of the territory and phenomena involved. We understand these forms to be the structure of a territory that concentrates intrinsic dynamism and potentialities. This suggests prospective strategies of intervention and possible scenarios as responses to trends identified at the local and global level.

To define the singularities of a system is not an entirely free operation in which all options are on the table. One must go through a series of approximations, find definitions that are consistent with the observations and accordingly precise. Singularity in this sense is not a concept, but a process. Aggregating and interconnecting these local singularities introduces us to the structure of both microscopic and macroscopic forms, stable structures that are constantly and indefinitely perturbed by ongoing climate change, by our societal organisations, beliefs, techniques and varied productions. They sustain invention and mutation; they endure despite the vicissitudes of history. Above all these are emergent, "potential forms", open to virtual actualisation in a given situation.

Potentialities

Our objective in implementing modelling and experimenting with methodological tools is to foster detection of the dynamic potentialities encompassing the singularities of a given territory.

Exploring and achieving these potentials means considering the various ways of accomplishing them via projects that are permeated by concrete mechanisms of collaborative participation at all stages and acted upon by transparent and informed civic deliberations. *Any territory, whether artificial or natural, develops, operates, functions and produces only through the deployment of its potential*. Fixed, closed, permanent, redundant, peaceful and predetermined, or open, moving, variable, tumultuous, differentiated and unpredictable. Potential is not actualisation in reverse, but a reality that suggests the conditions of its actualisation. *Potential is a virtual reality that is on the cusp of being actualised*. Hence the possibility and necessity of contradiction.

Potential is not simply a property or a quality that already exists and can be continued as such, perpetuated by new figures or revitalised at will. Potential is a modality that dynamically controls future developments and morphogenesis without predetermining them, and the matrix of conditions for all kinds of emergent forms. Existing and old forms of course, but also forms to come and forms to be projected by different project strategies.

Without being determined by resources that are already there, potential is always connected to the domain of actuality and reality. It always needs devices for attachment or anchoring so that it can come about and develop. So that it manifests itself in the order of the possible. Old preserved objects, inherited tradition, wastelands to be converted, riverbank developments, tramway installations, pedestrian walkways, local practices, heritage forms -- contrary to appearances these are not necessarily and arbitrarily valid, admissible and virtuous, they must be called upon by something current and situated. *There is co-determination or co-adaptation of inhabitant and territory*. Potential is necessarily polymorphic, virtually protean and contradictory; all actualisations remain possible as long as no one has noted their impossibilities. This is the reason that our graph of potentialities (Fig. 10) stems from a deductive procedure --that remains to be generalised-- the sources of which are the actuated singularities of territory, and thus *in fine* the values that have shaped them for millennia. As singularity is a form that subsumes a set of forms, defining its system means obtaining the means to characterise the set of potentialities that they relate to, based on its constituent parts.

Conclusion

The tool we present here consists in the development of an *integrative systemic model of territorial analysis and prospective*. It is structured around an elaboration that combines abstract, formal and theoretical considerations as well as technical, practical and operative imperatives. On the one hand it comprises fundamental notions, discriminating categories and logical and formal operations; on the other database requirements, GIS --its potentialities and limitations--, data visualization algorithms, mining protocols and processing procedures.

The major interest of our modelling approach is to allow the constitution of *observatories of territorial dynamics* to which researchers and ordinary citizens can contribute in an ongoing manner. *Ab hinc*, the observatories are not only *the sum total of a territory's history, of things and beings*, but above all the chance to account for the persistence and contingency of multiple concrete achievements, further projections and simulations of future developments.

Translated from the French by Roberta Shapiro

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21   Our approach is an extension of the Tardian method. See Tarde, G. 1898. Lois sociales : esquisse d'une sociologie, Paris, Felix Alcan.
22   Brunet, R. 1980. La composition des modèles dans l'analyse spatiale, L'espace géographique, n° 4. As for research on semiotics, we refer in particular to the work of Boudon, P. 2013. L'architecture des lieux, Gallion, Folio.

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fig. 1. Methodological diagram: cycles and iterations

fig. 2. Methodological diagram of the model
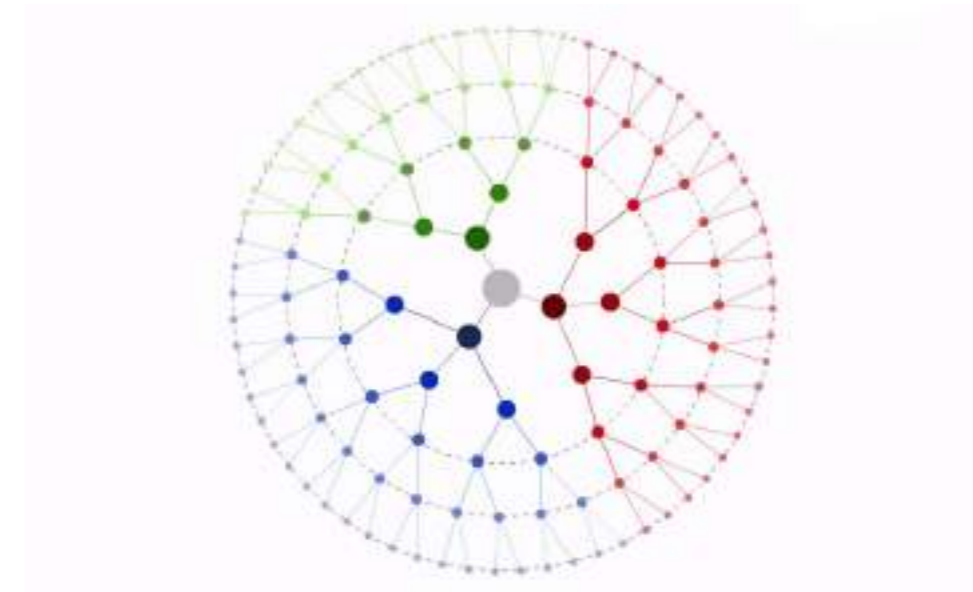
fig. 3. The general organising principle of the arborescence

fig. 4. Template structure for a geographic data base

fig. 5. Maps

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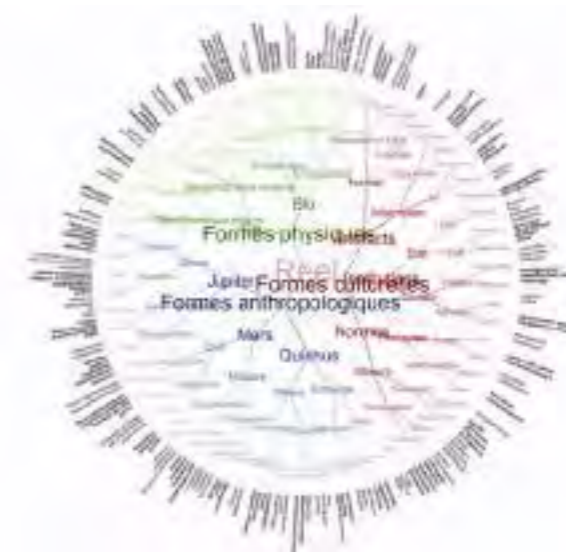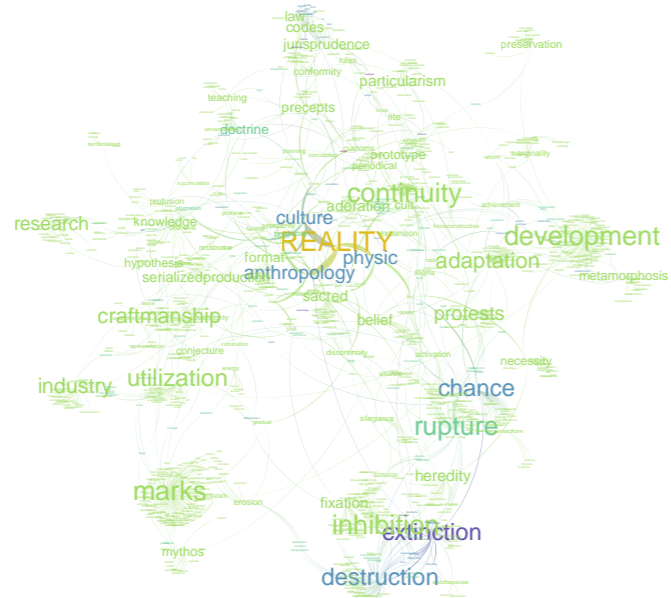
fig. 6. Semantic arborescence
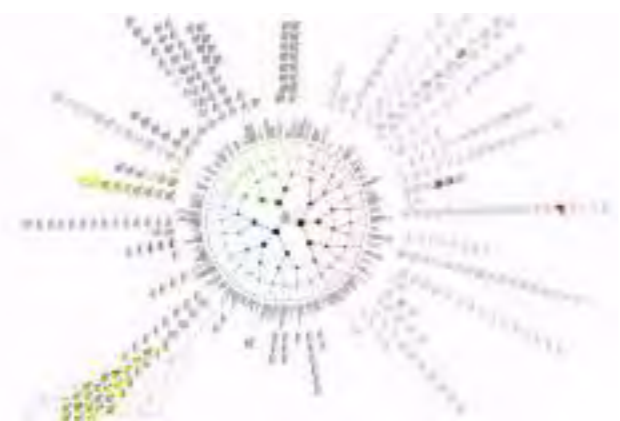
fig. 7. Distribution of maps at different scales

*fig. 8. Examples of stratigraphic data combining local and global scales
(Territory: Lisbon)*

fig. 9a. General tabulation

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PROFANE		ENDOCTRI-NEMENT	INSTRUC-TION	ACCULTURA-TION	ENTROPIE
	SACRÉ	CROISADES	DROIT DIVIN	SYNCRÉ-TISME	SANCTUARI-SATION
ART DE LA GUERRE	PROSÉLY-TISME	MILITAIRE		CONTRÔLE	MÉMORIALI-SATION
INSTITU-TIONS	SYNODE		CIVIL	DIALOGUE	ÉCOUMÈNE
ENSEIGNE-MENT	COMMU-NION	IMPERIA-LISME	DIPLOMATIE	ÉCHANGE	
BIO-MIMÉTISME	ANIMISME	GÉO-POLITIQUE	PLANIFICA-TION		NATURE

fig.10. Potentiality diagram (Territory: Urbino)

Les tabulations des FA reposent sur les mécanismes décrits ci-dessus, à ceci près que le tableau détaillant les combinaisons n'utilise pas des phrases avec *sujet - copule* (p. présent ou p. passé) - *prédicat*, mais des **phrases nominales**.

Celles-ci sont éminemment plus synthétiques : l'action, habituellement suggérée par un verbe, se trouve ici substantivée. Le geste est cristallisé dans le mot : *affinité, anthropisation, arme, assise, convoitise, diffusion, modèle*, etc.

Pourquoi dédaignons-nous la clarté propre à la forme verbale ? Pourquoi, précisément, pour les formes anthropologiques ? La possibilité de la brièveté synthétique serait-elle l'apanage du recul historique que permettent les FA ?

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fig. 9b. Example of a tabulation (detail of 9a)

URBAN REGENERATION, PUBLICNESS AND PARTICIPATION IN SPATIAL PLANNING: A CASE OF TAIPEI

1-B-3

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Abstract:

This study examines the issue of publicness and the practice of public participation in urban regeneration through municipal-led social housing as an approach to urban regeneration. The study examines the case of Taipei through the project process and deliberations to understand the communication and decision-making patterns of the project, which includes an analysis of who is eligible to be a participant, who is ignored, and the extent to which these participants are given decision-making power. As well as, what the public interest discussions are for these final urban regeneration projects. This study found that the participatory process, in this case, was quite ineffective. This is because the communication of the public interest at the outset led to conflicts between the municipality and the residents. And when the participatory process could not reach a consensus within a certain time frame, the one with the final decision-making power (the municipality) made an authoritative decision instead of continuous public communication.

Key words:

Urban regeneration, Taipei, Publicness, Participation

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1. INTRODUCTION

The curiosity in this study begins with several local phenomena in Taipei. Firstly, current urban regeneration projects exacerbate complex urban problems such as gentrification and housing speculation. The original intention of urban regeneration is to provide new urban development in the older parts of the city. However, these projects have mainly occurred in areas of relatively new development, triggering unequal urban development. Secondly, privately owned public open space (POPOS) plays an essential role in Taipei's urban areas, as public space is the object of 'trade' in the urban renewal incentive system. It is the product of transactions between planning authorities and private developers in the name of 'public interest', yet there is little discussion about whether these public spaces are public or not. Thirdly, participatory planning was identified as a 'must-have' in the planning system with the political transformation. However, while participatory approaches are seen as fundamental to achieving inclusive spaces theoretically, it remains a challenge to address situations of conflict of private and public interest and property-led developments, as a participatory approach is not a method but a model of governance that should lie between procedural and substantive, so there is no one-size-fits-all package that fits all situations. Hence, the primary query of the research is summarised as: **How does participatory planning influence publicness in urban regeneration projects?**

To answer this question, this study examines one of the cases of social housing as an urban regeneration approach that emerged in Taipei since 2014. This study extracted a wealth of valuable information for analysis through interviews, government meetings, attendance at government workshops, field observations, and a study of all public participation meeting transcripts. I explore the project process and deliberations to understand the communication and decision-making patterns of the projects, encompassing an analysis of the stakeholders and inter-stakeholders, who qualifies as a participant, who is ignored, and to what extent these participants are empowered to make decisions. and what the public interest discussions are for these final urban regeneration projects.

This study brings the discussion back to the implications of public participation in urban regeneration in Taiwan, aiming to address the knowledge gaps in participatory planning theory and specific planning practices. It discusses the implementation process of participation and the dialectical relationship of publicness and public participation in planning. In particular, it examines the competition, evolution and coexistence between public participation and public interest, and how physical space is renewed in Taiwan, which can also feedback to not only local planners but also in other parts of the world that are in a tug-of-war between the market and the state.

Finally, this study attempts to enrich the contribution to participatory planning theory. The issue of urban regeneration has been one of the most cutting-edge issues in urban governance; stakeholder participation and conflict management have been placed in specific planning processes. However, the extent to which participatory planning can be institutionalised or informally incorporated into urban regeneration is relatively unknown. This study analyses this through the case of Taiwan, where, on the one hand, the planning system has always had a centralised and pro-market tradition. On the other hand, the process of marketisation and democratisation offers the possibility of a public dimension to urban regeneration. Therefore, this study will contribute to the understanding of the characteristics of governance models, which influence the formation of socially inclusive public spaces in residential areas.

2. THEORETICAL REVIEW

Urban regeneration

Urban regeneration
Before the 1970s, most policymakers recognised that the straightforward spatial transformation approach was to demolish old neighbourhoods and replace new buildings and public infrastructures. These inner-city wiping out policies have been criticised and resulted in changes that policymakers and planners started to recognise a greater emphasis on rehabilitation and improving spatial quality rather than merely demolishing the existing neighbourhoods. A new method that integrates social and spatial transformation has been implemented (Stouten, 2010). This new idea leads to planning practices shifting from narrower space and building renewal to broader urban space and functions regeneration aspects. It is the turning point from renewal to regeneration, especially in Western European cities (De Magalhães, 2015; Stouten, 2012). Urban regeneration is not merely the renewal method of urban areas or buildings. However, it also attempts to address new challenges such as global economic and urban competition, climate change adaptation, and socially inclusive development through integrating urban governance strategies and spatial planning. However, its multidisciplinary nature, as well as multi-scale, multi-channel governance and networks (Davies, 2002; Mossberger & Stoker, 2001; Rhodes, 2000; Stoker & Mossberger, 1994), and increasingly sophisticated planning mechanisms have led to complex and lengthy regeneration processes and incoherent goals. This has further led to the perceived ambiguity of the proclaimed public interest in urban regeneration. a more explicit analytical framework is necessary. urban regeneration from three interrelated perspectives: Property ownership, publicness and participation in spatial planning.

Public participation in spatial planning
Spatial planning is considered to be an essential public service that introduces public participation (Baker et al., 2007). The earliest and widely spread theoretical participation model is the 'ladder of participation'(Arnstein, 1969).It takes the extent to which people are involved in decision making as the only measure of participation. It distinguishes between eight forms of participation, ranging from no participation to low levels of citizen power ('manipulation', 'therapy') to partial participation ('informing', 'consulting' and 'appeasing'), then to full involvement in the decision-making process ('partnership', 'delegated power' and finally 'citizen control'). The ladder gives a spectrum of participation in decision-making processes. However, ways of communication (how), authority (to what extent) and who should be participated (who) in a specific topic is more complex than solely indicating. Planning theorists thus introduced 'collaborative planning' (Healey, 2006) and 'communicative planning' and the concept of 'stakeholders' to expand more participatory dimensions (Fainstein, 2014; Innes, 1992; Innes & Booher, 2015; Monno & Khakee, 2012; Puustinen et al., 2017; Tayebi, 2013). The new planning theories depict the planning ideal as multiparty communication involving private interests, public institutions and citizens. As Innes (1992) proposes, by introducing an 'arena' of decision-making where different stakeholders are involved, communicative planning can "closed the theory-practice gap (Innes, 1992: 183)". Nevertheless, this 'arena' unavoidably faces power inequalities between stakeholders and the contradictions between their value systems. As a result, the planning and management tools have become increasingly complex, but also increasingly distant from existing urban problems. This has led to the emergence of the concept of 'planning as conflict management. It emphasises conflict as central to spatial and land use planning, which in turn creates opportunities to broaden the participation of stakeholder groups (Rogers, 2016) and to resolve disputes in land use planning arising from scarce resources (Bartos & Wehr, 2002; J. Campbell et al., 2005) and contested values through more sophisticated governance (Cullingworth

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& Nadin, 2006). In Taiwan, with democratisation in the late 1990s, Huang observed that Taipei municipality institutionalised participatory planning for the first time. An attempt was made to combine civil society and planning techniques, allowing community action to act as participants in planning and weakening the government's dominant role (Huang, 2006). However, issues such as the conflicts arising from the institutionalisation of participation in Taiwan and the interests of the various stakeholders have not yet been given much attention.

Publicness in spatial planning

Planning often involves multiple antagonistic parties, and there may be less common ground on how to address different needs and establish priorities. Land use and environmental issues involved in spatial planning require more attention to scientific and technical considerations and socio-economic impacts, which can involve long-term and irreversible effects. In general, spatial planning involves the juxtaposition of choices made by those dealing with three broad categories of public interests: 1) allocation of limited resources; 2) prioritisation of policies; and, 3) concerning environmental quality and sustainable development, which also encompasses the maintenance of physical environments and human well-beings: mental health and safety. Therefore, spatial planning practices inevitably involve restraining and regulating private property rights, which are highly conflicting because they involve stakeholders based on their divergent interests and identities (Cullingworth & Nadin, 2006; Peltonen & Sairinen, 2010). In this research, I divide publicness in spatial planning into public interests and public spaces. Public interests are the weighing of different interests, and public space is about creating, using and managing a physical space that is freely accessible for the public (often called urban open space). Public space can be seen as the physical realisation of public interest. For example, we need a community public space as the interaction of people in the community is one of our public interests. As experienced in the UK (Maidment, 2016) and the US (Ward, 2004) have shown, the public interest is the legitimacy of representative democracy; however, in practice there is no direct mechanism for the public to participate in the planning process.

Similarly, planners were thought to encourage public participation in planning, but not asking why (H. Campbell & Marshall, 2002b). In the practice of making decisions about specific planning proposals, the public interest is perceived to be about preserving public space or promoting economic growth, which is not easily settled(Tait, 2016). For example, in developmental states like Taiwan, planning is used as a tool to facilitate economic growth development (J.-Y. Hsu, 2005; J. Y. Hsu, 2011; W. J. Huang, 2019; Shin, 2019a, 2019b), which is an unquestionable public interest. On the one hand, in Healey's (2012) view, the consequence is that many people feel excluded and ignored and that the state responds to public concerns because of intense media pressure rather than discussing them with the general public. Citizens are not allowed to meaningfully engage in debates about addressing them (Owens & Cowell, 2011). This can be partly attributed to a lack of clarity in the way the public interest is addressed. On the other hand, planners find it difficult to know to whom they have obligations and where public participation fits into planning activities(H. Campbell & Marshall, 2002a). These issues are consistent with the difficulty of identifying a single public interest while recognising social diversity and reconciling the presence of diverse publics at different scales. In order to deal with this complex dynamic process, theorists have proposed different approaches. In particular, the expansion of participation as a mediation of policy and planning decisions. Ross & McGee (2006) highlights the importance of social impact assessment, particularly of those affected groups, to understand the conflict and identify participants. Interactions between stakeholders are not limited to debating their interests but are mediated to serve the actual needs of the stakeholders (Forester, 2006) Participation is, therefore, more than just the exchange of information, or the more meetings, but a deliberative activity based on the fundamental interests of the stakeholders. The role of participation is not only to ensure the quality of decisions. Participation can transform individual action into collective action in pursuing public interests in spatial planning.

Conceptual framework

Synthesising the above discussion, therefore, a state-of-the-art conceptual framework is needed in order to understand current practice. This study on urban regeneration starts from three interrelated perspectives. Property ownership (and the planning interventions or private dominance it entails), publicness and participation in spatial planning. Fig. 1 illustrates the conceptual framework for this study. The aim as participation is to understand publicness (the specific public interest), which can be realised through urban regeneration. This public interest is multi-scale, from a region, a city, to a block and a building.
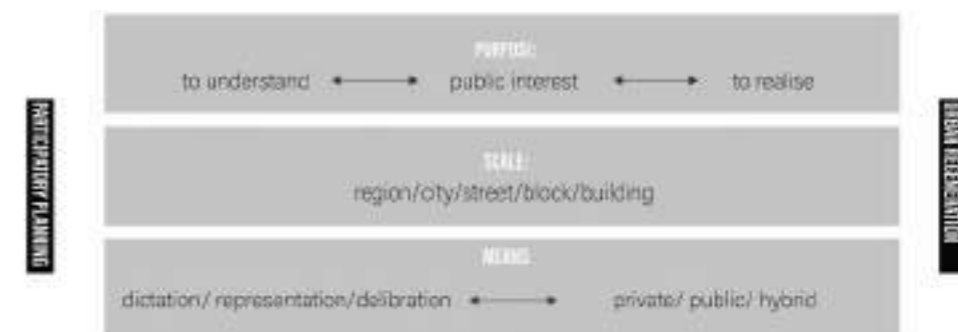
Fig. 1 Conceptual framework

3. CASE INTRODUCTION

Starting in 2014. social housing was formally introduced abroad as a rental-based scheme with affordable rents and reasonable living conditions for the general population, not limited to the lowest income earners. The new era of social housing in Taipei has begun.

With the announcement of the first attempt of the social housing project, the municipality framed it as a project that go through participatory process with the residents in the surrounding area, as the municipality expected it to realise urban regeneration in the surrounding area and also in the hope that the means combing social housing and urban regeneration will alleviate residents' concerns about the impact of such large-scale housing on their residential areas. The municipality and the commissioned architects have committed themselves to realising the public spaces and services provided by this large housing complex in a way that meets the voices from the residents, and which will be transformed to achieve the urban regeneration of the area.

The planning and design challenge in this project was the large volume of the building to accommodate the new 507 homes for social housing tenants. The project is proposed as an urban regeneration approach that would not only allow for a reduction in the impact of the large social housing complex on the neighbourhood, but would also create a new urban public space that enhance the quality of the living environment for the whole neighbourhood (see Fig. 2).
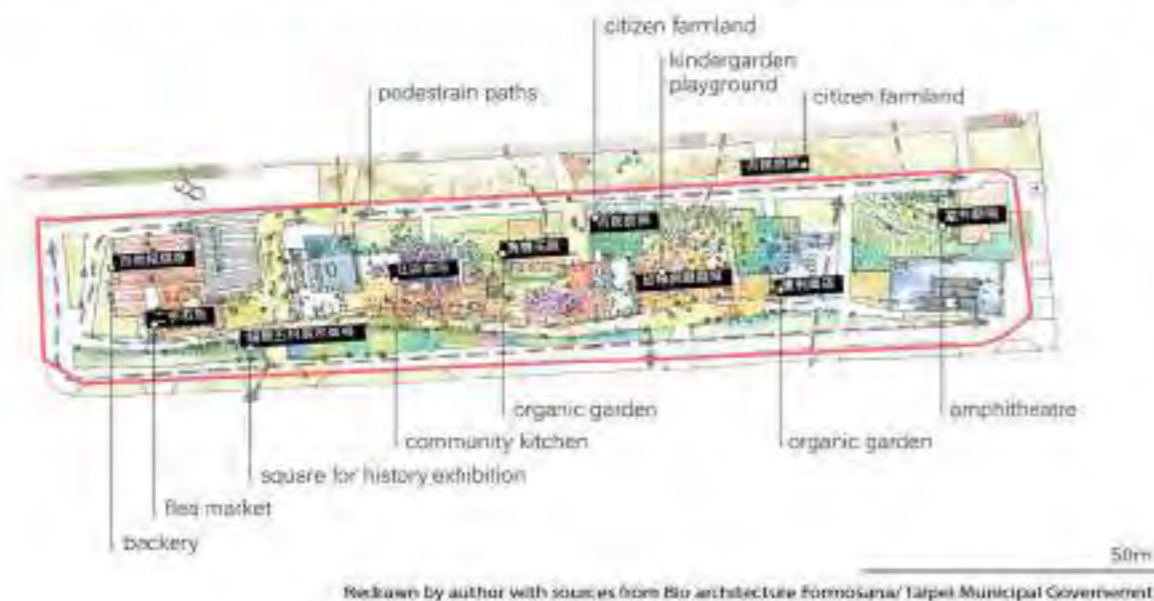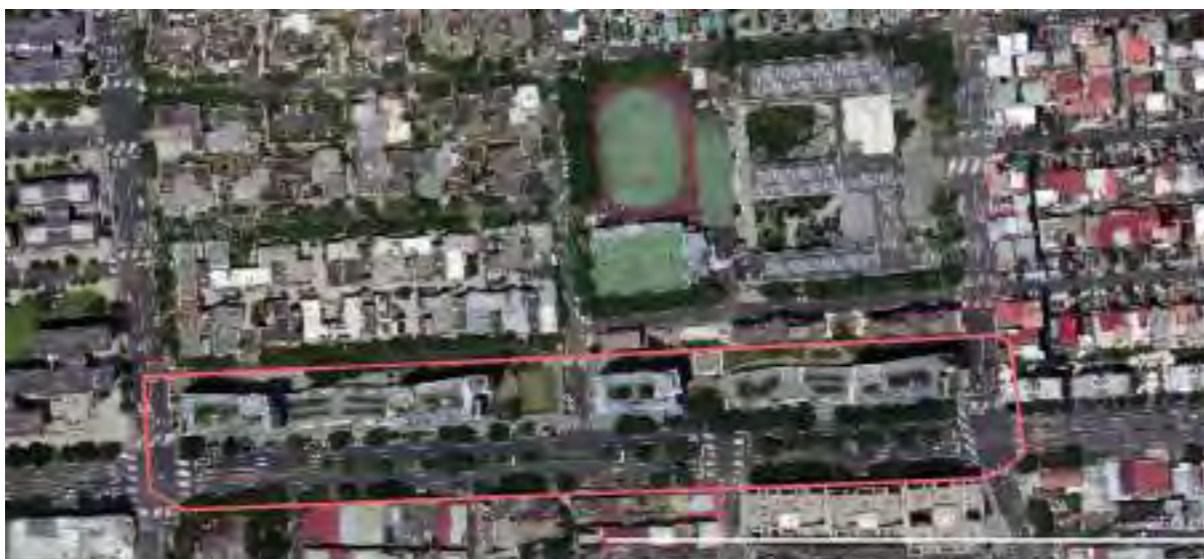
Fig. 2 Upper: The concept for the ground plan showing the integration of pedestrian routes and open space plan.

4. FINDINGS AND DISCUSSION

This study investigates the different stages of participation: from public opinion surveys to public meetings. The study is based on the objectives, the topics discussed, the presentations made by the residents and the organisers of previous presentations and workshops for the residents. The following summarises the findings of this study:

Ambiguous stakeholder identification

The participant recruitment process in this case was open and targeted through the specific recruitment of residents from the four boroughs adjacent to this case, as well as the free participation of residents outside of these districts (if they were aware of it). This reflects the municipality's identification of stakeholders in NIMBY (not in my backyard) as residents of these four boroughs. The municipality's delineation of the zone boundaries for stakeholders has not been researched and investigated, nor has it explained why residents of these four boroughs are considered stakeholders of equal weight. For convenience, the municipality used the residents of these four boroughs as the primary stakeholders in this case and also used these identified stakeholders as participants in the process. This ignores the fact that residents in the four boroughs are not all affected to the same extent. For example, those who live just across the street from that social housing are affected differently from the others; the impact of new high-rise social housing on the neighbourhood is also different from other residential areas in the same neighbourhood, but their differences are not specifically highlighted.

Such stakeholder identification was also challenged by residents living closer to the location of the case, who felt that those living further away (or not adjacent to the site) would be less affected and would therefore vote in favour of the government's social housing decision. It is also clear from the voices in the minutes of the meeting that those who spoke against the decision were mostly representatives of the housing blocks close to the site.

Lost in mutual trust, listen as spectator and express preference

The promise made by the previous mayor that social housing would not be built without the consent of a majority of residents gave residents a sense of trust at first, while the team of architects, despite their lack of experience in participatory planning and design, were willing to try and work with residents. Subsequently, the way in which the public opinion survey was conducted and the way in which it was responded to did not work. On the one hand, the participants began to perceive the participation process as a convincing exercise by the government, and the team of architects was perceived as a partner in the city's convincing efforts, which in turn influenced the spatial participation process of the team of architects. On the other hand, the team of architects came to see the residents as selfish and seemed to care more about the value of their property being affected by the social housing. In the end, the municipality could only try to convince local residents by packaging the social housing policy in the name of public interest. This all adds to the uncertainty of mutual trust.

The issue of responsiveness also needs to be extended to the planning system, although this seems to go beyond the original setting of this participatory process. After all, the municipality claims that this social housing project will have an urban regeneration effect. Under the current blueprint planning system, the application of adaptive planning principles is highly unlikely, with planning review cycles of as little as five years and as long as ten years or more. This makes it difficult to adapt the plan to new changes in society and to new spatial needs, such as down zoning or the adjustment of the level of public services in the residential area to the new social housing. As a result, even if participants requested a reduction in the number of households of the social housing and more green space, the municipality is unable to give a specific response as to how this should be approached in the participation process for the social housing.

Conflicting values in the spatial transformation

In this participatory process, the main thread of spatial transformation focuses on public space, but there is a difference between the municipality and the participants in terms of the impact of public space on the neighbourhood. For the municipality, it was about convincing residents that not only would there be no negative impact, but that it would even lead to urban regeneration for the area, as the new public space created was sufficient to improve the quality of life in the community, while the participants were concerned about the impact of densification on the community's landscape, open spaces and the provision of public services.

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This seems to be a typical NIMBY scenario: residents are opposed to new high-rise developments in their neighbourhoods, and are particularly concerned about the quality of social housing and the quality of its tenants (McNee & Pojani, 2022; Scally, 2013; Scally & Tighe, 2015; Wassmer & Wahid, 2019). In this regard, the NIMBY phenomenon is a confrontation between local residents and developers (or municipalities) over land-use interests (or values), and even though the former may consider new development to be beneficial to the area (Eranti, 2017), they are more concerned with whether their own interests are being compromised. Thus, inevitably, in different cases, NIMBYism carries negative connotations (McNee & Pojani, 2022; Petrova, 2016) and is seen to have a negative impact on the social inclusion of the city (McNee & Pojani, 2022).

There is, however, a more long-term perspective that may have been overlooked in the discussion of NIMBYism. In this case of social housing participation, the public interest of the residents differed from what the municipality perceived from the long-term neglect of the planning system. Although the lack of public space following the regeneration of early post-war housing was highlighted in the municipality's planning documents as early as 1984, there was no strategy to address this until the latest master plan in 2009. It is no coincidence that, despite the "selfish" voices of some in defence of their own interests, the concerns about neighbourhood living space are also the result of a long period of the planning system's inaction.

At the same time, this case illustrates the problem of the densification of large-scale social housing. In many lower density cities, the concept of urban densification or compact cities is used as a sustainable development strategy. In empirical studies of cities, a more compact and dense urban form is thought to lead to a more environmentally, economically and socially sustainable city (see Bibby et al., 2021; Burton, 2000). Nevertheless, Taipei has a different context, with a highly concentrated urban population, where increased density may lead to a further reduction in living space. This is particularly evident in residential areas where urban green spaces and public service provision have been neglected for a long time. Spatial transformation as the realisation of public interest in urban regeneration is therefore not in this case what the municipality claims it to be.

Controversial and compromised direct authority

The political propaganda of the former mayor promised the local residents the authority to approve or reject the government's social housing programme by voting directly, which directly led to the continuation or suspension of the policy. The question is, does such power contribute to urban regeneration and better neighbourhood living conditions? It seems to be a matter of the local residents voting for or against social housing that are seen as NIMBY facility, with the local residents seemingly having the final say.

As in some direct democracies (for example, referendums), the polarised voices are concentrated into mere support or opposition, rather than talking about more vision and concrete ideas for incremental improvements. And in the worst case, still, the majority decides on an option from a limited number of options in a limited amount of time. In terms of the authority and power axis, the direct authority in participatory mechanisms is through the inclusion of participants in decision-making at an early stage of planning and policy formation (Fung 2004; Fung and Wright 2003). There is a significant difference from this direct democracy.

This is because in this case, the participants cannot participate in social housing policy and planning with the municipality at the policy formation stage and can only passively choose to accept or not accept the municipality's social housing policy at a later stage. Although the ability of residents to overrule the municipality's social housing decisions by a majority vote appears to achieve direct authority on the axis of Authority & Power, this is merely at the surface, as in practice the authority to discuss and consult is lacking. Participants' suggestions and consultations on policy are difficult to discuss separately on the two options of support or opposition, and therefore, agenda setting,

policy evaluation, and consensus building, for example, are not explicitly involved in this case. As Fung argues (2004), direct authority differs from voting in that the former results in an open-ended process rather than a choice of the most popular preference among a limited number of options.

5. CONCLUSION

Following the aforementioned vein, this first example of social housing participation process in Taipei is fairly ineffective. This is despite the fact that the communication process seeks a resolution of conflicts between stakeholders defined as a 'win-win' rather than the 'zero-sum' mentality that occurs when stakeholders bargain according to their own fixed interests. However, when consensus building cannot be achieved in a participatory process over a certain period of time, those with the ultimate decision-making power will make compromises rather than endless negotiations and bargaining.

For the municipality, as the decisive authority, it has unusually reserved a large number of housing units for the neighbouring residents as part of the compensation in order to keeping them from voicing their opposition. As mentioned earlier, as a social housing policy to help the general public solve their housing problems, it should be open to applications from households of the general public, with the exception of special social groups, yet in this case up to 30% of the units were reserved for residents who originally lived in these four boroughs (in this vein, the social housing project is indeed seen as a NIMBY facility, but dubiously, the residents are opposed to it, yet benefit from it)

For the team of architects, they felt that they came with bona fides and were guardians of public interests. Initially they were willing to allow participatory planning and design to play a more important role, their experience of engagement was however frustrating. Consensus building was not taken seriously, although they felt they had also tried to make the message more transparent and helped to guide participant discussions. The strong response from the team of architects was revealing in its frustration: "…we are the guardians of the public interest. Promoters of the quality of public space. we bring the public and the government together to strike a balance, but maybe the residents didn't think of us in this way…" This highlights the dilemma of the roles of the (commissioned) expert in participatory processes. On the one hand, they are usually commissioned by the public and private sectors to perform professional services (in other words, they have clients to serve), but on the other hand they are seen as neutral (both by themselves and perhaps by the participants) in the role of facilitators in the process. Once the manner of communication has led to a crisis of trust, the former is more likely to be perceived by the participants as their role.

Finally, in this case, the limitation of time was significant. Consensus building is an important part of this collective meaning-making process, which involves 'voicing one's opinion' from widely differing positions, dialogue and response between the municipality and the architects' team. However, the endless response places a huge burden on the municipality's policy makers and planners, as both the municipality and the architects' team were under pressure to meet policy realisation deadlines and therefore cannot engage in an endless participatory process, which must be contained within the framework of a 'participatory scheme' to be carried out. Furthermore, prolonged participation can lead to fatigue among the participants, especially when responsiveness from the municipality is perceived as insufficient or when trust is not built. The concept of the 'cost of time' is therefore important in participatory planning. It has two implications: on the one hand, fostering trust and consensus in a short period of time requires sophisticated design. A clear participatory plan must be in place at an earlier stage, as the laypersons need a longer period of time for gathering and build their agendas and consensus. A better participatory mechanism is one that is in place on

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their daily basis, as ad hoc participatory processes will make it difficult to achieve trust. Secondly, an excessively long participatory process with no specific response will reduce the effectiveness of participation.

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TRANSVERSAL TEACHING OF ARCHITECTURE AND URBANISM AND LOCAL IMPACT IN TWO COUNTRIES

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Abstract:

In 2014, a technical cooperation project began to take place between the state of Guanajuato, Mexico, and the metropolis of Bordeaux (France), to work on study topics related to their respective metropolitan areas. As a result of this, the Bordeaux National Higher School of Architecture and Landscape Architecture in France (EnsapBx) and the Department of Architecture of the University of Guanajuato in Mexico carried out an agreement in order to bring the institutional project closer to the students in order to promote mobility and transversal knowledge for the realization of conceptual projects of urban intervention for the respective governments.

This is how, starting in 2015, academic workshops have been held on various topics such as: neighborhood identity, metropolitan context, requalification of public space, social cohesion, attention to steep reliefs, community and heritage strengthening, among many others. It takes place twice every year, one in each country, generating to date an important exchange of teachers and students, who attend to real problems, learning about different realities and territories, collaborative work with the community and with the government. It is based on problem-based learning, achieving in the students involved a great interest and its application of both intercultural and interdisciplinary knowledge (since experts are contacted to provide advice, depending on the topic to be addressed) and transversal (by applying different areas of the knowledge in integral projects).

This program pretends to strengthen through the years, as well as to continue in the learning-teaching commitment of architectural and urban knowledge.

Keywords

Interdiscipline, urban-architectural space, transversal teaching

INTRODUCTION

The collaboration between the Bordeaux Metropolis and the State of Guanajuato began in 2008 within the framework of decentralized cooperation between the governments of France and Mexico. This collaboration between countries focused on addressing economic, ecological and social challenges shared by the territories. For this, several pairs of cities and regions were assigned, such as: Mexico City and Paris, Campeche and La Rochelle, Tuxpan and the Brest Metropolis; where local governments, companies and universities actively participated in this project.

The cooperation between the Metropolis of Bordeaux and the State of Guanajuato, specifically with the Metropolitan Area of León and the Municipality of Guanajuato, was part of several technical cooperation projects that were also started in 2008, renewed in 2011, 2014 and 2017. The first official agreement between both regions was signed in 2011 and was renewed in 2015.

From the technical cooperation agreement signed in 2014 between the Metropolis of Bordeaux and the State of Guanajuato, a Letter of Intent was carried out and in 2015; two specific agreements, one for the exchange of students and the other for Scientific Cooperation and Research between faculty in the Bordeaux National Higher School of Architecture and Landscape Architecture (EnsapBx) and that in the Department of Architecture of the University of Guanajuato.

As a result of this, various activities were carried out such as: visits by university authorities, exchange of students for semester stays, research stays and collaborative workshops for students (WS), publications, presentations at local events, making videos, among other actions.

One of the activities that we highlight as most important in this process were the academic workshops. These began in 2015; they proposed, in an innovative way, to mobilize students and professors from both institutions for periods of one week in each venue. The objective: to carry out works of common interest to both schools, which could be transferred as conceptual projects of urban intervention for the respective governments and local inhabitants.

So far, eleven collaborative workshops have been held; six in the city of Guanajuato and five in the city of Bordeaux. The projects were coordinated by Carlos Gotlieb from EnsapBx and Velia Ordaz Zubia from the University of Guanajuato.

State the Art

Problem-based learning (PBL) began in Canada between the 1960s and 1970s in support of medical education; it sought to match theoretical teaching with professional practice. This trend was replicated by other schools, even transforming entire curricular plans.

Students today must face solving complex problems through innovative approaches and skills that not only represent content learning, but are also required to go beyond the classroom with skills such as: communication, use of technology to search for information, ability to reach judgments and sustained conclusions, effective definition of problems and development of solutions, improvement of communication skills, flexibility, adaptability, appreciation of diversity, ethical conduct, creativity and ingenuity and technical competence, among other things. All this, according to Morales and

Landa (2004: 147) focused on the development of viable solutions demonstrating the ability to face specific problems.

PBL, according to Barrows (1986), uses the problem as a starting point for the acquisition of new knowledge. It considers the following elements:

- Student-based learning

- Learning in small groups of students

- Problems form the focus of organization and stimulation of learning.

The use of PBL is not an easy task, since it is self-directed knowledge, it breaks with the canons of traditional teaching and lectures, to force students to search for the information required to solve the problem posed. Although the process is supported by the teacher, the learning that the student achieves autonomously is much greater than what he or she could receive in a traditional class.

In the field of urban planning it has been an interesting trend. There are examples such as the one used in Pro futuro in Malaga (2022), where students tackle a real problem, initiated by a research process that led to possible solutions to the problem posed. The work consisted of developing proposals for a sustainable city, also including aspects on ecology, tourism, transportation, government participation, private companies, just as it would be done in real life.

Another example is worked by the National Autonomous University of Mexico (UNAM, 2019) with the subject called social policy and social needs, which addresses urban problems. It approaches initial theoretical elements, addressing the problems of the city at different times, history, instruments, etc. with an emphasis on the problem itself. For its part, the Pontificia Universidad Católica Madre y Maestra (Henríquez and Valdez, 2021) also addresses this methodology. With this they seek to strengthen cognitive, methodological, linguistic, individual, social, organizational, entrepreneurial, leadership and research skills. The challenge is to promote significant learning in urban design by proposing solutions in the city, as a setting for debate, reflection, research and discussion of real problems, relating the exercise with the use of tactical urbanism. In this sense, based on this experience, it works on the following points:

- Students identify the most relevant aspects of the problems. They define knowledge needs. The teacher acts as a process companion and a facilitator.

- Learning is favored with social interaction; it builds knowledge from dialogue, which, in turn, fosters communication and oral expression skills.

- Critical thinking requires features of reflective practice that contemplate "learning by doing". With this, they seek professional practice in a more reflective and critical way.

Botero (2017) complements the PBL position with the advantages of granting empowerment and autonomy that the student acquires derived from making decisions on their own initiative. It is important to emphasize that the role of the teacher, although it does not correspond to that of a lecturer, their participation in this type of project requires greater concentration, logistics, planning and, therefore, greater involvement.

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Methodology

It is based on the proposals of Lewis (1973) in Herreras, 2004, as well as the follow-up of Henríquez and Valdez, 2021, adapted according to the needs of each case raised and the organizational logics of both EnsapBx and the Department of Architecture of the University of Guanajuato. In this tenor, the methodological process is carried out as follows:

- Organization. The participation of the University of Guanajuato generally takes place in the month of February, while EnsapBx holds the event in the month of May.

- Theme selection. The teachers responsible for each school (as appropriate) determine the area to work in collaboration with the entities or institutions of the related government administration. This process generates the commitment to obtain as much information as possible or to contact experts who will contribute to the accompaniment of the students. It is intended that the themes be complex issues related to the urban environment, different for each occasion. The activities focus on reflection on the design of public spaces, understood as means of appropriation of local environments.

- Student selection. For EnsapBx, the workshop focuses on Master 1, Architecture, City and Territory, while for the University of Guanajuato (UG), the subject corresponds to the so-called: Historic Centers and Metropolitan Areas. In the case of Bordeaux, the students are those enrolled in the course on a regular basis, together with Erasmus students, so multiculturalism becomes extremely interesting due to the experiences shared in the workshop. In the case of the Department of Architecture at UG, the students are selected for having the best grade point averages, with command of the English and French languages.

- Problem Statement. The theme is presented by the teachers, a conference or talk is generated by the authorities, a field visit is made to the site and the requests of the citizens as well as testimonies of key actors in the territory are collected. On-site contacts and logistics are an important part in which the institutions and the local public administration participate as a key player.

- Team building. Derived from the scale of the project, one or more work options or sectorizations are carried out. Teams are formed seeking the integration of French and Mexican students in all teams. It is intended that each team be of between 5 and 6 participants maximum. Communication skills are worked on at this point.

- Project development:

  o On day 1, the field visit and presentation to the authorities are carried out, on day 2 the work is carried out in the workshop through the necessary research, analysis and synthesis of the information of the project or section to work on. The teams are constituted, the diagnosis is generated.
  o On day 3 the strategy is worked on, the skills to develop are the use of instruments and tools appropriate to urban projects, the ability to synthesize and encouragement for research of additional factors necessary for the project. It is emphasized that the proposals must solve felt needs, with this, not an aesthetic intervention is sought, but the application of effective strategies to improve the quality of life.
  o On the 4th and 5th day, the project proposal is developed. The methodology is ap-

plied, appropriate instruments are used, creativity and innovation are encouraged. The process is permanently accompanied by teachers.

- Presentation of the result. On the afternoon of the 5th day, each project is presented to neighbors and authorities. Discussion and feedback is carried out by the actors, thereby promoting communication and entrepreneurship skills. The complexity of presenting in the language of the site in question is added, so the degree of security and motivation is also worked with the student, in addition to the multicultural experience that this type of project generates.

- Assessment and self-assessment. The evaluation corresponds to the subject teacher in respect to performance and the achievement of skills. Self-assessment is done year after year by implementing new strategies in subsequent activities.

Case Study Description

The academic workshop began in 2015 and is held alternately, one week a year in each country. So far, eleven collaborative workshops have been held, six in the city of Guanajuato and five in the city of Bordeaux, in which students and faculty from both institutions have participated.

The workshops held in Mexico, more precisely in the state of Guanajuato, were carried out as follows: February 2015 and February 2016, with the general theme of recovering the identity of a neighborhood in the metropolitan context; the second of them with the subject of requalification of the public space from the neighborhood action. Both exercises were carried out in the Barrio del Santuario de León, Gto. The 2017 exercise was also carried out in February, now in the neighborhood of San Juan de Dios, also in the city of León, with the participation of students from EnsapBx (Bordeaux National Higher School of Architecture and Landscape Architecture, France), and students from the Department of Architecture of the University of Guanajuato.

In the same way, Architecture students traveled to Bordeaux for one week a year to collaborate with EnsapBx students to generate intervention proposals in the Demi Lune communities in 2015 and Martignas in 2016 and 2017.

In the month of February 2018, the fourth WS was held in the city of Guanajuato. It was held in the city of Guanajuato on the river (of the same name) in the Marfil area (old road). The project combined environmental factors with a heritage area, coupled with the housing conditions and historical value of the site.

It was in May 2018 (from 14 to 18), that during the students' visit to France, heritage and environmental factors were taken up again as elements of analysis to be able to make an urban proposal in the Brazzaligne area, an area with historical relevance as the train lines gave identity to the area, as well as its relationship with the environment and the adaptation to the new complexes that are being planned in the surrounding areas, all in order to generate a comprehensive development. The project was called: **Habiter la Brazzaligne, Expérimentations de noveaux espaces de vie citoyenne et de prize en compte de la nature, Living in Brazzaligne, Experiments with New Spaces for Citizen Life Considering Nature.**

The projects presented were endorsed and evaluated by representatives of the Municipality, as well as staff from Bordeaux Metropole, the results having been very favorable.

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The 9th International Workshop was held in February 2019, with the theme: between tradition, tourism and habitability. Objective: Social inclusion and participation in a neighborhood of the city of Guanajuato, where the habitat was built in sectors of steep relief and precarious conditions. The exercise was carried out in the neighborhood of Tepetapa, its limit is considered to be in what used to be the Hacienda de Flores (today Comercial Mexicana). Within the neighborhood is the former railway station and the Santa Paula pantheon.

The Tepetapa neighborhood is one of the oldest neighborhoods in Guanajuato. Traditionally, miners and merchants have lived in the neighborhood. The said neighborhood is entered through the Tepetapa Bridge, a representative symbol of the city's architecture.

Representative spaces of the Tepetapa neighborhood are the Santa Paula Municipal Pantheon and the Mummy Museum. Both are currently used as a focus of tourist attraction. The museum is currently surrounded by a series of street stalls and a commercial area. Around the museum, the construction of houses has been chosen, generally of medium to low level, precarious housing prevailing.

The exercise for the year 2019 would be to integrate the housing area, improve housing conditions, adapt the residential use with the tourist use caused by the Pantheon and the Mummy Museum and adapt the railway station, to integrate the mobility that area requires.

In May 2019, the 10th workshop was held: Insertion sociale des quartiers en lien avec des opérations de grand rayonnement (secteur Bordeaux Maritime-Bacalan). Bacalan's objective was to reflect on the local redevelopment of the sector around Place Buscaillet, rue Achard, which will ultimately be affected by the dynamic renewal of Bassins à flot operations. The idea was to reflect on the evolution of the neighborhood valuing its local identity.

In March 2020, the 11th WS was held in the city of Guanajuato, Mexico. The theme: Yerbabuena: link between the traditional city and the new urbanization. The community of Yerbabuena, a rural community in its beginnings, has been absorbed by the urban development of the city, an excessive growth, caused largely by housing developers, natural expansion and irregular settlements, all without adequate conditions for its proper development, even in the absence of services. The objective was to propose possibilities for this "new rurality" that influences the quality of life of its inhabitants. As of this WS, scheduled tours have been paused due to COVID.

Each project generated as many proposals as the number of teams formed, they were developed by mixed teams of French and Mexican students and teachers who worked on one aspect or area of each of the projects. In each case, the approach taken was to reflect on the evolution of the neighborhoods or boroughs and value or prioritize the local identity and reappropriation of the inhabitants.

The workshops and participants held in Guanajuato were carried out as follows:

	Period	Country	Place	Topic	Students
1	February 2015	Mexico	Barrio del Santuario, city of León	Recovery of the identity of a neighborhood in the metropolitan context.	5 EnsapBx students 4 UG students
2	February 2016	Mexico	Barrio del Santuario, city of León	Requalification of public space from neighborhood action.	4 EnsapBx students 5 UG students
3	February 2017	Mexico	Barrio de San Juan de Dios, city of León	Comfort the pedestrian route	8 EnsapBx students 6 UG students
4	February 2018	Mexico	Río Guanajuato, city of Guanajuato	Rehabilitation of the Guanajuato River.	6 EnsapBx students 6 UG students
5	February 2019	Mexico	Tepetapa and Pueblito de Rocha boroughs, city of Guanajuato	Between tradition, tourism and habitability (social insertion and participation)	6 EnsapBx students 6 UG students
6	February 2020	Mexico	Yerbabuena, Guanajuato	Link between the traditional city and the new urbanization.	8 EnsapBx students 12 UG students

And in the Bordeaux Metropolis:

	Period	Country	Place	Topic	Students
1	May 2015	France	Demi-lune, Bordeaux/ Cenon	Metropolitan identity for a changing space	16 EnsapBx students 3 UG students
2	May 2016	France	Martignas -sur-Jalle	The city opens towards Jalle	14 EnsapBx students 5 UG students
3	May 2017	France	Martignas -sur-Jalle	A new dialogue between the urban center and its surroundings	11EnsapBx students 10 UG students
4	May 2018	France	Brazzaligne	Live in Brazzaligne, Experiments with new spaces for citizen life considering nature	6 EnsapBx students 6 UG students
5	May 2019	France	Bordeaux Mariti-mo-Bacalan	Social insertion and territory	6 EnsapBx students 6 UG students

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In each case the projects were presented in the concerned neighborhoods and to the inhabitants in an objective of appropriation of the projects. The works carried out from 2015 to 2017 included were published by EnsapBx and under the title of "Ateliers Bordeaux-Guanajuato 2015-2017". In 2017, the works were presented at the Cervantino International Festival in the city of Guanajuato and in 2019 at the inaugural event of the International Week of Latin America and the Caribbean in the city of Bordeaux, at the Municipal Planning Institute of Guanajuato, Secretariat of Social Development and Tourism in the Dieguino Museum of Guanajuato capital.

Additionally, the institutions exchanged students: 17 from UG at EnsapBx and 11 students from EnsapBx received at UG for semester stays and research stays. Finally, it is worth mentioning that several mutual visits have been made by the academic and administrative staff of both institutions from 2015 to date. Some examples of workshops are presented in the following images:

Image 2. 2020 Work Team.

Image 1. 2020 WS, Yerbabuena, Guanajuato. Visit to the site and work with locals.
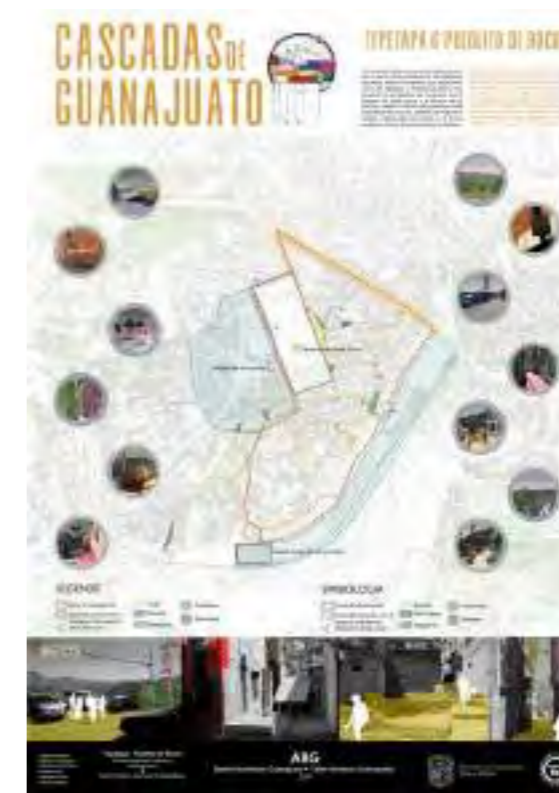
Image 3. Sample posters created in WS. Example of Tepetapa.

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Conclusion

The use of PBL in urban problems, based on the experience of collaborative work with French and Mexican students in different fields of study of urban planning, has allowed us to respond creatively to problems presented in each of the cities involved, attending to different scales and felt realities. The diagnoses are carried out through the knowledge of general data of the site, but also through the visit to the territory to work, through the interview with the competent authorities and with the inhabitants. This implies the involvement of the actors in the project, from its conception.
It addresses specific problems raised, improves creativity, motivates projects that transfer the idea on paper, and proposes options that are aimed at improving the quality of life of the population.
Each team talks inside the classroom, evaluates, investigates, diagnoses, formulates possible solutions, prioritizes actions to be carried out, and learns the value of collaborative work. With this, seen as a whole, we can determine that the proposed methodology is fulfilled, emphasizing the knowledge process that implies: significant content, critical thinking, improvement of communication instruments, greater interest in research, evaluation, and reflection.
In relation to the results, it is emphasized that each team presents the results of its work to the different actors involved: neighbors, users, and authorities; which contributes to an interesting feedback that provokes a continuous reflection by the student, which contributes in turn, to greater and better learning.
The methodology used, the making of real examples, the interaction with actors involved, the collaborative work with diverse thoughts, the development of interculturality, have been a success today in the EnsapBx-UG Workshop program, exceeding the expectations that were raised from the beginning, having increasing participation and more prepared students who get involved in comprehensive urban projects.

It is important to emphasize that these projects, although they focus on an educational field, participation with the government has made it possible to have a greater openness to collaborative work with educational institutions and, at the same time, to have a closer relationship with citizens, to have a better knowledge of the real needs and encourage citizen participation.
In addition to this, the projects, once completed, are delivered to both the government and the citizens. In Mexico, for example, the role of the government is limited by having to contract projects and subsequently, to contract the work, this is an interesting way to start new perspectives of city planning, through innovation and knowledge, coupled with the proactive energy of the students.
PBL is a tool that provides advantages:

- To the academic environment, by creating in the subject a form of appropriation of learning based on real experiences (therefore, more significant learning), teamwork, autonomous learning, capacity for expression, decision-making.
- To the population involved, by promoting citizen participation, which is essential in the urban-regional planning process.
- To government agencies. By integrating into their daily work the possibility of working together with the academic environment and with local actors, increased motivation and integration of a new work model.

PBL is a very interesting academic tool, however, it also requires a high degree of commitment and greater awareness of reality, even if it is properly permeated into the classroom, it can be the beginning of a significant change in the workplace, once the students are inserted in this dynamic.

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STUTTGART MEETS SUPERBLOCKS: REDISCOVERING STREETS AS URBAN LIVING ROOMS THROUGH A TRANSDISCIPLINARY AND INTERCULTURAL TEACHING APPROACH

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Abstract

How can Stuttgart push the transformation towards a socially just, culturally diverse and ecologically responsible city? This question was addressed in an Integrated Research and Design (IRD) project carried out in 2021 within the MSc program Integrated Urbanism and Sustainable Design (IUSD) at University of Stuttgart. IUSD has a unique teaching philosophy: it addresses global urban challenges by combining an transdisciplinary and intercultural approach with working in real-time local settings. The IRD project developed visions and urban design ideas for a first superblock in a dense inner-city neighborhood of Stuttgart. A superblock is a pedestrian-friendly area of multiple city blocks within which the road network is designed to serve local needs only, and through-traffic is reduced to a minimum. The IRD project applied an integrated approach, inspired by Barcelona's superblock, where the environment, buildings and social aspects were jointly considered and translated into holistic visions based on research-driven knowledge and co-creative design modes. The IRD project involved resident's initiatives throughout the process to enable a real-life work experience for students and ended with an on-site exhibition to publicly communicate the outcomes to the residents and improve their involvement with the project. A particular focus was given to streetscapes due to their potential for a variety of outdoor activities beyond their use for mobility. The IRD project addressed a range of topics, including how to enable social life, improve streetscapes' ecological structures and ecosystem services provision, and the possibilities and barriers of regulatory frameworks for implementing temporary and permanent design projects. The paper will share both insights and lessons-learnt about the integrated approach of the IRD projects as well as the ideas that were shared and discussed with residents. Finally, it will reflect on how such projects can catalyze broader local impact towards more just and livable cities.

Key words:

Superblocks, higher education, ecological transition, integrated planning

Urban challenges are increasingly understood as complex in terms of the various dimensions as well as actors to be addressed; requiring integrated and more transdisciplinary approaches in educating future urban change makers.

Our paper addresses co-production of knowledge that incorporates the ability to work in a multi-actor environment and reflects the process and outcome of an Integrated Research and Design (IRD) project that aimed at contextualizing the Superblock approach that originated in Barcelona for a neighborhood in Stuttgart-West, Germany. Co-production of knowledge includes the integration of knowledge from different disciplines, but moreover the inclusion of values, knowledge and know-how from non-academic sources such as civil society – individuals and associations -, as well as state actors (Klein et al., 2010; Polk, 2014). However, scholars have criticized researcher-driven project initiation and ownership, highlighting the problems of communication and the time and resource consuming process as well as the often raised but sometimes unmet expectations (Polk, 2014; Winkler, 2013; Bénit-Gbaffou, 2011). Consequently, a critical look and questioning of the reliability and applicability of the knowledge being co-produced is needed and need to be integrated in transdisciplinary and intercultural teaching approaches.

Global-local urban challenges: The Superblock Concept

Cities are considered major contributors to climate change, yet we still lack holistic and overarching planning approaches that try to link both causes and the consequences of climate change within urban environments. Previous planning models facilitated a car-oriented mobility, contributing to a large extend to the production of greenhouse gas emissions. The focus on car-friendly cities exacerbated traffic congestions, noise and air pollution, while negatively impacted on quality of life and human health. From a spatial point of view automobile hegemony reduced publicly useable or pedestrian-friendly spaces in dense urban areas and made social interaction more difficult. Cities and their neighborhoods have suffered under these conditions and have been increasingly affected by the impacts of a changing climate. Both challenges have urged urban planners and policy-makers to identify options for sustainable urban transformation.

A recent approach to adapt better to some of the urban challenges such as increased temperature and to increase the urban quality of life in general is the so-called 'Superblock' (López et al., 2020). The Superblock concept originated in Barcelona. This concept foresees that a Superblock is made up of a grid of blocks approximately 400 x 400 m with around 5000–6000 inhabitants, yet needs adaptation to the local context. The interior section of the Superblock is reserved for pedestrians and cyclists, and is closed for above-ground parking and all vehicles with the exception of emergency vehicles, services, loading and unloading vehicles and disabled assistance. The exterior section of the Superblock forms the 'perimeter' of the block, where most vehicles and motorized traffic circulates. These main roads accommodate separate pedestrian and cycling infrastructures along with extra bus lanes for rapid transit (López et al., 2020; Zografos et al., 2020; Mueller et al., 2020).

The Superblock is based on a people-oriented design that emphasizes the social and physical interrelations consistent with people's needs ultimately contributing to the Sustainable Development Goals; particularly SDG 11 "Sustainable Cities and Communities'' (López et al., 2020). More

specifically, Superblocks share some common principles: to reorganize city structures, to modify the road network with separate routes for the different modes of transport and to prevent through-traffic (see figure 1). Instead, cyclist and pedestrians are given priority and the street space is newly redistributed to serve local needs and to provide space for green areas and social encounters.
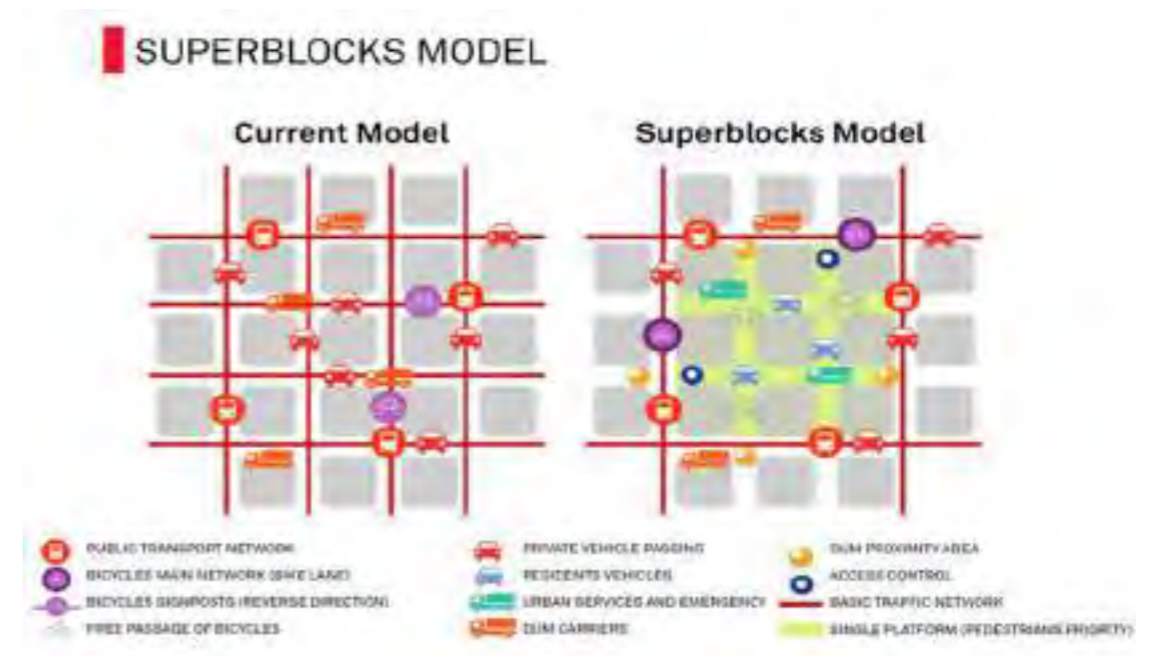
Fig. 1: Superblock model of urban mobility, Source: López et al., 2020:4

The Superblock concept comes with a set of processes and procedures to be implemented. Related policies can include both deterring measures (push) and incentives (pull). Push measures may include setting speed limits and reducing public parking space, while pull measures may incorporate improving the public transport system or ensuring a minimum density of trees to be included in the area (Scudellari et al., 2019). In Barcelona the superblock approach is a top-down approach allowing for participation, but still a strategy that is driven and adopted by the city council. On a city-wide level, the concept of the Superblock was incorporated at policy level in the city's climate action plan of Barcelona (Zografos et al., 2020).

However, the top-down approach implied also that the temporary intervention in public space by tactical urbanism followed a rigid temporal structure tied to funding and legislative periods, limiting the space for experimentation, learning and participation. While it was possible for residents to participate in the intervention in the Poblenou superblock after massive resistance, the fear of a possible termination of the superblocks due to a possible change of government and the associated time pressure limited the space for their involvement. Actors from the City Council were under immense pressure to achieve symbolic success and had to find ways of reconciling the claim for locally specific solutions and the promise of participation with the need of developing scalable solutions and delivering a proof-of-concept for the political-programmatic transformation of Barcelona's districts (Wendtland & Jung, 2021, p. 27).

Nevertheless, the concept of the Superblock is considered a small intervention with wide-reaching sustainability effects. The Barcelona's superblocks have been shown to contribute to improved health as well as social, environmental, and economic sustainability (Mueller et al., 2020; Zimmermann & Zimmermann, 2020).

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The need for contextualization of 'best-practice' models

The Barcelona Superblock is often perceived as a forerunner. However, in urban planning such 'best-practice' models can unfold differently. On the one hand, they can encourage a vision for an alternative transformation path for the future. Thereby they can be regarded as part of 'Techniques of Futuring'; a concept that has been promoted "(…) as practices bringing together actors around one or more imagined futures and through which actors come to share particular orientations for action"(Hajer & Pelzer, 2018: 222). The advantage of Superblocks is that they can be implemented at relatively low-cost as they do not require changes in the hard infrastructure or demolition of buildings. The concept foresees the transformation of the existing transport system while democratizing public spaces. In this sense, the Superblocks are scalable, as they can be used for the transformation of suburbs and city centers and applied to various urban developments (López et al., 2020). Barcelona thus seeks to transform the entire city with this approach and has set the goal of implementing 500 superblocks in the coming years.

On the other hand, 'best-practice' models are criticized as planning ideas that are transferred often without a necessary contextualization and are therefore with little fit to the reality on the ground (DeSatgé & Watson, 2018). In that sense, the Superblock, considered a successful transformation in Barcelona, has been replicated in different cities around the world, where it faces certain challenges and shortcomings. The complexity and radicality of the urban transformation require to pay attention to power relations that might replicate existing vulnerabilities and injustices. Zografos, et al. (2020) caution that urban transformational adaptation such as Barcelona's Superblock model are part of competitive urbanism whereby powerful interests compete about decision-making power on what can be considered the common good. Further concerns include the risk of gentrification and greater social inequality, an undesired outcome of improving deprived neighborhoods. Superblocks are also criticized for being highly dependent on the surrounding urban infrastructure and transportation system and therefore need to be combined with other (city-wide) planning interventions. Thus, López et al. (2020) recommend to include other dimensions such as the broader scales of everyday experience of inhabitants as well as political and social conflicts.

To overcome the trap of simple 'best practice' transfer, Healey (2012) therefore calls for an 'origin narrative' to understand the specificity of a place and the commonality between localities.

Stuttgart meets Superblock

The city of Stuttgart, South Germany, is a case in point for the urgent need of urban transformation. The city is located in a valley basin with low wind speeds, ongoing industrial activity, and a high volume of traffic, making particularly the low-lying inner-city neighborhoods highly susceptible to poor air quality and contributing to heat stress.

The Augustenstrasse neighborhood, in the Western district of the inner-city, is exemplary of the dense urban blocks and of public spaces dominated by car use that hinder social interaction (see Figure 2).

Fig. 2: Augustenstrasse in Stuttgart West, Source: Puspahati, 2021

Against this context, a neighborhood association (the 'Quartierswerkstatt Augustenstraße e.V.') is dedicated to create streets for people and improve the neighborhood's quality of life. Mid-2020, the association initiated a debate around how suitable it would be to adopt a spatial strategy such as the Superblock. At the local level, the District Advisory Council West decided to support the idea that was raised by the neighborhood association (Quartierswerkstatt Augustenstraße e.V., 2022). Therefore, in contrast to the top-down example of Barcelona, the case of Stuttgart is quite the opposite to Barcelona. There is no overall ,superblock' policy in place yet, but we find a very active civil society.

Towards co-producing knowledge and teaching methodologies in applied urban settings

In 2021, the association 'Quartierswerkstatt Augustenstrasse e.V.' together with residents of Stuttgart-West approached the Master program Integrated Urbanism and Sustainable Design (IUSD) at University of Stuttgart to involve students in a process of developing visions and strategies for contextualizing the Superblock model to their neighborhood.

This request was just in line with the teaching philosophy of the program: IUSD follows the didactical aim to facilitate shared learning experiences and to co-produce knowledge in the urban realm in order to develop collaborative research methods for sustainable solutions. 'Co-Design' and 'Co-Production' in science are meant to bridge the gap between science and practice to solve social and environmental problems. It is based on the perception, that feasible solutions for our complex urban reality can only be developed in partnership and requires knowledge that is co-produced by various actors. Furthermore, as planning is a normative terrain, co-production deals with the need to negotiate contested solutions as well as to ensure legitimacy of any research conducted (Polk, 2014).

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Fig. 3: Actors and Governance to Co-Produce Superblocks, Source:

Palacios, Sethi and ElMaghrabi, 2021

The decade of 'Education for Sustainable Development' (2004-2014) advocated for higher educational institutions to enforce a focus on skills, knowledge and competences needed for the grand societal transformation (UNESCO, 2014). The New Urban Agenda and the Sustainable Development Goals (SDGs) have reemphasized the urgency of change. However, higher education institutions across the world have been reluctant to integrate aspects of sustainability into their urban curricula (Bina et al. 2016).

IUSD can be seen here as an exception or forerunner, at least within the German context, to test a transdisciplinary and intercultural approach in real-life settings. This didactical approach is based on the understanding that the shaping of competences to address future urban challenges require a real-world impact. This implies new and innovative methods of teaching and learning. In order to achieve these goals, the IUSD curriculum includes 'Integrated Research and Design' (IRD) projects that are largely based on problem-based learning and the learning outcome is not only to develop competences for bringing about design solutions, but also to develop the skills needed to work in an action-oriented setting. IUSD seeks to bridge research and practice and, from the first year on, prepares students to work in applied settings. Being exposed to real world projects has created over the years various impact in communities and has become a motivational driver for students and contributed to their own personal development.

The Superblock therefore offered various opportunities to apply the teaching and learning approach in the context of Stuttgart West. The conceptual development of Superblocks requires an interdisciplinary lense as ecological aspects, ecosystem services, mobility needs, public useable space and urban planning aspects need to be addressed as crosschecked. The Barcelona case provides evidence as here the entire institutional set-up at the municipality was transformed to overcome silo-thinking.

Transdisciplinary and intercultural approach with working in real-time local settings

Under the slogan 'Stuttgart meets Superblocks', sixteen master students engaged in collaborative research and design from April to July 2021. Untypically for this action-oriented approach, the COVID-19 pandemic required to interact with stakeholders such as the City of Stuttgart and the

association mostly in an online format. Additionally, the students usually work in one studio space and now needed to brainstorm, propose and debate their ideas in the digital space. Although this impacted on the degree of direct exchange, some general steps continued to fertilize the process. Conversely, the online had positive sides for instance in allowing for engagement with representatives from Barcelona who were involved in the first Superblock implementation and could support with critical feedback and insights.

The group worked together in the IRD course over one term, arranged in three consecutive phases: In the research phase students acquainted themselves with the Superblock model and in small groups of 3-4 conducted a site analysis with methods including vegetation mapping, strollogy, tracing public life, sensory analysis, story-telling, surveys and interviews, and stakeholder analysis. In the transdisciplinary context of the IUSD, students can not only use a combination of methods from different disciplinary backgrounds such as urban ecology and planning, but the students' different disciplinary backgrounds also encourage cross-learning and investigation.

The findings of the analysis were then discussed and critically reflected in the group and against the reading and understanding from the diverse contexts of the students. The interculture perspectives allowed for bringing to the table insights and experiences from different cities in the world and question the meaning of new mobility approaches for urban transformation at the neighbourhood level. For instance, students from Colombia often bring vast experiences on urban mobility transformation and its implications that can fertilize a critical debate.

In a further step, the findings have been filtered to 'hot topics' as the basis for a process to create a common vision and aligned strategies. Here, members from the association acted as mentors to each project team developing a strategy. The final concepts were then encompassing both a spatial transformation idea and a process-design – including experiments, a communication strategy, a participation strategy and an action plan.

Finally, such strategies usually get tested and communicated in real life through small-scale urban experiments. Such temporary interventions by students are seen as an essential ingredient to the learning process. Usually, such temporary local action is highly dynamic, interactive and collaborative. In 2019, for instance students organized an open-air workshop in Leonhardsvorstadt, a divided inner-city neighborhood, during which residents and passers-by in the neighborhood could participate in rallies and quiz games and other interactive formats that translated strategic ideas. In 2016, temporary implementation included changing parking spaces in social gathering space across the city. These interventions are documented and evaluated and then included in the final proposal.

In the IRD project the urban experiment however, had to be translated in a different format due to the COVID-19 pandemic. Students organized instead an interactive pop-up exhibition. In July 2021 the 'Re-imagining your neighborhood' exhibition opened in a local cultural center 'Kulturzentrum Merlin' in Augustenstrasse. It presented the results of the project and showcased visions and urban design ideas for the first superblock to be implemented in the city of Stuttgart. The goal was to raise awareness in the neighborhood and to spark a discussion about the ideas for a green, vibrant, pedestrian-friendly and social neighborhood. The exhibition was open both to the direct neighborhood and to strategic stakeholders such as the municipal planning department. Visitors actively voiced their opinions on the future design and development of the neighborhood and indicated their interest in actively shaping the Superblock project.

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Fig. 4: Opening of the pop-up exhibition at the cultural center

Merlin in Stuttgart West, Source: ElMaghrabi, 2021

Fig. 5: Pop-up seating during exhibition opening at the cultural center Merlin

in Stuttgart West, Source: Akelom, Reji and Xu, 2021

Beyond this successful transfer of knowledge and insights, what needs to be mentioned here is that the association had high expectations with regards to the student involvement. The members were impressed by the outcomes of the IRD project, but were hoping for a continuous collaboration beyond the duration of the project; an expectation that was difficult to meet at the end of the day as it is contrasted by the logic of the semester structure at university as well as the temporariness of students who continue their studies usually abroad in the second year of IUSD.

Visions and urban design ideas for a first superblock

The visions and conceptual ideas centered around five thematic angles including sustainable urban mobility, urban ecology, social life, urban experimentation and governance. All themes were expected to complement each other under the overall vision to transform the streetscape into a more so-

cial and interactive space. In the following examples are given for strategic designs under the social and ecological theme.

Theme Social Life "Come…sit with us"

The overarching vision for improving social spaces in Augustenstrasse is 'bringing life' to the neighborhood through two primary goals: setting up interaction spaces and creating awareness.

Fig. 6: Mindmap of Social Life in Augustenstraße Neighbourhood,

Stuttgart, Source: Akelom, Reji and Xu, 2021

Offers for 'sitting' was one of the most expressed needs by residents. The group interpreted this need in a broader notion including various subtopics like comfort, safety or social interaction in public spaces. From the current state of lack of seating in public spaces in the neighborhood, the group developed the vision and slogan 'Come…sit with us!'. The deriving concept includes four spatial interventions for people to sit and socialize: seats on streets, seats on sidewalks, seats in the pathways in-between houses / buildings and seats in courtyards (see fig. 7). The locations within the potential Superblock were carefully checked for the impact of motor vehicles on street seating, the relationship of pavement seating to adjacent buildings (privacy of seating, relevance of seating to infrastructure services), whether open green spaces within the neighborhood can enhance the connection of seating to the landscape and be used to host ad hoc community events. The recommendations were summarized in a 'Handbook of Seating' as part of the communication strategy (see fig. 8).

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Fig. 7: Identification of locations for seating, Authors: Akelom, Reji and Xu, 2021

Fig. 8: Handbook of Seating as part of communication strategy,

Authors: Akelom, Reji and Xu, 2021

Theme "Stuttgrün Supercity"

The ecology group analyzed the number of greenspaces in the neighborhood and the regulating and supporting ecosystem services they provide to people. They concluded the study area, similarly to the city as a whole, have relatively large number of greenspaces, providing diverse ecosystem services including climate regulation, air purification, water retention and contributing to a diversity of habitats for urban wildlife. However, this greenery is disconnected from the built-up areas, resulting in a drastic reduction of benefits provided by regulating and supporting ecosystem services within the denser parts of the neighborhood. Additionally, most greenspaces are disconnected from each other, causing for instance issues of connectivity for wildlife, and are on private property and in private use with limited access only to the neighborhood, thus decreasing their potential for direct interactions with nature. Presently, Augustenstrasse users are still exposed to air pollution, the urban heat island effect and disconnection with nature. The group therefore concluded that spaces and surfaces available at different levels could be further integrated into the green structure of the street increasing the cooling effect.

Fig. 9: Contrast between green spaces inside the blocks and on street level,

Source: Barrera, Gomez and Ömür, 2021

In order to achieve a more green and socially cohesive community in the short and medium term, the group envisioned integrating the existing green spaces with the built environment through green elements on different scales and surfaces such as movable trees, rooftop gardens, and green façades (see fig. 10). As a result, the urban habitat will be enhanced, the outdoor comfort will be improved, and access to public green spaces will be granted. For the long term, they formulated a vision "Stuttgrün Supercity" to replicate both public and private interventions in the selected parts of the city and also to connect the green spaces through green streets within the urban fabric.

Fig. 10 Scenarios for Stuttgrün Supercity, Source: Barrera, Gomez and Ömür, 2021

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Reflection how projects in education can catalyze broader local impact

Albeit the pandemic context urged us to change to an online format for much of the teaching, our IRD project created exchange and reflection on a local level, based on many personal interactions. On the example of the Superblock approach, it was central to contextualize the transformational adaptation of a multiple city blocks, in the sense that it achieves radical change incorporated on a large scale within the political and civic realm. The Barcelona Superblock is considered a 'best-practice' example for other cities in need for urban transformation. Obviously closer examination brings to the foreground also the shortcomings such as the risk for gentrification and the limited participation. Thus, the visionary power of such projects to provide imaginaries for alternative futures (Hajer and Pelzer, 2018) need to be counterbalanced by an 'origin narrative' (Healey, 2012) to contextualize such project ideas against the realities on the ground.

Such futuring and contextualization can be explored and tested through involving students in reality-based community studios as done in our Integrated Research and Design (IRD) project. This teaching approach is part of the experiential orientation in 'Education for Sustainable Development' (ESD) and can provide innovative methods to foster sustainable development beyond the course itself. In addition, the IRD project with its co-productive approached evolved into a 'convening space' that helped bringing together relevant stakeholders - both from within the neighborhood (e.g., residents, businesses) and beyond (e.g., Stuttgart city council, Barcelona city council) – and paved the way for potential future collaborations.

The IRD project reflected here was implemented in the frame of the MSc Integrated Urbanism and Design that is characterized by a transdisciplinary and intercultural teaching approach applied in real-life settings. The case of the IRD project in Stuttgart provides certain lessons for this engagement:

First of all, the project 'Stuttgart meets Superblock' was initiated through the cooperation with the neighborhood Association 'Quartierswerkstatt Augustenstraße e.V.'. Such neighborhood organizations come in with high commitment and expectation – in this case to push the idea of a Superblock for Stuttgart West. Projects operating in real-life time need to negotiate the line between research and activism. They need to ensure to not overlook other vested interests.

As a second aspect, the transdisciplinary engagement allowed for a broader research perspective that included themes that otherwise often stand as conflicting aims such as environmental and ecological concerns as well as concerns for social cohesion. To learn in this situation to frame a common vision is an important learning outcome. It not only includes to take various forms of knowledge into account, but also the skill how to balance aims and find ways to communicate this through vision statements.

Thirdly, the intercultural perspectives allowed to question and check project ideas against experiences from other contexts. Moreover, it lends a fresh and less biased eye to the Stuttgart context and invited the neighborhood to be seen 'through the other'.

As a fourth aspect, the vision and design concepts presented become part of the search to make an imagined future persuasive to the broader neighborhood and other actors in decision-making power.

Finally, nevertheless, the time limitation of a community studio stands in stark contrast to the time span of such urban transformation. Students had to learn that engagement in real-world settings also requires expectation management and honest communication about time availability. Members of the associations hoped for continued engagement and exchange with students beyond the duration of the IRD project - expectations that were difficult to meet and led to some degree of frustration.

Many new concepts such as the Superblocks are first tested through temporary experiments. Here, higher education in the form of community studios such as our IRD project can become a catalyst for facilitating shared learning experiences in the urban realm. The applied transdisciplinary and intercultural approaches to develop solutions for complex urban reality are influenced and characterized by the diverse individual motivations and backgrounds of all participants. This entails a certain ambiguity and uncertainty about the expected outcomes, but it also opens new avenues for creating synergies, co-producing knowledge and fertilizing new perspectives.

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EXPLORATION OF A SOCIO-ECOLOGICAL CONTINUITY PROJECT IN GREAT GENEVA, TOWARDS A CONVERGENCE OF THE TERRITORIAL PROJECT OF BIODIVERSITY & ECOLOGICAL CONTINUITIES

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Abstract

A territorial project impelling biodiversity and socio-ecological transitions implies its renewal. The recognition of the landscape as a support of biodiversity led to the establishment of the tool of ecological continuities (ECs) within territorial planning. Paradoxically, the conceptualization and the representation of ECs are considered too reductive by science, while their implementation is already perceived as too complex by field actors. To overcome this paradox, research and practice extend this conceptualization to a socio-ecological understanding of the territory, it echoes the one towards which the territorial project tends. Beyond the maintenance of biodiversity, it is a question of considering the synergies between biodiversity and human activities as the basis of an eco-centered project.

The present research contributing to these updates of the territorial project and ECs, as well as to their intertwining. It aims to develop another approach to the project of biodiversity based on the socio-ecological synergies that occur on the whole territory, assuming that the fabric of the agricultural landscape is revealing of contemporary prospective synergies. This article presents one case studies whose objective is to explore a way of overcoming the issue of ecological continuity linked to the fragmentation of the landscape, especially by mobility infrastructures.

The objective is to elaborate a social-ecological continuities project which enhance each other, revitalizing the landscape as a medium for coexistence. The interweaving of landscape structures and mobility meshes changes as we move from human to wild habitats. If 'wilderness landscape[1] tend to keep humans outside, 'urbanized landscape'[2] encouraging local lifestyle, weaving links between human and anthropophilic species. This exploration brings three results: 1) a conceptual approach of ecological continuities; 2) a cartographic method to analyze human and non-human continuities; 3) a prospective scenario that can be used as a basis for discussions that open other possibilities.

Key words:

Territorial project – Wilderness landscape – Ecological continuities – Socio-ecological transition – Rural landscape

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1 *Paysage ensauvagé*

2 *Paysage aménagé*

The territorial project, a federating tool for land use planning, has integrated over the last decade the instruments of ecological continuities (ECs). This is a first step towards an 'ecocentric' territorial vision so that it can participate more actively in maintaining biodiversity. The result of this hybridization is the subject of many debates highlighting the frictions between urban planning and ecology cultures. This need to improve this interdisciplinary conception is accompanied by the need to renew these instruments so that they respond to socio-ecological issues at local levels. Indeed, the socio-ecological transition requires each territory to participate in halting the degradation of climate conditions and the collapse of biodiversity, while ensuring the supply of vital resources and a change in human lifestyles (GIEC, 2019; Lenton et al., 2019). Even if this requirement may add complexity to an already ambitious task, it could be seen as an opportunity to contribute to intertwining of the territorial project and ECs.

Biodiversity exists beyond the spaces reserved for it, and human activities impact all habitats, even those protected. Therefore, the present research aims at elaborating another approach of the project of biodiversity based on socio-ecological synergies that take place on the whole territory. Making the landscape ecologically rich and functional consists in diversifying its components and structures (crops, hedgerows, wetlands), while ensuring the continuity of each of them (Bergès, Roche, and Avon 2010). Landscape revitalization is based on improving the heterogeneity of the landscape, as well as the balance between continuity and fragmentation of these various habitats that compose the landscape (Burel and Baudry 1999). The objective of the case study presented here is to explore a way to overcome the issue of ecological continuity related to the fragmentation of the landscape, particularly by mobility infrastructures.

This exploration is a contribution to the Hors Zone à Bâtir[3] mandate, where the Great Geneva has commissioned the EPFL Laboratory of Urbanism to develop a method to move toward territorial planning in responding to socio-ecological issues. This experimentation was based on two case studies, one of them was the Allondon watershed, located in the Pays de Gex. This article reports on a contribution of this case study. It is the result of a collaboration with F. Guichot addressing human continuities beyond the Transit Oriented Development (TOD) model. While this article shows what this contribution brings to ecological continuities, the article by F. Guichot highlights how it contributes to human continuities. The objective of this contribution is to bringing out co-benefits of bothecological and sociological continuities, while improving their mutual quality. This conception is based on a landscape gradient that articulates the distancing and the encounter between human and non-human. It links a process making the landscape wilder[4] for the big fauna, where humans are kept outside, to a 'urbanized' landscape[5] encouraging local lifestyle, weaving links between human and anthropophilic species.

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3 Non-buildable zone
4 Processus d'ensauvagement du paysage
5 Wilderness landscape. Paysage aménagé

STATE OF ART

The socio-ecological transition of our era consists of a socio-technical process renewing the everyday life of society (Geels 2011; Pahl-Wostl et al. 2013; Werners et al. 2013) in order to secure the terrestrial living conditions of the living. The maintenance of climate and biodiversity deleteriously impacted by human activities (Nations Unies 1992b) relies on an evolution of the relationship between society and ecology (Bennett 1976). The socio-ecological transition is therefore a process of transformation of our relationship with the diversity of the living, commonly called biodiversity, which involves the joint evolution of the territory and the local society, space and practices. A perspective which is not without incidences on our ways of conceiving and projecting our living environments.

The territorial project has until now focused on the quality of human life through the prism of urbanization and urban space (Nassauer, 1995; Lovell et al., 2010; Nassauer, 2013; Renting et al., 2009). Thus, the ability of this territorial planning tool to address these social-ecological issues implies a profound change in both its content and its manner of doing so. This transformation requires considering urban and agricultural open space (Corboz 2001; Waldheim 2006; Viganò et al. 2017) and its ecological and sociological dimensions as intrinsic project components (Secchi 2009; Girardot and Brunau 2010; GIEC 2014). This transformation of urban planning practice refers to conceptions of contemporary territory that consider the set of highly heterogeneous urbanized landscapes (Secchi 2009) which recognizes the open space and its ecological processes structuring value for the project (Geddes 1915; McHarg 1969; Secchi and Viganò 2011; Skjonsberg 2018). This emerging operational approach implies intensifying interdisciplinary exchanges with environmental sciences and transdisciplinary exchanges with field actors, from design to implementation (Nassauer & Opdam, 2008).

Maintaining biodiversity. It is important to understand what biodiversity consists of to adopt a critical look at how to enhance it. Biodiversity deals with the diversity of life at all scales, from diversity within species (genetic) and between species (specific) to diversity of ecosystems (Nations Unies 1992a). This diversity is based on the interactions between terrestrial and aquatic biological, and eco-physiological processes (e.g., soil fertility, biodegradation of pollutants, etc.). The main factors of biodiversity mass extinction (Millennium Ecosystem Assessment 2005) are related to the fragmentation and destruction of habitats, both in terms of quantity and quality, due to human activities (Fahrig 2002). Responding to this issue has led to going beyond the protected areas approach to understand ecological processes at the territorial scale (Thompson et al. 2011), integrating anthropogenic spaces and ordinary biodiversity (DeFries et al. 2007). An approach characterized by the emergence of landscape ecology which conceptualized biodiversity factors at the ecosystem scale such as heterogeneity, fragmentation, or ecological continuity (Burel and Baudry 1999). Only the latter was democratized in public conservation policies during the 1970s under the name of ecological networks (Mougenot and Meliin 2000), especially in Europe (Jongman, Külvik, and Kristiansen 2004).

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Ecological continuities (ECs). The maintenance of biodiversity is at the heart of the ECs instrument[6]. This ecological model aims to restore species flows by connecting certain habitat[7] (Regina 2019) recognized as biodiversity reservoirs through spatially continuous or non-continuous landscape structures (Bergès et al. 2010; Pino and Marull 2012). The traduction of this model into the field of land use planning has resulted in an oversimplification of complex ecological concepts, calling into question its usefulness for maintaining biodiversity (Boitani et al. 2007; Chaurand 2017). While the implementation of ECs at local scales represents a major challenge because this approach is too abstract for field actors to appropriate it (Delclaux and Fleury 2020). The observation of conceptual and operational issues highlights the possible levers for overcoming this paradox.

Among the conceptual issues, three show this simplification that is potentially counterproductive for biodiversity maintenance:

- This approach is based on movements of only certain species (Franklin 1993). This choice guides decision-making, promoting the growth of certain species to the detriment of others.

- The confusion between ecological continuities and corridors leads to an operational generalization of corridors when they are only one of several ways to improve ecological continuities (Van Der Windt and Swart 2008).

- The exclusive use of the 'patch, matrix, corridor' model[9] (Forman and Godron 1986) is based on a binary vision of territories that distinguishes between harmful and favorable spaces (Thompson et al. 2011).

While the application of ECs raises issues specific to each territory, four operational issues are of a certain generality:

- The cartographic representation, resulting from the delicate passage from ecological modeling to an urban master plan, is sufficiently vague and flexible which makes it not very operational (Van Der Windt and Swart 2008).

- This modelling is dependent on naturalistic data that are often partial and obsolete when they are not inaccessible or even non-existent (Chaurand 2017).

- Lacks of knowledge from both field actors about ecology (Delclaux and Fleury 2020), and experts[10] about practical knowledge to know where and how to install continuities[11] (Bergès et al. 2010) is an obstacle to its implementation on the ground.

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6 *Called Trames Vertes et Bleues in France and Réseau Écologique Nationaux in Switzerland.*
7 *Such as forest, meadow or wetland.*
8 *This model delimits the nodal zones (reservoirs of biodiversity such as protected area), buffer zones that protect previous ones from external human impacts, and continuums that link them together (Bergès, Roche, and Avon 2010), constituting the ecological network.*
9 *Note that this representation has conceptual biases (Chaurand, 2017) that will be made explicit later.*
10 *Scientists and technicians.*
11 *What shape, structure, width, and composition to give them and which species to favor and monitor.*

Beyond ecological continuities. To improve ECs, some propose to diversify ecological models to make them more representative biodiversity, whereas others suggest moving beyond this paradox by moving away from ecological models to a social-ecological approach considering the whole territory and human practices (Pickett et al. 2008; Baudry, Alignier, and Thomas 2017; Simensen, Halvorsen, and Erikstad 2018; Vimal, Mathevet, and Thompson 2012). Hence, ECs could be understood in a more holistic way, where landscape structures fulfill other functions such as water management (van den Berg 2020). This approach affirms a willingness to embrace interdisciplinarity with human and social sciences, recognizing the benefits and complementary of the sociological dimensions and design thinking (Pickett, Cadenasso, and McGrath 2013). These prospective processes are more aligned with transitional issues (Rankovic, Pacteau, and Abbadie 2012), and joined the one towards which the territorial project tends.

METHODS

The case study is a contribution to the mandate Hors Zone à Bâtir, where the laboratory of Urbanism of the EPFL has elaborated a methodology to move towards a socio-ecological territorial planning in the Greater Geneva. This exploratory approach articulated research by design (Viganò 2014) and a transdisciplinary collaboration with planners of this cross-border agglomeration. In this context, we first elaborated maps of ecological and sociological continuities in Pays de Gex, which served as a support for discussion with them during the workshop. It allowed us to identify the current and potential field practices articulating ECs for wildlife and soft mobility[12]. This co-constructed knowledge allowed us to sharpen our conceptual approach of socio-ecological continuities, making it more integrated into field practice. We then developed maps that represent human and non-human continuities in an equivalent manner[13], each map highlighting the relationships between spatial structures, their functionalities, and their daily uses. They have been constructed thanks to a common legend to tend towards harmonized representations despite the great disparity of GIS data. The cartographic method is based on an overlay and a recategorization of GIS data, as much as possible in free access. Then, we elaborate a scenario of socio-ecological continuities, based on the previous cartographic analysis and a design thinking. The result is a territorial vision composed of prospective mapping and action principles, which makes tangible a possible transformation of the territory.

CASE STUDY DESCRIPTION

Greater Geneva and the 'Hors Zone à Bâtir' mandate. The Great Geneva area have undertaken to revise their spatial planning instruments, starting with its cross-border territorial vision for 2025. The Hors Zone à Bâtir (HZB) mandate develops the premises set by the Schéma d'agglomération in 2007 advocating a specific planning approach for the rural space, considering its multifunctionality as a starting point (comité régional franco-genevois 2007). The notion of HZB, which comes from the vocabulary of Swiss planning

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12 *Mobilité douce.*
13 *The mapping method will be explained in the results section.*

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(Office de l'urbanisme et Département du territoire 2020), is understood here as an general and exploratory notion, which allows apprehending all the space excluded from the Building Zone. The proposal consists of an exploratory approach of construction of a guiding image that identifies a specific planning, that of a "Metropolitan Infrastructure of Socio-Ecological Continuity" which articulates all the necessary changes in the unbuilt space.

The case of the Pays de Gex. From the Jura crest to the right bank of the Rhône, extends the French agglomeration community of the Pays de Gex and then a part of the Geneva canton in Switzerland (Fig. 1b). The Greater Geneva area has led to a redrawing of this governance into three PACAs[14] (fig. 1b), aiming to move towards a territorial coherence that renews cross-border relations (Bertrand, Burel, and Baudry 2016). The Allondon watershed was selected as a case study for the HZB mandate for the same reasons, adding the need for an ecologically coherent perimeter. Our contribution considered the 'enlarged Pays de Gex framework[15] as it corresponded more to the study of the ECs of the big fauna linking the Jura forest to the Rhône fluvial forest. From the point of view of mobility, the Pays de Gex is a paradigmatic example of the unbalanced relation within the Metropolitan area. Moreover, neither the agglomeration plan, nor the SCoT of the Pays de Gex, nor the Geneva PDC conceive of human and non-human continuities in synergy.

Fig 1a. The territory of Great Geneva, 2020

Fig 1b Périmètre d'Aménagement Coordonnés d'Agglomération (PACA), Great Geneva, 2021

RESULTS

The project of socio-ecological continuities exploration led to three results: a concept of socio-ecological continuities (A) ; an 'ecocentric' cartographic analysis of these continuities (B) ; an operative project (C).

A. Feedback and co-conceptualization of socio-ecological continuities.

Workshop. The transdisciplinary discussion[16] highlights the levers and tools that promote synergies between ECs and soft mobility outside the building zone. As they are perceived as 'incompatible', the cantonal approach consists in the distancing them by organizing the dispersion of walkers, and this for various zones[17] corresponding to distinct legal frameworks and public services. Concerning forest habitats, the plan directeur des forêts genevois establishes 'quiet zones' which are not equipped (e.g. table, pathway) but which remain accessible. Thanks to river revitalization projects, wet forests along rivers[18] are widening[19], and the paths are, in most cases, set back from the banks due to lack of space. In the 'agricultural zone', the revitalization of bocage hedges[20] and the rest of the non-cultivated agricultural landscape is done through farmers' initiatives, supported by tools such as the Surfaces de Promotions de Biodiversité. However, these agrarian initiatives do not necessarily consider ECs issues or soft mobility, and they are rarely coordinated with each other. The proximity of soft paths and agrarian hedges is a sensitive issue because of the conflicts of use between agricultural production and public promenade, coming from the collective imaginary considering agricultural area as public whereas it is private. The meeting space could be based on a network of gatherings, where walkers would have public use of the crop at certain locations. To understand the ECs of forest habitats in the broadest sense[21], it was proposed to speak of 'arboreal continuity[22].

Conceptualization of socio-ecological continuities. The project of socio-ecological continuities consists in establishing a mesh of arboreal continuities with heterogeneous components (hedge, path, river, etc.). This landscape structure aims to improve the quality of life of all species, respecting their respective needs as well as issues of coexistence. It allows the articulation of the movements of more and less anthropophilic species and humans according to a spatial and/or temporal gradient of proximity. This approach is based on a double radicality, going beyond the usual approaches to both human or sociological continuities (fig.2a) and non-human or ecological ones (fig.2b). This shift in perspective aims to analyze these two continuities in an equivalent manner (fig.2c), which corresponds to a cartographic challenge (cf. B.). Beyond analyzing them jointly, it is then a challenge of conceiving them in synergy (fig. 2d), bringing out co-benefits (cf. C).

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14 Périmètre d'Aménagement Coordonnés d'Agglomération - Agglomeration Coordinated Planning Perimeter.
15 Corresponding to the one defined by the study of ECs for the Schémas de Cohérence Territorial (SCoT) of the Pays de Gex (fig 4a).

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16 Discussion regrouping Flore Guichot (labU), Valentina Hemmeler Maïga (DT), Noélie Lecoanet (labU), Güner Sengul Juranville (GG), Paola Viganò (labU), Marine Villaret (labU), Eric Zellweger (DT).
17 Forest, agricultural zones, etc.
18 Also called 'linear' or 'narrow' forests
19 On average 20m on either side of the riverbank
20 We speak of bocage hedges and not of forest because this would require a change in the status of the plots
21 Beyond the status of 'forest zone'
22 Continuité arborée

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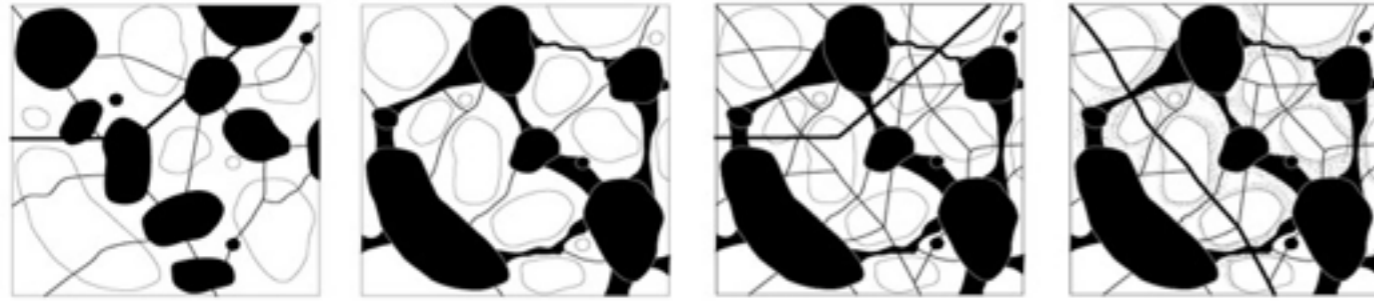
Figure 2, from right to left 2a, 2b, 2c, 2d. Towards a socio-ecological design, M. Villaret et F. Guichot, 2021.

B. Mapping socio-ecological continuities

Sociological continuities. Today, territorial mobility projects[23] mainly respond to commuting[24] issues (fig 3a), even though this mobility represents only 26.1% of daily trips and corresponds to 52% of the mileage (Blatti, Munafò, and Rames 2020). Reducing our fossil fuel-intensive mobility[25] implies relocating and decarbonizing our mobility. F. Guichot's takes the hypothesis that the weak mobility network (fig. 3b) is structuring to design a territorialized mobility aiming to encourage the diversity of endogenous lifestyles, aggregating daily and leisure activities. This project is based on the reterritorialization of mobility, a process that relies on the requalification of the existing road network[26], the transformation of practices, as well as on the effective porosity of the territory and its ecological rationality. This project of sociological continuities is established at the scale of 'dispersed proximities', a scale that is invisible in the conceptions of mobility linked to TOD. It also makes it possible to take the opposite view of the dominant dichotomy between mobility and ecological networks. This approach is developed in the article by F. Guichot.

Figure 3a. Commuting mobility map, F. Guichot, 2021.

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23 A design based on the TOD model.
24 Housing-to-work trajectories.
25 One of the challenges of the socio-ecological transition
26 Mobilité douce et transports en commun de proximité.

Figure 3b. Weak mobility map, ibid.

Ecological continuities. They are apprehended with the same approach as that carried to the sociological continuities, detaching itself from the usual ecological conceptions. The objective here is to establish a 'landscape grain' that organizes the distancing and the encounter between human and non-human. Such a procedure is based on the analysis of the landscape structures of the whole territory and the movement of more or less anthropophilic species.

From a network of continuity to an ecological landscape structures

The objective here is to go beyond the issues of representing ECs by confusing continuity and corridors on the one hand, and habitat and land use on the other. The first conceptual bias leads to schematic representations of continuities according to arrows or linear patches. "We must stop drawing arrows and start drawing landscape structures." (J. Baudry, interview of 05.05.2021). Moreover, in current practice, "we have not entered through the natural habitat in the ecological sense, but in the structural sense of land use (data 'Corinne land cover'), which is clearly insufficient for [the ECs] at the communal and inter-communal levels." (J. Chaurand, interview 08.06.2021). The map elaborated here (fig. 4b) aims to make visible the landscape structures that interweave various habitats, without delimiting any contour. It consists of a re-categorization of the carte des milieux de Genève, distinguishing between wooded, open, and aquatic[27] habitats, to facilitate the comparison with the Trames vertes, jaunes et bleues[28]. The sub-categorization makes it possible to read the components of these landscape structures, for example, the wooded areas[29] are made up of forest, hedgerow, or orchard. By comparing the official ecological continuities of the Pays de Gex (fig. 4a.) to those explored here (fig. 4b), we notice a difference in resolution, the second being more representative of the reality of the site. This map allows to identify the structuring components for each habitat and shows their respective fragmentation.

Figure 4a. left. Map of ecological continuities, SCoT of Pays de Gex , 2019.

Figure 4b. right. Map of the landscape structures of ecological continuity of the Pays de Gex, M. Villaret, 2021.

27 Including wetlands
28 Wooded areas. In France, ECs are called green and blue networks, but they often contain the yellow network as well.
29 It should be noted that the intra-urban vegetal stratum could not be represented due to a lack of data on the French side.

Anthropophilic and 'anthropophobic' species[30]

Usually, ECs are based on the observation of 'generalist species' because they are not very sensitive to a specific habitat and are therefore able, for example, to move within a wooded environment made up of different forest environments or to cross a meadow environment. While this approach has the advantage of including ordinary biodiversity, this choice of species is not in line with a perspective of coexistence. In this case, the choice of species is based on their 'degree of anthropophilia'. The most anthropophilic species help to conceive the coexistence by their meeting, knowing that the 'need' of proximity with the human is linked to the specific management of the habitat. In contrast, the less anthropophilic, or 'anthropophobic', help to think of coexistence by distancing the human from the non-human. These species live in environments that do not require human habitat management, and natural regeneration can be like a revitalization of their ecosystem. The objective is thus to assume the blooming of a 'functional biodiversity'[31] near the humans and a wild biodiversity far from the humans.

The deer[32] is the anthropophobic specie selected for this study because data on its movement[33] exist and are on open access. The map (fig. 5) represents a gradient of accessibility of deer from the most attractive habitats in dark green to the most repulsive in red. Deer seek out forested areas because they are their habitat, the place where they access their vital resources. To reach them when they are spatially discontinuous, the deer tries - as far as possible - to go along wooded rivers or to cross hedges and crops. In this way, they avoid crossing the noisiest transport infrastructures, and therefore the most frequented ones, as well as villages. This background map was overlaid with the topography and the movements of big fauna (black dotted lines) to identify the other spatial components that condition its movements. It also avoids overhanging places such as the vineyard hill, preferring the deepest valley bottoms. It rarely crosses the big cultures which are poor in woodland and in bocage networks. It systematically bypasses villages, but crosses golf areas which are without human at night. However, it does not hesitate to pass near human habitats when it is bordered by a river. We notice that it crosses the roads at the intersection with the river, certainly taking advantage of the underpass allowing the watercourse to pass under the road.

This study of the movements and needs of the deer makes tangible the components that condition its movements, locates the strategic places, and indicates the modalities of transformation of the landscape to be undertaken to facilitate or not its movements. As for humans, it is a question of positively distancing the animal, drawing it into a more comfortable and attractive place for it rather than forcing it to approach a place of risk (for them or for humans). This task is more complex because, depending on the species considered, the same landscape can be a facilitator or an obstacle to their movements. An aspect that would require the study of another open field species to find a better balance. It is therefore not a question of making a pre-established network ecologically continuous, but of transforming landscape structures to create a landscape gradient that organizes the proximity between humans and non-humans.

30 Anthropophilic species are the one that are favored by human activities, aiming to create symbioses (e.g. crop auxiliaries that limit the invasion of pests). Conversely, 'anthropophobic' species are the one that avoid humans.
31 Celle-ci désigne l'ensemble des espèces qui contribuent à des services écosystémiques, par exemple, dans un agroécosystème, des auxiliaires de cultures sont des espèces qui mangent les ravageurs des cultures, leur présence est utile aux agriculteurs.
32 A noter que la tentative de représenter une espèce anthropophile n'est pas présentée dans cet article du fait du manque de données accessibles et de temps pour aboutir à un résultat.
33 Corridors pour le déplacement de la grande faune (cerfs, chevreuils, sangliers), SITG, 2020.

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Figure 5: Deer ecological continuity map, M. Villaret, 2021.

A mapping method for socio-ecological continuities. Establishing this mapping of socio-ecological continuities raises three issues. The first is to represent ecological and sociological continuities in the same way despite the great disparity of available information. The second is to map in a readable way the interrelationships between spatial structures, their functionalities, their daily uses, as well as the landscape qualities specific to each continuity. The third is that these maps must allow a transversal reading making tangible the relationships - beneficial or deleterious - between these two continuities. Aware of these issues, the cartographic method developed here aims to represent the space of continuity, a notion considered in the broad sense, without being specific to a species. This to identify what it currently and potentially connects (what the species is looking for, logic of attractiveness), its components (bocage, schools, agriculture, etc.), as well as its logics of implantation[34]. These continuity maps show the places of attractiveness according to a gradient of accessibility (private or public space, barriers, etc.). They look at the space of movement not as a linear transport infrastructure, but as a landscape grain (Baudry and Boussard unpublished) or isotropic space (Secchi and Viganò 2011), influencing the fluidity of movement of the species considered. This allows us to understand how the intensity of use of a species is diffused in space. These shared representations of human and wildlife continuities allow for a cross analysis leading to a synergistic design.

C. Scenario of socio-ecological continuities

Together, social-ecological continuities enhance each other, revitalizing the landscape as a medium for coexistence. The interweaving of landscape structures and mobility networks changes as we move from human environments supporting human continuities to wilderness habitats supporting wildlife continuities. Here is a narrative of such a territorial scenario. Ecological continuities aim to re-establish the deer food chain, accepting the return of wolves, allowing the ecosystem to regenerate itself, reducing human intervention to 'laisser faire la nature' or living in symbiosis with it. Deer paths are materialized in space through a process making the landscape wilder, creating places hostile to humans and conducive to wildlife (fig 6a frame 6, fig 6b cut 6). Walkways are moved as far as possible from these areas, allowing forest stands to regenerate naturally (fig 6a frame 5, fig 6b cut 5). Agricultural fields crossed by deer become agroforestry, both edible forest for humans and sparse woodland for deer (fig 6a frame 9, fig 6b cut 9). In between, the landscape and the road network play the role of a 'buffer zone' aiming to slow down the movements of both bipedal and quadrupedal walkers. This rough landscape prevents humans from entering these wilderness areas and wildlife from leaving it. For example, the river separates a wilderness shoreline from a urbanized one (Fig. 6a frame 2, Fig. 6b cut 2). Roads act as barriers between a village and a wild forest. Hedgerow systems near the wilderness forests restrict deer movement to the open fields and tourist movement in the other direction, reserving the few paths for agricultural uses (Fig. 6a Frame 8, Fig. 6b Section 8). As one moves away from the big fauna passages, one approaches the human continuities corresponding to the other end of the landscape gradient. The bocage hedges are subject to specific management to attract the desired species such as crop auxiliaries (fig 6a frame 7, fig 6b cut 7). They become more welcoming to the public, composed of fruit species that can be freely harvested during their seasonal walks. The bocage network is here a place of diverse encounters, linking humans to their food and to the living organisms that create it, linking farmers to their agro-ecosystem and the biodiversity that underlies it. Woodlands or rivers crossing the villages are designed as function of human frequentation, like public spaces (fig 6a frames 1 and 4, fig 6b cuts 1 and 4). These human continuities offer a rich itinerary in terms of vegetation, sound, activities, or atmosphere. They serve to create a space of weak mobility pleasant for humans and anthropophilic species.

34 For example, big fauna avoids open hills, villages are located outside of the flood zones.

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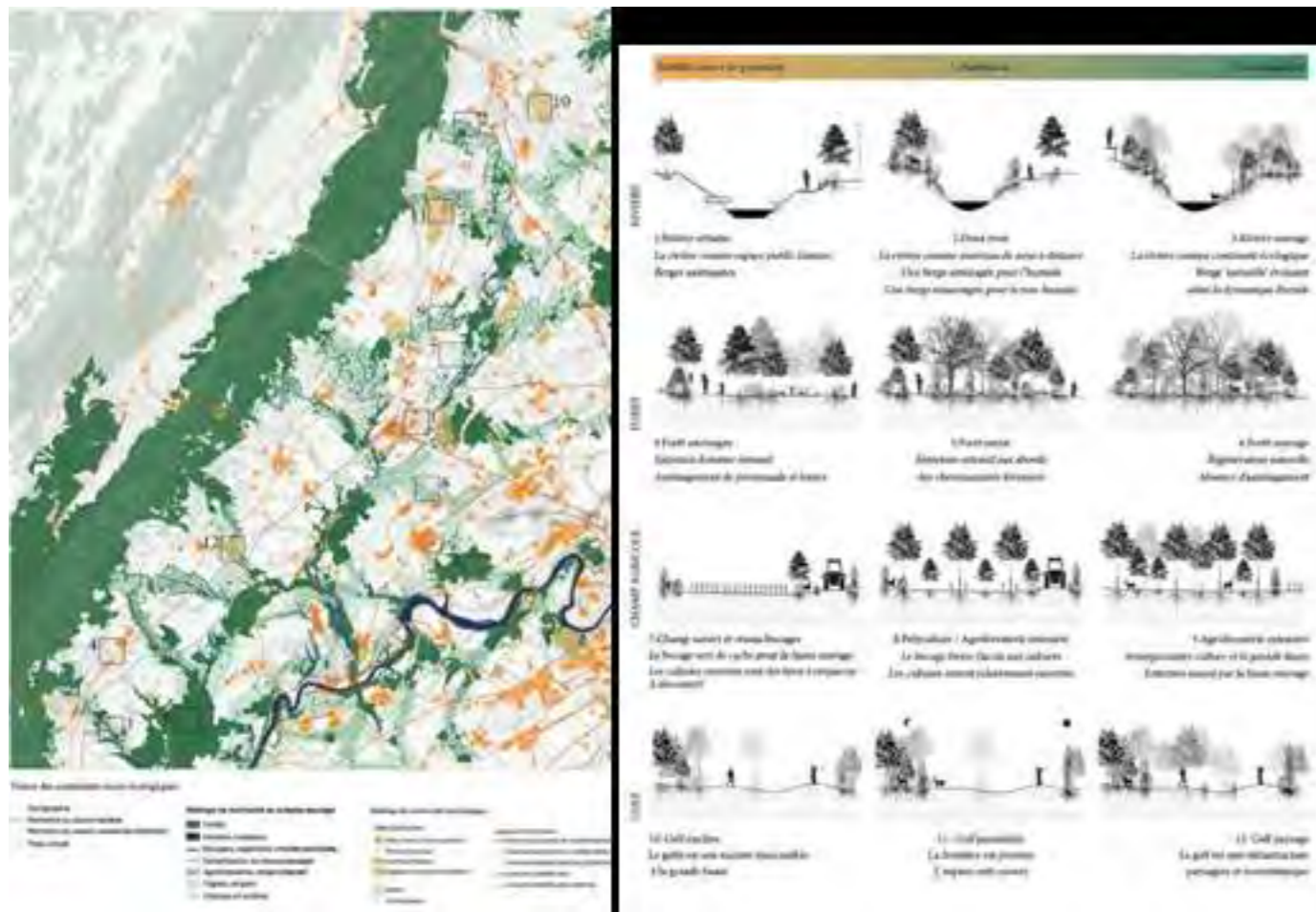
Figure 6a., 6b. Vision of social-ecological continuities,
F. Guichot & M. Villaret, 2021.

CONCLUSIONS

This conception of territorial coexistence between humans and non-humans leads to implementing ECs across the territory with a socio-ecological perspective. It contributes to integrate novel ECs in the territorial project. It considers agricultural land and practices and their transformations as space not subordinated to urban logics. It is based on an operative prospective that articulates a landscape project including the transformation of human practices tailored to the diversity of the different territorial realities related to planning (zoning, planification sector).

This first step requires further developments:

-The cartographic method of non-human continuities is based on the map of habitats[35] available in the Great Geneva. This information may be lacking in many other areas. This makes it difficult to replicate this mapping process.

-While this design proposes to consider both anthropophilic and anthropophobic species, the cartographic analysis and the scenario gives a limited place to anthropophilic species, due to the lack of available data, for the moment.

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35 Carte des milieux

- The analysis of the coexistence between wild species and human should take more into account the temporalities of use. As large mammals move mainly at night and humans during the day, the articulation of their continuities could be refined. More information is needed to develop this aspect.

-The next step is to transform this vision into an action plan for the territory. To doing this would require a greater integration of the agricultural and municipal logics, as well as the inhabitants.

ACKNOWLEDGMENTS

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CARTOGRAPHIC SOURCES

Fig 1a. Le territoire du Grand Genève, map extracted from the report « Grand Genève mode d'emploi », Agglomération du Grand Genève, 2020

Fig 1b Périmètre d'Aménagement Coordonnés d'Agglomération (PACA), map extracted from the report « Projet d'agglomération de 4e génération, Grand Genève, Synthèse », Grand Genève, 2021

Figure 2, from right to left 2a, 2b, 2c, 2d. Towards a socio-ecological design, F. Guichot & M. Villaret, 2021.

Figure 3a. Map of commuting mobility, F. Guichot, 2021. Data sources :

Data :

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Carreaux emplois, ibid.

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Ligne ferroviaire, ibid.

Mesure mobilité du plan d'agglomeration, ibid.

Carreaux de population, INSEE

Ligne et arrêt de bus, Openstreetmap

Figure 3b. Local mobility map, F. Guichot, 2021. Data sources :

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Qualité de desserte 2020, ibid.

Ligne ferroviaire, ibid.

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Figure 4a. Map of ecological continuities taken from the Pays de Gex SCoT, map extracted from the report « SCoT du Pays de Gex », 2019.

Figure 4b. Map of landscape structures of ecological continuity in Pays de Gex, M. Villaret, 2021. Data sources :

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Figure 6a., 6b. Vision of socio-ecological continuities, F. Guichot & M. Villaret, 2021.

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THE BIRD-FRIENDLY CITY : GRAPHIC REPRESENTATION AS A DESIGN RESEARCH TOOL TO EXPLORE A "LANDSCAPE CONTINUUM" AND ITS INTERACTIONS WITH THE AVIFAUNA IN 5 DIFFERENT URBAN FABRICS WITHIN THE CITY OF TOULOUSE

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Abstract

This research evaluates the capacity of urban fabrics from five different epochs to house birds in the city of Toulouse, France. This short paper questions graphic representation as a design research tool to : collect descriptive data, formulate shared research hypotheses, identify spatial units, test and represent spatial relationships. Our hypothesis is based on the presumed capacity for different urban fabrics to host the avifauna including aspects such as : land use, diversity of the site's ecosystems, materials and porosity of the architectural forms, vegetation cover and structure and maintenance strategies. The research method is based on two steps : a first descriptive stage of the work uses disciplinary readings of the urban forms where the graphic representation (map, plan, section) is used to compile data and formulate shared hypotheses ; a second analytical step of the work focuses on the relational aspect where the graphic representation serves to test and illustrate the spatial relationships between trees, vegetation, building facades, architectural and urban forms to measure the attractiveness of these landscape typo-morphologies to avifauna through ornithology and statistical investigation. The team includes architects, architect historians, landscape architects and ecologists, a botanist, ornithologists and urbanists. This short paper is mainly focused on the research method and present partial results of an on-going research.

Key words:

Urban forms, design-based research, avifauna, representation.

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Interdisciplinarity in design research through graphic representational tools

Design research approaches use design tools or design approaches to answer a research question. Prominski and von Seggern (2019) recently published a book on Design research for urban landscapes in which they attempt to clarify categories, processes and transferable outcomes of design research. Prominski (2019) explains that 'research through design' is controversial because the graphic and specific character of design : "research aims at transferable knowledge, while design aims at specific solutions". The epistemological stance of design research is projective. At the same time, the 'projective moments' of a design research need to be evaluated with regards to the 'original moments' of the research establishing general knowledge derived from the design process, and 'reflective moments' confirming (or not) existing knowledge. The 'transfer moment' eventually produces reusable results and applicable knowledge. These moments are interlinked, iterative and the research process is unpredictable. De Biase & Chabart (2020) recently edited a book on 'the act of representing' in architecture and design sciences. They present three types of epistemological approaches to 'representation in architecture': (1) as an analytical corpus (figurative patterns and systems of images from which architecture is elaborated, thought and disseminated), (2) as an operational tool (conceptual, mental and social representations of buildings) (3) and as a heuristic tool (the different tools and means of representation deployed in research protocols).

The research project presented in this short paper, MorphobioT (acronym based on French for Morphology Biodiversity Toulouse), used graphic representation as a tool that combined descriptive and analytical moments, disciplinary readings and shared projective stages, natural and human sciences methods. This short paper explores graphic representation as our main design-based research tool that triggered interdisciplinary dialogue and initiated prospective research outcomes. We used graphic representation to share knowledge and hypotheses, by collecting data, mapping and crossing disciplinary readings of the urban forms to identify spatial typologies. We used graphic representation as a projective tool of construction to spatially overlap and confront spatial typologies and biodiversity data and identify favorable 'situations' to birds. Finally, we used graphic representation as a tool of communication and dissemination to illustrate results and map this transferable knowledge.

METHOD

The MorphobioT programme : research on how to enhance biodiversity in dense urban landscapes

This research evaluates the capability of urban fabrics to house biodiversity, specifically birds, in the city of Toulouse. In order to address this question, we consider that we cannot study the urban form in a way that is dissociated from its vegetation structure : their combination generates the conditions for the development and maintenance of biodiversity (Mollie, 2020; Musy, 2014). We therefore proposed to examine five urban design models in which the relationship between nature and city has been considered in different ways through urban design practices. The urban fabrics consist of five different epochs and therefore different inherited urban forms and densities: a historical fabric from the XIXth century, a garden-city from 1950, a high-density tower block neighbourhood from 1960, a suburban neighbourhood from 1970 and an eco-neighbourhood from 2000 (fig. 1).

Figure 1: 5 sites in Toulouse (source: MorphobioT research team).

Understanding the ecosystemic relationship between urban form, architectural typologies, biodiversity, vegetation type and structure requires an interdisciplinary approach (Clergeau, 2020). Our research used a co-production approach, transversal to disciplines involved and stakeholders. The team included architects, architect historians, landscape architects and ecologists, a botanist, ornithologists and urbanists. Throughout the process, workshops have been organized with the local planning authority, decision-makers, designers, scientists, partners in the construction sector and neighbourhood associations to re-think urban forms and methods for space design which are beneficial to avifauna.

The research objectives were three-fold : (1) identify landscape typo-morphologies that can potentially maintain or generate biodiversity, (2) consider representation as an interdisciplinary mode and a tool for acculturation, (3) discuss typo-morphologies and design processes that creates better local living environments.

The MorphobioT approach : focus on graphic representation as a descriptive and analytical tool to collect, map, cross-reference and illustrate urban morphology favorable to avifauna.

The research method consisted of two stages, deploying a series of representational tools. While three-dimensional representations were envisaged during the research, plan and sectional approaches were favored in order to address the wide range of analytical scales as well as qualitative and quantitative data efficiently. Mapping in plan allowed us to manipulate contextual and neighbourhood-scale data, while sections informed local and specific knowledge with vertical and relational patterns. Sections also allowed a particular aesthetic, combining subjective drawings and spatial accuracy.

A first descriptive stage used readings from diverse disciplines of the urban forms through drawings (maps, plans, sections), from the metropolitan scale (1:50 000 – 1:5000), through the neighbourhood scale (1:1000 – 1:500) down to the scale of a private garden (1:250). The following have been surveyed and mapped by the interdisciplinary team : the green infrastructure context around the five sites, the historiography, evolution of architectural morphologies and urban forms, the

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urban composition, the public spaces and usages, layers of vegetation, identified plant species and ecological functions. Here the graphic representation was used to compile data, formulate shared hypotheses and produce detailed description of the association of urban and vegetal forms (urban masterplan and landscape sections).

Building on this descriptive stage, the second analytical stage focused on the relational aspect between urban forms, vegetation and avifauna. First, we defined 'landscape typo-morphologies' as typical spatial units representative of the relationship between trees, vegetation, building facades, architectural and urban forms. We used the graphic representation to illustrate these typo-morphologies in detailed sections and plans. Then, an ornithological survey was conducted to identify bird species, communities and behaviors in relation to these landscape typo-morphologies. Thanks to our knowledge of the sites and based on all collected data and results, we were able to zoom up on and illustrate more concrete specific 'situations' particularly favorable to avifauna within these landscape typo-morphologies. Here the graphic representation was used as a transversal and integrative tool (section at scale 1:250) to illustrate a complex ecosystemic form between the built environment and the living environment, particularly focusing on the way different bird communities interact with this system.

Focus on one case study : Ancely, a high-density tower block neighbourhood from the 1960s

In the following section, we seek to illustrate the design research approach applied to one of our case studies on one urban fabric (fig. 2). We present first results as we are halfway through the programme. Many figures are still under construction.

Figure 2: Pictures of the Ancely site, a high-density tower block neighbourhood from the 1960s (source: MorphobioT research team).

CASE STUDY DESCRIPTION

1. Descriptive stage : crossing disciplinary readings

At the metropolitan scale, the urbanists and the local Toulouse urban planning agency has established several contextual maps (1:50 000 – 1:10 000) to locate the site with regards to green infrastructure and potential ecological areas but also vegetation layers, woodland density and protected areas. The ecological potential of the site is high: it lies at the confluence between two Natura 2000 protected rivers corridors, the Garonne river and the Touch river, and includes several areas protected woodland (fig. 3).

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1 With an associative status, the French urban planning agencies develop expert assessments regarding the various domains of urban planning and territorial development (planning, housing, mobility, economy, environment, real estate…). (https://www.fnau.org/en/urban-planning-agencies/what-is-an-urban-planning-agency/).

Figure 3: the green infrastructure metropolitan context (source: MorphobioT research team and Toulouse urban planning agency).

At the neighbourhood scale (1:5000), the architectural historians have explored the historiography and evolution of the urban forms. The neighbourhood was built between 1955 and 1960. The architect, Roger Brunerie, proposed to adapt the principles of the modernist era to the initial context. The architectural forms follow the lines of the topography, and are positioned in successive river terraces, surrounded by the river confluence. The height of the block alternates between one and five floors. The architectural morphology follows the placement of crane tracks during the construction process and the composition uses a prefabricated construction system. The building materials are mainly prefabricated brick and concrete for the façade panels (Costamagna process), covered with Empeaux tiles. These are combined with façade faced with river stones . The facades are all pierced with regular bays and balconies. The public open space design offers a panorama over the site. The maintenance of the vegetation is intensively controlled. In order to grasp the notion of 'inherited biodiversity', the team carried out readings of the urban forms at different periods in plan and in section and established an historiography of the urban forms and the transformation over time. The main result shows a current cohabitation between a tree pattern inherited from the historic parkland of the Château d'Ancely, a planted pattern dating from the 1960s housing estate, and the riparian zone which has not changed.

Finally, at the scale of the neighbourhood and site, and based on several field surveys conducted in spring and summer 2021, a team of landscape architects, ecologists, botanists and architects mapped landscape elements in plan (A0 at 1:500) : land use, materials, public spaces and usages. They produced specific maps of the organization of the vegetation structure : layers of vegetation, continuities and masses. A botanical survey identified floristic composition, plant species, spontaneous flora and attractivity for the avifauna (persistent foliage, maturity, seeds..) (fig. 4, 5, 6). The team then worked on the graphic representation of a 'landscape continuum', highlighting in section, and at a scale of 1:250, the systemic patterns between the built and living environment, the heterogeneity and the articulation architecture-vegetation (fig. 7, 8). A final step focused on mapping the specificities of these forms with regards to the reception and maintenance of birdlife : plant species, building envelope characteristics, maintenance regimes suitable for birdlife.

Figure 4: an interdisciplinary on-site landscape, vegetation
and botanic survey session
(source: MorphobioT research team).

Figure 5: hand drawing extracts from the landscape, vegeta-
tion and botanic survey (source: MorphobioT research team).

Figure 6: technical drawing extract from the landscape, vege-
tation and botanic survey (
source: MorphobioT research team).

Figure 7: Extract from diagrammatic landscape, vegetation
and botanic pre-survey section

Figure 8: Extract from landscape, vegetation and botanic
post-survey site section,
originally drawn at 1:250 (source: MorphobioT research

The transition from the plan to sectional representation stage was key in the research. While the plan representations focused mainly on gathering data at a 1:500 scale allowing only for an overlay of disciplinary readings, the sections at 1:250 scale became a "stratigraphic" tool through which each discipline could be explored graphically in relation to each other, an aspect that is even more crucial for the next analytical stage.

2. Analytical stage : relational data

In the next analytical stage, we used graphic representation to (1) cross data in plan and identify spatial units which combine and articulate the historical, urban, vegetation, architectural and usage characteristics. (2) Five landscape typo-morphologies were established : 'public park surrounded by buildings', 'buildings facing riparian areas', 'planted parking areas facing residential buildings', 'planted forecourt at the entrance to the buildings' and 'planted tree belt around buildings'.

Figure 9: Illustrative picture for the landscape typo-morphol-
ogy 'public park surrounded by buildings'
(source: MorphobioT research team).

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For each typo-morphology, we discussed the characteristics that might be potentially attractive for the avifauna. For example, the typology 'public park surrounded by buildings' (fig. 9) is characterized by an architectural typology of 10-meter-high blocks surrounded by a large public wooded park, set back from the buildings. The wood is bi-stratified : one layer consists of mature trees more-than-10-meters-high, some inherited from the Chateau park, some planted during the 60s, the other layer consists of an extensive large-scale herbaceous surface traversed by paths. Both layers are attractive to birds, many of the trees are evergreen, mature enough to house bird nests with some producing fruits, seeds and nuts. The herbaceous layer is a source of food for birds. The park hosts recreational and amenity areas allowing the inhabitants to enjoy this green living environment. The usage rate is high as the park is becoming an attractive destination at the neighbourhood scale, which can be detrimental to birds because of the noise. Overall on the Ancely site, the high-maintenance strategy of the public grounds impacts heavily negatively on the attractiveness for avifauna, through regular grass-cutting and extensive tree pruning. Based on these characteristics, we then formulated hypotheses on the attractiveness to avifauna for each type of typo-morphology and identified two favorable typo-morphologies : "buildings facing the riparian area" and "public park surrounded by buildings".

In order to test these hypotheses, our partner Naturalia environment consultancy conducted an inventory during 2021 on ornithological diversity and avifauna behaviour. Eight 20-minute listening points were distributed throughout each site. Naturalia carried out three inventories during different seasons (January 2021 for winter, April 2021 for early-nesters, May 2021 for later-nesters) in order to establish statistic correlations between vegetation stratification, architectural characteristics, landscape typo-morphologies and functional diversity. The ornithologists defined five bird behaviour (singing, calling, resting, feeding, nesting) and six groupings of bird species based on functional traits that may influence habitat use, including bird morphology, behaviour, diet, breeding and movement. Each grouping has a representative specie : group 1, the Great Tit ; group 2, Green Woodpecker ; group 3, Eurasian Collared Dove ; group 4, Black-billed Magpie. Through statistic processing, they established significant interactions between forms and communities. Patterns of bird use and behaviour were highlighted in each landscape typo-morphology, in relation to architectural features and vegetation stratification.

RESULTS

Illustrate a landscape continuum and identify favourable 'situations'

Using the results from the ornithologists, we represented main tendencies and significant bird behaviours within each landscape typo-morphology. We identified specific local 'situations' that are favorable to avifauna. We used a 1:250-scale detail section to illustrate relationships between buildings, vegetation and birdlife as part of a complex ecosystemic form through a shared representation mode (fig. 10). In Ancely, the section on the typo-morphology "buildings facing the riparian area" shows the following relational results : the group illustrated by the Great Tit significantly uses the tree layer from the riparian corridor to call, the herbaceous layer to feed, and when they use the building, they use the rooves to rest and the facades to nest. The group illustrated by the Green Woodpecker significantly uses the tree layer to sing, rest and feed, the herbaceous layer to feed, the shrub layer to call and the mineral ground level to feed and nest.

On the other hand, the group illustrated by the Green Woodpecker and the Black-billed Magpie do not present any significant behavior in this landscape typo-morphology. The results take the form of a section to illustrate an «ecosystem landscape continuum». This graphic representation is currently being explored by the research team as a way to effectively convey our results. Sections are particularly effective as they show a vertical system between the tree layers, the buildings and architectural patterns and the avifauna behavior patterns to a degree of detail that is relevant to our qualitative approach. Sections were drawn and re-drawn according to the significance of the results during iterative discussions amongst the research team. We also approached the section as a sensitive transactional tool to initiate dialogue between stakeholders which allowed us to refine the representation. The section is as much a result of the research as it is a research tool. The following figure only shows an extract of the result section currently under development.

Figure 10 : extract from a relational 'situation' section within a landscape typo-morphology (source: MorphobioT research team).

DISCUSSION, CONCLUSION

Perspectives for research through design : from context to situated knowledge

Our research method used graphic representation for three different and simultaneous purposes described by Besse (2020) : (1) abstraction and distancing from the observed phenomena, when we mapped all collected data, (2) objective and systematic monitoring of the phenomena, when we conducted surveys and statistical analysis and (3) finally what the author calls 'variations' as the sets of interpretations and projective scenarios that derives from any subjective representation, when we worked on 'situations' in a landscape continuum. From an analytical approach encompassing a large amount of data, we have ended up working on favourable relational 'situations'. The

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manipulation of representational graphic tools allowed us to cross scales between large-scale contextual knowledge and zooms on situated knowledge (Burns & Kahn, 2021). While overall large-scale data were fundamental to contextualise and frame the study, meticulously mapping the local knowledge was key to understand complex systems. The notion of a favourable relational 'situation' implies the impossibility of an 'ideal' type of urban form for biodiversity, but rather the meeting between the site and a history that is already there, a project of "balanced alliance" between plants and urban forms, a host and an opportunity for living things (Bava, Hössler, & Philippe, 2018). As explained by Norwegians architects Haggärde & Løkken (2018) in their book Layered Landscape Lofoten, knowledge of the super local informs a complexity level. The two scales of knowledge inform each other.

From situated knowledge to transferable knowledge

The projective dimension of our research method played a crucial role in the epistemological process. We produced a unique situated knowledge through the analysis of five case studies in five different urban contexts. Yet, we also produced scientific transferable knowledge based on statistical analysis and data crossing on each landscape typo-morphologies. Based on the analysis of 5 urban fabrics, our objective was to go beyond the case study to give meaning to a systemic analysis, to go beyond situated knowledge to produce transferable knowledge, using interdisciplinary representations, serving operational design culture. During the stakeholder workshops (fig. 11), questions about recommendations for future projects often came up : which design strategies could enhance biodiversity in dense urban landscapes by creating new entanglements of humans and non-humans ? The question of densification was recurrent, particularly in already constituted urban fabrics, as well as the capacity of evolution by preserving or amplifying favorable systems. Several solutions were discussed with stakeholders during collective workshops around our sections on how to maintain and attract avifauna in cities : sanctuarise biodiversity areas, preserve low usage rate areas, publish guidelines for low maintenance regimes, maintain minimum distance between buildings and wooded areas, specify vegetation attractive to bird. The research also contributed to change perception on architecture as host for biodiversity.

In our research, graphic representation brought specific projective added value to the research by triggering "new perspectives and projections of the urban landscape for discovering new opportunities" (Langner, 2019). It served as a point of reference encouraging inter-disciplinarity discussion and possible knowledge transfer to aid designers address biodiversity challenges in urbanism. Haggärde & Løkken (2018) explore progressive reading and mapping to "find the hidden and unexpected", overlap material and "create new maps and layers of knowledge". Complex situations demand an "open search for knowledge" which can take unexpected directions, revealing possibilities and interactions. Our detailed sections and plans played this role. While they were used to map results, the level of detail, diagrammatic representations and the dynamics and seasonality brought the section to life. It created a tool that can be used by all and be the support for projective dialogue.

Figure 11: Interdisciplinary workshop with institutional partners, June 2021 (source: MorphobioT research team).

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NATURE-BASED ARCHITECTURE: AN INTEGRATIVE SESIGN STUDIO WITH A CONTEXTUAL APPROACH

1-C-3

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Abstract

This paper is about a special design studio of the Architecture Program of the Tecnológico de Monterrey in Mexico. The studio was placed in the last two semesters of the program, as a response to local challenges such as storm water flooding, speculative changes of land use, informal settlements and others, currently taking place in a declared natural protected area (NPA) which is now surrounded by (sub)urban growth. The paper reports the academic experience of the first part of the studio, (Fall 2021) in which the studio made a design proposal for an intra-urban 185 hectares natural park based on the Nature-based Solutions (NbS) framework.

Four approaches and their corresponding methodologies and techniques were used in this first part of the NbA Studio:

1) An interdisciplinary approach, where sustainable water management, biodiversity and social accessibility were integrated to architecture, landscape architecture and urban design.

2) An interscalar approach, including the landscape scale, corresponding with the scale of the micro-basin of the NPA; the urban sub-municipality scale; the contiguous urban districts scale, and the NPA scale itself.

3) The intercultural approach was provided by the use of the NbS framework and the interaction with teaching staff from TU Delft's Faculty of Architecture as advisors and critics in design presentations. The studio's staff and students also participated in the Nature-based Metropolitan Solutions MOOC implemented by TU Delft, Wageningen and edX recently. The studio was taught in English language.

4) A contextual approach to Architecture instead of the conventional objectual approach commonly used in other design studios in the program.

Hypotheses and results of the studio, are discussed in the paper from two points of view:
a) the object of design (the wetlands park) and its intended performance and viability
b) the learning experience and abilities, knowledge, attitudes and values acquired.

Key words:

Nature-based Solutions / Integrative Design / Contextual Approach

/ Architectural Education

The C+LAB, Cities Laboratory, is a national initiative of the School of Architecture, Art and Design of the Tecnológico de Monterrey that recognizes the commitment of universities to the needs of their environment and their role as a catalyst for the transformation of cities through the practical application of knowledge. (EAAD, 2022)

Through its 4 offices, it is consolidated as a platform on a national scale, which generates multidisciplinary projects for the public, private and social sectors throughout the Mexican territory. C+Lab focuses on 3 strategic axes: Urban Sustainability, Participatory Governance and Design for Social Innovation aiming to present comprehensive and inclusive solutions, in which the ultimate goal is human flourishing and the regeneration of the environment. (EAAD, 2022)

C+Lab is part of the City Initiative, an interdisciplinary ecosystem, -articulator of knowledge, methodologies, tools and data-, aimed at facing the challenges of urbanization that seeks to enable regenerative processes in the territory to achieve healthy, fair and resilient cities. Other components of the ecosystem are: 1. Urban Observatory, 2. Strategic Focus Research Group, and 3. Academic programs related to urban and territorial studies, including Bachelor in Urbanism, Bachelor in Architecture and Masters in Architecture and Urban Design. (EAAD, 2022)

During the final year of the Architecture 2011 program, students must complete Capstone Projects 2 in 9th semester and Final project in 10th semester. The courses develop a single case study consistently throughout the year, the first stage focuses on contextual analysis and design, and a second stage with emphasis on the architectonic scale design and development. Capstone Projects 2 is an advanced course, in which the students must apply the principles of architectural design, considering the study, analysis and solution of the theoretical, functional, environmental, plastic, building, structural and contextual aspects; managing architectural and urban projects in order to respect and adapt to the landscape context.

During the Fall semester 2021, Capstone Projects 2 was implemented as a simulator of an urban planning and design professional work integrating the C+Lab initiative and the academic objectives by working on a real consultation project with the main focus on contextual design at an urban scale with Nature-based Solutions as framework, titled Nature-based Architecture. The case study takes place in the northern part of the city of Queretaro, Mexico, a natural protected area, surrounded by city sprawl and vulnerable to real estate development speculation and informal settlements invasion. This natural protected area plays a fundamental role in the water system of a very large catchment area and is an opportunity for a biodiversity island within an intensely urbanized context. The premises of the studio Nature- based Architecture were as follows:

As an Architecture Studio, we can…

- Protect an intra–urban natural area from speculative real estate development and from informal settlements by Strategic Design and Architecture with a consensed urban project.

- Contribute to urban resilience and promote environmental justice with a regenerative approach to the city-region system.

- Design Nature- based architecture that complies with criteria of sustainability that also provides a positive impact according to international urban resilience indicators.

Urban Resilience

Resilience is now the emergency room of the sustainability building and, since cities are the main stage where the battle for sustainability and resilience is being held, we need a solid defined concept of urban resilience.

Meerow et al. (2015) proposed the following definition:

Urban resilience refers to the ability of an urban system-and all its constituent socio-ecological and socio-technical networks across temporal and spatial scales-to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity.

Integrative Design

The Nature-based Architecture Studio was taught with an integrative design vision, looking forward to sustaining environmental integrity as much as addressing social and economic issues of the City. The Studio therefore invited professionals and academics from different disciplines other than Architecture, Urbanism and Landscape Architecture: Biology, Engineering, Economics, Water Management and other disciplines were present in the Studio seeking to produce an interdisciplinary scope in the participants and in some ways, trying to commodify the object of design to make its benefits tradeable on markets (Radin, 1996).

Contextual Approach

According to Buchanan and Margolin (1995), what is needed is a middle ground between science and intuition, a distinctive method of deliberation and presentation that is suited to the special knowledge and perspective of the designer and to the special ability of the designer to make concrete practical connections among diverse bodies of formal and tacit knowledge.

The Studio approached the problem and proposed solutions based on a context-rich position, which is thought to contribute to sustainable development by relating advanced technologies to the social ecologies they might serve. Rather than emphasizing either traditional or advanced technological practices, context-rich designing seeks eco-socio-technological change (Moore and Karvonen, 2008)

This integrated approach is one of the main features of Nature-based Solutions.

PROJECT BASED LEARNING

The Studio was designed with a Project-Based Learning (PBL) methodology. According to Thomas (2000), PBL is defined as "a model that organizes learning around projects. Projects are complex tasks, based on challenging questions or problems, that involve students in design, problem-solving, decision making, or investigative activities; give students the opportunity to work relatively autonomously over extended periods of time; and culminate in realistic products or presentations."

Urban design education has followed the tradition of PBL from architectural education as a method of

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introducing knowledge and skills to students. It allows students to understand urban issues in cities and urban environments as an integral part of the living experience of people and produce urban scale projects and solutions. Urban design problems are complex problems involving transportation, landscape, people, economy, history, individual and groups of buildings, work places, leisure activities, parking and more. They require a complex design process aiming at producing sustainable and resilient solutions. (Mahgoub, 2015)

Interaction by IT

In order to face the challenges and new needs brought by the pandemic and the new reality, the Tecnológico de Monterrey has created the so called HyFlex+ Tec Strategy, a hybrid model that combines the digital experience with different degrees of attendance at different times of the academic period in which it will be implemented (CEDDIE, 2022)

This Capstone Projects 2 Studio was implemented in a synchronous hybrid modality with attention to two audiences, one face-to-face and one remote, simultaneously. Real-time sessions held by teachers and students in the physical and virtual classroom in ZOOM. The contents, resources and activities, as well as the recordings of the sessions were made accessible in a digital environment, using the platform Canvas, to support student learning. While half of the group attends the class in person, the other half of the group takes it remotely, learning the same subject or working on the same activities at the same time. Technological hardware like wide angle cameras and ambient microphones installed in the classroom also allowed to welcome guests from different disciplinary backgrounds, other institutions, even experts from abroad to lecture and critique the projects and have real time engagement with students even through social distance and down- sizing capacity strategies and other COVID-19 preventing measures.

Tecnológico de Monterrey has developed a telepresence technology to simulate a hologram effect with the idea of humanizing the distance teaching-learning experience and creating a dynamic similar to face-to-face classes labeled Hologram Professor. For the first time worldwide in 2016, the Hologram Professors were implemented at Tecnologico de Monterrey in undergraduate courses, being pioneers in the world of education in this design and implementation. This educational technology solution enables virtual mobility of teachers, mentors, leaders and entrepreneurs from a diversity of geographic locations and contexts to interact with students in an innovative, unique and live tele-presence model. (Innovación Educativa, 2020) This technology has been shared with TU Delft's Bouwkunde and its installation on campus was underway but not completed and tested before the elaboration of this paper. This will be one of the main communication means moving forward in the collaboration between both Universities for academic and applied research purposes.

BACKGROUND / PROBLEM STATEMENT

The northern part of the municipality of Queretaro, Mexico is affected by a water system and catchment area that has not been taken into account and respected by the urbanization development. Nowadays, it proposes a risk for the families who inhabit and move through the area because during the rainy season it is likely to flood, damaging the housing and commercial buildings; and create water currents on streets and sidewalks making it dangerous to move through them.

The social, economic, patrimonial and environmental impact is very evident, but there is a lack of technical instruments to understand the complete situation. This water system and catchment area has not even been completely visualized and labeled, the canals "Salitre- Azteca", "Jurica stream" and "El Arenal" are only part of the system, so this water system catchment area will be addressed as Microcuenca Norte (North Queretaro Watershed).

Figure 1. North Queretaro Watershed with satellite image as background. By authors with Google Earth background (2018) and information from INEGI (2010)

The coverage area of Microcuenca Norte covers 4 Delegations: Santa Rosa Jauregui, Félix Osores Sotomayor, Felipe Carrillo Puerto, and Epigmenio González; and includes very varied natural and urban landscapes: residential developments, rural communities, row housing, closed housing complexes, informal settlements, industrial parks, commercial areas, etc.

Figure 2. North Queretaro Watershed, City Delegations and urban fabric. C-Lab ITESM, with information from INEGI (2010), SIATL (2018)

NPA

At the lower part of the catchment area, there is a site that has been declared as a Natural Protected Area (NPA) by the federal government. The ecological value (a potential increase in the ecosystem services from this land) is the mitigation of flooding damages by slowing down, retaining, and allowing the infiltration of water.

Figure 3. Natural Protected Area with satellite image as background. By authors, Google Earth background (2018) with information from the Local Ecological Regulation Program (2009)

The Local Ecological Regulation Program norms the NPA as an environmental management unit with a land use of Ecological Preservation Zone, subcategory of Intraurban Park «Jurica Poniente», decreed on September 25, 2006, with an area of 224.11 hectares, and located in the center-west portion of the municipality of Querétaro. Its main runoff is the Jurica stream and it is an important area of infiltration of groundwater and prevents floods downstream. Although it is predominantly a rainfed agricultural area, there is endemic vegetation alongside the stream and natural shrubs throughout the site.

To the east of the site, there is Jurica, a residential area with very big plots of land, the land use is exclusively residential, with the only exception of commercial areas at the entrance of the neighborhood, a commercial space at the center, the John F. Kennedy School, and a few underused parks. The Hotel Jurica, Regency Club and the Church on the fringe with the Pueblo the Jurica act as a border, relying on the scale and the physical composition of the constructions (blind walls) to provide separation and a distinct image between Jurica and Pueblo de Jurica, to the northeast. This area has the composition of a small village, with a central plaza with a church, several schools, commercial corridors, and a varied composition and typologies of constructions and public spaces. To the south there is an industrial area, low income housing both serial housing and informal settlements, and to the west there are undeveloped, intraurban plots. However, part of this area has already been invaded by informal settlements, and another part is of interest to real estate developers.

During past municipal administrations, the land owners, also real estate developers (or plain speculators), have negotiated the extraction of certain plots from the Protection Decree. The current mayor, Luis Bernardo Nava has instructed his administration to promote and protect the NPA by converting it into a park. During September 2021, the City Council issued a decree that revoked the land use change and restored the original 224.11 hectares of protected area.

Luis Bernardo Nava is exercising the second term of his administration and during his reelection campaign, he promised the creation of a park. This was supported by a City Council decree issued in February 2022 that authorizes carrying out all the actions leading to the materialization of the Intra-urban Park project in Jurica Poniente.

As stated at the beginning of this paper, during the Fall semester 2021, within the academic program of Tecnológico de Monterrey, Capstone Projects 2: Nature-based Architecture Studio, was implemented as a simulator of an urban planning and design professional work integrating the C+Lab initiative and the academic objectives and used as case study the park and its area of influence in anticipation and as an exploratory exercise of a real consultation project.

As a result, the research work was carried out through analyzing and designing three main layers: water, mobility and biodiversity, and conceptualizing the park as a nature based solution architectural project that responds to social and environmental challenges with multiple benefits.

The scope of the project ranges over several discipline fields, multiple scales of analysis and design, and high complexity, so experts of different disciplines and backgrounds were invited to lecture, advise and review the projects. The bodies of knowledge added to the course included mobility, social and ecological management of water systems and catchment areas, biology and biodiversity, laws and regulations.

The experts who participated in the studio:

Oscar Hernández, expert in GIS and Head of Department of Comprehensive Planning for Mobility of the City of Queretaro.

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Taneha Kuzniecow, Assistant Professor and Research Coordinator of the Section Urban Design and Research Leader Delta Urbanism Research Group, TU Delft, and expert in nature based solutions.

Ulises Padilla, expert in biodiversity and Head of the Department of Environmental Planning of the Secretariat of Sustainable Development of the State of Queretaro. Raúl Pineda, researcher and professor of the University of Queretaro, expert in Watershed Management in Mexico.

Jessica Román, architect and expert in geographic information systems.

Alexander Wandl, Associate Professor of TU Delft's Department of Urbanism, expert in Circularity for Regenerative Cities and Regions.

Mikael Waterdrinker, Associate Professor of Architecture at Monterrey Institute of Technology and expert in urban mobility and design.

NbS framework

Nature-based Solutions are defined as solutions that are "inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions" (European Commission, 2021). In short, NbS provide integrated, multifunctional solutions to many of our current urban and rural challenges through the use of nature and natural processes (European Commission, 2021).

Within this NbS framework, Raymond et al. (2017) identified ten societal challenge areas related to climate resilience (expanded recently to twelve in the 2021 Evaluating the Impact of NBS Handbook) that can potentially be addressed by NBS (EC 2021): climate resilience, water management, natural and climate hazards, green space management, biodiversity enhancement, air quality, place regeneration, knowledge and social capacity building for sustainable urban transformation, participatory planning and governance, social justice and social cohesion, health and wellbeing and new economic opportunities and green jobs.

Being the societal challenges mostly the same, how can the European NBS framework be applied in a Latin American context?

We analyzed the probable impact of an urban project proposed for an intra-urban natural park doing research by design incorporating guidelines of the NBS framework within its program, and making a preliminary assessment of its viability in the city of Querétaro.

Research by design

Research by design is a method of exploration of possibilities that are improbable if we do not take action (De Jong, 2001). Research by design allows us to give form to a program and / or a project of a given solution in order to visualize and communicate it more accurately to the stakeholders and to be able to assess the given solution ex-ante. Research by design is a reliable method of quantification of materials, visualizing procedures and calculating costs and benefits of a given project, to assess its viability. A project may act as a hypothesis in a scientific method. It is an assumption of what we think can be the solution of the problem stated in advance.

Research by design hypotheses

The NBA Studio proposed a number of working hypotheses, based on the problem statement; integrative design and context-rich design thinking.

a)   Problem statement, facing impact by flooding and land subsidence (water management), urban (socio-spatial) fragmentation and biodiversity breakup by land erosion and degradation.

b)   Integrative design, seeking to maximize monetary values of ecosystem services to demonstrate a higher viability.

c)   Context-rich design thinking, coincident with the NbS framework in which societal challenges are addressed along with environmental and economic issues, namely Climate Resilience; Water Management; Natural and Climate Hazards; Green Space Management; Biodiversity; Air Quality; Place Regeneration; Knowledge and Social Capacity Building for Sustainable Urban Transformation; Participatory Planning and Governance; Social Justice and Social Cohesion; Health and Well-being; New Economic Opportunities and Green Jobs (European Commission, 2021).

The spatial design goals included:

1.   Maximize the potential of afforestation of the area of intervention (NPA) and its surrounding impact area, considered with an outreach with a topological radius of 12km

2.   Reduce erosion and facilitate water absorption in the hills surrounding the upstream area of intervention (see figure 4)

3.   Control, regulate and treat the illegal sewage lines currently affecting the area of intervention, which cause a high level of pollution

4.   Mitigate stormwater runoff hazards by designing a system of detention basins within the area of intervention

5.   Increase water infiltration to the watershed by radically slowing down the water runoff speed and increasing the area of contact where soil conditions are more favorable by designing a system of meandering swales

6.   Provide large areas of tree nurseries within the NPA served with continuous irrigation

7.   Destinate strategic areas within the area of intervention no larger than 5% of the total ANP area for social infrastructure

8.   Provide a system of intra-urban parks within the NPA with different features depending on their specific socio-spatial context.

Figure 4. Master Plan of Architectural nature based projects for social and environmental problems in the city of Queretaro: La Queretana Urban Park and proposed urban fabric montage with satellite image as background.

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a: design results

A synthesis of the Studio's designed areas for the NPA resulted in 227 hectares (Ha) of green spaces, 1.45 million cubic meters (m3) of stormwater runoff detained, 0.72 million cubic meters of water infiltrated to the watershed and 22 to 45 Ha dedicated to tree production (nurseries). We took valuation parameters from Elmqvist et al. (2015) (1), from own estimations (2) and from the State water provider (Comisión Estatal de Aguas de Querétaro) (3), to estimate a probable value of ecosystem services delivered by the park. The results can be found in Table 1.

Service	Quantity		Average value		Value/year
Pollution and air quality regulation	227	(Ha of green spaces)	647.00	(s/ha/y) (1)	146,869.00
Carbon sequestration	227	(Ha of green spaces)	395.00	(s/ha/y) (1)	89,665.00
Carbon storage	227	(Ha of green spaces)	3,125.00	(s/ha/y) (1)	709,375.00
Storm water reduction	227	(Ha of green spaces)	922.00	(s/ha/y) (1)	209,294.00
Storm water runoff damage	1,453,855	(M³ water retained/year)	1.25	(m³/y) (2)	1,817,318.40
Water filtration and infiltration	726,927	(M³ water infiltrated/year - 1/2 of water retained)	0.92	(m³/y) (3)	668,773.17
Damage savings by land subsidence	726,927	(M³ water infiltrated/year)	0.30	(m³ infiltrated water / y) (3)	218,078.21
Energy savings	227	(Ha of green spaces)	1,412.00	(s/ha/y) (1)	320,524.00
Recreation	227	(Ha of green spaces)	6,325.00	(s/ha/y) (1)	1,435,775.00
Positive health effects	227	(Ha of green spaces)	18,870.00	(s/ha/y) (1)	4,283,490.00
Tree production	22	(Ha dedicated to nurseries)	58,833.00	(s/ha/y) (2)	1,294,326.00
Food production	133	(Ha currently dedicated to agriculture)	9,500.00	(s/ha/y) (3)	1,263,500.00
Total					9,929,987.77

Table 1. Estimated values of ecosystem services provided by areas designed in the NPA

(1) Elmqvist et al. 2015. Benefits of restoring ecosystem services in urban areas. Science Direct.
(2) Nature-based Architecture Studio's own estimation
(3) 1/5 of the CEA's official fee for a subsidized m3 of water in Querétaro.

A total estimated value for the ecosystem services to be provided by the NPA as designed in the Studio, resulted in 9.93 million US Dollars per year.

b: Learning experience (students' testimonies)

The studio was composed of 14 students who worked as a single office in an integrated project with a shared masterplan. The process was organized in 3 stages: research and analysis of three main layers: Water, biodiversity and mobility, in three scales: region, city, and site; integrative design in two scales: green infrastructure urban network and landscape architecture; and the coordination to design a "piece of the city" that included urban, landscape and architectural scale: (team 1) Green infrastructure network, masterplan and urban fabric design (of unbuilt context); (team 2) Landscape architecture design of park itself; (team 3) Integral housing design in adjacent areas within the urban fabric defined by team 1, and (team 4) social infrastructure and sports facilities within the park designed by team 2.

Besides being responsible for each of their own projects, students were organized in 3 transversal logistic teams to ensure coordinated work as a professional unit: (1) GIS, CAD, and document information organization, (2) graphic design, 3d model, boards, book, and other outlets, (3) narrative and integration of projects.

The results of the Nature-based Architecture Studio were presented in two separate events to two different audiences in two languages. The first event was Critday, an academic critique in English language with a virtual setting to welcome abroad guest reviewers: Taneha Kuzniecow, Alexander Wandl, and Mikael Waterdrinker. The feedback was focused on the design, functionality of the proposals, and the coherence between analysis, arguments and solutions. The second event was held a few days later in a face- to- face setting, in Spanish, and the audience included the Homeowner Association representatives of neighboring Jurica, Raúl Pineda, and the Secretary of Public Works for the City of Queretaro. The media used for this presentation were a 3d wood model and 4 boards to provoke curiosity and proximity to the work presented. The feedback was focused on the feasibility of the proposals and as a result of this presentation, the Secretary arranged a subsequent meeting with the mayor to discuss moving forward with the project on a professional level.

At the end of the course, the academic goals were accomplished, but it did not result in 14 individual projects, there was a unified vision with multi-scale solutions that explored methodologies and produced data and images that made complex situations visible, triggered dialogue and reflection, enabled to strengthen ties with strategic stakeholders and presented the C+LAB´s value proposition to escalate to a consulting and research project.

A number of interviews to the students upon completion of the semester showed that they valued the multidisciplinary and dynamic scale approach to understanding complex systems, and finding answers for design in the challenges of larger scales. Secondly, they recognized technology and software to be of the essence to enable coordinated work. At the beginning of the semester a GIS workshop was mandatory for the students and they continued to use the software throughout the project. Finally, the students highly valued soft skills such as collaborative work, communication, organization, leadership, and empathy, all of which they put into action in this exercise. Students recognize that the future of professional work increasingly demands collaboration, hybrid virtual and face - to face interactions, self- study and new skills, and adaptability of change, all of which they experienced in the Nature- based Architecture Studio.

CONCLUSIONS

In the context of writing this paper we are faced with two crises: climate change and the pandemic. Education at the center of this equation makes it possible to reframe the challenges, understand root causes and provide resources to build new solutions. In the case described in this paper, the pedagogy sets the project not as the final objective, but as the frame that enables multidisciplinary meeting spaces, dialogue platforms to enable debate, reflection, share knowledge and learn from the experiences of others for the construction of consensus, identification of solutions and generation of inputs for public policies and professional site-specific projects.

The transformation capacity of this project can be evaluated in three main categories: a) Addressing the risks: in the face of flooding, sustainable water management; protect intra urban land invasion by informal settlements and real estate development creating a park recognized and appropriated by the people; fixing socio-spatial segregation and biodiversity breakup by creating a site for all species to encounter, interact and grow.

b) Integration of multiple benefits: ecosystemic services, the recognition of shared interests by the community, opportunities for new local economic development.

c) New forms of governance: activating and engaging stakeholders other than the traditional roles. The creation of networks of knowledge and new narratives trigger change.

Crisis has become an opportunity to achieve the extraordinary.

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RENEWING URBAN MODELS : DOES THE CITY NEED LOW-TECH?

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Abstract

Based on research carried out within the Urbalotek project (Lopez, Le Bot et al. 2021), this paper aims to question the relevance of translating the low-tech approach – usually applied to technical devices – to the urban and territorial scale, and to answer the following question: would the emergence of the concept of the low-tech city add something to the abundance of concepts already present in this emerging urban thought?
Building upon extensive analysis of existing research, this work consists of a comparative analysis of 14 city concepts, a decomposition and semantic classification of their multiple definitions, in a series of conceptual indicators. It highlights, through critical analysis, a set of convergences, divergences and interrelations in these contemporary urban approaches (synoptic diagram), focussing on the issues of sobriety, resilience and 'lesser technological intensity'. This research allows to distinguish theoretical and practical aspects specific to a low-tech approach to urban issues, to arrive at a possible definition of the low-tech city, not as a closed concept, but as the product of a new 'urbanism of discernment', illustrating its characteristics and what its intrinsic functioning might be.

Key words:

low-tech city, urban planning theory, discernment, conviviality, critical analysis

1. INTRODUCTION:

Over the past fifteen years, the language used in the fields of architecture and urban design, but also in a large part of the political discourse about planning and the city, has been changing (cf. Marchal et al., 2018; Bognon et al., 2020; Lemaire et al., 2020). We are witnessing a paradigm shift that is based on a revised reading of the consequences of human action on ecosystem disruptions (Lallau, 2011). Whereas sustainable development sought to mitigate the negative externalities of our productivist model, a new intellectual framework, described as anthropocene thinking[1], now seems to be emerging (Bulkeley, 2021). This framework, by integrating the instability of our ecosystem which is permanently disrupted and subject to crises (particularly climatic ones), is leaving behind a certain form of optimism that drove the concept of the sustainable city.

New major federative principles are emerging, with a host of new keywords (adaptable, resilient, inclusive, frugal, smart, etc.) and spectacular technical innovations (the reign of the flexible, data, real-time monitoring, parameterisation, etc.). Against the injunctions of the all-digital world (Greenfield 2013), low-tech thought, based on the work of the philosopher Ivan (Illich 1973), now seems to be coming back to the fore (Hirsch-Kreinsen 2008; Bihouix, (2014) 2020; Bonjean et al. 2022).

"Low-tech, as opposed to high-tech, is an approach that aims, with a view to sustainability, to question our real needs and develop solutions that are as minimally technologised as possible, that minimise the energy required for production and use, that use the least possible amount of scarce resources/materials, and that do not inflict hidden costs on the community [..] This approach is not only technological, but also systemic. It aims to challenge economic, organisational, social and cultural models. (La Fabrique Écologique et al., 2019)

Generally applied to technical devices or very localised social organisations (Social and Solidarity Economy (SSE), third places, associations, etc.), the low-tech approach does not have a conceptual translation at the urban and territorial scale. This is what our research is about.

To measure the interest and relevance of this translation, we sought to compare the low-tech approach with the essential components of contemporary urban thought (comparative analysis). This research then highlighted, through critical analysis, a series of convergences, divergences and interrelations. This work distinguishes theoretical and practical aspects which could be more specific to a low-tech approach to urban issues. This reflection leads to a possible definition of the low-tech city, not as a closed concept, but as the product of a new urbanism of discernment.

2. STATE OF THE ART

If it is possible to outline its contours, urban phenomenology could be defined as the product of a heterogeneous mixture: between societal dynamics and power relations (economy, mores, public expression...), environmental influences (climate, dissent, epidemics...), and political injunctions (regulations, project strategy, visions...). This human arrangement produces a history (memory, identity, experience...) of fluctuating space (buildings, streets, squares, parks...), as well as its share of negative externalities (pollution, social conflicts, accidents...) and positive ones (intellectual cross-pollination, cultural mixing, freedom...). Circulating according to the movements of thought, urban thought identifies dysfunctions. It then isolates the issues and proposes a certain number of solutions in response.

This study has mobilised a first series of scientific and theoretical works dealing with emerging urban approaches. Françoise Choay (1980) distinguishes between texts that are operational in nature, and texts that are commentaries, confining themselves to a narrative, but which can 'exert an inciting action' on the production of cities, or which can 'frame public action' (Dupuy 2018). These intellectual paths are sometimes grouped together and put into perspective in the form of models or concepts; when they do not directly form utopias (radiant city, garden city, etc.) which are realised.

According to some authors, the urban 'model' thus refers to 'a set of objects, policies, urban planning doctrines, 'best practice' or labels which share a common characteristic: that of serving as a reference for imitation or reproduction in a context other than that of its initial production' (Peyroux, Sanjuan, 2016). Although the use of references (good practices) by city designers and actors seems to be replacing urban models (Devisme, et al. 2008; Bourdin and Idt 2016; Mullon 2018), the latter continue to permeate political discourse (Carriou and Ratouis 2014). This work set aside 'algorithmic urban model' approaches that mobilise data to test dynamics (Wegener, 1994) or evaluate urban policies linked to indicators (Mittal et al. 2019); but whose scientific validity is debated (Leducq et al. 2018).

There are many attempts in the literature to cross-analyse and conceptually classify city models. We looked closely at the work of (Fraker, 2007), who proposed a classification of the discourses on urban design, trying to make them revolve around six 'fields of force'; conceptual poles of attraction which dialectically influence this or that discourse. Fraker makes an important point, which we have been aware of in our own work: 'apparently opposing positions cite the same texts as their theoretical roots'.

By the concept of the city, we mean here an intellectual device, with an operational aim, which intends to think about the city and its urban character from a certain angle. For some years now, this angle has generally been supported by the addition of a meaningful adjective (e.g., adaptable, sustainable, inclusive, etc.). For example, it is striking to observe the evolution of the urban themes addressed by the Europan architecture and urban planning competition[2]. If until 2006, most of the subjects explored the recurring topics of urban projects in a transverse manner: habitat, lifestyle, urbanity, intensity, landscape, mobility, etc., over the last ten years, the concepts of the 'adjectivised' city have come to the fore: sustainable cities (2008-2012), adaptable cities (2013-2015), productive cities (2016-2020), and living cities (2021). A thematisation that echoes a series of scientific productions and eponymous books. These concepts generally have in common that they propose a matrix for resolving urban dysfunctions, as well as a desirable and stabilised imaginary.

3. METHODS

Amongst this abundance of doctrine, we have decided to study a set of relatively recent city concepts (adaptable city, human-scale city, circular city, creative city, frugal city, sober city, inclusive city, manufacturing city, city of proximities, resilient city, smart city, natural city, as well as the urban bioregion) - which present similarities or antagonisms with the definition of low-tech - with a view to identifying the contours of a possible 'low-tech city' (cf. Tab.1).

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1. The idea of the Anthropocene city is used to describe a state of urbanity of cities in the 21st century, confronted with a disturbed geological environment. The geographer Harriet Bulkeley thus approaches the issue of the Anthropocene city as the product of an evolution of what she calls strategic urbanism, which has evolved into climate urbanism, 'where climate action is now embedded in the strategic priorities of urban and economic development at the city scale' (Bulkeley, 2021).

2. Organised with the help of PUCA every two years. The Plan Urbanisme Construction Architecture (PUCA) is a French interministerial service, attached to the Ministry of Ecology.

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	Concepts	Autors (date) used	Linked Concepts
1	Adaptable city	Antonioli et al (2021); Buratti (2020); Antonioli (2020); Cocquière and Diguet (2018); Ginez (2018); Diguet et al (2018); Casa (2017); Ethier (2017); Besson (2016); Douay and Prevot (2016); Mias et al. (2015); Lydon, Garcia, and Duany (2015); Gwiazdzinski(2015); Mould (2014); Guez (2014); Europan (2014); Gwiazdzinski (2012); Europan (2012); Gwiazdzinski (2011); Pradel (2010).	Chrono-urbanism; Proximity based city; Creative city
2	City on a human scale	Lynch (1981); Bettencourt and West (2010); Gehl (2010); Illich and Giard (1973); Ford (1999); Paquot (2020); Gehl (2012); Dupuy (1974); Mumford et al. (2016); Kohr (2016); Bailly (2008); Rey (2014)	Bioregion; Garden city; Ecological city
3	Circular city	Grisot (2020); Vialleix and Mariasine (2019); Hemmerdinger et al. (2019); Boeri et al.(2018); Bourg (2018); Bonato and Orsini (2018); Bahers, Durand, and Beraud (2017); Arnsperger and Bourg (2016); Sauvé, Normandin, and McDonald (2016); Kampelmann (2016); Vialleix and Mariasine (2014); Grosse (2014); Geldron (2013); UNEP (2011); Barles (2008; 2006); Erkman (1998); Allenby (1994); Pearce and Turner (1990); Odum (1976); Duvigneaud (1974); Wolman (1965).	Fab city; Frugal city; Circular urbanism; Urban metabolism
4	Creative city	Pilati and Tremblay (2007); Florida (2005); Hall (1998); Scott (2006); Pratt (2008); Andersson (1985); Törnqvist (1983); Kunzmann (2005); Power and Scott (2011); Evans (2001); DCMS (2001); Landry and Bianchini (1990); Ambrosino and Guillon (2009); Roy-Valex (2006); Lévine (2004); Darchen and Tremblay (2008); Ambrosino (2008); Camors and Soulard (2010); Vivant (2009); Peck (2005); Landry Matarasso, and Bianchini (1996); Landry and Bianchini (1995); Landry (2008); Howkins (2001); Florida (2017); (2019); Martin-Brelot et al. (2010); Ambrosino (2019).	Culturalist urbanism; Creative environments; Cities in civilization; Cultural planning; Creative economy; Creative industries
5	Frugal City	Agenét (2018); Haëntjens (2011); Madec and Bornarel (2018); Haudeville and Bas (2016); Collectif (2019).	Sober city; Circular city
6	Sober City	Wirz (2018); Loubière (2013); Cézard, Mourad, and ADEME (2019); Rabhi (2010); Erkman (1998); Lorrain, Halpern, and Chevauché (2018).	Sustainable city; Frugal city; Smart City
7	Inclusive city	Santiago (2020); Espino (2015); Durkheim (1893); Clément and Valegeas (2017); Simay (2009); Polère (2016); Stavo-debauge (2017); Hancock and Lieber (2017); Luhmann (2010); Marmissolle (2019).	Social cohesion; Right to the city; Social inclusion; Sustainable city (in its social dimension); Creative city; Accessible city; Conviviality.
8	Fab city	Collin and Szaniecki (2008); Pierron (2007); Millard (2017); Pecqueur (2006); Trolé (2020); Europan (2018; 2020); Rumpala (2014; 2018); Veltz (2017); Weber, Berlan, and Sintomer (2014); Petit (2020); Gallot (2021); Petit (2016); PUCA (2020); March and Ribera-Fumaz (2016); Florentin and Chabanel (2018); Besson (2017); Ferdière (2007).	Smart-City; Creative City; Circular City; Productive City
9	Proximity based city	A Bailly (2014); Moreno (2016); Madec (2008); E. Bailly and Marchand (2019); Chapuis and Viard (2013); Laville and Nyssens (2006); Jacobs (1961); Batty (2008).	Chrono-urbanism; adaptable city; malleable city; city on a human scale; intense city; bio-block; archipelago city.
10	Resilient city	Beatley and Newman (2013); Meerow, Newell, and Stults (2016); Walker and Cooper(2011); Toubin et al.(2012); Cunha and Thomas (2017); Arnaut (2005); Bailly and Marchand (2019); Holling(1973); Evans (2011); Godschalk (2019; 2003); Ambrosino and Ramirez-Cobo (2019); Werner and Smith (1982).	Sustainable city; Adaptable city; Urban metabolisms
11	Smart city	Bertalanffy, 1968; Greenfield (2013); Ascher (2000); Deakin and Al Waer (2011); Ascher (2001); Diguet and Lopez (2019); Giffinger et al.(2007); Picon (2012); Zubizarreta, Seravalli, and Arrizabalaga (2016); Kitchin (2014); (Wiener, 1948)	Cybernetics; Systemic; Hypertextsociety; Digital city; Connected city.
12	Nature city	Beatley and Newman (2013); Benton-Short and Short (2008); Watson et al. (2001); Register (1987); Maami (2007); Leduc and Scarwell (2020); Tedesco (2014); Berque (2008); Chalas (2010); Beal, Charvolin, and Morel Journel (2011); Younès (2008); Waldheim (2016); Steiner (2011); Toll (1968); Clergeau (2015); Wright and Walker (1932); Waldheim (2006); Howard (1898); Clergeau (2020); Ambrosino and Ramirez-Cobo (2019); Schuiten and Loze (2010).	Biodiverse city; biophilic cities; vegetal city; diffuse city; circular city; territorial biomimetism; eco-cities
13	Urban bioregion	Newkirk, (1975); Peter Berg and Raymon (1977-2015); Kirkpatrick Sale (1985); Alberto Magnaghi (2014); Julie Celnik (2017) Mathias Rollot (2018)	Environmentalism; Territorialism; Degrowth; Ecoregion
14	Low-tech	Rocca (2010); Falk and Lyson (1988); Socialter (2019); Hirsch-Kreinsen and Jacobson (2008); Le Corvoisier et al. (2021); Bihouix (2014); Lopez and Soulard (2020); Bihouix and Moulas (2020); Armani et al. (2020); Hirsch-Kreinsen (2008); Collectif (2019); Florentin and Ruggeri (2019)	Conviviality; Slow-tech; Low-cost; Frugality; Circular economy; Retro-tech; Lo-Tek; Degrowth

Tab. 1 : Readings used to analyse each concept and define its markers.

We are inspired by the work of (Hatuka et al. 2018), who propose a cross-analysis of the concepts of city (global, sustainable, resilient, creative and smart) by juxtaposing them and exploring their similarities and differences. Starting with a selection of works representative of the debates on these concepts, our research is based on a descriptive analysis and a breakdown into conceptual markers, facilitating comparisons (see Fig. 1).

The methodology consisted of several steps. 1) reading recent works (mainly btw. 2000 and 2020) concerning the analysis, defence or criticism of a particular city concept; 2) isolating the various definitions which each author gives of each city concept; 3) each definition uses keywords, notions or qualifiers which explain its socio-political approach. A cross-analysis of these keywords, concepts or qualifiers enabled us to group them into 'main conceptual markers'; 4) We thus isolated 18 conceptual markers, which we have classified according to four aspects: social and cultural, economic, rhythm and scale, and ecosystemic. 5) These markers were gathered in a synoptic table, allowing us to evaluate the level of conceptual proximity of each definition (of each work) with each marker.

This work of analysis and decomposition into markers has made it possible toto study each city concept and to illustrate their socio-political orientations in the form of diagrams, radiating out from the 18 main markers[3] (cf. figure 2). Since an identical analysis was applied to the low-tech approach, the comparison of the markers with each other enabled us to judge the degree of proximity of this intellectual tool to contemporary urban thought. This methodological approach, which is resolutely inductive, has not therefore sought to distinguish or single out the markers of low-tech, nor to support a prior admissibility of the concept of the low-tech city.

3. For example, the words 'natural', 'renaturation', the qualifier 'biodiverse' and the notion of 'coexistence with the living' were grouped together under the main marker: 'Symbiosis'.

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Fig. 2 : Conceptual analysis diagram of the city concepts studied

4. RESULTS

From these analyses, we have learned several lessons about the level of conceptual intertwining of urban thinking at the beginning of the twenty-first century. We have identified 'transfer, borrowing, copying, circulation, mobility, hybridisation and assemblies' (Leducq et al. 2018) within the concepts studied; an entanglement which we have tried to illustrate in this synoptic diagram (cf. fig. 3). This inventory was a prerequisite for assessing the relevance of a new urban concept based on low-tech.
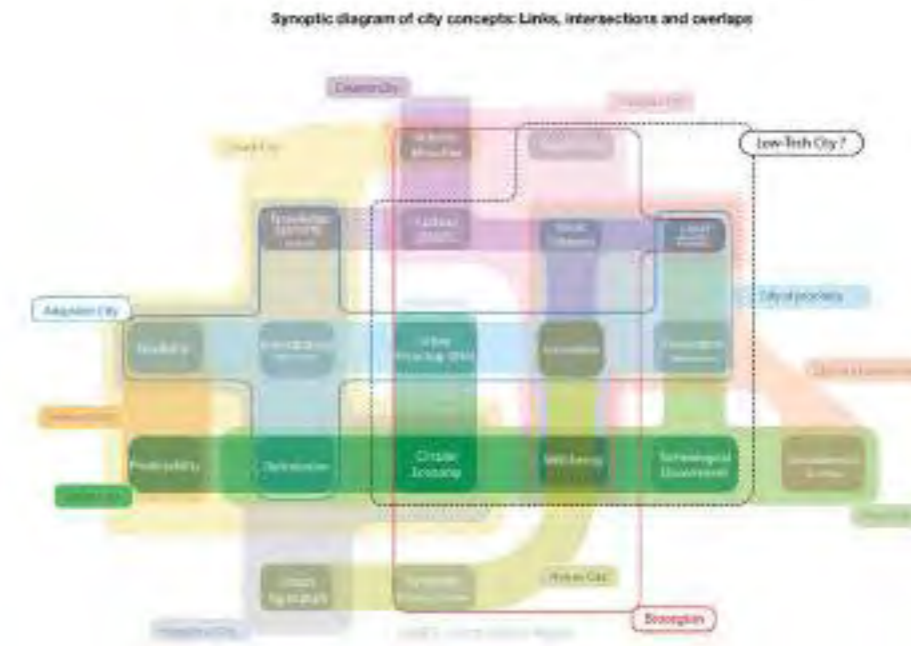
Fig. 3 : Synoptic diagram of city concepts: links and overlaps

We have also noticed that the conceptual markers also cover a variety of semantic realities that are sometimes even incompatible with each other. It is the art of the keyword to be able to make approaches that do not always overlap cohabit. Thus, while some markers manage to reach a consensus (a), others nevertheless remain more differentiating (b). Finally, we felt it was necessary to distinguish low-tech from its antagonistic urban vision: the smart city (c); as well as to note the conceptual link with Bioregion, which seemed to us to be potentially fruitful (d).

a. Some markers are agreed upon:

• **Innovation:** Omnipresent in the literature studied, innovation has been a structuring term in public policy since the 2000s (Gaglio G., 2011). "The word progress has almost disappeared from public discourse, replaced by innovation" (Klein 2020). It is seen as a way of overcoming certain contradictions: 1) methodological, by renewing the practice of urban projects (participation of inhabitants, digital uses, impact on living organisms, climatic resilience, etc.), or 2) systemic, by treating certain urban pathologies (congestion, pollution, exclusion, delinquency, etc.) The reason why progress has lost its lustre is that it is presented by the authors as being responsible for anthropogenic upheavals, whereas the mission of innovation is to prevent or slow down this disintegration. But this is not a given.

• **Optimisation:** Very present in the concepts studied, the notion of optimisation is again divided into two approaches: one aiming for productivity gains (making investments profitable), particularly thanks to digital technology (Smart city), while the other hopes for sobriety (sober and frugal cities).

The median ambivalence of the adaptable city and chrono-urbanism, which certainly propose to optimise the use of land, but whose activation, most often on a commercial basis, of spaces and temporalities that would otherwise have remained marginal, can then generate more externalities (pollution, congestion, etc.). The low-tech approach is generally critical of optimisation and performance when these generate complexity, damage conviviality (Illich) and cause predictable rebound effects.

• **Well-being and peace, versus intensification and effervescence:** The quality of urban life in the broad sense is a central theme in the concepts studied. It takes the form of well-being and calm in the concept of cities on a human scale; in the natural city, it is correlated with the presence of life; in the frugal city, it is linked to a form of asceticism, of restraint; in the inclusive city, it aims at urban hospitality, favouring the integration of relegated people. In its creative, adaptable, or smart approaches, the quality of urban life may not want to leave any space-time unoccupied (effervescence), whereas the low-tech approach wishes to regain control of urban temporalities (defervescence), advocating a 'calmed civilisation that respects nature and is technically sustainable', through a 'reduction in material consumption' and allowing the rediscovery of simple joys, including cultural activities or well-being (Bihouix, (2014) 2020).

a.   Other markers are more differentiating:

• **Technological discernment:** The low-tech approach differs from all the concepts that envisage a significant use of technology (particularly digital technology): mainly the smart city, but also certain approaches to creative and productive cities, based on the cognitive economy and a privileged use of digital technology; or the adaptable city, many of whose tools are often based on the hybridisation of space and digital technology. Low-tech incorporates three decisive components in its ethical arbitrations: the programmed depletion of mineral resources, the importance of the rebound effects linked to the use of technologies, and accessibility or appropriation by the greatest number (user-friendliness). This technological discernment is the main marker of low-tech. (Bihouix, 2022) Quoted in the concepts of the sober and frugal city, the latter see in the low-tech approach the right measure that technologies should have in the city.

• **Predictability:** Managing the acceleration and increasing complexity of urban systems has become a major challenge for cities; this is where predictivity comes in. In the Smart City, it takes the form of controlling urban effervescence by capturing and monitoring events and creating proactive management scenarios based on algorithmic analysis of large databases. In the resilient city, it is based on the control of crisis situations (climatic, economic events, etc.) by building predictive models, in order to prepare for an imminent shock and better anticipate the return to a stable situation. Driven by a certain methodological discernment, the low-tech approach distinguishes: 1) anthroposystemic problems (caused by human action in an unstable socio-economic system) from 2) natural unpredictability. Thus, a low-tech city would not give up on foreseeing what can be foreseen, unless the implementation of (technological) means to respond to it is part of a headlong rush to deal with the shortcomings of the neoliberal economic system.

• **Equality and inclusiveness:** Although the notions of social cohesion, and now inclusiveness, have gradually replaced the question of reducing inequalities (in the socio-economic sense of the term), they have nevertheless opened up the debate on other, broader phenomena of exclusion, relating to gender, origins, sexuality, diverse backgrounds or religions. These considerations are part of the challenges of the smart-city or the creative city. They see the integration of marginalised populations as a breeding ground for urban dynamism and innovation, without questioning systemic social inequalities or the distribution of wealth. The question of equality, in the economic sense, refers

directly to the notion of sharing. For T. Paquot and P. Bihouix, a sharing of working time (by reducing the weekly rhythm) and the reduction of economic inequalities are constitutive of a deceleration of the economy; of a reappropriation of individual time, and of the accomplishment of tasks that are less optimised and more emancipating, as well as necessary for a more sober society in harmony with its ecosystem.

• **Sobriety:** Asceticism, frugality, austerity? Sobriety is also the subject of consensus, and brings with it the notions of optimisation, circular economy, or technological discernment. Because of the duality of the intrinsic reading of certain markers, different trajectories of sobriety can be distinguished in the concepts: 1) The frugal city is based on optimising consumption (even going so far as to advocate deconsumption, in a form of voluntary asceticism), but with equal well-being, with a view to limiting the impact on the environment. This would mean making 'the choice to live better by consuming fewer resources' (Jean Haëntjens); 2) The sober city is based on the optimisation of production alone (energy saving; waste reduction), posed as an 'alternative to degrowth' (Wirz, 2018) without reducing consumption.

• **Biodiversity and global warming:** Although ecosystem issues are almost omnipresent in the conceptual debate on the city, three families of issues coexist without always complementing each other: climate issues, dealing primarily with the reduction of greenhouse gases (Smart city, sober city) and the consequences of climate disruption (resilient city); resource issues (renewal, pollution, waste); and finally, issues of the place of living organisms in and out of urban environments, according to two distinct modalities: limited coexistence with the rest of the biosphere, by limiting their impact on biodiversity (circular city, resilient city, frugal city); and more symbiotic integration of urban systems and natural landscapes (natural city, bioregion), combining productive landscapes, biodiversity corridors and calmed urban webs.

c.   Low-tech versus Smart city

Over the last ten years, the rise of big data and the Internet of Things has brought to the forefront the concept of the 'Smart City' (Giffinger & al., 2007; Deakin & al. , 2011), which aims to solve urban problems through the use of digital technologies (Picon 2013). The latter is subject to strong criticism, particularly in terms of governance (Greenfield, 2013; Bréville, 2017; Allix, 2019) and in view of the programmed depletion of certain key resources (Bihouix, 2010). If the smart city consists of a form of transposition, on an urban scale, of the operating frameworks of high-tech thinking, then it could undoubtedly find part of its counter-model in an urbanised approach to the low-tech approach, which is the subject of this study.

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Fig. 4 : Comparative diagram of low-tech and smart city conceptual markers

It emerges from these analyses that the low-tech approach contains ethical and critical elements which are highly effective for thinking about urban issues. Most of its conceptual markers can already be found in other concepts. However, we argue here that the conceptual potential of low-tech is not fully employed, nor is it soluble, in contemporary urban thinking. As an approach which is capable of arbitration, it cannot be satisfied with the semantic ambivalence which we have observed in our analyses (see 4).

At least four aspects seem to us to make this approach singular: 1. it approaches environmental issues in a resolutely systemic way, emphasising in particular the depletion of resources; its reading of the circular economy and frugality is all the more thoughtful and credible 2. It could propose a calmed and pacified approach to urban phenomenology, a form of sobriety that avoids event-drivenness, effervescence and productivism. 3. It places the human being and equity at the centre of its approach. By placing accessibility and technological discernment at a high level of requirement, it makes it possible to envisage the conditions for a full and complete urban conviviality (Illich, 1973). Finally, and more generally, it reflects on the interweaving of scales (spatial and temporal), on the rebound effects and on the right level of governance, without focusing solely on the local level.

If we had to summarise what makes this concept specific, it is its capacity to demonstrate a global discernment, which includes methodological and ethical dimensions, just as important as the question of technological discernment. It thus seems to us that an urban space which seeks to come closer to the principles of low-tech should aim to implement what we call: an urbanism of discernment. The low-tech city would thus be defined as:

The low-tech city is a territorial or urban system, whose constructive and social practices, governance, relationship with the living and economic functioning, testify to the implementation of an urbanism of discernment.
This systemic, critical, and ethical approach is based on four principles: the praise of sufficiency, the sustainable management of resources, conviviality (appropriation, accessibility of tools and knowledge) and the search for the appropriate scale in organisations and solutions.

Fig. 6 : Basic diagram of the low-tech city

In the diagram opposite (Fig. 4), we can clearly see the differences in their approaches. The Smart City is distinguished by its recourse to the (digitised) knowledge economy and the logic of intensification, predictivity, flexibility and urban optimisation. Conversely, low-tech is much more present on the social aspects (accessibility, well-being, social cohesion, etc.), even if inclusiveness is less addressed by its thinkers, who prefer the notion of conviviality. On the economic side, low-tech aims to be more egalitarian and sober (resources), while being more ambitious in terms of circularity (particularly urban recycling and reuse). We also have reservations about the recent attempts (see Smart City Casablanca symposium 2022) to bring together the concepts of certain city players.

d.Low-tech enriches bioregionalism without contradicting it

However, low-tech seems to be able to find a completely complementary deployment framework in bioregionalism (Fig. 5); around at least three markers: the symbiotic approach, social cohesion and the local scale. In fact, an urban metabolism that questions the question of resources in an ecosystemic way, their management scale and their good use should, in our opinion, lead to a symbiotic functioning with the territory on the bioregionalist model. Similarly, the latter proposes a very accomplished reading of localism (scalar discernment), capable of generating several levels of relative proximity, depending on the interest of the community in settling agricultural, energy, waste or infrastructure issues at the level of the neighbourhood, the city or the catchment area.

The implementation of the low-tech city is therefore based on the four principles mentioned above (cf. Fig. 6), and we wanted to illustrate them and, at the same time, show how the notion of discernment can play a role here as a tool, an applicable method, and a way of thinking:

Questioning the demand (or the praise of the sufficient)

A low-tech approach, applied to the city, could enable urban needs and desires to be apprehended with greater discernment. To do this, it would propose arbitration logics that go well beyond the sole criteria of profitability or efficiency. It would consider the sustainability of the chosen solutions, their replicability, their rebound effect, etc. It would most often invite us to renounce the useless mobilisation of natural resources. Instead of disruptive innovation, it would seek to work with what

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Seek sobriety in the use of resources (here and elsewhere)

The scientific literature on the circular economy agrees to establish as a decisive element of the operationalisation of the concept the implementation of action hierarchies, called "R-hierarchies" (Hultman and Corvellec, 2012; Blomsma and Brennan, 2017; Reike et Al., 2018). Ranging from short loops (the 3Rs: Renounce, Reduce, Recycle), to longer ones (nuancing the hierarchy by integrating various imperatives such as: Repair, Reuse, Remanufacture, Recover...), these orders of priorities rank the actions to be taken according to the resource retention allowed during the product's life cycle. In terms of development and construction, low-tech could be part of this type of approach: firstly, it would mean giving up building, by favouring urban recycling (Grisot, 2020), by optimising the use of equipment (transitional urbanism) or the modularity of equipment (reversible, multifunctional). This would mean considering rehabilitation before reuse; reuse before recycling materials; and recycling materials before using new materials. If other solutions are exhausted, any new construction would question its supply of resources (biosourced, geosourced, locally and ethically produced as much as possible...) and their implementation as simply as possible.

Making it accessible to all

Products, services, and low-tech initiatives are by nature inexpensive and user-friendly, as meant by Ivan Illich. In other words, they enable people to act, and systematically favour autonomy, simplicity, ease of repair, and accessibility to the greatest number. On an urban scale, rather than collaboration, it is a question of reinstilling the spirit of cooperation at all scales. In a low-tech city, individuals should gain autonomy of thought and action, and could rediscover the pleasure of contributing to the construction of the territory. It could be based on a wide variety of spaces for cooperation and appropriation of know-how: fab labs, recycling centres, repair cafés, participatory work sites, allotments, neighbourhood committees, etc. Implementing discerning urbanism will require involved citizens, a learning society and confidence in collective intelligence.

Finding the appropriate scale

The low-tech city would embrace the idea of a fair proportion between means and ends, whatever its size, from village to metropolis (Lynch 1981; Batty 2008). It would seek solutions to act on a human scale (Gehl, 2010; Paquot, 2020), from the local to the territorial, depending on needs and possible trade-offs: On the scale of social and political organisations (governance), daily or exceptional travel, supply, public spaces, and buildings that are the framework... Regarding production chains, the low-tech city would aim to increase its capacity for self-production, by relocating certain production units, and beyond that, by mobilising to the maximum the resources and know-how of the bioregion in which it is located.

CONCLUSION

At the end of this research work, was it necessary to add this additional reading prism, the low-tech approach, to the conceptual abundance which runs through urban thinking? We have shown through analysis that its methodological, ethical, and scalar discernment places this systemic approach at a level of requirement which clearly distinguishes it from other concepts. Although its conceptual markers can be found in several city models (see figure 3), low-tech seems to be able to avoid certain semantic ambivalences (see figure 4) which would be detrimental to its coherence.

Furthermore, although not all the concepts we have studied (cf. tab.1 and fig. 2) are breakthrough

models, it is clear that most of them attempt to provide answers to the world's disruptions (particularly those linked to the climate) and, in this sense, formulate a more or less assertive critique of consumer society, globalisation of trade and the excessively linear (extraction > waste) and costly functioning of urban metabolisms (Barles, 2006). Many territories and urban actors are now showing an interest in these models but are often lost in their sometimes-contradictory injunctions... because these are often incompatible with the structural functioning of our capitalist societies.

The question of the compatibility of this low-tech approach with the modes of production of the capitalist city, and of capitalism in general, remains unanswered (see Harvey 2012). While none of the other city models studied envisage an overcoming of capitalism, the low-tech approach is currently torn: judged by some to be 'incompatible with capitalism' and a bearer of renewed imaginaries (Vion-Dury, Bihouix, 2020; Abrassart et al., 2020); and by others, as a potential source of solutions for industrial innovation (Hirsch-Kreinsen, 2008) and supply chain problems (Armani et al. 2020).

The aim here was not to make the low-tech city a new deus ex machina of urban practice, with the vocation of replacing (or encompassing) all other concepts. However, we are convinced that this approach could be, at the scale of a territory, fertile in terms of reflections and initiatives likely to accelerate the transition and develop the resilience of urban territories (Hopkins 2009), in the service of better living together.

In this work, we sought to judge the relevance of the application of this concept to urban issues, and therefore to the city (Sennett 2019). It is undoubtedly in its capacity to question many of the socio-economic foundations of capitalism that this alternative urbanism finds all its conceptual credibility and its reason for existing.

ACKNOWLEDGEMENTS

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UNDERGROUND SYSTEMS, A FRAMEWORK FOR URBAN SOIL ASSESSMENT

1-C-5

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Abstract

Over the last years, in the framework of ecological transition, the question of soil has been critically revised in the fields of urbanism and urban planning. This paper focusses on how to integrate soil and subsoil sciences in urban assessment via a systemic reconceptualization of urban soils as a three-dimensional element composed by different strata: (a) the land, the place where urban policies and zoning laws apply, (b) the living soil, an ecosystem service that is often replaced by different urban utilities; the (c) subsoil, the hydrogeological structure that plays a crucial role for major urban functions. Although these strata are domains of different disciplines and regulations (urbanism, pedology, geology…), modifications of land use can cause major dysfunctions through these different layers, such as for example the pollution of both ground and surface water bodies, or the reduction of the natural soil capacity to infiltrate, store, and ultimately recycle water.
Through data gathering (from land cover to urban plans, pedology, hydrogeomorphology and geology…) and integrated analysis (urban and soil sciences) this work describes, analyses and categorizes the transversal connections of this threefold system in the capital region of Brussels. A region where not only the pressure of densification entails the development of former productive areas for new dwellings, and thus where soil as such becomes crucial, but also where climate change is increasingly revealing major water dysfunctions as a result of an intensive process of urbanisation of waters (covering, piping, pumping, discharging…) that has progressively replaced the space of both soil and subsoil.
The purpose of this paper is to unravel paths towards a deep soils-oriented classification of urban tissues based on the different interaction of the soil strata, as a basis for encouraging a better assessment of the environmental impact of urban developments, as well as to produce soil-oriented approaches for urban transformation. This work is part of the 3Dcit-is research (ABV Environment ; ELI UCLouvain ; LAB UCLouvain) funded by Innoviris (Join R&D Project, 2019).

Key words:

soil; land; subsoil; urban waters; urban transformation

1. INTRODUCTION:

Over the last decades, the question of soil has been critically revised in the fields of urbanism and urban planning. European and international policies and programs demonstrate an increasing interest in limiting land consumption and favouring a sustainable land use: the "no net land take" initiative, aiming zero land consumption by 2050, as part of the "Roadmap to a Resource Efficient Europe" (EC 2011), the Green Deal, as well as the United Nation acknowledging the importance of the soil by proclaiming 2015 the "international year of soil" (United Nations 2013).

In the '80s, in his seminal text 'Progetto di suolo', Bernardo Secchi (Secchi 1986) started to introduce the question of soil as an active rather than technical support to urban and territorial design. Today, this active support, enriched by its living matter and its ecosystemic functions, is placed by the ecological transition at the centre of the urban debate (Viganò and Guenat 2022, 43).

Soil fulfils many functions which are essential for the city: (a) the function of food or vegetal materials production and of source of raw material – both still often externalized outside the city (Mantziaras and Viganò 2016, 24) - is experiencing a renewed interest (Perrin and Soulard 2017); (b) soil also serves as a physical support for human constructions and (c) plays a role as an archive by preserving clues to trace history (Havlicek 2016, 24–25); furthermore soil is (d) a cultural, recreational and aesthetic element, and (e) fulfils the functions of preserving the living environment and regulating climate change or the water cycle (Viganò and Guenat 2022, 55).

However, a degraded soil is not able to fulfil many -if not all- of these essential functions (Cavalieri 2019). The impacts of soil dysfunction in urban areas can be numerous (Hazelton, Murphy, and CSIRO Publishing Staff 2009, 9): damage to buildings, erosion, flooding, degraded ecosystems. Moreover, soil leads to risks of flooding, drought and heat islands, accentuated by climate change, as well as pollution of groundwater and rivers (Labo XX+I 2021; Mantziaras and Viganò 2016, 30–31). To partially mitigate these risks, soil protection and regeneration should be systematically assessed in urbanism and urban planning.

2. STATE OF THE ART

Despite the increasing awareness of the necessity of an 'Urbanism of Soil' (Viganò and Guenat 2022), and more precisely of understanding the soil as a volume, current policies often overlook the third dimension by only considering the soil as a technical support, rather than a living and complex environment able to provide and regulate ecosystems services while also generating cultural services. In this work we propose to unpack the volume of soil by distinguishing, describing - and ultimately relinking – three different strata: the land, a political surface where regulations apply, the soil as a living environment (horizon O,A,B,C), and the subsoil (horizon R) as a geological construction. In this part of the work, we will specify how we conceptualise and use for this work the notion of soils and subsoil.

Soil is the very thin part, up to a few metres thick (Havlicek 2016, 22), which lies under our feet and is supported by the subsoil, which is a pure mineral structure (Mantziaras and Viganò 2016, 22). What differentiates the soil from the subsoil is its role as a living environment, hosting insects, worms, fungi, bacteria and other micro-organisms as well as other small animals and plants (Protasoni 2022, 23). This relationship between soil and life goes beyond the unique role of a living environment, as soil is itself shaped by life (Darwin 1881). The structure and matter of the soil is produced and transformed by living beings, from the decomposition of plants to the transformation of matter

by worms. Thus, the physical and chemical properties of the soil are the result of transformations induced by living beings. This particular relation comes from the position of the soil as the point of contact between the atmosphere, the earth and living organisms, and its structure is at the same time the result of this interaction (Peleman et al. 2022, 9).

The process of soil genesis is long, a soil takes hundreds of years to acquire the structure it has today (Mantziaras and Viganò 2016, 23) and it should therefore be considered dynamically, as an element in constant transformation and evolution (Vialle 2022, 117). This dynamic view of soil leads it to be considered as a system, via which one can 'care' (Viganò and Guenat 2022, 43), in order to enable the emergence of future soils better suited to fulfil their functions.

Subsoil, as a support under the layer of the soil, starts when the organic matters completely disappears (horizon R: bedrock). In urbanised environments, it might hosts infrastructures (energy, water, metro, ...) ; it is used as a source of raw material, or ultimately function as a natural underground water -permeable or impermeable- tank. In this work, we observe the subsoil from a hydrogeological point of view, focusing on its capacity to infiltrate and storage urban waters. In this sense, underground water reserves are not only used to supply the city but are part of an entire water cycle. Hence the renewal of these stocks is of utmost importance to improve the water cycle (De Bondt 2017, 9). In this sense, subsoil can play, through infiltration, a regulating role in water managing, by flattening the impact of seasonal rain variation, allowing the infiltration and retention of water on rainy days, thus creating water stocks for dry periods.

During the 20th century, in urban environments, soil and subsoil were considered as a potential space to build on, where technical networks (water, gas, electric cables ...) or other infrastructure (metro, underground roads, storage spaces ...) can be placed to free up space on the surface (Boivin 1989). This vision has significantly influenced urban soils and subsoils. Underground constructions have a large impact on the groundwater system (Zunino 2011): they act as barriers and may require permanent water pumping or other technical infrastructure to maintain them. The properties of soils have also been considerably modified, through compaction, mixing, and the addition of other natural or manmade materials, resulting in large variations in soil properties even on a small scale (Hazelton, Murphy, and CSIRO Publishing Staff 2009, 9). Urban soils or 'technological soils' have been heavily modified by process of urbanisation, both in terms of composition and matters. Despite heavy modifications, recent works demonstrate that urban soils can be a source of regenerations (Viganò and Guenat 2022, 53). Variations on urban soil types are therefore products of the cultural, social and technological history of cities (Hazelton, Murphy, and CSIRO Publishing Staff 2009, 12). Somehow the lack of consideration for soil in urban environments due to its invisibilisation and hence its low cultural importance, ends up by influencing its properties (Vialle 2022, 115). Nowadays, a large part of urban soil no longer - or to a much lesser degree - fulfils its role of living environment. Soil sealing, soil displacement, drilling or pollution cause changes in soil functioning, compromising its ability to host life and thus its capacity to regenerate (Havlicek 2016, 23).

Between soil and subsoil in the capital region of Brussels

Soil consumption and the degradation of its functions are starting to be handled in Brussels-Capital Region. The Règlement Régional d'Urbanisme (RRU) (Gouvernement de la Région de Bruxelles-Capitale 2006) provides regulations limiting soil sealing in gardens and yards, and, in case of new constructions, requires a rainwater management on the scale of the parcel itself, by implementing water infiltration or water re-use via the use of tanks. Operations as such, that intervene in the early stage of the process (water-cycle), and thus "source-control measures", are proposed by De Bondt against the so-called "end-of-pipes" solutions that have proven to be costly and of limited effectiveness (De Bondt 2017, 13).

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In line with the European strategy for 2030, presented in November 2021 (Commission to the European Parliament et al. 2021), which aims to preserve and restore soils as living environments, as living soil, Bruxelles Environnement, the administration in charge of the environment and green spaces in Brussels-Capital Region propose the "Good Soil" strategy ('Good Soil' 2020). The study, launched in 2019, proposes general guidelines to protect the soil and improve its quality; promote projects that strengthen living soils as well as implementing tools for monitoring soil conditions. Within this framework, an atlas ('Atlas des sols bruxellois' 2022), based on surveys, shows models of different heavy metal pollution and of soil moisture. Moreover, as a monitoring tool, a database indicating the soil quality index (Indice de Qualité des Sols Bruxellois, IQSB) was created. It consists of an evaluation of soil quality by citizens or by professionals, not only considering the soil pollution, but also analysing the soil as a living environment (presence of organic matter, insects, roots) and its structure (compaction, permeability, the presence of manmade materials …).

Projects related to soil and water infiltration are not only regulatory or governmental. Brusseau (Crespin 2020), and the ongoing Brusseau bis, are research projects funded by the regional agency (Innoviris, co-create) bringing together researchers and citizens science to address water and flooding issues in a participative process. The idea of 'watershed solidarity' (water-sensitive citizen's actions) is one of the main concepts brought forward by this collective. Indeed, water infiltration, and therefore the presence of soils that can fulfil this function, is one of the main levers for reducing runoff. The problems of the water system, in relation to soils and soil sealing, are also the subjects of the book Water vs. Urban Scape: exploring integrated water-urban arrangements (Ranzato et al. 2017) and are approached by the study of the research group LaboXX+I (2021), founded by regional administrations, which focuses on the periphery of the Belgian capital, crossing the Brussels-Capital Region and the Flemish regional border. An issue of the magazine L Latitude Logbook, CAVES (Aragone, Cauciello, and Ranzato 2020), also focuses on the questions of basements and their relation with water.

A new gaze at the urban soil and subsoil

Within this framework, the goal of this paper is to unfold the different dimensions of soil, placing the 'living soil' in relation to urban surfaces and the subsoil. This question becomes particularly relevant regarding the increasing pressure on urban soil. The European policies of 'no land take' and the current trend of 'inward urbanisation', which strengthen the protection of agricultural and natural soils against urban sprawl and car dependency, suggest the re-centring of development projects inside the cities, thus, while preventing natural soil sealing, increasing the current pressure on urban soils (Vialle 2022, 117). This trend is clearly visible in Brussels-Capital Region, as large projects and planification concentrate construction on industrial wastelands (Josaphat, Heyvaert, Delta, Tour et Taxis, Bistebroek, Gare du Nord, etc.). The soil on these sites is often still permeable and those projects generate impervious surfaces and soil pollution management, leading to large soil displacement to the periphery. It is therefore urgent to imagine a city which is not only 'soil-destructive', but also 'soil-regenerating' (Viganò and Guenat 2022, 53), and accordingly placing the issues of soil and subsoil at the core or urban transformations. This shift also introduces a different vision of the city, which has been based on the externalisation of agricultural and natural materials production (Mantziaras and Viganò 2016, 24–25). In this sense, the clear separation between agricultural and natural areas located outside the cities and in the cities themselves where artificialisation and pressure on the soil are facing significant limits, should be reconsidered. With this in mind, the methodology presented in the following paragraph intends to provide tools for a better assessment of soils in urban areas. This method does not address the soil as an isolated element, but considers it within its context, by considering what lies underneath it, the subsoil, and what stands above it, the urban surface (land)

and its regulatory frameworks.

METHODOLOGY

This paper focuses on how to integrate soil and subsoil sciences in urban assessment via a systemic reconceptualization of urban soils as a three-dimensional space composed by different strata: (a) the land, the place where urban policies and zoning laws apply, (b) the soil, an ecosystem service that is often replaced by different urban utilities; (c) the subsoil, the hydrogeological structure that plays a crucial role for major urban functions. Although these strata are domains of different disciplines and regulations (urbanism, pedology, geology, hydrogeology…), modifications of land use can cause major dysfunctions through these different layers, such as the pollution of both ground and surface water bodies, or the reduction of the natural soil capacity to infiltrate, store, and ultimately recycle water.

Using this threefold structure, this work first proposes a set of operations for each category, such as to gather, collect, and process the available and pertinent data; to produce and describe some critical cartographies accompanied by quantitative charts. Secondly, it observes the interactions (in terms of dysfunctions, missing links, as well as of opportunities) between these strata, opening up some paths for revising currently in use urban assessment methods.

'Land'

Data

For the first layer, we propose to use the term land for describing the soil surface, that is to say the space where the soil and human-beings and their activities intersect, the space where land use, planning tools, protection rules are mostly applied.

Being this stratum closely related to urban policies, most of the data is issued by the regional administrations, such as perspective.brussels or Bruxelles Environnement. These datasets therefore, unlike the others used in this paper, do not necessarily represent reality but rather describe a future and regulatory function for the regional space.

The first dataset analysed is the Plan Régional d'Affectation du Sol (PRAS), the regional zoning plan, from which the approval of building permits depends directly. A first step in the study of this plan in relation to the question of soil consists of a reclassification of the 21 'affectations' proposed. We have therefore grouped the affectations into three categories, based on the study of LaboXX+I (2021): (1) land taken, still buildable (2) land taken (despite being) unbuildable and (3) no land taken. The distinction between land take and no land take is based on the European definition of this concept ('Land Take in Europe' 2019), which for example defines urban parks as land take in the same way as built-up areas, since they are both produced by urbanisation.

Other land regulations (or protections) also overlap with the PRAS. Firstly, the Natura2000 areas, which derive from European directives (Directive 92/43/CEE 1992; Directive 2009/147/CE 2009), aim to protect natural habitats, and therefore the soil of these habitats. Secondly, the region of Brussels-Capital defined protection zones around groundwater catchments supplying the city with potable water. This protection limits the possibility of construction and activities that could lead to a degradation of the soil and therefore of the quality of the water pumped.

Moreover, overlapping this geography with other environmental risks (such as flooring risk, heat islands, air and soil pollution), the to-be-urbanised pattern becomes critical (Labo XX+I 2021).

Cartography

The map in figure 1 highlights the broadness of urbanisation foreseen by the zoning, reaching 70% of the Brussels-Capital Region. Land not dedicated to construction and not seen as urban parks, thus following the European definition of no-land take, exists only in a few places close to the borders of the Region. In the South-East, the Sonian Woods and the Bois de la Cambre stand out as the most extensive no land take areas. These spaces are recognised as such, as shown by the various protective regulations that are superimposed on these areas. Indeed, 81% of the no land take surface is also protected by an additional regulation (Natura2000 or groundwater catchment protection).
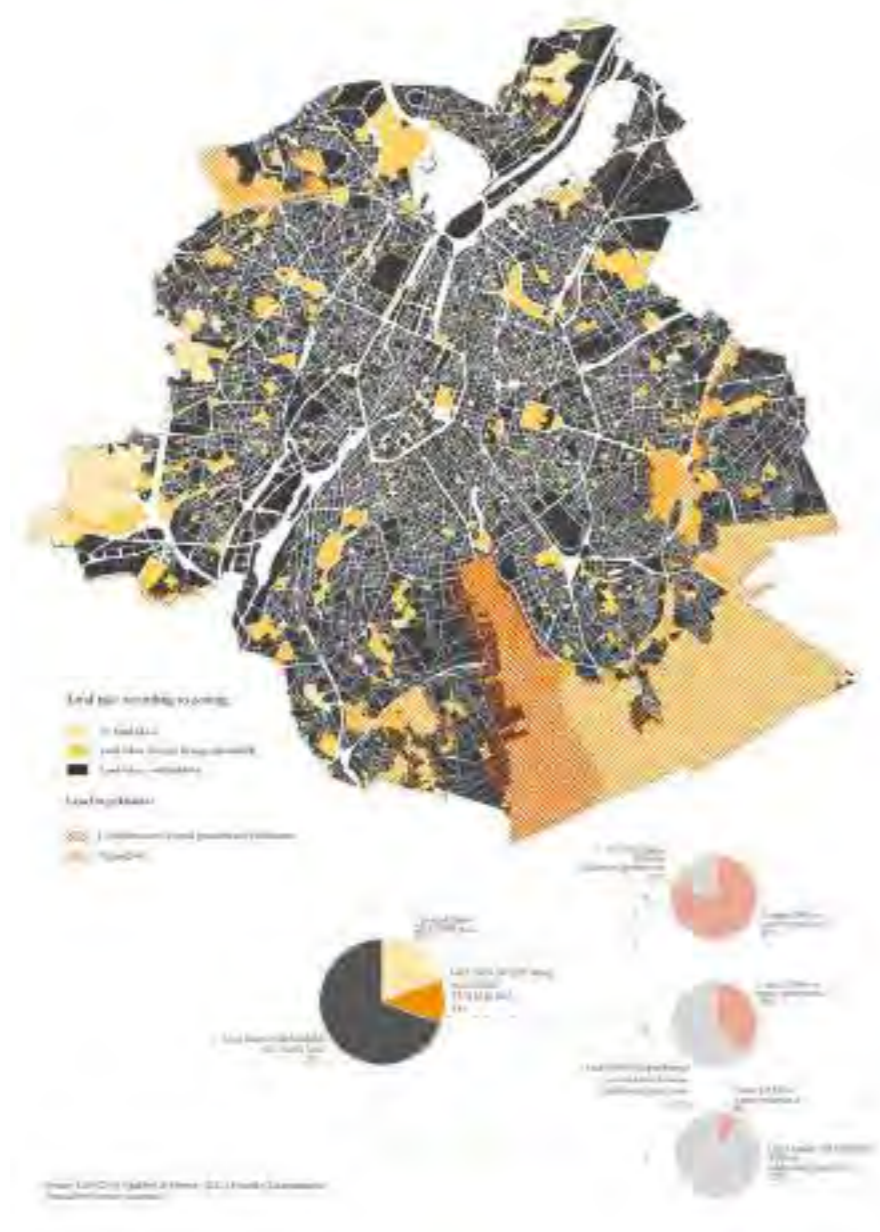
Soil

Data

The second layer proposed is that of the 'soil', referring to the living soil as described before. This chapter observes than the question of land cover (vs land use), and by means of data processing, classify the quality and potentials of existing soils in Brussels Capital Region. This type of observation grounds on the hypothesis that, although living soil takes a very long time to regenerate, damaged soil can be revived by promoting a soil-regenerative city (Viganò and Guenat 2022, 53), that should

both act towards the protection of undamaged soils and the regeneration of damaged ones.

To produce such geography, we used several indicators. The first is a land cover dataset, at one metre resolution, generated from satellite imagery, and produced during a study on Belgian ecotopes (Radoux et al. 2018). This dataset helps build a detailed overview of the rate of soil sealing, hence considering soils that therefore no longer fulfil their biological functions. However, especially in urban areas, even permeable soil is not free from human intervention, that can compromise its role as a living environment.

Pollution is one of these factors limiting soil life. The available data on pollution, provided by Bruxelles Envrionnement ('Inventaire de l'état du sol' 2020), covers the parcels currently studied and therefore does not give an exhaustive view of the real soil pollution in Brussels-Capital Region. Moreover, this dataset is simplified and does not distinguish the types of identified pollution (hydrocarbons, heavy metals, etc.). New soil assessment databases are being built (see state of the art), including indicators about compaction and share of organic matter, but are still not exhaustive at the scale of the Brussels-Capital Region.

It is therefore difficult to assess precisely the impact of pollution on living soils but we can nevertheless assume that it has an impact on the soil's inhabitants, if not on their quantity (some plants, for example, tolerate pollution quite well (Ashraf, Ozturk, and Ahmad 2010, 35–36)), at least in terms of their diversity.

Figure 2 - Cartography of the three indicators

The third indicator explored is the biological value, provided by parcel, for Brussels-Capital Region by Bruxelles Environnement (Dubois and Rengle 2020). This indicator does not specifically concern the soil, but given the strong link between the state of the soil and the biodiversity that it allows, it remains valuable for evaluating the existence of living soil.

Cartography

Starting from these three indicators and their related cartographies, we proceeded in overlapping this information, observing the different combinations that result. An area could, therefore, be

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classified as mainly unsealed, polluted and having a small biological value, also highlighting the correlation between these indicators.

The map (figure 4) shows this classification and confirms the link between soil sealing and the biological value of the area. In order to get an idea of the soil condition in Brussels-Capital Region, a statistical analysis (figure 3) has been carried out. Although large areas are sealed, the broad surface of permeable parcels with high biological value, such as parks and the Sonian Forest, make this category one of the largest in the region in terms of surface area. This analysis therefore deconstructs the image of a city in which the soil has already lost all its ecological value and is merely a surface waiting to be built. However, it also highlights the scale of the task of improving the quality of the soil in the city, given that impermeable areas with low biological value is still by far one of the most important categories. Policies regulating soil sealing at the level of the parcel, such as the RRU (see state of the art), can have a significant impact on that scale, but also on a larger scale as their effect is cumulative.
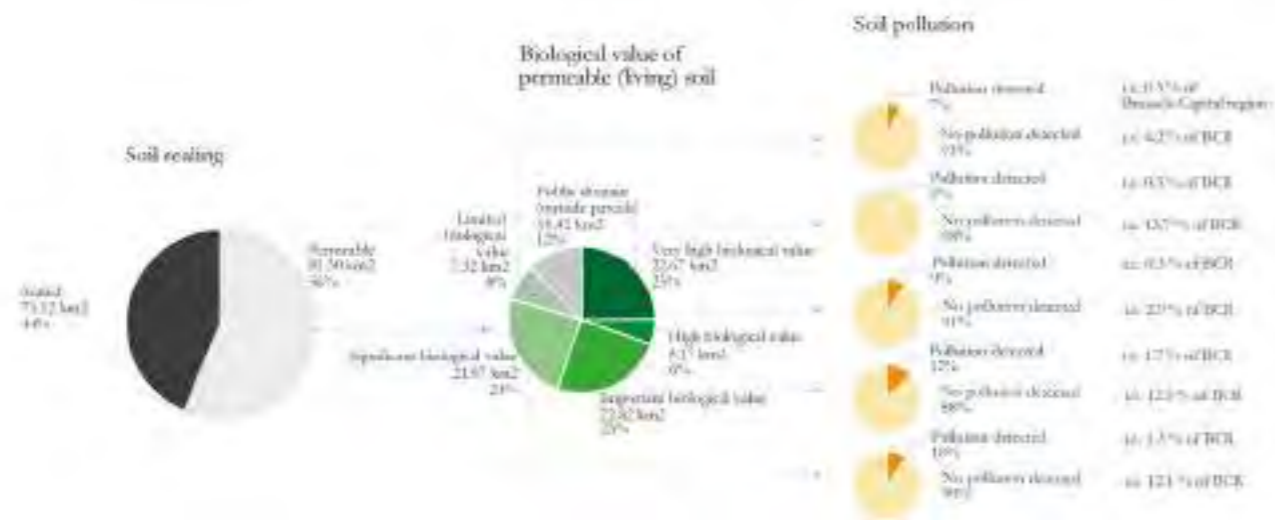
Figure 3 - Distribution of soil according to its condition.
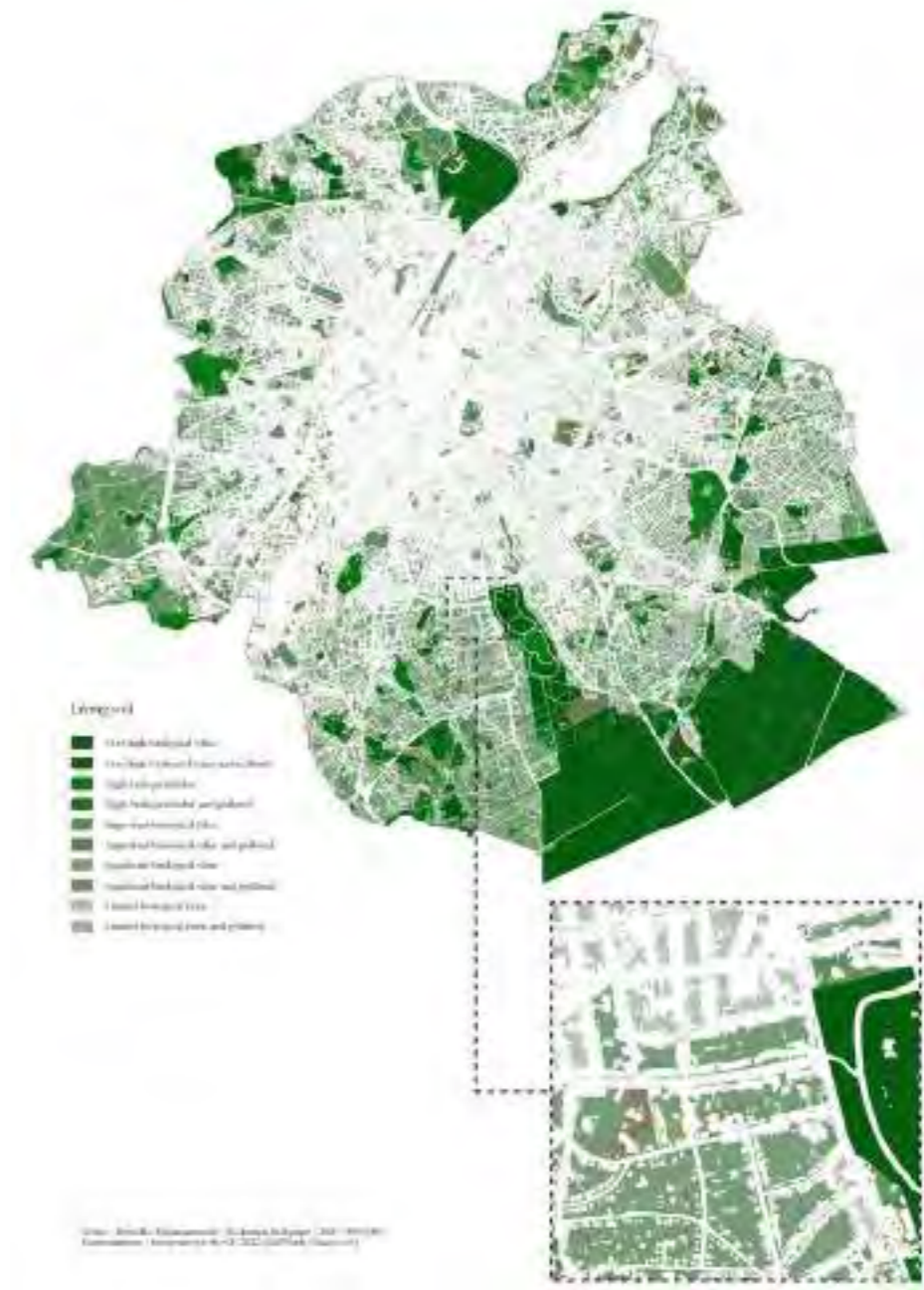
Figure 4 - Classification of permeable soil according to its biological value and to pollution

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Subsoil

Data

The third strata of analysis is 'subsoil' (horizon R). As mentioned before in this work, we observe subsoils as interactors or interceptors of urban transformation. In this sense, the most important urban function of this strata is that of infiltrating (or not) and storing (or not) rain, runoff, or leaking water.

For this operation, the research used two databases. The first, produced by the study Brustrati3D (Devleeschouwer et al. 2018), represents the geological layers of the Brussels-Capital Region. The second classifies subsoil in hydrogeological units (Bruxelles Environnement 2020). To pre-process these datasets, the geological layers are sorted according to their depth and also to the hydrogeological unit to which they can be attached.

Three hydrogeological units are important for our work: aquifer, aquitard and aquicludes.

Aquifers are porous and permeable mineral structures, allowing water circulation, which makes them perfect reservoirs from which water can be pumped easily. These strata contain, or can contain, water because of their porosity. The distinction between porosity, which determines the amount of water that can be stored in a mineral structure, and permeability, which measures the ability of water to move through the structure, is important here because it refers to two distinct capacities of the subsoil: first, the ability to store water and second, the capacity to infiltrate it. Moreover, an important distinction for this study: an aquifer can be confined when it is surrounded by impermeable strata, or unconfined, water can therefore circulate to other surrounding strata.

An aquitard includes geological layers that slow down the circulation of water and are therefore not very permeable. Aquitards can therefore be saturated with water, but infiltration, as well as pumping, are difficult.

Finally, aquicludes are impermeable strata, which prevent water movement. However, this category can be porous and consequently contain water. This categorization therefore depends more on the permeability of the structures than on their porosity. Aquicludes are generally clay strata, which do not allow a good circulation of water, unlike sand structures, which are found in the aquifer group (De Bondt and Claeys 2008).

Cartography

To better understand these relationships, in addition to the maps, we produced several sections of Brussels-Capital Region as well as zooms allowing the hydrogeological superpositions of the different subsoil strata to be seen more precisely (figure 5).

The first observation is that of detecting the profile of the first barrier to infiltration for any of the different sections produced and consequently to calculate volumes of permeable/porous subsoil. As shown in the section (figure 5), the first barrier to infiltration could be due to: groundwater, an aquitard, an aquiclude, or to a combination of these elements.

Moving from a vertical analysis, using sections, to a horizontal analysis, using cartographies, the volume of permeable/porous soil (before the first barrier) is calculated per parcel (figure 6). At first glance, the patterns of this map recall the topography and the valleys. Indeed, along the valleys, the upper part of subsoil is composed of impermeable alluvial clays, thus considered as an aquitard, and the groundwater level is also closer to the surface. On closer inspection, however, there are many differences with the topography, because of less permeable geological structures or a higher groundwater level. This map allows us to determine the water storage potential of the subsoil and thus its potential to regulate flood risks, and this for the entire Brussels-Capital Region.
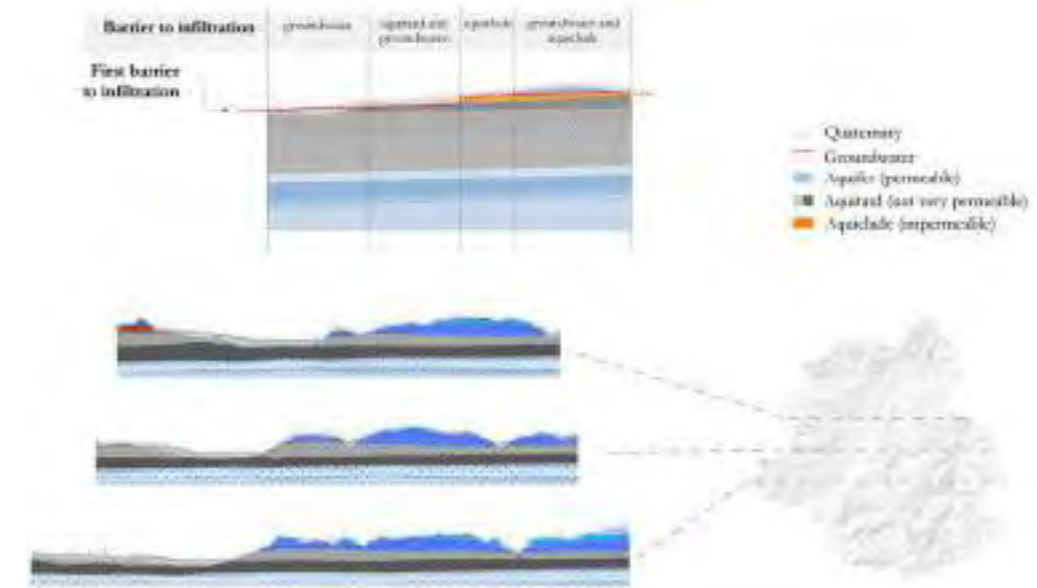
Figure 5 - Sections describing the evaluation of the first barrier to infiltration and three section of the Brussels-Capital Region

Figure 6 - Map of the depth before the first barrier to infiltration

RESULTS

Interrelations between strata

After a first step of analysis, where strata have been observed as separated items and single units, a second step of the work is that of observing the interaction between the different parts. Interactions that are observed through a common unit of observation, that of the parcel.

As many factors, as well as many regulations applies to the different strata, the crossing possibilities are multiple and still under observation. In this article we propose a first possible reading, while opening paths for continuing this work.

The map in figure 8 illustrates these relationships between strata by showing only the areas where the soil is permeable and the subsoil has a high infiltration potential. As these two elements are linked, soil and subsoil need both to be permeable to allow water infiltration, the maps show the actual areas where the function of infiltration can be fulfilled. The question of land is also represented on this map, with different colours regarding the affections. The impact of planning on water infiltration is visible: the proportion (figure 7) of non-buildable land is higher when only the areas that can infiltrate water are selected (47%), compared with the total non-buildable land of the Region (30%).

However, quite a sizeable portion of the infiltration areas are still in land take zones, highlighting a threat to the soil and subsoil function of infiltration, as the soil of these parcels could be sealed.
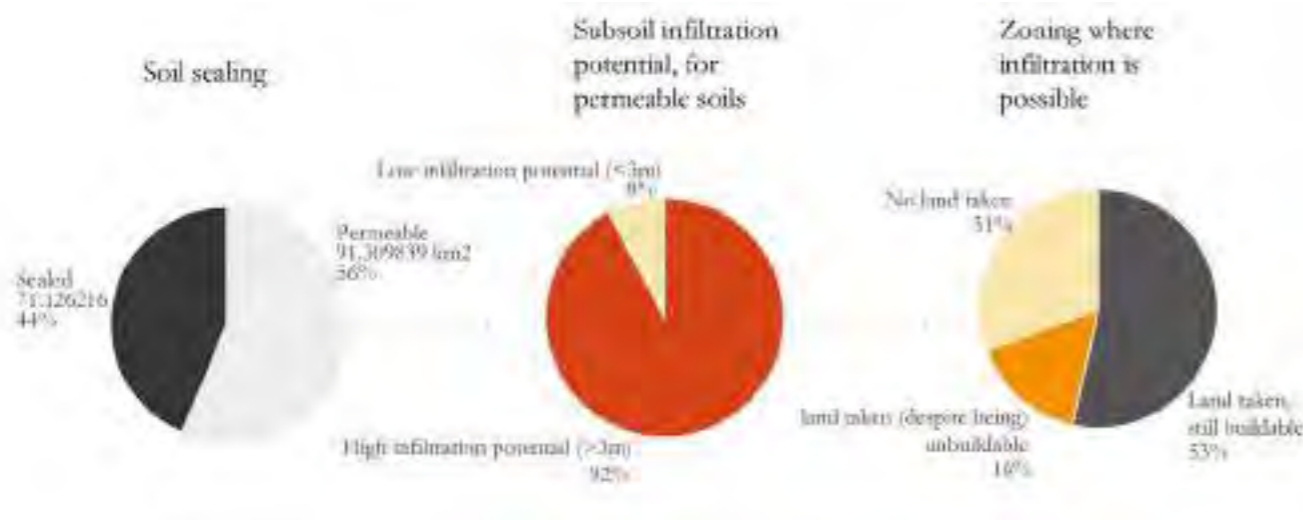
Figure 7 - Distribution of permeable soil, subsoil where water infiltration is possible and its zoning.

Potential of improvement of soil and subsoil functions
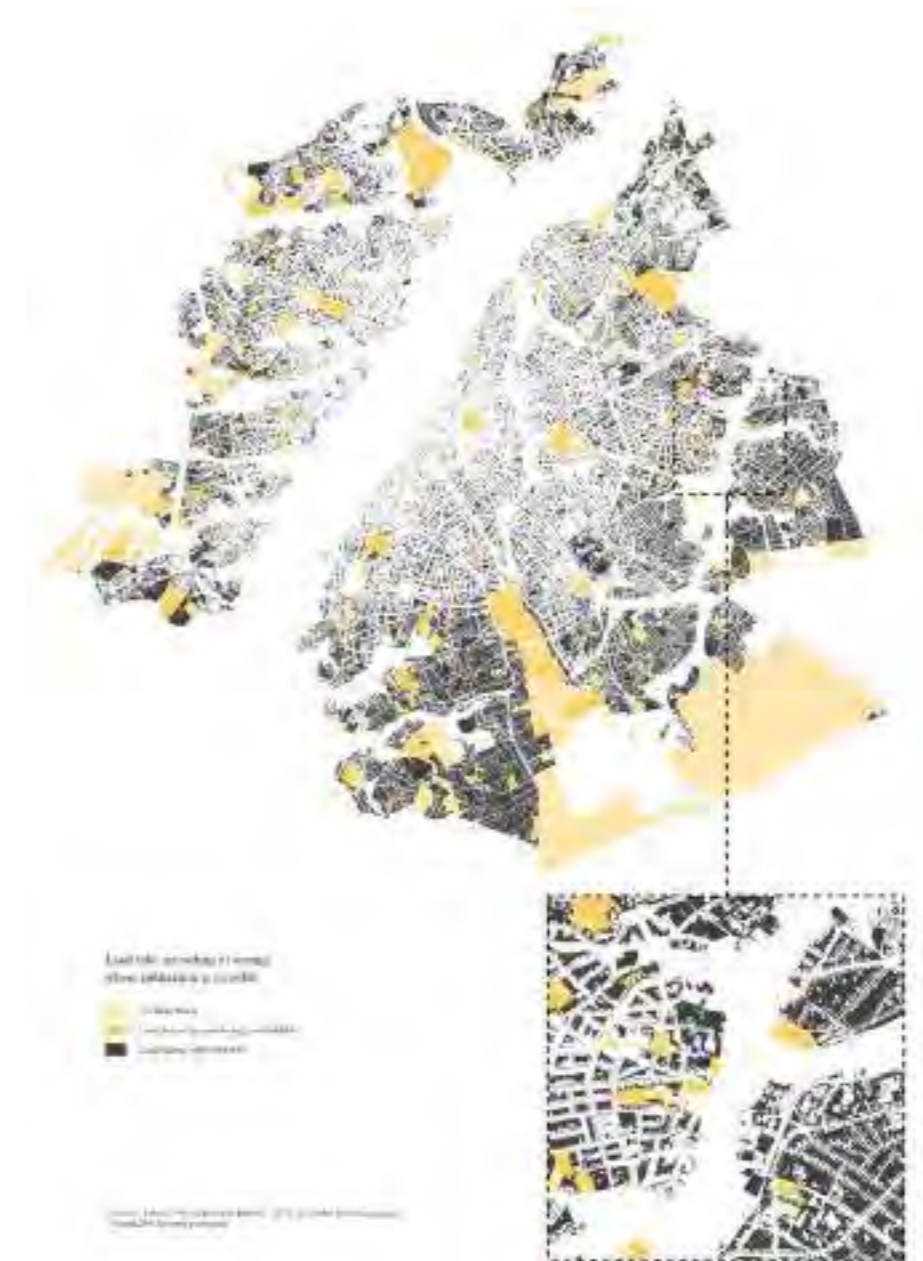
Despite the multiple crossing readings still open to evaluations, this article proposes to recategorize the urban tissue while considering underground dynamics, and in this sense also providing a tool for a better assessment of soil and subsoil for cities to face the ecological transition. The three strata can therefore be crossed with the aim of revealing potentials of improvement of soil and subsoil functions.

For example, the map of figure 9 shows a combination of: the mostly impermeable parcels, with low biological value, and with a good infiltration potential. This selection highlights a specific geography where a land use cover change could have a significant impact both from the point of view of biodiversity and the one of rainwater infiltration, and thus reducing flooding events.

These parcels represent one third of the total number of parcels of the Brussels-Capital Region, but only 14% of the total surface. They are therefore generally small since they are situated in the most densely built areas of the Brussels-Capital Region.

These parcels are generally located upstream, resulting from the proximity between the subsoil infiltration potential and the topography. From the point of view of 'watershed solidarity' (see state of the art), these parcels are therefore all the more important because an increase in infiltration will have positive effects on the downstream flood risks.
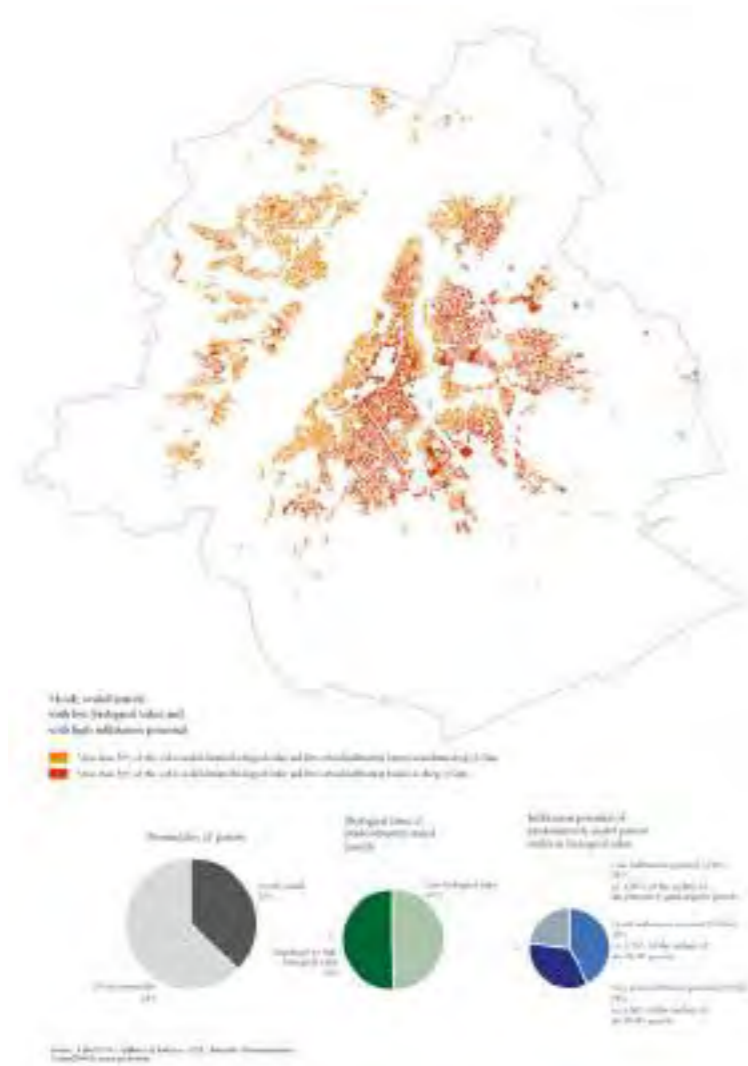
Figure 9 - Parcels where the soil is mostly sealed, biological value is low and the subsoil infiltration potential is high. Distribution of these parcels according to the subsoil infiltration potential.

CONCLUSIONS

These examples of combining the different strata give an insight of the possibilities offered by the method presented in this paper. After crossing the different data, resulting in a multitude of new groups, the identification of broad categories is useful, as shown in the last two maps (figures 8 & 9).

This clustering can follow a logic specific to the studied issue. For example, when studying rainwater infiltration, impermeable soils laying on permeable subsoils or permeable soils laying on impermeable subsoils lead to the same conclusion: infiltration is limited. It would therefore be possible to group them together in one category. Another approach is to identify potentials and create new clusters according to that (as shown in the previous map, figure 9), thus increasing the possibilities of assessment of the soil and subsoil in urban projects.

This last point is central to this paper. The pressures of climate change and demographic growth in Brussels-Capital region require a better consideration of the impact of urban projects on the soil and subsoil. Indeed, whether it concerns biodiversity issues, water management (and the subsequent problems of flooding and drought), or urban climate, considering the soil and subsoil is a key element in which to intervene in order to limit risks and improve cities resilience.

Some questions posed by this paper are open to further exploration. Underground constructions have a significant impact on the subsoil functions. For example, some sections of the Brussels metro act as a barrier, affecting groundwater levels, requiring constant pumping and causing diversion of clean water to the sewage system. Implementing these elements to the model presented in this paper could be an interesting addition.

The recent evolution of soil studies, which not only considers pollution and soil sealing, but also soil structure and emphasis on the soil as a living entity, is also worth investigating. The effectiveness and relevance of measures promoting soil life and water infiltration also depends on their location and context. This opens the door to the spatial study of the implementation of this type of measure, not only in relation to the soil and subsoil but also in relation to, for example, existing green and blue corridors.

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Abstract

This paper welcomes »new interdisciplinary and intercultural approaches« as vital to teaching for sustainability, and asks if novelty might benefit from the transformative use of existing approaches such as what might be termed ›hybrid modernism‹: connecting modernity and technology with the respective local histories and traditions. This paper suggests an imaginary cultural journey through the realm of ›hybrid modernism‹ first in architecture and urban planning in general, and then in international urbanism. Bordeaux itself might offer an appropriate start with outstanding connections between contemporary architecture and the UNESCO heritage urban fabric. The journey continues with a visit (1) to one of the main laboratories of ›hybrid modernism‹ during the 1920s/1930s (the Ecole the Beaux-Arts and the Groupe des Architectes Modernes in Paris), (2) to Georges Cantacuzino, the integrative figure of Modernism in Romania, and his ›classical attitude‹, (3) before turning to International Urbanism (cultural context, education examples) and the Atelier Parisien d'Urbanisme (APUR) as example of a contemporary think tank that cherishes ›hybrid modernism‹. The journey finishes with notes on the ›classical attitude‹ itself.

Key words:

International Urbanism, ›Hybrid Modernism‹, ›Classical Attitude‹ as inter-cultural humanistic strategy

1. INTRODUCTION:

Hybrid Modernism – an international current phenomenon

This year, the highest international honour in architecture, the Pritzker Architecture Prize, has been awarded to the Burkina Faso born German architect Diébédo Francis Kéré (*1965). He is the first African and the first black person to receive this prize.

The new Benin National Assembly (under construction since 2019, image 01) in Porto-Novo, one of the projects Kéré has been awarded the Pritzker Prize for, is especially intriguing – for two reasons. First, the main issue of the project is a modern interpretation of the »palaver tree, the age-old West African tradition of meeting under a tree to make consensual decisions in the interest of a community« (https://www.kerearchitecture.com/work/building/benin-national-assembly [16 May 2022]). The Benin commission, and this is the second intriguing point, has welcomed this approach, thus going against the prevailing opinion in many African regions that such traditions were old-fashioned and primitive (Woeller 2022).

Kére's approach to architecture is exemplary for the subject of this paper, with respect to »new interdisciplinary and intercultural approaches« and ›hybrid modernism‹ as vital to teaching for sustainability.

01 Park surrounding the Benin National Assembly (Copyright Kéré Architecture)

The two above-named aspects remind of the role of history in architecture and urban planning (both in practice, and in academia): First, the fact that dealing with history is at times still a disputed issue; second, that what might be termed ›hybrid modernism‹ is becoming acknowledged as legitimate endeavour of connecting modernity and technology with the respective local histories and traditions.

This paper suggests a cultural travel in space and time which would focus, in the first place, upon to a few examples, historical and contemporary, of ›hybrid modernism‹ first in architecture and urban planning in general, and then in international urbanism in particular.

Bordeaux itself seems appropriate enough for a starting point. It includes connections between outstanding contemporary architecture, urbanism and landscape, and a historical urban fabric of superb quality and coherence including the UNESCO heritage area of Port of the Moon (cf. e.g. Courret 2009; https://whc.unesco.org/en/list/1256/ [16 May 2022]). The imaginary cultural journey would continue with a halt in Paris at the École the Beaux-Arts and the Groupe des Architectes Modernes, followed by a visit to Georges Cantacuzino, the integrative figure of Modernism in Romania, who developed a ›classical attitude‹: an intercultural strategy of connecting traditions with Modernism, and aesthetics with the ethics of human scale – local traditions including aspects of construction methods, materials, culture, topography, and climate. The journey would then proceeds to ›hybrid modernism‹ in the field of International Urbanism – first with some notes on its cultural and architectural context, and second with two examples of architectural education from Stuttgart. The paper will conclude with some thoughts on the notions of history and modernity underlying ›hybrid modernism‹ or the ›classical attitude‹.

Eventually, this paper also wishes to pay homage to contributions from Bordeaux by Michel de Montaigne and Montesquieu to integrative humanist philosophy of universal value.

METHODS

Reflecting the complexity of the subject, the methodological essentials of this paper echo a detective-like approach inspired by Sir Arthur Conan Doyle's figure, Sherlock Holmes: »Breadth of view […] is one of the essentials of our profession. The inter-play of ideas and the oblique uses of knowledge are often of extraordinary interest.« (Conan Doyle 1997, p. 412) Such, in short, are the methodological aspects of the proposed cultural journey:

- wide angles and close-ups: general overviews and examples,

- contextualisation and quotations (voices),

- interdisciplinarity (architecture, urban planning, international urbanism, history, philosophy, ethnography, literature etc.),

- intercultural approach (as to countries mentioned, in alphabetical order: Benin, Burkina Faso, France, Germany, Great Britain, India, Romania, South Africa, Tanzania etc.; as to languages of literature consulted: English, French, German, Romanian),

- connectivity between (1) theory, teaching and practice, and between (2) past and present as to mentioned examples and personalities.

Some examples and voices might be less known. In this view, this paper refers to a recent debate on the relevance of history in architectural education, Enseigner l'histoire, which took place at the EPFL / École Polytechnique Fédérale de Lausanne, and was published by L'Architecture d'aujourd'hui in June 2021 (AA No. 443, June 2021). One suggestion put forward by Françoise Fromonot, architect, teacher, and critic, appears to be of particular interest: »Rather than withdrawing into illusory securities, or allowing itself to be immolated on the altar of efficiency, the teaching of history could take better advantage of this complexity, daring to confront marginal questions, exhuming authors left in the shadows, multiplying points of view, destabilising students' preconceived ideas in order

to get them used to arguing.« (Fromonot 2021)

CULTURAL JOURNEY

Bordeaux

The Garonne quay in central Bordeaux may present a second example of an outstanding dialogue between tradition and modernism: the project of Mirroir d'Eau and the Quais de la Garonne by landscape architect Michel Corajoud (1937-2014) (http://corajoudmichel.nerim.net/Realisations/Bordeauxlesquais/Bordpresgen1.html [30 May 2022]) who in 2008 liberated a substantial portion of the Garonne banks from car-traffic. Corajoud and his team set the stage but to perfection for the Place de la Bourse and the Bourse (the former Place Royale), a superb ensemble of French Classicism in urban design and architecture. The Place Royale with the Bourse facing the river was initiated by Claude Boucher in 1728 and brought to fruition by the Marquis de Tournay, his successor as Construction Intendant since 1742: a project intended to open the city of Bordeaux on to the Garonne port, with the then Rue Royale (today's rue Ferdinand Philippart) communicating between the Place du Parlement and the quay. The Bourse itself (inaugurated in 1748), was the work of the Gabriel family of architects (Ange-Jacques, son to Jacques V, practically took office as director of construction at Bordeaux after his father´s death in 1742; see e.g. Tagdell 1978 pp. 167-171). A novel project, since it was »contrary to the whole tradition of the development of Bordeaux – which had been away from the river, behind the preserved walls« (Tagdell op. cit. p. 169).

L'École des Beaux Arts in Paris

The present-day ensemble of the Place de la Bourse reflects concepts pursued by French Classicism, Haussmann type urbanism the École Polytechnique, and the École des Beaux-Arts. The architectural section of the latter is of special interest to this paper. Descending from the Académie Royale d'Architecture founded by Louis XIV in 1671, and re-founded as École Royale des Beaux Arts in 1819, the École included one of the first modern schools of architecture worldwide. Its national and international impact was tremendous.

The École still exists on its historical premises in Saint-Germain-des-Prés – without the architectural section, though, which had been closed down by the French government following students´ protests in 1968. Heir to the architectural section of the École des Beaux-Arts, L'École nationale supérieure d'architecture Paris-Malaquais has been founded in 2001. Its premises include the historical Cour Mûrier, the bâtiment Perret, and the building designed by Roger-Henri Expert for the École in the Rue Jacques Callot (see e.g. Drew Egbert 1980; L'Architecture d'aujourd´hui 1997; Teodorovici 2014, pp. 29-31; https://beauxartsparis.fr/en; https://paris-malaquais.archi.fr/ecole#les-lieux [3 June 2022]) (image 02 & 03).

While acknowledging the legitimate aspects of criticism of the École put forward by strands of Modernism, this paper wishes to remind of some positive features of its legacy in architectural education with regard to sustainability.

02 École des Beaux-Arts in Paris, Cour Mûrier (Photograph: Dan Teodorovici).

03 Roger-Henri Expert, Atelier building for the École des Beaux-Arts in Paris, Rue Jacques Callot, 1933. Today a site of ENSA Paris-Malaquais (Photograph: Dan Teodorovici).

For instance, Georges Gromort (1870-1961), professor of architectural history at the École from 1919 to 1961, suggested that »[i]n architecture, it is the climate which counts: the spirit in which, according to our affinities and momentous humour, we study a programme. But if there is an art, which shall be freed from the tyrannies of fashion, then architecture is certainly the first and foremost one. And the very reason for this being that the buildings we erect are supposed to outlast us. Who cares for the last year's hat? We want a change because it is worn out, and maybe we decide not to use it anymore at all. In contrast, though, even the most modest building should last for at least one century!« (Gromort 1983 [1942], pp. 151-152)

Today, with the sustainability debate and climate change combat on one hand, and the life cycle of many a building lasting less than 50 years, the approach formulated by Gromort and typical of the Ecole seems nothing less than topical.

Gromort backed a movement called Groupe des Architectes Modernes, launched at the Parisian Salon d'Automne in 1922. It was the third main actor on the French architectural scene in the interwar period – and what a complex and vivid dispute there was! Two other groups fiercely opposed each other – the architecture nouvelle led especially by Le Corbusier (1887-1965) on the one side, and the arch-conservative Beaux-Arts traditionalists around Gustave Umbdenstock (1866-1940) and Louis Hautecœur (1884-1973) on the other side.

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Although being under attack by both Modernists and Traditionalists, the Groupe des Architectes Modernes were not averse to a creative approach to history. This group was initiated by a number of progressive Beaux-Arts professors and graduates around Auguste Perret (1874-1954), Tony Garnier (1869-1948), Henry Sauvage (1873-1932), and Roger-Henri Expert (1882-1955), who, beyond individual focuses, attempted at blending French Classicism and regional traditions with Modernism (Lemoine, B. / Rivoirard, P. 1987; Gargiani 1992; Teodorovici 2010, p. 29; Teodorovici 2014, p. 39) In this endeavour, the three senior members of the Groupe – Garnier, Sauvage, and Perret – had already experimented before World War I, so that the foundation of the movement actually brought together and somewhat formalized the aspirations of its three senior co-founding members. As early as the 1920s and 1930s, the École des Beaux-Arts thus partly became one of the main creative laboratories of ›hybrid modernism‹.

At the same time, the Groupe des Architectes Modernes succeeded, to a certain extent, to mediate between clashing groups, and to co-operate with avant-garde architects, as suggested by L'Architecture d'aujourd'hui, still one of the leading French journal on architecture and urban planning. In November 1936, for example, under the leading of André Bloc, the board of patronage (comité de patronage) brought together architects such as Victor Bourgeois, W.M. Dudok, Roger-Henri Expert, Tony Garnier, Le Corbusier, Auguste Perret, G.H. Pingusson, and Robert Mallet-Stevens; the editorial board (comité de redaction) included Pierre Vago, Albert Laprade, G.H. Pingusson etc.; correspondents involved architects such as Erno Goldfinger (for Great Britain), Bruno Taut (for Japan) or Georges Cantacuzino (for Romania), and Julius Posener acted as secretary to the journal (see L'Architecture d'aujourd'hui Nr. 11, November 1936).

Georges Cantacuzino and the ›Classical Attitude‹

The Romanian cosmopolitan architect and intellectual Georges Cantacuzino (1899-1960) belonged to those architects and planners who, in the interwar-period, advocated a ›hybrid modernism‹, and who, mostly, sank into oblivion after 1945. Cantacuzino, who had himself studied at the École primarily under Gromort and Expert, in the late 1920s developed what he coined a ›classical attitude‹: a strategy of bringing together traditions, both classical and local, and Modernism, and linking aesthetics to the ethics of human scale – local traditions naturally include aspects of construction methods, materials, culture, topography, and climate. The architectural outcome might be best described as essays at ›tailoring‹ each and every project to the respective situation or genius loci (image 04). In the 1930s, Cantacuzino became the undisputed integrative figure of Modernism in Romania.

But is this ›hybrid‹ approach not an expression of opportunism and arbitrariness? The basic variation in styles and materiality, or sometimes the difficulty of clearly classifying the diverse formal language of ›hybrid modernism‹ may induce those who prefer the concept of unambiguous labelling in architecture to answer in the affirmative.

Cantacuzino took such accusations seriously, but he denied them any substance in the first place, since »(i)t is not the variety of styles that we are concerned with, but rather the thread running

them. Considering the fluidity between disciplines, any attempt at a rigid classification based on style is illusory as the essentials of architecture do not consist in the individual nor in the particular« (Cantacuzino 1926, p. 19; all quotations from Cantacuzino have been translated into English by the author of this paper). Some eight years later he emphasized that »[i]t is not a canonizing selection of objects and forms that we need, but a comprehensive ethics from which a true aesthetic can emerge.« (Cantacuzino, 1966 [1934], p. 64).

04 Georges Cantacuzino, Hotel Bellona, Eforie Nord, Black Sea Coast, 1934.
Postcard ca. 1960 (Archive Dan Teodorovici).

While pragmatically acknowledging the legitimacy of what might be called pure traditionalism and pure modernism, Cantacuzino himself defended a third position:

»There are the traditionalists, the modernists and the others. The latter include those architects who believe that it is necessary to seek an equilibrium based on classical disciplines without rejecting modern themes and without turning one's back on tradition.«

(Cantacuzino 2001 [1947], pp. 40-41).

Of the architects who endorse such an approach, Karl Friedrich Schinkel (1781-1841), Auguste Perret and Charles Correa (1930-2015) may be remembered here.

Schinkel believed that »[t]his new style will not emerge from history as an incomprehensible fantasy, which invades all contexts. On the contrary, one will hardly notice the new style, its greatest merit being the consequent application of a number of innovations that have been acknowledged in the course of time.« (see Hermann 1977 [1932], p. 64).

And Perret wrote, »[h]e who, without denying the modern principles and building materials, creates

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a work which gives the impression of always having been there, he could indeed be satisfied.« (Perret 1986 [1952], p. 51)

Charles Correa's quest for a »new Indian architecture", which combined »Indian architecture with the International Style, tradition with modernity, East with West, eventually formulates what is actually and originally the basis and starting point of all architecture – or at least should be.« (Lenz 1998, p. 4) (image 05)
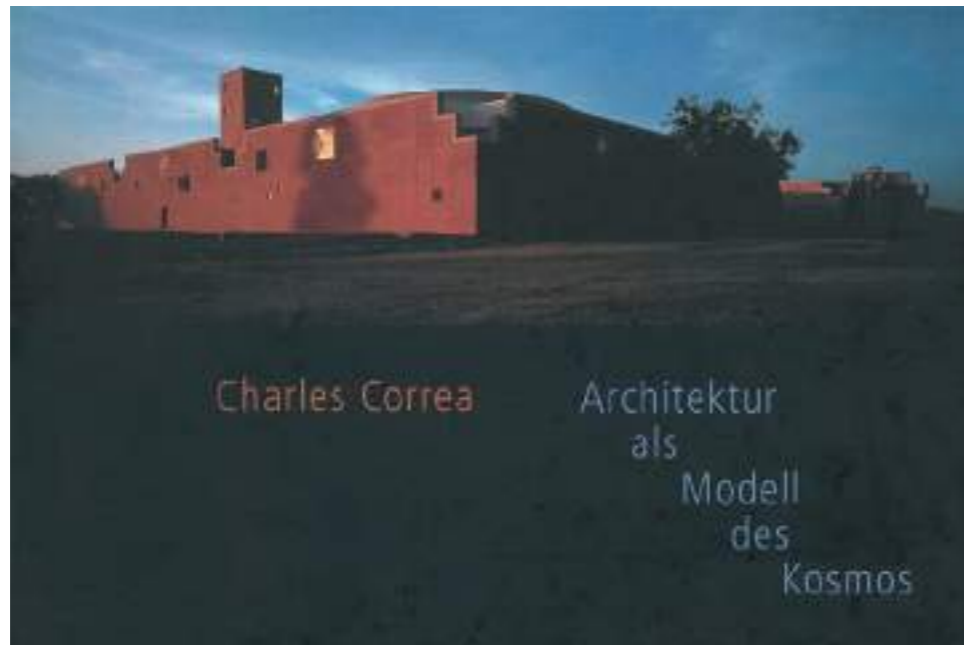
05 Charles Correa Exhibition at Stuttgart ifa gallery in 1998. Exhibition Catalogue Front Cover showing the Jawahar Kala Kendra Cultural Centre in Jaipur, 1986-92 (see Lenz 1998).

Naturally, Cantacuzino was concerned with the development of Romanian architecture, but he put it into the international context: »Our problem is not to reduce general tendencies to regional aesthetics; on the contrary, we have to appreciate our old regional heritage as a cultural value of general interest, that we transfer into the great realm of the eternal artworks of humanity.« And he added: »Today we cannot reject the great questions of humanity, no less than we did in the past. For humanity comes first – regionalism second.« (Cantacuzino 1934, p. 19)

Along the same line, Roger C. Fisher, contemporary South African architectural historian and theoretician, refers to African architecture and recommends: »[F]or we who wish that the African theory of architecture be heard, it is then our task to ensure that what is uniquely African enters the global orthography of architecture's universal language. This we will achieve through critical analysis and representation of our particularities. At the same time, in order to democratise this endeavour and not create a new hegemony, namely the hegemony of the discipline itself, we, as

architectural designers, will need to ensure that the local languages of ordinary people are able to articulate and hence have access to our enterprises.« (Fisher 2021, p. 292)

International Urbanism: notes on the architectural and cultural context

06 Georges Cantacuzino, Persepolis. Water colour ca. 1935 (Archive Cantacuzino Family, London).

The work of Georges Cantacuzino also shows connections to International Urbanism, of which vernacular principles are a vital part. His study travels, radio talks, paintings, and essays, particularly his book Patrar de Veghe [Moonwatch] (1938) are testimony to his commitment (see Teodorovici 2014, pp. 95-97) (image 06).

Commitment to International Urbanism presupposes – implicitly or explicitly – an interest in other cultures; it requires a fundamental curiosity and openness to the Other. This openness, in the words of the Spanish philosopher and sociologist José Ortega y Gasset (1883-1955), »inflicts a deep wound, and through it we are forever open to the infinite multiplicity of the human« (Ortega y Gasset 1964, p. 145). Michel de Montaigne (1533-1592) had a similar attitude, for he was sceptical of negative reports about indigenous people in the »New World«, and extended his scepticism to customs in France and Europe: »Now, [...] I find that there is nothing barbarous and savage in this nation, by anything that I can gather, excepting, that every one gives the title of barbarism to everything that is not in use in his own country« (Montaigne 1952, p. 93; see also Breuer et al 1996; Lévi-Strauss 2019).

For Claude Lévi-Strauss (1908-2009), the French anthropologist and founder of structuralist ethnology, Montaigne was an important source of inspiration. Lévi-Strauss advocated taking ›wild thinking‹ with its mythology seriously and found his »path that led him away from a judging reason and toward a discourse of diversity« (Breuer et al 1996, p. 160; Lévy-Strauss 2019). Lévi-Strauss's thinking in turn influenced currents in architecture and urbanism, for example, structuralism and

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International Urbanism. Correspondences can be found in modernist art and architecture for the mythological-wild thinking that preoccupied Lévi-Strauss: tribal and folk art on the one hand, anonymous or vernacular building on the other.

Vernacular building exerted an intense fascination on varieties of classical modernism of the 1920s and 1930s. Vernacular building in, for example, Mediterranean countries, Central and Eastern Europe, the Near and Middle East, or Japan inspired numerous modernist architects, including Frank Lloyd Wright (in the U.S. and Japan), Le Corbusier (including in France, India, etc.), Bruno Taut (in Germany, Japan, and Turkey), Giuseppe Terragni (in Italy), or Georges Cantacuzino (in Romania) (see, among others, Pagano / Guarniero 1936; Pevsner / Honour / Fleming eds. 1992; Frampton 1996; Moravánszky 2002; Teodorovici 2014). The architectural public's interest in vernacular building flared up again in the 1950s and 1960s. This is evidenced, for instance, by the architectural-urbanistic variety of structuralism, which found inspiration for the model of the labyrinthine city and compact city in Kasbah settlements e.g. in North Africa (cf. among others, Hertzberger 1995 & 2000), the engagement of Raimund Abraham (1933-2010) with the book Elementare Architektur (1963), or of Bernd Rudofsky (1905-1988) with Architecture without Architects (publication and exhibition at the Museum of Modern Art in New York (1964).

At the same time, interest in the protection of historical monuments grew, and a wide variety of regionalisms developed. The tendency to creatively combine reflection on local building traditions with modernity continues to play an important role in architecture and urban planning worldwide. One of the most important contemporary trends, the so-called ›informal‹ settlement building, in turn seems to be inspired by vernacular principles (cf. among others Cantacuzino, S. 1985; Cantacuzino, S. 1989; Frampton 1996; Steele 1997; Ribbeck / Padilla / Dahman 2002; Piesik 2017; Lepik 2013; Dethier 2020). As to the Global South, one may further think of pioneers of International Modernism, such as Otto Königsberger, Yona Friedman, or John Turner, and of architects such as Hasan Fathy in Egypt, or the aforementioned Charles Correa in India and Roger C. Fisher in South Africa.

Sustainability Development Goals

The 2030 Sustainable Development Agenda adopted by the United Nations in 2015 combines 17 goals, one of which addresses urban life and development: »Make cities inclusive, safe, resilient and sustainable« (goal Nr. 11: https://www.un.org/sustainabledevelopment/cities/ [23 May 2022]).

With regard to this paper, the goal target Nr. 11.4 is of singular interest: »Strengthen efforts to protect and safeguard the world's cultural and natural heritage.« For one thing, it refers to the official protection of architectural monuments and urban ensembles as embodied by international, national and regional organizations, both public and private, ranging from UNESCO, and the respective national trusts such as the Commission nationale du patrimoine et de l'architecture in France, or the Deutsches Nationalkomitee für Denkmalschutz in Germany. Accordingly, the Bundesstiftung Baukultur (German Federal Foundation for Building Culture), on the occasion of its recent official public meeting early in May 2022, proclaimed the necessity of a »Neue Umbaukultur« (»New Conversion Culture«) based on an intensive building culture education »Potsdam Resolution of Building Culture Education« adopted during the above mentioned 2022 meeting (https://www.

bundesstiftung-baukultur.de/presse/detail/auf-dem-weg-zu-einer-neuen-umbaukultur-konvent-der-baukultur-2022-in-potsdam [30 May 2022]).

International Urbanism: examples from Stuttgart

With respect to architectural education, the SDGs highlight a vital phenomenon of uniting people. A Stuttgart perspective for instance may well start as a local one, but, perceived in a comprehensive way, would soon transcend the local realm and become global or rather ›glocal‹.

Teaching experience shows that this is true not only for Stuttgart students when addressing planning tasks located in other parts of the world including the Global South.

At the Faculty of Architecture and Urban Planning of the University of Stuttgart, the first courses of International Urbanism were initiated by Professor Lothar Götz in 1968. Inspired by the pioneering work of Otto Koenigsberger (1908-1999) and his innovative course on Tropical Architecture (established at the Architectural Association in London in 1953; see, e.g., Wakely 1999), Götz and his team undertook the first study and research projects on tropical architecture with excursions to countries in Africa, South Asia and South America (cf. Götz 1993; on the occasion of the Emeritus Ceremony of Lothar Götz in 1993, Koenigsberger, as a special guest, was awarded an honorary doctorate). Ulrich Malisius, who in 1978 did his diploma thesis under the supervision of Professor Götz, for instance, in 1987 himself contributed to the project of an open-air theatre and training centre of the National Ballet of Tanzania in Bagamoyo, a design based on local materials and construction techniques such as »coral stone walls, roofs made of palm leaves, and the roof truss made of logs connected with ropes« (Malisius in Götz 1993, p. 84). (image 07)

07 Open-air theatre and National Ballet training centre in Bagamoyo, Tanzania
(see Götz 1993, p. 83)

A ›glocal‹ perspective applies equally to international students who focus on planning tasks in Germany or the Stuttgart region. Students of international study programmes such as IUSD (Integrated Urbanism and Sustainable Design) and MIP (Master of Infrastructural Planning) offered at the University of Stuttgart, for example, soon realize that, in spite of their different backgrounds, they share common planning tools, methods, and graphic language patterns. They also share common topics, common tasks, common goals.

This reflects the postulate mentioned by Roger C. Fisher that »architecture is an innate and shared human enterprise«. Reminding of »the universal language of architecture itself«, Fisher underlines that »architects share a common way of representing buildings on paper. We take this for granted but architectural representation is an acquired language. We merely have to look at the way buildings have been depicted in other eras to verify this fact. This very fact unites the architectural endeavour globally and makes it an internationally tradable skill and art.« (Fisher 2021, p. 292).

Eventually architects and students truly committed to their profession have proved that they may provide conclusive and often refreshing approaches to local tasks in places other than their native region or countries – for instance, in Stuttgart.

08 IRD Students' Newspaper Stuttgart am Neckar, 2017, front cover (Copyright: University of Stuttgart, Chair of International Urbanism).

09 IRD Students' Newspaper Stuttgart am Neckar, 2017, page 20: map of cultural monuments and facilities in the Stuttgart Neckar Valley (Copyright: University of Stuttgart, Chair of International Urbanism).

For the sake of illustration, one example from Stuttgart may suffice. In the summer of 2017 the course Integrated Research and Design / IRD (as part of the international M.Sc. Integrated Urbanism and Sustainable Design) marked the kick-off for the inter- and transdisciplinary research project WECHSEL (German for »Change«). WECHSEL (2017-2019, funded by the German Federal Ministry of Education and Research BMBF / Bundesministerium für Bildung und Forschung within the framework of the social-ecological research focused on the topic of »Sustainable Transformations of Urban Areas«; see https://international-urbanism.de/research/wechsel/ [16 May 2022]) examined spatial aspects of the energy systems transition (Energiewende in German). The Stuttgart Neckar Valley provided an instructive case study of exploring the possibilities of reconfiguring the existing energy infrastructure in favour of a high-quality urban and landscape development alongside the river bank. Coupling research, teaching, participation and communal policies of the Capital City of Stuttgart, the project pursued an integrative approach combining urban development with mobility and energy production and storage.

Within the framework of IRD and WECHSEL, 22 international students devoted their passion to analysing the Stuttgart Neckar Valley. Delving into the genius loci, they developed improvement strategies, experimental concepts and temporary place-making activities (see: https://international-urbanism.de/media/stuttgart-am-neckar-2017-iusd-newspaper/ [16 May 2022], see e.g. pp. 20, 21, 26-27, 28). Addressing the awareness of the Neckar River, one project suggested to contextualize the local public transport map by introducing the river course similar to cities such as Paris or London. The proposal was taken up by the Stuttgart Public Transport Association VVS / Verkehrsverbund Stuttgart to enhance, as a first step, the bus routes map (see: https://download.vvs.de/SSB-Busliniennetz_A0.pdf [16 May 2022]).

Atelier Parisien d'Urbanisme

The above-named research project WECHSEL consisted in a temporary urban development think tank. In the view of long-term inter- and transdisciplinary approaches, though, there is need for permanent units aiming at strengthening the bonds between the vertical levels of policy making, administration, planning, and civil society.

Amongst the most prominent examples of the latter format features the French APUR, l'Atelier Parisien d'Urbanisme (https://www.apur.org/en/about-us [2 June 2022]). Cherishing architectural and urban heritage is also key to its inter- and transdisciplinary strategy. APUR was established by the Conseil de Paris back in 1967: Six years after the now iconic pamphlet by Jane Jacobs, The Death and Life of Great American cities (1961) and five years after the ›Loi Malraux‹ of 1962, by which then Minister of Culture André Malraux devised the cautious urban renewal of the Marais district in Paris (see e.g. Hirsch 2016).

APUR is a unique interdisciplinary think tank and planning unit that proved very successful as a strategic platform for research, strategic planning and a culture of dialogue between key players in politics, administration, business, infrastructure (energy, supply and disposal, transport), planning and civil society in Paris and the Paris metropolis. Currently, APUR has some 27 partners and shareholders (including the City of Paris, the Préfecture de la région Île-de-France, the Direction

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Régionale et Interdépartementale de l'Equipement et de l'Aménagement d'Ile-de-France, the Ministère de la Culture, the Métropole du Grand Paris etc.). Its interdisciplinary team of about 80 professionals conceives long-term adaptive urban (re)development concepts (by 2001, about a quarter of Paris had been renewed, including numerous industrial and infrastructural brownfields). APUR has initiated the conversion of historic buildings, reclaimed urban space and curbed the predominance of automobile traffic, strengthened public transport and introduced the Vélib rental bicycle system. Since 2008, APUR has also been studying the areas of Greater Paris and the future Métropole du Grand Paris, including sustainability, climate adaptation and digitalization.

One of the most remarkable APUR projects is the Coulée Verte (green corridor) in south-eastern Paris, consisting of the Viaduc des Arts with the Promenade Plantée and the park at the Quartier Reuilly. It is the first project of international renown to have successfully converted and integrated a major former railway infrastructural complex into a contemporary urban development. The Coulée Verte has inspired too a project in Stuttgart, the so-called Stuttgarter Gleisbogen (see Klegraf ed. 2014; http://gleisbogen-stuttgart.de/fr/le-gleisbogen-de-stuttgart-larc-ferroviaire-de-stuttgart/ [3 June 2022]).

CONCLUSION

Thoughts on classical attitude and its notions of tradition and modernity

Although such balanced approaches exist throughout much of the world, past and present, and thus seem to have a universal aspect to them, they seldomly appear to get the appropriate public credit.

Mentioning some reasons lying behind this situation, Georges Cantacuzino points out that »[i]f we take a brief look at the ancient past or at times closer to us, we quickly become aware that this attitude of balance, harmony and serenity tends to manifest itself incessantly. Nevertheless, it usually must assert itself against archaic prejudices, against naturalistic reactions, against romantic crises or against the principles of positivism.« (Cantacuzino 1940, pp. 57).

Another reason may be the lack of a universally acknowledged label or brand: Terms such as ›hybrid modernism‹, ›heterodox modernism‹ and ›moderate modernism‹ may be used as synonyms or close to ›classical attitude‹ and ›classicism‹. To quote again Cantacuzino:

» [C]lassicism would be a mental balance between personality and tradition, an attitude of serenity of the present between the known, judged, comprehended past and the intuitively suggested, prepared, provoked future. By classicism, therefore, we do not understand a style, nor a development of styles, nor a relationship of formal languages; by classicism we understand an ethical attitude.« (ibd.).

A further reason might be that ›hybrid modernism‹ or ›classical attitude‹ is rather a complex phenomenon, with a tendency, not towards revolution, but towards pragmatism and common sense, that is, towards reform. This implies that the notions of history and modernity are carrying

on a dialogue, or, to put it in the words of French philosopher Edgar Morin: a »dialogic« (Morin 1988, p. 127).

This ›dialogic‹ relies on the notion of history and tradition as process, with the notion of historiography being rooted in a striving for authenticity by virtue critical contextualisation and detecting facts, whilst rejecting any ideological instrumentalization.

Among the many historians and intellectuals who share this notion, one may think of Marc Bloch and Montesquieu. Marc Bloch advocated the concept of »critical science of historical change […] in the age of the theory of relativity and quantum mechanics« (Schöttler 2006, pp. 242-243). And Montesquieu, in his Spirit of Laws, a major contribution from Bordeaux to Enlightenment and democracy, pointed out that »[t]o apply the ideas of the present time to distant ages is the most fruitful source of error« (Montesquieu 1952 [1748], p. 276). And Marc Bloch cites »an old Arabic proverb […]: ›Men rather resemble their own time than their fathers.‹ For want of meditating on this Eastern wisdom, the study of the past has sometimes been discredited.« (Bloch 1993, p. 89).

At the same time, this ›dialogic‹ includes a conception of modernity that is open towards history. Hans Ulrich Gumbrecht, the German philosopher, for instance states that nowadays, with respect to shaping the future, what had once been the compelling force of tradition as an indissoluble entity has been replaced by »the commitment to making critical choices« (see Gumbrecht 1997, p. 131).

This echoes the conception of ›modernity‹ advocated by Charles Baudelaire (1821-1867) in his Painter of the modern life: »Modernity is the transient, the fleeting, the contingent; it is one half of art, the other being the – eternal and the immovable« (Baudelaire 1863).

Today, such a balanced approach of ›hybrid modernism‹ or ›classical attitude‹ only gains in topicality – and maybe in attractivity too, the more so since it aspires, as Paul Valéry admirably puts it in his Eupalinos (1923), to »combine an analysis [...] with a rapture« (Valéry 1991, p. 60).

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XPLORING LOCAL PERSPECTIVES ON AREAS IN TRANSITION, SOCIO-SPATIAL ANALYSIS WITH NARRATIVE STORY MAPS

1-D-2

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Abstract

Planning and designing in an international context is a valuable part of current urban planning studies and aims at broadening perspectives in favor of new thought patterns that might trigger innovation. However, planning tasks in foreign contexts require a different methodical approach than this would be the case with tasks in one's familiar environment:
In addition to the impeded access to quantitative information about a planning area, collecting qualitative data can only be mastered by participatory processes involving local actors. Their perspectives and life stories can significantly contribute to the site analysis: By exploring the everyday routines and realities of the residents, including the subtleties of the cultural context, an understanding of social space production and specific transformation needs could be developed.

This paper examines how narrative formats can be used to explore and convey local perspectives on areas in transition. It is based on a collaborative project between the University of Stuttgart, Department of International Urbanism, Sultan Qaboos University in Oman, Department of Civil and Architectural Engineering and the citizen-led initiative Muscat Space Lab, Oman. During a multi-staged hybrid process, the cooperation partners co-produced knowledge about two areas in transition within the Muscat agglomeration, compiled this knowledge in the format of a neighborhood atlas, transformed it into narratives and visualized it with interactive story maps.

The project results show that storytelling with story maps proved to be a valuable method for integrating local perspectives into site analysis and thinking beyond well-known patterns. However, it became clear that the commitment of local facilitators is needed to provide sufficient access to information, ground location research in reality, and avoid falling back into superficial assumptions and stereotypes. Based on the outcome of this project, the article systematizes the potentials and problems arising from this methodology and gives recommendations for integrating local partners into the process.

Key words:

narrative mapping, site analysis, coproduction, transdisciplinary research, hybrid teaching

1. INTRODUCTION:

International agendas, such as the Agenda 2030 - the Sustainable Development Goal (UN, 2015), the New Urban Agenda (NUA) (UN HABITAT, 2016) or the New Leipzig Charter (2020) have emphasized the need for sustainable urban development. In Higher Education, this translates into a need for new ways of learning and the need to enhance collaborative forms of learning in the curricula, among others (Bina et al., 2016), intending to empower the next generation to understand better the complex urban challenges in order to be part of the solution (UNESCO, 2011). Thereby, competencies and skills such as systemic thinking, anticipatory and strategic competencies, as well as interpersonal competencies are seen as crucial (UNESCO, 2017). Specifically, in planning studies, international collaborations and practice-oriented and collaborative forms of learning are seen as ways to foster these skills and competencies (Fokdal et al., 2020). Practice-oriented learning takes a starting point in a real-life problem and facilitates an intense engagement with a specific local context and its actors. Therefore, it is increasingly seen as a way forward to bridge between global themes such as "climate change" or "sustainable development" and specific local context. Especially around the Sustainable Development Goals, the discussion on how to localize this global agenda and how to track changes on the ground has been vibrant. Among others, the dominance of rather "hard" indicators to monitor the local transformation towards more sustainability has been criticized (e.g. Ley et al., 2021). Increasingly a call for "softer" indicators and more focus on local perspectives and attention to narratives is gaining ground (e.g. Heiß, 2022). Along these lines, the department of International Urbanism at the University of Stuttgart tries to include practice-oriented and collaborative forms of learning in an international context as well as new methods into the curricula of urban planners and designers in order to prepare the next generation of students to respond to the multiple crises and challenges with a more sensitive and sustainable approach. This paper offers an insight into an international cooperation between Sultan Qaboos University in Oman, the Department of International Urbanism and the citizen-led initiative Muscat Space Lab. It showcases an example of how narrative formats can be used to explore and convey local perceptions, perspectives and everyday realities on areas in transition in Oman. Thereby we argue that this new method, as well as the international collaboration, could be a way forward in empowering the next generation of urban planners and designers to develop more sensitive and sustainable solutions.

2. SETTING THE SCENE – THEORETICAL APPROACH AND METHODOLOGY

2.1. The collaboration

The international collaboration focused on site analysis in two urban areas within the agglomeration of Muscat and was divided into several online and offline stages. The administration and organization of these urban focus areas and analytical themes were conducted online in a collaboration between the University of Stuttgart, the SQU and MCTspaceLab. The following data collection process was conducted on-ground with the support of MCTspaceLab, students from SQU, and community members of the two focus areas (Hay Al Maarifa community members and Harat Al Shamal community members). The data was then shared and distributed online during the next phase of the project.

The first stage of the project aimed at (1) identifying the working themes, (2) developing a digital database of information on the case-study sites and (3) identifying key interview partners. The

second stage of the project initiated a joint-digital workshop with the aim of developing a coherent knowledge base on the context and case-study sites through expert lectures from professionals on the ground and abroad who possessed a valuable knowledge of the context. Furthermore, this phase aimed to enable networks between the students from SQU and the University of Stuttgart with the two community groups in order to identify key interview topics and partners on-site. The third stage of the project was dedicated to a hybrid mode of data collection, whereas the fourth and final stage of the project was devoted to developing comprehensive neighborhood atlases and story maps.

Figure 1. Process of the project and involved actors, source:
Chair of International Urbanism, University of Stuttgart (2022)

2.2 Selection of the focus areas

The Sultanate of Oman, situated in the Arabian Peninsula, is one of the six members of the Gulf Cooperation Council (GCC). Similar to its neighboring countries, Oman went through a rapid urban development since the 1970s during the large oil boom in the Gulf region. This led to a rapid rural-urban migration as well as extensive internal labor migration to the capital city of Muscat. Together these phenomena led to rapid urban population growth and the transformation of Oman's capital Muscat into a car-based city. An increase in demand in the housing market was clearly visible. Due to being geographically restricted by the mountain foot and waterfront, Muscat experienced a linear growth towards the south. Starting from the historical port area Muttrah, the city has expanded linearly towards Al Batinah Wilayat. Furthermore, the royal decrees 81/84 and 125/2008 that allocate state-owned lands to Omani citizens for residential purposes through a land lottery system as a scheme for public welfare, encouraged the linear growth of the city and initiated urban sprawl (Nebel and Richthofen, 2016).

The urban development in older areas of the capital of Muscat differs from the newer development; nevertheless, it interlinks closely with current housing policies. In historic neighborhoods, a transformation process occurs concerning the population structure and the type of occupancy of the buildings. While many traditional Omani families are moving to the newly established settlements, the building stock in historic districts is increasingly rented out to migrant workers.

In order to gain a comprehensive overview of the diverse development, two sites across the city were chosen: Harat Al Shamal community in Mattrah and Hay Al Maarifa community in Al-Khoud 6. The selection was based in already existing relationships by involved actors and following criteria:

- the possibility to work on multiple scales and territorialities

- the possibility of studying the socio-spatial aspect of urban development

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- the possibility of analyzing contrasting views on the urban development process in Muscat (old and new)

- digital accessibility to the site

- physical accessibility to the site

- potential active collaborators on-site and willingness for them to collaborate

Furthermore, both sites have changed significantly in recent years - each in its own way - and are therefore prototypical for socio-spatial transformation processes in the Muscat metropolitan area. Harat Al Shamal, a neighborhood in the historic port area of Mattrah, and Al-Khoud 6, a neighborhood that has developed out of the land lottery system. These two neighborhoods differed in the process of their urban development, land management and administration, social-spatial development and social capital. Harat Al Shamal provided the opportunity to work on a small scale, on the development of context-sensitive urban upgrading measures in the neighborhood. Al-Khoud 6, on the other hand, provided the opportunity to work on a macro scale of strategic development of public space management, bottom-up governance and participatory development.

Faced with the challenge of not being able to visit Muscat in person before the start of the project, a hybrid mode of data collection was introduced. This mode required dedicated local partners who were not only interested in conducting the data collection process but also assisting in data analysis and interpretation of context-sensitive information. MCTspaceLab and students from SQU were these partners. Furthermore, the physical accessibility to the site by MCTspaceLab and SQU students was crucial, just as possessing an active knowledge of the community was essential to conduct interviews for narrative mapping.

2.3 Socio-Spatial Analysis and Narrative Story Maps

In the third stage of the practice-oriented teaching project, emphasis was given to socio-spatial analysis. A socio-spatial perspective (SSP) conceptualizes the interrelationship between social and spatial structures, taking into account a) global and local networks and their social-ecological interactions, b) temporal factors and c) multiple scales and territorialities (Jessop, Brenner and Jones 2008). The socio-spatial approach to urban analysis is based on the belief that physical space and social interaction function both as a product and a generator of change (Gottdiener and Budd, 2005). It emphasizes the interdependence between the creation and appropriation of spaces and the relationships and practices between actors and institutions (Maschke and Wellnitz, 2019).

As part of our joint project, this analytical lens was supplemented by the approach of narrative mapping. More of a method than a theoretical approach, mapping serves both to depict the existing reality in its complexity and to change the perception of this reality through the inevitable selection and interpretation of socio-spatial information (Corner, 2009). In the context of urban transformation, mapping unravels relational problems and can, as such, be seen as a spatial practice in itself (Kitchin and Dodge, 2011). By acknowledging this non-neutral status of mapping, whose data representation is always characterized by a proportion of non-objectifiable information distortion by the originator, mapping can be used as an instrument for granting agency (Corner and MacLean 1996). Narrative mapping, in turn, has the potential to personalize this agency and give actors a voice. It is based on a multi-staged process relating autobiographical narratives to spatial situations, revealing inherent

framework conditions and collective trajectories (Maschke and Wellnitz, 2019). Within this process, it has the potential to combine visual analytics with critical cartography, the former being primarily related to quantitative data representation and the latter to reflexive qualitative information assessment (Roth, 2021). This conceptual tension and hybrid character provide room for application in transdisciplinary research and design, linking insights of analytical reasoning to tangible human experiences.

In addition to socio-spatial and narrative mapping approaches, this project integrated the method of storytelling through interactive story maps. Conceptually this implies that information is structured in a temporal pattern that the recipient of the information can influence. Storytelling is used as an a) organizing system of information that b) deliberately shapes the specific meaning of information through its dramaturgy (Roth, 2021). The story map integrates local experts' subjective perspectives and life stories into coherent narratives through its dramaturgical storyline, adding context and depth to an otherwise abstract topic.

2.3 Analysis and visualization tools

The socio-spatial analysis was supplemented in the final phase of the project, with the students first compiling information about their focus areas into a neighborhood atlas and then creating interactive story maps. For the purpose of the neighborhood atlas, the teaching team provided the students with a specifically developed analysis tool aimed at defining overarching topics of analysis while at the same time operationalizing them into individual components (see Figure 2).
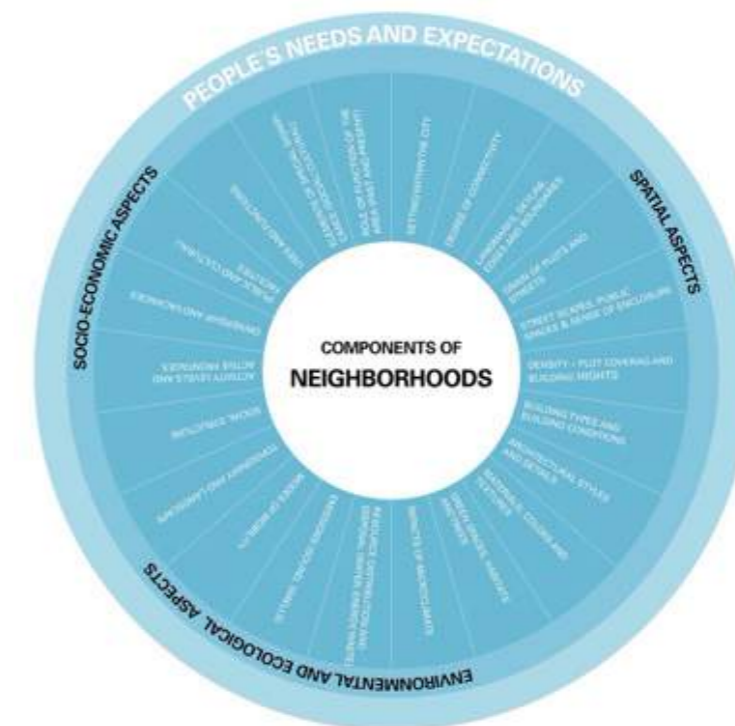
Figure 2. Atlas of Neighborhood Components, source: Chair of International Urbanism, University of Stuttgart (2021)

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This step of the analysis and the Atlas of Neighborhood Components tool addressed quantitatively ascertainable aspects of the focus area. The students used literature and databases as well as the information, image and video material provided by Muscat Space Lab to investigate and assess these quantitative data. In addition, surveys were carried out in cooperation with the students of the SQU, which also led to a contribution of quantitative information to the neighborhood atlas.

As a further step, qualitative aspects were collected and analyzed through the collaboration with the community and used to develop a narrative storyboard, which formed the conceptual basis for creating interactive story maps. These storyboards were then again discussed with local experts to check whether their socio-spatial content corresponds correctly with the situation on-site. This feedback loop preceded the creation of the story maps, which were then produced with the application ArcGIS StoryMaps developed by the geospatial software provider esri.

3. RESULTS

As a result of this multi-staged, collaborative process, the student groups created a total of three neighborhood atlases and narrative story maps for the Al Khoud 6 area and two atlases and story maps for the Harat Al Shamal area. The following subchapters provide examples of the results of a group of students who engaged with the focus area of Harat Al Shamal in Muttrah.

3.1 Harat Al Shamal Neighborhood Atlas

The neighborhood atlas's focus consists of presenting the environmental, ecological, spatial and socio-economic aspects, which were embedded in the context of the area's historical development. A combination of maps, sketches, diagrams as well as written descriptions highlights essential key points of the socio-spatial change in the area.

Figure 3. Example page from the Harat Al Shamal neighborhood atlas. Source: Chair of International Urbanism, University of Stuttgart (2021), created by Alice Fleury, Madita Goll, Paula Marchart, Lea Pfeiffer and Lilli Selcho

The compilation and reflection of the data in a digital neighborhood atlas format was an essential intermediate step toward assessing the site's situation. Building on this quantitative data processing, additional interviews with local partners were conducted, which formed the basis for the work on narrative story maps about the area.

3.1 Harat Al Shamal Narrative StoryMap

The narrative story map format was used to present the Harat al Shamal neighborhood from the perspective of various fictional characters. The characters used are derived from the analysis of the district's socio-economic data. Each of the characters presents the respective living conditions from a specific point of view, thereby processing the results of the qualitative interviews.
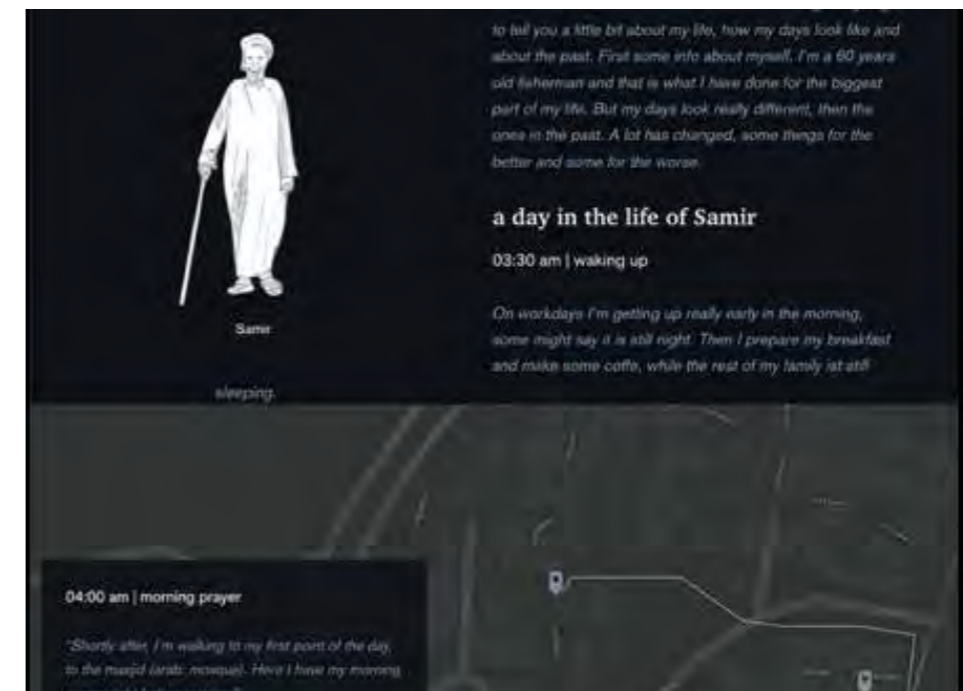
Figure 4. Screenshot from the Harat Al Shamal story map, created by Alice Fleury, Madita Goll, Paula Marchart, Lea Pfeiffer and Lilli Selcho, source: https://storymaps.arcgis.com/stories/f4aac81e8d-d247cbb2b53a4eacf9e204

A total of five different character types were used in the story map, which are intended to reflect the population and user structure of the district. In addition to protagonists from the environment of traditional Omani families, migrant workers were considered and depicted as well as tourists visiting the site. Furthermore, different age groups and genders were taken into account when selecting the protagonists. Each of these characters presents a fictional day in the neighborhood from his or her perspective. This dramaturgical framework links the protagonists' life stories both geographically and timewise.

In addition to personalized information, a variety of statistical and geographical data is integrated into the narratives of the respective characters, resulting in an overlay of qualitative descriptions and quantitative data in the story map format. The aim here was to combine this quantitative data

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with the people's life stories on-site, thereby increasing and illustrating its meaningfulness.
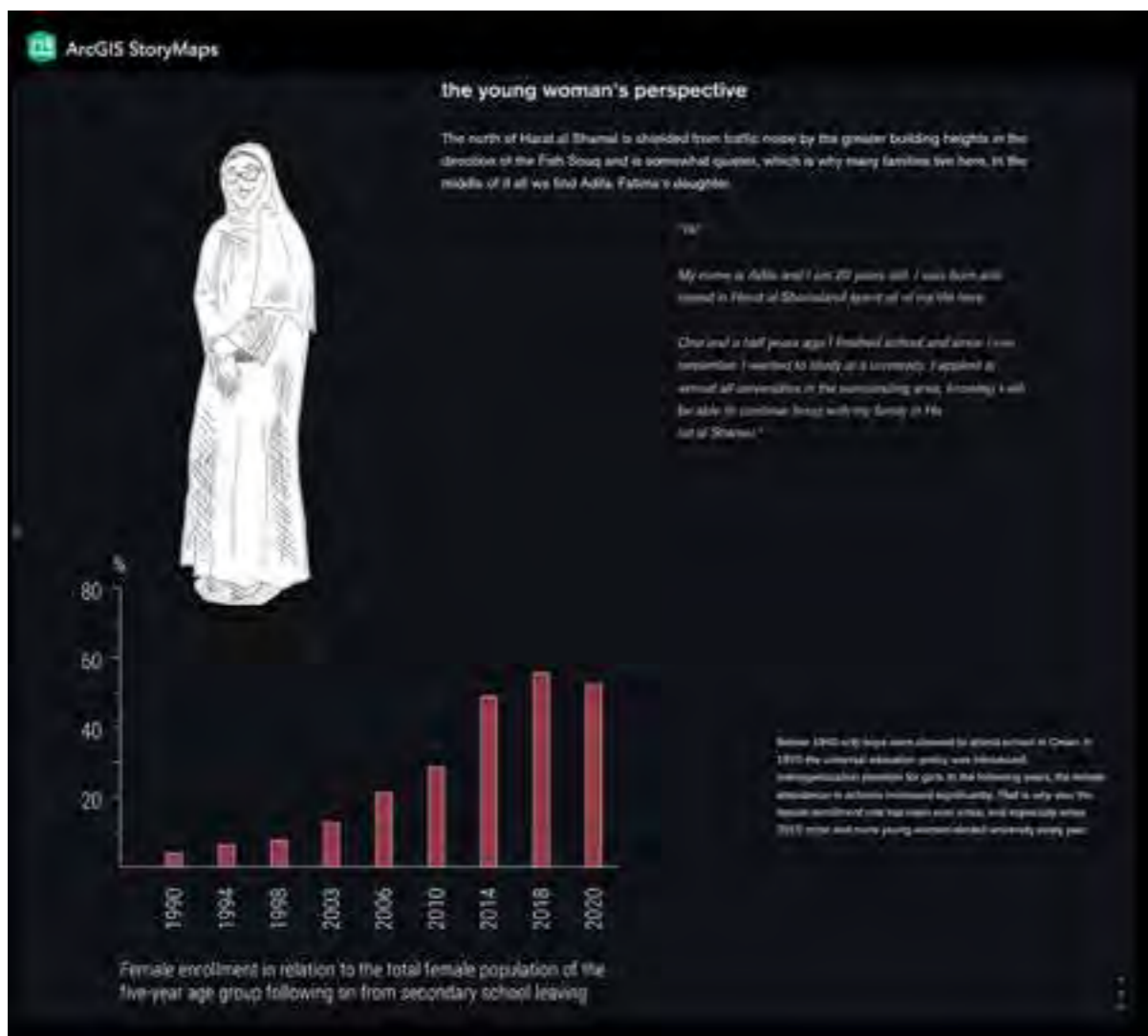
Figure 5. Screenshot from the Harat Al Shamal story map, created by Alice Fleury, Madita Goll, Paula Marchart, Lea Pfeiffer and Lilli Selcho, source: https://storymaps.arcgis.com/stories/f4aac81e8d-d247cbb2b53a4eacf9e204

The story map and its dramaturgical framework intend to give the reader a holistic picture of the neighborhood by merging different perspectives and forms of information. While individual details can be further explored and specific passages can be scrolled back and forth, the story map enables the reader to explore the protagonists' "lifestories" playfully and flexibly.

4.   DISCUSSION

As aforementioned, international collaborations and practice-oriented collaborative learning forms are crucial to fostering anticipatory, strategic and interpersonal competencies in planning studies (UNESCO, 2017). To achieve collaborative forms of learning, it was essential to have partners on board who were competent in terms of content and had an interest and a broad social network within the chosen location. Regarding the practice-oriented focus, it was crucial to identify and work with active stakeholders of the selected site to pick up on existing neighborhood development challenges and facilitate intense engagement with local actors who can potentially carry the discussion forward. This has especially relevance when focusing on skills and competencies that are significant to push forward the transformation towards a more sustainable future. Practice-oriented learning formats, for example, enhance interpersonal competencies and increase awareness of the co-existence of diverse perspectives and opinions (UNESCO, 2019).

As an example, each actor group in this collaboration constellation possessed distinctive roles, thoughts and responsibilities:

- The University of Stuttgart took up the role of online administration, alignment of time-frames, organization of the themes, identifying appropriate case-study research sites, providing theoretical knowledge guidance through the different stages and guidance to the students during the development of their story maps. In this endeavor, they were supported by the SQU staff members.

- The SQU staff members complimented the process by identifying potential expert lecturers and cross-checking information collected from the site in order to develop an online data base. Furthermore, they supported the students during the joint-workshop by providing consultations and constructive feedback.

- MCTspaceLab took up the central role of identifying possible experts for providing input lectures and identifying individuals for expert interviews. Furthermore, they were responsible for preparing detailed walk-through videos to mimic the experience of being on-site, which was complemented with detailed photo documentation.

- The Hay Al Maarifa community and Harat Al Shamal community members engaged in taking part in completing surveys and being present for in-depth interviews with the students during the data collection process.

- Additionally, the SQU students further complemented the data collection process by supporting the students from the University of Stuttgart in conducting interviews on-site, developing surveys and adding to the photo documentation of the two sites.

- The students from the University of Stuttgart were responsible for the hybrid data collection process, data analysis and, finally, data synthesis into the interactive story maps.

To augment the collaboration on eye level, constant communication, feedback loops and co-dependency on each other were prevalent during all stages of the project. Yet, the main challenge in this multi-stakeholder collaboration was to get each of the involved actor groups to understand their role and responsibilities in a generic manner and to get the respective roles to evolve with the collaboration.

The collaborative and practice-oriented approach applied here, further fostered systemic thinking by all involved actors. Thereby, the analytical components defined in the Atlas of Neighborhood Components (socio-economic, spatial, environmental and ecological) with a special focus on people's needs and expectations were investigated on multiple analytical scales (macro, meso, and micro). Further enhancing the competencies of systemic thinking, the project tried to localize themes defined in the global agenda, such as the SDGs, in a participatory manner. This led to community members

becoming aware of the global agenda and of the importance of addressing some of these issues, such as land management, social cohesion, and an awareness of the active role a community can play in the transformation of their neighborhood. In addition, indicators for public spaces - for example - were critically reflected, and a more sensitive approach was developed through the narratives and story mapping. As the results show, socio-spatial analysis, a comprehensive neighborhood atlas and the inclusion of narratives into story maps proved to be a valuable approach to moving beyond "hard" indicators and to gaining a better understanding of the local context and people's needs and expectations.

5.   CONCLUSIONS

The new method of story mapping and including narratives in the socio-spatial analysis was a helpful way to develop a more sensitive approach to understanding the local context and the dynamics of the two areas in transition. Even though international collaborations and practice-oriented learning have proven very efficient in enhancing skills and competencies, equipping students and community members to become active players in the transformation towards a more sustainable future, these formats also bring several challenges. Some of them have been addressed here, such as the need and possibility for continuous feedback loops between different actors. In addition, we also want to point to some of the more structural challenges related to international collaborations in Higher Education: A significant challenge consisted of the difficulty of aligning timetables of different study programs. Another challenge was the restriction to the digital realm due to the pandemic situation. The online teaching mode also presented the challenge that the students have weaker social ties with each other, which can have a negative impact on the intensity of group work.

Further, we want to capture a set of observations related to the different roles of involved actors and related challenges in practice-oriented teaching formats. These observations seem to have relevance beyond this specific project and deserve further investigation in order to be able to draw lessons learned.

•   From "enablers" to partners: The main challenge in our case was to move away from the local partners only providing data – enabling our design process - towards a true collaboration on eye level. This is not a new topic in the discussion; nevertheless, it still deserves attention.

•   Local partners as implementors: It is a key criterion that a collaboration with the local partners is reached in order to ensure that the results developed during the joint workshop and mapping have relevance for the local context and are actually taken forward in the future development of the area. Only with local partners on board can the collaboration actually have an impact in terms of perceiving a gap and internalizing the that leads to action (UNESCO, 2019).

•   International partners as mediators and brokers: international collaborations in higher education are often shaped by the political environment and the local space for negotiating urban development. Here, not just students and the local communities become aware of the different perspectives at stake but also actors from the public and private sectors who are involved. In the case described here, the international collaboration put pressure on the public sector to deliver in one case, and in the second case to become a listener to the needs and expectations of the local community.

These observations are relevant and essential to be aware of when engaging in international collaborations and practice-oriented learning processes. Finally, the methodology of creating a neighborhood atlas and a story map based on quantitative and qualitative data needs further testing in a different context in order to enhance our understanding of how this approach can support the development of 'softer' indicators for localizing the SDGs or more generally global agenda-setting. Nevertheless, narrative story maps are deliberately interpretive, and as such they should be subject to careful consideration and responsible cross-checking by local partners.

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INTERDISCIPLINARY RESEARCH IN ARCHITECTURE: THE PRACTICE OF ECO-PHILOSOPHICAL THEORY IN CONTEMPORARY CHINESE ARCHITECTURE

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Abstract

Architecture is not simply a discipline that focuses on spatial plastic design. It encompasses many interdisciplinary studies. The architects need to consider the methods to respond to the global climate, social environment, and the local cultural context. In the 21st century, in particular, the global environment is changing rapidly thus, the current concepts of architectural design and education are no longer relevant to the present. They need to change with the times. Furthermore, China has a large market for architectural practice, which provides a platform for not only foreign but local architects to experiment with various practices. This paper aims to discuss how architectural practice can respond to and reconcile contemporary issues such as man and society, man and the natural ecology, in the context of global change. The ecological philosophy is a theoretical reflection that guides the design practice of contemporary Chinese architects. The first approach of this paper is to discuss the definition of eco-philosophical architecture, and secondly, to focus on the architectural works and theoretical practices of architects such as Wang Shu, Liu Jiakun, and Chang Yungho as paradigms of this doctrine. The results of the study show that eco-philosophy is practiced through various aspects of the material, space, site design, and so on. At the meanwhile, under this doctrine, architecture is no longer an isolated object, but must be discussed in the context of the urban environment in relation to the changes in the social and ecological systems.

Key words:

Ecological philosophical theory, The unity of man and nature, Taoism Nature, Materials, Contemporary Chinese Architects, Architectural Practice

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INTRODUCTION:

From the conceptual planning stage, we usually imagine the architecture as a whole and tend to its artistic plastic creation. Whether a church in the West or a stately palace in the East, architectural aesthetic importance is embodied in architectural form. That is, in classical architecture, visualism has largely dominated the development of aesthetics. However, the 20th-century modernist masters, represented by Le Corbusier, abandoned classical aesthetics and advocated the adaptation of architectural design for an industrialized society. As a result, the study and integration of more practical functions, along with the economic costs of architecture have received emphasis. Thus, with the development of the times, architecture has become viewed as no longer a single discipline that focuses only on spatial form and spatial function. It is a discipline with rich connotation and extension, integrating varied characteristics of the humanities, natural sciences, and social sciences (Yu, Zhai, & Wang). Contemporary architectural practice and architectural education, then, should pay more attention to this embrace of interdisciplinary research and study, drawing upon the concerns and trajectories of the day.

Perhaps, one of the most important intersections at the present is that of the natural world/environment and society. Architecture should draw more from an ecological study according to the background of global changes. The topic of global climate and environmental change has been a major issue of concern since the 1990s. In June 1992 the United Nations Environment and Development Organization's (pivotal) "Earth Summit" held in Rio de Janeiro outlined issues of immediate environmental concern, including the accumulation of greenhouse gases (and thus industrial pollution control and energy policies), encroaching threats to biodiversity, and rampant deforestation (Taylor, 1992). Sustained population growth, as well as rapid industrialization and urbanization, have been cited as main instigators to these drastic changes in the global climate and ecology (Zhang, Uwasu, Hara, & Yabar). As a result, the problems of urban ecology have become increasingly serious. Moreover, the changes in the built and urban environment affect the sustainable development of humans and society, as well as humans and the natural ecology. In light of this, architects need to consider the methods necessary for responding to the global climate, social environment, and local cultural contexts while employing a cross-disciplinary mindset.

China, a nation positioned very much at the center of global transformation, possesses a large market for architectural practice, providing a rich platform for both foreign and local architects to experiment. China also possesses a rich ecology. Thus, its architectural design cannot escape the impacts of environmental change, which means architects must establish ways for their designs to respond to environmental changes. This also makes China become an ideal site for architectural practice.

This paper aims to discuss how architectural practice can respond to and reconcile contemporary issues such as relationships between man and society, and man and the natural ecology, in the context of global change. In this background, ecological philosophy as a theoretical reflection guides the design practice of contemporary Chinese architects. To do so, this study develops as follows. First, it focuses on Chinese traditional ecological philosophy theory based on Confucianism and

Taoism, which is based on "the unity of nature and man" and "Taoism nature". Next, it analyzes the application of this philosophy in architectural practice. This study selects three Chinese architects including Wang Shu, Liu Jiakun, and Chang Yungho as paradigms of this doctrine and contemplates their architectural works based on this Chinese traditional philosophy.

2. STATE OF THE ART

The interdisciplinary exploration of the ecological philosophy of architecture offers the main theoretical support for this paper, discussing the relationship between humans and nature among three disciplines: architecture, ecology, and philosophy. First, ecological philosophy is centered on the relationship between man and nature. Western philosophy has been engaged in sustained and enduring thought about the relationship between humans and the natural world. Contemporary Western ecological philosophy can be divided into two theoretical underpinnings for elaboration. One is instrumental theory, which regards nature as a tool for human survival and development, and the other is intrinsic value theory, which recognizes the existence of nature independently of human beings (Chen, 2020). These two types of theories consider the relationship between humans and nature at different levels from the perspectives of instrumentalism and intrinsic value theory, respectively. Phenomenology revisits the previous philosophical views on the opposition between man and nature with a subject-object dichotomy. In this context, the German philosopher Heidegger quoted Hölderlin's poem "Man dwells poetically on the earth". This serves as the best footnote for the relationship between man and nature in ecological philosophy (Liang, 2020).

In traditional Chinese culture, there exists a perspective equivalent to Heidegger's philosophy. In ancient China, philosophy originated during the ancient period, beginning in the Spring and Autumn period, and took on a prosperous stance during the Warring States period (Chen, 2017). The ancient philosophers, influenced by Taoism and Confucianism, explored and reflected upon the relationship between man and nature. They put forward the philosophical theories of "the unity of man and nature" and "Taoist nature" to explain that man and nature should live in harmony. At the present, although most modern ecological philosophical research is based on Western philosophical theories, Eastern philosophical theories still represent an ideological foundation for Eastern artists. Especially in the field of contemporary architecture, many architects do not merely copy and mimic the advanced western modern architectural system, but, rather, combine and blend western elements with eastern ecological philosophy in their architectural creation. In light of this understanding, the present paper examines Wang Shu, Liu Jiakun, and Chang Yungho and their representative works, and explores the practical value of architectural ecological philosophy through the analysis of architectural materials.

3. METHODS/THEORY REVIEW

"The unity of man and nature" is an important idea in Chinese traditional culture, which is expounded by both Confucianism and Taoism. Whether Confucianism or Taoism, the unity of man and nature forms related cultural psychology on the basis of the intimacy between man and nature. It advocates that man and nature are inherently one. The origin of this idea of harmony between man and nature can be traced back to the era of farming. Agricultural production is mainly based on farming, which

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is fairly dependent on its local natural environment and weather. Farming is especially sensitive to the four seasons and climate changes. Thus, in the traditional context, the cultural mentality of life interdependence was the "harmony between man and nature". The belief is that the natural life of man and the life of all things in the universe are coordinated and unified, with people pursuing a harmonious and intimate relationship with nature. Subsequently, a related cultural psychology formed, which was understood as the result of comprehending nature with poetic feelings, believing that human beings and nature are one body and a kind of affinity. To sum up, in the sense of cognition, the relationship between man and nature was understood as metaphysical. Moreover, this relationship was also understood as bound by a particular sense of ethics, wherein nature was to be revered to maintain symbiosis. Finally, this connection to nature also heavily impacted aesthetic senses, in which objects were seen to be imbued with human feelings (Zhu, 2005).

The concept of "Taoism Nature" comes from Laozi's Tao Te Ching. In Lao Tzu's view, nature is the fundamental law followed by Tao, heaven, earth, and man. The "Tao" in Taoism refers to the naturalness of heaven and earth, that is, the laws of nature. The concept of Tao reflects some important characteristics of the existence of natural things, and the development of things should conform to the nature of heaven and earth. To comply with the Tao is actually to put the laws of nature first.

From an ecological point of view, "Taoism Nature" requires people to conform to the natural world and follow the laws of nature when dealing with the relationship with heaven, earth, and nature, which is consistent with the basic proposition of modern ecology (Le, 2004). Ecology emphasizes the protection of the natural environment, and at the same time, it opposes the excessive development of nature. Taoism is the same with this mind. In Taoism, nature speaks of natural inaction. Inaction means not doing, not intervening. That is to say, Taoism requires one not to break the laws of nature, but to reduce damage to nature. In other words, it aims to achieve the greatest possible harmony between man and nature. For instance, architecture is not a single object. it is largely influenced by both people and its local environment. The unity of man and nature of the law of nature has a very tremendous impact on the existence of architecture. This ecological philosophy can be reflected in all aspects of architecture. Thus, it is important and necessary to investigate how traditional philosophy influenced contemporary Chinese architects' design.

4.   CASE STUDY DESCRIPTION

In this chapter, this study selects three architects including Wang Shu, Liu Jiakun, and Chang Yungho, and their representative architectural works as case studies to explore the embodiment of traditional ecological philosophy in contemporary Chinese architecture.

4.1.Wang Shu

ARCHITECT OVERVIEW AND HIS ECOLOGICAL IDEA

Wang Shu is an architect working in Hangzhou and is also the Dean of the School of Architecture at the China Academy of Art. He respects regional traditions, environment, and culture and is known in academia for his critical opposition to "so-called professional modern architecture without a soul".

Wang was awarded the Pritzker Prize for Architecture in 2012 and is the only Chinese winner to date. His architecture is timeless, deeply rooted in historical context, and cosmopolitan. Even if he won the highest honor in the architectural world, Wang Shu's architectural works did not increase with the increase in fame. He designs regional buildings with unique Chinese cultural flavor based on his architectural concept. One of Wang Shu's architectural philosophies is respect for historical value and his narrative of materials. Among them, the application of "tiles" in his designs is the best response to this idea.

Tile is the most common building material for traditional Chinese buildings. It is also a symbol of history, culture, and status. In traditional architecture, tiles connect people and people, as well as people and nature into meaningful wholes. Nowadays, with the acceleration of China's urbanization process, combined with the development needs of new cities, the old urban areas with ancient buildings and traditional dwellings have been forcibly demolished, resulting in heaps of abandoned tile "garbage". New materials are now used in place of these former tiles, which means that the recycling of traditional Chinese materials has become an urgent problem to be solved. In response to this, Wang Shu collects discarded tiles and combines them with new technologies in his modern architectural works such form as "Tile garden" and "Wapan wall (tile wall)" (Figure 1, 2). "Tile garden", an installation built at the Venice Biennale in 2006, is a form of roof built from abandoned tiles. Bamboo bridges for pedestrians are placed on the tiles for pedestrians to stroll across and experience. "Wapan wall" reflects a traditional construction technique and is a kind of wall made of mud, wood, brick, stone, tile, and other materials. Most of the tiles used in those structures are leftover from the demolition of buildings. Thus it can be seen that traditional craftsmen can uphold the concept of economical and sustainable development and the ecological concept of recycling waste building materials. Wang Shu, as an example, inherited the traditional construction skills of the "Wapan wall" and devoted himself to collecting the discarded bricks and tiles in the urban renovation to create a new "Wapan wall" that caters to modern aesthetics. To better understand this development, the present will now explore the application of these tiles in two particular Wang constructions, the Xiangshan campus of the China Academy of Art and the Ningbo History Museum.

Figure 1. Tile garden, Venice Biennale in 2006 (source: régine debatty, CC BY-SA 2.0 <https://www.flickr.com/photos/nearnearfuture/279969131>)

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Figure 2. Wapan wall (source: Siyuwj, the building designed by Wang Shu, CC BY-SA 3.0 <https://cre-ativecommons.org/licenses/by-sa/3.0>, via Wikimedia Commons)

Environmentally conscious architectural practices

To begin with, the building of the Xiangshan campus was constructed in two phases. The first phase was started in 2001 and completed in 2004. It consisted of 10 buildings and two covered bridges. The second phase, which started in 2004 and was completed in 2007, consisted of 10 buildings and two smaller buildings. Before the construction of the Xiangshan campus, Wang Shu had been collecting old tiles from old buildings demolished, which mainly in Zhejiang Province. During the first phase, he collected 3.3 million bricks and tiles, and by the end of the second phase, a total of 7 million old bricks and tiles of different ages were used across this campus (Di, 2012). For the first phase of the Xiangshan campus, it is difficult to find the architectural forms of "Tile gardens" and "Wapan wall", but Wang Shu's dedication to bricks and tiles can still be found in the details of the eaves of the buildings. In the second phase, however, the "Tile gardens" and "Wapan wall" were widely used as Wang's two architectural prototypes. The "Tile garden" is mainly used on the roofs of buildings, such as the roofs of Building No. 19. In terms of tile walls, Buildings No. 12, 14, 19, and others are widely reflected on their outer walls (Figure 3).

Wang Shu also applied this tile wall technology to the 24-meter-high wall of Ningbo Museum (Figure 4). From a distance, various bricks and tiles of different sizes and colors outline a landscape painting with a traditional Chinese flavor. The façade concept of Ningbo Museum can also be reminiscent of traditional landscape paintings. The whole architectural shape is taken from the "mountain" form of landscape painting, which is full of poetry.

Figure 3. Building No. 19, Xiangshan Campus, China Academy of Art (source: by author)

In a sense, tiles are one of many ways Wang Shu attempts to incorporate natural and cultural heritage into their designs. Clay tiles in particular are inherently land and local culture-dependent, and the history of this element is reminiscent of ancient Chinese architectural designs. Meanwhile, based on the Pritzker Architecture Prize award-winning comments, we can also recognize that:

"Wang Shu knows how to embrace the challenges of construction and employ them to his advantage… Using recycled materials, he is able to send several messages on the careful use of resources and respect for tradition and context as well as give a frank appraisal of technology and the quality of construction today, particularly in China. Wang Shu's works that use recycled building materials, such as roof tiles and bricks from dismantled walls, create rich textural and tactile collages."

Figure 4. Ningbo Museum (source: by author)

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4.2 Liu Jiakun

Architect overview and his ecological idea

Liu Jiakun is one of the most influential contemporary architects in China. After graduation, he did not immediately devote himself to architecture but studied writing and painting intensively for over 10 years. It was as late as 1999 that he devoted himself to his architectural career and established his own architectural office. He received many awards within a few years, including the Architectural Record China Awards for Best Public Building and Best Historic Preservation Building, the China Architecture Art Award, and the Asia Construction Association Honorary Award. He has been invited to exhibit and give lectures abroad, and his work has also received attention from architectural scholars all over the world.

The architectural designs made by both Wang Shu and Liu Jiakun are inseparable from the local context of China. If Wang's architecture is rooted in the specific regional culture of China's Jiangnan region, Liu's architecture is geographically established in China's central basin region. In particular, several of Liu's masterpieces can be found in Chengdu, Sichuan. He, like Wang, is skilled at creating works out of discarded construction materials. However, the circumstances of the two architects are totally different. While Wang's "Wapan Wall" was inspired by the demolition of the old city under the process of urbanization, Liu's design is a humanistic architectural creation under the social task of rebuilding due to the "Wenchuan Earthquake" in Sichuan. As a native architect of Sichuan, Liu Jiakun was deeply touched by the disaster. He mentioned that "the earthquake affected not only people but also buildings," and "although the collapsed houses were not designed by me, I still feel a responsibility". Returning to his architect's rationality, he approaches working on the post-disaster disposal of building ruins. He is concerned with not only the supply of the large quantities of building materials but also the post-disaster reconstruction work. Considering the two difficult problems of "debris disposal" and "building material supply" simultaneously, Liu invented "recycled bricks" (Figure 5). The basic principle of "recycled bricks" is to use crushed ruins as aggregate, mix them with cut straw as fiber, and add cement and other materials. Then it was made into lightweight blocks by the local brick factories in the disaster area. The "recycled bricks" are not only a material regeneration of waste materials but also a spiritual and emotional regeneration of post-disaster reconstruction.

Figure 5. Recycled brick. (Source: Jiakun architect https://www.jiakun.com/project/detail?id=25>)

As mentioned above, the original purpose of «recycled brick» was for post-disaster reconstruction. However, with the gradual completion of post-earthquake reconstruction work, this form has gradually diminished the need for earthquake emergency rescue. Today, «recycled bricks» are entering a wide range of environmentally sustainable products as «recycled materials from demolished buildings». They are gradually diversifying. These include permeable substrates, permeable floor tiles, load-bearing bricks, hollow wall bricks, facing bricks, etc., which have been used in urban public construction. Liu Jiakun also used these recycled bricks for his subsequent projects, such as the Shuijingfang Museum and Xicun Beisen Compound.

The Shuijingfang Museum is located in the Shuijingfang Historical Culture District of Chengdu and is surrounded by preserved residential buildings. Within the site are ancient wells, gatehouses, and a wooden roof-framed brewing production workshop from the Republican period. Here are also located the ruins of a Yuan Dynasty wine cellar, among other heritage sites. The Shuijingfang Heritage Museum is a liquor-themed museum to showcase the long history of the Shuijingfang district. This building is based on the scale of residential buildings and uses small aggregated volumes to stitch together the texture of the adjacent historic district. The main color of the whole building is grey, and the grey bricks with fair-faced concrete create a strong historical atmosphere in the museum. Meanwhile, the use of «recycled bricks» can be found in this complex. As shown in figure 6, the wall is built of «recycled bricks», which combined with bamboo, creates a serene architectural atmosphere bathed in sunlight. The façade is made more vibrant by the texture of the "recycled bricks".

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Figure 6. Recycled brick in Shuijingfang Museum. (Source: Jiakun architect <http://www.jiakun.com/ project/detail?id=11>)

Xicun Veisen Compound is at 1 North Beisen Road, Chengdu, Sichuan. The site covers an entire block that measures 237 meters from east to west and 178 meters from north to south. This place was used for a golf course and a natatorium. However, Liu redesigned it by using the concept of the compound for the community sports center. This design refers to the space prototypes of the collective living mode proposed under the background of the planned economic revival during the 1950s to 1980s. The architect attempts to transfer this idealistic collectivism into the current contemporary context. Therefore, the project using the form of the compound synthesizes collective memory, vernacular characteristics, and the modern lifestyle. It provides a contemporary arena for diversified lifestyles in modern cities. With the promotion of «recycled bricks» in public buildings, this material has been applied in this compound in several ways: the outer wall, inside wall, landscape paving, courtyard walls, etc. The recycled brick processing method exposes the internal aggregate of the recycled brick, which becomes a unique material expression. In this way, it meets environmental protection requirements as well as makes this architecture with strong local material characteristics.

4.3.   Chang Yungho

Architect overview and his ecological idea

Chang Yungho is a well-known Chinese architect. He works as one of the jury members of the Pritzker Prize, the highest award in architecture. Unlike Wang Shu and Liu Jiakun, Chang Yunghoh has experience studying abroad. He completed his master's degree in architecture at the University of California, Berkeley, USA. Therefore, his design ideas have been influenced by foreign cultures to a certain extent. Chang is an architectural educator as well as the chief architect of a very architectural studio. He teaches architecture at several universities and shares his ideas about architecture. His works not only have the characteristics of Western architectural design but also shows the

inheritance of traditional Chinese architectural culture. Meanwhile, he put forward his ideas for future ecological architecture, which can be embodied in the use of building materials. Among them, in his ecological bamboo courtyard house works, the use of «bamboo» not only inherits the tradition but also becomes an example of Chinese ecological architecture.

Environmentally conscious architectural practices

Bamboo Housing is one of Chang Yungho's proposals for future residences. This house was not built, but we can still find the architect's ecological mind through this design. Bamboo Housing emerges from the context of ecological and future dwellings. It consists of three layers of walls. The outermost wall layer is made of bamboo and translucent solar panels, with the solar panels on the outside and the bamboo on the inside. The second wall layer is the outer wall of the inside building. It is placed between the courtyard and the residential space. This wall has varied thicknesses set with a variety of materials. The different layers of the wall can be combined at will depending on the season and climate. The third wall is the air wall in the center of the interior in the shape of a cross. This wall is transparent, and a small water courtyard is hidden inside the wall. As a whole, the courtyard, the surrounding bamboo walls, and the core water inside the house constitute a small ecological environment (Figure 7). The courtyard and bamboo walls can adjust ventilation and lighting. The roof is designed with a slope in order to collect rainwater and gather it towards the internal pool. In other words, the pool can also regulate and improve the humidity of the air to a certain extent.
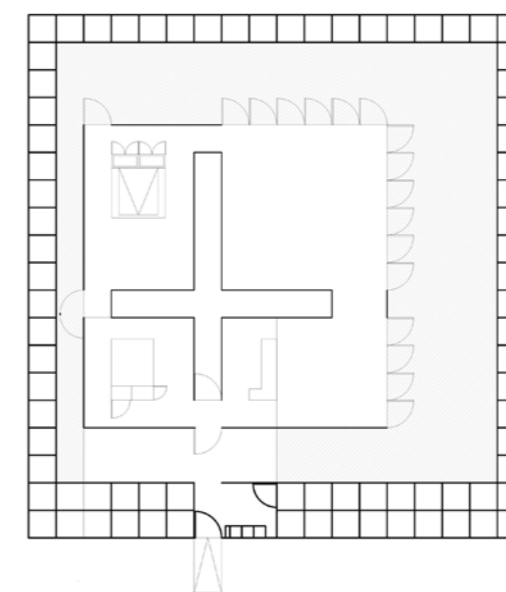
Figure 7. the floor plan of bamboo housing.

In addition, Chang Yungho's preference for bamboo can be also traced back to the 3rd Gwangju Design Biennale in 2009. His work is the «bamboo lantern», a kind of small pavilion (Figure 8). The design of this pavilion is a dialogue between the two aspects. The floor plan is taken from the «round sky and square earth» in traditional culture, which is the square from the outside and a circle inside. The inherent directionality of the «square» form organizes the peripheral visual space, while the sense of stillness contained in the circle defines the closed resting space inside. The square appearance with the concave and convex feeling is created by bamboos. The thin bamboo skin is processed to a certain extent and then made into this regular shape. Bamboo gives the interior a natural beauty of artificial materials. Meanwhile, this material is taken from nature which is a solution to the nowadays sustainable development strategies.

Figure 8. the appearance of the bamboo lantern. (Source: Atelier FCJZ https://www.fcjz.com/archive/p/5bce0f136981a30016369b5e>)

5. RESULTS

Chapter 4 analyzes three architects' ecological thoughts and their architectural works. It can be seen that they all have their own opinions in terms of eco-philosophical architecture. The result is shown in Table 1. Their philosophical thoughts are more reflected in the innovation and application of materials. Wang Shu's Tile garden and Wapan wall, Liu Jiakun's recycled brick, Chang Yungho's bamboo courtyard, are not only a response to tradition but also designed based on the concept of ecological architecture. Their design is combined with China's regional environment and culture to create sustainable architectural elements with Chinese characteristics.

The result shows that trends in modern ecological architecture can be roughly divided into two categories. One is the integration of architecture into nature, that is, the integration of architecture into a circulatory system that communicates with the environment. This enables the cost-effective use of resources and makes the building part of the ecosystem. The second is to introduce nature into architecture and use high-tech knowledge to promote ecological construction and naturalization of artificial environments. Here these three architects not only use the traditional materials to let architecture into nature but also combine the materials with modern technology in the context of the Chinese local environment.

6. CONCLUSIONS

Architecture is a discipline that moves beyond a simple focus on spatial plastic design to encompass a variety of interdisciplinary studies. This research focused on architecture as an interdisciplinary study of Ecology philosophical theory by considering the current social issue of global climate and environmental change. China, a country at the epicenter of such novel transformation, has a sizable market for architectural practice, providing a fertile ground for both foreign and local architects to experiment. This paper discussed how contemporary Chinese architectural practice can respond to and reconcile contemporary issues such as relationships between man and society, and man and the natural ecology, in the context of global change. It explored ecological philosophy as a theoretical reflection that guides the design practice of three architects: Wang Shu, Liu Jiakun, and Chang Yungho.

The research first discussed the key ideas of the western ecological philosophy of architecture. This idea is very similar to Traditional Chinese philosophical theories of "the unity of man and nature" and "Taoist nature". After, this study examined the meaning and core minds of these two traditional philosophical theories. With this step, this study sought to explore the manner in which contemporary Chinese architects inherited this philosophy in their architectural design process. It selected Wang Shu, Liu Jiakun, and Chang Yungho as study objects and analyzed their representative thoughts on ecological philosophy and their architectural practices. The result shows that they all have a deep understanding of traditional materials on this topic. Wang Shu designed "Tile garden" and "Wapan wall", which are composed of tiles from removed housings, to echo the ecological cycle. Liu Jiakun designed recycled brick during the emergency of the urban regeneration due to the earthquake disaster. Last, Chang Yungho used traditional bamboo but combined it with modern architectural technology that was mainly designed for facades in the context of ecological architecture. In short, these three architects showed their ecological philosophy on thinking about the architectural traditional materials. Their designs all have many influences on today's debate.

This study implicates that architecture should no longer be understood as an isolated object, but must be discussed in the context of the urban environment concerning the changes in the social and ecological systems. However, this study has analyzed three architects' ecological philosophy only by investigating their idea about architectural materials. To understand their ecological practices deeply, it is necessary to further this topic by researching architects' other design approach: architectural layout, space form, and so on.

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OBSERVATIONAL DESIGN, A PHENOMENOLOGICAL VIEW ON POLYVALENT EVERYDAY PLACES

1-D-4

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Abstract

In recent times, it can be noticed that disciplines around city making and city planning are confronted with new questions beyond control and plannability.

Based on the 'everyday place' as a supposedly comprehensible general we broadly discussed the social dimension of space and its qualitative design implementation was considered in interplay with the existing.

The phenomenological consideration in this setting depicts that urban spaces with a reduced symbolic appearance have an indeterminacy which is characterized by coming and going, by traditional imprinting in cultural change and by spaces of possibility. These spaces provide the conditions for materialization of individual needs which we call polyvalent everyday places. Our teaching formats at the Institute of Urban Planning and Design SuE, Faculty of Architecture and Urban Planning, University of Stuttgart, Germany between 2017-2021 and with international workshops (2017+2019 Buenos Aires, 2018 Valparaíso, 2018+2019 Stuttgart, and 2019 São Paulo) aimed to challenge the common ways of thinking among architectural and urban planning disciplines and to encourage students to engage in a cross-scale and open-ended discourse of negotiation at the intersection of architecture and the city.

The findings of the first years were synthesized into a conceptual-theoretical work and polyvalent elements were built on the Praça da Républica during an international workshop in São Paulo. The documentation and further observation of other local everyday logics were part of the 12th International Architecture Biennale of São Paulo: Todo dia/Everyday.

Considering polyvalent everyday places based on a developed method of observational design and the general acceptance of indeterminacy in planning processes, local insights can be incorporated into forward-looking concepts for a sustainable society for ever-changing conditions, mechanisms and everyday logics.

This openness leads to solid and at the same time revisable and error-friendly designs for cities and architecture which are characterized by qualitative processes of change and enable

sustainability in the built as well as in the discussion-open space of the academic environment.

Key words:

Observational Design, Polyvalent Everyday Places, Everyday Places, Polyvalent Everyday Elements, Zwischenstadt, Architecture Without Architects

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IN RECENT TIMES, IT CAN BE NOTICED THAT DISCIPLINES RELATING TO CITY MAKING AND CITY PLANNING ARE CONFRONTED WITH NEW AND COMPLEX QUESTIONS BEYOND CONTROL AND PLANNABILITY.

The Institute of Urban Planning and Design SuE at the Faculty of Architecture and Urban Planning, University of Stuttgart, Germany committed itself to question a social significance of architecture, urban planning and the design of the built environment based on the diametrically opposed conceptional pair of polyvalent everyday places. Using the everyday place as a supposedly comprehensible general, the social dimension of space was broadly discussed and its qualitative realization into space was considered synergistically between the planning instances and the phenomenological view of the inhabitants.

For this purpose, the satisfaction of needs usually communicated in planning processes was questioned first and foremost to focus on contradictory realities of cities. The renunciation of an analytical determination of design parameters was already proclaimed by Thomas Sieverts in 1997. He wished for a departure from "urban design within a well-defined conceptual framework" to "refer to a reliable programmatic basis of defined needs[1]." However, in his numerous critical essays Lucius Burckhardt claims in ´The Minimal Intervention´ in 1982: "Whatever the philosophy behind individual conceivabilities may be, some experts always know the necessities of some other people whom they have never met[2]."

To redefine design parameters seminars involving students were formed to discuss where spaces scalable and adaptable to people's lives and desires can be designed and how this can be reflected in future planning disciplines. The notion of formal indeterminacy for subordinate appropriation, repurposing, transformation and adaptation to individual needs was based on qualities which were found by students in the urban realm.

The understanding of building in compliance with living conditions conjointly with the polyvalently applied validation of the building shapes should be scrutinized based on evolutionary grown structures. An unbiased view of the fulfillment of spatial needs for everyday life should be targeted to question the status quo of planning disciplines[3].

Questioning self-evident planning processes is not a recent phenomenon. Examples range from individual building elements during the construction process by Giancarlos di Carlo and Team X in the post-war period to the ´Urban Reidentification Grid´ project as an extension of the home to the street in the context of English everyday culture by Alison and Peter Smithson. In addition to that, contemporary projects such as Alejandro Aravena's concept of Elemental or the ´BeL Sozietät für Architektur´ at the IBA Hamburg 2013 provides inspiration for residents to participate in the construction of their homes as co-actors. The increasingly emerging practice of participatory planning processes has not only challenged the world of planners but rather – as Bernard Rudowsky's exhibition at New York's MoMA in 1963 is entitled ´Architecture Without Architects´ – has generated a fundamental abandonment of planning instances for the fulfillment of spatial needs for individual everyday life.

All of these projects share a flexible approach and the attempt to deal creatively with the challenge of unpredictability in and beyond planning processes. In this context, the individual everyday life is the pivotal point of numerous approaches. Hermann Hertzberger is reflecting these confrontations with everyday life and accordingly generates robust and inherent forms and elements[4].

The examples and concepts have been created following flexibility and appropriation. Our investigation of polyvalent everyday places however focuses on raising questions for our observations.

The approach of being an observer enables to detect which aspects can be perceived or excluded by further planning. The conscious procedure of seeing and perceiving information allows a new perspective of a situation or context at each point during the investigation. One can consider everyday situations and actions as a marginal social phenomenon or rather – according to our thesis – as a form of discussed qualities leading to an integral part of future planning instances.

The investigation at the interface between architecture and city initially promised opportunities and had to be delineated for different teaching formats. A design studio in 2017 provided at the beginning of the investigation essential insights for following seminars to enhance the topic with scientifical and theoretical aspects. Based on the findings, the documentation of the initial years led to a conceptual-theoretical work and was shown at the 12th International Architecture Biennale of São Paulo: Todo dia/Everyday in 2019. A workshop based on different polyvalent elements was held with students from São Paulo, Buenos Aires, Valparaíso and Stuttgart to discuss this topic publicly.

Previous teaching formats and the international workshops accumulated little regarding the issue of flexible architecture, the creation and extension of modern concepts of open floor plan or self-expansion. It rather led to unusual structural and social interventions for individual everyday logics and corresponding qualities for planning.

The attention on the urban scale was not based on former conceptual approaches of programmatically adaptable spaces but rather on the debate on multi-layered everyday logics in built and evolved spaces. Jezko Fezer and Mathias Heyden express it the following: "From the fundamental planning-theoretical insight that space and what is contained in it mutually influence each other, followed that no space can be built for assumed uses without these uses changing in that space[5]."

In spite of the fact that former approaches were often assigned to the planning in general or reduced to specific neighborhoods, the broader perception of local aspects were relevant to us. For an unbiased observation of the indeterminate, sites with a mostly static and symbolic built fabric in inner cities seemed unsuitable. Likewise, the engagement with terminated territorial areas appeared rather obstructive. Therefore, we dealt with a phenomenological aspect of the ´Zwischenstadt´[6] and found our area of investigation in the suburban of the industrially shaped and close-knit Neckar Valley of Stuttgart.

In this spectrum we addressed different phenomenological approaches to understand the interdependence holistically in the sense of Humboldt's educational ideal. We continued to develop these aspects for a coming design practice – as far as this is possible in a 14-week semester. First and foremost, the current perception of the evolved structure of the Neckar Valley had to be dissolved in order to concentrate on the content-related focus of polyvalent everyday places. In this sense, we used additional methods from related sciences to get closer to the topic. A selection of methods is specifically assigned in the following text sections for better understanding.

1 Sieverts, Thomas; 2000; Zwischenstadt: Zwischen Ort und Welt, Raum und Zeit, Stadt und Land; Bauwelt Fundamente, Band 118; Birkhäuser Verlag; pp. 183, translated by the author
2 Burkhardt, Lucius; 2013; Der kleinstmögliche Eingriff; Martin Schmitz Verlag, pp 88, translated by the author
3 cl. Fezer, Jesko; Heyden, Mathias; Hörbe, Kim; 2004; Hier entsteht - Strategien partizipativer Architektur und räumlicher Aneignung; b-books; 1. Edition; pp. 19

4 cl. Hertzberger, Herman; 1995; Vom Bauen – Vorlesungen über Architektur; Aries
5 Fezer, Jesko; Heyden, Mathias; Hörbe, Kim; 2004; Hier entsteht - Strategien partizipativer Architektur und räumlicher Aneignung; b-books; 1. Edition; pp. 21, translated by the author
6 The term ´Zwischenstadt´ propagated by Thomas Sieverts can at best be translated as `in-between city` or `intermediate city`. It describes a sprawling structure in metropolitan areas that can neither be assigned to the city nor to the rural area and does not correspond to a suburb. The ´Zwischenstadt´ often has no historical core and has grown quickly and relatively randomly.

THE PHENOMENOLOGICAL VIEW OF THE ´ZWISCHENSTADT´

The origin of our phenomenological view is to accept complexity within cities and see it as a basis for further research. It is necessary to read existing structures in a contemporary manner as well as to interpret one's own experiences. The existing understanding of values must be degenerated so that marginalized knowledge and unknown history can be included in a comprehensive investigation. Making new definitions of reality visible involves the potential of moving away from traditional planning strategies in order to discuss contemporary solutions for future challenges.

In general, it is easier to consider a defined context which is usually divided into urban and rural. However, a deeper discussion can take place on the subject of ´Polyvalent Everyday Places´ in areas whose definition is not generalized and remain open. In this context Thomas Sieverts´ concept of the ´Zwischenstadt´ seemed purposeful because it describes a settlement structure between the rural and urban area.

The ´Zwischenstadt´ itself has a great autonomy and distinguishes itself from adjacent settlements as an independent entity which often emerged in a short period of time. This development which is short-term in the planning period often has no clear orientation. It is characterized by a lack of goals and plans and single elements often show little durability. The city region of Stuttgart with its wide-spread settlements is a distinctive net-shaped structure as a polycentric metropolitan region. The mobility opportunities between individual centers show a great amount of the definition of Sievert's so-called ´Zwischenstadt´ and is characterized by diverse fields of tension[7].

The collective and conflictual negotiation of space in these areas has always been immanent – especially in the suburbs of the Neckar Valley. The encounter of agricultural areas was formerly serving as flood plains for the river Neckar and exists nowadays as industrial area. Evolved rural structures had been increasingly scaled down by the expansion of the city as well as the forms of mobility that coincide in a confined space due to Stuttgart's characteristic topography. Today, it comes to numerous negotiations concerning this issue. However, the balance between living and working in this area is unique in a regional comparison[8]. It is not exclusively residents who work in this area but this balance allows an extraordinary quality and cultural diversity for the region.

The indeterminate vibrancy evokes numerous other spatial and political tendencies with which we as future planners are confronted. When observing the interface between city and architecture, the privatization and isolation of the population is noticeably increasing: high and opaque fences, closed courtyard entrances, numerous private warning signs and the militarization of street spaces with oversized vehicles for individual mobility are only a few visible changes. The open city – as Richard Sennett describes the idea of an open system with complex dependencies – seems more and more of lower acceptance if not in danger for these areas[9].

Thus, the aspect of security is becoming increasingly relevant in planning, administration and research. It is often not perceptible whether the increased security is demanded from the society, privately desired or subjectively felt[10]. This way of dealing with diversity is thus no longer obvious and must be relearned. It is not a constant value but needs to be considered in different perspectives and point of views. Ultimately, the traditional and subjective attitude must be questioned.

The city as such needs a new form of consideration in the sense of Jürgen Krusche's term of an ´Ambivalent City´: "…which was previously declared problematic should be considered in its positive relevance as everyday normality. Urban life is characterized by radical mobility and multiplicity, ambiguity, ambivalence, and contradictions[11]."

The integral areas of the Neckar Valley have always been counter-reactions to local and global economic incidences. Different from non-reproducable city centers of highest symbolic importance, a self-determined life is still possible in the ´Zwischenstadt´[12]. Planning disciplines are faced with far-reaching problems that cannot be combined under an overarching 'master plan' and thus dissolve into culturally unconnected and non-binding individual elements[13]. This "individualization of life forms as a consequence of the dissolution of collective ties has winners and losers"[14] according to Thomas Sievert's perception in regard to the ´Zwischenstadt´.

The approach of polyvalent everyday places should involve in-between spaces in the course of the individualization of living conditions in order to document the ´escape into everyday life´ and to discuss common qualities of this phenomenon. Thus, phenomenologically, the Neckar suburbs seem to be purely functional whose design claim seems rather marginalized and thus resembles a "space without property"[15].

The subsequent polyvalent everyday places are often part of significant activities as a reaction to the environment and the self-determination through available resources. In this context, the ´do it yourself movement´ (DIY) is also a part of local behavior, but not only a recent phenomenon. For some social groups it is simply part of their own survival. These self-made interventions, appropriations and extensions often contain a personality with manifold skills. At each of these places, concrete needs find a materialized form which has a radiant effect on the public space[16].

The publication "Bedeutsame Belanglosigkeiten" by Vittorio Magnago Lambugnani focuses on small and formal aspects or objects within the urban space. Nevertheless, his description is close to what polyvalent everyday places may represent: "The small things […] are not only surprisingly diverse, but also multi-layered, complex and quite contradictory entities. They are functionally, technically and economically determined [...] They are anonymous and yet always individual. They are ubiquitous and at the same time exhibit a strong sense of place. They are modest in every way and hauntingly image-defining. They are utilitarian and yet firmly rooted in the culture of the city, to which they contribute, seemingly inconsequentially, in surprisingly significant ways."

The entities of polyvalent everyday places are of vital and autonomous sustainability, abandon the cycle of consumption and therefore making the individual responsible for his environment. This phenomenological positivity can be increasingly – however not exclusively – found in the ´Zwischenstadt´. This area is characterized by indeterminacy, constant change and transformation.

7 cl. Sieverts, Thomas; 2000; Zwischenstadt: Zwischen Ort und Welt, Raum und Zeit, Stadt und Land; Bau-welt Fundamente, Band 118; Birkhäuser Verlag; pp. 148
8 Verkehrsbedarfsermittlung für den Raum östlich von Stuttgart - Verkehrswirtschaftliche Untersuchung 2020, pp. 11, Daten: Statistisches Landesamt Baden-Württemberg auf Basis der Gemeinden mit Stand 31.12.2005; Modus Consult Karlsruhe im Auftrag des Bundesministeriums für Verkehr, Bau und Stad-tentwicklung/Regierungspräsidium Stuttgart, April 2007
9 cl. Sennet, Richard; 2018; Die offene Stadt – Eine Ethik des Bauens und Bewohnens; Hanser Berlin, 2. Edition

10 cl. Krusche, Jürgen; 2017; Preface; in: Krusche, Jürgen; 2017; Die ambivalente Stadt – Gegenwart und Zukunft des öffentlichen Raumes; Jovis; pp. 8
11 Ibid, pp. 11, translated by the author
12 Sieverts, Thomas; 2000; Zwischenstadt: Zwischen Ort und Welt, Raum und Zeit, Stadt und Land; Bauwelt Funda-mente, Band 118; Birkhäuser Verlag; pp. 180
13 Sieverts, Thomas; 2000; Zwischenstadt: Zwischen Ort und Welt, Raum und Zeit, Stadt und Land; Bauwelt Funda-mente, Band 118; Birkhäuser Verlag; pp. 175
14 Ibid, pp 175, translated by the author
15 Ibid, pp 179
16 Lampugnani, Vittorio; 2019; Bedeutsame Belanglosigkeiten - Kleine Dinge im Stadtraum; Wagenbach Klaus GmbH; pp. 8, translated by the author

The ´Zwischenstadt´ invites to observe, experience and discoverer investigations in polyvalent everyday places.

POLYVALENT EVERYDAY PLACES AS AN AESTHETIC CALCULATION

The liberal urban society seen as tolerant and creative is culturally anchored in the prototype of a European city and dissociates from the ideal perspective of a functionally separated modern city[17]. The countermovement to this fragmentation and segregation of the city can be observed especially in the peripheral areas of settlements. The growing social diversity in these places can be seen in the spectrum of different dimensions of social inequality. In our case, the quantitative and qualitative increase is caused by a multitude of possibilities for working, living and leisure spaces in the grown and industrialized Neckar Valley.

To be part of a workplace, a club or a neighborhood is a great advantage in terms of temporary affiliation. However, according to Andrea Breitfuss urban public spaces are rated high as soon as the intensity of a relation to other social groups can be determined by oneself[18]. The social mix of residents from different employments and earning capacities is necessary and has increased. Thus, these advantages prevent residential segregation in the Neckar suburbs.

It can be shown that a clash of different social groups in the Neckar Valley lead to numerous actions and reactions which Sieverts describes as secondary consequences. The proximity to each other is an interesting parameter. This can basically lead to two different consequences: an increase of social contact or a separation from other social groups.

In reference to his essay ´poverty in prosperity´ Jens Dangschat's quotes: "The problem is that the contact hypothesis works primarily for people with high economic, cultural, social and communicative competencies – and just not or hardly at all for people with the opposite sign. For them, daily contacts not only lead to a retention of reservations, fears and competitive thinking, but they deepen to the extent that spatial ´sticking together´ is perceived as unavoidable. [...] A mixture of ´retreat into the private sphere´, ´excessive demands´, and visible xenophobia emerges in these neighborhoods."[19]

An intrinsic part of this topic is the sociological aspect which will not be discussed to a greater extent in this paper due to further complexities. Considering social dependencies in the ´Zwischenstadt´, includes making use of a phenomenological approach since the previously described mixture of public participation and private withdrawal can easily lead to an overload of social diversity. Especially spatial expressions of polyvalent everyday places with its aesthetic and anesthetic appearance might enable a qualitative analysis of situations. The discussion in the field of aesthetics and anesthetics generates new insights into this field.

Polyvalent everyday places are not precisely definable and thus aesthetic aspects are hidden behind the intrinsic complexity. Therefore, a classification into categories seems to be complex too. At this point, we acknowledge that individual spatial situations are of fundamental interest in order to study polyvalent everyday places: Places and situations whose main objectives are easily readable but cannot be assigned to a single category. These parallel themes and qualities need to be

investigated in addition to the first glance. Thus, ´reading further´ suggests numerous other themes and backgrounds and unfolds broader complexity. The design of the space is of little amount and the perception, overwhelmed by complexity, is therefore more likely to be dedicated to the anesthetic.

Robyn Boyd's book ´The Australian Ugliness´ from the 1960s brings the multiple interventions and contributory tendencies in the context of aesthetics down to a common denominator: "It is not a lack of imagination or sensitivity or originality which causes the [aesthetic] despolation, but an over-abundance of these qualities without the co-ordinating discipline of traditional craft technique and, more important of course, without a common artistic aim."[20]

Nevertheless, current social trends are yearning for a reduction of complexity whose spiral of dependency is ever continuing. In ever shorter periods of time, arbitrary private gems and retreat-oriented paradises are created. Situations requiring processes of negotiation emerge but are often not executed. Frequently, such spatial longings are demanded at the interface between private and public spaces.

The diversity and ambivalence of the surrounding is not problematic by itself but rather their interpretations, prejudices and vulnerability. "One result of these tendencies is that, especially in the (urban) middle class, the number of lines of demarcation and exclusion according to lifestyle values is increasing, and these are more frequently drawn demonstratively." [21]

Flexible lifestyles make it more difficult to demarcate and classify them into established categories and situations. Moreover, their aesthetics are often perceived differently in the field of tension between the self-evident and the unnatural. In this context, the interventions which seem to be ugly and senseless are an indication of grievances and missing qualities in a building, in a neighborhood or even in the ´Zwischenstadt´ itself. This is the assertion made in the context of our teaching formats.

This antithesis to beauty stimulates our perception and questions the formulation – built or implied – the limits of possible interventions and the meaningfulness of their appearance. Wolfgang Welsch concludes that "one aims at an aesthetic that draws attention to its reverse side, to its anesthetic [...]" [22]. He suggests that understanding urban structures depends on perceiving the imperceptible. Attention should be drawn to the phenomenological and metaphysical part of perception. Aesthetic thoughts and experiences can gain reality skills "for a world characterized by both aestheticization [23]

and anestheticization." Sievert applies this idea to the aesthetic aspects of the ´Zwischenstadt´ to an area where what is perceived anesthetically does not consequently enter into consciousness but is in a greater relationship[24].

Our teaching formats were characterized by an increased perception of sensing and noticing. It was also influenced by an increased sharpening of the eye regarding details since opacity can barely lead to a scientifically quantifiable analysis. In this phenomenological part, the focus was set on qualitative and individual aspects whose individual aspects were to be developed. At the beginning of our teaching formats, we sent our students on a dérive to perceive situationist phenomena. In further steps we followed investigations in the style of visual geography with the method of

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17 cl. Dangschat, Jens; 2017; Urbaner sozialer Wandel; in: Krusche, Jürgen; 2017; Die ambivalente Stadt – Gegenwart und Zukunft des öffentlichen Raumes; Jovis; pp. 18
18 Ibid, pp. 18-19
19 Ibid, pp. 22

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20 Boyd, Robyn; 2012; The Australian Ugliness; Text Publishing, pp. 33
21 Dangschat, Jens; 2017; Urbaner sozialer Wandel; in: Krusche, Jürgen; 2017; Die ambivalente Stadt – Gegenwart und Zukunft des öffentlichen Raumes; Jovis; pp. 29, translated by the author
22 Sieverts, Thomas; 2000; Zwischenstadt: Zwischen Ort und Welt, Raum und Zeit, Stadt und Land; Bauwelt Fundamente, Band 118; Birkhäuser Verlag; pp. 107, translated by the author
23 Ibid, pp 108, translated by the author
24 Ibid, pp 108

reflexive photography as well as classical guided interviews with passers-by. The aim was to make the first findings communicable in descriptions, texts, drawings, sketches and photographs. Then as Robyn Boyd early recognized in ´The Australian Ugliness´ for the sprawling new world: "The chief characteristic is inconsistency; good and bad muddled together, sophistication and schoolboyishness, toughness and genteelness, all strongly marked and clearly isolated, but so cut up and mixed up that no one can be quite sure which in the long run predominates. " [25]

The numerous rational choices and resulting interventions on the anesthetic issue can lead to a new understanding and approach to everyday design work as relationships are considered and sensitized in a new way. Regarding the perception of the phenomenological, Robyn Boyd, sums up the approach of our investigative strategy: "The argument […] is that the ugliness in the streets of almost every city in the modern world is not art of any sort and is really not very pop either. It is as functional but as artistically heedless as an anthill and as accidental as a rubbish dump. No matter how one photographs it, draws it, looks at it, or describes it, it remains physically an awful mess. In any case negative, careless ugliness is not the worst thing. What really must concern us more is the positive, atrocious prettiness of bad design. " [26]

This opacity demands new methods in order to experience the understanding of the phenomenological part of the Neckar Valley. In the context of his modernist training, Boyd recognizes: "The mess is accepted without pleasure or complacency, but without sufficient distaste to kindle a reaction. It is unfortunate, but it is not tragic[27]. " Thus, looking at polyvalent everyday places in the context of aesthetics and anesthetics provides access to the complexity of built spaces and makes them interesting for future planning approaches.

However, the view of what was previously ignored must be explicitly sharpened for further documentation and research. For this purpose, we use the method of mapping in the further course of the teaching formats to make structures in the closer environment visible. With the help of physical conceptual models as a reproduction of specific spaces, spatial contexts could be discussed in a complementary way. To make these spaces and connections visible and communicable, we made use of reduction in the form of axonometric and schematic sketches. Photographic works have emerged as the most important means of communication in this context, enabling a further level to be shown and discussed.

THE PERCEPTION OF THE IMPERCEPTIBLE AND PHOTOGRAPHY AS A MEDIUM

The expansion of visual components within architectural and urban planning projects made it possible to focus on individual aspects of social spaces. Photography often plays a central role in the exploration of the city. Apart from the possibility of collaging and excessive image editing, photographs of polyvalent everyday places make the unseen visible and enable further discussions among participants.

In our teaching formats, the primary goal was not to show and reduce information for a narrative exploration of needs, but rather to depict the unchanged reality that eludes aesthetic image representation. For this purpose, photography seemed to be the appropriate medium for further research and to draw attention to certain facts in order to document the different methods used.

Henri Delaborde remarked in 1856: "Compared to art, photography, for example, seems to us insufficient, even deficient, since it can only give the raw image of reality […]."[28]

In his contribution ´Autopsy of the City´[29] Jürgen Hesse deals with a phenomenological trace that leads him to the theme of experienced space and atmosphere. Via attentive self-looking a micrology of the city can emerge[30]. Self-gaze as an access to patterns of the urban realm enables a phenomenological autopsy whose small-scale explorations are understood as a "micrological method of phenomenological urban research" and bring us closer to the aspects of indeterminacy[31].

The indeterminacy of the ´Zwischenstadt´ with its positive connotations invited us to accept this realization as an open space of hope documented through photography. Thomas Sieverts understands indeterminacy as a challenge: "as an adventure of urban development, as a space that cannot be determined and fixed, but can already be prefigured and brought into a certain inclination by the projection of an activatable imagination."[32] This first impression of the Neckar Valley – characterized by functional spaces – was to be understood as an open space of possibilities whose flexibility and adaptability was not leaving a negative impression on the visible design.

The ´Ambivalent City´ described by Jürgen Krusche shows a fundamental complexity of contemporary ways of life. These complex relationships are the basis of European cities which should be encountered with an open mind. This complexity cannot be met with a pigeonhole thinking as in traditional analysis procedures[33]. Thus, regarding our teaching formats, the usual dualistic division into safe/unsafe or beautiful/ugly seems too short-sighted for a holistic understanding.

With respect to photography, Jürgen Hesse compares the new kinds of urban research with a forensic medical examination. The photographic autopsy follows the purpose of micrology. Such detailed observation potentially brings everything into focus to sharpen the overall impression based on details. In this case, however, the visualization of situations does not turn to the socially relevant but to the aspects and materialized aspects of approaches beyond lifeworld attention[34].

Assessable individual everyday situations often lie in the shadows of attention, receive an increased interest, and are set apart from impressive stereotypes. Through photography the overlooked is drawn to an expansion of the mimetic field and a sharpening of attention for corresponding can be implemented.

For our teaching formats photographs of everyday situations and individual spatial interventions were produced by students as an introduction to the topic. The absence of people was aimed to reduce the situations and objects to themselves. Ideally, only artifacts and discreet clues were meant to indicate the purpose of use. "That which is not visible in the picture, but which can be felt, provokes the search for meaning, identity, and difference in something behind the scenes, which eludes any direct visualization,"[35] mentions Jürgen Hesse about his series of pictures of garages. A social signature can thus be reduced to itself and analyzed in a highly complex relationship through materialized situations.

In this way, photography allows access in "multisensory understanding via atmospheric realities" [36] and therefore brings aspects of a place into language that can be discussed with students, and which are distinguished from the purely visible. Unlike the first impression of a situation, this access allows a greater range and depth to the theme of polyvalent everyday places. It exposes unexpected qualities through graphics which leads to new insights in the design process.

25 Tsiolkas, Christos; Introduction pp. 4; in: Boyd, Robyn; 2012; The Australian Ugliness; Text Publishing
26 Tsiolkas, Christos; Introduction pp. 8; in: Boyd, Robyn; 2012; The Australian Ugliness; Text Publishing
27 Boyd, Robyn; 2012; The Australian Ugliness; Text Publishing, pp. 39

28 Hesse, Jürgen; 2017; Autopsie der Stadt; in: Krusche, Jürgen; Die ambivalente Stadt – Gegenwart und Zukunft des öffentlichen Raumes; Jovis; pp. 132, translated by the author
29 Ibid, pp. 132-157
30 Krusche, Jürgen; 2017; Preface; in: Krusche, Jürgen; 2017; Die ambivalente Stadt – Gegenwart und Zukunft des öffentlichen Raumes; Jovis; pp. 14
31 Ibid, pp. 14, translated by the author
32 Sieverts, Thomas; 2000; Zwischenstadt: Zwischen Ort und Welt, Raum und Zeit, Stadt und Land; Bauwelt Fundamente, Band 118; Birkhäuser Verlag; pp. 186, translated by the author
33 cl. Krusche, Jürgen; 2017; Die Stadt zwischen Offenheit und Schließung, Diversität und Risiko; in: Krusche, Jürgen; 2017; Die ambivalente Stadt – Gegenwart und Zukunft des öffentlichen Raumes; Jovis; pp. 15
34 cl. Hesse, Jürgen; 2017; Autopsie der Stadt; in: Krusche, Jürgen; Die ambivalente Stadt – Gegenwart und Zukunft des öffentlichen Raumes; Jovis; pp. 132
35 Ibid, pp. 138, translated by the author
36 Ibid, pp. 142

IMPLEMENTATION IN A NEW ´OBSERVATIONAL DESIGN´

The phenomenological examination of the ´Zwischenstadt´ around the theme of polyvalent everyday places has shown that urban spaces with a reduced symbolic appearance contain an indeterminacy which is characterized by coming and going, by traditional imprinting in cultural change and by spaces of possibility of trying things out. These spaces offer the prerequisite for subjectivity and materialization of individual needs which we call polyvalent everyday places.

The self-image of planners being aware of everything and thinking ahead to an orderly everyday life is still valid today when it comes to the exploitation of the tradition-bound canon: a utilization and economization of space. However, what emerges as a design with such a basic tenor usually remains questionable within the complexity of cities. In general, planning authorities tend to serve an artificial satisfaction of needs – especially since these are usually derived from statistical values of the past to legitimize democratic majorities.

The departure from the analytical determination of needs for a hypothetical urban planning of a future society requires a revision in the approach to the designing everyday practice. With permanently changing circumstances, the focus must be put on human life and the positive and negative aspects of the everyday lives of different actors: the everyday urban reality of people's lives. In the everyday practice of these changing places – in our study area of the ´Zwischenstadt´ – this has been working for a long time. However, we observe from tenders and competitions that sustainable rethinking in the planning disciplines and municipal planning processes towards an interpretive and changeable indeterminacy does not yet seem to be accomplished.

Our recent teaching formats have aimed to challenge the usual ways of thinking in planning fields and set students up to engage in a cross-scale and open-ended discourse of negotiation at the interface between architecture and the city. Investigation of polyvalent realities and reviewing through the polyvalent elements (ramp, platform, wall, opening, niche, and roof) led to our contribution to 12th International Architecture Biennale of São Paulo: Todo dia/Everyday in 2019. All these insights and discussions brought deep insights to the issue of indeterminacy in our built environment. With these insights and the general acceptance of indeterminacy in planning processes, forward-looking concepts for a sustainable architectural and urban society can emerge for the ever-changing boundary conditions, mechanisms and everyday logics.

In order to think holistically in the planning disciplines and teaching apparatuses, we need to assume plurality as inevitable. Design tasks beyond the necessary evil require a serious and detailed look at the existing and its diverse appropriations and transformations. In this way, social and cultural design emerges between spaces of possibility and experimental trial fields, the formulation of which can always remain indeterminate.

This design approach, spectated as an indeterminate cycle that is always characterized by actions and reactions, needs to be the starting point of any basic attitude in teaching at universities. Our future task as planners will be the need to find a design path with principal indeterminacy which must be ambiguous in the sense of sustainability yet has a robustness that enables different forms of social justice.

With and observational design approach we take the indeterminate in urban development seriously and allow for spaces with the potential of high-quality persisting over decades or even continuing to grow over time on the basis of polyvalent everyday places. This openness leads to robust and at the same time revisable and error-friendly designs for the city and architecture which are characterized by qualitative change processes and enable real sustainability in the built environment as well as in the discussion-open space of the academic environment.

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Fig. 1: Idyllic Disaster - Backyard Schmiedener Str., Stuttgart, Photography: Jonas Mattes for the Institute of Urban Planning and Design SuE, Faculty of Architecture and Urban Planning, University of Stuttgart, Germany

Fig. 2: Functional Appropriation, Ulmer Str., Stuttgart, Photography: Sascha Bauer for the Institute of Urban Planning and Design SuE, Faculty of Architecture and Urban Planning, University of Stuttgart, Germany

Fig. 3: Improvisational Living – Reichenbachstr., Stuttgart, Photography: Jonas Mattes for the Institute of Urban Planning and Design SuE, Faculty of Architecture and Urban Planning, University of Stuttgart, Germany

Fig. 4: Purposeful Extension – Augsburger Str., Stuttgart, Photography: Jonas Mattes for the Institute of Urban Planning and Design SuE, Faculty of Architecture and Urban Planning, University of Stuttgart, Germany

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Fig. 5: Informal Necessity – Waiblinger Str., Stuttgart, Photography: Jonas Mattes for the Institute of Urban Planning and Design SuE, Faculty of Architecture and Urban Planning, University of Stuttgart, Germany

Fig. 7: Platform Element, Sao Paulo, Photography: Sascha Bauer for the workshop at the 12th International Architecture Biennale of São Paulo: Todo dia/Everyday and the Institute of Urban Planning and Design SuE, Faculty of Architecture and Urban Planning, University of Stuttgart, Germany

Fig. 6: Formal Occupation – Oppelner Str., Stuttgart, Photography: Jonas Mattes for the Institute of Urban Planning and Design SuE, Faculty of Architecture and Urban Planning, University of Stuttgart, Germany

Fig. 8: Flying Roof, Sao Paulo, Photography: Sascha Bauer for the workshop at the 12th International Architecture Biennale of São Paulo: Todo dia/Everyday and the Institute of Urban Planning and Design SuE, Faculty of Architecture and Urban Planning, University of Stuttgart, Germany

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TOOLS, NETWORKS AND COMMON RESOURCES: EMERGENT PARADIGMS DURING COVID19

1-D-5

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Abstract

During the first wave of 2020 pandemic, a rise in numbers and popularity of commons-based initiatives was observed worldwide. Their emergence and expansion can be observed in a multiplicity of threats and shocks globally within global literature. Parallel to this, there was a rise of academic articles including the term "resilience", while multiple global examples followed once again inequitable and discriminatory resilience practices. Based on these observations, this paper attempts an alternative understanding of resilience, following the principles of commoning. Firstly, the characteristics that define commoning practices and initiatives are explored. In continuation they are used as a base towards the analysis of the term of resilience through attributes associated with these characteristics. "Adaptability", "Endogeneity", "Interconnectedness" and "Scalability" are identified as the four attributes of resilient systems that could be supported by the existence of commoning practices and are further analysed within this paper through three global examples.

The elements presented in this paper are the result of research including more than 30 initiatives in Greece, Canada, Colombia and USA and more than 100 literature references. The research process has been combined with tactile interventions in the territory of Moravia (Medellín, Colombia).

This research, being published after the first shock and within the constant stretches of the 2020 pandemic aims at the the addition to the academic discourse on resilience, the support in the creation of more effective networks and the enhancement of the involvement of community processes in decision making regarding urban resilience.

Key words:

commons, resilience, collective intelligence

1. INTRODUCTION

Could we imagine the transition to equitable resilience practices following the example that commoning practices propose?

This paper, through literature and empiric examples, is interrelating the existence of commons-based initiatives with the resilience potential on diverse scales. The emergence of many community initiatives in cases of shocks historically is used as a motive to imagine the transition of the understanding of resilience practices from a commoning perspective. The emergence of such initiatives has been described as an indicator of resilient communities (Magis 2010) or as a temporary expression of resilience (Fransen et al. 2021). Though, it has yet to be analysed as the catalyst of resilience, creating an understanding of how the diverse elements that compose them support the survival of communities and greater scales.

The research was initiated by the observation that during the first months of the 2020 pandemic, individuals, groups, public and private bodies shared from cultural and research content to material resources. According to many analysts, this provided equity on physical and mental health support, and the creation of solidarity production and research (Pazaitis et al, 2020; Frazer, Shard, Herman 2020; Zastrow 2020 et al.). The value of commoning and open source distribution, mainly in the area of the design equipment, spread rapidly across the globe and it was recognised by local and international bodies as a tool towards resilience (Biasin and Kamenjasevic 2020). New legislations emerged, either promoting the commoning of vital goods for the response or protecting property rights and profit.

COVID19 was not the first time that such an emergence was observed. It might have been more widespread, or just apparent due to the wide use of digital means during physical distancing restrictions. In cases of shocks historically, many community initiatives emerged (Childs 2008). Often, such initiatives emerge in low income neighbourhoods with higher density (Fransen et al. 2021), where shocks and stretches cause disproportionate disasters.

Contrasting the theoretical interpretation of resilience as an inclusive process of transformation, literature and research have, once again, proven the inequity that characterised the resilience policies and actions as a response to diverse shocks (medical, economic, social etc.) caused by COVID19 pandemic globally (BARI 2020 et al.). Resilience has been observed to redirect from its transformational and survival potential towards the protection of economic growth, with the creation of generic capital-centred metrics.

2. STATE OF THE ART

Based on the analysis of the previous chapter, this research is focusing on the following question:

- How does the existence of community initiatives based on the commons within ecosystems relate with the transformation potential in front of disasters?

The question is analysed through the following two subqueries:

- What are the characteristics of community initiatives based on the commons?

- How do these characteristics relate with attributes encountered within resilient systems?

The abovementioned question and subqueries are analysed in the following chapters. First, the central characteristics that define the categorisation and results of commoning practices are identified within global literature. Based on this analysis, the term of resilience is deconstructed and reconstructed through attributes pertinent in resilient systems that can be interrelated with the action of commoning practices. The interrelation of the terms is completed with three examples highlighting the interrelation among their characteristics and reflections on resilience.

This research has also been combined with a multiplicity of community projects, mainly based in the neighbourhood of Moravia at Medellin, Colombia, which resulted from urban laboratories with the involvement of the residents. The projects include a directory of community initiatives of the area, maps of community action, mapping and artistic projects.

Being published within the reality of incremental shocks and stretches caused by environmental, social and political events, this research has as a goal to evolve the academic knowledge, open a discussion as well as support resilience processes. It aims at placing the principles of commoning in the discussions of resilience studies of diverse granularities (from the community to the urban level).

3. METHODS

The literature review is based on a comparative and critical review methodology (Paré et al. 2015). The project achieves inclusive results through the analysis of well known, new or less published authors and analysis of literature from many disciplines.

The proposal of the transition to an alternative understanding of resilience, results from a research on diverse localities globally, so as to explore more broadly the distinctive aspects of community formation and resilience approaches. This paper is composed in cooperation with three distinctive academic institutions (Aristotle University of Thessaloniki (Thessaloniki, Greece), Northeastern

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University, (Boston, MA, USA) and Universidad Pontifícia Bolivariana (Medellín, Colombia)) and three diverse departments (Department of Spatial Planning and Development, Department of Economics and Department of Architecture and Urban Planning). This way, a multidisciplinary approach is achieved, focusing on the globality of the topic and providing the opportunity for novel comparisons towards an alternative approach of resilience. This literature review includes papers from scientific journals, conference proceedings, reports and published laws.

The research and correlation emerges from the analysis of more than 30 examples of initiatives globally. Three of these cases are presented in this paper so as to provide an example of the interrelation. The analysis of the examples is not an exhaustive analysis of their characteristics, but rather a first attempt to translate the correlations into real-world observations. The information was collected through community meetings, semi-structured interviews and published material, as well as participation in the actions of the initiatives. It is part of a research project that has been ongoing since January 2019 and includes tactile actions on neighbourhood level as well as educational courses and the involvement of university students from Universidad Pontificia Bolivariana (Medellin, Colombia).

4. COMMONS-BASED INITIATIVES

The main definition of the commons in literature includes the existence of an horizontal, non-hierarchical, community structure organised around the common possession and management of a material or immaterial resource (Bauwens et al. 2019; Bollier 2014). According to studies, this structure is proposed to add to the capacity of the community to utilise its collective intelligence, participate and act irrespectively of the established rules of the market. The collective possession of goods (material and immaterial), as opposed to private ownership, is the main characteristic that defines an initiative as such, followed by a set of attributes that differ greatly among the analysts.

The commons are gaining an increasing interest within global interdisciplinary literature (Cangelosi 2019; Goldman 1998; Dietz, Dolsak, Ostrom, Stern et al. 2001; Dolšak and Ostrom 2003; Linebaugh 2008; Hardt and Negri 2009; De Angelis 2010, 2017; Federici 2010; Mattei 2011; Bollier and Helfrich 2012; Marella 2012 et al.), as well as gaining attention among policy makers (Cangelosi 2019). Looking at a global level, commons-based initiatives are not a new concept, especially in the global South, where they have been proven to be the driver of formation and transformation of the urban environment (Mundoli, Unnikrishnan, and Nagendra 2019; Monterroso, Cronkleton, Larson 2019; Wade 1994; McCay, and Acheson 1987).

The categorisation of commons-based initiatives as such, is a topic that has been widely analysed, with a big diversity among the elements that define them (Bauwens, Kostakis, Pazaitis 2019; Hudson, Rosenbloom, Cole 2019; Foster, Iaione 2016 et al.). The "resource" and the "community" are the main elements that are prominent for the existence of every commons-based initiative (Bauwens et al. 2019; Bollier 2014; Choudary 2015 et al.). As parts of the aforementioned elements, or as distinctive elements, we often encounter within literature the "rules" (Bauwens et al. 2019; Bollier 2014 et al.) that define the initiative, the "infrastructure" (Choudary 2015) that enables the connection within the community and among the community and the resource and, in the digital example, "data" (Lane 2020; O'Brien 2018; Choudary 2015 et al.).

This chapter follows an exploration of the diverse characteristics of the elements of "community" and "resource" (as part of which there are mentions on the infrastructure, rules and data).

4.1 Common resources

As common resource of the initiatives is perceived any material or immaterial element (Bauwens 2019; Bollier 2014; Foster, Iaione 2016 et al.) that can be equally used and does not pertain in the state of a possession of a certain individual or legal entity.

According to analysts, common resources are considered public goods (meant to be freely used by those in the community) and rivalrous (their use by one precludes their use by another) (Beckwith, Sherry and Prendergas 2015). Finally, the nature of the resource has to be linked with the common purpose and goals of the community formed.

In the digital example (e.g. data commons), the concept of ownership has been analysed as in a state of flux (Bezaitis and Anderson 2011) and rivalry highly questioned. The terms of ownership and property rights are blurring, in many cases giving space to commoning practices.

4.2 Community

The academic discourse regarding the community involved in commoning practices is highly focused on the inclusion, the purpose and the ways of management of the resource through decision-making mechanisms.

The threat of both ends of openness of the community is a wide discussion among analysts (Manzini 2020). This discussion sums up and includes the importance of the coexistence of equity (Beckwith, Sherry and Prendergas 2015) in participation and clear boundaries (Ostrom 1990; Aldrich 2012; Komninos 2019; Manzini 2020 et al.). Towards this goal, the disconnection from descriptive and sociocultural characteristics and the identification of common purpose, goals and objectives (Ostrom 1990) is considered vital.

A connection with locality is also highlighted within the 8 design principles[1] that lead to effective commons according to Elinor Ostrom (Ostrom 1990). In a later example this could be amplified and expressed as contextualisation, so as to include diverse levels of locality in a global-local world.

Shared stewardship practices (Ostrom 1990) are considered central so as to ensure an horizontal, non-hierarchical structure. This includes, among others, that the user of the resource is also a participator in the decision-making and organisation processes supporting the creation of reciprocal links (Festa 2016) .

Commons-based initiatives expressed through a digital or cyberphysical space are seen as parts of wider ecosystems (Randhir 2019; Bauwen, and Pantazis 2018) within diverse scales of analysis (from the urban, to the metropolitan and global), amplifying the understanding of the community. Within these spaces, also synchronous and asynchronous collaborations are achieved, facilitating and expanding commoning practices.

5. RESILIENCE

Resilience is a term analysed within interdisciplinary global literature in an exponentially increasing number of articles (Berkes and Ross, 2013, 2016; Davidson, 2010; Folke, 2006; Imperiale, and Vanclay, 2016, 2021 et al.). A diversity of disciplines have adopted the term, from economics, to mechanics

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1 1. Commons need to have clearly defined boundaries, 2. Rules should fit local circumstances, 3. Participatory decision-making is vital, 4. Commons must be monitored, 5. Sanctions for those who abuse the commons should be graduated, 6. Conflict resolution should be easily accessible, 7. Commons need the right to organise, 8. Commons work best when nested within larger networks.

and urban studies, leading to the creation of a variety of alternative explanations. Additionally, many declarations and guidelines have been issued globally regarding resilience and risk management (IDNDR 1994; UNDRO 1982; UNISDR 2005, 2015) within urban environments. The United Nations with these documentations asked for a more equitable approach and reduction of the risks (Imperiale, and Vanclay 2019a, 2019b, 2021). Through the 2030 Agenda for Sustainable Development (United Nations, 2015), the term resilience is integrated within the Sustainable Development Goals (SDGs) (Imperiale, and Vanclay 2021; Le Blanc 2015[2]). The understanding of the importance of the term, but at the same time the threat of loss of its importance and focus, can be highlighted by the fact that from January 2020 till July 2021, more than 26.900 articles have been published on Google Scholar, analysing resilience during COVID19.

In technological systems, resilience is mostly analysed as the potential of a system to retain its form or go back to its initial form following a disaster (Holling, and Meffe 1996). This explanation follows the definition of the latin form of the word resilience "resilire" (re- + salire) which, according to Oxford Dictionary, translates into leap/ spring back/rebound. In sociological, economic and urban studies such a definition has been followed by some scientists but widely declined. Resilience in social and urban studies is understood as an evolutionary, non-linear approach that provides transformation potential (Martin, Simmie 2010; Adger 2003; Vale et al. 2005; Shaw, 2012; Aldrich 2012 et al.).

5.1   Resilience in a peer to peer world

Resilience, in the context of this research, is understood and analysed as the capacity of a system to sense, self-organise, connect and eventually evolve. The attributes of systems with resilience potential discussed in the following paragraphs are the "adaptability", the "endogeneity", the "interconnectedness" and the "scalability".

5.1.1   Adaptability

"Adaptability" is a prominent characteristic of resilient systems in global literature, as it forms part of the very explanation of the term for a multiplicity of authors (Imperiale, and Vanclay, 2021; Aldrich 2012; Martin, Simmie 2010; Adger 2003 et al.).

Resilient system as capable of adapting to a new reality, rather than going back to its initial form, following a shock. The adaptability in a range of studies is connected with a transformation potential achieved through evolutionary processes (Martin, Simmie 2010; Adger 2003; Vale et al. 2005; Shaw, 2012; Aldrich 2012 et al.).

Adaptability as an expression of resilience is connected with long-term results (Imperiale, and Vanclay, 2021; Aldrich 2012; Collodi, Pelling, Fraser, Borie, and Di Vicenz, 2021; Gyawali, Tiwari, Bajracharya, and Skotte, 2019). It is connected with the capacity of the system to respond to future shocks.

"Adaptability" is enhanced with the existence of digital technologies. The new media have been proven to enable a more informed and immediate response to threats and shocks and support resilience (Zastrow 2020; Biasin and Kamenjasevic 2020).

5.1.2   Endogeneity

The attribute of "Endogeneity" focuses on the understanding of resilience as an inner capacity that emerges from the characteristics of the system. The term refers both to the internal characteristics in smaller scales (Aldrich 2012; Vale and Campanella 2005; Imperiale, and Vanclay 2021; Adger 2006; Gaillard and Mercer 2012) and the understanding of ecosystems as an agglomeration of parts (Armitage et al. 2009; Beratan 2007; Berkes and Ross 2013, 2016; Imperiale, and Vanclay 2021).

Within global research it has been highlighted that even if vulnerability and risk are factors that lead to disasters, community resilience in front of disasters could not be predicted by mere vulnerability indicators (such as accessibility and socioeconomic metrics) in a variety of contexts globally (Aldrich 2012). It is a seperate, endogenous, capacity that results from the combination of a multiplicity of factors that eventually enable communities and cities to sense, self-organise and evolve (Aldrich 2012; Vale and Campanella 2005; Imperiale, and Vanclay 2021; Adger 2006; Gaillard and Mercer 2012).

The importance of the understanding of resilience as endogenous can be highlighted by literature that proves that an opposite approach halts the resilience potential. Often the response to shocks and stretches has focused on the provision of material aid to affected communities by external bodies (often governmental bodies and NGOs). Such practices have been observed to lower the capacity of the communities to create and activate their own mechanisms of response, providing short-term solutions (Aldrich 2012; Vale and Campanella 2005 et al.).

On larger scales, the endogenous capacity of resilience includes the ability to include all the smaller parts. Many authors have underlined that resilience on greater scales (like the urban) highly depends on the capacity to sense, learn, include, and strengthen the transformation of smaller granularities (e.g., neighborhoods; communities) (Armitage et al. 2009; Beratan 2007; Berkes and Ross 2013, 2016; Imperiale, and Vanclay 2021).

5.1.3   Interconnectedness

The attribute discussed here as "interconnectedness" includes the wide literature that associates resilient systems with the diverse forms of social capital[3] (Aldrich 2012, 2019; Dow 1999; Hurlbert, Haines, and Beggs 2000; Nakagawa, and Shaw 2004; Reininger et al. 2013; Shoji, Takafuji, and Harada 2019; Smiley, Howell, and Elliott 2018). It refers both to the internal and external connections that, according to analysts and global examples, define the resilience potential.

Resilience has been widely associated within global literature with the co-existence of the 3 forms of social capital and the structural and cognitive characteristics of the connections (Szreter, Woolcock 2004; Aldrich 2012; Putnam 2000; Hawkins, Maurer 2010; Poortinga 2012; Szreter and Woolcock 2004; Fransen et al. 2021 et al.). It has been proven that in different moments in time and socioeconomic global contexts, social capital has been the element that defined the survival of communities through coordinated efforts and cooperative activities (Aldrich 2012; Aldrich and Meyer 2015; Cai 2017; Pfefferbaum et al. 2017; Reininger et al. 2013). According to Putnam, social capital includes the most prominent features of social interactions (networks, norms and trust) (Putnam 1995: 664–665) and enables the flow of resources and the coordination of action. Social capital is understood as the networks and resources that people can access due to interpersonal connections.

5.1.4 Scalability

The attribute of "Scalability" is finally included in this analysis as it particularly highlights the potential of a more equitable understanding of resilience processes. It is an attribute that can be observed in global literature and examples, though it is not being discussed as such. "Scalability" highlights the potential of seeing reflections of processes taking place on smaller granularities to the resilience of bigger granularities.

Many authors have underlined that resilience on greater scales (like the urban) highly depends on the capacity to sense, learn, include, and strengthen the transformation of smaller granularities (e.g., neighbourhoods; communities) (Armitage et al. 2009; Beratan 2007; Berkes and Ross 2013, 2016; Imperiale, and Vanclay 2021). Within literature we can also notice the reverse procedure, that could propose a bottom-up understanding of resilience. Organised communities through setting priorities often influence government policies within a multiplicity of disasters (Aldrich, 2012). They have been proven to promote the adoption of laws that promote resilience in more equitable terms.

Resilience processes in smaller granularities (that of the community or neighbourhood etc.) have been proven capable of defining resilience outcomes on greater scales also in a negative way. Negative externalities of social capital within literature mainly refer to the communities and individuals that are excluded by the community processes, leading to their lowered capacity to survive in cases of disasters (Aldrich 2012; Manzini 2020 et al.). Social capital can be seen both as the internal connections of a system and as an element that supports or halts the scalability potential of the outcomes, understanding greater granularities as agglomerations of parts.

6.   EXEMPLES

The reflections of the discussed characteristics (internal characteristics, and interconnectedness) of three examples of commons-based initiatives are paralleled in continuation with resilience attributes (Table 1).

6.1   Moravia resiste

General Characteristics

"We resist through the understanding and appropriation of our territory" Orley Mazo, community leader, Interview 28/03/2022, Medellin, Colombia.

Moravia Resiste is a community initiative of the neighbourhood of Moravia at Medellin, Colombia, that takes action towards the involvement of the neighbours in Municipality decisions regarding spatial planning.

The initiative was formed in 2018, when the Municipality called certain community leaders in order to communicate the new plans for the neighbourhood of Moravia. The spatial planning categorisation had recently changed from PMI (Plan de Mejoramiento Integral) which focuses on citizen participation, to PRU (Plan de Renovación Urbana) which focuses on economic development. According to the new designs, most of the population had to be relocated for the construction of high-rise buildings with development and gentrification objectives. The leaders opened the call to the neighbours and gathered more than 250 individuals. The municipality blocked their access to the space and the individuals decided to found Moravia Resiste towards the creation of alternative

urban planning proposals and the communication of information regarding the future of the neighbourhood. The procedures of the new plan have been stopped till the day.

The initiative gained popularity during COVID19 with the support of education and food supply, as well as with the commoning of information and the creation of a network towards the support of families facing evictions.

Resource

Moravia Resiste works towards the commoning of urban space. They follow the idea of "urban commons" turning the neighbourhood into a public good. Through community meetings they create proposals that they share with decision-making actors towards the planning of their neighbourhood. They also create common actions in order to inhabit the neighbourhood and use the space as a place for art expression, including but not limited to concerts, cinema, talks, public cooking, photography walks, graffiti and murals etc.

During the pandemic they created distinctive Whatsapp groups so as to continue the information flow regarding the procedures on Municipality level and stop attempts of relocation in times of lockdown.

Urban planning through the processes of Moravia Resiste is handed over to the community, disconnecting it from the rules of the market.

Community

Moravia Resiste consists of a central body of around 16 members. They do not have an hierarchical structure. They organise assemblies open to everyone through which they take decisions. In every assembly they have a participation of around 200 individuals.

Moravia Resiste includes members with the common goal to create actions capable of including the residents in the formation of the urban space and with the common concern of relocation. Their common objectives are the protection of the residents of the neighbourhood in front of gentrification, the improvement of urban space, the use of space for cultural expressions and the exposure of the situation of Moravia at a national and international level. Moravia Resiste is linked with the context not only of the neighbourhood but also of the city of Medellin, as the new urban planning processes are affecting a wider part of the city.

They use physical and digital communication tools in order to create synchronous and asynchronous collaborations. They have as a base 2 physical spaces within the neighbourhood. They organise most assemblies in a hybrid form. They also have multimedia documentation towards the communication of their work.

6.1.1   Resilience attributes

Adaptability

The understanding of the territory facilitated by the processes of Moravia Resiste has created the potential for more immediate response in cases of disaster, enhancing the adaptability of the community in a diversity of threats.

In the beginning of the lockdown during COVID19, they were the main actors that created online communication tools for the expression of needs and collective action. They also functioned as a mediator among parts of the neighbourhood that were in immediate need and actors that could support them.

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Their approach to the urban commons goes beyond the resistance in front of the new plan. It moves towards the adaptation to new complex realities, including the constant change of the population of the neighbourhood through internal and external migratory movements and the constant change of urban planning tools and laws with developmental goals.

Endogeneity

Due to the characteristics and processes described above, Moravia Resiste enhanced the endogenous capacity of resilience through the involvement of a multiplicity of individuals in processes that facilitate adaptation. They do not provide external support, but rather support the creation and expansion of a community capable of sensing, organising and adapting.

Interconnectedness

The processes mentioned above enhance the interconnectedness at all three levels.

The members of the community are connected through assemblies, events, virtual tools and artistic interventions.

Moravia Resiste provides links with other actors like the Municipality for the flow of information, Universities (UCL London, Universidad de Antioquia, Colombia etc) and NGOs that support the processes of understanding and inhabiting the territory. They also provide links with other initiatives like JARUM (cooperative of gardeners), Llévate Alguito Pués (Cooperative of artisans) etc.

Finally, they enhance the links with broader areas of the city, mainly situated at the northeastern part of Medellín, that face the same threats.

Scalability

The processes of Moravia Resiste sparked the creation of wider social movements in front of the threat of displacement and gentrification within the city. Reflections of their action can be seen at the urban level, as the displacement planned has not taken place yet and at the same time, the case of Moravia, and in extension Medellin, has been much more widely known through their documentation, artistic and other actions.

6.2   Llévate Alguito Pués

General

"The idea is not "Come on, let's work for our family", it is for our common family. And this is the essence of Llévate Alguito Pués.", Santiago Betancur Cardona, artisan-member of the initiative, Interview 05/04/2022, Medellin, Colombia.

Llévate Alguito Pués is a cooperative of artisans. It is run by artisans of the neighbourhood of Moravia at Medellin, Colombia, that create collective entrepreneurship actions towards more sustainable community-based tourism practices.

Llévate Alguito Pués started in 2019 by a community leader and her family who contacted all the artisans they personally knew. The beginning of the initiative was followed by the pandemic 1,5 months later, during which they developed collaborative practices to support each other and individuals in need.

Resource

Llévate Alguito Pués is mainly based on the commoning of tools and infrastructure. They have a physical and a virtual store through which they offer products and share the profit equally.

They offer courses to colleges, educational institutions and groups towards the expansion of knowledge of traditional artisan techniques.

They understand design and tools as public goods which they share. They provide an alternative function to the competitiveness of the market, rethinking the processes that result from the expansion of tourism, towards more sustainable practices.

Community

Llévate Alguito Pués is open to all artisans of the neighbourhood with the common goal of mutually sharing knowledge and products. Their common objectives are the limitation of the competitiveness that is caused by the commercialisation of the area, the creation of sustainable practices, the mutual support in front of economic threats, the sharing of knowledge and skills and the exposure of the multiplicity of cultures of the colombian territory (indigenous, afro etc.).

Equity in participation is ensured with the creation of open calls for interested artisans. They started as 14 productive units, reduced to 6 during the pandemic. The members of the initiative meet on a weekly basis so as to take decisions collectively.

During the pandemic they created an online infrastructure that enabled the residents of the area to register their products and individuals to purchase them on a country level, creating synchronous and asynchronous collaborations.

They are inherently linked with the neighbourhood as they participate and support processes like "Moravidad 2021" (organisation of cultural activities on the streets of the neighbourhood).

6.2.1   Resilience Attributes

Adaptability

Llévate Alguito Pués, based on its aforementioned characteristics, has supported residents, artisans and entrepreneurs, of the area to adapt to new economic realities that emerged both from the expansion of tourism and the shocks that followed the pandemic. It is a space through which novel forms of action emerge towards the adaptation of economic activities through community connectedness. From Llévate Alguito Pués and their links with the neighbourhood resulted a multiplicity of actions during COVID19, including a facebook group providing information and support and an online fundraising campaign that supported artisans during lockdown.

Endogeneity

Llévate Alguito Pués supported resilience as an endogenous process, as the initiative did not provide any external material support. It provided the connections, tools and infrastructure for the community to sense, self-organise and respond.

Interconnectedness

Llévate Alguito Pués, based on its goals and form of action presented above, provides a big interconnection potential internally and externally. It connects artisans among one another, and neighbours in general towards collective action.

Llévate Alguito Pués also connects the members of the initiative with the neighbourhood, with the rest of the city and with the villages of the area through their educational activities and the organisation of events.

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Llévate Alguito Pués has many connections with other community initiatives like JARUM, Moravia Resiste and Mamá Chila (space of protection of children and adolescents).

Scalability

The action of Llévate Alguito Pués has proven to have scalable potential. Except for the results at the neighbourhood level, they have managed to influence diverse villages of the area to move towards similar practices.

At the same time, through the creation of the facebook group "Moravia y el Bosque" and the action of "Moraviaton" they supported the resilience of residents that do not form part of the initiative and were suffering hunger during lockdown measures.

6.3   City life/Vida urbana

General

"City Life/Vida Urbana is a grassroots community organisation committed to fighting for racial, social and economic justice and gender equality by building working class power. We promote individual empowerment, develop community leaders and build collective power to effect systemic change and transform society." (https://www.clvu.org/)

The community of City Life/ Vida Urbana supports housing as a human right and works towards the augmentation of collective action within the city. In 2019 they supported a total of 800 housing units from evictions. During COVID19 they had a wide action following the economic impacts of lockdown measures.

City Life/ Vida Urbana was established in 1973 from a group of local residents and activists with roots in the civil rights, feminist and anti-Vietnam War movements. At the beginning it was called "Jamaica Plain Tenants Action Group". The work of City Life is primarily focused at the neighbourhoods of Jamaica Plain and Dorchester, but open to include any other area of the city.

Resource

Legal advice is generally associated with high costs, which often is a barrier for similar cases. The action of City Life/ Vida Urbana is providing an alternative to this market, understanding legal support as a commons. City Life is focusing on the commoning of information, legal support and relevant material.

All material is created by the community and is open to anyone to use, transform and improve. Information and material flow is enabled through physical and digital infrastructures and is easily accessible.

Community

The actions of City Life are currently coordinated by a core of 14 community organisers. Even if there is an organising board, decisions are drawn among all members through biweekly community meetings in English and Spanish, open to everyone. Their meetings are equitably accessible due to physical and digital communication, including personal communication at the scale of the building.

Their common purpose and goal is focused on the transition towards a society based on racial justice and accessibility to food, housing, health care, education and meaningful employment. Their intention is to scale up the impact through cooperation with leaders, local, national and international groups.

They have online databases that are informed with the input of the residents, enabling also asynchronous collaborations.

Except for the collective action and individual protection from evictions, they have formed actions that prevented school segregation at Boston, organised educational events against repressive regimes globally, created voting campaigns increasing the vote turnouts. This action links them with the context on diverse levels.

6.3.1   Resilience attributes

Adaptability

City Life/ Vida Urbana, through the characteristics and form of action presented, has increased the adaptability of the community in front of a multiplicity of threats. In the beginning of the lockdown measures they sensed the upcoming crisis in housing in the US, organised and raised awareness regarding the upcoming evictions.

They have also supported the adaptation in front of stretches throughout the city, like school segregation. By creating community control of neighbourhoods, they increase this sensing and adaptability potential on a neighbourhood level.

Endogeneity

The endogenous nature of resilience offered by City Life/ Vida Urbana is based on their action towards the ability of the community to legally protect themselves. This contradicts common practices that see legal support as an external element provided to individuals. That way they enhance the potential of collective action in front of a multiplicity of events.

Interconnectedness

City Life/ Vida Urbana is promoting the connection among individuals within the level of the building, the neighbourhood and the city.

City Life is connected with other movements and initiatives that work towards the protection of human rights. Example of which is RentStrike, a movement that emerged on a country level during the pandemic.

Finally, City Life/ Vida Urbana is being connected with governmental bodies so as to share information and enable the creation of laws that protect vulnerable groups.

Scalability

The resilience outcomes of City Life/ Vida Urbana are widely scalable. Their action was central towards the creation of "Moratorium of Evictions" (Moratorium on evictions and foreclosures forms and other resources, 2020) voted at the state level.

Table 1_Interrelation of resilience attributes and characteristics of commoning, per initiative , University of Stuttgart, Germany

7.   DISCUSSION AND FUTURE WORK

With the constantly increasing occurrence and severity of disasters in the global urban centres, it is more vital than ever to rethink the term of resilience. COVID19 pandemic underlined the fragility of the centres of economic and social activity as well as their negative side as centres of inequity and thus epicentres of disasters. These were also the moments when commoning and solidarity community initiatives emerged or gained popularity, providing an alternative to the inequitable approach and response. Starting from the observation of this dual reality, in this research the characteristics of commoning processes have been used as an agent in order to deconstruct and reconstruct the term of resilience.

Based on the analysis of the previous chapters, also summarised in Table 1 through the examples, following I the following characteristics of the commons are the ones correlating with the attributes of resilient systems:

-    "Adaptability": The commons have been observed to function as sensors of the reality and support communities and cities in their process of adaptation. This is based on their characteristics as spaces of collective intelligence, their non-hierarchical structure and their independence from the rules of the market.

-    "Endogeneity": The commons support the endogenous resilience capacity of groups. Their dependence on the capabilities and knowledge of the users and active participation increases the internal ability to sense, organise and respond.

-    "Interconnectedness": The capacity of the commons to create networks and ensure the flow of resources enhances the interconnectedness of the community within which they act. Through the creation of internal links and the participation in larger networks, commoning enhances the three levels of social capital of the communities (bonding, bridging and linking) both in structural and cognitive terms.

-    "Scalability": Finally, the alternative sociopolitical reality that commoning proposes, often leads to political actions that create reflections on greater scales. This is achieved through tactile actions, creation of proposals or connections within larger ecosystems, among others.

8.   CONCLUSION

This research proposed an alternative understanding of resilience focusing on attributes connected with the outcomes of commoning practices, through an interdisciplinary and global literature review and analysis of examples.

This paper focuses on literature that approaches resilience in front of disasters as an evolutionary process, associated with social interactions and with a focus on the inclusion of vulnerable groups. Commoning is analysed as an alternative paradigm and enabler of novel characteristics on the community level as well as on greater scales. The connecting points of the two are observed within global examples.

As the current resilience metrics and decisions have proven to fail to include the most vulnerable, the focus on aspects of resilience proposed by commoning could ensure a more equitable resilience on diverse scales. This paper is attempting to open the dialogue for the transition towards this alternative understanding of resilience.

The research refers to academics in the fields of social sciences, economics, spatial engineering, data sciences etc, as well as community organisations, activists, individuals interested in supporting their communities within current and future stretches and shocks.

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TOOLS, NETWORKS AND COMMON RESOURCES: EMERGENT PARADIGMS DURING COVID19

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Abstract

The alarming building industry-induced carbon emissions call for a radical shift in the current modes of production. From international metropolises to developing megacities, the need for resilient, smart, and innovative approaches to urban development encourages the launch of transdisciplinary initiatives. Since 2002, the Solar Decathlon international competition for architecture, engineering, and technological innovation has been a leading figure in such actions for a transition towards a more environmentally-friendly construction industry. Students, together with their supervising team of professors and researchers, are invited to develop original housing prototypes, both technologically ground-breaking and socioculturally anchored in their contexts. In the 2018 edition held in Dubai, twenty-one teams attempted to address the challenges of living in extreme, hot, and humid climates in the region. Among them, the Baitykool prototype was one of the three awarded projects led by a multidisciplinary and multicultural team. Adaptation to local ways of living and rational integration of new technologies is at the heart of its concerns. The result of such a process is a prototype of sustainable habitat, in which technological innovation does not compromise the authenticity of a situated dwelling.
Using a competition framework and real-life challenges, an active pedagogy approach was developed to form students for interdisciplinary empathy and transversal managerial skills. By empowering these actors, the learning process is enhanced by its embeddedness in pragmatic conditions that, while they await young professionals, are usually not a part of their curricula. Finally, this challenge-based approach is a tangible step towards making the students potential leaders of an environmentally conscious and a better making of our spatial realities.

Key words:

challenge-based learning; interdisciplinarity; solar decathlon; international competition; sustainable habitat; environmental transition

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1. INTRODUCTION

The building industry has one of the most significant carbon footprints, from supply chain (Onat & Kucukvar, 2020), to construction, to use and maintenance. In 2019 in France, the residential and tertiary sectors occupied the third place in the ranking of the most polluting production processes, with greenhouse gas emission rates estimated at 80.8 million tons of CO^2 [1]. These developments are not new. Since the middle of the XXth century, housing has been a matter of speed and quantity, regardless of the increasingly imminent resource depletion and ecosystem damage (Krausmann et al., 2017; Sinaï, 2020). The reconstruction of cities in the aftermath of the Second World War and the re-housing of large numbers of people took precedence over the environmental emergency, the effects of which had already begun to manifest at the beginning of the Industrial Revolution[2].

Those troublesome developments have encouraged the launch of creative initiatives at a professional as well as an academic level, in order to implement radical change in tackling the effects of construction-induced climate crisis. Architectural and engineering competitions figure among the "challenge-based learning" (CBL) and innovation opportunities that offer such exclusive frameworks for experimentation and transitioning towards operational research and development. At a university level, these competitions encourage students to think of sustainable alternatives and inspire action, in a context where they are relatively exempt from the constraints of productivity and direct cost-effectiveness that condition the professional world.

In recent decades, architectural innovation competitions have been requiring the participation of interdisciplinary teams, from natural and technical sciences to humanities and social sciences. The need for eclectic expert knowledge and broad approaches, that include "all of the aesthetics, technical, economic, political issues of social production itself" (Chayaamor-Heil & Vitalis, 2021) shows the complexity of contemporary urban making and sustainability goals. More specifically, climate change issues figure among the challenges that need an "increase [of] interdisciplinarity across working groups to overcome disciplinary bias and the under-representation of human and social science disciplines" (Piccardo et al., 2022), thus "landscape, urban design and architectural processes have had to become more inclusive and more consensual with more discourse" (Bryant, 2021).

Since 2002, the Solar Decathlon international architecture and engineering competition have been one of the most anticipated events where students from all over the world gather to develop innovative building solutions while anchoring their process in the sociocultural contexts of their intervention. During its first Middle-East edition held in 2018 in Dubai (SDME), and among twenty-one international student teams, team Baitykool of the University of Bordeaux set out to design and build an innovative prototype of urban habitat, in response to the challenging extreme climate of the region. Over the course of two years, from 2016 to 2018, this architecture and engineering competition provided the perfect opportunity for professors and students alike to experiment with challenge-based learning, seizing the opportunity to establish new relationships between the university and various institutional and socio-economic stakeholders. Adaptation to local ways of living, rational integration of new technologies, and urban development strategies were at the heart of the team's concerns. Drawing on a wide range of disciplines, Baitykool is a showcase for collaborative teaching and active pedagogy, and an example of the interplay between research and praxis.

In this paper, we will highlight the importance of opening the production of our spatial realities to students' and young professionals' visions through international competitions as a "learning tool" (Herrera-Limones et al., 2020). By empowering these actors in the making of a real-life prototype, the learning process is enhanced by its embeddedness in pragmatic conditions that, while they await young professionals, are usually not a part of their curricula (Torres-Antonini, 2013). By choosing Baitykool as a case study, we illustrate an original approach to the challenges of housing in extreme climates, in which technological innovation does not compromise the authenticity of a situated dwelling. Finally, we will demonstrate how the Solar Decathlon experience has impacted students' career development and professional integration into the Green Economy.

THE TWO-WAY VIRTUE OF STUDENT SUSTAINABLE BUILDING COMPETITIONS

Architecture and engineering competitions are spaces and times of creativity and reflection. They are conducive to alternative practices that usually do not get to be explored in the daily practice of these professions. They are also an opportunity for students to develop complementary knowledge to their academic training. Several researchers agree on the capacity of architectural and engineering competitions to be a source of critical and reflective practices, leading to the production of bold and innovative solutions (Adamczyk et al., 2004). The students' need to seek originality in order to stand out from the other participants pushes teams to channel divergent ideas and to tap into their competitive and inquisitive nature (Willis et al., 2017), resulting in often unconventional and unexpected responses (Guilford, 1973). This holistic approach to active pedagogy shifts the students' stance from passive to active learners, as they develop the ability to transfer knowledge to tangible action (Sivan et al., 2000).

Since its creation in 2002, the Solar Decathlon competition has encouraged teams from all over the world to explore the limits of technological innovation and imagine a new model of housing that is sustainable, high-performance, resilient, and adapted to the domestic practices of its users. Over a period of two years, participants from fifteen to twenty teams must develop a fully functional housing

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1   Based on annual data from 1990 to 2019 from INSEE https://www.insee.fr/fr/statis-tiques/2015759#tableau-figure1
2 According to Agnes Sinai, since the 1950s, the industrialization of human activities has intensified so much that it has triggered a transition to a new geological era: the Anthropocene.

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prototype, averaging 100 m² in size. The houses are required to use the sun as their only source of energy and to be equipped with all the technologies allowing for maximum energy efficiency and comfort.

Although the competition originated in the United States, it has been developing for more than a decade in other regions and continents. Each new edition takes place in a different country, thus setting the local climate and cultural context as additional conditions for the evaluation of the projects. The resulting houses' designs are then built and transported to one common competition site, where the prototypes are open to public tours and are evaluated on the basis of ten contests: energy management, engineering and construction, architecture, sustainability, mobility, house functioning, communication, energy efficiency, innovation, and comfort conditions. Additional prizes are awarded for interior design and building-integrated photovoltaic panels (BIPV).

The Solar Decathlon competition is universities' opportunity "to incorporate the concept of sustainability across strategies and teaching content"(Herrera-Limones et al., 2020) as it has become essential to engage with all academic fields in order to avoid challenges' blind spots, and "respond more adequately to society's needs and problems" (Herrera-Limones et al., 2020). By being open to a wide range of disciplines, Solar Decathlon uses a "problem-solving" approach to encourage students to develop knowledge as close to reality as possible, while exceeding the usual academic guidelines. This form of active learning "represents a significant change and challenge which are innovations in themselves and can provide an environment for stimulating innovative behaviour in staff and students"(Graaff & Cowdroy, 1997).

The competition is at the intersection of research and practice and has a two-way virtue. On the one hand, it benefits the participants and trains them to become leading actors in the building industry's environmental shift. With the help of professors and expert collaborators, students get to experience first-hand real-life challenges, embedded in complex multi-dimensional contexts. Not only does the challenges-based learning approach train future generations of academics, but it also prepares highly skilled professionals (Shin et al., 2018), as some of them discover new vocations and "imagine themselves in careers that they never considered before"(Willis et al., 2017). A problem-solving pedagogy arms students with technical and collaborative skills "in ways not usually contemplated in their curricula, but which nonetheless will be expected of them as professionals" (Torres-Antonini, 2013). In fact, more often than never, real-life challenges are a combination of systemic issues that need "systems thinking" to deal "with the complexity of sustainability issues and overcome[ing] disciplinary silos"(Piccardo et al., 2022). In that sense, the Solar Decathlon competition prepares its candidates to become leading actors in the making of sustainable habitats and urban environments, which "constitutes precisely the kind of 'problem' deemed suitable for an interdisciplinary approach"(Petts et al., 2008).

On the other hand, public and private investors of the building industry benefit from a fresh outtake on current urban development and sustainability innovations. During the Solar Decathlon competition, after the on-site assembly, all prototypes that meet the safety standards are open to the public at large. Both curious visitors and sustainability and building innovation experts get an in-depth look at the students' creative solutions. By giving the teams support and a framework to experiment beyond traditional barriers of practice, companies, and government institutions are able to witness in the span of two years new – and often successful – attempts to come up with original building proposals.

Both sides of the benefits are at the core of "action research" approaches where the participants "enter[s] a real-world situation with the aim of improving the situation and acquiring knowledge" (van Buuren et al., 2015).

BAITYKOOL, AN ORIGINAL COLLABORATION FOR THE TRAINING OF POLYVALENT ACTORS

In 2018, the Solar Decathlon organization launched its first Middle East edition in Dubai, as an introduction to the challenges of an extreme, hot, and humid climate (Image 1). Twenty-one international teams applied as early as 2016 to design a housing prototype, taking into consideration the particular climatic and cultural contexts of the region. Among twenty-one initial participants, the Franco-Emirati-Palestinian team of Baitykool stands out as an example of unprecedented multicultural and transdisciplinary collaboration. The originality of the prototype, as well as the uniqueness of Baitykool's teamwork, earned them third place on the podium, with various high distinctions in sustainability, energy efficiency, BIPV, architecture, and more.

Image 1 Aerial photo of the Solar Hai, during the assembly of the teams' prototypes on site. © www. solardecathlonme.com

The benefits of multiculturality

Before resulting in a functioning and innovative prototype, Baitykool started as a multicultural and multidisciplinary team. Using pre-established scientific and academic collaborations, the schools of architecture (Ecole Nationale Supérieure d'Architecture et de Paysage de Bordeaux) and engineering (Arts et Métiers Talence) of Bordeaux as well as the University of Bordeaux, partnered with the departments of engineering and architecture of Annajah University in Nablus, Palestine, and Amity

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University in Dubai, United Arab Emirates. This transnational collaboration was a way to build up true historical and socio-cultural knowledge of the region, in order to provide an adequate answer to the challenge of the competition. Applying to the Middle East edition of the Solar Decathlon required historical knowledge and a deep practical understanding of the socio-cultural context of the region. The transversal cultural exchanges between the team members across the three countries and the various disciplines were a collective learning experience, allowing for a better understanding of the architectural, social, and cultural components of the competition setting.

Working in a multicultural team was also an opportunity for both students and faculty advisors to internationalize their practice by working with companies, sponsors, and partners from the three countries and beyond, and to learn a wide range of collaborative skills such as choosing a common language, managing long-distance exchanges, collectively respecting deliverable deadlines, sharing the workload fairly, and organizing cross-countries social events.

While architecture and engineering students make up the majority of the team, other disciplines have been actively involved in the design as well as in the construction and the narrative of the project. Students and researchers in communication, biology, sociology and urban research worked together with the design team in order to add to the multidimensional aspect of the prototype. The goal was to build a fully functioning house that was anchored in its context rather than a generic and disconnected showroom for green technology or building innovations.

Interdisciplinary empathy

The multiculturality and interdisciplinarity of the team were a big part of the transformative experience of the participating students, beyond the technical and innovative expertise entailed by the competition. The team's eclectic configuration challenges stereotypes about the collaborating disciplines as it helps team members to "develop empathy with those from other professional fields" (Torres-Antonini, 2013). Understanding diverse work cultures is a key element in achieving a sustainable proposal that takes into consideration all dimensions of a resilient habitat. A design and innovation competition like the Solar Decathlon gives "ground to interdisciplinarity practices which champion the conceptual integration

of diverse values and knowledge capacity, which devolves disciplinary hierarchies without losing disciplinary distinctions" (Bryant, 2021).

Most of the students were in their master's or final year before graduation, which predisposed them to greater pedagogical maturity. As Bryant (2021) argues, such collaboration within a wide range of disciplines requires the capacity to make operational and coherent decisions from divergent perspectives, the ability to make and receive constructive critique for the sake of the project, and the resourcefulness to both simplify disciplinary jargon to convey ideas, and transition from one jargon to the other to freshen one's own point of view on the challenge.

An evolutive working format

The team's working format evolved with each step of the project, from design to manufacturing to on-site construction. During the design phase, weekly workshops were scheduled to establish consistency in the creative process. These afternoons were attended by professors and students from various disciplines, especially from architecture and engineering. The goal was to channel new concept ideas for the prototype, using the interdisciplinarity of the team as much as possible. This proved to be more delicate than expected in the first few months, when engineering students in particular felt left out of the creative process that was mainly taken over by architecture students. A dedicated time to identify what each member of the team could bring to the group and the project However, the more concrete and tangible the architectural concept became, the more other disciplines felt included.

Gradually, as the team grew larger, students were assigned to thematic work packages that corresponded to the main contests of the competition (energy, engineering and construction, architecture, communication, biological system, etc.). This work structure was a way to both concentrate the expertise on different aspects of the prototype for optimal solutions and facilitate the work on the seven deliverables[3] that were expected by the SDME organization throughout the whole competition. In order to set an accountability system, each week were added steering committee and technical committee meetings during which organizational, financial, and technical aspects were discussed and approved.

The second phase marked the shift from a conceptual process that the students were familiar with, to the concretization process which confronted most of them – for the first time – to canvassing companies and sponsors, defining technical specifications, training with professional workers, and manufacturing pieces of the prototype among many other real-life tasks that are entailed by a construction project. The contact with professionals and experts from the building industry was in itself a learning experience which highlighted the importance of work precision and clarity in communication.

As soon as the two-phase prototype assembly started in the last five months of the competition, daily meetings were organized to collectively resolve issues both technical and managerial.

The three stages of the project not only recreated real-life work conditions by dealing with rush periods, canvassing companies and partners, managing relationships within the team, and distributing the workload fairly, but they also offered the students the opportunity to familiarize themselves with different kinds of tasks outside of their original discipline. Some architecture students were involved in biological system management, while some energy management students worked on the wooden structure. A unique experience was offered to those who had never worked in construction sites as they were allowed to participate in the prototype construction and assembly. They were able to witness first-hand the materialization of what once was only a virtual image on their computer screen.

Because the competition lasted two years, from 2016 to 2018, which is a long time period in a traditional university course, Baitykool had to manage a continuous turnover of team members. By succeeding in maintaining a strong interdisciplinary core group of almost fifteen students since the beginning, the turnover helped keep the creative process running around a stable set of concepts.

BAITYKOOL, A MINERAL FORTRESS SHIELDING A LIVING AND GREEN OASIS

As a result of the multicultural and cross-disciplinary teamwork of Baitykool, a 90 m² prototype was designed and inspired by local vernacular architecture models (Image 2). The building revisits the traditional courtyard house configuration to adapt it to various types of inhabitants.

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3 Each deliverable consisted of a detailed report on the team's advancement on every aspect of the prototype, to insure the feasibility of its manufacturing and construction.

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Drawing from the study of Dubai's rising young and cosmopolitan population, the house's organization was intended to answer to the need for hybrid spaces and multipurpose use, such as co-living and co-working. It could also be adapted to traditional domestic activities and practices of a family.

Image 2 The Baitykool prototype. The access is veiled by a wooden pergola on the North façade. © www.solardecathlonme.com

1 Main entrance
2 Patio, green core
3 Living / Coworking area + Kitchen
4 Central wing / technical room / bathroom
5 Aquaponics system-integrated wall
6 Bedroom / Co-working area
7 Reading nook / relaxation area

Image 2 The Baitykool prototype. The Figure 1 Ground floor plan of the prototype. © Baitykool

From the outside, the house is mineral and arid. It is protected with the UHPFC cladding from the desert heat and sandstorms. The main façade of the house (1) is North oriented and the main entrance is located on the West side in order to avoid frontal exposure of the interior and preserve the privacy of the inhabitants.

Once inside (2), a vivid and organic core contrasts with the overall monolithic aspect of the building. Like a green urban oasis, the patio is where life happens. To the left side (3), accordion French doors (3) lead to a lounge/coworking space with modular furniture and a flexible space layout. The perpendicular wing (4) leads to the technical room, the bathroom, and the first bedroom/working space. The corridor is naturally illuminated by the light of the courtyard passing through the aquaponics system's aquarium.

The third wing (5) serves both as a large coworking space and as a master bedroom, with a handcrafted playful nook to take some height and explore another perspective on space in a single-storey house. When the sun sets, what seems to be a closed block of concrete during the day, is lightened and illuminated by night (Image 3), creating a constellation of lights through the contemporary double-skin "mashrabiya". The house's introversion is emphasized by its fiber-reinforced concrete double-skin, allowing one to see without being seen.

Image 3 View of the Baitykool prototype by night. © Baitykool

The patio, where all disciplines intersect

Baitykool's housing project consists of a multi-purpose inhabited space. Its interior articulation is inspired by the local architectural model of courtyard houses (Image 4). In the common vernacular tradition of the Arab-Muslim architectural model, the interior courtyard has historically been mobilized to serve cross-cutting issues of sustainability (Ibrahim, 2019; Zamani et al., 2012), adapting to both the climatic condition of the area as well as the social and cultural habits of its people.

Image 4 The interior courtyard, around which all the spaces of the house are organized. Baitykool

In the prototype, the courtyard is the spatial element where we most witness the intersection of the team members' expertise and knowledge in their respective disciplines. From an architectural point of view, the patio articulates two distinct ways of practicing space. When isolated physically from the rest of the house with the transparent accordion patio doors, a U-shaped transition through privacy is created from public to private. Once the doors are wide open, the limits between exterior and interior blur, and the whole space opens and encourages social interaction (Image 5).

Image 5 The courtyard with the accordion-like French doors are open, inviting gathering and free circulation between spaces. © Baitykool

The prototype's spatial configuration also meets the functional needs of the targeted inhabitants, allowing the separation between coworking and co-living time periods thanks to the space's modularity. This transition in temporalities and between practices echoes those of the traditional local spatial models of the area. Most of the courtyard houses are in fact organized around a centrality the appropriations of which evolve throughout the day, defining various activities.

The courtyard also addresses the energy production and climate comfort goals of the house through a set of complementary devices. First, a wood-carbon solar canopy[4] protects the courtyard and supports transparent photovoltaic panels that provide shade without totally blocking natural light (Image 6). This innovative integration of PV panels owned the team the first prize in the BIPV challenge.

Image 6 The solar canopy with integrated photovoltaic panels, providing shade to the courtyard and preserving the evapotranspiration of the plants to achieve a local microclimate. Baitykool

The canopy also contributes to passive cooling. It helps preserve the roof's and the courtyard's plants' evapotranspiration to create a pleasant microclimate outdoors, despite the harshness of the temperatures.

When the weather cools down at nightfall, the automated beams of the canopy fold to offer an uncovered view to the sky while at the same time creating a tunnel effect to evacuate hot air upward.

The central wall of the courtyard has an aquaponics system integrated into the envelope. The goal was to assure the development of self-sufficient food production on a micro-local scale. Thanks to specific bacteria, the waste produced by the fish in the aquarium is transformed into minerals, which feed the vertical "zipgrow" farm's fruits and vegetables, which in turn filter the water that returns to the aquarium in a self-sustaining closed loop.

Finally, the green roof benefits from an automated irrigation system that uses recycled greywater, thanks to "vermifilration" and bio-solar purification.

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4 The wood gives inertia to the beams' structure while carbon confers more rigidity (up 10 meters range).

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Although the courtyard represents a micro-spatial scale, its functions and performance depend on a combination of various disciplinary perspectives, which goes to show the necessity of transdisciplinary thinking in the design of sustainable spaces, from the the smallest domestic scale to large urban and territorial ones.

The Baitykool prototype also showcases an interesting fusion of vernacular and new technologies, as it couples the principles of the traditional courtyard house model with innovative technological devices to create a space that is not only anchored in local living cultures, but is also adapted to the climatic and environmental challenges of the region, thus reaching as much as possible for a sustainable solution.

CONCLUSION

Lessons on innovation and authenticity

The Baitykool case study demonstrates that, of all the challenges of the competition, the search for a balance between the risk-taking associated with innovation and its anchoring in the pre-existing context is the most delicate. "How do we design a prototype that responds to the specificities of a given cultural and environmental context, while making it duplicable and adaptable to other conditions?". This is where the intersection of technical and social sciences is crucial. The development of a modular, scalable, high-performance architectural prototype must be thought out in tandem with the socio-cultural narrative it carries, tapping into the richness of the local context. Drawing inspiration from traditional vernacular architecture is in no way an obstacle to technical experimentation and innovation, which are necessary today to meet contemporary environmental challenges. And conversely, the integration of technological devices is not synonymous with altering the authenticity of living and building cultures. Rather, it is a matter of preserving the architectural heritage by supporting it in its transition and adaptation to current needs.

Active pedagogy, soft skills, and enhanced professionalization

The Solar Decathlon international competition is a concentrated experience of active pedagogy and challenge-based learning, with various benefits for the participating students. Beyond the expectations of the competition, essential soft skills have been brought into play by the project's pedagogical approach, showing that "competition and collaboration can be used to complement formal learning in the classroom" (Willis et al., 2017) and to "bridge the gap between education and practice by means of a holistic approach" (Graaff & Cowdroy, 1997).

According to a survey[5] conducted by the Support Mission for Pedagogy and Innovation (Mission d'appui à la pédagogie et à l'innovation) with the Baitykool team, personal development skills are among the most recurrent in the surveyed students' feedbacks. Compared to traditional academic settings, more than half of the respondents reported a unique and empowering environment that encourages self-confidence and accountability.

Moreover, all of the students claim to have acquired more technical skills through a wide variety of practices. Carrying out the project allowed them to deepen their understanding of technical systems and even develop an expertise in their own disciplinary backgrounds

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5 *The study was conducted by Laure Bourhis, a master's student in educational sciences, on behalf of MAPI (Mission d'Appui à la Pédagogie et à l'Innovation) with teachers and students involved in the Baitykool project. The aim was to carry out an inter-discourse comparison between the two groups around eight major themes, including the professional integration of students following the competition.*

By embodying different roles and responsibilities within the project, the students acquired cross-cutting management skills, both in terms of time organization and task tracking, as well as in team and human resource supervision.

Finally, after having experienced the on-site construction and assembly of the prototype, most students - especially architects and engineers - say that they have a better awareness of what is involved in the concretization of a building project in real life and, as designers, have a greater perspective on their expectations of other on-site collaborators and field actors.

Professional integration in the Green Economy

After the Solar Decathlon experience, at least ten members of Baitykool's student team have gone on to pursue professional and academic careers related to sustainability in the building industry and energy solutions sectors. An architecture graduate started a doctorate in bio-sourced material construction, a hydrobiology student co-founded a start-up of innovative water management systems, and several engineering students graduated and joined sustainable energy solutions companies and organizations, to only name a few.

Many students report that incorporating the Solar Decathlon experience into their professional profiles and resumes has been appreciated by their employers, testifying to their innovative approach to design and their ability to work under realistic pressure and work conditions. Others have taken advantage of their managerial and personal development to move up the professional ladder, thus demonstrating their sense of agency and their management skills within their company.

In conclusion, the active "student-centred learning" (Rogers, 1961) opportunity offered by this type of student competitions has lasting effects on both the shift toward more sustainable practices within the building industry and on the participants' professionalization, involvement, and eagerness to substantially contribute as potential leaders in a better making of our spatial realities.

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ARTIFICIAL INTELLIGENCE AND HEAT EXPOSURE: MAPPING PEDESTRIAN DENSITY AROUND METRO STATIONS

1-E-2

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Abstract

Urban studies are extensively tackling the role of Artificial Intelligence (AI) in studying people experience in public spaces. Thermal comfort is one of the essential factors that shape the quality of pedestrian experience in the urban context. AI is continuously offering applications to detect and evaluate human behavior in indoor and outdoor places. The current research has used one of computer vision applications to analyze pedestrian behavior in a metro station's context in the Central Business District (CBD) of Cairo, Egypt. This study investigated how pedestrian movement behavior is affected by heat exposure in the urban context. The results illustrated the relationship between urban configuration, thermal conditions and pedestrian experience in stations' area. The findings also shed the light on AI contribution in urban studies. The gained results could address a number of aspects that influenced users' experiences in the case study. This study provided a guide for future research to develop qualitative and quantitative study for pedestrian comfort levels depending on innovative applications.

Key words:

challenge-based learning; interdisciplinarity; solar decathlon; international competition; sustainable habitat; environmental transition

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1. INTRODUCTION

Previous studies have investigated Urban Heat Island (UHI) effects on people thermal comfort in urban context. Numerous studies have studied how thermal conditions are strongly related to the nature of urban configuration elements, land cover and other heat-absorbing and heat-retaining surfaces (Elmarakby, Khalifa, Elshater, & Afifi, 2021; Elbardisy, Salheen, & Fahmy, 2021). Increasing UHI effect has a serious influence on energy use, pollution levels and people health in cities. Cities are increasingly turning towards depending on specialized technologies to address issues related to society, ecology, morphology and many others. On the other side, the emerging concept of 'Smart Cities' highly encourages the incorporation of sensors, computer vision and Big Data (Allam & A.Dhunny, 2019). Today's world is exploring the contribution of Artificial Intelligence (AI) technology in multiple fields. This is due to the promising applications that have appeared lately. In addition, the flexibility of applications and software foundation provides great opportunities to think, test and apply. AI is a technology enabling machines to do mental functions that were always done by humans (Yigitcanlar, et al., 2020).

Increasing dependence on sustainable modes of transportation has been an international trend. There are active transportation initiatives to encourage walking and cycling to reduce UHI effects and mitigate environmental problems (Heaviside, Macintyre , & Vardoulakis , The Urban Heat Island: Implications for Health in a Changing Environment, 2017). Metro is one of the most important modes of transportation in Cairo. More than four million people depend on metro in their daily trips (CAPMAS, 2017). There are several studies have worked to evaluate users' experience in stations' context (Sun, Zacharias, Ma, & Oreskovic, 2016; Basbasa, Campisi, & Canale, 2020; Hernandez & Monzon, 2016). Previous literature assured that users' experience mainly depends on their comfort levels and Level of Service (LOS) in urban spaces. However, there is a lack of using technology in studying pedestrian behavior in stations' context. The gap in literature is in providing an effective method to provide qualitative and quantitative mapping for pedestrian behavior. Previous studies depended mostly on observation, interviews and surveys to investigate the effect of urban configuration and its physical elements on users' experience in the study area.

This research has worked to investigate the relationship between outdoor thermal conditions and pedestrian movement behavior. This was mainly through detecting people preferences by using one of ascending AI applications to map users' experiences in the station's context. This study aimed to investigate the capability of AI applications' contribution to detect and analyse human behaviour in urban spaces. In addition, it targeted studying the UHI effect on pedestrian movement behaviour ad preferences in stations' areas. The researchers worked to fill the literature gap on using computer vision applications as an effective method to provide qualitative and quantitative analysis for users' experiences in different urban environments.

STATE OF THE ART

Urban sprawl has led to the growth of urban traffic and increasing attractions in the city's central area. This is one of the biggest urban challenges facing today's cities (Khosravi, Haghshenas, & Saleh, 2020). UHI phenomenon is one of urban sprawl results that affects people health, due to pollution of the air, water and soil from industry and traffic, from noise and from over-crowding and poor housing (Heaviside, Macintyre , & Vardoulakis , 2017). UHI effect describes the higher temperatures experienced in urban areas compared to the surrounding rural ones. It also leads to increased

energy needs that further contribute to harmful environmental and public health consequences (Mohajerani, Bakaric, & Jeffrey-Bailey, 2017). Most of the research investigations on methods to mitigate UHI aimed to reduce energy demand for cooling and green-house gas (GHG) emissions (Bonamente, et al., 2013). On the other hand, the impact of the UHI on heat-related health could not be ignored especially when discussing future impacts associated with climate change. The heat island effect arises as a result of a reduction in vegetation, a higher heat radiation of surfaces with low albedo, e.g., asphalt and concrete, and increased anthropogenic heat production (Long L. & Zhang, 2020). Heat stress is a direct consequence of the UHI effect. Long exposure to heat impact seriously contributes to human discomfort in the urban environment (Lee, et al., 2017).

Today's countries have active transportation initiatives to reduce urban heat islands (UHI) by reducing automobile use in cities and promoting cycling and walking. Metro is considered as one of sustainable modes of transportation that serve millions of Egyptian citizens daily. Attractive urban environments that achieve higher comfort levels can contribute to encourage people to use public transit (Stojanovski, 2020). The properties of materials used for pavement, streets, walls and landscape architecture elements strongly affect thermal conditions in the urban context. Therefore, urban designers and landscape architects play an important role to mitigate UHI effect.

Providing suitable station's context surely depends precise detection of people behaviour in the stations' area. This is to evaluate their experience and investigate their needs in order to be considered in developing existing stations' area or allocating future stations. Jamei et al (2016) have discussed that the use of appropriate masses geometry and vegetation seems to be very promising in mitigating UHIs effect and providing a better pedestrian thermal comfort. At the micro-scale, the street architecture, e.g., canopy geometry and building orientation has an effect on thermal conditions in urban spaces by controlling wind speed, sun shading, heat emission, etc (Krüger, Pearlmutter, & Rasia, 2010). Shaded pedestrian and cyclist paths and more relaxed environments is effectively encouraging walking and cycling which are the main methods to transfer between different public transportation means or form station (origin) to destination (Alattar & Furlan, 2017). Based on the above, the configuration of stations' context is an essential factor that affects commuters' thermal comfort. Therefore, stations' context design could contribute to encourage people to use public transportation means in their daily trips (Zhao & Li, 2017).

Artificial intelligence (AI) is a powerful technology with an increasing popularity and applications in various fields ranging from marketing to banking and finance, from agriculture to security, from space exploration to robotics and transport (Yigitcanlar, et al., Artificial Intelligence Technologies and Related Urban Planning and Development Concepts: How Are They Perceived and Utilized in Australia?, 2020).Its systems are widely accepted as a technology offering an alternative way to tackle complex and dynamic problems in urban studies (Wu & Silva, 2010). Computer vision is a discipline that makes computers "see" by processing images and/or image frames (video) (Turk, 2004), by understanding the geometry of image formation and properties of the sensor (camera) (Gavrila & Munder, 2007). The recognition of human body action is considered as a good deal of interest in the computer vision community. Its ascending application are able to detect pedestrian flow, speed, density, etc. which are the main factors of evaluating level of service (LOS) for a specific area. Thus, the researchers worked to investigate the contribution of this technology in studying stations' context.

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METHOD

Case study: This research has studied the area of three station exits in Downtown, Cairo. Orabi station is leading to Ramses Street which is a vital area including commercial, residential and administrative uses (Figure 1). The study area has various types of commuters: daily commuters who work or live in station's catchment area and occasional ones who visit the surrounding buildings for a specific purpose. Researchers found that Orabi station's area could be an appropriate case to be studied from different sides.

Figure 1. Orabi station location and its exits

Processing data: The primary phase is to study the station's area by observing commuters' behavior, their activities and gathering areas. The main aim of this phase, March 2021, is to determine rush hours and the nature of pedestrian activities in the study area. The researchers have prepared a map for the station's area using ArcGIS with database of buildings' height, use, roads width and other landscape architecture elements. This was in order to assess the urban configuration elements in the targeted area.

Data gathering was through recording videos for station exits at rush hours, from 1:00pm to 3:00 pm, two days per week for one month. The researchers excluded the non-working days because the target was to map pedestrian movement and preferences at the highest densities. Gathering data phase also included thermal imaging for the station's area with focusing on paving, vertical elements, station structure, etc. Thermal imaging is a technique used to examine UHIs using thermal infrared camera that receives radiation from targeted objects (Elmarakby, Khalifa, Elshater, & Afifi, 2021). The researchers used the FLIR T540 Thermal Camera (model: 79302-0201) to capture photos from various points in the study area to address the entire thermal states of objects. The images were captured from 1:00 to 2:00 pm on December 16, 2021. Thermal camera processed the captured photos and produced images with heatmaps supported by colour range that presented the variation of temperatures in the cadre. The produced images helped to detect the urban configuration impact on thermal conditions in the study area.

The researchers have depended on 'Goodvision Insights' software, one of ascending applications, that uses computer vision technology to process image frames and produce traffic data analysis. Input data was the recorded videos which have been processed in order to extract traffic data. The researchers defined the area of interest to be analysed, the research area of interest was

mainly people. The analysis produced was presented through numeric values, raster images with heatmaps and lines of movement of various colours. In order to get the output values on GIS map, the researchers have divided the cadre into cells with equal areas and produced their values to be entered on the same cells on the map. This was in order to relate the results of density, flow and speed variation values to the urban configuration study and thermal images values.

RESULTS

Thermal images observation showed that lower temperature was always in areas adjacent to buildings where their shading spread. In addition, sidewalks of interlocking materials were of lower temperature than those of asphalt and concrete. The results confirmed that buildings' location, height and orientation contribute to lower temperature in the station's area through provided shading and wind flow allowance.
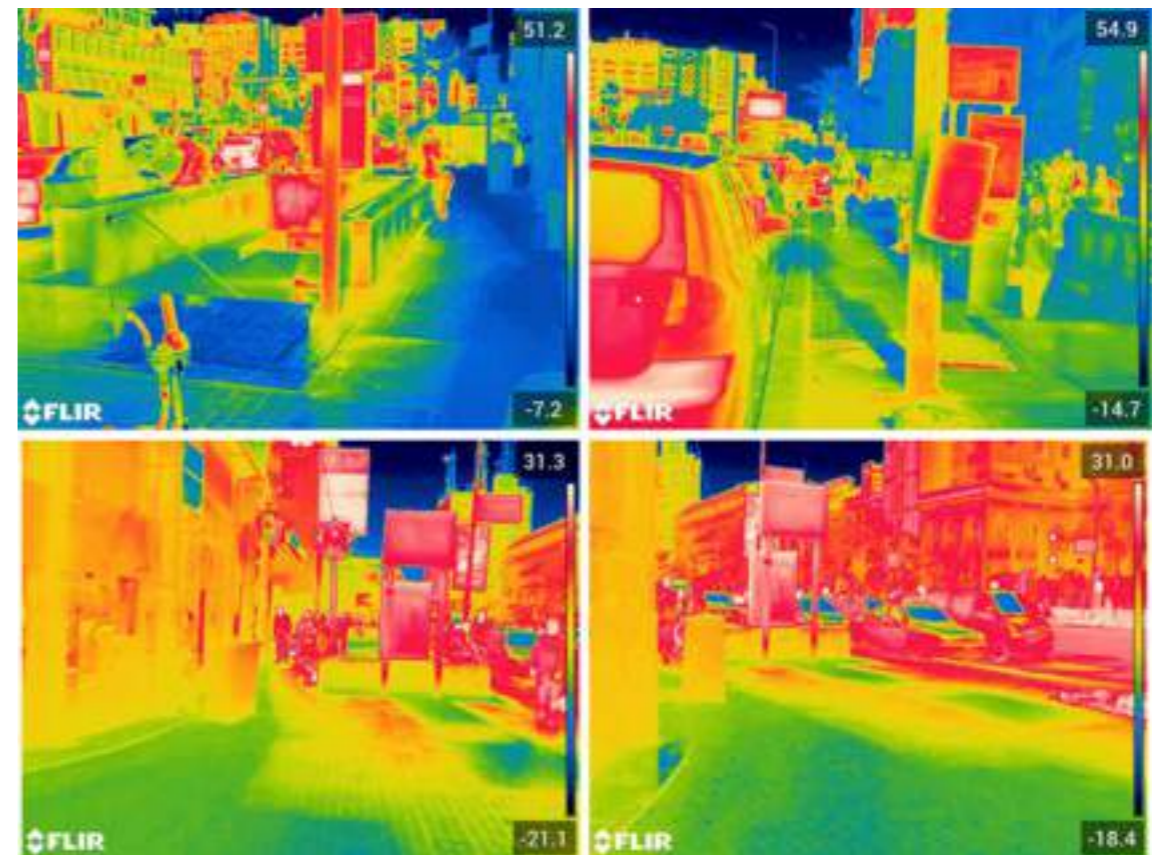
Figure 2. Exit 1 area thermal photos. Source: (Wael, Elshater, & Afifi, 2022)

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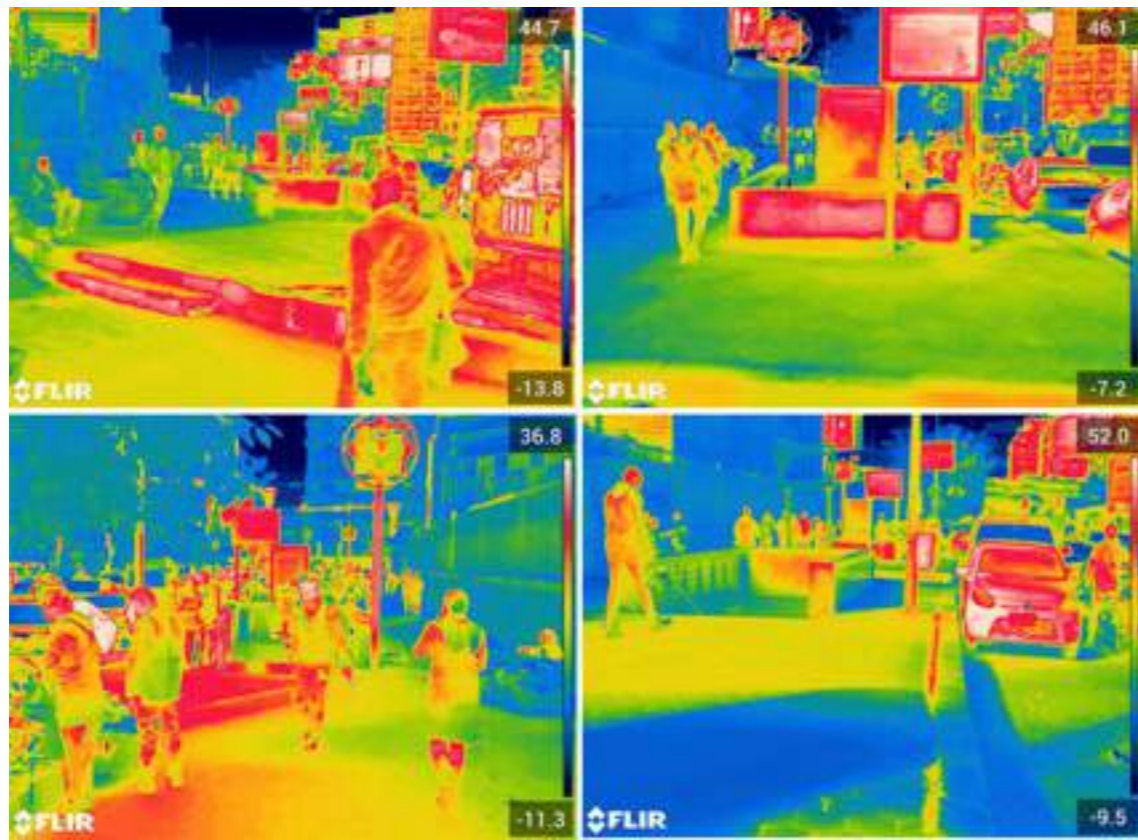
Figure 3. Exit 2,3 area thermal photos, source: (Wael, Elshater, & Afifi, 2022)

Comparing numeric values of pedestrian density to temperature variation heatmap, the researchers found that higher densities are usually related to areas of lower temperature, especially in areas adjacent to buildings (Figure 4). So, buildings also play an important role to give pedestrian a sense of enclosure, that's why they prefer buildings' adjacent areas. The researchers also found that trees contribute to lowering temperature of sidewalks in exits 2,3 comparing to exit 1. Consequently, vendors and kiosk preferred to use areas of trees shading to allocate their activities. On the other side, pedestrians are restricted to use these areas to walk or rest because of their occupancy. This means that although lower temperature contributes to increasing activities, the station area design should organize the use of the space to serve all commuters' types without disturbing their flow.

igure 4. People density heatmaps. Source: (Wael, Elshater, & Afifi, 2022)

As for pedestrian movement behaviour analysis, it showed that people preferred to use paths with lower temperatures most of the time. However, many pedestrians were forced to walk or stop in warmer areas to reach their destinations or even transfer to other transportation means that definitely lower comfort levels for station commuters. Speed change heatmaps reflected that pedestrian speed change was related to their density and flow rate (Figure 5). In addition, it was related to temperature variation, people had to walk faster in warmer areas than cooler ones. All of the above assured the impact of thermal comfort levels on pedestrian movement behavior and their preferences in stations' area. Previous literature has discussed the role of contextual design as a potential option for better walkable places (Tarek, Hassan, Elshater, & Elfayoumi, 2020; Abusaada & Elshater, 2021). This research results have been shown to work particularly well to evaluate pedestrian experience in stations' areas using computer vision technology. In addition, it discussed a method that contribute to development plans that aim to enhance users' experience in public places.
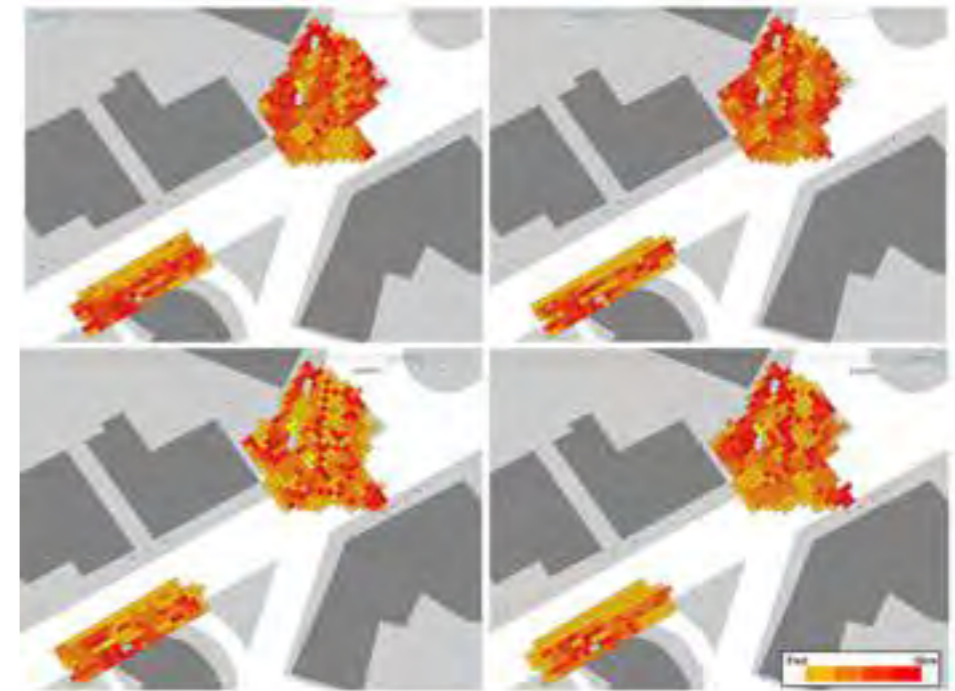
Figure 5. Speed change heatmaps. Source: (Wael, Elshater, & Afifi, 2022)

The current research has faced multiple limitations of security issues that limited the use o camera in specific places. This prevented the researchers to study more cases in order to provide comparative analysis. Financial issues were also a limitation that could not be neglected as license of using the application required were expensive to be afforded for analysing more videos for longer period. However, the results were almost close to each other for most of days, so the number of videos recorded was sufficient for the research purpose. The research contribution is to shed light on the role of AI technology in planning and design process of the station context. In addition, it clarifies a method of evaluating their level of services. The study investigated the effect of urban configuration with its physical element on pedestrian thermal comfort and consequently their preferences.

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CONCLUSION

The researchers here discuss the contribution of AI in studying pedestrian behavior in stations' context. In addition, they work to relate their movement patterns to the thermal conditions in order to show the effect of thermal comfort levels on pedestrian preferences. The researchers have used AI to map pedestrian movement patterns considering the metro station context in Downtown, Cairo. The main primary findings identified the inherent relationship between user experiences and urban composition. The results also revealed that the urban morphology of the metro station context influences commuters' thermal comfort and movement preferences. This study opens future research directions with the potential to develop a qualitative and quantitative analysis of people's experiences around metro stations.

The researchers here discussed the role of computer vision techniques in mapping pedestrian behaviour and evaluating their overall experience in stations' area. Therefore, using technology could help to facilitate design and development processes through its contribution in human behavior and LOS studies. Moreover, the current study has investigated the relationship between urban configuration and station commuters' thermal comfort. Studying people density, speed and flow rate has helped to investigate this strong relation. This confirmed the role of urban design in making stations' context more attractive and consequently encourage the use of public transport means.

Future research may address the existing work limits by studying various station regions of different conditions and at different seasons. Future research teams should include technical professionals to assist in linking the findings in a simpler way. In terms of security, future studies may work with the government to install cameras in various points of stations' catchment area to monitor people's movement patterns at different times per day and in different months. As a result, further study might help understand the impact of different temperature conditions on comfort levels and human behavior in station areas. These findings would aid in formulating criteria for station area design and development.

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CONSTRUCTION WASTE AS A RESOURCE FOR A NEW PRACTICE:
OPPORTUNITY FOR PROJECTS NEGOTIATED BETWEEN ECOLOGICAL TRANSITION, OPERATIONAL FEASIBILITY, AND SUSTAINABILITY OF THE PROCESS

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Abstract

Today, buildings and public works occupy an essential place in the world economy. However, they are the leading creator of waste in France: 227 million tons of waste per year in France (ADEME, 2018). At the same time, these sectors consume large amounts of resources to meet the needs of renovation and new construction.
In this context, architectural and urban practices are brought to mutate, to be remodeled through the prism of ecologic transition, operational feasibility, and economic efficiency. Although waste management is the responsibility of the contracting authority, these practices are now indicative of cooperation areas between construction stakeholders. This cooperation between the project's actors would require mediation, awareness, and transmission of know-how; know-how to anticipate and know-how to design.
While the recovery of construction waste is a political challenge to be met and a booming field of research, it nevertheless raises satisfying mainly thoughts from the angle of ecologic urgency, waste-resources also raise the question of the organizational, economic, and architectural feasibility of the reuse process and its temporalities (times for reflection, analysis, implementation, visibility, memorization of the action and transmission of knowledge) which appears to be necessary.
In this context, could the promotion and communication of new operational methods resulting from the waste prevention approach in partnership with local and institutional actors ensure the continuity of the process and the transmission of the socio-territorial approach and establish a new pedagogy allowing the massification of practices and the reuse promotion?
From these research issues, our paper will seek to demonstrate that there is a possible space for negotiation between institutional strategies for construction waste prevention, the transformation of operational practices for the reuse process, and the importance of recovery and communication for a new approach for the process sustainability.

Key words:

Construction waste - Ecologic transition - Reuse practices – knowledge Transmission

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1. INTRODUCTION

Towards a resource architecture

This article is a milestone in a long journey of an ongoing thesis. Within the framework of the doctoral studies in architecture and city, it briefly presents the framework and the method of work and reports on the progress to date. It will return to the relationship between the regulatory definitions of waste prevention practices and those given by professionals, and more particularly to the new practices and interdisciplinary approaches emerging in researching projects thought by the resource. This paper is also an opportunity to test the operative concept of "réusage" defined in the framework of this research to go beyond the status of "waste" and move towards a global process of interdisciplinary design that questions our construction processes sustainability.

The building and public works sector include two sub-sectors: "Building" and "public works", each of which includes different types of operations (construction, rehabilitation, deconstruction). Today, buildings and public works occupy an essential place in the French economy: a turnover of around 162 billion euros in 2016, of which 78% for buildings and 22% for public works (ADEME, 2018). However, they are the 1st creator of waste in France: 227 million tons of waste per year[1]. The building sector generates more than 42 million tons of waste each year (the equivalent of 4,000 Eiffel Towers), including 22 million tons generated by demolition sites, 18 million tons by rehabilitation sites, and 4 million tons by new construction sites (ADEME, 2018). Construction waste is 73% inert waste that could be reinvested. At the same time, these sectors consume large quantities of resources to meet the needs of renovation and new construction. 460 million tons of mineral materials are used each year for building and infrastructure construction, or about 7 tons per capita per year (ADEME, 2018).

2-STATE OF THE ART

Construction waste: from source to resource

In France, the notions of source, consumption, and resource are controversial. On the one hand, many studies consider the massive production of housing as a solution to building the city upon the city (Touati & Crozy, 2015). On the other hand, various researchers reveal the need to limit production and valorize material to protect the environment and opt for a "fairer transition" (Lavelle, 2015). To do so, the environmental code distinguishes between different types of waste management according to a hierarchy: reduce waste (do not demolish buildings), "réemploi" or reuse for the same employment, "réutilisation" or reuse for another employment, recycle or revalue waste and then dispose of it (last resort). To resort to the reuse or the re-use of materials requires starting two different paths. Indeed, "réemploi" is a specific prevention action designating "any operation by which substances, materials or products that are not waste are used again for a use identical to that for which they were conceived"[2]. "Réutilisation", on the other hand, is defined as "any operation by which substances, materials or products that have become waste are used again"[3]. Unlike « réemploi », it implies that the products or substances have become waste before

the operation allowing their reuse, i.e. that the user has disposed of the object or substance and that it has been collected.

This context of tensions or contradictions between two objectives that could be articulated is thus revealing territory with stakes, all the more so as the question of natural resources and the economic model that stems from them is now on the political agenda. Today, France has a waste recovery rate close to 56%, which is still lower than some of its European neighbors (90% recovery of inert waste in the Netherlands), and the objective of 70% recovery of construction waste by 2020 set in the Waste Framework Directive, which has not been achieved (Sia Partners, 2013). Aware of this considerable delay, legislation is focusing on construction waste and in particular demolition waste (RECORD, 2011).

Recently, the AGEC law of February 10, 2020 "Anti-waste and circular economy"[4], which raises the uncertainties concerning the status of "waste", and obliges public project owners to carry out a diagnosis relating to the management of products, materials, and waste before demolition. It means a detailed diagnosis of the work allowing to distinguish the products, the wastes, and the materials and to reveal the potential of management of the wastes and the possible reuse in the operation. This AGEC law sets up an Extended Producer Responsibility (EPR) channel and a fund dedicated to the financing of reuse and thus, reinforces the partnerships between the State and the innovative private project leaders.

Nevertheless, the counter-meaning and the accumulation of laws and regulations diminish the performance of the standards[5]. The way some articles of the law, the DTU, and the standards are written does not highlight the potential for reuse. The E+C- standard[6], for example, which makes it possible to evaluate the global carbon impact of the buildings and that of the construction products and equipment which compose it, does not evoke for the moment the reuse as a constructive process vector of inertia of the building which contributes to its low carbon footprint and thus answers the objectives of this label.

Evolution and mutation of practices...

In this context, architectural and urban practices concerning the prevention of construction and public works waste and, more specifically, the techniques for reusing construction and reconstruction materials are being transformed and reshaped in the light of the ecological transition, operational feasibility, and economic efficiency. Although waste management is the responsibility of the project owner, these practices are now revealing fields of cooperation between construction actors. Cooperation consists in producing knowledge together and sharing it so that it can be appropriated by all. This notion is different from that of collaboration, which consists of working together for individual objectives (Laurent, 2018). This cooperation between project actors would require mediation, awareness-raising, and transmission of knowledge-thinking, knowledge-anticipating, and know-how. In this context, the financial support of public and private policies appears as a lever for reuse and waste prevention. In particular, collaborative platforms such as DEMOCLES, the FAIRE call for projects launched by the Pavillon de l'Arsenal, a gas pedal for architectural and urban projects, and the various calls for research and development projects supported by ADEME since

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[1] According to article L.541-1-1 of the Environmental Code, waste is defined as «any substance or object, or more generally any good, which the holder discards or intends or is «Espace to «.».
[2] Article L. 541-1-1 of the Environmental Code.
[3] Idem.

[4] Law n°2020-105 of February 10, 2020, focuses on 4 major orientations: waste, mobilization of industry, citizen information, and waste collection.
[5] Encore Heureux, Matière grise, matériaux/réemploi/architecture, Paris, Éditions du Pavillon de l'Arsenal, 2014.
[6] The E+C- standard also makes it possible to evaluate the production of waste related to the implementation of the latter. See: https://www.actu-environnement.com/media/pdf/news-27814-referentiel-label-energie-carbone-methode.pdf

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2009. Examples include BAZED, which offers assistance in designing "zero waste buildings", a circular approach to reducing the environmental impact of buildings and their waste production, DEMODULOR, which presents new demountable construction systems for reuse and recycling, ReQualif, which deals with the prequalification and reuse of construction components, and REPAR 1 and REPAR 2, which deal with the mobilization of materials for reuse, from dismantling, deconstruction or rehabilitation products by including materials from dismantling in architecture, urban planning and construction projects.

With this in mind, many researchers have focused their attention on the crisis of materials and the processes of reuse. Let us note, for example, the research on the practices of reuse of materials in the "pre-rational" phase (Huygen, 2008, p.12) and the recent National Strategy for Architecture (SNA) instigated by Fleur Pellerin, which gives a special place to action research, experimentation and the built well. Moreover, some collectives and architects engaged in this practice such as Patrick Bouchain, Bellastock (association of architects), and Encore Heureux (architecture agency) in Paris, Na! Architecture in Grenoble and ROTOR in Brussels have tested processes for an architecture that is the expression of the will to manage and prevent construction waste. These actors of the professional practice work on the questions of deconstruction and reconditioning of recovered materials and lead reflections on the reuse of materials.

In addition, the interministerial research program entitled Architecture of the 20th century, resources for the sustainable architecture of the 21st century deals with the issues of resource diagnosis, tools for networking resources, and actors. For example, in the REPIC research project that took place between September 2016 and February 2020, the winner of the first session, consisted in demonstrating the hypothesis that reuse inflects architectural design methods. These different structures, through analysis and experimental research, reveal the interest in the multidisciplinary of these processes and situate the research in an overall dynamic. Nevertheless, the question of the prevention of construction waste as an opportunity for negotiated projects between ecological transition, operational feasibility, and sustainability of the process remains an unexplored field.

In the context of construction and reconstruction described above, could the promotion and communication of new interdisciplinary operational methods in partnership with local and institutional actors ensure the continuity of the process and the transmission of a socio-territorial approach and establish a new pedagogy allowing the massification of practices and the promotion of re-use?

3-METHODS

A theory-practice method

France is an interesting field of exploration for several reasons. First, the current ecological emergency requires us to think in terms of resources. Thus, this territory is bound to change, as shown by the formulation of tools and recent regulations encouraging the management and recovery of waste from the building and public works sector and the availability of funding for research and application of innovative methods to encourage project leaders to address these topical issues. The financing of the waste management project can be considered as a lever or a brake on the project in terms of the

adhesion of the economic actors. ADEME, for example, is an organization that constantly launches calls for projects and calls for research topics that aim to finance innovative projects on waste prevention and management. Moreover, France presents a diversity of spatial and social situations, which clearly shows that there is not one field of study but many fields of study that constitute a key issue that architects must face.

Framing of the research…

To explore our research axes, we have defined a theoretical-practical method (Findeli & Coste, 2007) which is in line with the work already carried out within the main laboratory of the thesis direction: the Centre de Recherche sur l'Habitat (CRH) of the Laboratoire Architecture Ville Urbanisme et Environnement (LAVUE), counting among the mixed research units (UMR n° 7218) of the Centre National de la Recherche Scientifique (CNRS) which develops studies on the processes of production and management of the built environment and the social qualification of urban spaces. My research is at the crossroads of axis 1 Urban fabrications and axis 3 Inheritances and innovations in the construction of territories.

In this same perspective, this project is also framed by the laboratory Project(s) in Marseille, which is interested in the development of methods and tools for a project in connection with the practice of reuse.

To experiment with our research through the project, we collaborated with the aforementioned architecture and urban planning agency, which co-financed this thesis for its interest in the subject in its operational practice. Indeed, it has been engaged for many years in an Environmental Quality (EQ) and waste recovery approach. More specifically, these last years, in the reconversion of built sites, with strong patrimonial and environmental character, by an approach of conservation, rehabilitation, and reuse of existing materials in priority collected on the site of the project. Thus, this CIFRE thesis allowed us to combine fundamental research and action research and to experiment research through projects (Hanrot, 2002)[7].

To explore our research hypotheses, we have defined the following tools and methodological components:

State-of-the-art analysis

this methodological component consists in crossing various fields of knowledge invested or not by the scientific community while being based on the theoretical literature: the waste of the BTP and the regulations in force, the reuse of materials, the ecological transition, the research in architecture, the theoretical approach and the empirical approach of the practice of the trade, the transmission of knowledge for and by the project. It was a question of drawing, under a multidisciplinary method [8], the knowledge and the useful tools for our research. This cross-state of the art highlighted the relationship between theoretical, practical, and pedagogical approaches concerning the prevention of construction waste. From this apparatus, we were able to build an analysis grid according to the criteria of the obligation of means: regulatory and insurance aspect, territory of the project, proximity of the resources used, tools and methods implemented, quantity of waste recovered, cost

7 HANROT Stéphane, A la recherche de l'architecture : Essai d'épistémologie de la discipline et de la recherche architecturale, Paris, Editions L'Harmattan, 2002. I had the opportunity to be supervised by this TPCAU professor during my research course at ENSA Marseille and I have been able to assimilate these reflections on the importance of the conciliation between research, learning methods, and an architectural project that I will put into practice for my thesis project.
8 In the sense given to this term by the HCERES: «multidisciplinarity is a juxtaposition of disciplinary perspectives that broadens the field of knowledge by increasing the number of data, tools, and methods available. The disciplinary components, in this case, retain their identity [...]» In Critères d'évaluation des entités de recherche : le référentiel du HCERES, November 3, 2014.

and economy of the approach, research and development component implemented, timetable of the project and noted brakes. This analysis grid-enabled us to study the operational approaches.

Analysis of projects / operational approaches in France and/or in the regions

The aim was to initiate exploratory research through the empirical literature on the subject, to integrate ongoing research and development projects into our reflection process. We will support a selection of experiments initiated by the previously mentioned collectives and committed architects that we confronted with our previously established analysis grid. This study allowed us to structure our research, identify the different channels and the games of actors set up, and draw lessons from the successes and failures of the tools and methods established during the analyzed experiments. To do so, we used both data collection tools such as the logbook, photographs of the sites and projects, observation sketches, and semi-structured interviews with the construction actors, and analysis tools such as analysis grids, multi-criteria analysis tools, drawing surveys as well as location maps that network resources and actors. This research provided contextual data (site, territory, actors, resources), operational data (techniques, tools, economic feasibility, and timetable), and methodological data (regulatory implementation, channels implemented, research areas) and allowed us to build an inventory of various experiences. These data allowed us to study the specific conditions and analyze the experiments by emphasizing the reasons for the difficulties encountered so far. At the end of this first exploratory phase, we defined a hypothesis of a model of approach specific to the architectural practice of valorization of construction waste.

Transmission and communication

Within the framework of my CIFRE doctorate, I organized a series of conferences that allowed me to compare the waste prevention approaches implemented by 5 architectural agencies on the territory: Raedificare, Atelier Aïno, Bellastock, Encore Heureux, and Rotor. This conference cycle is accompanied by individual interviews with the speakers. This approach allows me to analyze the relationship of architects to the resource and to exchange on emerging practices: project tools, management of additional temporalities, relations and mediation between actors, valorization, and communication of processes. The transcription of the conferences and interviews, the comparative multi-criteria analysis of the projects presented, the commented drawing, and the sharing of reflections between the speakers and the public, are all methodological tools that allow me to understand the evolution of knowledge-thinking, knowledge-analysis, know-how, and knowledge-working.

A speaker was invited to present the waste prevention approach initiated on one of the projects of our corpus of the study cited in the following paragraph: "réemploi", "réutilisation", or other possibilities tested or implemented. He explains the context of the operation, the process put into practice, and the technical, regulatory, and economic levers and obstacles encountered. Moreover, it tells the story of the project in terms of temporalities linked to this practice, the relationship between actors and exchanges set up: project actors, institutional actors, and material and immaterial platforms.

Fig [1]: Poster of the conference cycle that I organized and animated from March 04 to May 06, 2022. Source: personal production

4-CASE STUDY

Architectural and urban projects

Our corpus of projects is made up of two parts: a selection of projects implemented by different actors in the field of construction waste prevention and material reuse on the territory and a selection of experimentation projects within the architecture and urban planning agency with which we collaborated during the thesis.

Corpus of projects on the scale of the territory

The corpus of projects initiated by the collectives and architects involved in reuse will be used to analyze the operational processes underway (see the second methodological section). To do so, we have chosen a selection of projects according to criteria of program difference, the difference in approach, and difference in missions between study, research and development, AMO reemployment, etc.

The first project is the Hélios project of rehabilitation of a former rest home in Grasse (06) into 18 housing units. The Atelier Aïno, an architectural cooperative, was responsible for the project and combined research and experimentation in the implementation of reuse on the site.

Then, the project of deconstruction of the mail platform in Nice[10] managed by La Poste Immo was entrusted to Raedificare[11], an association that was created in late 2016 in the south region to ensure a mission of assistance to the project owner on the approach of reuse and "sourcing" of materials. The interest in the project comes from the synergy set up between the actors and the projects in the

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10 This project was registered in the framework of the Filidéchet call for projects launched by the ADEME and the Region.
11 The association Raedificare aims to give a second life to materials from the demolition of buildings. Its ambition is to make reuse a full-fledged sector of the construction industry.

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framework of the routing of materials collected for the realization of projects in Marseille.

The third project is La ferme des possibles in Stains (93). Supported by the Novaedia cooperative, it is a 1.2-hectare agricultural farm committed to organic farming and agroforestry. Bellastock has been commissioned to accompany the project owner in achieving its objectives and to act as a project manager with the architectural firm Frédéric Denise - Archipel Zéro for the reused lots.

The fourth project studied is that of the La Grande Halle de Colombelles designed by Encore Heureux and Remix in Paris in 2019. The particularity of this project is the plurality of resource destinations: in-situ reuse, ex-situ reuse made available to other actors, and local reuse to design site facilities.

Finally, the last and not the least project is the rehabilitation of the Caserne de Reuilly[12] by the company ROTOR, delivered in 2019. For this project, Paris Habitat entrusted the company with the management of additional timeframes linked to the missions of supporting reuse and setting up an inventory of available materials. ROTOR also organized an exhibition of these materials on the building site to valorize them.

5-RESULTS

From "réemploi" to "réusage": the field of possibilities

« Réemploi »: from the legal definition to the meaning of use

Limiting the reuse, only operation of waste prevention, to the identical use of materials and products within the construction which initially accommodated them is very reductive for this action which wants to be broader. Indeed, the reflection on the future of the material stops in this sense at the scale of the building: once removed from its place of origin by its "holder", the material is considered waste and the possibility of its prevention becomes almost impossible considering the responsibility and the complexity which is located last the status "waste". The French legislation, to the understanding and the analysis of the definitions of the operations of prevention and management of the waste, presents more possibilities for management of the waste (« réutilisation », recycling, recovery) than for prevention (« réemploi » or reemployment). This seems contradictory to the will to fight against waste and the circular economy expressed by the recent law Anti-waste and circular economy (AGEC) of February 10, 2020.

Construction professionals prefer to use the term « réemploi » in its broader definition given by the ADEME. This definition allows more freedom of use of available materials and more opportunities for waste prevention than the legal definition, which is more restrictive due to the "waste" status. Indeed, the collective work Deconstruction and reuse, how to circulate building elements, defines "réemploi" as "the fact of recovering constructive elements during transformation or demolition work and finding new uses for them in other projects" (Rotor, 2018). Marseille-based architect Valérie Décot, manager of the architecture D and Co and Readificare, defines "réemploi" as the re-use of "a material that has already been used in another building. During demolition or rehabilitation, the elements are deconstructed to be used again in a new project. It does not go through the waste or recycling process" (Décot, 2020). Jean Marc Huygen, architect-engineer and lecturer, defines "réemploi" as the legal definition of "réutilisation". Indeed, he defines it as "the act of giving a new use to an object that has lost the use for which it was designed and manufactured" (Huygen, 2008).

The Parisian architectural cooperative Bellastock, for its part, further expands the notion of "réemploi" to encompass both its definition "in the strict sense" and the notion of "réemploi" (REPAR 2, 2018). This definition is in line with that of the European Waste Framework Directive 2008/98/EC[13] and its amending version 2018/852, which has been in force in European Union countries since July 5, 2020, and which does not distinguish between "réemploi" and recycling. Indeed, this directive sets a framework for the prevention and management of waste through "réemploi", recycling and recovery. In this sense, "réemploi" includes any waste prevention operation in the sense of "detritus", the unusable. The objective is thus "as a priority to prevent and reduce the production and harmfulness of waste, [...] by promoting reuse" (article 4 of the directive).

About the definitions suggested by the professionals, which are in line with the European framework directive, I note the need to broaden the definition of "réemploi" concerning the use of materials, products, and equipment, to extend the waste prevention activity and to counter the limitation of the fields of possibilities resulting from the waste status and the definition of "réemploi" given by the legislator in France. Today, professionals refer to "réemploi" as a global process that considers materials, equipment, and products as resources and reflects on the opportunities to preserve them. Thus, they extend the life of materials as a resource and integrate them into the ecological transition and circular economy.

From "réemploi" to "réusage": the field of possibilities

From waste to resource, my doctoral research is an opportunity to study the possibilities offered by resource materials in terms of operational practice as triggers for new architectural design practices. In this context, I feel it is necessary to clarify my remarks by proposing my definition' of the actions of waste prevention and resource use. This definition is based on the articulation between the notions of use, temporality, local scale, circular economy, and ecological transition. I propose to introduce the notion of "R-use" or "Re-usage" which means for me any operation allowing the use of a resource in material, product, or equipment resulting from a construction or deconstruction operation on the spot or the local scale.

This notion of "R-usage" is composed of an "R" for Rehabilitation, Repair, "Réemploi" and "Re-utilisation" and the term "usage"[14] and allows me to link the notion of resource and that of practice. It opens by definition the field of the possible without being limited by the use and the destination. Thus, I give to the resource the sense of the object, the process, and the relation with its environmental and material context. This notion goes beyond the downstream of the architectural project towards architectural research in love which is based on the resourcing of the "Réusage" and which questions the sustainability of our construction processes.

The "Réusage" would not be limited to the valorization of the resources nor the optimization of the production, but it exceeds them towards the integration of the resources all upstream of the project and practice of the building like a resource with the whole share. It is thus a question of thinking all the scales and of working to transmit to the users and the future generations, inexhaustible resources. It invites, by its definition, the actors of the building to renew their constructive practices and to the adaptation of the architecture to the requirements of its environmental context. This notion goes beyond the limit of use on-site to extend to a local ecosystem. It responds to the need of professionals to open and extend the possibilities of "réemploi" both in the strict sense of the term, in the sense of the notion of reuse, and the sense of any possible use on a local scale, provided that the possibility of a subsequent "réusage" of materials, products and equipment is preserved. Moreover, it integrates the reuse of resources for an identical use outside the initial site and on a local scale: an operation that does not correspond to any of the waste prevention operations cited in Article L541-1 of the Environmental Code.

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12 This involves the transformation of the Barracks into a crèche, a public project, business premises, local shops, and 600 new homes.

13 Source: https://www.legifrance.gouv.fr/jorf/id/JORFTEXT000019818802.
14 To use something, to apply a process, a technique, to make an object, a material act according to its nature, its function to obtain an effect which allows satisfying a need. Source: «usage», CNRTL. https://www.cnrtl.fr/definition/usage.

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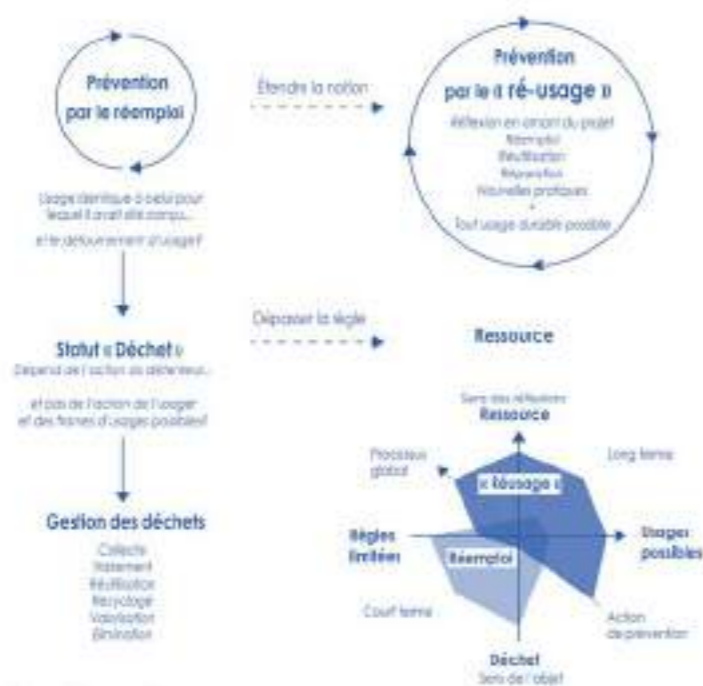
Fig [2]: "Ré-usage" or the field of possibilities

Towards an interdisciplinary synergy…

The exploratory analysis of the various projects of my corpus allowed me to analyze the actions of prevention of waste in the Building and Public Works sector, which are presented each time. From the setting up of the argument to convince the contracting authority of the interest of the prevention of the waste of the building and public works within the framework of the missions of project management to the participation in the architectural and urban design of the projects and the follow-up of the building site, a methodology of work is set up on a case by case basis and according to the architectural, urban, historical, technical and environmental analysis of the building. This analysis is accompanied by a diagnosis of the materials, products, and equipment available. According to this diagnosis, the approach of the architectural and urban project is never the same and the action of "re-use" of the waste of the BTP is "personalized", defined by the resource: conservation, rehabilitation, repair, re-use, etc. I consider the design "defined by the resource", any interdisciplinary design having for the object of reflection, the resource in materials, products, and equipment. The analysis of the resources and their integration into the project is done at the design stage. This design will have to allow the preservation of the resources and guarantee their "ré-usage".

This analysis allowed me to identify the key local and institutional actors who support the practices of prevention of waste of the BTP (ADEME, Region, DREAL, Envirobat BDM) and to understand their relations with the actors of the projects implemented at the agency of architecture and town planning. Would the actions for the prevention of construction waste implemented in architectural and urban practice exceed the limits of the actions defined by the regulations? Would the integration of available resources while improving projects through "resource-defined" design allow the implementation of new project methodologies to prevent construction waste?

The development of this approach was an opportunity to create a synergy between the different actors of the project. Gathered around common objectives, they are open to encouraging the replicability of experiments in future projects. Surrounding themselves with specialists, such as the

engineer of "réemploi", the "réemploi" study office, or the assistant to the contracting authority, allowed the realization of experimentation and going to the end of the possibilities of "réusage". To transmit this process, the actors of the project organize an open day event at the end of the building site, communications within the framework of conferences or round tables, and training courses to transmit the know-how and to raise awareness of these virtuous actions.

6- CONCLUSION

From project to process: a path question

The objective of this research is to consider the valorization of waste through the reuse of materials as a global process and not only as an architectural project. It is a question of defining the path that an architect would develop in his search for negotiated projects between ecological transition, operational feasibility, and sustainability of the approach. This path will be the result of an immersion in the architectural practice (architectural agency), the research environment (laboratory), and the pedagogical environment (teaching, observation, pedagogy).

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A THEORETICAL REVIEW OF MACHINE LEARNING TECHNOLOGY-ASSISTED STREET QUALITY RESEARCH IN THE ERA OF ARTIFICIAL INTELLIGENCE: POTENTIAL, DEVELOPMENT AND INNOVATION

1-E-4

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Abstract

Urban streets are a vital platform for connecting people and communities, and good street quality is linked to a healthier, more vibrant and sustainable quality of life The measurement and comparison of street qualities have become popular and have yielded significant results in the field of urban planning. With the increasing availability of complex and up-to-date urban data, urban studies are increasingly incorporating the use of large datasets and advanced analytical methods, including computational processes that adopt Artificial Intelligence and Machine Learning. Therefore, this study aims to provide a comprehensive and holistic overview of existing academic research and to construct a data-driven framework for analysing street vitality, providing insights for future street evaluation and design processes. This paper first reviews and summarizes previous studies on urban street vitality. The summary includes the research object, index factors and methods used in previous studies. It is used to construct the theoretical framework of data-driven street vitality analysis explored in this paper This theoretical framework focuses on the help of machine learning analysis of large data sets derived from online indexes, this analysis represents a new approach to measuring urban vitality in the era of artificial intelligence is conceptualized. Using measurements of street morphologies and street features by Image semantic segmentation in machine learning, after calculation with mathematical statistics, can reflect pedestrians' perception of the built environment and physical characteristics of the street. This paper tries to explore the possibility of establishing an automated operation mechanism to improve the computability, scalability and flexibility of urban cloud resource data.   It can be incorporated into digital city research and evaluation in the future. This paper aims to provide literature-based insights, as well as a description of the ML methods applications and an in-depth review of recent advances. the theoretical review of machine learning to lead to improvement of urban design. This paper aims that future studies may lead to better knowledge about urban functions, and urban processes, which can lead to better design processes.

Key words:

Artificial Intelligence, Machine Learning, Street Quality, Street Vitality

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1.   INTRODUCTION

The increase of the world's population to 10 billion by 2050, coupled with the ongoing economic growth, and infrastructure expansion in many countries, requires us to reconsider the global carbon impact. The consequences of the fourth industrial revolution and the resulting climate change are directly and practically affecting all parts of the globe. Meanwhile, the focus on public health brought by COVID-19 has dramatically changed the character of street demand. In that context, multidisciplinary design, prediction, calculation and analysis enable us to assess subsequent trends and consequences for improving the quality, sustainability and resilience of buildings, infrastructure and common resources in the built environment. Seeking profoundly different approaches to identify closer dialogues, better collaboration, increased agency and effective ways to address a world in which climate change has become a reality.

The street is a key feature of a resilient city (Polko, 2012), and the resilient spatial quality of streets has received widespread attention for its dynamic adaptability that can be transformed for health purposes. In biology, "vitality" refers to the ability to live organisms to maintain survival and development. Urban research circles give different interpretations of the definition of "vitality". Social vitality is the main existence of vitality in public space (Gehl,1987) or the number of pedestrians and the number of various activities (Montgomery, 1998). The street is the communication space of urban life and an important place for people to experience life. Thus it can be seen that people and their activities in places are the source of spatial vitality. For streets, street vitality is a performance characteristic that measures the density and frequency of social interaction between people.

The new data environment constituted by big data and open data provides the data basis for the study of urban form and its related effects (Jordan and Mitchell, 2015), while the pioneering urban research methods and technologies such as radar imaging, virtual reality, eye tracker, deep learning, data mining and visualization provide the technical means for further research (Long and Ye, 2019). Machine Learning (ML) is the intersection of computer science and statistics and is at the heart of intelligence and data science (Jordan and Mitchell, 2015), with many data-driven analyses relying on the common experience of the multiple disciplines that make up the data set. The huge potential of ML methods opens up a very promising area of research for years to come (Li et al., 2020). ML approaches are making inroads into science, technology and business, leading to more evidence-based decisions in many areas, including healthcare, manufacturing, education and finance, to name a few (Al-Garadi et al., 2020). More urban studies scholars are devoted to adopting a new method of data collection and analysis, the multi-source data integration and fusion, to evaluate or improve the degree of urban development. Among these, advances in machine learning such as computer vision, in particular, have made it possible to extract street features from sources such as panoramic street view images, crowdsourced photos or social media data.

Therefore, this paper reviews the latest applications, related challenges, opportunities and future research directions in the issue of street vitality. The review will include an overview of street vitality, street data sources and street quality indicators, as well as a description of the ML methods used, highlighting their operating principles, advantages, disadvantages and potential applications. Therefore, we summarize the main contributions of this review paper below. An in-depth review of recent advances in machine learning algorithms applied to street vitality.

2.   REVIEW OF STREET STUDIES

2.1.Transformation in Demand for Street Space Quality

Appeal to street, both activities demand and psychological demand is also the change of heart perception dimensions. In the second half of the 19th century, urban theory and construction lagged behind the speed of population agglomeration and spatial expansion, and streets became areas breeding dirt, poverty, congestion and crime in society. Under this background, European urban scholars began to attach importance to spatial quality. They introduced green open space into cities (e.g. Haussmann's renovation of Paris,1853), and regard hygiene, safety and aesthetics as the basic principles of space quality construction. The urban transformation movement centred on street space is gradually rising in Europe.

In the early 20th century, the quality appeal of street space returning to the natural countryside (e.g. Howard's Garden City Movement, 1902; Perry's Neighbourhood Unit, 1929) aimed to create autonomous, quiet and safe neighbourhoods (Sharifi, 2015). Before the dominance of vehicles, the street was an important place for urban life and interaction, and the urban skeleton bridging the different functional spaces in the city. With the advent of the industrial age, mobility in the city increased and the demand for transport grew. Meanwhile, Corbusier's Ville Contemporaine (1922) emphasizes that efficiency, and large-scale green had become people's primary demands for street space. After World War II, Europe and The United States entered the peak of urbanization. The friendly and harmonious living environment of traditional city blocks was eroded by modern civilization.
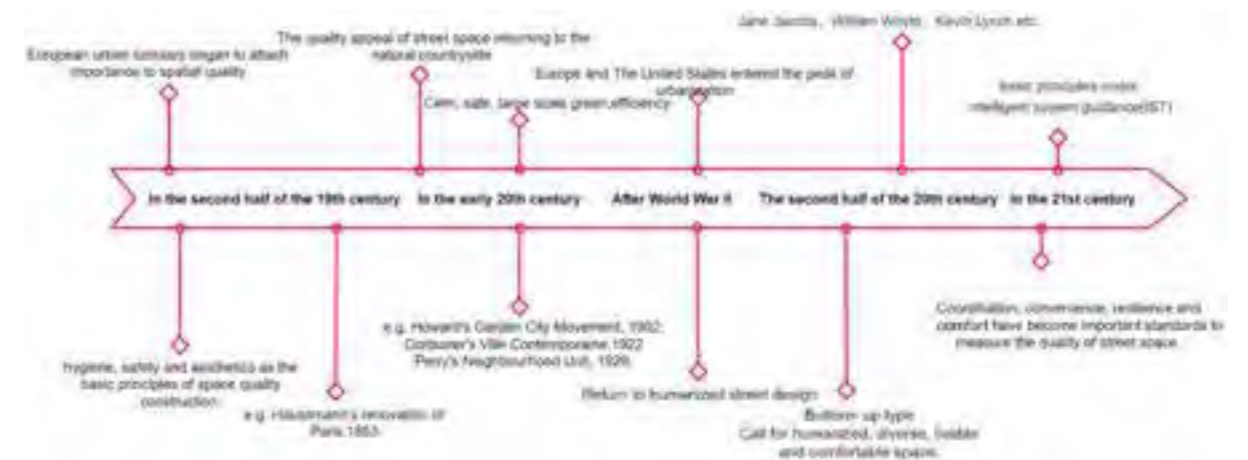
Figure 1. Transformation in demand for street space quality

The demand for good quality public space design is becoming increasingly more important (Gehl, 2003).People began to return to the demands of humanized street space quality The Street as predominantly traffic place; pedestrians are squeezed into the narrow sidewalks where only walking is possible (Gehl, 2003).Since the 1950s and 1960s, Western scholars such as Jane Jacobs(e.g. The Death and Life of Great American Cities(1961)), William Whyte (e.g. The Exploding Metropolis (1958)) and Kevin Lynch(e.g. The Image of the City (1960)) have constantly reflected on the modernist urban theory in urban practice, and the social and cultural function of streets has been increasingly valued, calling for the design of more humane public space. They all try to monitor people's perceptions of the environment using a bottom-up type of analysis. This has had a major impact on the field

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of urban planning (Hou, 2018). Therefore, the pedestrian system composed of streets, especially pedestrian blocks and squares, is the main place to judge the urban space and environment (Gehl, 1987). The street space should be diverse, livable and comfortable. With the rise of new urbanism in the early 1980s, creating a rich, walkable, compact and mixed-use spatial environment became the theme(Talen, 2005). In the 21st century, the basic principles of street design under intelligent system guidance(IST) are changing to walking, interconnection, diversification and intelligent transportation(Ganin et al., 2019). Coordination, convenience, resilience and comfortable have become important standards to measure the quality of street space.

In contrast to the top-down modernism practice of urban planning, the simple and crude demolition will do great harm to urban development and the human living environment(Frazier et al., 2013), the purpose of urban planning is to generate and coordinate a variety of functions, in order to meet the needs of different people of diverse (Healey, 2006) and complex, residential area of physics and environment form, space, energy, there is a close relationship between sustainable and healthy settlements and liveability (Lukuman et al.,2017). A real livable space should be the embodiment of residents' self-will (Jacobs, 1961). Urban streets are important media spaces for human life and social gathering, and their quality has a significant and substantial impact on residents' behaviour and quality of life (Jacob, 1993; World Health Organization. Regional Office for, 2018). The United Nations Human Settlements Programme published "Streets as Public Spaces and Drivers of Urban Prosperity", pointing out that streets have an important impact on six aspects of urban social productivity, quality of life and supporting facilities (UN Habitat, 2013).

The presence and gathering of people in space can usually indicate that the public space is functioning in a healthy way (Gehl and Svarre, 2013; Sadik-Kahn and Solomonow,2017). Professional planners talk about the concept of "sticky streets"—avenues that make people want to stop and enjoy their surroundings (Toderian 2014). Its spatial quality includes the connotation of material space which embodies the personality of street space (Rapoport, 1970) and other dimensions, e.g. the mapping of inner spiritual emotion of users carried by the street (Weinreb and Rofè 2013). Among them, objective space quality refers to the quality of material space elements such as road surface, architectural interface, window façade, environmental facilities and trees, while subjective inner perception refers to the presentation of deeper inner spiritual feelings (Brown et al.,2009) such as safety, comfort and beauty under the action of urban material space.

2.2 Review of the Traditional Methods and Focus of Street Research

Street environments can be measured subjectively, objectively or in combination (Lin & Moudon, 2010). Subjective interviews and questionnaires can directly and intuitively obtain residents' subjective views on street environmental quality. In objective quantitative studies of quality of life, a common approach is to count the number of people in a street, park or square in order to assess the use patterns of the study area and assess how it functions (Whyte, 1980; Nasar, 1990; Gehl,2010; Gehl,2013; Anderson et al.,2018; Akaltin et al.,2019). By observing how people use a space, and by comparing users' responses to different urban elements, we can form an understanding of which elements contribute to quality public space. The traditional street analysis is limited by technology and data, and the manpower investigation method is more careful, but the efficiency is low.

Incorporating new technologies to create street environmental assessment systems can even be used as a complement to subjective personal experience in urban Settings. Space Syntax theory (Hillier and Hanson, 1984) is being widely used for large-scale evaluation of urban street networks. However, these common methods of evaluation do not cover the full complexity of residents' spatial movement and the flexibility of street life. With the development of geographic information and computer science, it has become possible to collect and analyse residents' behavioural data through information processing software and equipment (Clarke, 1986). Subjective personal experience perception is extremely complex, involving certain factors such as cultural background, personality traits and previous experiences so that no two citizens experience a city or urban environment in exactly the same way. The broad field of subjective experience and environmental behaviour has been central to the study of architectural and urban phenomenology and has produced a variety of theoretical positions and viewpoints. The data-driven framework combined with computer science can solve the problem of experience quality of a specific topic within a quantitative framework, and provide a convincing basis and supplementary explanation for subsequent street improvement design.

Figure 2. Timing diagram and research focus maps of studies on street spatial quality from 1996 to 2021

A review of the urban street research literature (Fig. 2), from 1997 - 2021 reveals that basic research in the first decade focused on microclimate and the effects of street microenvironment on urban health, air pollution and quality of life. Since 2007, the research focus has gradually shifted to the quality of street space and environmental behaviour. Then, quality studies are closer to subjective perception, functional use, street aesthetics and social life as well as some evaluations.

2.3 Potentials in the Context of Big Data and Artificial intelligence (AI)

Since the 1990s, big data (Mashey, 1998) has changed the formation process of information and space, as a by-product of the digital trajectory of residents' real life, once data is associated with data from other sources, it will be more helpful to deduce the dynamic law of urban operation and development, and then guide environmental adaptation and future-oriented planning decisions. providing a new way for the acquisition and space of non-transaction data in urban planning. Modern urban planning will follow the theory of "Knowledge Discovery in Database" advocated by modern information science (Fayyad et al.,1996). The thinking paradigm combining causality and correlation

and the data analysis technology of artificial intelligence is used. More emphasis is placed on data analysis, finding rules, acquiring knowledge and wisdom, and finally spatial visualization.

Geographic information and Internet technology provide new technical tools for urban street assessment. The collection and integration of open spatial and temporal big data allow the acquisition of quantitative urban features. Several scholars have collected users' walking tracks in urban streets and analysed the hot spots of urban activities using GIS platforms (Edwards, 2009; Sagl et al., 2012). Data analysis techniques of big data mainly come from artificial intelligence technologies and methods, including statistics, machine learning, data mining and social network analysis.

Figure 3. Timeline of technology and method of street space quality research

The new data environment constituted by big data and open data provides the data basis for the study of urban form and its related effects (Jordan and Mitchell, 2015), while the pioneering urban research methods and technologies such as radar imaging, virtual reality, eye tracker, deep learning, data mining and visualization provide the technical means for further research (Long and Ye, 2019). Some scholars have carried out active research and discussion on street space by using street view images. Street view image was widely applied in 2017 and became a craze in 2018 to evaluate street space and formulate development strategies (Fig.4). Street view image can directly reflect the street space environment from the perspective of human eyes (Seiferling et al., 2017). And those online data acquisition can replace other data collection methods that are limited by weather, time and place (Rundle et al., 2011).

Studies have begun to analyze the relationship between street view images and pedestrians since 2019. Mainly because the pedestrian index based on visual perception (e.g., visual congestion and pavement, etc.) was constructed to measure urban walkability (Zhou et al., 2019).

Figure.4 Example of street view images and segmentation (Liu and Amejide, 2022)

Semantic segmentation is applied to extract pixels of various physical features from images as indicators of objectively measured street-view perception. Some indicators, such as greenness, proximity, transparency and attractiveness, tend to favour visual quality. Shen et al. (2017) sampled thousands of images and applied SegNet (Badrinarayanan et al., 2017) semantic annotation tools to identify green, sky, buildings, roads, and vehicles, which could then be represented and analyzed through an interactive visual analysis system. In GIS-based studies, it is inevitable that subjects who are unable to use GIS tools due to age or cognition will appear, but in street view images, it is possible to calculate the number of pedestrians through deep learning (Yin et al., 2015), and the partial Mosaic will not make subjects worry about the risk of privacy leakage. The ML algorithm was used to predict six scene perception scores, namely, safe, lively, beautiful, rich, depressed and boring(Fu et al.,2019). In addition, recent studies constructed five eye-level perception indexes (Openness, Greenness, Enclosure, Walkability, and Imageability) and their image characteristics and compared them with the corresponding subjective ratings (Ma et al., 2021). Also, Six important perceived qualities and Relationships with Property Value of street landscape rating were quantified subjectively and objectively in Shanghai (Qiu et al., 2019).

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3. RELATED CASE STUDIES FOR STREET QUALITY WITH MACHINE LEARNING APPLICATIONS

3.1 Extraction of Street Elements

In general, built environment elements are extracted based on image data, and CNN in ML is used to identify and quantify environmental elements in images. The main analysis object is the pixel. For instance, by crowdsourcing and Google street view, combining the use of untrained workers, to explore found, tags and evaluate Google street view in the image of the pavement can step feasibility, step for large-scale access to the street provides a new, extensible method(Hara et al., 2013). The Index system of research: (1) the path;(2) the curb;(3) the road;(4) the pavement continuity.

(a) 0.80, 0.59; 0.20, 0.0   (b) 0.82, 0.70; 0.0 , 0.0   (c) 0.86, 0.59; 0.15, 0.0   (d) 0.74, 0.89; 0.52, 0.52   (e) 0.97, 0.79; 0.9k, 0.55   (f) 0.94, 0.96; 0.63, 0.61

Figure 5. Crowdsourcing is used to find, tags and evaluate Google street view (GSV) sidewalk accessibility problem in the image(Hara et al., 2013)

Using the street view of natural images depicting urban visual environment, with the aid of digging deep learning model street view content, and proposed the scene expression vector (street visual descriptor) and scene semantic tree (street scene ontology) To better assist quantitative analysis and qualitative understanding of the urban visual environment (Zhang, 2018). Index system:(1) semantic segmentation method based on the deep learning scene, retrieve visual elements in the scene (such as buildings, vehicles, sky, etc.); (2) to identify objects in the image together, form and vector;(3) the whole street in all view objects share together, get the street scene expression vector.

(a) Input street-level image   (b) PSPNet architecture   (c) Output semantic mask
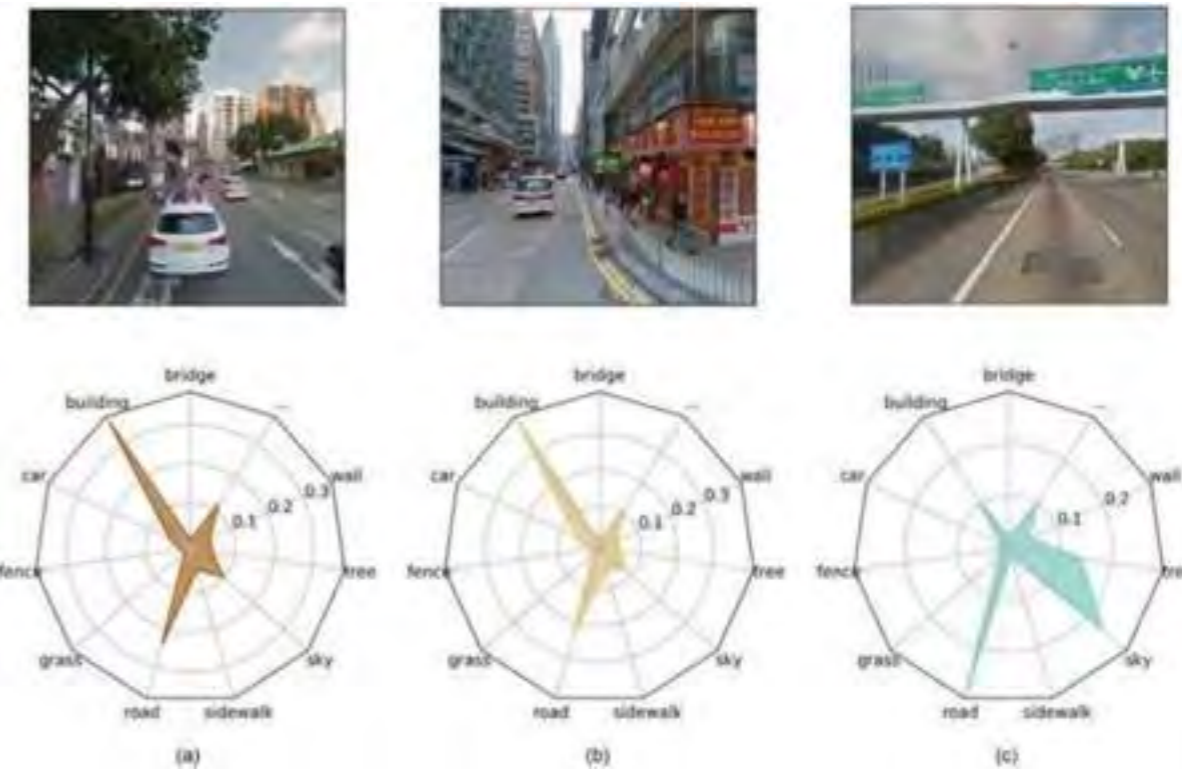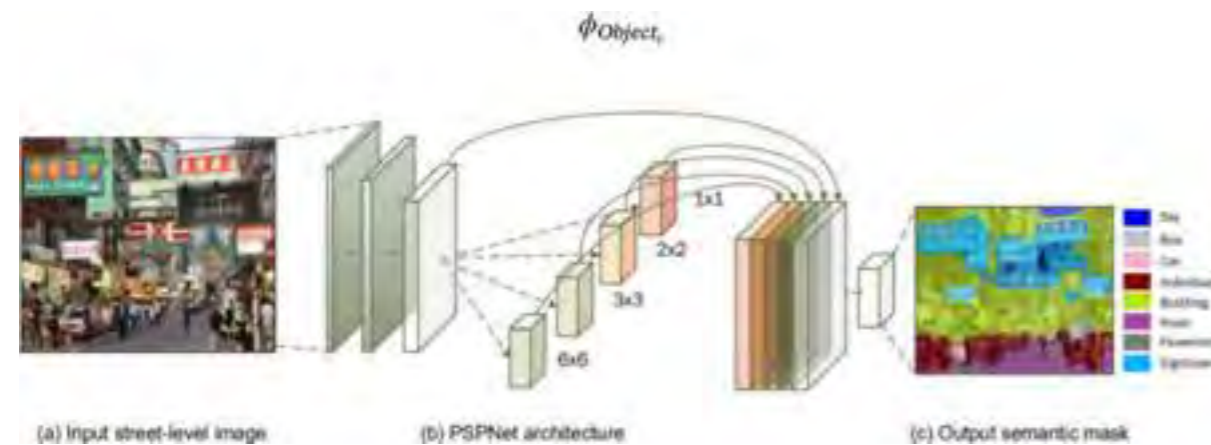
Figure 6. Based on the segmentation of ML, the corresponding scene element proportion distribution of road can be calculated (Zhang et al., 2018)

3.2 Quantified Built Environments

Based on the street view image data, the correlation analysis of a single factor or several factors in the street physical space environment is carried out to build a quantitative analysis model.Formed from the city centre high density of residential and commercial buildings of all kinds of the street canyon, have a direct impact on the formation of the urban microclimate. The study first proposed the urban street canyon multi-level classification system, which is based on the classification system of tens of thousands of street view pictures from manual annotation, building a training set, a training a multitasking deep learning model in the valley street, classification, implementation of street view shown in street canyon type classification and recognition, as a case study of Hong Kong area to carry out the experiment, the fine mapping of Hong Kong street canyon maps(Hu et al., 2019).

Study index system:(1) based on the level of the aspect ratio (according to the height of the building is divided into five types and road width ratio); (2) based on the level of the symmetry (according to the buildings on both sides of the street and right high left low, high left low right, about the same divided into 3 classes); (3) based on the level of the complex geometry (general valley street, a crossroads, viaduct and divided into six classes)

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Figure 7. Multi-level classification system and multi-task deep learning model of urban street canyons(Hu et al., 2019)

Through the street view image data, forecasting street residents streets where images are average hourly amount of travel curve, to quantify urban physical space, and then through the urban material space inversion social activity space and the social and economic attributes, set the material space and social space connection bridge, for potentially measure in the built environment and human activities, social and economic level The imbalance of the exhibition, human relations research, urban design and management to provide the reference and decision support(Zhang et al., 2019). Research index system: Based on the deep convolutional neural network of DenseNet, the daily spectrum curve (composed of 24-dimensional vectors) of residents' travel activities in the street where the street image is located is output by taking any street image as input.
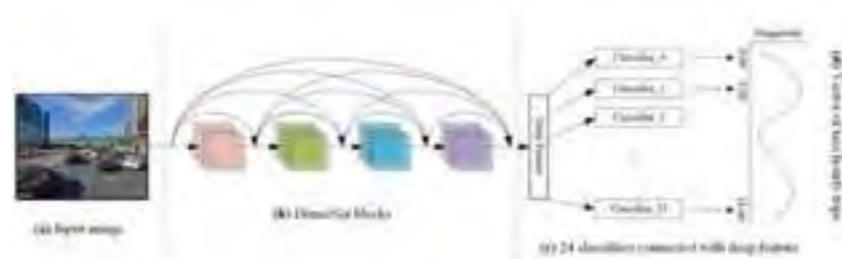
Figure 8. DenseNet prediction model of daily time spectrum curve of residents' travel activity (Zhang et al., 2019)

Google street view images to evaluate the street level of urban greening are discussed in this paper, presents a modifying existing green landscape index (GVI) formula, and use the Google street view images in New York City, Manhattan district east village area evaluation of case studies have been carried out on the street greening,   the study found that Google street view street greening is very suitable for assessment, the modified GVI is a relatively Objective of street green space measuring method(Li et al., 2015a)
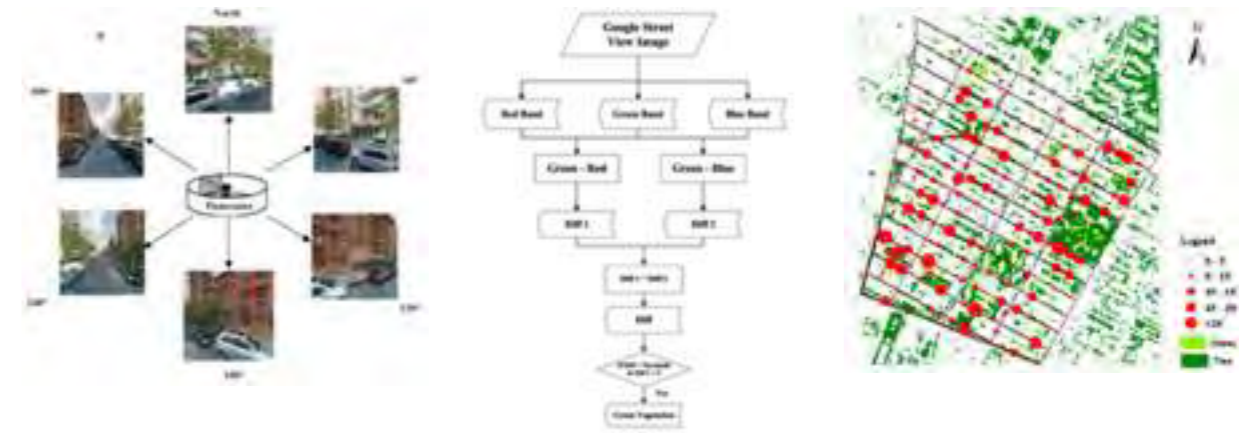
Figure 9. GSV images captured and The workflow for green vegetation extraction GVI results calculated using the modified formula(Li et al.,2015a)

Meanwhile, Li et al by getting google street view images of different areas in the horizontal and vertical Angle of view street view images, to calculate the green view index, quantitative analysis to street the virescence distribution, urban residential street greening and different social-economic relation between or racial/ethnic groups (Li et al., 2015b).

3.3 Evaluation of Space Quality

The research theory is based on classical street aesthetics, graph-floor relationship and the walkability audit model. Machine learning is mainly used to extract the comprehensive evaluation method of street space physical characteristics and other factors combined with statistics.

By collecting street view images of crowdsourcing (dataset containing 110,988 images from 56 cities) perception attribute data sets, the construction of a new Siamese-like convolutional neural architecture, which learns from a joint classification and ranking loss, to predict human judgments of pairwise image comparisons. The street are safe, vitality, and beautiful, as well as the quality of six quantitative evaluation factors (safe, lively, boring, wealthy, depressing, and beautiful) of perception (Dubey et al., 2016).

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Figure 10.CNN models (Siamese model and Ranking SS-CNN) and Example results generated by the RSS-CNN(Dubey et al., 2016)

Based on a new visual quality evaluation and variation identification method for large area street space. This paper studies the space of Beijing historic blocks, namely hutong, analyzes Tencent street View pictures captured in 'hutong', and automatically realize the physical visual quality of street space by using the machine learning segmentation method SegNet combined with three-dimensional composition calculation of greening, openness and enclosure, as well as two-dimensional analysis of wall continuity and cross-section proportion. The perceived visual quality of street space was evaluated from five aspects through the rating of willingness to stay (Tang and Long, 2019).
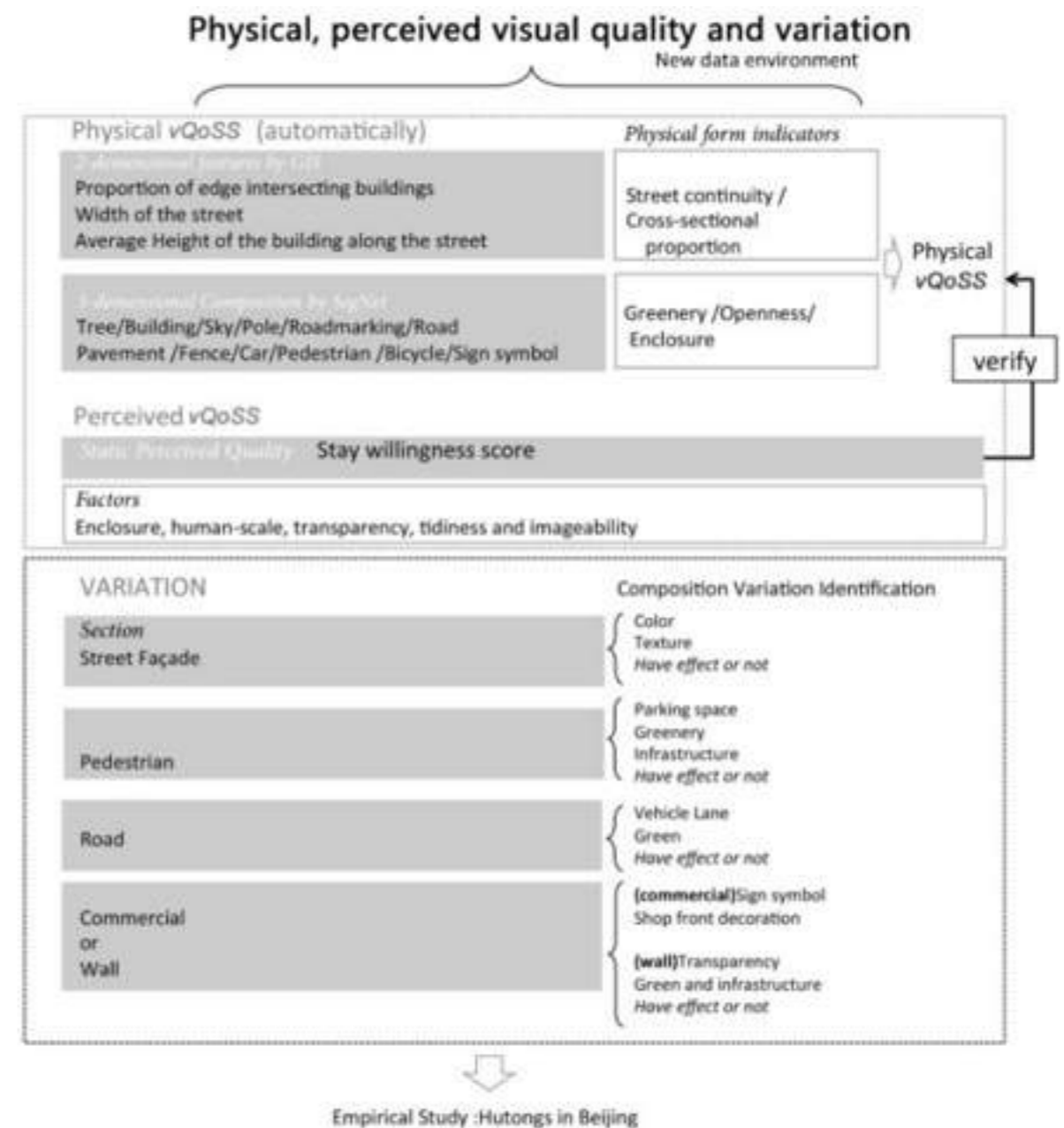
Figure 11. The overall framework and Criteria for variation recognition and Samples for variation recognition (Tang and Long, 2019)

4. TAXONOMY OF ML FOR STREET STUDIES

4.1 Taxonomy of ML for street vitality application

In the design and modelling of ML application of street morphology, all the parameter properties and infrastructure directly related to the geometric and physical shape of the Street are included (Fig.12). Street data sources, data collection and structuring are high demand areas, especially for ML-based applications. Without data, ML models can neither be trained nor calibrated (Al-Garadi et AL., 2020). The construction of street quality indicators that affect street vitality completely depends on the collection and clearing of basic data sources, and the different street characteristics identified can form specific indicators.

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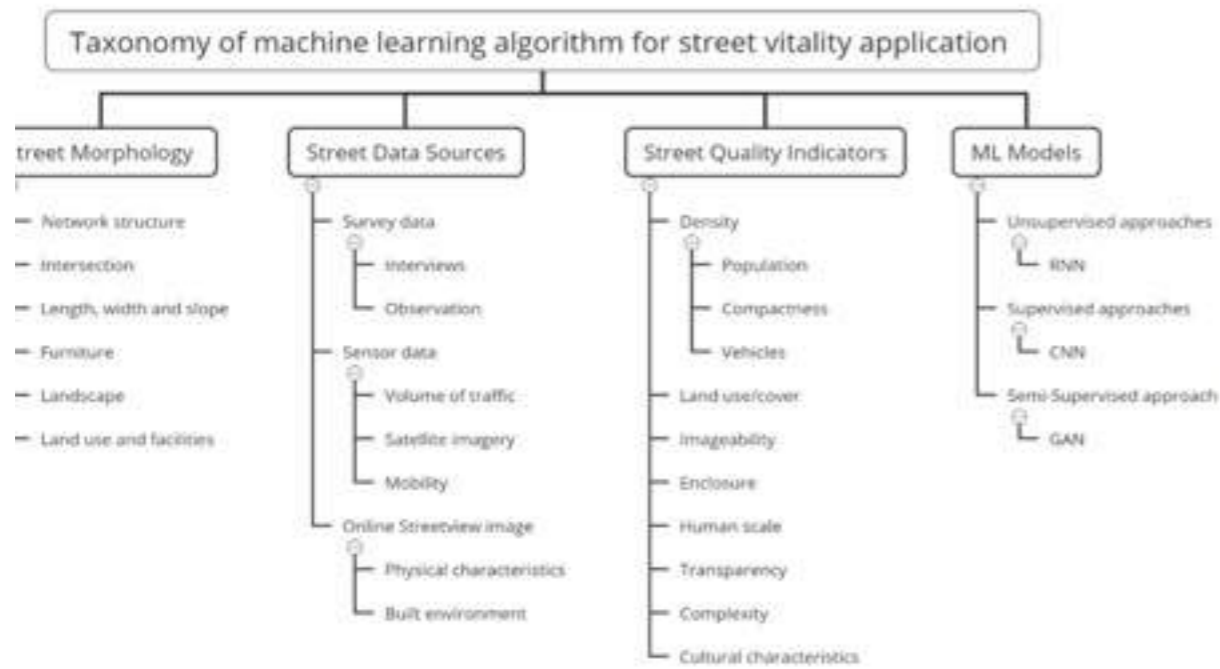
Figure 12. Taxonomy of ML for street vitality application

ML's value due to their unique problem-solving nature lies in their ability to build machines that are automatically calibrated and improved through experience (Jordan and Mitchell, 2015). With the explosion of processor power and the amount of data collected, new algorithms are constantly being developed to meet different research purposes.

Pyramid Pooling Module (PSPNet) was used to extract the built environment elements in the street. PSPNet has been implemented into a module that can be trained to classify pixels in a raster to identify (Zhao et al., 2017) and mark 150 types of elements in a picture. The physical features and environmental elements used in this study are tree, grass, sidewalk, fence, road, person, signboard, streetlights and building. The percentage of these elements in each image can be calculated.
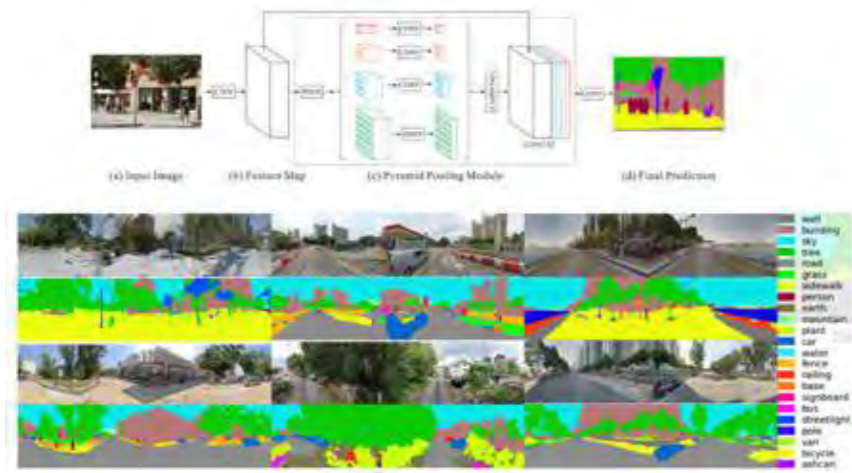
Figure 13. PSPNet principle (Zhao et al., 2017) and extracted element examples

Mask Region-based Convolutional Neural Networks (MaskR-CNN) (He et al., 2017), were applied to the segmentation of SVI. MaskRCNN is based on ResNet50. By adding a branch network on the basis of faster-RCNN, the target pixels are divided while the target detection is realized (Kaim-ing He, 2017). Mask Region-CNN (Convolutional Neural Networks) in deep learning, referred to as 'Mask-RCNN' which is based on image recognition, is a deep neural network aimed to solve instance segmentation problem in machine learning or computer vision.

4.2 Comparison of ML Algorithm for Street Studies

Based on the above related research and the classification of commonly used street research application. These examples illustrate the wide range of types of analysis that can be performed using trained machine learning to analyze street images and extract street elements. The built environment elements of the street can reflect whether the infrastructure and facilities of the street can meet the needs of users. Secondly, the built environment can reflect the corresponding street quality, and the calculation formula can be directly calculated automatically in combination with the programming code, which eliminates the traditional manual statistics step and increases the accuracy while improving the efficiency. These cases provide technical references for this report, and the machine learning selected in this paper is mainly a variant based on Convolutional neural Network (CNN). These are the most well-known and established image segmentation algorithms.

ML	Principle	Application	Advantages	Disadvantages
RNN	By using a special loop structure, it is used in studies related to sequence data to form continuous information related to the past for prediction.	Complex time-series prediction such as predictions of street volume	very efficient in many applications with sequential data	When RNN are trained over longer sequences, will suffer from gradient problems
CNN	Similar to the receiving region of the brain, it processes the input from sensors and can effectively process a large amount of input data, so it is widely used in the field of computer vision	Street image recognition and segmentation	Efficiency for high dimensional problems, Ability to work with complex features	It takes a lot of training data and research data to be effective
GAN	the generator(generates a sample) and the discriminator, tries to detect whether a sample is real or whether it is the result of the generator	Given semantic image or data sample, generate cityscape, layout, urban design	Generate data similar to the original data to solve data problems in ML	Hard to be trained and need to constantly provide different types of data to check for accuracy

Table 1. Comparison of three commonly used ML algorithms (Based on Koumetio ET AL., 2021)

4.3 Street Quality Indicators that Effect to Street Vitality

Urban design quality audit methods widely recognized and referenced by academic 'Observational Validation of Urban Design Measures for New York City' (OVUM, Ewing, 2006) objectively measure the five subjective urban design qualities from the street environment, imageability, enclosure, human scale, transparency and complexity (Fig.12.; Appendix A).

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Figure 12. Conceptual framework of Ewing`s audit tool and widely used by other scholars

They used the scoring of an expert group, which required a lot of manual labour to take photos and score the streets subjectively. Moreover, manual statistics were conducted in excel tables. These indicators still make sense today, widely used and redefined by scholars who study streets.

Ewing's evaluation quantification system is widely used by street design scholars as an audit tool, but there are other physical characteristics of streets that can reflect the quality of streets and thus affect the vitality of streets. Later scholars also proposed other indicators based on Ewing's indicators and their own object and content. In addition, recent studies constructed five eye-level perception indexes (Openness, Greenness, Enclosure, Walkability and Imageability) and their image characteristics and compared them with the corresponding subjective ratings (Ma et al., 2021).

Ewing's evaluation quantification system is widely used by street design scholars as an audit tool, but there are other physical characteristics of streets that can reflect the quality of streets and thus affect their vitality of streets. Later scholars also proposed other indicators based on Ewing's indicators and their own object and content.

Table 3. Some of the quality parameters that affect street vitality.

Properties	Quality	Definitions	Related elements	Reference
Objective visual	Street scale	Physical features, which can objectively measure streets	Block length, Width, Building height	Cervero and Kockelman,1997
	Greenness	Urban Greenspace that are an essential element in streetscape	Tree, Grass, Forests, Greenbelts, Lawns	Ma et al., 2021
	Imageability	Quality of a place that makes it distinct, recognizable, and memorable	Courtyard, Plaza, Park, Garden, Landscape, Historic, Identifiers, Buildings, Outdoor dining	Ewing et al., 2006
	Transparency	Defined as the degree to which people can see or perceive human activity or what lies beyond the edge of a street or other public space.	Windows, Wall, Active uses	Ewing et al., 2006
	Enclosure	The degree to which streets and other public spaces are visually defined by buildings, walls, trees and other vertical elements.	Long sightline, façade or street wall, frame of vision	Ewing et al., 2006
	Openness	The openness of space will affect users' preferences, and people generally prefer to conduct activities in Spaces with high openness	External space, area and shape	Kaplan et al., 1989
Subjective perception	Safety	An individual's experience of the risk of becoming a victim of crime and disturbance of public order	People, Signboard, Streetlight, Fence	Jansson, 2019
	Human scale	which refers to a size, texture, and articulation of physical elements that match the size and proportions of humans and correspond to the speed at which humans walk.	Long sightline, Windows, Average building height, Small planters, Street furniture, Street light, outdoor table	Ewing et al., 2006
	Complexity	The visual richness of a place that depends on the variety of the physical environment, including the numbers and kinds.	Buildings, Building colors, Public art, Pedestrians	Ewing et al., 2006
	Walkability	The psychological impact of the surrounding visual elements on the walking experience	Sidewalk	Ma et al., 2021

a)   Street Dimensions: such as block length, street width and building height are used to objectively measure streets (Cervero and Kockelman, 1997; Ewing,2006).

b)   Safety: According to Maslow's Hierarchy of Needs (1943), physiological and security requirements are the lowest and most basic requirements. Well-designed and maintained street environments increase residents' willingness to come and live, make them feel safe, reduce their stress and improve their health (Brownson et al., 2004; Dubey et al., 2016). Conversely, messy, dirty, dilapidated streets, often found in poorly managed areas, reduce residents' sense of security and thus their willingness to live there (Naik et al., 2014). There is a significant correlation between safety measured by geotagged images and the number of homicides (Salesses et al., 2013). Street activities can only take place in a safe environment and attract more people.

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c)   Greenness: Urban green spaces, including street tree buffers, greenbelts and lawns, are important elements in urban landscape design(e.g., Fernow, 1910;Schroeder and Cannon, 1983; Wolf, 2005; Chen et al.,2009). It has become an important tool for regulating the urban environment (Appleyard, 1980). Improving natural ecology, maintaining carbon and oxygen balance and effectively controlling air pollution and the heat island effect (Lawrence, 1995; Nowak et al., 2007; Jim and Chen,2008; Lafortezza et al., 2009). Providing good visual elements of street aesthetics for pedestrians and drivers(Camacho-Cervantes et al., 2014), attracting pedestrians and effectively increasing outdoor stay time, promoting physical and mental health(Lu, 2019). Urban street greening makes a significant contribution to the attractiveness and walkability of residential streets (Schroeder and Cannon,.1983; Wolf, 2005; Bain et al., 2012). Li et al. (2015) applied pixel classification technology to Google Street View images to calculate the Green View index and analyze the perceived greening of lower Manhattan.

d)   Walkability: According to Abley (2005,pp.3), walkability can be defined as "the extent to which the built environment is friendly to the presence of people living, shopping, visiting, enjoying or spending time in an area". Walkability is a key factor for sustainable cities. The comprehensive development of an integrated footpath system will help reduce the public's dependence on road transport, thus relieving demand on the transport system and mitigating the environmental impact. The provision of well-planned integrated walking systems and pedestrian streets can reduce the number of short motor trips and pedestrian/vehicle collisions. This will increase liquidity. Enhancing road safety and improving local air quality. Planning and urban design measures contribute to creating a safe, inviting and accessible walking environment, which is a prerequisite for improving walkability.The psychological impact of the surrounding visual elements on the walking experience, such as the sense of comfort and pleasure for walking (E. J. Kim and Kim, 2020; Leinberger and Alfonzo, 2012). Improving walkability is of great significance to the construction of low-carbon and sustainable cities. Creating a walkable city is an effective way to build a low-carbon and healthy city (Shao, 2021).

e)   Openness: The openness of space will affect users' preferences, and people generally prefer to conduct activities in Spaces with high openness (Kaplan et al., 1989). Because in open places human activity is more likely to be noticed(Fu et al., 2019). Spatial syntax combined with GIS can quantitatively analyze accessibility and openness of location (Cohen et al., 2007; Othman et al., 2020) Street Spaces with high openness and visibility have high vitality. From a two-dimensional perspective, openness can be calculated by quantifying geometric features of external space such as area and shape (Ji et al., 2019).

As previous research has shown, street quality can be broken down into specific parameters. Some of them, such as attractiveness, may lean toward visual quality. On the other hand, parameters such as perceived safety may be the sensory and social dimensions of the experience (Naik et al., 2016). Visual elements measured objectively cannot fully represent residents' experience on the street (Ewing and Handy, 2009). Thus, a better understanding of the perceived quality of the street environment can help cities improve public health and sustainability (Qiu et al., 2021; Fu et al., 2019). Perception of subjective measurements is likely to alter and complement the effects of objective measurements, such as the recombination of visual elements or personal view indices, thereby quantifying the relationship between eye level and subjective assessment of street view perception and property value (Qiu et al.,2021).

5. DISCUSSION AND CONCLUSIONS

The types of buildings, occupancy types of urban space and population density all greatly affect the sustainability of cities, especially in the current post-carbon era and post-epidemic era, the use of urban space is facing impact and transformation. ML models help predict target metrics based on several variables. This predictive analysis allows the prediction of some extreme phenomena and offers great application potential for urban planning to simulate and plan sustainable urban form development through decision support tools.

Rather than a profound change, perhaps the pandemic will improve our approach rather than change our fundamental approach and values. Our respective disciplines have created deep knowledge, understanding and methods for studying street Spaces. In the future, we also discuss sustainable, resilient and inclusive streets by incorporating environmental, and socio-economic elements and indicators. We should also focus on the integration of ML with other technologies. AI, ML and DL still have a complex way to go to build resilient, intelligent, connected and sustainable urban environments.

Artificial intelligence is enriched by the data generated in production and life in cities, building artificial intelligence in urban systems for computer science, the Internet of things, and smart cities, which complement each other. However, it also faces new challenges: a large amount of urban basic data deepens the complexity of ML application and increases the cost of calculation. In addition, some of the latest ML algorithms and models with the highest performance are only mastered by some companies or countries, so the technical transparency of ML is also restricted to a certain extent, which hinders the development and innovation of ML.

Appendices A- Ewing `s Auditing Tools

measuring urban design qualities scoring sheet	auditor		
street:	date & time		
step	recorded value	multiplier	(multiplier) x (recorded value)
imageability			
1. number of courtyards, plazas, and parks (both sides, within study area)		0.41	0.00
2. number of major landscape features (both sides, beyond study area)		0.72	0.00
3. proportion historic building frontage (both sides, within study area)		0.97	0.00
4. number of buildings with identifiers (both sides, within study area)		0.11	0.00
5. number of buildings with non-rectangular shapes (both sides, within study area)		0.08	0.00
6. presence of outdoor dining (your side, within study area)		0.64	0.00
7. number of people (your side, within study area)		0.02	0.00
8. noise level (both sides, within study area)		-0.18	0.00
		add constant	+2.44
	imageablity score		2.44
enclosure			
1. number of long sight lines (both sides, beyond study area)		-0.31	0.00
2a. proportion street wall (your side, beyond study area)		0.72	0.00
2b. proportion street wall (opposite side, beyond study area)		0.04	0.00
3a. proportion sky (ahead, beyond study area)		-1.42	0.00
3b. proportion sky (across, beyond study area)		-2.19	0.00
		add constant	+2.57
	enlosure score		2.57
human scale			
1. number of long sight lines (both sides, beyond study area)		-0.74	0.00
2. proportion windows at street level (your side, within study area)		1.10	0.00
3. average building heights (your side, within study area)		-0.003	0.00
4. number of small planters (your side, within study area)		0.05	0.00
5. number of pieces of street furniture and other street items (your side, within study area)		0.04	0.00
		add constant	+2.61
	human scale score		2.61
transparency			
1. proportion windows at street level (your side, within study area)		1.22	0.00
2. proportion street wall (your side, beyond study area)		0.67	0.00
3. proportion active uses (your side, within study area)		0.53	0.00
		add constant	+1.71
	transparency score		1.71
complexity			
1. number of buildings (both sides, beyond study area)		0.05	0.00
2a. number of basic building colors (both sides, beyond study area)		0.23	0.00
2b. number of accent colors (both sides, beyond study area)		0.12	0.00
3. presence of outdoor dining (your side, within study area)		0.42	0.00
4. number of pieces of public art (both sides, within study area)		0.29	0.00
5. number of people (your side, within study area)		0.03	0.00
		add constant	+2.61
	complexity score		2.61

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LEARNING FROM SUB-SAHARAN AFRICAN URBAN COMPLEXITIES:
STUDENTS AS CATALYSTS FOR KNOWLEDGE

1-E-5

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Abstract

Rapid urbanization is produced by and results in complexities across urban areas that are significantly shaping the future of Sub-Saharan African cities and the wider world (Ammann and Förster, 2018; United Nations, 2019). As a field, the role of urban design in guiding this transformation will have a big impact on our social, environmental and economic future. As a profession, both in the Global North and the Global South, it is necessary to understand that the process demands new ways of thinking, methods and instruments in practice as well as in teaching in the fields of the built environment (Diaw et al., 2002). In this article, four urban design studios are discussed. Each invited students from Nigeria and Ethiopia came to Germany to work in inter-cultural teams on case studies in their home countries. Students played a key role as 'knowledge catalysts' as they brought local expertise into the academic discourse. In this paper the studios are evaluated for their reading of complexity in the context of rapid urbanization, and more precisely how they approached complexity through a multi-actor, trans-scalar and transdisciplinary perspective. The article draws conclusions on academic internationalization as an opportunity to create new knowledge and on the team-based studio teaching method to address complexities in Sub-Saharan African urban realities.

Key words:

rapid urbanization, urban design, higher education, inter-cultural, urban complexities

1. INTRODUCTION AND STATE OF THE ART

1. Globalization and Internationalization in South-North Relations

Globalization is a reality. Flows of resources, goods, people, information and knowledge travel around our interconnected world with increasing pace. As a result, there is an ever-changing landscape of unintended connections and intended collaborations between countries, continents and people that need to be reflected and continuously developed. While internationalization is often considered as a response to globalization, the two phenomena should instead be seen as intertwined and overlapping (Sehoole and de Wit, 2013). Globalization refers to increasing cross-border flows and has broad social, economic and ecological effects around the world. Internationalization refers to specific policies, programs and activities by governments, institutions and organizations that form these global connections according to their agendas (Knight, 2008; Sehoole and de Wit, 2013). These globalized networks lead to more cooperation and collaboration on the one hand, but also to more competition and power struggles on the other (Klopp et al., 2014).

The relationship between the Global South and the Global North is much informed by its colonial past. Inequalities and asymmetries in power relations have had a long tradition and the notion of one-way flows of, for example, technical support and knowledge into one and resources and people into the other direction have been described and critiqued widely (Klopp et al., 2014). The task and question therefore is how internationalization and South-North relations can be reformulated towards multi-directional inclusive collaborations with mutual benefits. Hence, capacity development has turned into a worthwhile aim in internationalization and development co-operation, needing critical reflection (Nossum, 2016). Only when countries of the Global South have opportunities to harness their potential and take ownership of their own development, these asymmetries can be rebalanced.

Higher education can and should be a driver for capacity building. Internationalization of higher education is about building new networks, learning from one another and about encounters with the unfamiliar that shape reflective and responsive thinking as well as about comparative learning opportunities and development of multi-cultural competences (Ratnayake and Butt, 2017). Hence, inter-cultural exchange fosters critical reflexivity and building personalities. Nevertheless, when using higher education for capacity building in the Global South, the typical mode is to send students abroad for training. This will always only be a chance for a few, and critiques argue that capacity is not built when students are equipped with knowledge that doesn´t suit or benefit their home countries (Klopp et al., 2014; Nossum, 2016).

In a globalized world, higher education shapes transnational relations and trans-local knowledge building. This knowledge is vital as common knowledge forms a base of discussion and fosters debates on universalism versus locality. Knowledge flows are never one-way and particularly in South-North relations sensitivity and reflectiveness are essential.

2. Urban planning and design education in Sub-Saharan Africa

Rapid urbanization is a fact (Pieterse and Parnell, 2014; UN-Habitat, 2014; United Nations, 2019). The global urban population has been growing continuously, but whereas most of the urbanization process in Europe and the Americas happened in the 19th and 20th century, 90 per cent of the projected 2.5 billion new urban dwellers until 2050 will be in Asia and Africa (United Nations, 2019). In fact, Africa´s urban population is projected to triple and to account 21 per cent of the world´s urban population by 2050 (Güneralp et al., 2017). As the scale, rate and dynamics of Sub-Saharan African urbanization distinguish from those elsewhere (UN-Habitat, 2014) there is a clear demand for understanding of what is happening and consequently, a coordination of the ongoing process. Hence, urban planning and design must respond to these new urban realities (Pieterse and Parnell, 2014; Watson, 2009).

Higher education in Sub-Saharan Africa is key. As much as practice and theory need to be developed in relation to rapid urbanization, higher education in urban planning and design needs to be reformed (Duminy et al., 2014). Education systems and ideas of what teaching urban design should involve is much influenced by Northern curricula, modernist urban design visions and referencing to cultural, economic and political settings outside the continent (Scholz et al., 2021). Many planning schools refer mainly to the formal planning system, targeting education for public formal planning institutions whereas most of the urbanization is happening outside of the formal planning system (Duminy et al., 2014). An important debate is also how much education does and shall relate to urban design and planning practice (Faling and Todes, 2004). Students on the one hand need to face 'real world problems' and on the other hand universities also can push for change in practice. Universities must support in shaping pathways for different and new forms of planning and design reflecting African urban realities.

The model of a city developed according to exact plans with separated land uses has already come into criticism in Europe for its unsustainable volumes of traffic and obstruction of a diverse and lively city. Certainly, it can serve the African context even less, where city life is based on mixed uses, adaptation, hybridity and diversity. We must unlearn normative assumptions of what is "good development" or "best practice" (Healey, 2013). Higher education needs to be at the forefront of experimenting, testing and investigating these new forms of urban design and urban design teaching in the context of rapid urbanization. Where planning values and knowledge may seem universal, cross-cultural encounters (Ratnayake and Butt, 2017) and working with specific case studies (Duminy et al., 2014) show how much these need to be locally adapted. Urban designers are somewhat part of a 'globalized' profession, students must understand globalization, global forces and global responsibilities, but they also must understand locality, that responses to global challenges are often very local and that not every locality needs the same response.

What really counts might not be the exact school of thought that is being taught, but rather about "usable skills versus more general literacies" and an "ethical stance"(Ratnayake and Butt, 2017). To be able to work in a rapidly changing environment future urban designers need to become critical thinkers with a high capacity for continuous learning and reflecting. Knowledge is necessary on a wide range of topics as much as theoretical, technical and practical skills, but it is also about communication and interpersonal skills that students and future professionals need for presentations,

public speaking and negotiation (Caves and Wagner, 2018). In the end personal attitudes and shared values are key. Urban design shall serve the public, so it is about a sense of justice and equity, economic stability and environmental sustainability (Caves and Wagner 2018) and the task for higher education to support students to develop these.

3. Complexity: A trans-scalar, trans-disciplinary and multi-actor task

Scholars discussing rapid urbanization in Sub-Saharan Africa clearly state that understanding and responding to its complexity is key for the future development of African cities (Ammann and Förster, 2018; Diaw et al., 2002; UN-Habitat, 2016, 2014; United Nations, 2019). Established dichotomies such as rural-urban, formal-informal or the clear separation of disciplines must be overcome to acknowledge these complexities.

The rural-urban divide is still persistent, whereas today´s reality can be rather described as an urban-rural continuum, where each city is part of a larger system and areas are connected through migration and translocal livelihoods. The peri-urban edge is not where the city ends and the rural landscape starts and urban agglomerations largely formed by informal settlements do not stop with administrative boarders (Pieterse and Parnell, 2014).

Relations between metropolitan regions and their hinterlands must be seen through their relational ties where the growing urban areas demand for building material, food, energy and water (Ammann and Förster, 2018). The same applies to economic activities, growing industries and services that either benefit or are threatened by proximity or distance to the large cities. Resources are connectors between people, areas and regions and to ensure water and energy security for instance, regional agreements and actions are required. Climate and environment change-related issues rise alarmingly and are one of those that clearly show worldwide connectivity (UN-Habitat, 2014).Hence, these growing complexities ask for multi- and trans-scalar perspectives.

Since the space production is an interrelated process (Ammann and Förster, 2018) urban design must take different angles and acknowledge that the city consists of a relational network of various topics. Answering complex questions demands expert knowledge, moreover, bringing together different skills and expertise. Particularly in the African context, with a lack of adequate formal infrastructure and service provision the only way to leapfrog towards innovative and sustainable action is to think in integrated systems. Simple and single-sided viewpoints can sometimes benefit one aspect but harm another one. Collaborative forces are needed to bring several dimensions productively together, sustainable development for instance brings together the ecological, the economic and the social (UN-Habitat, 2014).

Complexities in urban Africa must be understood through the various local actors that live and engage in the production of the African city (Ammann and Förster, 2018; Pieterse and Parnell, 2014; Watson, 2009). African societies are used to adaptation, flexibility and resiliently finding and creating ways through often challenging circumstances. Informality is not only the response to sometimes lacking infrastructures and opportunities, but often a way of generating income and housing as much as it is a service provision, a form of production and distribution for a the city at large (Ammann and Förster, 2018). For the improvement of the livelihoods of the majority, the

role of the state within complex and sometimes competing power systems needs to be reflected (Pieterse and Parnell, 2014). African cities are not merely formed by the informal and the formal, but consist of a multilayered hybridity, grey zones and many in-betweens (Ammann and Förster, 2018). Therefore, new forms of cooperation and governance as well as building up on existing networks of actors need to be at the forefront for a future development of African cities (Pieterse and Parnell, 2014; Watson, 2009).

METHODS

The main driving question in this paper is: how can complexities in the context of rapid urbanization be understood and addressed in and through urban design and in urban design studios? And more particularly, how did the four urban design studios evaluated consider multiple actors, different disciplines and scales in the studio? How did the studio setting contribute to the outcome?

Figure 1. Graphic: Fabienne Hoelzel, Ute Tern, Bukanzelle Simmel
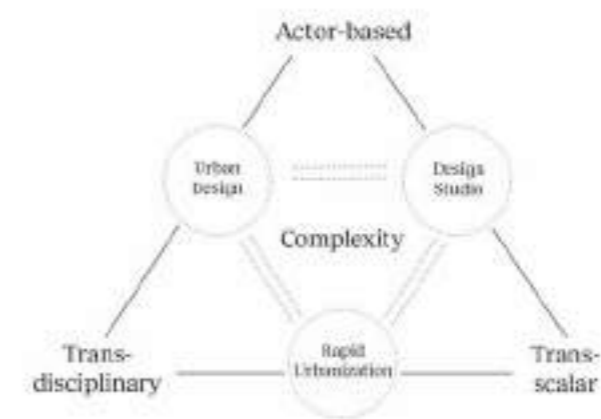
The evaluation is considering the studio setting as such, the different phases of the studio, as well as the elements and methods used. It further discusses the relevance of teaching urban design as teamwork in inter-cultural settings. The evaluation was done by reviewing the studio reader and program, intermediate and final presentations of the urban design studios as well as the studio documentations. A graphical representation to compare the studios was developed accordingly.

CASE STUDY DESCRIPTION

We use this article to evaluate and describe our own teaching practice and therefore theorize working in inter-cultural teams and teaching urban design studios on African urbanization. The four design studios took place between 2018 and 2021 and were held by the Chair of Urban Design at Stuttgart State Academy of Art and Design (ABK), Germany. The concept of the ABK urban design studio was designed and implemented by Prof. Fabienne Hoelzel with the appointment of her professorship in

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2017 and the presented cases were jointly taught by the authors. Each summer semester the chair dedicates its semester program to cases and topics in Sub-Saharan Africa and relevant to contextual urbanization. In these last four years cases were taken from Nigeria and Ethiopia and in each of the studios students from these two countries were invited to participate one semester as part of the ABK urban design studio. Whereas in 2018 and in 2019 the students worked on urbanization in Ethiopia with the studios Urbanizing Ethiopia. Hawassa and Urbanizing Ethiopia. Ziway the studio in 2020 Urban Systems: Otumara, Lagos was, due to COVID-19, held in a digital format, which meant that the three Nigerian students stayed in Lagos and the students from ABK as well as the teaching team in Germany. As the scholarships could be moved into 2021 this gave a new opportunity for the urban design studio An Inter-African Perspective. In Search for a 'Third [African] Way' where three students from Ethiopia additionally to the three students from Nigeria studied for one semester in Stuttgart. The design studios were accompanied by seminars during the semester and excursions before or after the studios. Spring and fall schools gave the chance to invite additional students to work short term with the studio group and in two of the cases a guest professor and a guest lecturer from Ethiopia joined the teaching team. All the studios were part of a growing collaboration between the Chair of Urban Design, ABK and the Ethiopian Institute of Architecture, Building and Construction (EiABC), Addis Ababa University in Ethiopia as well as the University of Lagos (UniLag) in Nigeria.
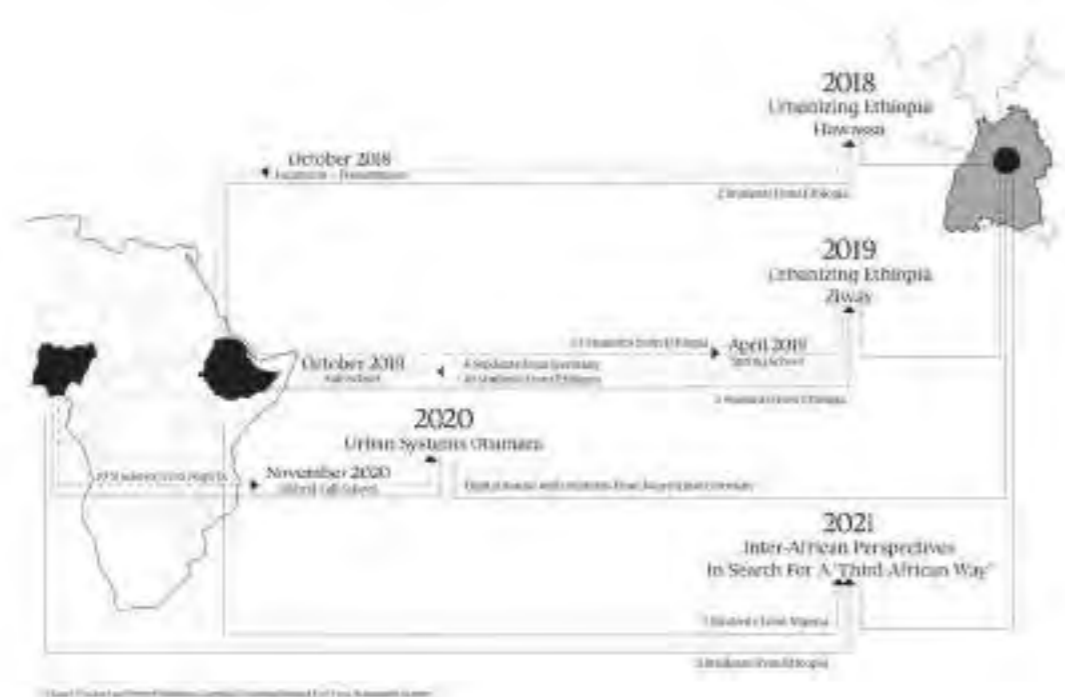
responsibilities to the students coming from Ethiopia and Nigeria, as none of the other group partners had been in the country or visited the case study area before. As the title of this paper suggests, the studio setting understands students as catalysts for knowledge. They did not only bring data from the requested field research in the form of texts, pictures and diagrams. As they grew up in the African context, experiencing everyday urbanization in Sub-Saharan-African cities, they contributed in reflecting, discussing and understanding the cultural, political, economic and social environment in which the studios were embedded. At the same time, the value of working in inter-cultural teams was particularly well received as it would question what previously was seen as obvious and normal. The constant teamwork was sometimes found quite challenging, but always leading to critical reflections, in-depth argumentation and negotiation and in the end to a more profound outcome. In all the four cases, in some or the other way, the studio output was distributed to a larger audience, in form of additional fall schools, finals with guests from Ethiopia and Nigeria to reflect upon, presentations on the ground or, as in the last case, a further development as a manifesto. The feedback in these formats was always encouraging that there is some evidence in design studio´s ability to stimulate further discussions on Sub-Saharan African urbanization and that knowledge production can take place therein.

2. Studio setting – studio phases

RESULTS

I. Studio setting – inter-cultural teamwork

All the four design studios described here have aspects in common. One aspect is the important role of the incoming students and their preliminary research. This extended phase gave a lot of

The urban design studios were divided into several phases that were built upon each other but were not seen as clearly finished after one and another: Going back and forth and to continue working in one phase while the next one has started is typical for the urban design studios at ABK. After the preliminary research the studio teams continued together with in-depth research and analysis in the first phases such as the Inventory and Analysis [1], Reading Local Systems [3] or Theory and Research [4]. Each studio then moved into a strategy and concept phase, where aims and value sets were developed that the teams used to guide their projects and to reflect their own proposals. From there, frameworks and urban design projects were developed and designed that were seen both as a

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response to and a test for the strategies and concepts established. As part of the phases or sometimes to move from one phase into another, experimental methods were used. Whereas the projects as such aimed to be down-to earth and realistic, these in-between exercises were there to make bold statements, develop strong hypotheses and visionary suggestions or used scenarios to learn from an extreme or a single-sided perspective. All these are elements of ABK urban design studios to really come up with a future-oriented normative, radical, but also possible idea for African cities. Finally in the last phase, the team developed a joint overall project. In the single-case urban design studios [1][2][3] these were joint urban design projects including overall strategies and implementation guidelines. In the last studio [4] the different urban design projects were further developed into the manifesto for a 'Third [African] Way' to guide rapid urbanization in Africa.
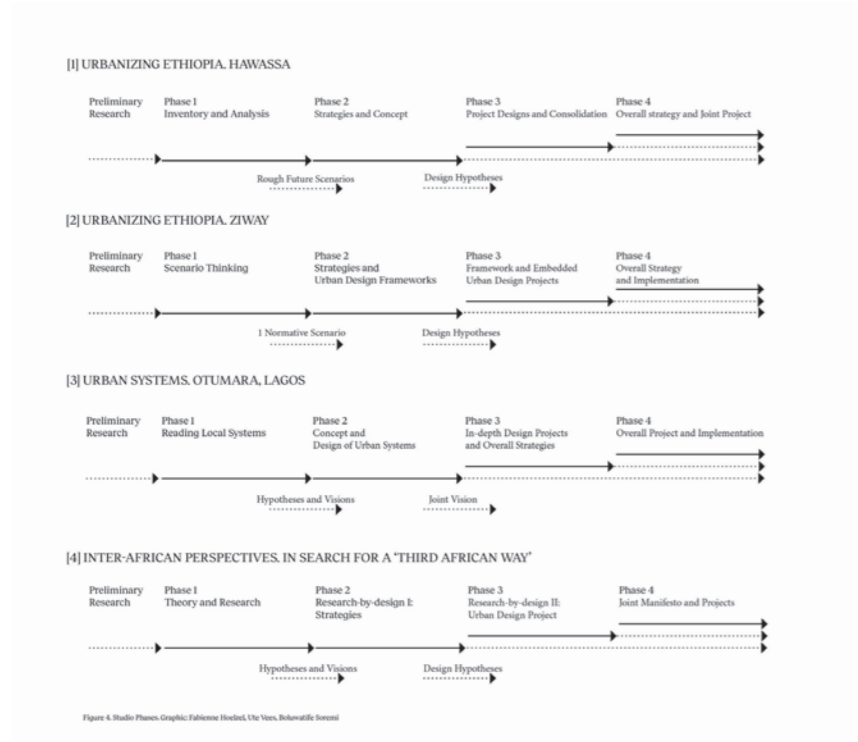
Figure 6. Studio Phases. Graphic: Fabienne Hoelzel, Ute Vees, Boluwatife Sowemi

3. Complexity – the transdisciplinary perspective

All students came from fields within the built environment such as architecture, landscape architecture, urban planning, urban design and environmental design, so the transdisciplinary approach herein is not meant in its strict sense. Nevertheless, part of the studio method included that students became experts in certain topics that were given and from which perspective they were part of the project and team. Urban design is a collective approach and exercise. Therefore, the studios worked in expert and focus groups throughout the entire studio. The large group was divided into smaller teams with two to three students each. In Urbanizing Ethiopia. Hawassa [1] these four groups were culture and governance, green and public space, urban metabolism and program and settlement; in Urbanizing Ethiopia. Ziway [2] they were economy, landscape and public space, urban metabolism and housing and settlement; in Urban Systems. Otumara [3] water, mobility, public life, waste, energy and housing.

The first phase was always about understanding the topic as such and within the specific case study area, so the small teams worked towards one or two focus topics. From there they developed hypotheses, concepts and strategies. Coming from the individual focus areas, in this second phase they would start the joint discussion to see how these topics overlap, how strategies can come together or contradict each other. Hence, phase two did usually already formulate some sort of joint vision that was expressed through the strategies and concepts.
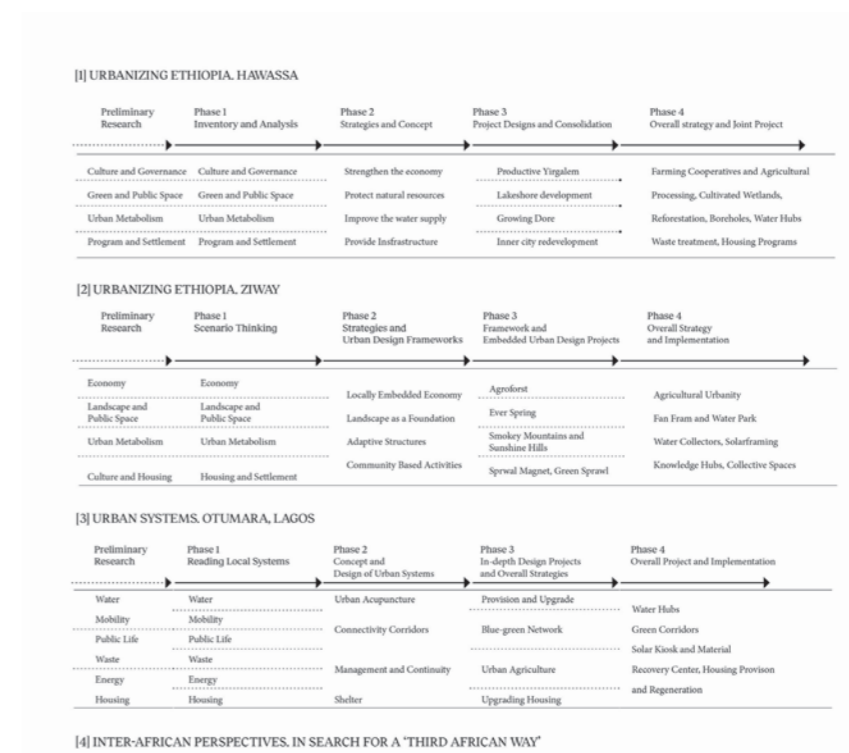
The Inter-African Perspectives [4], due to its setting, was organized differently and the topics were not pregiven, but emerged from the first phase, when the six case studies were presented and commonalities were discussed. Always one case from Ethiopia and one case from Nigeria formed one group and from the six cases three groups continued working on the bigger topics African Urbanity, African New Towns and African Mobility.

Towards the end, specific design projects were used to 'test' the concepts and ideas and show how these would manifest spatially. Projects were either designed by the groups or collaborative design projects that emerged from joint strategies and overlapping topics. Such joint projects were for example farming cooperatives and cultivated wetlands [1], wind parks and agroforests [2] or blue-green networks and material recovery [3]. Students would possibly readjust or merge topics and finally come together in the last phase where the different perspectives lead to a complex and comprehensive overall project.

This approach was found convincing as it can add complexity to the project by going in-depth into several themes and at the same time understanding how these relate, co-exist and overlap. It was about arguing from a certain perspective and then, as a group, discuss how these different viewpoints and knowledge bases can come together. Even if the students were not or didn't become hydrologists or economists themselves, they got a deeper understanding of urban complexities and

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that urban design can never stand only on its own as a discipline and that as a person an urban designer can never work on her or his own solely.

4. Complexity – the multi-scalar perspective

Urban design does not operate on a single scale. As shown in Figure 6, the scales in the ABK urban design studios vary: Students were mainly working towards regional scales in the two Urbanizing Ethiopia [1][2] studios, as urbanization in Ethiopia is primarily happening in small and medium sized towns and the chosen cases were towns where agriculture, hinterland development and migration are apparent. In the case of Urban Systems. Otumara [3] where the case study area was an informal settlement, completely self-organized by its community, the scales where the overall project was implemented mainly focused on a household and neighborhood scale. As the Inter-African Perspectives [4] studio brought six different cases together the scales the groups were working on were very much related to the topics. The dense and inner-city cases in Lagos and Addis Ababa worked on much smaller cases with an exploration of African Urbanity whereas the cases working on new town development and mobility scaled up towards a city and regional scale. The chosen scales were developed as a work-in-process during the semester and based on the cases as well as on the topics. The scales sometimes changed throughout the different phases, due to their particular rationale. In the preliminary research phase, the students were always asked to look from several scales into the topics, from national data and federal strategies to every-day practices of the people.
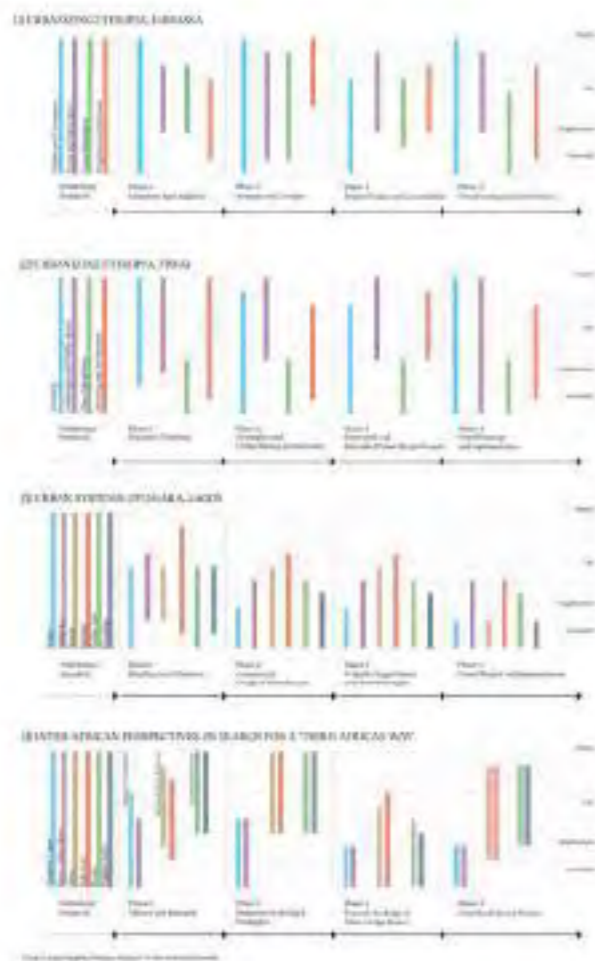
Therefore, the different scales played an important role in all the studios. Particularly in combination and in relation to the phasing, the teamwork, focus topics and the actor perspective students gained a deeper understanding on which scales urbanization is taking place and how urban design can respond to them.

5. Complexity – the multi-actor perspective

The literature shows it clearly, so did all the research phases of the different studios: Actors need to be core in all the urban design projects related to Sub-Saharan African urbanization. The analysis and research phases looked in detail who is responsible for what, how are for instance infrastructure development, mobility systems organized and water and waste managed? How do people maintain their life and through which kind of economic activities? Which spaces are used for what, how do different actor groups relate to each other, and which role do culture and social activities play in the production of the city? What does it actually mean when the federal state or local government has all the power, but is either not able or willing to give service to the majority of the people?
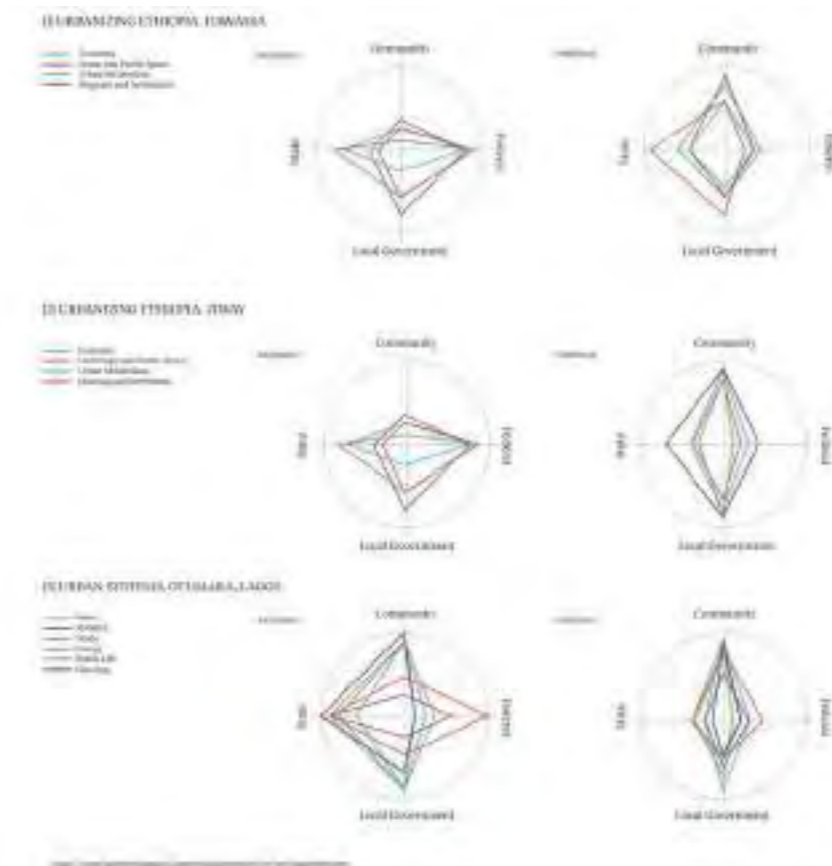
Based on these insights in phase one, the actors were key part of the development of the strategies and concepts in all the studios. Students considered how and who would be part of an implementation, who would need to be on board for the success of a project and how would power possibly have to shift to make a certain strategy turn out well. In some of the cases new actor groups or a formalization of informal actors were suggested, new forms of organization were introduced and certain actors brought together to from new entities.

In the cases of Ethiopia the relation from state and local governments to the common people was found quite different than in Nigeria. In Ethiopia the federal state has a lot of power, but might not give basic service to certain areas, especially outside of the capital. As soon as decisions are made by the federal state government, projects may happen very quickly without much participation of the communities, but often with the help of foreign direct investment. In Nigeria formally the state and local governments have a lot of power, but there has been a lack of proactive developmental planning and a prevalence of reactive development control. Whereas the two Urbanizing Ethiopia [1][2] studios suggested strengthening local governments to introduce their regional strategies, the Urban Systems. Otumara [3] studio suggested a complete power shift to acknowledge the already self-organized system of the community.

In the end, all the four projects with a sum of nine case study areas suggest a power shift towards a more people centered and community-based development. All of them base their ideas on some sort of hybrid governance system that goes beyond top-down and bottom-up thinking. All the proposals show correlation in strengthening local actors and communities and shifting some power away from the federal and state governments.

6. Complexity - process-oriented and strategic urban design

The three dimensions multi-actor, trans-disciplinary, multi-scalar are part of a strategic urban design approach that focuses on process rather than on products. Strategic in a sense that the proposals aim to "transform place qualities and connectivities, in ways which might have the potential to encourage future benefits to emerge" (Healey, 2009). The reflections within and around the ABK urban design studios have also shown, that a rather strategic approach is a way to deal with uncertainty and complexity in the context of African urbanism. The focus on actors, topics and scales in combination with the inter-cultural teamwork and the phasing have added complexity to the project and there was a common understanding that even if students do careful designs in the last phase, these are rather a proof of concept or a test for the strategies than a set in stone design. The studio concept moves urban design away from the idea of drawing exact masterplans, but rather designing the process for possible futures to emerge. A project can only be strategic, if it understands how topics and fields interlink, which role existing and possible future actors play and on which scale an intervention has to be implemented to have a wider impact.

CONCLUSIONS

We have shown that a process-oriented strategic approach that addresses complexity through a multi-actor, trans-disciplinary and multi-scalar perspective can be explored through urban design studios with case studies in Sub-Saharan Africa. Therefore, these can contribute to questions around planning and design in the context of rapid urbanization. Urban design studios, working with a young emerging generation, can offer such a setting. Furthermore, in the cases shown the critical reflections and the valuable outcome was not merely about the methods used, but the studio setting, including the phasing and the students as catalysts for knowledge. The value of organizing and setting up an entire urban design studio around incomings goes beyond: It gives possibility to reflect upon South-North relations and chances of internationalization. Higher education and universities shall take its responsibilities in creating these linkages and make internationalization more than a symbol of competition. Rather it can be used as a way of creating multi-directional learning and capacity building for the highly needed future professionals in urbanizing regions.

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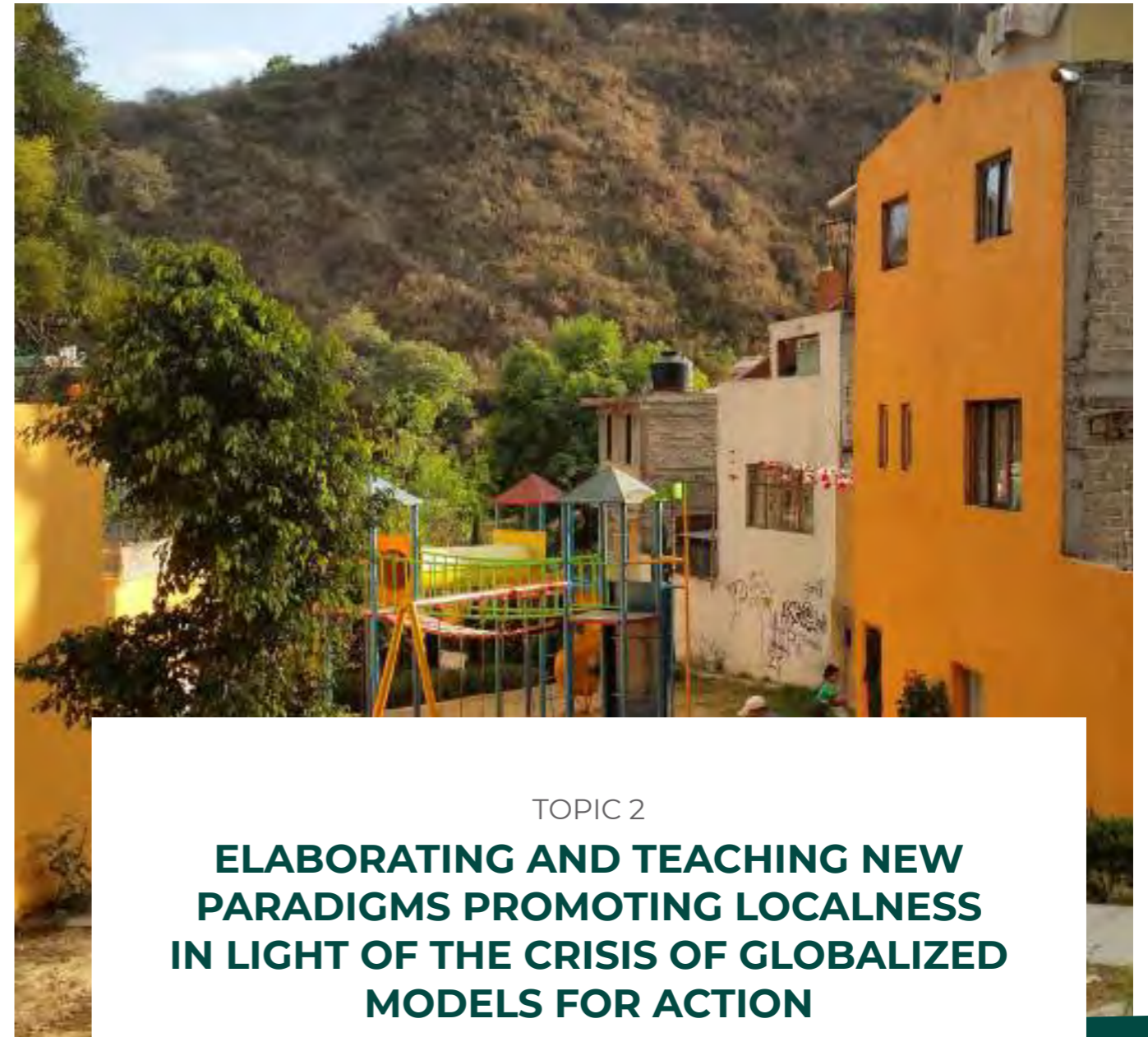
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ELABORATING AND TEACHING NEW PARADIGMS PROMOTING LOCALNESS IN LIGHT OF THE CRISIS OF GLOBALIZED MODELS FOR ACTION

The environmental crisis caused by productivism questions the models of action promoted in the name of modernity, focused as they are on perpetually increased performance and universal reproducibility in any context. By the same token, the crisis also favors the emergence of a new attitude of frugality attentive to the use of resources in a given milieu, in spatial terms as much as in cultural, social or economic terms. In a hyperconnected world, widely circulating singular approaches supplant models with purported universal validity, suggesting a new complexity in the relation between the local and the global. This theme aims to seize a panorama of pedagogies invested in this new way of imaging situated development, as well as to identify their possible contribution to new figures of internationalization, and cooperation in particular.

CYCLE DE LA MATIÈRE , A PEDAGOGICAL EXPERIMENT ON LOCAL MATERIAL REUSE

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ABSTRACT:

The "Cycle Matière" research is an innovative architecture and urban design studio at ENSA Paris Val-de-Seine, that addresses the question of resources, material cycles and building cultures.

The central theme of this design studio is the question of local resources. Our goal is to understand the link between local resources and architecture, through the investigation of the cycle of construction materials. We are specifically focused on reusable materials as tools to rethink architecture and its link with the existing city and its resources. Our main hypothesis is that the material resources of the city can become components that can be reused in order to construct new buildings. As such, the city is rebuilt by the city itself, reusing its own local resources, allowing a real circular economy.

The research's methodology consists in analyzing local territory to identify and map reservoirs of reusable materials, such as demolition and construction sites, or industries scrap materials. We aim to create a storage unit, as well as a workshop to transform the materials, within the walls of the Architecture School, in order to process the collected material and imagine a resource center inside ENSA Paris Val-de-Seine, which becomes a stakeholder of the circular economy of the territory.

The students have to imagine a "micro-architecture" at 1 to 1 scale using the collected materials.

Throughout the research, students discover the high potential of reuse material. Due to the increase of waste disposal cost, there is an important incentive for local industries and construction companies to give away scrap materials. The materials, recovered in close vicinity with the site, are transported with wheel devices such as trolleys or bikes, thus reducing CO_2 emissions.

The diversity of materials, combining both basic and sophisticated architectural details, is a driving force of the creative energy of the project.

KEYWORDS:

Ressources – reuse – circular economy – architecture

INTRODUCTION

The « Cycle de la matière » design studio was initiated in 2020 by Dimitri Toubanos, with David Serero, Edith Akiki, Yann Blanchi, Emmanuel Doutriaux and Vincent Laureau[1], at Paris Val-de-Seine National School of Architecture[1]. It takes place in the first year of postgraduate studies (master 1) and is included in one of the six master's departments of Paris Val-de-Seine School of Architecture: the "Xp - Experimental" department. This master's department approaches architecture through an opened design process combining scientific protocols and drawing on references from art, construction, sociology and geography. Since 2020, different teachers have participated in this design studio, including Dimitri Toubanos, Lionel Debs, Emmanuel Doutriaux and Hugues Fontenas in 2021. The past acadamic year, this design studio was directed by Dimitri Toubanos, Vassily Laffineur and David Serero.

The « Cycle de la matière » design studio was launched in response to a national competition by the Ministry of Culture in 2020, called "Cycle de la Matière" for the Fabcity campus in Paris. This competition was created by David Serero, Minh Man Nguyen, Dimitri Toubanos, Antoine Aubinais and Marc de Fouquet, for the French Ministry of Culture, aiming the construction of prototypes at 1 to 1 scale. Those prototypes emerged from an exploration and research on the construction materials life cycle. It was launched in June of 2019, with results that had to presented in June 2020. Eleven architecture schools throughout France answered this competition, developing various methods to approach construction materials' life cycle. Each response emerged from a newly created course on this topic that was developed in each school of architecture. As such, design studios dealing with modularity and flexibility were proposed, as well as experiment on several materials and structural assemblies through parametric design, 3D printing and CNC manufacturing. They concluded by a construction workshop with full scale built prototypes.

At Paris Val-de-Seine Architecture School, the lack of design/build courses on 1 to 1 construction scale in the university's program, as well as courses that approach materiality through physical experimentation was a founding element of the "cycle de la matière" course. It allowed the authors to imagine a design studio focused on physical experimentations with matter, in order to design and built "micro-architectures" or "tiny-houses". Our goal was to approach architecture through its materiality, its constructive culture and know-how. We did not only seek to analyze specific constructive assemblies but also proposed new ones, using materials that are "left behind" and physical experimentation as the key approach to this course. Also, we did not approach it as a complementary applied course or a workshop, but as a design studio, that took place during a whole semester. This allowed to treat the subject as an architectural challenge, and not just as a construction module. Thus, this design studio used a varied methodology, inspired by different fields such as architecture, urbanism, geography, sustainability, construction, history and sociology.

Besides bringing a new research topic at Paris Val-de-Seine architecture school, the aim of this design studio was to focus on specific materials, that are not usually approached by architects, due to the lack of knowledge and insurance guaranty regarding their use. Indeed, while seeking a holistic approach to the question of local resources, we rapidly focused on reuse materials as a way to approach resources in a different manner. The aim was not to demonstrate the capacity of experimentation through various materials, in order to put forward a specific material, but to rehabilitate materials that are left behind, while also being widely available around us.

1   Short bio of authors and participants at the end of article

Our goal was to deeply understand the link between architecture and the city, considering that the city is filled with materials that just need to be rediscovered and reused. In doing so, we chose to investigate the true meaning of construction materials life cycle, by extending it.

Our hypothesis was that one can revisit buildings demolition phase by reusing materials in different ways. In that way, we stop the process that conducts materials to become waste, which is the only way to allow their potential reuse. In fact, if materials become waste, they cannot be reused but have to be recycled, incinerated or buried. Thus, by experimenting with reused materials, we allow them to have a new life, serving in new buildings. In consequence, our main hypothesis was that the material resources of the city can become components that can be reused in order to construct new buildings. As such, the city is rebuilt by the city itself, reusing its own local resources, allowing a real circular economy.

REUSING AS AN ENVIRONMENTAL AND SOCIAL ACT

If you take French pastry like rice pudding, pain perdu or crème brulé, these now famous deserts were originally just made from left-overs from the cooking of the principal meal: Eggs yokes, extra rice, pan flour… Can we develop a genuine architecture based on reused materials inspired by how cooking left-overs became exquisite deserts internationally reputed?

Throughout the ages, this process has often been used as disappearing civilizations left behind them ruins of temples and palaces. Blocks of stones from antique castle or churches were always used to build new ones. We can also find in the roof's carpentry work of Hausmann housing buildings in Paris the traces and marks of previous assemblies from the buildings existing prior to their construction. In a way architectural materials were always part of a cycle, until we invented modernity and industrial materials, that incited us, in reverse, to always buy new products and tear the old ones away[2].

We can nevertheless highlight two recent architectural practices that recently broke expectancy on the topic of reusing construction material for another usage.

The first one is the RURAL Studio[3], launched in Alabama, USA, by Samuel Mockbee at Auburn University, educating citizen architect and social implication. The goal of this design studio is to empower students to develop social practice by inventing minimal housing with extremely local resources. Wall of houses were built with refurbished carpets tiles, glass roof with old cars wind shields and wood carpentry of sophisticated shell out of scrap wood.

The reuse of material is here a pedagogical awareness on the importance of matter, but also an act of sharing culture and experience on the rethinking of housing.

This aspect has been brightly developed by architects Encore Heureux, in an exhibition in Paris at the "Pavillon de l'Arsenal" named "Matière grise" in 2019. Grey Matter, an euphemism for old materials that are wear down, but still have the potential to be reused.

2   *Matière Grise, Materiaux, réemploi, architecture, Encore Heureux, Ed. Pavillon de l'Arsenal, 2019*

3   http://ruralstudio.org/

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Figure 01 : House in Auburn, Alabama - Source : Rural Studio

Maquette du dépliant. Le format choisi est un A2, en prévoyant une potentielle utilisation comme poster.

Figure 02 : Opalis platform poster - Source : Rotor

Another interesting practice is Rotor[4], a Belgium team of architects and researchers that have been active for the past 15 years in establishing a network of supplier of refurbished materials from construction left-over, demolition, or refurbishment of buildings. These collected materials are stored in huge warehouse, waiting to be scouted by designers and architects. The platform called OPALIS[5] allows to identify resources on any location in a city based on existing stock of products as well as future demolition and availability of materials. This shared database can foster the need for architects to easily identify resources of material for their new project.

Theses researches show that the local environment, either rural or urban, create an interesting and suitable ecosystem that allows to gather and harvest construction materials. The question for architects is therefore: What is the design and construction methods to put these components together?

METHODOLOGY AND CASE STUDY DESCRIPTION

PEDAGOGICAL EXPERIMENT

The pedagogical approach to this experiment on materials, is to propose an alternative to the pedagogy of the project as a purely intellectual process of drawing, to a process of material crafting and applied practice.

In a way this method of combining advanced fabrication with theory recalls the Bauhaus agenda, the famous school of architecture in the early 1930's in Weimar, Germany, that had so much influence in combining theory of art and architecture with local applied arts and artisanship.

Our pedagogical approach is based on the notion of design/build project. That means that the architect, far from being a mere designer, participates to the realization of the project from a constructive point of view. The assembly of materials and the constructive details inspire the design, while being immediately integrated in the project. In traditional design methods, architects often design buildings without knowing the material to be used for the project. With this method, materiality is the starting point of the project.

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4   *https://rotordc.com/*

5   *For more information, consult : https://opalis.eu/fr*

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IDENTIFYING RESSOURCES & MATERIALS

The group of students were given a very specific method to identify resources in a research area located in a circle of one kilometer diameter around the school, looking at industries that produce scrap materials, local artisans ready to share their resources, or specific materials collectors such as glass, or fabric. Other sources of materials were construction and demolition sites, that surrounded the school Campus Massena in Paris.

Step 1 : Firstly, the students had to assess existing material resources within the walls of the school of architecture. Large vaulted spaces underneath a road viaduct on the site of the school has been filled up with old furniture and products during previous phases of refurbishment of the school. In groups of four to five, the students emptied the vaults to free up storage space, store the materials available in the vaults and listed them. The research students, developed a "Ressourcerie" in a vaulted space underneath a circulation bridge near the school. This storage and workshop area allowed to test construction through prototyping and experiment.

Step 2 : Collecting and storing the resources.

Then, the students created a database of materials and resources from their sites of study. In groups, they had to choose a "territory for exploration" and produce an analysis of the exploration territory they were studying, paying particular attention to the resources available there. To this end, they produced a map of the territory, in which appear the available resources, as well as the possibilities and means of transporting the material to the school. The proximity of material and the combination of a storage and ateliers area triggers several options of experimentation on matter, in terms of constructive detail, material combination, or quantity and types of materials and products. At the end of this step, each group of students had to select the materials with which they planned to experiment in the following stages.

EXPERIMENTING ON MATTER

Step 3 : Case study analysis

While starting to experiment on matter, students had to choose different case studies. They had to analyze each example in order to understand the structural assemblies and the way different materials were manipulated. They produced different drawings in order to explain the design and construction process. Also, they had to pinpoint how the case study could influence their own project.

Step 4 : Constructive experimentation

The student's proposal and project were based on initial conceptual sketches, that tune in reduced scale model, and large-scale model (1/10 to ½) to full scale details, to full scale prototype of part of the project. This assembly allowed to progressively refine the project's quality and details, to adjust esthetic and simplify progressively assembly techniques. Then, each group of students had to experiment with the assemblies of the selected materials. In order to do so, they had to use both drawing and diagramming, modeling and assembling on a 1 to 1 scale through constructive experimentation.

Constructive experimentation was done by testing the characteristics of matter and its assemblies. At the same time, they experimented perception and emotional quality of space and materials, through the space created. This translates into an architectural intention, that of designing a space that produces a particular sensation. In order to do so, we proposed to use digital tools for the simulation of an experience in the project. This was done through modeling, using BIM software augmented by a parametric module, in order to deepen physical and bioclimatic phenomena, according to the students lines of research.

In parallel, each group of students had to choose a specific program that could translate the emotion that was sought into practical spaces. Those space had to have a purpose, a specific use.

Each group of student had to propose a «micro-architecture» fulfilling two conditions. On the one hand, the prototypes had to be removable and transportable. On the other hand, the prototypes had to question the theme of reversibility and flexibility. It was thus be a question of designing «micro-architectures» which could have different functions for later reuse.

CONSTRUCTING A MICRO ARCHITECTURE IN SCALE 1 TO 1

The last step was the realization at 1 to 1 scale of prototypes, that started from parts of the whole project, to the "micro-architecture" itself. This allowed to develop collaborative skills, in order to join forces and interact with other persons of the group, thus ameliorating their intellectual and manual synchronization. An important part of this process was the immediate confrontation to reality. The students were forced to assume all the problems at once and could not postpone the resolution of details or assembly difficulties for the final construction phase.

The students also had to provide, for each project, a financial estimate of the expenses to be considered for the realization of the full-scale prototype (hardware, specialized labor, timetable, etc.). Due to the school limited construction budget, the projects had to be as economical as possible.

The students proposal were evaluated on :

- The choice of materials

- The intrinsic qualities of reused materials

- The structural, thermal, embodied energy, porosity and light characteristics of the materials used.

- The quality of the assembly

- Its ability to be dismantled

-The flexibility of the project

- The spatial qualities of the project

- The response to a program

- The capacity to explore the emotion that has been selected by each group

- Material experimentation on the selected sensation

- The ingenuity of the system put in place

- The cost of the realization and the economic feasibility

- The capacity to plan and execute construction phase

Step 5 : Realization

After a teacher's evaluation, which consisted in selecting the projects that met in the best manner the necessary standards and experimental methodology in order to be built, the last phase of this design studio consisted in building the "micro-architecture" in scale 1 to 1. The initial group of four to five students that had design the project, were joined by seven other students. They formed a new group of twelve students that had to confirm the hypotheses of the modeling, while verifying the spatial qualities of prototypes. They also had to adapt to a construction site and methodology, taking roles of construction managers. Details had to be drawn several times, while dealing with the hazards of a construction. Finally, they also had to coordinate and experiment the dismantling of the projects, after a timelapse of use of each "micro-architecture".

RESULTS AND MAJOR FINDINGS

This pedagogical and research experience allowed us to put forward several findings that will hopefully be useful for fellow researchers, teachers, students and architecture schools, as well as for designers and institutions that want to deal with reusable materials.

THE ARCHITECTURE SHOOL AS A RESOURCE CENTER

The first major finding concerns the school itself. During the past three academic years, we have collected several reusable materials. Let us remind that one of the founding principles of this design studio is that each micro-architecture designed and built by the students, is an experimentation that is going to be dismantled after a few months of use. Thus, each year, the students collect new materials that they will used for the constructions, but remain at the school for the following year. Year after year, a large palette of materials was collected. In order to deal with this situation, we have imagined a storage unit within the school. To do so, we used an abandoned space adjacent to the school, a former infrastructure to support the "Petite Ceinture", an old transportation system that existed in Paris until the 1930'. This infrastructure is composed of different vaults, that used to be abandoned before they became the storage space for different students' associations of the school. One of those vaults was lent to our design studio to store the reuse materials.

Figure 03 : Picture of the pre-existing vault – Source : "Cycle de la matière" design studio

Through the years, we occupied a second vault, while coordinating with the different students' associations in order to imagine a **resource center** within the school. Three vaults are now used as storage units by our design studio and different students' associations, and a fourth one is used as a workshop to transform the material. In time, we plan to develop the process, using the existing infrastructure, that is transformed from unused abandoned space to resources for the larger territory. Indeed, a central issue in dealing with reusable material is the space to store the materials that are recuperated. This brings forward deep territorial problems, especially the lack of land, which is a resource in itself. How to find spaces within the city in order to store material, thus avoiding the ever-extending urban sprawl? The school of architecture becomes such a place, but also goes forward in becoming a resource center in which the material is brought, stored, and then transformed, thus becoming a stakeholder of the circular economy of the territory.
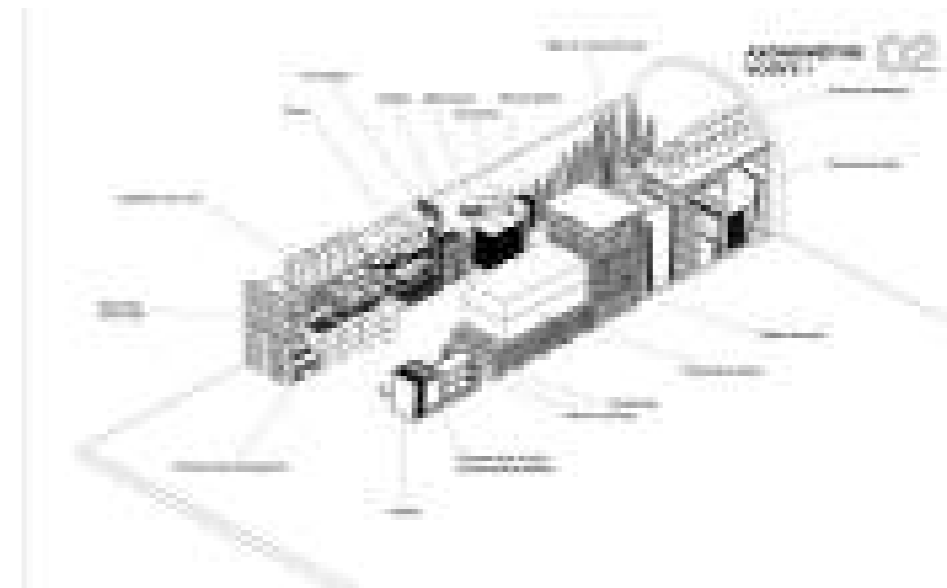
Figure 04: Picture of the organization of the storage unit – Source : "Cycle de la matière" design studio

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Figure 05: Picture of the transformation process in front of the transformation unit

– Source : Photography by Véronique-Armelle Medetognon (student 2021-2022)

RETHINKING THE PEDAGOGICAL APPROACH

The second major finding of this research concerns the pedagogical experiment in itself. In fact, by putting resources and physical experimentation in the center of this course, we accompanied a shift of pedagogical paradigm, which usually is focused on the conceptual process, leaving behind the physical world and the profound knowledge on material. Our methodology consisted in inviting the students to address materiality and resources before addressing a conceptual idea, which often forgets to apprehend how the idea could be built. By mapping the local resources, then understanding what materials are available in each resource, how to transport them to the school, how to store them, and then what these materials can do, it changed the whole teaching dynamic for the students. Architects are not free designers, they are also bound by the capacity of each material they chose to use. This is not just the problem of engineers as is often transcribed. It is the quintessence of architecture, to marry thinking and constructing.

In doing so, the students were taught the importance of details, of construction principles and of hazard between the design process and the construction. In fact, during the last part of the semester, the five students, the initial designers of a project were joined by seven more, in order to construct the micro-architecture in real scale at 1:1. A jury chose the two micro-architectures that were going to be built. In the process, the initial five students that were in charge of the design had then to change roles, in order to become construction managers. They had to explain the project to their colleagues, then draw all together execution plans before the construction, reinventing the structural assemblies and details, as well as conceiving a guide for the construction, describing the steps to follow, the tools to use, the necessary workers and time needed to build. During the construction, the students realized that several aspects of the project are harder to build. They had to draw construction details over and over, in order to adapt to the construction, giving them a glimpse of what is often a real-life construction. The question of the tolerance of each detail was an important discovery for them. Also, they discovered the importance of structural assemblies, and how to design dismountable as-

semblies with strategies such as reducing screws or connectors and other semi-permanent methods, in order to conceive a temporary building easy to dismantle as required in the design assignment.

IMPLEMENT REUSABLE MATERIALS IN THE CONSTRUCTION INDUSTRY

Moreover, we hope that the findings of this experience will be helpful for architecture practices, in order to prove the possibility to implement reuse materials in projects.

Indeed, this design studio proved that reuse materials can be used both for the primary and secondary structures. This decomposed the initial thought and process of the few example that implement reuse materials nowadays. In these projects, reuse materials are mainly used in the secondary structures, as part of the "decorative façade" or as part of non-structural parts of a building, such as separative walls, doors, windows, etc.

On the other hand, the primary structure, that allows the building to stand, is never the place in which architects would experiment reusable materials. This paradigm was shifted throughout this design studio.

Indeed, several projects used reusable wood sections in order to conceive the primary structure of their project. It was the case of project built this year by a group of twelve students, that used wood sections of 70 x 40 mm, in order to imagine the primary structure of their micro-architecture.

Figure 06: Project "Le Jeu". Source : Photography by Didier Boy de la Tour

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Figure 07: Project "Le Jeu". Source : Photography by Didier Boy de la Tour

A second project designed by the students even managed to imagined a primary structure based on materials that are never used as such. The five students that designed the "Entre flux et absorption" project experimented the construction of walls composed by glass and polystyrene. Their proposal began by the resource available, windows that they got from a low-income housing building that was being demolished. They managed to recuperate more than one hundred window frames. Then they deconstructed the window frames, in order to extract the glasses, which they assembled with insulation panels made of polystyrene that they managed to recuperate from another demolition site. In accordance with the experimentation protocol that was demanded in the pedagogical process, they managed to prove the structural efficiency of their proposal by building a first prototype of the wall assemblage.

Figure 08: Wall prototype of the project "Entre flux et absorption" - Source : Photography by the students

Going from the experimental prototype to the final micro-architecture, the group of students demonstrated the capacity of the wall structure to support the roof framework as well as the roof filling, thus demonstrating something that seemed structurally impossible: building a wall from glass and polystyrene materials.

Figure 09: Project "Entre flux et absorption". Photography by Didier Boy de la Tour

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Figure 10: Project "Entre flux et absorption". Photography by Didier Boy de la Tour

During the four months of use, several storms tested the stability of the micro-architecture's structure.

Although we are aware that the experiment is only partial, being that it's use was only of 4 months, and that its structure remains experimental, it still demonstrated the capacity of reinventing structural assemblies, reusing materials that are not "meant" to be reused. While the experimentation remains pedagogical, it allows us to believe that it could be an inspiration in order to change the paradigm in which reusable materials are impossible to use in the primary structure.

We hope that this will allow a shift in the manner young architects deal with reusable materials. Having acquired the competence and knowledge, as well as having developed the investigation and experimentation methodology, the students will be sufficiently equipped in order to pursue testing reuse materials in their future practice. This is confirmed by the topics and projects students choose for their final project that gives the Architects title. It is also confirmed by the development of young emerging practices, composed by young architects, that deal with reusable materials. Bellastock, Encore Heureux, or Studiolada, are only few of the examples of young architects that took the reuse of materials as a founding approach of their practices. This reflates the shift in architecture practice, that hopefully will lead to a shift in insurance policies. Those policies are one of the main problems that reusable materials face. How does one ensure the efficiency of materials that have been used, whose characteristics were altered by time? We hope that our research will accompany this paradigmatic shift, by complementing the existing methodology with even more thorough scientific experimentation of the use of materials in time, through the development of experimentations in laboratory that accompany the physical experimentation by the students.

CONCLUSION: THE CITY IS A MINE - RECREATING THE CITY BY THE CITY

When enlarging the scope of the experimentation itself to a larger scale, several conclusions are to be made. First and foremost, we were astonished by the quantity of materials that are abandoned or thrown away, in a close vicinity to Paris Val-de-Seine Architecture School. Main material providers included construction sites, demolition sites, as well various stores that through away a large amount of unused material. These materials are considered faulty for various reasons, usually due to poor packaging. But it can also simply be a surplus of material that a construction company or a store has ordered, or merchandise that has not been sold and that a store does not know how to through away quickly enough, or even the package of materials itself, that can easily be reused.

In the end, the quantity of materials that is available in close vicinity with one architecture school is considerable. Imagine enlarging the scale to the whole city of Paris. Being that the city itself is mainly built, with few free land spaces, we can easily imagine that in order to construct new buildings, old ones would have to be demolished or transformed. In doing so, they automatically become resources that can provide reuse materials. Those materials could be reused for the new or transformed building. They could also become a resource for another construction nearby. This creates a circular economy. The city becomes a mine full of resources, that just wait to be discovered, extracted, transported, stored and reused. The only thing that is missing is the infrastructure to allow such a process. If created, we could consider that the future of the city depends on the city itself, which will provide for the material for its own transformation. Thus, we can reinvent the cites by the cities.

Our experimentation starts with small scale projects, but we look forward to larger scale implementation of the process.

At the term of this research and the micro-architectures that were fabricated, we identified that cities are powerful reservoirs to recuperate, save, store and reuse the materials and resources that constitutes buildings and our living environment.

1- Cities can build more cities. The notion of site and resources can by reorganized to accommodate the cities to political, historical or climatical changes. The city is a given infrastructure that allows to put in network the resources and materials that compose the city itself. In a sense, one can say that cities are the mines of tomorrow. Being so, we can imagine to build new cities by the cities and the resources they are composed of.

2- The Design/build methodology is an alternative pedagogical model for architects to traditional learning by drawing. By having a direct contact to materials and their constructive challenge, architectural proposition emerges from the physical manipulation of space and not in a reduced knowledge and purely intellectual manner. Dealing with reuse material needs a catalyzing environment in order to surpass the limits of norms, laws and insurance policies.

3- The Schools of architecture and university campuses might become catalyzing environments to initiate these strategies. If the cities are mines, we need to imagine the infrastructure of a mine: extracting, transporting, stocking and transforming matter. We need to identify specific places in order to stock and transform matter. Architecture schools and university campuses can become those specific places.

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PLATFORM FOR THE DISSEMINATION OF PROSPECTIVE SCENARIOS FOR THE VALORISATION OF LOCAL RESOURCES TO RESPOND TO SUSTAINABLE DEVELOPMENT ISSUES IN THE LANDES DE GASCOGNE TERRITORY.

Proposals for methodological contributions from geography and systemology to reinforce the relevance of the architectural and urban project on a territorial scale.

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ABSTRACT:

The educational experience of an architectural projects workshop conducted at Bordeaux Architecture school (ENSAPBx) which focuses on the development of the Landes de Gascogne territory, is an action-research whose analysis is used to develop support tools dedicated to facilitate the role of mediator endorsed by the architect in the context of a reinforcement of the definition of the status of places (Magnaghi, A., 2004).

Territorial development through the architectural project is an object of study for urban planning and development, from a constructivist perspective of the territory (Colletis and Pecqueur, B., 2017) where the architectural project can be conceived as a territorial resource.

A web platform developed as part of a thesis in Architecture is assimilated to a "transactional place" (Dugua, B., Trotta, B., G., 2012) presenting student projects in the form of prospective scenarios about local resource management. These projects, designed over a period of ten years (Parin, C., Bouriette, C., Robert, J., 2019), constitute a corpus of descriptions, diagnoses, and scenarios. They are analyzed through the prism of two contributions offered to local actors (inhabitants, institutions, students themselves), in order to fuel thoughts and ideas on local development: on the one hand, they offer an illustration of the potential for situations of innovative use of latent or synergized local resources, and on the other hand they offer a construction of knowledge on the attributes of the territory (Lacquement, G., Chevalier, P., 2016) and its development issues. The projects are mobilized to help raise awareness on the potential uses of untapped or latent local resources (Talandier, M., 2016). This may involve the development of biosourced materials, of upcycled materials, or even the transmission of know-how and knowledge attributed to vernacular local culture, which are all new uses of local resources that can promote sustainable socio-ecological development.

KEYWORDS:

Territory, Development, Mediation, Resources, Circularity, Website

An experiment was carried out by an action-research project in the field of architecture and urban planning from 2009 to the present day, and which was taken as a case study in a doctoral thesis defended in 2022. This case study shows a process of problematization of local development issues, which takes place in the *Landes de Gascogne* territory in south of France, around several strategies of co-construction and mediation about the transformation of space by architectural and urban projects, by highlighting a pool of issues and local resources to be valued.

The amount of data generated by the action-research taken as a case study is analyzed in the doctoral thesis from the perspective of the light they shed on the potential of local development. Space transformation scenarios through architectural, landscape and urban projects, carried out by students in the *Landes de Gascogne* territory, show a wealth of knowledge produced by the project process, from diagnoses to the formalization of projects that use local materials, vernacular know-how, aspects of local culture capable of creating emulation among the inhabitants of the territory because these are the materials of the territory anchored in the unique realities of the places.

To make these studies of the territory and these scenarios fruitful, a proposal for the creation of a web platform, to communicate on these projects and above all on the issues and resources they highlight, is a working tool to support a certain practice of architects and town planners. It is a question of extending the process of co-construction and of a form of mediation, which makes it possible to promote the appropriation of the latent resources of a territory by the individuals who inhabit it. Indeed, mediation is today an emerging practice for architects and urban planners, which consists above all in anchoring oneself in the realities of the complex relationships between local actors, and in perpetuating the added value of a spatial project on existing situations. The dissemination of scenarios and the highlighting of the issues and resources that underlie them through communication tools is a mediation strategy that aims to provide a basis for reflection for various possible branches of action (entrepreneurship, individual project , political project) to initiate the implementation of architectural or urban projects.

The website must play the role of an "intermediate object" (Jeantet, A., 1998), making it possible to formulate some "reciprocal prescriptions" (Ibid.) between the actors living in the territory, in order to negotiate the implementation of architectural and urban projects participating to the development of the territory ans focusing on the valorisation of local resources. These reciprocal prescriptions are then a mode of negotiation between the actors, who are based both on a "specification", in other words the required results, as well as on evolving prototypes (Ibid.).

The notion of specifications is itself one of the issues to which the corpus of student projects responds, inventoried and publicly presented on the website, by proposing a solution to the following dilemma: How to establish a list of "required results" (specifications) while the desires and subjective constraints of the different actors often contradict each other?

State of the art

The "capacitating" role of architecture in the territory

For Antoine Picon, architecture is now perceived as being "*an integral component of the territory, […] which is expected to function with the efficiency that was previously reserved for living beings and machines.*" (Picon, A., 2010), because architecture today must have the potential to shape the territory (Ibid.). The project can therefore be a vector of territorial transformation, such as the development of a new material or the creation of new ways of life. In this sense, the architectural project acquires a role that can be described as "capacitating", based on the choice of resources to be developed and the issues to be addressed. This is the underlying idea in the concept of "urban acupuncture" (Lerner, J. 2007; Casagrande, 2010; Solà-Morales, M., 2008), itself falling into the category of *tactical urbanism* (Courage, 2013; Douay and Prévot, 2016; Gwiazdzinski, L., 2018). This approach follows two principles, that of the economy of means for maximum impact, and that of reversibility : it implies that localized projects can play a role in the creation of the characteristics of the territory by becoming themselves territorial resources.

Territorial resources to be valued

First of all, the territory is considered here in an inhabited dimension, that is to say as a geographical perimeter self-defined by its inhabitants, their shared culture, their socio-economic exchanges and the specificities of the local ecosystem. Territories are recognized as complex systems, because they are "living" entities (Leloup, F., 2010), which means that a territory is continually being constructed.

The possibility of self-determination of the "place status" of a territory, is defended by the constructivist theory of territory (Colletis and Pecqueur, B., 2017), as well as the Italian territorialist school which share the idea that a voluntary process on the part of the inhabitants to value certain territorial resources makes it possible to define and emancipate said territory (Magnaghi, A., 2014). This idea is also implicitly defended by the economist Elinor Oström (2010 [1990]) in her theory of the "third way" for recognition and self-governance for the management of common resources (Common-Pool-Ressources – CPR), which are the "collective, non-privatized and inalienable commons" (Magnaghi, A., 2014). The management of these resources must go through the transformation of the visions that the actors can have of them, by understanding their conservation issues to ensure their sustainability and allow everyone to use them. It is therefore governance issues that appear to be at the heart of the problematic about resource management, and valuing.

In the context of systems thinking (Latour, B., 1991; Capra, 1996; Du Plessis C., 2008) the idea of relying on the territory to defend a certain localized functioning of production and consumption is not politically neutral because it refers in particular to a search for autonomy for individuals, a society (Raffestin, C., 1980). Today, it is a political position that can be defended as a response to environmental and sustainable development issues, which consists of favoring local production and consumption, and promoting the creation of a circular productive system.

The approach of putting resources into circularity is linked to that of valuing latent resources to make them "emerge" (Janin, C. et al., 2015; Talandier, M., 2016) because this consists of making the most of of the existing. Latent resources are the "materials of the territory". They can be physical such as plant essences that can be transformed into local biosourced materials, or even materials produced by the recycling of waste, or they can be non-physical (immaterial) such as climate, weather, "social capital" or the culture and know-how in a population.

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Mediation: positive diagnosis to bring out latent resources

Mediation is a central issue in the creation of the appropriate governance to manage a multitude of contradictory desires and constraints. The notion of mediation is also consistent with the definition of the notion of interface in geography which refers to a device (generally spatialized), which includes the functions of exchange and regulation (Chapelon, L. and al., 2008). The specificity of mediation is precisely to rely on an "intermediary" to manage the exchange of information in order to make it accessible, and doing so makes compromises which is a form of regulation (TLFI, mediation). For many theoreticians and architects, the action- research approach and participatory design process make it possible to integrate the active participation of citizens as a source of proposals on the one hand and as a guarantee for the decisions taken on the other, on their projects. Some think that this form of project practice should tend to become more generalized in the future, and thereby to become more professional by leaving the field of commitment and to be taken over more by consulting firms or institutions (Maffei , S., Villari, B., 2004; Douay, N., Prévot, M., 2016; Gaziulusoy, I., Ryan, C., 2017).

Case study description

The Landes de Gascogne faced with the risk of a functionalist role dedicated to serve the metropolis

The research-action study area that has been undertaken for 10 years by teacher-researchers, architects and urban planners from ENSAP Bordeaux is that of the *Landes de Gascogne*. The development issues of the territory are those of the benefit that there would be for its inhabitants to reinforce the local identity and to get rid of a functionalist role in the service of the metropolis, by a process which is conceptually close to the notion of reterritorialization (Magnaghi, A., 2014).

The case study is mobilized to present a problematization process based on a series of issues identified by public actors involved in local development concerns. To carry out a problematization of the demand relating to the revalorization of the local identity, the research-action "Architecture and Territory *Landes de Gascogne*" was oriented towards a questioning of the processes of production of space in rural and peri-urban areas. It is the challenge of defining the identity of the place that is central, a concern related to the status of the territory in relation with metropolis.

The concern that animates the elected officials when formulating a problem concerning the revalorization of the identity of the territory, appears as the formulation of a fear, that of seeing their "marginal" territory transforming into the periphery of the poles which around them, lose autonomy and be subordinated to them. Indeed, the subordination of a rural territory to a metropolis implies the risk of seeing this territory devalued, according to the process described by Magnaghi (2000), with a loss of status as a place in favor of that of of peripheral space to a center which is then only considered as a functional spatial resource to be exploited.

This dynamic is confirmed in the *Landes* "triangle" where the timber industry has developed around the monoculture of maritime pine, creating a pool of jobs for the whole of Aquitaine Region, but with no direct impact on the quality of life locally. The *Landes* Forest, which is a political construction, is an exploited forest which nevertheless shelters traces of the landscape prior to its constitution, composed of waterways, riparian forests, oak groves, peat bogs and wetlands, as well as traces of the districts of *Airials* and their systems of habitation of the territory dating from the agro-pastoral era of the *Landes de Gascogne*, a legacy and a dormant heritage.

A co-construction of the problematization of development issues, between students, teacher-researchers, elected officials and inhabitants of the territory

Designing student projects as scenarios is part of an approach that is underpinned by the problematization of the issues identified over a long period. The original issues, given by the elected officials, were related to the need to revalue the space of towns and the outskirts of towns, and in particular their relationship to the Landscape (the Landes forest), to the greater territory (links with major urban centers and basins jobs) by raising the question of alternative or redesigned mobility as well as regional architectural forms.

The issues addressed have evolved by incremental rebounds from one year to the other, thanks to the process set up for the advancement of the research-action which consisted of a process of "feedback", making it possible to refine the issues on which the students' projects could shed light by proposing formalized solutions in spatial architectural, landscape, urban projects, and social organization, from mobility, or the management of energy and material resources in the territory. A multitude of actors were integrated into this process, in order to multiply the sources of situated knowledge, and to obtain feedback from individuals primarily interested in the development of project sites. Over time, and through the integration of different interlocutors and new study sites (the PNRLG, the Pays d'Albret, then the Community of Communes Cœur Haute Lande - CCCHL, which will integrate the country in 2017), the work issues have increasingly turned towards the activation of synergies (D'Arienzo, R., and Younès, C., 2017) and virtuous cycles between economic or cultural activities based on architectural interventions and landscapes.

Methods

A "positive" diagnosis formalized by project-scenarios

The accumulation of student projects on the same territory, often on the same villages from year to year, has produced a wealth of data resulting from analyzes of spatial, functional and even landscape structures carried out on site.

The methodology adopted to carry out the analyzes of the project sites, specific to each group of students, is close to the geographical method. It is an analysis based on the accumulation of data: natural characteristics, urbanization, urban transformations at work, socio-demographic evolution, administrative and economic evolution, planned uses. This type of analysis can be carried out by cross-referencing data found in publicly accessible databases, in particular by maps of different kinds, local historical analyses, statistics, etc. On each project site, the groups of students completed the analysis by referencing GIS type data, with an in-situ analysis concerning a referencing and a critical reading of the direct observation that they could make of the spaces, uses, flows, atmospheres, and morphological, urban and natural characteristics. Various disciplinary approaches were adopted, according to the analysis criteria that each group found relevant to mobilize : sociological, architectural, historical, ecosystemic approach.

Student projects formulate spatial proposals that are represented graphically, as possible futures, and above all show the potential for developing latent local resources (Talandier, M., 2016) by highlighting them. These projects are transforming the "preconceived" vision that the actors of the territory could previously have on particular sectors and on the modes of urban territorial development. The underlying postulate of this status as an example for projects produced by students is the capacity of the projects to "[...] *reveal a pool of "common resources" (a common pool of resources) and*

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to mobilize knowledge and know-how to generate new "commons", both material and immaterial (Oström, 2010)." (Parin, C., Bouriette, C., Robert, J., 2019).

Through the project-scenarios, there is both an identification of development levers and the identification of the issues and of the nature of the development itself. Indeed, the development of a territory is measured according to chosen criteria, which correspond to the needs identified for the improvement of living conditions. These needs are defined according to political ideals, such as wealth, access to services, the proper functioning of ecosystems and the increase in biodiversity, etc. The areas usually identified are described as being economic, social, societal and environmental criteria, each including development issues, by the applied research laboratory and national observatory of partnerships between actors (Rameau, 2019).

The positive diagnosis method on which the student projects are based, shows alternative issues: indeed, unlike the "normative" diagnosis (Pinson, D., 2018) which offers a limited and open to criticism of the state of the territory diagnosed, the positive diagnosis seeks to point out potentials. The alternative method of diagnosis carried out by the research-action project is based on a process of designing architectural and urban projects in a process of capitalizing on knowledge. This approach makes it possible to find and cross synergies between the data identified on the territory to enhance them, thanks to the collaboration of a plurality of actors, to make of them new opportunities for socio-cultural, economic, and environmental development.

Mapping an ecosystem of issues and resources

The research-action approach initiated on the *Landes de Gascogne* territory has set itself the objective of bringing to light the major structures of the territory and establishing links between heterogeneous entities (material or immaterial resources).

The quantity and diversity of data generated by the forty or so "positive" diagnoses of project sites on the territory and of the scenarios constituted by the student projects, had to be inventoried in order to be mapped, highlighting the links that could be identified between identification of issues and resources to be developed. Student projects are in fact able to reveal and connect the complexity of issues identified outside of a sectoral approach, and the territory's resource systems.

The issues likely to generate alternative practices in the Landes territory are located at the intersection of these three domains (landscape entities) that structure the territory from an economic, social and environmental point of view. The resources present on the territory are also located at the interface of structuring domains for the territory, which have been identified as the habitat, the forest, and networks.

We note that certain development issues constitute potential resources. These are resources that could be exploited and constitute in themselves development issues, because their valuation responds to other issues by "rebound":

- The development of the tapping production sector: allows the improvement of the quality of maritime pine wood for construction, as well as the improvement of biodiversity (Association Gemme la Forêt d'Aquitaine, December 2015).

- The creation of "Third Places" as enablers of the activation of potentials for putting materials and waste, knowledge and know-how into circularity.

  The development of mechanisms favoring local food production.

- The development of temporary / mobile structures that promote the pooling of space and the flexibility of the local response in terms of services and tourist equipments needs.

Results

A few scenarios and issues highlighted as a base for discussion and action

What the corpus of student projects has shown in particular, are some ways of promoting effective local resources, based on three approaches, including two circular economy approaches:

1. the reuse and recycling of building materials and "waste";

2. a process of enhancement and innovation in architectural design based on materials and industry already deployed in the territory, in particular that of small-section timber from the cultivation of maritime pine, as well as that of the production chains of paper and cardboard as well as related products of this industry (cellulose wadding), which currently occupies a leading position on the national level;

3. a process of enhancement and innovation in architectural design, based on biosourced materials that could be extracted, grown locally, or from conventional agriculture, such as straw, earth (clay present in large quantities which supplied the Grès de Gascogne factory), or even hemp, or even mycelium (from mushrooms).

The issue that seems most promising in a medium-term operational perspective seems to be that of the valorization of maritime pine wood derivatives, beyond the research that has been carried out by the students in the direction of the development of a "sector" for recycling and reuse in general. Indeed, it is the valorization of related products of the sawmill industry which is the approach that remains over many years of workshops and generations of students who have studied the subject of the valorization of local resources and of heritage.

The approaches adopted by the students in terms of developing "latent" resources, which they have integrated into their projects, aim to support the development of greater economic autonomy by relocating a production of construction materials on the perimeter of the territory, which also makes it possible to create jobs. The objective of relocating the means of production is generally correlated in student projects with several other strategies that relate to the theme of putting knowledge and know-how into circularity, as well as energy, water and other resources.

The projects show in particular the potential for improving living conditions at the collective level in the villages, by mobilizing resources. Their development are shown in the student project-scenarios to have a positive impact for the community: this is the case in particular of the value of elements of the landscape, such as certain plant species, of a landscape situation such as the edge between clearing and forest, and this is also the case of the enhancement of heritage or non-heritage constructions, constructions that can be valued for play a role at the scale of landscaping or urban planning, etc.

The relationship to heritage is central to many projects, through the enhancement of heritage sites, the requalification of buildings or structures, and the study of vernacular constructive and functional principles to consider ways of reusing them by adapting them to the contemporary challenges.

An overview of some "alternative" uses of places

The purpose of creating an online platform that lists the resources which are identified by the students, who have integrated them into their project scenarios, is above all to participate in the visualization of the causal links between sustainable development issues and resources.

The presentation of student projects carried out since the beginnings of action research makes it possible to visualize the mobilization of new forms of knowledge and the emergence of new ideas,

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which are rooted in the "loop" process of exchanges with the actors. The updating of these know-how and vernacular knowledge, by their adaptation in new forms by the students in their projects, makes it possible to integrate the new emerging ideas into the debates and negotiations taking place between actors.

The "web" interface is designed to allow you to explore it according to several navigation criteria:

- First, the resources identified by the students are classified into broad categories (cultural heritage, social capital, plants, intangible space resources, renewable energies, waste, environmental heritage, and local biosourced materials), which are then subject to more precise sub-categories according to the specific resources identified and implemented in the different projects.

- Secondly, student projects are presented on a map that allows them to be located geographically and to associate the resources used with specific places. Each village that was a field of study between 2013 and 2018 is listed and is the subject of a summary sheet concerning the projects that are part of it.

- Third, the projects are the subject of individual descriptive sheets which are presented in such a way as to have an overview of the diversity of the proposals.

- The files for each project consist of a title, the geographical location and the date of its development, the names of the students who are the authors, and a summary presentation on the basis of three media: a gallery of images selected from the presentation developed by the students of their proposal, a text that summarizes the purpose of the project, the sustainable development issues it raises, and the scenario envisaged to meet these issues, a prioritized list of material and immaterial resources mobilized.

Conclusions

 The analysis of a large corpus of student projects which are carried out within the framework of the educational action-research as a case study for our analysis, has made it possible to develop methods to take advantage of the knowledge induced in the projects, and to formulate proposals for mediation tools on the resources and issues of the territory.

The method of analysis of the students' projects, which are considered as scenarios of a possible future and some matter for debate, makes it possible to draw up an image of the territorial system frozen in some fictitious point in time. It is drawn according to the prism of the issues on the one hand and of the resources on the other.

This method of inventorying and clarifying interrelationships can then be integrated into a strategic approach based on the development of local resources, and in particular the identification of latent resources. The website, based on a method for analyzing student projects, is a tool developed and tested in my thesis, and is intended to be revised and refined as they are implemented in a broader context than the thesis itself.

The method for identifying and representing the interrelationships between issues and resources, developed for the analysis of student projects in the thesis, serves as a support for the digital platform, but the latter still needs to be adjusted. The objective of this platform is to be accessible and manipulable by the actors of the territory by serving them as a basis for exchanges to reach consensus on development issues, to present approaches for the development of resources such as circularity, and to highlight latent resources identified by the project-scenarios.

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EXPERIMENTING PEDAGOGIES OF TRANSITION, SITUATED PROSPECTIVE TRANSITION DESIGNS: SHIFTS IN DESIGN KNOWLEDGE, SKILLS AND TEACHING PRACTICES

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ABSTRACT:

In the face of today's global crisis, *designing transition* opens a *window towards the future*, in search of local balances between available resources, ways of living, producing, distributing, consuming, and the impact on the environment.

In France, urban and territorial prospective thinking is traditionally practiced by Urban Agencies, while the local authorities have very limited use of prospective planning and design despite the lack of prefiguration and preparation of our territories in the face of climate issues.

In this context, the Architecture schools appear as places for experimenting with *prospective transition projects*, in relation with communal and local scales and stakeholders, in order to initiate political debate in a soft and democratic way. This paper will take on this hypothesis, and discuss the specific knowledge, skills and teaching practices for environmental transition situated projects, based on our pedagogical activity and student work developed within the last two years in three inter-scalar *Project-in-transition* master studios at the Strasbourg School of Architecture (ENSAS).

The paper will present and reflect on:

(1) *transition-focused design levers* (obsolescence, imminent threats, creative desire)

(2) *shifts in design purpose and project process challenges* including redefinition of project scope, orders of necessity and conceptual perimeters through ecosystemic, metabolic and organic approaches; enlargement of project materials and more-than-human territorial actors; consideration of local cultures and their capacity to generate and sustain a shift in lifestyles, production and territorial modes (renewed solidarities, territories of commons, interrelated systems of resource governance, territorial rooted economic cycles);

(3) *the shifting role of the teacher and experimental pedagogical frameworks* for locally anchored transition project.

Ultimately, the paper seeks to critically position *situated prospective design thinking* as an alternative to unidimensional, often technical-based replicable solutions, still dominant today in ecological transition pedagogies.

KEYWORDS:

Transition design, situated knowledge, prospective, environmental/ecological transition, explorative scenarios, experimental pedagogy

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INTRODUCTION

Architecture schools appear as places for experimenting with situated, prospective *transition projects*, in relation with the communal, intercommunal, territorial scales and stakeholders, in order to initiate local political debate in a soft and democratic way.

In France, urban and territorial prospective thinking is traditionally practiced by Urban Agencies[1], while the local authorities have very limited use of prospective planning and design despite the lack of prefiguration and preparation of our territories in the face of climate issues. Recent climate catastrophic events worldwide, the COVID-19 pandemic, and the return of war in Europe are events revealing deep ecological, social and political crises in which the territory can be a vector, accelerator and catalyst for change.

For our pedagogical team at Strasbourg School of Architecture (ENSAS), the last three years coincided with an elevated level of awareness of the need to accelerate environmental transition in our practice, research and pedagogical approaches, a transition that has already been partially at work for several decades in architecture, urbanism and landscape milieus, but which was never completely positioned at the core, as the major driving force and raison d'être of spatial design studios. What does *transition as a pedagogical project* mean within a French school of architecture? What specific knowledge, design skills and teaching practices can it be based on? And to what extent can it contribute in supporting local territorial transition? This article will address these questions based on our work in experimental *Project-in-transition* master studios that we have initiated since 2019 at ENSAS.

State of the art

Opposing postures towards transition and its pedagogy

If the need for transition and prospective thinking has become obvious, the knowledge and know-how to implement it are still an open debate.

In France, the Grandes Écoles have taken up the subject, offering elitist degrees and paid training courses specialized in ecological transition[2], placing them at the center of their institutional strategy[3]. However, many of them have founded their pedagogy on a political posture where transition relies on a production, economical and behavioral model that is not called into question, an approach

toward which their recent graduates have been critical[4]. This way of thinking finds an echo in the public realm, where very active organizations (such as *The Shift Project*) – financially sponsored by France's most powerful companies – develop think tanks, create strategies, and lobby communities and elected officials seeking to "redefine the economy to achieve carbon transition".

Another stream of thought regarding transition denounces a fault line in that approach: the responsibility of liberal democracies for the ecological crises, as systems that have allowed the productivist exploitation of the earth and the generalized urbanization of the world[5]. This more critical perspective proposed through the concept of Capitalocene (rather than that of Anthropocene), echoes other relatively recent reflections such as Collapsology theory or alternative emerging systems of organization like the Commons. The idea behind them being alternative forms of production, governance, urban and territorial organization capable of breaking with the systems in place producing the generalized logics of globalization and metropolisation in order to re-anchor/re-attach our societies within their territories, and recover/reinvent certain forms of autonomy. Such positions have been expressed and debated in the framework of the *Ecole Urbaine de Lyon*, a publicly funded research, education and innovation program[6], focused on building and opening up for public debate a new field of knowledge and expertise – the Urban Anthropocene. Their scientific and pedagogical model – *The School of Anthropocene* – seems also a form of resistance to the power systems at work, aiming for an "open, sensitive, citizen university on global change"[7], though appears recently to have lost its funding[8].

1   French "Agences d'urbanisme"/ Urban planning agencies, are organizations for reflection, studies and support for public policies, that may be created by municipalities, public establishments for inter-municipal cooperation and local authorities, together with the State and public establishments or other organizations that contribute to the planning and development of their territory. These agencies have several missions: monitor urban developments, participate in the definition of development policies and the preparation of urban planning documents, contribute to the dissemination of innovation, approaches and tools for sustainable territorial development, landscape and urban quality and support cross-border cooperation and decentralized cooperation linked to urban strategies.. https://www.fnau.org/fr/les-agences-durbanisme/quest-ce-quune-agence-durbanisme/
2   Business, management and engineering schools: https://www.hec.edu/fr/executive-education/programmes-courts-executive/sustainable-transition-management#inscription; https://www.isige.mines-sparis.psl.eu/formation/ige/; https://www.ecoledesponts.fr/masteres-specialises ; http://www 2.agroparistech.fr/Gestion-de-l-environnement-transition-ecologique-biodiversite-ecosystemes-3797.html
3   https://www.hec.edu/fr/news-room/la-transition-ecologique-un-chemin-deja-initie-chez-hec-paris

4   https://basta.media/AgroParisTech-nous-refusons-de-servir-ce-systeme-ingenieurs-diplomes-declaration?fbclid=IwAR3lz1-5TsHpT_QwpYjBmBpuFNAaFIgreBIP-mgxI-m0xSv0F-wVymEQrnkk
5   https://ecoleurbainedelyon.universite-lyon.fr/medias/fichier/presentation-cours-public-democratie-et-capitalocene-urbain_1557467100476-pdf?ID_FICHE=29954
6   Ecole Urbaine de Lyon is an "Institut Convergences" program, created in June 2017, as part of the Plan d'Investissement d'Avenir (PIA2) by the Commissariat Général à l'Investissement (CGI). It is directed by Michel Lussault, Geographer, Professor of Urban Studies at the Ecole Normale Supérieure de Lyon (ENS). It consists in traditional scientific research but also public debate on the urban Anthropocene, through public lectures & discussions, conferences, interviews, seminars, workshops, performances. https://ecoleurbainedelyon.universite-lyon.fr/presentation/
7   https://ecoleanthropocene.universite-lyon.fr/programmation-par-type-d-evenement-2022-242995.kjsp?RH=1544783438360 .
8   https://www.lemonde.fr/societe/article/2022/04/14/le-gouvernement-coupe-ses-financements-a-l-ecole-urbaine-de-lyon_6122204_3224.html.

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A disciplinary culture prepared for experimenting with the project of transition

In the field of spatial design, the turn of the XXIst century brought about conceptual and practical renewal through reconsideration of space as a complex hybrid intertwining physical materiality with practices and ideas[9], hybridization of architectural, urban and landscape knowledge and skills, openings towards the future through visions and scenarios reflecting societal projects[10], more "frugal", "tactical", open and sourced-from-within project economies[11], and stronger processual, interrelational and transversal eco-ethical thinking brought about by territorialist and bioregionalist movements[12]. All these advancements, although they do not go without conflicting pre-existent systems of values and power, progressively penetrate and renew disciplinary knowledge, practices and especially pedagogies[13], setting the ground for the *project of transition*. At ENSAS, the *transition project* set as a new *"horizon of expectation"* relies on a "space of experience"[14] of project design cultures deeply rooted within the school and its cross-border territory marked a decade ago by the shift from the *urban to the metropolitan project*[15]. Taking a stand in favor of the second, more critical and comprehensive transition posture, the experimental pedagogical transition design framework discussed in this article is the result of the hybridization of the authors' approaches and references, between fundamental research and professional practice.

Methods. The transition design studio: transition as a project. General framework.

Designing transition is a moving target, so expansive and so acute in its temporalities, that is well beyond the scope of any article to even start and explain what it is, let alone, claim to know how to teach it. However, we have decided since 2020 to explicitly set the focus of our three Master studios (including the End-of-study design studio) on the *project of transition*: *Urban studio in Transition* (M1&M2, resp: A.Jauréguiberry), *Architecting infrastructures. Designing Transition* Studio (M1&M2, resp: A.Grigorovschi), *City &Territories in transition* End-of-study Project Studio (M2, resp:

A. Jauréguiberry). So what follows is not so much a methodology but a set of strategies that we have put in place, for how to approach the situation in order to affect a transition in our own teaching as well as the project itself.

Setting up environmental ethics as a prerequisite for design
Besides the standard design approach that has been collectively developed and taught at ENSAS (City and Territory Department) since the early 2000s[16], it is a reconsidered relation with our environment which we submit as a starting point to students, in order to help re-set the conceptual framework and design tools in their entirety. If the necessity and urgency to adapt and prepare our cities and territories to climate change seems to be an indisputable fact for students who choose to work with us, *how to do it* and *how to transform it into an opportunity* becomes the shared goal of the design studio. *Ecosophical thinking* is set as the paradigmatic studio realm: accepting the world as an interdependent complex system of relationships and forces in confrontation, with the positioning of the project as (part of this) relational complexity. The idea of *finitude* and its corollaries – the impossibility of infinite resources, growth, etc.; and the unlikelihood of perpetuating the current ways of operating and interacting with the environment – is also at the center of this new design conceptual framework. Finally, *empathy* with the world and an *increased attention* to the changes it undergoes, is also submitted as a major design challenge.

Researching global and situated transition challenges, objectives and themes
Students are encouraged to learn about general and local climate change objectives, challenges and strategies, by consulting major global and national documents (such as IPCC Reports[17], ADEME[18] studies, National reference scenarios of the French strategy for energy and climate, etc.), and by researching locally specific issues within relevant documents, such as local risk assessment reports elaborated by French Urbanism Agencies (ADEUS, AURM[19]), Climate Action Plans, etc. They are made aware and asked to engage with underlying themes that could be explored as transition levers of agency through the design[20].

Formulating "how" and "what if" prospective questions
To liberate thinking patterns from immediate problem-solving design reflexes and to allow the expression and creation of desire, students are regularly asked to discuss, rephrase, and ultimately formalize "how" and "what if" questions in order to share feelings, intuitions and ideas about the futures they dream, about the society they want to build, in general and on their design sites: *How to recycle car-dominated and sealed-surfaced activity areas in the North of Strasbourg?; How to give a new meaning to a former industrial and military highly land-pressured brownfield? What if Strasbourg hosted a social value factory at its core, on one of the most valuable land resources near*

9   Lussault M., 2007. L'Homme spatial : La construction sociale de l'espace humain, Paris : Seuil. ; Levy, J., Lussault, M., 2013. Espace, in Levy, J., Lussault, M. (eds.), Dictionnaire de la géographie et de l'espace des sociétés, Paris : Bélin, Paris.

10   Secchi, B., 2001. Projects, visions, scenarios . Planum, n° 514. ; Viganò, P., 2012. Les territoires de l'urbanisme. Le projet comme producteur de connaissance, Genève : MëtisPresses. ; Grigorovschi, A., 2017. Le retour du futur : le scénario exploratoire pour une mise à jour de la pensée projectuelle, in Mazzoni, C., Borghi R. (eds.), Strasbourg, ville énergie. Futurs possibles, Paris : La Commune, pp. 235-259.

11   Haëntjens, J., 2011. La ville frugale. Un modèle pour préparer l'après pétrole, Limoges : FYP ; Rollot, M.,(eds.), 2018. L'hypothèse collaborative. Conversation avec les collectifs d'architectes français, Paris : Hyperville : https://hal.archives-ouvertes.fr/hal-01819337/document.

12   Magnaghi, A., 2003 (1st ed. : 2000). Le projet local, Liège : Mardaga, Liège. ; Magnaghi, A., 2014. La biorégion urbaine, Paris : Etérotopia. ; Rollot, M.,(eds.), 2018. Les territoires du vivant. Un manifeste biorégionaliste, Paris : Editions François Bourin. ; Rollot, M., Schaffner, M., 2021. Qu'est-ce qu'une biorégion ?, Marseille : Wildproject. ; Grigorovschi, A., 2016. Architecture urbaine, cultures de projet et outils conceptuels en débats : figure, récit et scénario dans la pensée et la représentation de la ville contemporaine, PhD thesis, Strasbourg : University of Strasbourg.

13   Guillot, X. (eds.), 2016. Ville, Territoire, Paysage. Vers un nouveau cycle de pensée du projet, Saint-Etienne : Publications de l'Université de Saint-Etienne, pp. 260-267.

14   Koselleck R., 1990 (1st ed. : 1979). Le futur passé. Contribution à la sémantique des temps historiques, Paris : EHESS.

15   Borghi, R., d'Emilio, L., Grigorovschi, A., Mazzoni, C., 2016. Du projet urbain au projet métropolitain : acteurs, échelles et temporalités de Strasbourg métropole rhénane, in X. Guillot (eds.), op.cit., pp. 260-267.

16   The approach consists in immersive experience, targeted research, interpretative/critical problem statement and conceptualization through creative practices (performance, mental map, etc.) and construction of the design narrative (formalized through images, words, models…). Borghi, R., d'Emilio, L., Grigorovschi, A., Mazzoni, C., 2016. op. cit.

17   IPCC : The Intergovernmental Panel on Climate Change, an United Nations body. https://www.ipcc.ch/reports/

18   ADEME is a State Public Agency : Agence De l'Environnement et de la Maîtrise de l'Énergie / The French Environment and Energy Management Agency. More recently, it also bears the name of Agency of the Ecological Transition.

19   ADEUS – Agence d'Urbanisme de Strasbourg Rhin Supérieur/ Strasbourg, Upper Rhine Urban Planning Agency; AURM – Agence d'Urbanisme de la Région Mulhousienne/ Urban Planning Agency of the Mulhouse Region.

20   Specific transition themes would be reflected in the Results chapter of this article.

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the city-center? What if a Strasbourg activity area could become a productive park, part of a natural reservoir? What if the former urban highway of Strasbourg became its largest city park? Pedagogically, phrasing these questions helps students build core *transition-related and site-specific* problem statements, and introduces perspective for alternative project narratives set up in a post-carbon, post-growth, all-living shared environment.

Implementing interdisciplinary, intercultural and situated thinking
Studios rely on interdisciplinary pedagogical teams (*architects, urbanists, historians, landscape architects, philosophers, poets, anthropologists, engineers*) and partnerships with local actors (*politicians, experts, technicians*) who intervene punctually, provide theoretical and practical inputs, constructive criticism, and support publications and on-site events allowing students to engage in opening local debate on territorial transition. Other than "expert" perspective, spatial and cultural immersive experience, an important part of our pedagogical design approach, gives students access to local cultures of living and other local public or private stakeholders which are relevant for their unique design situations (such as harbor authorities, activity areas managers, farmers, social housing authorities, infrastructure managers, etc.). Students are asked to navigate between different knowledge and concerns, while still putting them in perspective through prospective eco-ethical questioning.

Case study description. *The transition design studio: specific terrains and approaches*

The body of design projects that we have selected to illustrate this paper allows us to discuss the specificities of *transition design* looking into different types of transition fostering urban and territorial situations.

- ***Territories of opportunity for engaging transition design thinking***

There are, first of all, what we could call "situations of opportunity" that seem to facilitate transition thinking. Prospective thinking considers them on different timeframes: from long term and almost dystopic modes of thinking to shorter timeframes of agency.

Obsolescence situations. How to reinvest obsolete (infra)structures and buildings? One of the most obvious design test cases for transition projects is obsolescent situations[21]. The obsolete is often a priority subject in urban transformation processes, an opportunity for territorial regeneration: brownfields, wastelands, spaces abandoned because their use has become meaningless, "uncertain" and/or forgotten territories, etc.
Whether they're working on military brownfields, former industrial complexes or fossil-fuel era infrastructures[22], students are asked to document and reflect on the unique reasons of obsolescence of their project sites, based on Picon-Lefebvre's work which identifies three major causes: changes in social practices, technological changes and/or the end of the narrative that had supported their original making and existence[23]. This helps students identify levers of regeneration/transition both from a functional (program) point of view and from a meaning and place-making perspective.

21   Rollot M., 2016. L'obsolescence. Ouvrir l'impossible, Genève : MëisPresses.
22   Lopez, F., 2019. L'ordre électrique. Infrastructures énergétiques et territoires, Genève : MëisPresses.
23   Picon-Lefebvre , V., 2007. La question de l'obsolescence des infrastructures Destruction ou transformation, in Prelorenzo, C., Rouillard, D., Le Temps des infrastructures, Paris : L'Harmattan, pp 113-121.

Strasbourg, France
How to transform «thermal wrecks» - energetically obsolete modern buildings?

Laboratóire : Yannick EHINDER, David LAPIERRONNE, Lùs Antonio MARTINEZ, Florengoi POUP, Margot IMWARD
Urban studio de Transition. Resp: A. Jaunkpabemy. ENSAS 2021.

Threatened environments (risks, shortages). How to prepare and adapt territories for climate change risks? How to rethink urbanism and territorial organization and meanings in areas threaten by climatic hazards and/or resource shortage?
Territories threatened or already suffering from severe climatic changes – rising sea levels and coastal flooding, floods, water scarcity and drought, snow load changes, heat waves, urban overheating, heat islands, pollution, wildfires, etc. – are also the most likely to desire and undertake transition projects.
From a pedagogical viewpoint, this is highly valuable as the local stakeholders are more open and willing to discuss, offer support and/or engage collaborations in order to initiate or enhance prospective thinking on these issues. For their individual end-of-study projects, the students are thus encouraged to get in contact with local stakeholders, while in the other Masters studios we teach, where the project situations are chosen in advance, the partnerships with local actors (municipalities, local Urban Agencies, etc.) are pre-established by the pedagogical team.
Students are encouraged to research existing data for areas where climate vulnerability is previously identified and documented (in terms of probability, intensity and timescale), including historical trends and future projections, and to cross-reference them with the spatial, socio-economical and geographical data (land use, topography, landscape features, administrative boundaries, demographic data, critical infrastructure and public facilities, etc). This becomes the basis for discussing the socio-economical models, technological processes and lifestyles that have shaped a specific territory and modified its landscape during the last centuries/decades; reflect on their pertinence, sustainability and adaptability.
In parallel, the design process also includes assessment of climate hazard impacts (at least a summary one, in the areas where local stakeholders didn't start this kind of evaluation process) by trying to anticipate the potential effects on economic activities, and identify natural and technological risks, polluted sites, vulnerable people, activity sectors and systems, etc.

Ho Chi Minh, Vietnam
How to reconsider planning in relation to rising waters to preserve the biosphere of the Mekong Delta ?
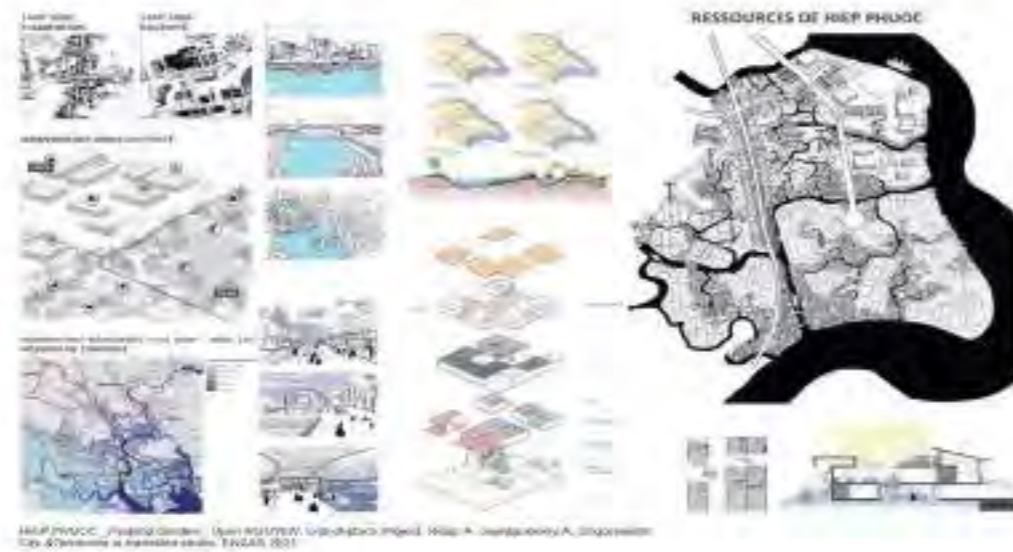
Antartica, beyond the 60th parallel
How to imagine a human and urban settlement in a hostile environment?

- **Places and territories under the pressure of the current models of urban & territorial development, withstanding transition**

Hostile environments. How to imagine a human settlement in a world that has become hostile? Such scenarios are based on the hypothesis of a collapsing earth system. The whole planet becomes a hostile environment. In order to experience and prepare for this kind of catastrophic scenario, extreme environments and living conditions, are interesting design test cases. Pedagogically also, these environments facilitate taking a step aside and force us to consider geological, natural or physical phenomena and conditions most often ignored or taken for granted in the traditional urban design process for the living spaces of our modern societies. Students are very naturally led to question environmental conditions and quickly understand the importance of considering them as an integral part of the project: dealing with winds, understanding geology, temperature, sunlight conditions; defining new reference frames, assigning value to totally different variables, discussing the possibility or the necessity of new lifestyles, productive methods and spaces, in accordance with the site's limited resources, and questioning the pertinence of the spatial organization, the rationalities behind materiality choices before imagining alternative spatial esthetics.

How to deal with environments pressured by the logics and systems in place? Transition design thinking can also be initiated in the pedagogical context by working on urban and territorial situations where the current models (infinite growth, carbon dependence, globalized market economy, traditional urban design/planning and territorial development, etc.) are still strongly operating.
Whether it is within rural areas, metropolitan outskirts or more central urban contexts, these places and territories have not yet completely reached obsolescence, do not seem to suffer immediate environmental risks, and are quite valuable and coveted lands, rather than hostile environments. In this case, transition design relies on building a problem statement: identifying and critically approaching direct and indirect local effects of the current system (from an eco-ethical and spatial perspective). From those, the students are encouraged to research alternative ideas, on the one hand, by researching the former/historical local dynamics that have been replaced by the system in place, and, on the other hand, by looking for Pasolini's "fireflies"[24], as the local still existing resistance mechanisms, the surviving glimmers of counter-power. Drawing from them, projects of more or less radical counter-proposals can be imagined.

24   Passolini, P. P., 1975. Il vuoto del potere in Italia' (The Power Void in Italy), Corriere della sera, pp. 201-202.

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Le Vexin, France:
How to repare a rural area for the future by sharing resources?

Strasbourg, France:
How to increase food autonomy in contemporary metropolis?

Strasbourg, France:
How to repurpose an enclosed street characterized by railway and military infrastructures in order to reconnect it to the city and make it a support of solidarity?

Results. Emerging themes fostering transition design

Looking back into the last three years of teaching in our *Project-in-transition* studios in ENSA Strasbourg, we can identify a few recurring themes that are nothing but urban and societal narratives at work, informing a certain *sense of the century* in terms of aspirations and alternative systems of value*.

Reinventing the **urban-natural balance***,* echoing a growing societal desire to reconnect with natural elements and living beings. Linked to the growing environmental ethics and exacerbated by the COVID-19 health crisis, this societal need is sourced both in admiration and in fear of nature. It reflects on the one hand on threatening natural phenomena like water issues (flooding, scarcity), but also on human behaviors and practices like urban exodus, new forms of peri-urbanization, and neo-rurality phenomena that are often problematic and easily become starting points for design projects in the studios. On the other hand, willingness for re-naturalization and re-wilding, or, as Bernardo Secchi already started to describe it in the first decade of the XXI century, "the idea of a nature that dominates and structures the project of the city and the contemporary territory"[25] also seems to be a powerful transition design lever especially when approached through the question of its "nature": from purely aesthetic, to more productive, diverse and hybrid spaces, or even wilder or less humanly controlled environments, and their ecosystemic capacities. This theme also sources design projects devoted to question the urban-rural pairing or the metropolis/territory relationships, or even the hidden-dark side of metropolization processes, giving students perspective on the ideas of extractive economy, exploited territories and interdependency issues[26].
Redefining the city-nature or city-countryside relationship, for instance, could go hand in hand with the need for an increase food autonomy by working on alternative food production and soft local logistics infrastructures that would rely on "the power from within", that of actors and structures already in place whose values and practices can lay the foundations for new forms of resource sharing and new social and solidarity economies.

Increasing **food self-sufficiency** is another powerful concern that seems to fuel transition design projects. The raising awareness around healthy and fresh food, criticisms of the mass food industry and the way it has transformed the quality of products as well as productive environments through parcel regrouping, pesticide use, mono-cultures, destruction of hedges and bocages, but also the more recent problems of the global supply chains revealed by the pandemic and the Ukraine war, are major causes of a massive social desire for change. These issues source design projects focused on renewing conditions of food production and distribution in rural territories but also in urban and dense environments. The spatial impact of new, more local nourishing infrastructures, the territorial capacity for food productive areas, the governance of these facilities and the underlying social values, distribution infrastructural logistics and their circular faculties in terms of waste or water management, are just a few of the questions that students mobilize when approaching their design terrains[27].

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25   B. Secchi, 2004. De l'urbanisme et de la société ?, Conference proceedings, Grenoble : Université Pierre Mendès, pp.13-24.

26   Marot, S., 2019. Taking the country's side. Agriculture and architecture, Lisbonne: Triennale de Lisbonne. ; Capital Agricole, Exhibition Catalog, Paris : Pavillon de l'Arsenal. ; Barles, S., Dumont, M., Métabolisme et métropole, Paris : Décitre, 2021.

27   See for instance experiences from Transition towns movement: https://www.transitionnetwork.org/transition. Hopkins, R., 2014. The transition handbook. From oil dependency to local resilience, Cambridge: Green Books.

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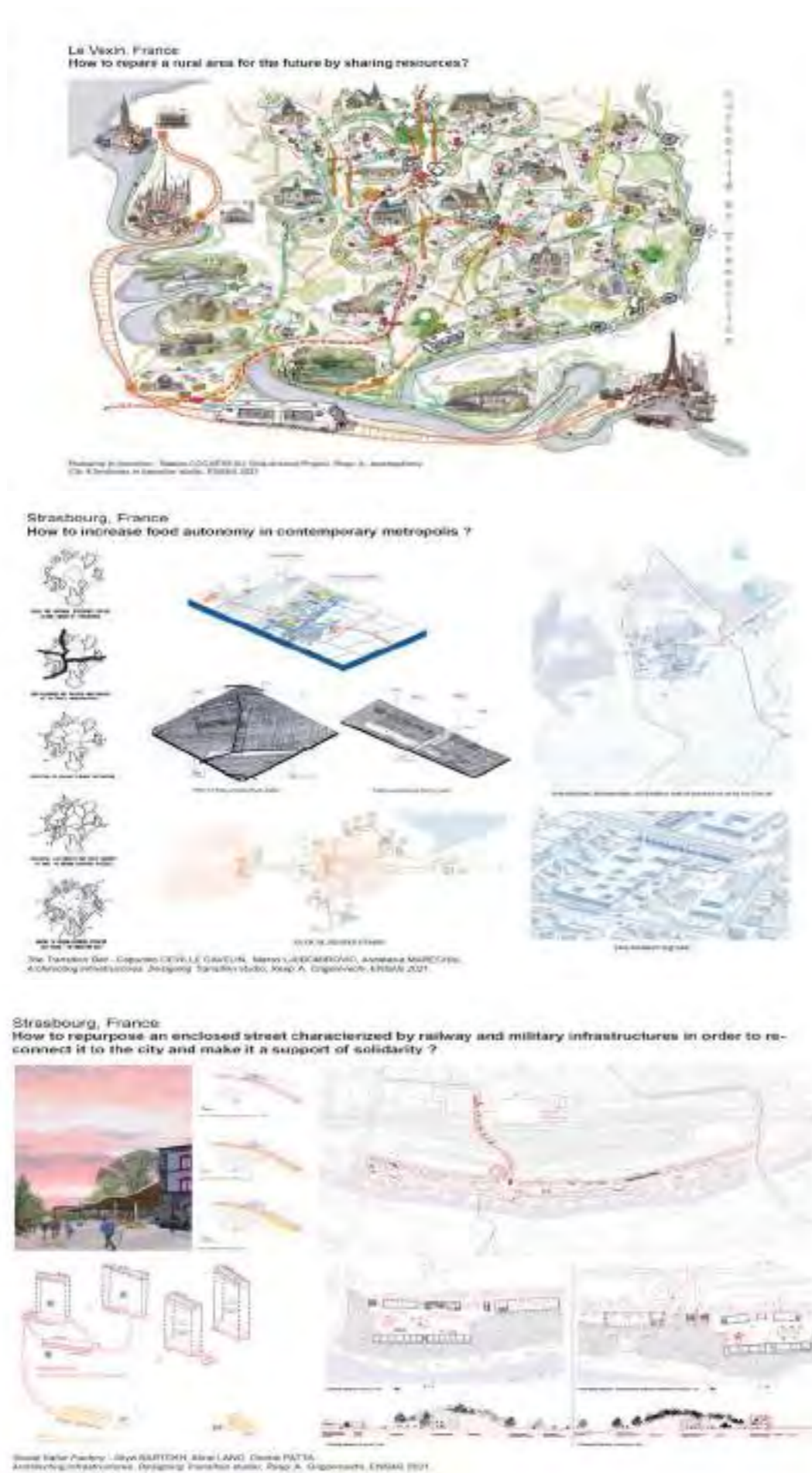
Envisioning "Commons", as alternative rationalities and practices for governing and managing resources by communities and groups of people acting for individual and collective interest, aiming for both social equity and ecological sustainability[28]. The idea of territories as common goods allows students to critically evaluate, within their design terrains, phenomena like privatization and commodification of natural resources (land, underground, water, forests, etc.) or infrastructures of collective interest (waterworks, ports, historical and patrimonial infrastructures, etc.), question the binary State/Market power balance, the private/public division of land rights, the unique monetary value that governs resources and agency today, and ultimately look for alternatives. The logics and practices of commons help reflect on and scale up new interactions, solidarities and cooperation between the systems of actors appropriating the resources, the way they use and distribute them, as well as their benefits and impacts, not only in terms of economic value, but also ecological and social costs. It also allows students to discuss alternative lifestyles and governance that can ensure the sustainability of the system by avoiding resource overconsumption and negative externalities.

Recycling and circularity as targeted principles for resource economy describe the desirable transformation of our society from a linear economy (appropriate – use/produce - consume - throw away) to a circular economy, aiming to reduce waste production, improve waste management and material recycling. This explicitly introduces the question of metabolisms[29], their problems (such as waste management based on long distance and polluting logistic systems) and territorial paradoxes (for instance, when the most fertile land is also the most accessible through public transit) in order to establish their transition potential in terms of architectural, urban or territorial design.
Recycling introduces the idea of lifecycles as acts of architectural and urban renewal for spaces whose functions and programs became obsolescent, abandoned and/or problematic; but also in terms of strategies aimed at recovering materials from waste in order to reuse them rather than dismantle them. These principles also imply a shared ethical responsibility not only from an environmental viewpoint, but also in terms of the integration of a new system of social values into the economy shaping our environments. New social and ecological economies reinventing or reactivating forgotten local know-how and craftsmanship, flexible buildings that can adapt to evolving needs over time, integrating vernacular knowledge, developing socially inclusive and solidarity networks, and varying their forms and spaces of existence, scales and speeds.

Slowing down towards more sober, frugal lifestyles. Rejecting the increasing acceleration of lifestyles and the social and mental pressure that comes with it, young generations – and our students are no exception – aspire to renew societal relationships to time, work, mobility, consumption patterns. Drawing from that as well as the practical, theoretical and critical precedents[30], slow culture and principles of frugality, not as deprivation but as opportunities, become major shifters for planning and design culture: "living better with less resources"[31], "Obtain much with less"[32]. Slowing down as increasing active mobility for instance, becomes an opportunity to think new space-time

relations of proximity, questioning degrees of (de)centralization and scales for services and working opportunities, while sustaining a qualitative redefinition for public space, more in line with climate challenges (unsealed surfaces, fresh islands, etc.) and more integrated with and respectful towards natural and living systems (vital streams such as water, biodiversity, etc.). Fighting incremental global consumption and acceleration through more sober and locally embodied behaviors is also a working hypothesis for designing transition: using materials available nearby, envisioning systems and places for producing and consuming locally, taking into account regional culture and know-how, involving local populations, etc.

Condensing the "spirit of the time", these themes are confronted with the "sense of place" crystallizing specific local environments and become the field of investigation for situated transition potential through the design project.

Conclusion. Design in transition:
from "urban project" to "transition project" – issues for discussion

First and foremost, considering *transition as a project* in our master studios helped reconnect with one of the founding ideas of the European modern urbanism, that design is a political act as much as it is a physical spatial expression. Focusing on climate change issues, environmental questions, more-than-human project owners, city and territory planning and design gains meaning as part of a vaster biopolitical action. This opens the studio as a space for debate not only on the individual formalized student designs but also on their bioethical approaches, the necessity of building a disciplinary environmental ethics and the way in which this would impact the design process and the traditional disciplinary knowledge, know how, and skills, as well as the profile, role and posture of the figure of the architect.

Shifts in conceptual categories, design materials and process
The urban project as defined and taught in Strasbourg School of Architecture since the 1980s had already gone beyond the static character of the traditional project "site" by considering the project's "situation"[33]. The transition project, as we have experimented since 2020 in our Architecture, City and Territory design studios, goes even further by focusing on the project's "environment" or "milieu"[34]. Beyond the terminology change, this actually shows a progressive shift in the conceptual design process, from a logic of objects and perimeters, easily controllable by the architect's mastery, to a logic of dynamic symbiotic relations, that need to be understood from within their inter-scalar and multi-dimensional complexity. Reactivated in the effort to define transition design thinking, the underlying tension of what constitutes design purpose - *project-object vs. project-process*, already introduced by the funding figures of the Strasbourg school of the urban project in the 80s and 90s, (and restated in the 2000s by a renewed pedagogical team), naturally becomes fertile conceptual ground when navigating uncertainty and dealing with dynamic inter-relational environments and overlapping time-frames that govern project conditions (major territorial cycles, daily life, metabolic process temporalities, life-cycle time-frames, urgency liked to crisis, etc.). The opposition design-object/design-process appears thus derisory as design needs to deal and be positioned within this inter-scalar spatial and temporal complexity. The design goal, as we have tried to develop it within

28   Declève, B., Declève, M., Kaufmann, V. (eds.), 2022. La ville en communs. Récits d'urbanisme, Genève : MëtisPresses. ; Ostrom, E., 1990. Governing the Commons: The Evolution of Institutions for Collective Action, Cambridge: Cambridge University Press. ; Dardot, P., Laval, C., 2014. Communs, Essai sur la revolution au XXIe siècle, Paris : La Découverte.
29   Barles, S., 2017. Écologie territoriale et métabolisme urbain : quelques enjeux de la transition socioécologique, Revue d'Économie Régionale & Urbaine, N° 5, pp. 819-836. DOI : 10.3917/reru.175.0819.
30   Slow food; Citta Slow movement; Rosa, H., 2010. Accélération: Une crise sociale du temps, Paris : La Découverte. ; Rosa, H., 2012. Aliénation et accélération : vers une théorie critique de la modernité tardive, Paris : La Découverte.
31   Haëntjens, J., 2011. Op cit.
32   Paquot, Th., 2017. Dicologik – frugalité, Ecologik, N°53, p.146.

33   Mazzoni, C., d'Emilio, L. (eds.), 2014. Strasbourg métropole. Images et récits pour la ville-archipel, Paris : La Commune, Paris. ; Grigorovschi, A., 2016. Op. cit.
34   The terme « milieu » is used here in the sense understood by Augustin Berque. Berque, A., 2000. Ecoumène- Introduction à l´étude des milieux humains, Paris : Belin.

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our studios-in-transition, is both to envision desirable futures and to acknowledge and consider the process of assimilation of these targeted transformations within the local and broader environment (by reaching and engaging the local actors' expertise, willingness and desire for change), while still giving space to the unknown.

The challenge is to articulate design-objects with design-processes, architectural interventions with territorial ecosystems, punctual spatial actions with long term visions, trying to get them be not only compatible but beneficial, fueling each other, while including their unpredictability. What seems to appear outdated is the idea of a perfectly finished and totally controlled design product. Furthermore, considering temporality as a design material becomes an asset when dealing with resource scarcity and tight project budgets: envisioning immediate spatial action in precise locations, leaving parts of a site/territory "on hold", keeping it in a state of uncertainty–*making the choice not to build or to unbuild* as part of the design process, considering natural phenomena and their temporality as acting design forces, including the possible interest and engagement of local communities in the project over time, determining and localizing priority design interventions capable to initiate/accelerate transition processes, etc. Provisional and flexible become design values. This implies different speeds of progression within the project and accepting new design aesthetics and materiality – of the ongoing, of the not totally defined and controlled spaces, of co-existence and sharing with other living beings – but also questioning and preparing for their social acceptability.

Moreover, the explorative prospective approach opens the possibility for inventing and testing new orders of necessity, especially when it comes to the economy/ecology pairing. Beyond the functional and spatial qualities of traditional urban and architectural projects that ensure an increase in land/building economical value which in practice reassures developers and land owners, the transition project tends to be integrative of multiple values and objectives (environmental, economic, social) with different speeds while aiming for improving the overall habitability conditions for all the living. Its environmental contribution ("natural capital" preservation of soil, water, reconstruction of biodiversity, regeneration of a living ground, etc), its capacity to imagine how multiple actors and resources could interact and create alternative closing metabolic loops of energy and matter and how these new practices contribute to the transformation of the material forms of cities and territories, its ability to identify the pertinent "local" environments and scales for action in relation to the territorial conditions and issues at stake, its capacity to rely on local cultures and skills, its social contribution (for instance, dissemination and hybridization of knowledge and know-how), its flexibility and synergetic potential; these are transition design qualities that start to be acknowledged in the pedagogical context. Weekly design studio discussions become occasions for a collective critical debate of these new project values, not only in terms of spatial quality /aesthetics, but also in terms of the economy of means, environmental footprint (mobility and logistics choices, sealed/unsealed surfaces, heat/cool islands), as well as the project's capacity to foster mutability, adaptability and polyvalence.

Based on these remarks, the *transition project* process seems very close to that of the "urban project" but its actors, assets, dysfunctions, and constraints are not linked solely to the profitability of a balance sheet, but rather to the sustainability and resilience of the larger-scale local environment. The "local" dimension is also the key for discussing the object of transition prospective design. If the urban project traditionally focused on the city, and later on metropolitan situations, designing transition is not specifically linked to one of the territorial categories – urban, metropolitan, rural – as it tries to conceive the territorial functioning as a whole, seizing local and global interactions. Defining the pertinent "local" scale and design focus is part of the project: facing the difficulty to define a problematic upstream, the "local" dimension is being questioned, discussed and redefined for each individual project (according to geographical/geological features, climate conditions, territorial distribution of expertise, resources, demographics, etc.).

Impacts on profession, pedagogy and local transition thinking
This enlargement in project scope and design values, also helps to discuss (with students, our direct local partners and beyond) the *architect-urbanist*'s contemporary role and the evolving field of capacities and skills of the architectural practice and profession in France: from the figure of the architect-builder, as master of the work to which one gives form[35], to more hybrid and open profiles engaged in the process of renewing the bonds between humans, other beings and things.
The acknowledgement of the *urban project* as an architectural practice has replicated the idea of mastery "Maîtrise d'oeuvre" (Mastery of the work), and the responsibility that comes with it, by making it "urban" "Maîtrise d'oeuvre *urbaine*". But what about *transition projects*? Leaving the realm of finite inanimate objects and dealing with living environments and the inter-relational, inter-scalar spatial and temporal complexity of contemporary territories while facing the pressure of environmental and climate urgency, rapidly relativizes our capacity for mastery. The transition design posture stands more between responsibility and humility towards a future that cannot be predicted, let alone mastered. But choices of not building, putting on hold or even tearing down built and urbanized structures seems contrary with the conventional mission of architecture – the act of building.
However, other project skills take precedence when designing in conditions of uncertainty and great complexity: the ability to understand and interweave different registers, to integrate multiple constraints, to formulate spatialized scenarios and visions, and to permanently take critical distance. If acknowledged and used for other purposes than building edifices, these skills can open up and help the profession engage transition by recognizing a more open architectural practice, at the crossroads of prospective territorial strategy, project management, programming and design. Without totally negating the mastery of architect builders, envisioning architects as orchestrators, advisors, mediators, or "passeurs"[36] as architects passing through places and structures (public, private, associative or hybrid) and facilitating territorial mutability by linking the architectural culture with vernacular know-how, with the eventful and the unexpected; this helps us review pedagogical objectives and reconsider the field of possible forms of design projects encouraged in a school of architecture.

As have been implicit through this, teachers are no longer "masters" as the transition studios imply a continual learning process including from the professors themselves. Between *learning by doing* and *flipped classroom,* transition pedagogy aims at empowering students to stand back critically and helping them build the open design thinking patterns, adopt the improvisational nature and elasticity of the project needed to pivot and host any number of concerns that are acute, often crisis based and in a temporality that can't be put in the old projectual time-frames and their reassuring regularity. In that sense, teaching transition is teaching a strong capacity to modify the course of the project, where professors take on a new role, between teaching and coaching. Finally, transition design also calls for a design culture of sharing, team work, collective and interdisciplinary effort, going against the still dominating teaching practices of design studios reserved to practicing architects, as well as the individualistic and competitive culture of the architectural milieu and the still present culture of star architects.

35   As a reminder, in France, only graduated in architecture who have passed a HMNOP (Habilitation à la Maîtrise oeuvre en son nom propre / Habilitation to undertake and build projects in their own name, a 6th year of study) have legally the right to call themselves "Architects".
36   Term employed by L'atelier Commun, a collective of young architects, during the roundtable TikTak Transitions #1 - Imaginer les pédagogies de l'architecture face à la crise écologique, ENSA Strasbourg, 2022 https://www.youtube.com/watch?v=wdM130J4jDM ; See also their blog: https://www. horslesmetropoles.org/archiconstructeurpasseur

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Outlook

Based on these preliminary remarks, transition architecture and urbanism seem to be above all a political project that requires us to challenge and very often disrupt the systems, behaviors and balances of power in place, be they disciplinary, professional, economic, social or cultural. In many ways, adapting places and territories to climate change seems to make them maladjusted to current systems, just as preparing future young architects for designing transition seems to make them less suitable for the current professional market.

It is still too early to be able to identify the outcomes of transition design thinking and pedagogy down the road, beyond the studio framework and immediate local outreach. How do these students who take on transition move into practice after graduation? Are local stakeholders who have exposure to transition thinking and designs produced in the studios influenced by it in their practice? How and at what pace could systemic impacts be reached?

Within schools, as out in the territories, the debate is set and we stand with those who act locally, modestly and collectively to contribute to the *project of transition* as an alternative to unidimensional, often technical-based, replicable solutions, comforting environmentally-problematic power structures and behaviors.

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RENEWAL DESIGN OF HUMAN SETTLEMENTS BASED ON ANTHROPOLOGICAL OBSERVATION: A PEDAGOGIC EXPLORATION OF ARCHITECTURAL DESIGN STUDIO

2-A-4

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ABSTRACT

Taking the design studio "Renewal Design of Human Settlements Based on Anthropological Observation" as an example, this paper explores a pedagogic strategy of making architectural anthropology an architectural design method. To concern the students with regional culture, in this studio, the design chooses students' hometowns as sites, and the design process is inspired by anthropological observation through the medium of regional space-life interactive relationship, key feature characteristics and traditional building paradigms.

KEY WORDS

architectural design teaching; architectural anthropology; subject identity; key feature characteristics; traditional building paradigm

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1. ATTENTION TO "REGIONAL CULTURE" IN ARCHITECTURAL DESIGN STUDIO INTRODUCTION

Throughout the history of architectural education in China, the basic curriculum of architectural design has undergone several major changes. Prior to the 1980s, methods derived from the Academy of Fine Arts in Paris ("Buza") were widely adopted, emphasizing the training of basic drawing skills. In the early 1980s, under the influence of the "Bauhaus" basic curriculum originated from Germany, the training of abstract formal composition became the mainstream.[1]Since 1990, modernist architecture has paid attention to "(space) volume rather than mass"[2], the basic courses of architecture schools began to take architectural space as the main subject. In the past ten years, studios based on the body as a clue have continued to emerge in the basic teaching of design worldwide.[3]

However, for nearly half a century, when modernism has accompanied the wave of globalization, it has caused continuous impact and crush of regional differences and cultural diversity of the built environment, endangering human identity and the original value[4] , triggering the return of the attention to "regional culture" in architectural design teaching. [5]In a study on the comparative analysis of the first-year architectural teaching in worldwide architecture school 1, the researcher analyzed through NVivo text2, and obtained 13 teaching key points of the first-year architecture design teaching in 11 architecture colleges, among which Eight schools clearly regard "cultural mining" as a teaching keyword . [6]For example, in Cornell University, student can stay in Rome for a whole semester to immerse themselves in a real historical environment. So they can understand the origin of architecture through personal experience and local research. And the architectural teaching is consist of human, social and cultural factors related to space. The Cooper Union emphasizes the differences in architectural design under different social and ecological conditions. The teaching content includes the study of regional cultural, environmental and technical issues to let student has a deep understanding of world architecture and urbanization. In China, for example, Southeast University has followed the ETH space-based teaching system with an orderly structure including contextual environment and material structure factors" [7], In Southeast University, the entry-level studio "Initial Nanjing" aimed to let student observe and analyze the site of Nanjing comprehensively and deeply before the subsequent design teaching.[8] The architectural education of Xi'an University of Architecture and Technology draws inspiration from traditional Chinese philosophy, combining place and context, life and imagination, space and form, materials and construction as four main components of the architectural teaching system .[9]

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1 The architecture schools studied in this paper include 5 foreign institutions and 6 Chinese institutions, namely: Architectural Association School of Architecture; University College London Bartlett School of Architecture ; Faculty of Architecture and the Built Environment ,TU Delft; College of Architecture, Art, and Planning, Cornell University; The Irwin S. Chanin School of Architecture, The Cooper Union for the Advancement of Science and Art); Tsinghua University; Tongji University; Southeast University; Tianjin University; Xi'an University of Architecture and Technology; Nanjing University.

2 NVivo is a text analysis method that combines qualitative and quantitative analysis to reflect people's cognition of things by analyzing changes in the frequency of word usage in texts.

In teaching, how to guide students to pay attention to regional culture in architectural design? Architectural anthropology can undoubtedly provide an excellent perspective, paradigm and method. Architectural anthropology became popular in the Western architectural field as early as the 1970s, while in China in the early 1990s, Academician Chang Qing introduce it systemically to China , and expounded the anthropological properties of Architecture as an Object of Institution, Custom, Scenario, and Body Perception.[10] "From a macro perspective, architectural anthropology is a unique perspective, paradigm and method for observing, experiencing and analyzing the spatial relationship and potential dimensions between man and nature-society and between man and man... Which is quite different from the style-composition paradigm and the modernist function-form paradigm ." [4] Common Concerns about "Space and Society"[11] ,let architecture and anthropology have a natural relationship; and the needs of human nature in customs, emotions, bodies, etc. can be used as the starting point for design ideas; in addition, " Participating in observation" used in anthropological research coincides with the "Practicing in local"advocated in the architecture design.

In the past architectural design practice and teaching, the perspective of architectural anthropology has been widely used in designing the space and architecture. However, few research has been conducted on it as a teaching method. Therefore, taking the senior architectural design topic "settlement renewal design based on Anthropological Observation" of the School of architecture of Tsinghua University in recent two years as an example, through the topics selecting and methods setting, this paper attempts to explore architectural anthropology as an architectural design method in architectural teaching, so as to provide an idea and direction of architectural design teaching.

2. Design topic selection

This design brief is no longer set for the building type, function or area , but has the specific requirements for the "location" in design. Students need to take their hometown or particularly familiar settlements as the design object, restudy the local natural and cultural environment based on past life experience and feelings, so as to determine the location and design brief.

2.1 Different subject identities lead to differences in place cognition

In his discussion on the "insideness" and "outsideness" of places, Edward Relph revealed the difference between "city people" and "people outside the city". [12] Christian Norberg Schultz also made a distinction between "inside" and "outside" of space . [13]On the basis of summarizing the views of predecessors, Shan Jun further puts forward the regionality of a specific place, that is, the understanding of the place varies according to the role and degree of participation of the subject, and the regionality is first an "internal commonality", and then an "external characteristic" .[14]

These studies lead to a conclusion that architects can not be completely equal to people "outside the city". They need to go deep into the life context of the people served by the design in the city and experience the internal power of a region; We also need to maintain an objective and comprehensive perspective "outside the city "to feel the characteristics that distinguish this place from that place. In anthropological research, there is the methodology of "participation in investigation", that is, Fei Xiaotong said that we should "get in" and "get out" .[15] In architectural design, architects go to the project site for field investigation in order to obtain the basic understanding of the place. However, in architectural studio, due to time constraints, the time given to students to conduct site

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research usually is only one week. More commonly, students take one or half day out of the busy school schedule and go around the site, even if they have completed the preliminary site research . It is obvious that the investigation in hurry can only get a superficial impression, let alone the understanding of regional culture.

2.2 Independent topic selection: from seeing and impressing to participating in observation

Students are required to choose the site they are most familiar with. This allows students to have the dual identity of "city people" and "people outside the city" in this design. The identity of "city people", that is, for the selected area, they have been "participating in observation" for more than ten years before, and they are influenced by the area culture and have an inseparable blood relationship. As Peter Zumthor, a Pritzker Prize winner, said when talking about little practice outside Switzerland: "I'm homesick, but I certainly don't miss Switzerland, but my acquaintances. I was born and grew up here. I know the language of this area. I know what men's Choir and party parties are. I think I can recognize the posturing of enthusiastic stamp collectors on the streets here. Only in this way I can definitely distinguish shy people from sociable people." Meanwhile students have left their hometown to the university and entered a broader external world, which makes them also an "outsider" to rethink about the unique regional culture and give their own answers through this architecture design.

For example, based on their living experience in the old neighborhood of Macao, students find that there are a large number of fragmented commercial spaces in Queziyuan market area are not effectively organized, resulting in problems such as poor space quality and low commercial value, and then connect the existing functions by inserting parasitic blocks to fill the urban cracks; In the selection of building structure and materials, the goal is to highlight the characteristics of urban collage in Macao, and finally create a new urban appearance (Figure 1). The design topic is not to deliberately look for problems in a given area, but to directly connect the real situation and solutions through real local life. Architects are no longer onlookers, but the main subject of space use and scene experience.

Figure 1 Put forward practical problems and solutions based on long-term participation and observation

3. Anthropological observation as an architectural design method

After determining the familiar area as the design object, the biggest problem faced by the design course is how to start and put forward the design, that is, the problem of architectural design method. [16]Although the method is a "subjective tool and means". And it has considerable diversity - especially for architecture design - but in teaching, we must set laws and systems in order to make it teachable. In the course brief of architectural design in various colleges and universities, we can often see several design methods summarized from many cases and empirical studies. Taking the courses taught by the author as an example, they include: based on the regional natural environment, the regional socio-economic development, the regional characteristics, colors and landscapes, the regional materials and processes, the prototype and the theory, and the function and other design methods. As mentioned above, anthropological observation can also be studied as an enlightening design method for architectural design focusing on regional culture.

To apply the knowledge of anthropology in architectural design, we need an effective transformation intermediary. For example, the architectural design teaching based on the theory of embodied cognition, using the body movement and perception as a media, is a successful attempt. Other possible media are discussed below.

3.1 Exploration 1: Anthropological Observation → the connection between "space and life" → architecture design

Architectural an thropology holds that in order to transform a specific genius loci into a meaningful architecture space, we must first regard architecture as the form of human behavior in social communication. For example, Louis Isadore Kahn believes that the inspiration of architectural creation lies in the sensitivity to forms of various organization, and uses analogical thinking to associate it with special architectural forms.[17] In order to facilitate students' understanding, this is described in teaching as the correspondence between a certain spatial structure or spatial prototype and a specific lifestyle, that is, the relationship between "space" and "life". This method requires students to describe and study the typical spatial structure of certain areas, record the daily life of local people, explore the behavioral reasons behind the spatial structure, and study the diachronic morphological generation. Here, "why" is more important than "what". This method is conducive to reveal the deep laws of the regionality and pay attention to the "invisible" meaning hidden under the "visible" form.

For example, in Sungai Lima in Malaysia, villagers have been living on fishing and drying shrimp for generations. In order to facilitate fishing and air drying, houses, drying platforms, tool rooms and fishing boats spread linearly to the sea, which are connected by wooden bridges, forming a texture perpendicular to the coastline; With the increase of population, people gather together to carry out public life in non-fishing time, so several horizontal paths connecting residential units are formed on the shore (Fig. 2). By understanding the logic of space generation, combined with shrimp industry development plan, the building is designed for two modes : Sea week mode and rest week mode: the building units of sea week are scattered, and the texture spreading to the sea is continued with households as units, and the newly added blocks are used as guest houses or shrimp processing workshops to subsidize the income of fishermen; During the rest week, the building blocks gather to create a horizontally connected public market (Figure 3). Considering the functional variability and sea level rising, the buildings adopts the form of floating unit module which can be assembled.

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The architecture form and space do not come from the random concept that born from nothing, but from the respect for local life and village pattern.

Figure 2 Analysis of the relationship between spatial structure and daily life
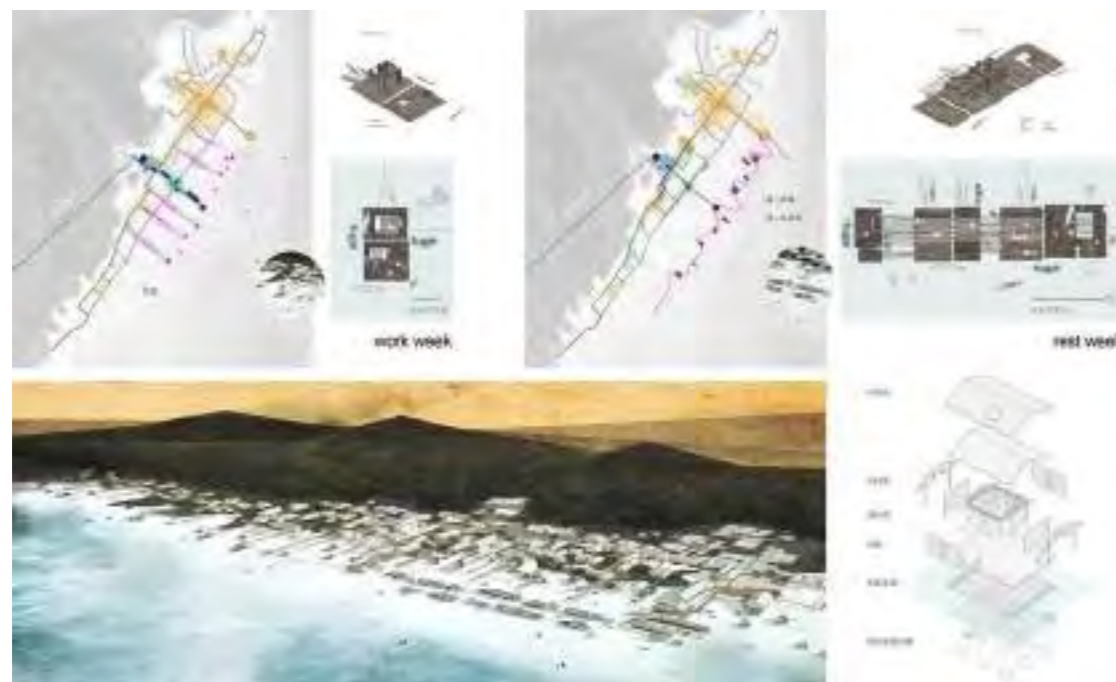
Figure 3 Design based on the continuous spatial structure

3.2 exploration 2: Anthropological Observation → core style elements → architectural design

Architectural anthropology emphasizes key words such as "prototype", "pattern language" and "collective memory" in a place[4]. Community is not only the main part of settlement construction, but also the main part and important driving force for the further development of settlement. In the diachronic, everyone is interpreting architecture with their own time and space roles, which provides a fresh and vivid explanation for the diversity of vernacular architecture formed in different regions and groups. At the beginning of the design, various people including craftsmen, leaders,

squires, village cadres, rural teachers and ordinary villagers were selected to record their oral history. Combined with technical tools such as keyword extraction, the core elements of the settlement style hidden in the collective unconsciousness of the community were excavated, so as to obtain the regional characteristics of subjective identity from the perspective of anthropology. From this, we can analyze which are the collective unconsciousness formed by the long-term influence of the natural environment and cultural environment, and which are temporary and fragmented factors, so as to clarify the "variable" and "unchanged" in the renewal of contemporary settlements, which can be transformed into the basis for the self-organization ability of the community and the protection of the core style in architectural design.

For example, in Longji Zhuang inhabited area of Guangxi, based on Anthropological Observation and oral history collection (Fig. 4), students extract and sort the keywords of oral history texts. Among them, Ganlan style buildings, wood, terrace, tourism development, pavilion, sloping roof and folk song party are the most frequently mentioned elements by villagers (Fig. 5), so they focus on translating these elements in the design (Fig. 6 and Fig. 7). Other elements, such as spiritual space (main room), daily living space (fire pond) and construction paradigm, are rarely mentioned. In the design process, the proposal of design concepts and keywords is not based on the preconceived assumptions of researchers, but from the bottom-up, subject and micro perspective, through the spontaneous narration of community subjects, inspired by the concepts shared by the settlement residents but not actively discovered.

Figure 4 Anthropological Observation and oral history collection

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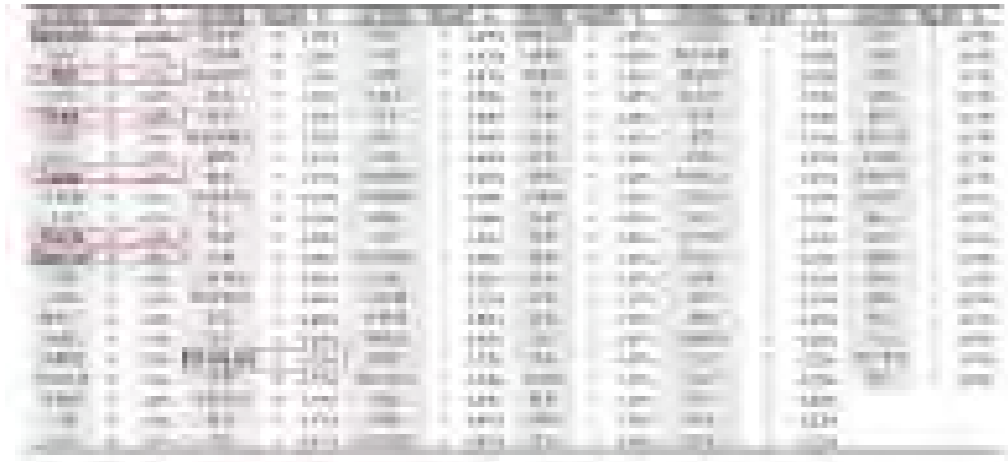
Figure 5 Extraction and sorting of core features
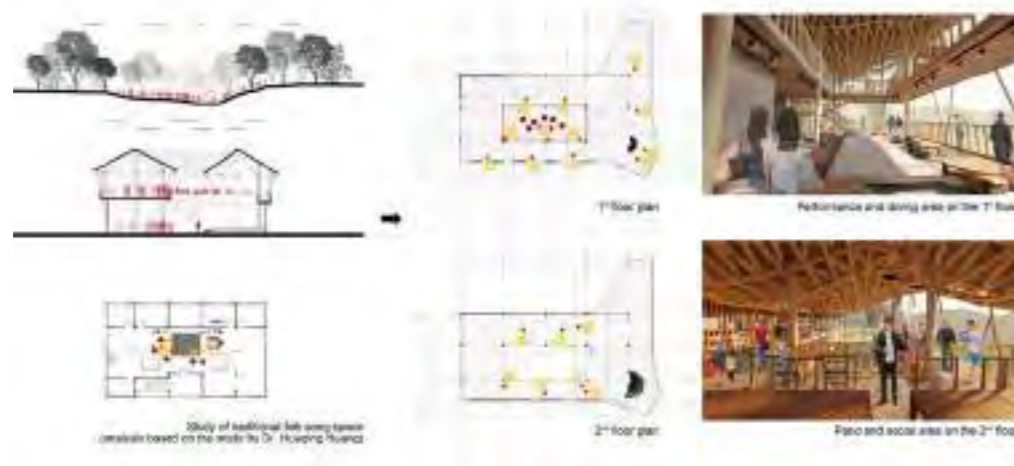
Figure 6 Design based on the protection of the core style and features -

- Taking the research and translation of the elements of "folk songs" in the scheme as an example

Figure 7 Integrate a variety of "variable" and "constant"

elements in the collective unconsciousness of villagers to complete the design

3.3 Exploration 3: Anthropological Observation → traditional construction paradigm

→ architectural design

"Paradigm" is a collection of beliefs, values and technologies shared by members of a given community,[18] Some scholars in the field of architectural anthropology used the theories and research methods of cultural anthropology , regarded the village as a "community", and summarized the local construction activities according to the technical paradigm, social paradigm and spiritual paradigm.[19] Inspired by the above discussion, this method requires students to first observe and record a typical traditional construction activity, then focus on the technical paradigm, select a natural material resource or a traditional construction technology, study its material characteristics and construction methods, and deeply analyze the appropriate structural system, node structure and corresponding architecture design in combination with traditional and modern architectural cases, This studio discusses how to meet the requirements of function, space and environmental quality to the greatest extent under the specific environment, and complete the architectural design.

For example, students start from observing and studying the construction process of Wenzhou Taishun traditional corridor bridge, and on the basis of optimizing its structural system, form a large-scale urban complex through unit repetition, which not only connects the island with the city, but also shows the scene of waterfront recreation on the wooden arch bridge that once appeared but has been forgotten in Wenzhou (Fig. 8).
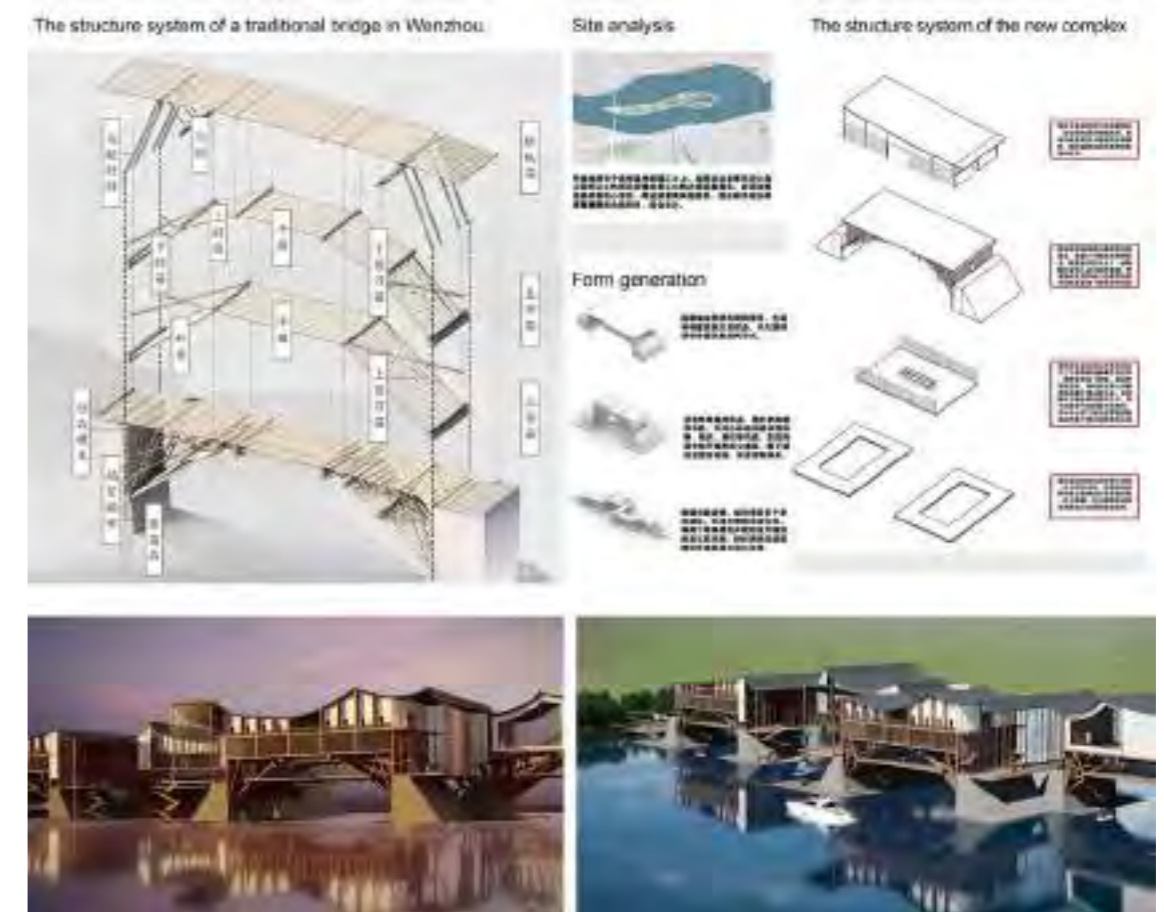
Figure 8 Design based on learning the traditional construction paradigm

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4.Summary and reflection

Settlement renewal based on anthropological observation is an attempt to transform the current research of architectural anthropology into architectural design teaching and practice. From the observation of the teaching process and the follow-up student feedback, students have great interest in this topic. Their sensitivity to the site helps them fully mobilize their past life experience and gain the spatial imagination, and they are more willing to design and to think deeply about the site. At the same time, the clear starting point, the design process according to academic research clues, and the specific tasks with the clear time line make the design process have traces to follow. This teaching method is effective for students with science and engineering background.

Reflecting on this studio, there are still the following problems: 1) the research on architectural anthropology as a design method has not been systematic, the design methods that mentioned above is still fragmented. 2) Research results are difficult to be applied in the specific design. It is unrealistic to expect students to find the design entry point directly from the research and translate smoothly using architectural design language. 3) Influenced by architectural anthropology research, some student can not really tell what elements should be kept in traditional architecture, sometimes they only directly intimate the original traditional design without creative thinking and carefully selecting. While the regional value is often hidden in those invisible places. 4) The studio is only 8 weeks, and the research won't be deep enough, resulting in the cognition of a region is easy to remain on the surface as symbols. The above problems need to be continuously discussed in the follow-up teaching.

In addition, this studio may also inspire the research of architectural anthropology. By extracting the main characteristics of their hometown culture, students distinguish "here" from "other place" which shows a dual perspectives of architects and locals and how they define the "internal commonality" and "external characteristics" of a region. (Fig. 9). Their views are also part of the collective unconsciousness of the community, and are valuable in the study of architectural anthropology and regional culture.

Figure 9 Students' refinement and translation of regional culture in design

At the same time, in addition to studying how architecture "reflects" social culture, the "agency" of space, that is, the constructive role of spatial change on social development, is the key issue to deeply connect architecture and anthropology. [20]Heidegger emphasized the importance of man-made objects to the appearance of places, and the essence of architecture is to create places. [21] The place created is not only a pale and rigid existence, but always in constant construction with the continuation of social life. This is also the significance of today's settlement renewal through architectural design. We need to jump out of the trap of traditional absolute "good" and explore the "variable" and "constant" of settlement renewal through scientific research, so as to inject continuous vitality into cultural development.

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A FRANCO-VIETNAMESE DOCTORAL PROGRAM IN RESEARCH-ACTION THROUGH LANDSCAPE APPROACH: A PLACE FOR THE EXCHANGE OF EXPERIENCES AND THE RENEWAL OF PROFESSIONAL PRACTICES IN SPATIAL PLANNING AND URBANISM

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ABSTRACT:

With the support of the Francophony University Agency, a doctoral program was recently opened at the Hanoi University of Architecture in partnership with four French superior schools of architecture and landscape. It comes on top of master or post-master level courses in architecture and urban planning in which an important place is dedicated to the landscape issue. It is true that, over the last few decades, the notion of landscape has proved to be at the origin of new ways of thinking and doing, based on a renewed vision of the links between societies and their environment and on a particular attention to the ecological, cultural and aesthetic dimensions of the living spaces concerned. One of the challenges is to ensure that architectural and urban projects are not carried out under the sole influence of globalized systems of representation, which are likely to mask the diversity of local knowledge and know-how and to deny specific modes of relationship to territorial resources.

The doctoral students enrolled in this program carry out their thesis under the aegis of international co-supervision. This is a system that encourages the mobility of doctoral students and develops scientific cooperation between the French and Vietnamese research teams that host them. This contribution aims to focus on the contribution of doctoral seminars in the field in France and Vietnam. The field is considered here as a means of confronting from the outset, before any analytical breakdown, the complexity of the interrelationships between the phenomena of social, natural or cultural origin that produce urban and peri-urban spaces and make them evolve. We propose here to explain the mechanisms that allow professional practices, related to architectural, urban or landscape projects and mobilizing a multi-cultural approach, to integrate the very production of the knowledge and know-how they bring to bear.

KEYS WORDS:

doctoral program, international co-supervision, intercultural knowledge and know-how, spatial and urban planning; urban project; landscape; socio-ecological transition; action research; doctoral workshop; Hanoi Architecture University; Vietnam; Europe; Southeast Asia

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1. THE ISSUES RELATED TO THE CITY, THE TERRITORY AND THE LANDSCAPE HAVE, AT PRESENT, TAKEN ON AN UNPRECEDENTED IMPORTANCE IN OUR SOCIETIES, BOTH IN THE NORTH AND IN THE SOUTH.

Meeting social expectations in these areas requires that professional practices, related to architectural, urban or landscape projects and situated at the articulation of Western and Eastern approaches in these fields, be able to integrate the very production of the knowledge and know-how they call upon. With this in mind, a doctoral program was opened in 2016 at the Hanoi Architectural University (HAU) in Vietnam, with the support of the Francophony University Agency (AUF) and in partnership with the following French institutions: the Paris-Belleville National School of Architecture (ENSAB), the Normandy National School of Architecture (ENSAN), the Bordeaux National School of Architecture and Landscape (ENSAPBx) and the Toulouse National School of Architecture (ENSAT). The management of this doctoral program has been entrusted to the HAU (Vietnam) and the ENSAPBx (France). It comes on top of master or post-master level courses in architecture and urban planning in which an important place is dedicated to the landscape issue. It is true that, during the last decades, the notion of landscape has proved to be at the origin of new ways of thinking and doing, based on a renewed vision of the links between societies and their environment and on a particular attention to the ecological, cultural and aesthetic dimensions of the living spaces concerned (Marot, 1985; Luginbühl, 2012). Almost everywhere in the world, the landscape approach is thus proving to be the bearer of alternative conceptions of town and country planning (Davasse & Moisset, 2019).

One of the challenges is to ensure that architectural and urban projects are not carried out under the sole influence of globalized systems of representation, which are likely to mask the diversity of local knowledge and know-how and to deny specific modes of relationship to territorial resources. On this basis, this contribution aims to emphasize the contribution of doctoral seminars in the field in France and Vietnam. The field is considered here as a means of confronting from the outset, before any analytical breakdown, the complexity of the interrelations between the phenomena of social, ecological or cultural origin that produce urban, peri-urban and rural spaces and make them evolve. It is also a means of bringing together all the actors involved in the planning and management of these areas around a common framework for discussion.

An international co-supervision doctoral program aimed at space and space project professionals in Southeast Asia

The main objective of this program is to open access to doctoral training for professionals in architecture, urban planning and landscape in Southeast Asia. The aim is to articulate an initial curriculum with a professional focus and a high-level research training based on the proven scientific skills of the partner institutions in Vietnam and in France. The perspective of this doctoral training can be situated in the field of action research (Callon, Lascoumes & Barthe, 2001; Nicolas-Le Strat, 2018). This has a double interest:
- on the one hand, to strengthen the specific field of research on the city, territory and landscape in Southeast Asia by allowing it to be enriched by the contribution of professional project specialists.
- on the other hand, to develop the capacity to build a critical and epistemological reflection on the practice of project and public action as they are carried out today in globalized cities.

Doctoral students carry out their thesis under the aegis of international co-supervision as developed in France[1]. This is a system that encourages the mobility of doctoral students and develops scientific cooperation between the French and Vietnamese research teams that host them. The research work is carried out in alternate periods in each of the two countries. During these periods, the doctoral students participate in research seminars offered by the teacher-researchers of the HAU and the French partner institutions.

It should be noted that this doctoral training supports the policies implemented by the Vietnamese Ministry of Education and Training (MEF), which in 2013 launched the "20,000 PhDs in 2020" doctoral scholarship program in partnership with the French Embassy. This doctoral scholarship program has helped to increase the number of teacher-researchers with a doctoral degree from 14% in 2013 to 23% in 2017 (Ben Henda, 2021). In particular, it aims to train PhDs of international standard who can work as teachers-researchers and researchers in the public sector in Vietnam, particularly in the Ministry of Education and Training and the Ministry of Construction, which are the supervisors of the Hanoi University of Architecture (HAU), and in other countries in South-East Asia (Laos, Cambodia, etc.).

Teaching through landscape to implement an ecological and social transition

The proposals for teaching through landscape made here are based on the observation that, too often, the contemporary urban and territorial fabric tends to homogenize built and unbuilt forms, in connection with the globalization of cultural representations and the deployment of a neoliberal way of thinking about the city and its spaces. This is characterized by territorial planning and urban planning policies that are still largely subject to functionalist rules (Auricoste, 2003). However, in some places, forms of resistance or diversion linked to the diversity of cultural contexts, the existence of urban planning and construction traditions, and the presence of specific ways of living are superimposed on this globalization. Even if the concern for landscape is still very little present in South-East Asia, it seems interesting on these bases to develop a landscape engineering, interdisciplinary and intercultural at the same time. This landscape engineering aims to considerer local knowledge and know-how, to co-understand the situations encountered and the associated behaviors, and to co-elaborate answers adapted to the specific issues encountered.

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1   The decree of 25 May 2016, which organises the French national training framework and the procedures leading to the award of the national doctorate diploma, governs thesis co-supervision in Title III. It sets out the elements that must be included in the thesis co-supervision agreement, in particular: the procedures for setting up the jury and for providing material, pedagogical and linguistic support for students: https://www.legifrance.gouv.fr/loda/id/JORFTEXT000032587086/

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*Fig. 1 — Opening up the landscape and public space on the outskirts
of Xuan Hong village (Nam Dinh province)*

*Fig. 2 — The infilling of the rice fields and the advance
of the built-up front in south-west Hanoi*

The aim is to gradually put in place a new interpretative framework. It is linked to the increasingly urgent need to find answers to the environmental transformations underway (climate change, biodiversity crisis, resource depletion). It is also linked to the search for anchorage in postmodern societies that are globally reterritorialized and to the political, economic and social recompositions that result from this. In Vietnam and Southeast Asia, as elsewhere in the world, new territories are emerging: they transcend existing organizations and networks, under the simultaneous necessity to reflect on and implement a transition, both ecological and social. In fact, the proposed pedagogy aims at mobilizing the landscape as a means to think globally, in the double dimension of the social and the ecological, what we often continue to treat separately. It thus becomes possible to pay

attention to the complexity of the phenomena, to their multiple temporalities and to the very existence of alternative practices aiming at inscribing projects in the complexity of local eco-socio-cultural relations.

Doctoral workshops in the field to identify landscape situations and build knowledge and know-how together

The aim is to offer doctoral students and future doctoral students both methodological and practical training. On the one hand, it is a question of offering courses aimed at improving the working methods of doctoral students (documentary research methods, surveys, reading and writing, etc.). On the other hand, it is a question of deepening the question of observation of the city, its territories and its landscapes during field workshops. Observation is considered here as a way to confront from the outset, before any analytical breakdown, the complexity of the interrelations between the phenomena of social, natural or cultural origin that produce peri-urban spaces and make them evolve. It is also a means of bringing together all the actors involved in the development and management of these areas around a common framework for discussion.

*Fig. 3 — Landscape surveys in Phuong Dinh (west of Hanoi) in the framework of a doctoral workshop
bringing together researchers, doctoral students and professionals of space and spatial projects*

The entry through the landscape has a double objective. On the one hand, it is about grasping successive landscape situations, considered in their materiality and constituted by a set of visible objects partially reflecting (certain determinants not appearing to the observer) a certain state of a spatial system studied as an environment and/or a territory. On the other hand, it is a question of apprehending the relationship of actors and inhabitants to their environment, by considering their discourses and their socio-spatial practices and by trying to grasp their expectations and aspirations in terms of environment and living environment. Considered in this way, the landscape proves to be a mediation tool, capable of serving as a support for the sharing of knowledge and views necessary for any policy oriented towards sustainability.

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Through the training provided in the framework of these doctoral workshops in the field, the aim is, first of all, to provide methodological and practical support to young doctoral researchers engaged in their first year of thesis. It is also about supporting the access of future graduates or young graduates, professionals or future professionals of architecture, urbanism and landscape in South-East Asia to a doctoral course.

Fig. 4 — Identification of "inhabitant" practices in Tan Hoi (west of Hanoi) in the context of fieldwork carried out during a doctoral research project.

All lectures and fieldwork are conducted in French. The workshop is open to doctoral students and second year master's students in the disciplines of architecture, urban planning and landscape. Each participant is asked to send to the organizers before the start of the workshop a presentation of their work and the role of fieldwork in it, together with a summary bibliography. Depending on the areas in which the workshop is held and the themes studied, experts or stakeholders directly concerned are involved.

A growing intercultural educational and research cooperation

Student mobility and scientific cooperation between the Hanoi Architecture University and French partner institutions have been strongly developed since the establishment of the doctoral program. Research projects on an international scale have been undertaken, in close collaboration with major institutes such as the CNRS, the IRD (French Institute for Development Research) and the AUF (French University Agency of the Francophony). In addition, the doctoral program ensures that doctoral students are involved in teaching undergraduate and graduate students. This is how a whole Francophone sector is built up in a scientific, educational and cultural continuity.

The objective is to constitute a network of interdisciplinary and interprofessional exchanges gathering experiences of research, professional practices and training to research in this field of landscape. It is also to experiment innovative methods of research and action and to promote a renewal of the order among the actors of the territories by associating them closely to the works within the framework of the seminars indicated below or within the framework of events gathering the world of research and that of action.

The challenge is to include the landscape in devices aiming at renewing the representations that we make, through it, of the environment and of the territorial processes, and to better integrate

local practices and cultures in the actions carried out. It is also to develop policies and projects specifically carried out in the name of landscape, which are still relatively exceptional today (Gauché, 2015). Finally, it is necessary to increase the number of research works on landscape action in cities and the countryside, which are still too few (Nguyen (ed.), 2021). To do so, it is necessary to allow professional practices, related to territorial, urban or landscape projects, and situated at the articulation of Western and Eastern approaches in these fields, to integrate the very production of the knowledge and know-how they bring to bear. The objective is thus to enrich the field of research and action in this field of landscape, from the crossing of views and experiences.

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TOURISM DEVELOPMENT AT AN URBANIZING LANDSCAPE, QUESTIONING THE ROLE OF PLANNER. STUDY CASE, NGLANGGERAN TOURISM VILLAGE, YOGYAKARTA, INDONESIA

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ABSTRACT:

It is important for [tourism] planners and designers to understand the relation of tourism development with urbanization process, especially at emerging destination. Urbanization processes have been occurring not only in cities but expanding into areas traditionally not considered as cities. It often leads to the social and environmental transformation of vast rural areas; and operationalization of wilderness space to serve capitalist urbanization.

Nglanggeran is a small village, located about 1 hour drive from Yogyakarta, which is one of the primary tourism destinations in Indonesia. Initiated some 20 years ago, the village is now a popular tourism village with several international and national awards. Due to its popularity, development interests were poured in and mesmerized local population: colossally scaled infrastructure and new economic activities at variated scales. The desire for accelerated economic growth from tourism often led to the dependencies to external resources; then had marginalized local communities and local economy. Sustainable tourism aims to promote economic growth as well as sustaining its cultural identity of society and strengthen the local economy; the question would then be how.

Often, planners are more familiar working as consultants for the government or privates and unfamiliar to capture local perspectives. It is then imperative to ask for a more intensive role of planner to facilitate local perspectives and to enable local action in tourism development. Planners have to be able not only to identify the local strength but also to enable local populations to understand their local strength.

The methodology will be evaluating several community development processes; as well as participating in the on-going community planning activities, surveys, focused interviews to the planners and the local populations. The research aims to identify key lessons learns which can be utilized to feed into constructing teaching methods for planners and into establishing fostering multi stakeholder cooperation.

KEYWORDS:
Tourism, Community, Planner, Facilitator, Indonesia

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INTRODUCTION

In Indonesia, many regions had selected tourism as their key development sector and had developed their urban centers as tourism destinations. Leiper (1979) introduced the tourism system, which outlined five elements of tourism: tourists, three geographical spaces (generating region, transit route, and destination region), and tourist industry. Tourist destination region is defined as geographical spaces or locations which attract tourists to stay temporarily or as a tourist receiving region. Although urban centers play an important role in tourism development for a region, for instance as primary transportation hub or location of primary facilities; however, tourism development is not isolated in the core urban areas. It is important for [tourism] planners and designers to understand the relation of tourism development with urbanization process, especially at emerging destination.

Urbanization processes have been taking place not only in cities but also expanding into areas, which are not traditionally considered as cities (Brenner and Schmid, 2015). Much of these processes reflected the trends found at tourism destinations. The destination core is now a territory which had been continuously experiencing unique multi-scalar process of socio-spatial transformation (Brenner and Schmid, 2015). New functions had emerged in various spatial forms, which were originally not associated to these functions. Some of the previous functions disappeared, yet some adapted to and managed to make their roles in these new configurations. They also proposed that the urban transformation encompassed a broader territories and landscapes, than just an expanding urban area; but [can] also include many that might contain relatively small, dispersed or minimal populations, but where major socio-economic, infrastructural and socio-metabolic functions took place in support or in consequences of the existence, operations, and growth imperatives of often-distant agglomerations.

Even before the rapid urbanization started; under the intention to allow local communities to take benefits from tourism, tourism was brought into the villages. Yet, within the industrialization, the processes had been intensified to answer the ever-increasing demand of tourism growth. 'Rural' areas around the urban destination core had also been profoundly transformed: various forms tourist-based facilities are undermining the original agricultural uses and dwelling functions. Tourism development at so-called tourism villages have been developed towards similar urban standard and reference. The growth of tourism is translated as various modern facilities which have alienated the original life of village communities.

Community Based Tourism (CBT) emerged as a community development strategy, which used tourism as a tool to strengthen local communities to manage tourism resources (Suansri, 2003); thus, also to manage tourism development. Scholars had elaborated the necessity and the importance of CBT development (Blackstock, 2005, Mensah & Afenyo, 2022); also critically observed its implementation, drawbacks, and challenges (Goodwin & Santili, 2009, Mensah & Afenyo, 2022). In Indonesia, CBT was started as small-scale initiatives at rural areas, then continued to contribute into larger scale initiatives and diverse development issues.

Community based tourism development had increased opportunities for communities at rural areas to engage, obtain benefit from, and sustainably manage tourism development. Community empowerment is an essential methodology for this approach. Community empowerment is a process to improve the capacity of local communities to change their mind set and to take action. There have been examples where community empowerment had changed the mind set of local communities

from exploiting into sustainably using their natural resources (Indecon, 2014); from being unaware of their strength into being proud and appreciative; from being uncapable into being able to teach others.

Tourism development at one region should carefully considered the character of local potentials and the capacity of local communities. Regions should put more attention in developing their local potentials: their local products, local knowledge, local human resources; by increasing their added value and not simply by exchanging it with something else or totally new values.

Often, planners are more familiar to work as consultants for the government or privates and less familiar to capture local perspectives. It is important to ask for a more intensive role of planner to facilitate local perspectives and to enable local action in [tourism] development. Planners have to be able not only to identify the local strength but also to enable local populations to understand their local strength. However, at the moment in Indonesia, this topic is hardly discussed at planning and tourism schools. A very few universities had shown interest to put this topic a compulsory class, however the content is still very limited to the principles, concepts, and case studies.

Methodology

The methodology will be evaluating several community-based planning as one of key activities in community-based tourism (CBT) development processes. The research takes 2(two) case studies:
- Liang Ndara village, which is located adjacent to one of the key destinations at Flores Island – Labuan Bajo, in West Manggarai District.
- Nglanggeran village, which is located adjacent to one of key destinations at Java Island – Yogyakarta, in Gunung Kidul District

The researched had also observed and participated in the on-going community planning activities at Liang Ndara (2014 and 2017) and Nglanggeran (2021 and 2022), which included preparatory works, field surveys, desk works. However, at Nglanggeran case, the current process of community planning is data collection (May 2022). We had documented the process and conducted several focused interviews to the student facilitators and the local populations.

Case Study Description

Community Development Process at Liang Ndara, Flores
Liang Ndara is a village adjacent to a nearby bustling tourism destination of Labuan Bajo, Flores Island, East Nusa Tenggara. Flores Island covers 14,300 square km, consists of 9 districts and multiple ethnicities. More than 70% of its population live from agriculture and plantation; although tourism has developed in Flores since 1980es. Labuan Bajo is the capital of Manggarai Barat district with population of ±7.360 orang (2017); which is by far the most populated cities in the island (see Table 1). There are 4(four) primary urban centers at Flores, which are Labuan Bajo (West Manggarai), Bajawa (Ngada), Ende (Ende), and Maumere (Sikka). However, in the last few years, Labuan Bajo outweigh the others in terms of tourist arrivals and tourism development (see Table 2).

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Table 1. District Capital and Its Population at Flores Island

No	District	Capital	Population (2020)
1	West Manggarai	Labuan Bajo	280,412
2	Manggarai	Ruteng	342,908
3	East Manggarai	Borong	289,936
4	Ngada	Bajawa	165,314
5	Nagekeo	Mbay	147,189
6	Ende	Ende	274,599
7	Sikka	Maumere	321,790
8	East Flores	Larantuka	257,785
9	Lembata	Lewoleba	145,685

Source: https://ntt.bps.go.id

Table 2. Tourist Arrivals at Primary Urban Centers at Flores Island

No	District/City	Tourist Arrivals		
		2016	2018	2021
1	West Manggarai	54,758	179,081	142,965
2	Ngada	93,560	133,551	12,413
3	Ende	22,638	93,000	13,059
4	Sikka	29,079	50,212	21,333

Source: https://ntt.bps.go.id

Liang Ndara village is located ±25km from Labuan Bajo or only around 45 minutes driving. Majority of local livelihood are farmers. Originally, tourism development at Liang Ndara was very modest. Some ten years ago, for the communities, tourists were foreigners who came and spend 1-2 hours at their village to see their traditional dance performance (named *Caci performance*). There were 3(three) dance groups who could organize this performance for tourists. The only opportunities to get involved in tourism was becoming part of the dance groups, either as dancers, singers, or musicians. At that moment, tourism was not considered as an important economic activities or economic sectors by local communities.

Over time, Liang Ndara had been transformed, as various forms of tourist-based facilities were developed in the village areas, both by private developers and by local governments. Although they have not *yet* undermined the original agricultural uses and dwelling functions, but they have arguably transformed the cultural environment of this Manggaraian village.

Map 1. West Manggarai District

Image 1. The landscape of Liang Ndara Village (left) the Caci performance (right)

Tourism development at Liang Ndara had been significantly influenced by external factors, which was the development of Labuan Bajo as destination core and the tourism market changes. In 2016, Flores (Komodo and surrounding) was appointed as one of the nation-wide 10 priority tourism destinations (Bali & Beyond). Development projects were implemented in Labuan Bajo by different ministries and private developers; coupled by massive promotion. The national government through its ministries and state-owned enterprises had constructed many major tourism facilities, including luxury hotels, commercial areas, and extensive promenades at the waterfront. Besides that, many private developers were also in operation. Not only they developed extensive hotels, marinas, and shopping complexes at Labuan Bajo; but also acquired land to the surrounding rural areas, even up to Liang Ndara village.

Liang Ndara village in particular was appointed as the pilot tourism village for Labuan Bajo. In 2018, Flores – including Liang Ndara village - was offered as post-tour destination for the IMF – World Bank meeting in Bali (October 2018). Due to this attention, both tourism facilities and supporting facilities were constructed at the village by district government and different ministries, including:

- Construction of parking spaces, tourism signage, homestays, public toilets, performance stage, souvenir kiosks
- Construction of traditional market
- Improvement of access road

The market situation had completely changed over the last ten years. Its adjacent location from Labuan Bajo had highly improved the demand for the village, which allow the village to provide land (for tourism premises), facilities (i.e. homestays), and attraction (i.e. performance, village exploration). The output was clearly visible for local communities by the increasing number of visitors over the last years, which was very significant in comparison to other neighboring tourism villages (i.e. Tado, 1.5hour away from Labuan Bajo). Now tourism had been considered as an important economic sector at the village. Moreover, the village government could get support and secured funding from the district government to construct facilities and conduct events.

Table 3. Tourist Arrivals to Liang Ndara village

	2012	2013	2014	2015	2016	2017	2018
Liang Ndara	74	193	353	971	1.538	1.835	2.361
Tado	53	20	92	212	271	348	405

Source: Sanggar Riang Tana Tiwa Liang Ndara and Lembaga Ekowisata Tado (2019)

This study case had showed that the urban transformation expanded beyond the urban area, into the rural areas. The changing tourism market had transformed socio-economic, infrastructural and socio-metabolic functions of the village to relate into the existence, operations, and growth imperatives of Labuan Bajo as its distant agglomerations.

Community Based Tourism Planning Process at Nglanggeran Village, Yogyakarta
Nglanggeran is a small village, located about 1 hour drive from Yogyakarta, which is one of the primary tourism destinations in Indonesia. Tourist arrivals to Yogyakarta increased from 2.84 million in 2013 to 5.23 million in 2017. However, it had been dominated by domestic tourists; since foreign tourist arrivals are only 8.3% of total arrivals (2013) and even 7.6% (2017). Yogyakarta received only 2.8% of all foreign tourist visitors in Indonesia in 2017 (ITMP, 2020)[1]. Yogyakarta was the primary entry point for Borobudur Temple, Yogyakarta city, and many other tourism attractions at the region. Strategic location at the center of Java Island, availability of various transportation options, low cost facilities and services, and various attractions for everyone had made Yogyakarta a very popular destination.

Initiated some 20 years ago, Nglanggeran village is now a popular tourism village with several international (UNWTO Best Tourism Village, 2021)[2] and national awards[3]. At the beginning, it was initiated by a group of local youths who were concerned about the environmental condition of the village. Tourism was started as a community-based development strategy to overcome poverty, drought, and loss of young generation (due to the trend for local youths to work abroad).
They had foreseen tourism as a strategy to raise community awareness to conserve the natural landscape and to generate income for local communities. Only later in the 2010es, the initiatives were more focused on tourism development and organized by local tourism organization (POKDARWIS – Kelompok Sadar Wisata) Nglanggeran.

Until 2014, the development is relatively modest; however, then they marked a very sharp increase in 2014. However, despite the success, the village also encountered some problems at that time, such as increasing solid waste and crowd. Therefore, they had implemented several measures to try reducing the number of tourist arrivals, yet keeping their income steady. By shifting to *ecotourism* and by developing more sophisticated tourism products, the village had eventually managed to reduce tourist arrivals and even increased their income. In 2019, they had reduced tourist arrivals by one-third and increase their income by 2.5 times (see Table 4.).

Table 4. Tourist Arrivals and Revenue of Nglanggeran Village (2013-2019)

Year	Tourist Arrivals	Revenue
2013	85.658	USD 29.000
2014	325.303	USD 97.000
2015	255.917	USD 105.000
2016	172.863	USD 123.000
2017	151.035	USD 134.000
2018	142.179	USD 172.000
2019	103.107	USD 223.000

Source: POKDARWIS Nglanggeran, 2021

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2   https://www.unwto.org/tourism-villages/en/villages/nglanggeran/
3   http://gunungapipurba.com/pages/detail/penghargaan

Although tourism was initiated 20 years ago, but it had been intensified in the last 5-8 years to answer the increasing demand of tourism growth. Nglanggeran had seen development forces much more powerful than ever. Due to its popularity, development interests and projects were poured in, including:

- Large scaled infrastructure, including a large access road which has just recently built across the village and had completely transformed the landscape. The road connects different districts in the region, which will certainly increase connectivity and traffics; as well as open access for larger market to the village. Other large-scale infrastructures include a transportation hub (intermodal terminal).
- New commercial activities at variated scales, including retail chains (i.e. mini markets, restaurants, etc.). At the moment, commercial facilities at the village are limited to community-owned shops and village-owned grocery store; thus, the introduction of retail-chain business is expected to change the economic scale.

Tourism development have been developed towards similar urban standard and reference, which had transformed the village landscape by the introduction of various new tourist-based facilities. There is a growing concern that the growth of tourism is translated as modern facilities which will alienate the original life of village communities.

Image 2. The changing landscape of the village

Our interviews with key tourism stakeholders had identified recent strategic issues at the village. The desire for accelerated economic growth from tourism and particularly the accelerated development program under COVID19 economic relief policy had opened up opportunities for external resources. However, many of the acceleration takes place so quickly and without any consultation to or consensus of local communities. If this trend continues, it is feared that it might marginalize local communities and local economy at the village. Key tourism stakeholders, including POKDARWIS were concerned that the improved access and the accelerated development projects would drive mass tourism market to the village, which might jeopardize the existing tourism development. They realized that it was necessary to have a better process for any development interventions in the future. Nevertheless, they also realized that many of the village communities did not have similar understanding about this.

Map 2. Nglanggeran Village

Another rising issue at the village is about distribution of economic benefit to all village communities. Tourism attractions, facilities, and activities were concentrated at two sub-villages; because for example homestays were located close to the attractions. Therefore, some people suggested that tourism facilities should be constructed throughout the whole village so that economic distribution could be more equal to all village areas. This suggestion had been strongly contested by the other community groups, who vice versa think that economic benefit should be distributed proportionally to each person interests and capacity. For instance, one should learn about tour guiding, then he/she can become tour guides and obtain economic benefit from tourism. However, there are community members which due to location, capacity, ability, will not be able to work at tourism. Thus, key tourism stakeholders also realized that they need a strategy for better and more equal economic distribution, even to those who cannot directly work at tourism.

Despite the importance of tourism for the village, Nglanggeran village only has the general village development plan (*Rencana Pembangunan Jangka Menengah Desa),* and does not have any specific plan for tourism development. They lack any support for tourism planning activities, either from government, donors, or other institutions. Therefore, in 2021, the village had established a partnership with a local NGO (Indecon Foundation - Yayasan Ekowisata Indonesia) and Pancasila University to jointly conduct a participatory planning process. Each parties share their own primary roles in this partnership, which are:
- Nglanggeran village : provide local communities to implement planning activities
- Pancasila University : provide student facilitators, provide technical advice
- Indecon Foundation : provide technical expertise, provide planners

Results

Community Planning at Liang Ndara Village, Flores
Village tourism planning activities at Liang Ndara village was conducted at two time periods: first in 2014 and second in 2018. This situation had provided the research valuable opportunities to examine the differences between these periods to be able to develop hypothesis on how to improve the process in the future.

Our key finding is that the **internal and external factors of the different periods were different** as well as **their impact to the whole planning process.** In the first phase, engagement of local communities was very weak, because interest, knowledge, capacity, and exposure of local communities to tourism were still very low. There was no particular capacity building to improve this situation. The planning document was developed largely with discussion and consultation to local communities. The spatial scale of the plan was relatively small, which only focused on one tourism attraction.

In the second phase, the external and internal situations were very much different. First, the knowledge and capacity of local communities in tourism had highly improved. Second, the urbanizing of Labuan Bajo had considerably increased demand and created opportunities for the village. More local communities had been exposed to tourism, had foreseen various economic opportunities from tourism, had developed higher interests to engage in tourism. These increasing enthusiasts were highly expressed and visible during the process. However, the technical capacity on planning was still limited and only those with high interests were able to get involved in the planning activities.

However, the need for tourism village *planning* itself was clear that it was because such plan was preferred for any development aids or projects from the external parties. Liang Ndara village government then formed a small working group of 5 people which worked together with the community planners from Indecon. They conducted the usual planning process, including collecting data to update in its village tourism plan and conducting community workshops. The working group consisted of representatives of village government, local tourism guides, youth groups, and community leaders. They participated and assisted the community planners during the following process: (1) data collection, (2) identification of strategic issues, and (3) community workshops. Their participation was still limited in the process of data analysis, formulation of plan, and writing of the document.

The planning document was a great success, that it was used during assessment and negotiation with the district and national government. However, not all of the plans were successfully implemented. For instance, in the case of homestay construction where the developer had built an alienated structure: an urban house without any reference to local architecture or local culture. The 36sqm homestay, which have two small bedrooms and a common room; had never been operationalized ever since.

Image 3. Dialogue session on tourism facilities development in Liang Ndara (left)

Houses built by Ministry of Public Works allocated for homestays (right)

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Community Planning at Nglanggeran Village, Flores

Our key finding is that **the approach emphasized on the engagement and capacity building of local communities in the process.** At Nglanggeran village, the whole process can be categorized into three parallel processes with sets of methods, which aimed to address the challenges. The key differences of these processes with the usual planning process are the other two parallel set of activities.

- The main planning activities
- The dissemination activities
- The capacity building activities

Diagram 1. Three Parallel Activities

1. The main planning activities

The main planning activities comprises of the 'usual' activities implemented sequentially, which are preparation, data collection, data analysis, and formulation of actions. However, considerable efforts were put into encouraging local communities to take part into the process.

The <u>first method</u> is that besides the primary POKDARWIS team members, POKDARWIS also formed a small working group, which actively engaged in the planning activities. This group were also primarily trained in capacity building activities. The members of the working group were local communities from each sub-villages; which comprised of POKDARWIS team, village government officer, tourism stakeholders (if any, such as guide), and common villagers. This working group is focal point for all planning activities. POKDARWIS team played an important role in selecting the members. The <u>second method</u> is organizing community meetings between each stage of planning activities, which aim to deliver the result or the progress of each stage; for instance, the first community meeting was planned to deliver the collected data.

However, the *level of engagement* of each member was not similar although they all had received similar trainings and participated in similar activities. We had observed and found out that the differences were due to:

- different interests; some community members had high interests because they were highly affected by tourism or by possible output and impact of the training.

- different time commitment; some community members could commit much time, while others could not because they had other jobs.
- different supporting system; some community members had supportive family or working environment which allow them to participate, while others did not.

The key challenge was first (i) increasing the capacity of the working group, both in the knowledge, technical know-how, and also how to facilitate wider stakeholders in the village. Secondly, (ii) it has been very challenging to keep the spirit of the working group.

2. The capacity building activities

Tourism and planning itself has various knowledge, terminologies, and methodology which might not be familiar for most people. Thus, a simultaneous series of training-like sessions were conducted provided by professional planners and facilitators to improve the capacity of local communities to be able to participate actively. The main target of the trainings were the small working groups; however, it is expected to have more trainees from other community groups in the future.

The training contents were more technical know-how rather than theoretical, with various kind of exercise. The first training (January 2022) included basic knowledge on:
- Basic knowledge on tourism and sustainable tourism
- Planning process
- Method to collect data on tourism attraction, amenities, and accesibilities

The second training (February 2022) included knowledge on:
- Tourism profile (attraction, amenity, accessibility, ancillary)
- Method and plan to facilitate community discussions

The third training (March 2022) included knowledge on:
- Method to collect data on tourism market
- Development concepts, including ecotourism, community-based tourism

3. The dissemination activities

A simultaneous public dissemination medias are plan to be distributed parallel to the implementation planning activities. They aim to familiarize the process and – only later – the output of planning to wider communities in the village. These activities aim to target wider communities, to avoid that planning activities are done exclusively by planners or elite representatives of the communities or local governments. Originally, there are few number activities planned, including social media, website, posters, and community meetings; which are planned to start from the beginning of the process. However, until few months of the implementation, dissemination activities have not yet started. *We do not know yet the underlying reason for this at the moment.*

The key challenges for planners and student facilitators in this process were to create various methods to allow local communities to contribute in the key stages, for instance: how to participate

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in collecting data, how to participate in analyzing and writing up survey results, how to develop concept, etc. The method must be easy enough to execute and to explain; because the usual method might be too technical or too lengthy to learn. One of the methods used at this stage was Persona.

Key challenges for local communities to participate in the planning activities, based on interviews to a key person from the team, was:
- There is very little interests on activities which are has more 'desk work' rather than more 'field work'
- Planning is still considered not important. Sometimes, things which are not planned are easier and quicker to implement; thus, there is less necessity to plan it.
- Lack of experience in planning activities, local communities are looking for tangible and quick results.

Another key finding is that since the approach emphasized on the engagement of local communities; **there was less emphasize on the substance itself**. It was still very challenging for local communities to be engaged in analyzing data and in writing up the documents. We believed that this would be a great question for the next steps.

The Role of Community Planner and Student Facilitator

Although the technical experts as the planners did not 'normally' act as planners, it did not reduce their importance in the process. Yet, as we mentioned earlier, their role had been shifted. In addition, they had to act also as a teacher and a facilitator. For instance, their task was *not only* to collect data but also to teach local communities to collect data. Technically, the new role of planners include:
- Provide capacity building, both formally in training sessions and informally when working, for local communities: explaining the knowledge and terminologies into daily words which can be easily understood by local communities.
- Create new method to allow local communities to participate in the activities, for instance to collect technical data and to analyze data.

Similarly, the challenges were posed to the student facilitators. During their intern, the students usually learn to assist planners in the usual planning activities; but this time they had also learnt to facilitate local communities. For the students, it was quite challenging because they had to learn two skills in the same time. However, this experience had provided them chances to have hands-on experiences for community facilitating when they are still at school. For the local communities, the students become their colleagues. Our interviews showed that local communities highly appreciated the presence and assistance of the student facilitators.
Technically, the role of student facilitators include:
- Assist the working group to collect data and to input data, using the previously developed instruments
- Keep the engagement of communities, by keeping the spirit and making the process all fun

Conclusions

When this paper is submitted (May 2022), the current process of community planning at Nglanggeran village is data collection. Therefore, the conclusion will be limited to temporary conclusion; which means that the research might come up with additional findings and conclusion in the near future.

The research had identified key lessons learns from both cases, which can be used to improve teaching methods for planners in order to facilitate community-based development. They are:
- Improved capacity of local communities had increased their engagement in the planning process; therefore, capacity building should become an integrated component of any community-based planning or community-based development
- Role of community planners continues to be essential; but it should not be limited only to plan the development *for the communities*, but also facilitating the communities to plan the development *with them*.
- Community based development is a process which require considerable amount of time and number of human resources input. However, the process is important as much as the output of the planning.

Community based development approach requires hand-on experience to be learnt. It will be best to be learnt together with the communities directly. Working with communities as an internship program is a possibility to provide this opportunity to planning students.

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EVOLVING TRADITION: SELF-EXAMINATION OF MODERNITY BASED ON THE RURAL PROCESS IN SOUTHERN JIANGSU, CHINA

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ABSTRACT:

If modernity is generally interpreted as an endless desire to solve progressive needs, tradition should not be limited to a given historical period. Otherwise, the huge fracture between both will leave us lost on the way to the future. In the context of globalization, it's still possible to maintain territorial identity in a progress process, by examining the contributions of traditional patterns from the perspective of evolutionism. Based on the historical traces of rural development in southern Jiangsu, this research analyzes different formal representations of traditional evolution in different dimensions: ethics, politics and community interests. It uses historical description and dialectic analysis, and explains the conditions that promote the evolution of tradition seen from three aspects: society, policy and territory. Currently, rural development in China is moving towards an ecological community, which is not only the result of traditional evolution, but also the reflection of modernity in southern Jiangsu. Evolutionary tradition as a new paradigm to understand modernity can support self-examination of local development and face diverse uncertainties. And spatial intervention strategies in southern Jiangsu may provide inspiration to keep local identities.

KEYWORDS:

tradition; modernity; rural area; territory; local identity; ecologic community

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Generally globalization is considered to be a process of international integration (Nayef, 2006), in which the world becomes smaller and smaller along with the exchange of knowledge, economy, culture and policy (Larsson, 2001). Despite the many derived benefits, the combination between local and global has become a new challenge. In the face of the ongoing modernization process, the preservation of the places traditions has become an important task in promoting local identity (García Hermida, 2018). Even so, tradition is often used as a reference to the construction of modernity, it includes the elements that are explicitly stripped away and constantly diluted (Li, 2020). There is a paradox that the static tradition will eventually lose its referential significance, because we voluntarily give up the possibility of being today the tradition of the future. Therefore it is necessary to re-understand the tradition and liberate it from the constraints of a limited historical period. In contrast, modernity is considered a constant and irreversible desire to cater to the purpose of modernization, becoming a program or an unfinished business (Habermas, 1990). That's why we need to reflect on the inherent notion that separates tradition from modernity to boast civilization reconstruction (Huntington, 2002), and to believe that tradition, as a historical process, still has vitality in contemporary times (AlSayyad, 2014).

In terms of the global macro scale, modernity is the result of horizontal comparisons of tradition between places, while on the regional scale, modernity is the result of vertical comparisons of tradition over the timeline (Zheng, 2012). Tradition represents the sequence of time from past to present to future, and the things carried by time (Cairns, 2011). Therefore, an interpretative hypothesis arises: as the boundaries of modernity migrate, tradition is also being revisited. Based on this, the inheritance and resistance between tradition and modernity becomes a selected evolutionary relationship. Examining tradition and modernity through an evolutionary perspective balance, at least epistemologically, the inequality between the two provides a new paradigm for the establishment of local identity characterized by tradition in the modernization process. Evolving tradition is the development based on past genes on one hand and the changes and adaptions based on the current situation or the specific challenges on the other hand. It is a comprehensive transformation process that shows a temporal continuity of positive states and organic interaction between parts (Olsson, Galaz and Boonstra, 2014). The development of Chinese villages with thousands of years of agricultural civilization deeply reflects the dialectical relationship between tradition and modernity.

This paper takes the villages in the southern Jiangsu region as the research object and tries to understand the evolution of traditions by analyzing the salient features presented in the modernization process. The aim of this research is to dialectically analyze the contemporary representations of the continuous historical genes shown by the case, and to explain that the tradition has not disappeared due to the modernity construction. A new theoretical paradigm of tradition and modernity as an organic unity needs to be interpreted to deal with the negative effects of globalization on local identities.

Southern Jiangsu refers to the five cities in Jiangsu Province. It is located in the center of the Yangtze River Delta on the southeastern coast of China. It has a long history and is one of China's most developed and modernized regions (Figure 1). Due to the favorable natural resources and climatic conditions, since the Song Dynasty, rural areas in southern Jiangsu have become the country's major tax revenue centers, and are also known as the "land of plenty" (Song, 2012). It is precisely because of the long-standing farming civilization and the intense modernization process that the localness of rural areas is manifested in the interaction between tradition and modernity.

Figure 1 The location of southern Jiangsu area. Source: by the author

1. Community substrate for evolution of tradition

Since the formation of human society, traditions have been sprouting in the common life of a group. Ferdinand Tönnies, a German sociologist, called this organic whole consisting of a common life based on human interrelationships as a community, containing ideology, blood, geographical relations, etc. (Tönnies, 1935). In this sense, the village is a territorial community based on agricultural production and life, which contains farmlands, farmers, nature, and village life (Mao, 2014). Therefore, the evolution of rural traditions in the context of modernization is based on the selection, adaptation, and combined re-expression of the regional community in the face of social changes (Wen, 2017), and is an overall structural development process (Dayley and Sattayanurak, 2016). As one or a group of distinctive territorial communities, the rural areas in the southern Jiangsu explain the evolution of tradition from different perspectives.

1.1 The ethical community: evolution of the moral code and order (case study)

The natural economy of self-sufficiency and the family-based form of agricultural production during the feudal period were the basis for the formation of the rural ethical community in southern Jiangsu. The rural ethical community, a miniature society of acquaintances, was formed in the common production and living activities with the village settlement as the geographical spatial boundary (Fei, 2019). The long-term common production and life and clear division of labor have led to mutual trust and interdependence among villagers, forming independent groups that solve problems together (Figure 2). Villagers take common activity goals, living habits, and aspirations as their code of conduct. The ethics and morality centered on Confucianism support an autonomous order for individuals, families, and the overall village. In daily life, a series of guidelines governing productive life are set or enforced by the recognized elders, clans or gentry in the group. The moral rules of ancestor worship and respect of elders by their children naturally formed the accepted norms of village governance. At the same time, in those activities with human labor as the main productivity, the mutual help and gifts among villagers have contributed to the altruistic social structure with the

family as the unit (Wang, 2015). The common moral value orientation and the contractual spirit are the essence of the ethical order of the feudal society and villages.

After 1840, feudal society gradually disintegrated, and the rural self-governance system in which "imperial authority not under county and state law not under village" was changed. However, this change did not completely erase the past moral and ethical order, but revised the past traditions by establishing a legal system in the countryside. As a result, a new ethical community is formed that includes both legal and moral orders (Chen, 2008). In the post-productive society (Åsa and Svante, 2014), the villages in southern Jiangsu are no longer independent settlements, but are becoming closer to the outside world in terms of economic, cultural, and construction activities. In this context, the moral order of the acquaintance society was selectively reorganized to form new shared social notions. Traditional genes such as ancestor worship and the clan-based organizations have become the value representation of agricultural civilization. In contemporary times, the ritual order of the past is still an important logic of rural social governance.

Compared to the past, the changes are merely a selective inheritance of moral standards and the abandonment of some stereotypes that restrict equality and freedom, such as gender inequality and exclusion. Because of the kinship of acquaintance society, rapid urbanization has not broken the countryside completely from the past, but rather has stimulated a nostalgic feeling and recall for a sense of belonging to the countryside. Logically, this new tradition based on the past ethical order has become a necessary condition for the construction of modern villages. For example, building retirement communities around ancestral halls, reviving folk cultural activities and traditional handicrafts, and nurturing young intangible cultural inheritors, these are also essentially the result of modernity.

Figure 2 The scenery of farming and weaving in Song dynasty 1050s). Source: The Palace Museum: https://www.dpm.org.cn/collection/paint/231693.html

1.2   Political community: persistence of the farmers-based logicThe logic of the formation of

China's political community is profoundly reflected in the saying "a country is based on its civilians while civilians live on food". Regardless of the era, satisfying the basic needs of the people has always been the first goal of state rule. The "idea of co-construction of home and country"[①] has been the invisible political structure that has enabled China to achieve great unity for thousands of years. Despite the change of dynasties, the root caused was the mismatch between institutions and social relations, while the farmers-oriented political logic remained the same (Pan, 2021).

Marx Weber defined a political community as a capacity to be able to exercise orderly domination over the territory and the people living on it by forceful means (Weber, 2009). Thus, it seems that the rural political community shows the export of the state's right to dominate the life and production of the villagers on the one hand, and the identification of the individuals for the political purposes of the state on the other. During the feudal period, the farmers were the majority of state production, and the situation of the farmers and the countryside determined the rise or fall of the country. This mutual identification of the country and farmers with agriculture as the link is manifested in the formulation of policies to solve the farmers' practical problems and in the farmers' emotional support for the prosperity of the country. "The country is defeated and the home lost", reveals the integration of fate between the family and the country, which is always the last thing the people at the bottom want to happen.

Until modern times, the home-settlement-country co-construction relationship is still a common political belief among the people. In the early 20th century, a large number of ethnic industrial, commercial and educational practices appeared in rural areas of southern Jiangsu to save the country's destiny (Yang, 2021). The new party of China also takes the political task of redistributing land fairly to farmers. It was the integration of the destinies of farmers and the country that gave birth to a new era. After the 1950s, the development of the entire countryside became the vanguard of building socialism. The "Rural People's Commune" and the "Up the Mountains and Down to the Village" movement[②] united workers, farmers, and young intellectuals to form large rural production groups by developing the collective economy, they are committed to rural agriculture, water conservancy projects, and housing construction (Figure 3). During the period of large-scale production, farmers' recognition of national policies reached the greatest degree. In the following decades, lots of communal and village industries were encouraged in southern Jiangsu. The redistribution of labor and the diversity of production methods brought about by rural industry has contributed to rapid urbanization, making this area one of the most developed regions in China, but this result has also caused population loss, resource shortages, and poor public services and infrastructure.

Under this circumstance, policies with the goal of developing the countryside were implemented, such as the construction of new socialist countryside, beautiful countryside, and characteristic idyllic countryside. Although the methods and focuses are different, the overall goal of revitalizing the rural society, economy, culture and environment together with the well-being of villagers as the core has never changed. The only main change is that in the development of specific rural society, the malpractice that restricts farmers from obtaining a happy life has been gradually shifted. Compared with the feudal period, the "farmers-based" logic also expanded the object from agricultural laborers to rural people. This also shows that whether it is a feudal society or a modern one, the people-based political tradition has always been the logical starting point for rural development.

Figure 3 The scene where the state calls on workers and peasants to build water conservancy projects. Source: Yang, H. (2021)

1.3   **Interests community: superposition of regionalized characteristics**

As Marx said, everything people strive for, is related to their own interests (Bureau, 2006). But interests and responsibilities are inseparable. In feudal society, due to the relatively closed geographical area and independent production groups, the division of interests in the countryside only occurred in the inner society around the farmland. For individuals, the basic demand is to survive. For settlements, long-term safe and stable production and living environments are required. Therefore, the division of labor and cooperation among individuals has become the only way to realize interest demands, forming a long-term interest acquisition with "men's farming and women's weaving" as the responsibility boundary. With the development of the handicraft industry, the commodity economy and five social classes appeared in the rural areas of southern Jiangsu in the Song dynasty. The upper class promoted the development of rural tourism at that time (Xing, 2011). The hierarchical social structure, on the one hand, expands the interest groups in the countryside, moving from the internal structure to the external one. On the other hand, some clans also show a localization trend to consolidate the foundation of their families (Liang, 2006).

The rural interest community in feudal society appeared within families and settlements with the goal of promoting agricultural and handicraft production. It shows a one-dimensional responsibility relationship between individuals and directional groups. The strong agricultural economy of "Suhu is ripe and the state is full"[3] in southern Jiangsu has consolidated its water town characteristics depending on geographical conditions. Therefore, a relatively single and independent regionalized social structure is formed.

The continuous expansion and reasonable division of interests are the basis for keeping cooperation among community members (Zhong, 2020). After entering the period of socialist construction in the 1950s, the scope of rural interest groups gradually expanded. Agricultural cooperatives extended interest groups to the outside of individual villages. On the one hand, the people's communes highly concentrated rural production relations and labor, and the planned economy made individual farmers highly dependent on the collective to form a common production group. On the other hand, the superposition and average use of resources within the area help disadvantaged groups to a certain extent. However, the highly centralized economic and political system hindered the organic connection among the farmers and finally went bankrupt because of farmers' resistance. Since then, the rural collective economy has begun to move towards a larger and more diverse market competition. In this context, the "South Jiangsu Model", which relies on central cities to develop rural industries through market regulation and aims at common prosperity, came into being (Chen, 2008). During this period, rural areas in southern Jiangsu began to be non-

agricultural, urbanized, and developed towards the integration of urban and rural areas. After the 21st century, with rapid urbanization, the construction of a large number of infrastructures has brought the rural and urban areas of Southern Jiangsu closer together. However, when the capacity of development factors such as regional population and resources is constant, it also causes the countryside to be swallowed up by the expanding cities (Figure 4).

In recent years, the land transfer policy has attracted a large amount of outside investments. Through the redistribution of rural land use, management and ownership rights by social capitals, the government, enterprises, rural collectives, villagers and other social forces form a super community of interest. Its essence is to promote the cohesion of social structures by the expansion of economic relations based on the form of developing rural tourism, the aim of promoting the affluence of local villagers, and local elements such as social, cultural, and agricultural economic landscapes accumulated in rural areas in the past. From this view, the new regionalized characteristic is merely a reproduction of the traditional structure through the reorganization of populations, industries and interest relations in modern society.
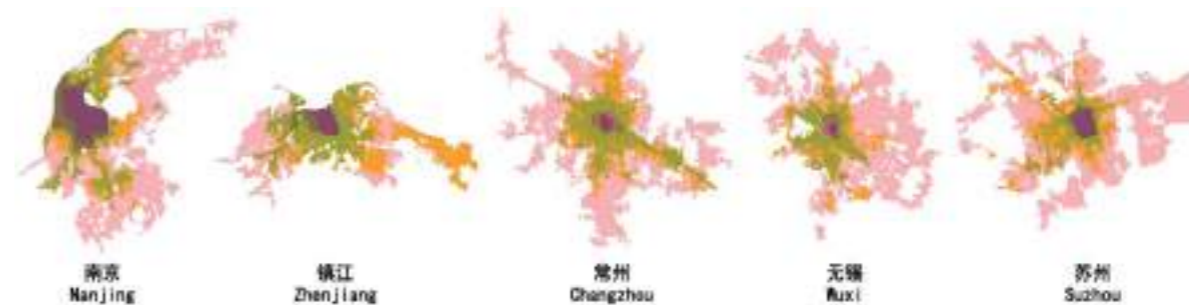
Figure 4 The superposition of urban regional expansion of southern Jiangsu since Ming dynasty (1420s). Source: Qin, L. (2019). The spatial pattern of urban areas and urban system of Yangtze River Delta in the past 600 years. GEOGRAPHICAL RESEARCH, 38, 1045-1062.

2. Conditions and characteristics of the evolving tradition

2.1 Social inclusiveness

The small peasant economy has endowed Chinese rural society with natural, autonomous and self-adaptive characteristics, which are also endogenous mechanisms of traditional rural society (Li, 2020). Historically, the countryside, as the lowest level of Chinese society, has been the "stabilizer" and "reservoir" of national prosperity and stability (He, 2018). An inclusive rural society can guarantee equal participation of individual farmers in social life, leading up to exploring the social value of local traditions in contemporary times and strengthening local identity. Its characteristics include the following:

(1) Psychological inclusion: A social ethic of fairness and justice is a prerequisite for each individual farmer to have equal opportunities for development. There is a need to care for vulnerable groups in the urbanization process and to support their active participation in public social life. Often the most distinctive handicraft techniques and historical stories of the village are known only by a small number of people, and giving these people sufficient encouragement and the right to participate in public social activities is the way to inherit the tradition.

(2) Spatial inclusion: Integrated urban and rural development, both supporting each other. It is necessary to coordinate the distribution of benefits in terms of population, economy and capital, promoting the two-directions flow of urban and rural elements, and expanding the functions of agriculture and rural areas. Urban sprawl should allow for a clear setting of rural geographical

boundaries. At the same time, small towns are used as intermediate links to regulate the unbalanced spatial expansion between cities and villages. Different positioning of the spatial attributes of suburban and remote villages is allowed, so as to maintain the rural spatial characteristics that are different from cities.

(3) Institutional Inclusion: Compared to the past, rural society is more complex and open. The rural social entities have included villagers, government, tourists, and investors. Therefore, an inclusive system that guarantees the rights and interests of all parties is established to realize the co-ownership, co-governance and sharing of rural resources. It ensures the sense of rights and interests of the participants in rural society and facilitates the innovation of traditions.

2.2 Policy flexibility

The practice has proved that the completely top-down policy in the past is no longer suitable for modern rural areas. All rural people need to negotiate with the authority their own interests, especially the local villagers. However, without top-down macro policy design and overall planning, it is not easy to achieve a healthy rural development. Top-down direction design and bottom-up interest demands need to be combined. A weak top-down policy stance on the one hand is helpful to the government's control of resources in the region. On the other hand, it can give social forces the confidence to take responsibility and obtain benefits. And even more important, the local people have gained space for self-development under the planned premise. The keys to achieving a weak top-down are local official and unofficial community organizations. In addition to government management agencies, educated youth, locals and investors should be encouraged to jointly establish unofficial rural cooperative consultative public organizations. Policy flexibility is manifested in focusing on agriculture, farmers and rural development, giving all parties the initiative to explore, select, and re-organize traditions.

2.3 Territorial form

Since ancient times, rural construction has relied on a simple view of nature without architects (Rudofsky,1964). Local people adapt and use the environment to achieve a harmonious coexistence of production and life with the local natural conditions, thus forming a territorial culture highly related to the local environment, as the saying goes: "One side of the land nurtures one side of the people". The physical elements, like climate, soil, mountains, water, farmland, and buildings, constitute territorial characteristics (Figure 5). The space, structure and form of a village settlement are not only a result of responding to nature, but also a carrier of the accumulation and adaptation process of local traditions. Therefore, it is not the static built environment, but an ongoing spatial and cultural representation that contains the interrelationship of human society and nature. Whether past, present, or future, any rural transformation exhibits the modernity that embraces tradition, especially in historic villages (Wen, 2017). The maintenance of the overall territorial structure within a specific geographic space is the basis for the rediscovery of traditional genes and their retention of vitality.
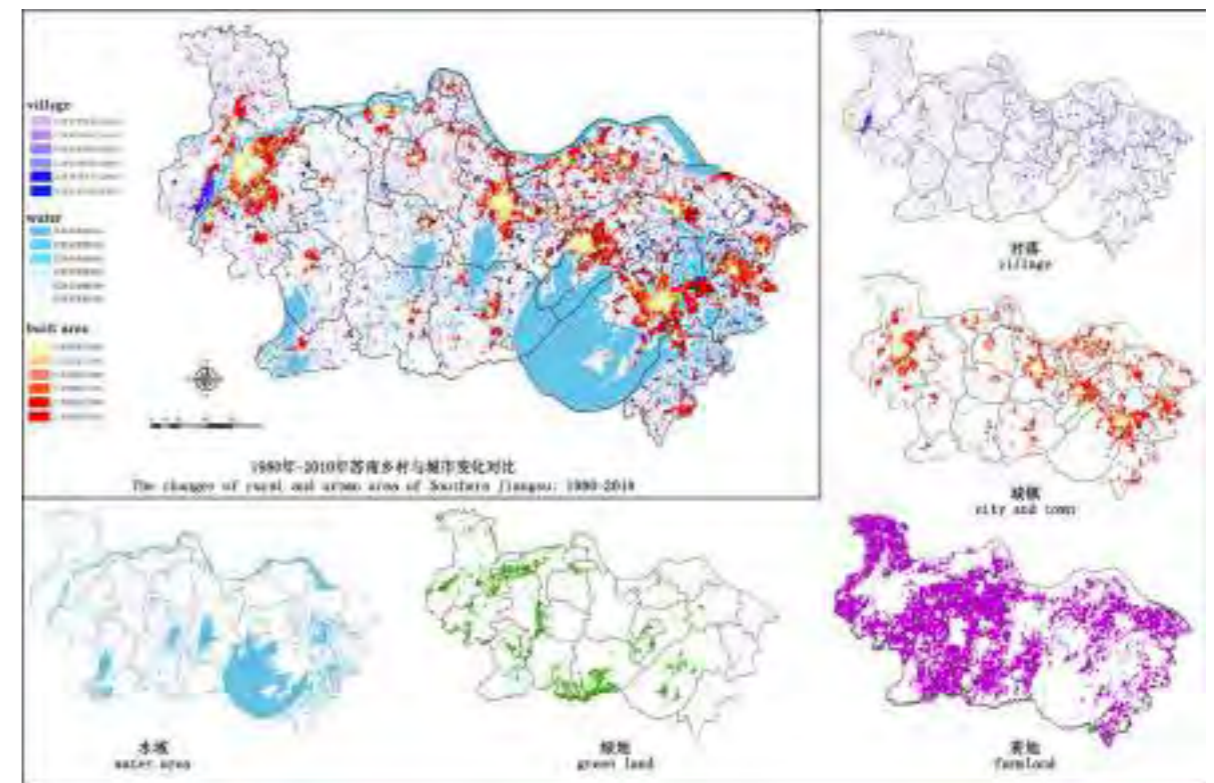
Figure 5 The territorial characteristics of southern Jiangsu. Source: by the author

3. Towards ecological community: the continuous tradition and modernity of southern Jiangsu countryside

The Marxist ecological view dialectically points out that man is a part of nature, and the prospect of man and nature must be a community relationship (Bureau, 2006). In fact, the ancient and simple overall nature view of "Unity of Heaven and Man" has always been one of the important principles of Chinese people's production and life. The ecological community itself is a Chinese philosophical tradition, especially in rural settlements. President Xi Jinping put forward the ecological view that "Lucid waters and lush mountains are invaluable assets", which creatively incorporates the natural environment into the category of sustainable productivity (Zhao and Yang, 2015). Since modern times, urbanization and industrialization have had a serious impact on the original rural environment. Contemporary rural development is actually an ecological community construction process that includes tradition and modernity. The practice in the rural areas of southern Jiangsu is a useful attempt.

Introduce the practice

(1) Comprehensive survey: In 2012, Jiangsu Province launched a systematic investigation of the rural living environment by means of interviews, drawings, statistical tables, photos, etc. 283 typical sample villages (110 in southern Jiangsu) were selected, and statistical analysis was carried out on population, environment, industry, history, land use, housing, and landscape. The survey consists of 13 research groups mainly from universities and research institutions, including architects, planners, engineers, students, government personnel, etc. Majors cover urban and rural planning, architecture and landscape design, geography, society, etc. Finally, a detailed research report is formed according to the regional characteristics and types of rural modernization. A comprehensive survey has more precisely identified the problems of rural areas and neglected cultural traditions in the process of urbanization. The findings provide a scientific basis for specific rural development interventions.

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(2) Discrimination of elements: Due to the large number and complex types, the intervention measures in Jiangsu villages have formulated the principle of "classification and adjustment according to village conditions". On the one hand, villages are divided into four types: historical villages, cultural features, natural landscapes, and modern communities. On the other hand, five elements of village development are established, people: population structure, density, class; culture: history, heritage; land: territorial environment; production: industrial situation; scenery: interactive place. The division of elements at two levels identifies the potential of rural development.

(3) Project of characteristic idyllic villages: Beginning in 2017, the Jiangsu Provincial Government proposed a plan to build characteristic idyllic villages. It emphasized the industrial characteristics, idyllic attributes and locality of the countryside. The project focused on the multiple values of contemporary villages and promoted the organic combination of idyllic production, idyllic ecology and idyllic life. Specific measures include: restoring the natural ecological relationship, developing a "land of plenty" for multi-functional agriculture, bridging the capital circulation between cities and villages, cultivating rural gentlemen in the new era, protecting cultural heritage and traditional handicrafts, and training farmers for more advanced production techniques. Meanwhile, designer studios and a comprehensive assistance system have been set up in the countryside to ensure the sustainability of the project effect. In essence, the characteristic idyllic village plan is a post-productive (Wilson, 2001) space practice that relies on nature and the built environment of the countryside, takes nostalgia as a link, moves modernity from the city to the countryside, and at the same time reproduces the traditional farming civilization.

(4) Identity and contribution to regionalization: Southern Jiangsu is located at the core of the Yangtze River Delta Economic Zone and is an important window for China in the process of globalization (Figure 6). As the hinterland of the economic zone, the characteristics of water towns, humanistic attributes and recognizable territorial forms are important manifestations of locality in the rural areas of southern Jiangsu. The reappearance of traditional farming civilization in this area has supplemented the urban group in the Yangtze River Delta with a sense of place in space and a sense of retrospect in time.

(5)

Figure 6 The location of characteristic idyllic village in the Yangtze River Delta region. Source: the author re-drew according to the "Yangtze River Delta Urban Agglomeration Development Plan"

4. Conclusion

Just like Arnold Joseph Toynbee's view of history, whether it is a modern civilization or a traditional one, they are inherited by the inertia with culture as the carrier, which is a spiral upward, and it is impossible to completely break with the past (Zhao, 2011). Changes in production tools, ways and living conditions have brought us closer to modernity, but every progress is based on the past, so it can only be said to be evolution. In that sense, modernity is a term used to measure progress and may be replaced in the future, so it is a part of the tradition.

The process of villages in southern Jiangsu shows that the essence of ecological community construction in the process of transformation, change and urbanization is the re-expression of traditional genes of the past in the modern context. To explain this process from a dialectical theoretical framework is actually to reflect on the complete separation and to seek a common contextual understanding. Its purpose is to discuss the concept and position of local modernity acquired through tradition in the process of globalization, in order to construct a sustainable paradigm of understanding.

Local construction activities in the process of modernization misunderstand historical existences and exclude them from the expectations. In our case study evolution may constitute a new paradigm for understanding the relationship between tradition and modernity, providing an epistemological reflection on orderly sustainable development. To advance towards an ecological community is an inevitable trend of local development, and maintaining vigilance against modernity is the theoretical consequence of local identity safeguard in the process.

Notes

1. Idea of co-construction of home and country: It refers to the commonalities in the organizational structure of home, settlement and country. Now it generally means that families, groups and country are connected in management, social responsibility and mutual contribution.

2. Rural People's Commune: It refers to the high-level agricultural production cooperative units established in rural areas since 1958, including workers, farmers, businessmen, students, and soldiers, and it is a rural joint organization for early socialist construction; Up the Mountains and Down to the Village: The government encouraged urban educated youth to settle and work in the countryside from 1955-1980s.

3. Suhu is ripe and the state is full: The bumper harvests in Southern Jiangsu are enough to feed the whole country in Song Dynasty.

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EXPRESSION MECHANISM AND INHERITANCE STRATEGIES OF LOCALNESS IN THE CONSTRUCTION OF RURAL SETTLEMENTS

2-B-3

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ABSTRACT:

Under the background of rapid globalization, the localness of rural areas becomes the key factor to resist the homogenization brought by globalization. Rural areas are full of characteristics because of the localness contained in rural settlements. The construction of rural settlements is an important way to express and inherit rural localness. However, the localness is neglected in the current rural construction activities, resulting in the appearance of most villages looking extremely similar. Moreover, the theoretical exploration of local expression and inheritance is not enough. Taking localness in the construction of rural settlements as research object, using the method of grounded theory, this paper selects two rural settlements in Yunnan province where minority lives to carry out a comprehensive investigation. Furthermore, this paper reveals the external embodiment, internal meaning and expression mechanism of localness based on the investigation, and then proposes some strategies and suggestions for inheriting and improving localness, including some ways to adapt to the natural environment and inherit local culture.

KEYWORDS:
localness, rural settlements, construction, nature, culture

1 INTRODUCTION

Accompanied by the process of globalization, culture in many places becomes more and more unified. Many distinctive cultures have been gradually marginalized or even disappeared. The diversity of culture faces great challenges. Faced with such challenges, some scholars begin to advocate protecting and developing local cultural characteristics (Zheng Xi, 2022; Che Zhenyv, 2021). Localness is an inherent attribute contained in local culture. To inherit and promote local culture, having a deep understanding of the localness is extremely necessary.

Rural areas are important spaces to generate and inherit local culture. Many traditional villages have become more distinctive due to the localness contained in residential and public spaces. However, at present, extensive and rapid construction activities are being carried out, which leads to many similar villages in their appearance. Many buildings in the villages seem similar. They are built with the same materials and forms, and their style is extremely incompatible with the local traditional buildings. Under this trend, the local culture characteristics are gradually fading in the rural areas.

There are some questions. How to avoid this phenomenon of culture convergence in rural construction and how to inherit local culture through rural construction activities. To answer these questions, this research takes *Lvtao* village and *Chengzi* village in Yunnan province as cases to conduct a full investigation. This research makes the following contributions. First, this research reveals the connotation and expression mechanism of localness. Second, this research proposes some feasible strategies for inheriting and promoting rural localness through rural construction. These strategies can be applied to the rural design.

This paper is organized as follows. Section one shows the rural investigation results. Section two introduces the cognition of rural localness which is gained through rural investigation. Section three analyzes the expression mechanism and proposes some strategies to inherit rural localness. The final section summarizes the main conclusion and the outlook.

2 Investigation: Lvtao villages & Chengzi village

2.1 Lvtao village

(1) Climate and landform

Lvtao village is located in Erhai basin, between Cangshan mountain and Erhai lake. A large amount of farmland is distributed around the village (Fig. 1). The area where *Lvtao* village is located is flat and rich in stone. In the past, local people usually chose stone to build their houses. It often rains in this place in summer.
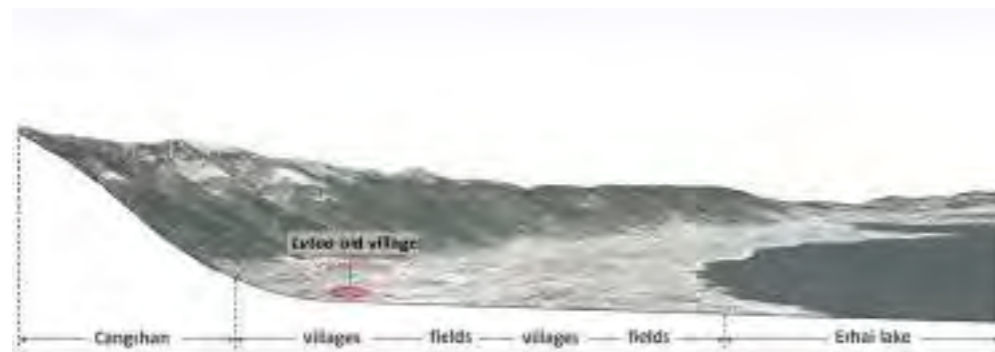
Fig. 1 Location of Lvtao village in Erhai basin.

(2) History and culture

Lvtao village has a long history. Part of the Tea-Horse Road in Dali passes through the old village. The old road and old bridge are still preserved in *Lvtao* village. In addition to its long history, *Lvtao* village also has a special nationality and religious culture. *Lvtao* village is a rural settlement inhabited by Bai nationality. The villagers of *Lvtao* village believe in the Benzhu religion. It is also the traditional religion of Bai people. Most villages in Dali where Bai people live will have their own Patron God temples, and *LVtao* village is not an exception. There is also a festival of Patron God worship in *LVtao* village. At this festival, the villagers will carry out a variety of sacrificial activities.

(3) Traditional residence

There are many traditional buildings called "Tuku houses" by local people in *LVtao* village. The Tuku houses are also one of the oldest buildings in the Erhai lake area. Tuku houses can be built easily by local people. The main materials of Tuku houses are pebbles and wood, which are available locally. Tuku buildings have sloping roofs. Its appearance gives people a sense of massiness and compactness. There are few windows on the facade of Tuku houses (Fig. 2). Different houses are combined in the form of the courtyard. The courtyards are the favorite living space of local people. Courtyards in *LVtao* village are connected through different alleys.

Fig. 2 Tuku houses in Lvtao village.

(4) Public space

The most important public spaces in *Lvtao* village are alleys and the Sifang street (Fig. 3). Different alleys in the village are connected geometrically. They form the main structure of *Lvtao* village. Sifang street, a square, is located in the middle of *Lvtao* village. It is also a place for villagers' daily breaks and chatting.

Fig. 3 Public space of Lvtao village.

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(5) Village landscape

Like other old villages in Dali, *Lvtao* village has some special landscapes. Tuku houses in *Lvtao* village can reflect the special architectural culture. The old trees, old road and old wells in the village are all the important cultural landscapes. In addition, the farmland near the village is also part of the village landscape.

2.2 *Chengzi* village

(1) Climate and landform

Fig. 4 Chengzi village.

Chengzi village is a small settlement located in the mountainous areas. It's hot in summer but cold in winter. The buildings in the village are distributed along the Feifeng mountain. There is some farmland in the small basin in front of the buildings (Fig. 4). The clay in the area where *Chengzi* village is located is suitable for building houses, so local people usually choose it to build houses.

(2) History and culture

Like *Lvtao* village, *Chengzi* village also has a long history. There are still many historical buildings, old trees and old river in the village. In the early stage, the villagers of *Chengzi* were all the Yi people. Therefore, there is not only a profound history, but also a special national culture in *Chengzi* village. Because of its long history and national culture, *Chengzi* village has become a village of Chinese traditional villages.

(3) Traditional residence

There are many traditional buildings called "Tuzhang houses" by local people in *Chengzi* village (Fig. 5). Tuzhang house is a typical living house of Yi people. It usually can be seen in these places where Yi people live together. Tuzhang houses are built with sun-dried mud bricks, which are made of clay. Clay bricks and flat roofs are the main features of Tuzhang house. Villagers usually dry grain on roofs, such as corn. Different Tuzhang houses are combined through the courtyard. Due to the special materials and forms, the Tuku houses can always provide a comfortable living space even if it is a hot summer.

(a) *Tuku houses*

(b) *Construction of Tuku house*

Fig. 5 Traditional houses in Chengzi village.

(4) Public space

Because of the special landform, there is no regular structure of public space in *Chengzi* village. Some alleys distributed in the village are important public spaces (Fig. 6). There is an old temple in the village.

Fig. 6 The alleys of Chengzi village.

(5) Village landscape

The Tuzhang houses are also a special village landscape. Villagers usually choose to preserve their grains on the roofs of Tuzhang houses during the autumn harvest. This sight becomes a special local landscape. In addition, the farmland landscape in front of the village is also an agricultural landscape (Fig. 7).

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Fig. 7 Special landscape in Chengzi village

3 Analysis and discussion based on the cases

3.1 What is the localness in rural construction?

Through the field investigation of *LvTao* village and *Chengzi* village, it is found that the space of the two villages both reflects unique features, including natural characteristics and cultural identity. In other words, the two villages can not only integrate in the surrounding environment, but also embody the features of local culture. Villages represent the characteristics of local nature and culture, so the village is local. It seems to grow from the local environment.

To expound the localness contained in rural settlements, this paper compares the two traditional villages with other villages which cannot reflect the localness. Figure 8 shows three villages from different regions but having the same appearance and features. Buildings in the villages were built up with the same materials and shapes. We can hardly decide which places they belong to, if we just focus on the appearance of them.
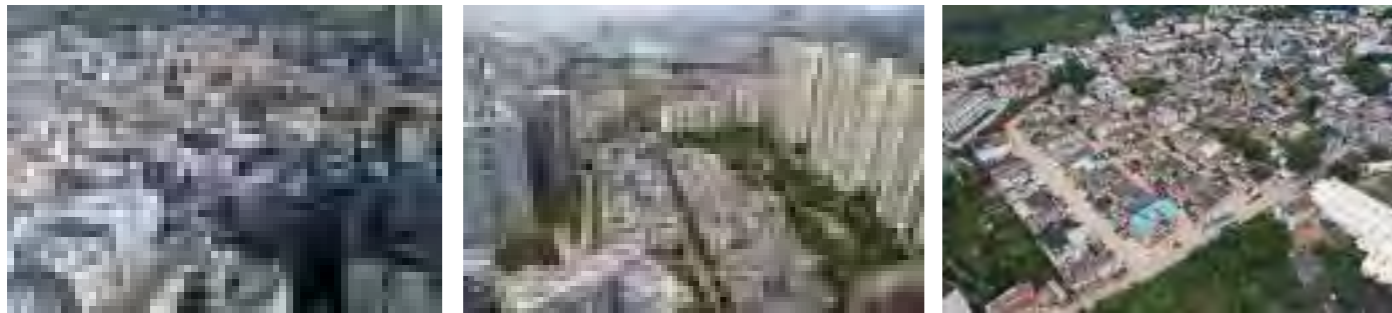
Fig. 8 Three villages in different places but have same appearance.

However, when it comes to *Lvtao* village or *Chengzi* village, we can clearly define where the village comes from, because they both can express the typical characteristics of local nature and culture. For example, when it is in Lvtao village, we can realize it is in Dali through the Tuku houses, because Tuku house is a typical dwelling in the Erhai area of Dali. Another example in *Chengzi* village, the features of Tuzhang houses are in harmony with the local environment, so it is local.

Therefore, we can draw a conclusion that the localness is a property of villages which are full of regional characteristics. Because of the localness, the village can easily integrate into the local environment. In essence, localness is an attribute of a local field environment, which is different from other places but has the characteristics of local environment. Localness is also the embodiment of local characteristics. Localness is similar to regionality, but opposite to homogeneity and unity. Fundamentally, localness in rural settlement is an expression of the relationship between village and the local environment.

3.2 Why can the rural areas appear the localness through rural construction?

To answer this question, this paper analyses the rural construction modes of *Lvtao* village and *Chengzi* village. Both of them are local and they follow the same path in the construction of settlement. The construction models of traditional dwellings, public space and landscape all reflect such logic that the villages try to adapt to the local natural environment and they are affected by the local culture at the same time. Based on this observation and summary, this paper establishes an analytical framework to analyze the expression mechanism of localness in rural settlements (Fig. 9).
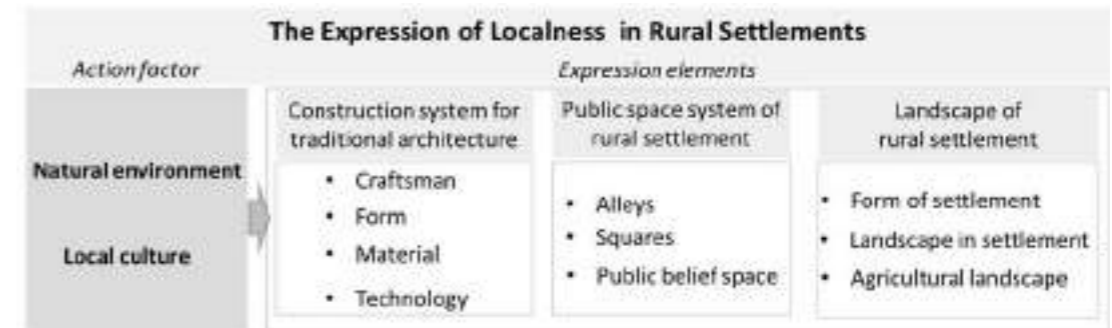
Fig. 9 Analytical framework for the expression mechanism of localness.

Actually, under the influence of both nature and culture elements, the path of rural settlement construction is also the mechanism to express localness. It can be embodied through the following aspects.

(1) Selection of local construction methods in traditional residence under the influence of natural and cultural factors

First, houses are all built by local craftsmen. The construction craftsmen of *Lvtao* village and *Chengzi* village both come from local areas. They have a good command of traditional technology and the usage of local materials. In addition, the craftsmen also understand the local culture and villagers' religious beliefs.

Second, the architectural forms adapt to the local natural environment. The sloping roofs of Tuku houses in *Lvtao* village help to drain water quickly when it rains. These spaces such as cornice space and courtyard are the typical space type in the Erhai Lake area of Dali. The flat roofs of Tuzhang houses in *Chengzi* village can provide more spaces for villagers to dry their grain. Tuzhang house is also a type of dwelling house that Yi people usually live in.

Third, choose building materials from local areas. Dali is rich in stone, so most traditional buildings in Dali were built with stone. On the contrary, there is not much stone in the area where *Chengzi* village is located, but the clay there is good building material, so the villagers used to use it to build houses.

(2) Village space construction that is influenced by local culture

Bai people living in the Erhai area of Dali believe in the local Benzhu religion. The religious belief is also reflected in the rural environment, so the Patron God temples can be seen in most villages of the Erhai area. *Lvtao* village is one of them.

To sum up, in the construction of rural settlements, localness appears when the construction activities are adapted to local natural environment and influenced by local culture. In short, the expression of localness is influenced by local nature and culture (Fig. 10).

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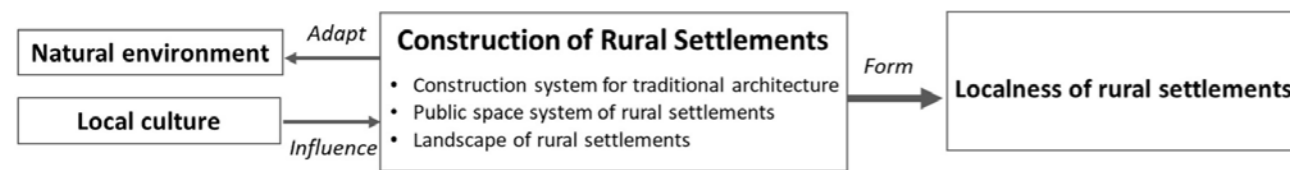
Fig. 10 The expression mechanism of localness in rural settlement construction.

3.3 How to inherit and promote localness through rural construction?

Problems that many villages are becoming more and more similar in current rural construction have emphasized the importance of inheriting and promoting localness. The most important strategy is to choose these methods that adapt to the local natural environment and also can help to inherit the local traditional culture.

First, choose the methods that adapt to the local natural environment and use the local traditional construction modes in current rural construction.

The natural environment is one of the factors that influence the formation of localness, so the rural construction methods to inherit the localness should adapt to the local natural environment first. As mentioned above, in the past rural construction, construction activities were not only affected by landform and climate conditions, but also restricted by local construction technology level and natural resources. Now, with the progress of technology and the development of society, there are no longer too many constraints of the natural environment in rural construction. However, to inherit the localness of rural areas, architects and planners should still conform to the natural environment and pay more attention to the local materials in rural construction. For example, in the current rural design, architects have more opportunities to choose some new materials, but they still need to keep those materials suitable for local areas. They even need to choose local materials as much as possible. In this way, they can create a comfortable living space and protect the traditional features of rural areas.

Second, continue the local cultural tradition and highlight characteristics of local traditional culture through settlement construction

Culture is an extremely important factor for the inheritance and promotion of localness, so we need to pay more attention to the inheritance of local culture in rural construction. Specifically, we need to inherit and develop the local architectural tradition and promote the atmosphere of cultural spaces in rural settlements. To inherit the tradition of local buildings, architects and planners could study the tradition of local buildings first, and then apply it in the following design. The characteristics of local building tradition are reflected through building materials, form, scale and the decoration on the buildings. Therefore, these buildings which are going to be built need to continue the tradition of local buildings in these key elements. In addition, cultural spaces in rural settlements are those spaces that can embody features of local culture, so the rural construction to inherit localness needs to create some cultural spaces for those local cultural activities, including religious spaces.

In a word, in current rural construction, to inherit and promote the localness in rural settlements, these are some recommended strategies such as choosing the construction modes adapting to the local natural environment and the methods to continue the local building tradition.

4 Conclusion

Choosing the localness in the construction of rural settlements as research object, this paper uses two specific cases to reveal the external embodiment, internal meaning and expression mechanism of localness, and then puts forward some strategies and suggestions for inheriting and improving localness of rural settlements in current rural construction.

In general, localness is some characteristics that rural settlements embody. These characteristics are closely related to the local natural and cultural environment. Rural settlements in different areas have different characteristics. It is the localness in rural settlements. Because of the localness, rural settlements can be better integrated into the local environment and have some local characteristics. Rural settlements like this seem to grow out of the local environment. In essence, one place is different from another place because of the localness. It is also a concept opposite to globalization and homogenization. Rural settlements with localness are also full of characteristics.

Expressing localness in rural settlements is also a process to coordinate rural settlement with the local environment in external appearance and internal characteristics. The formation and expression of localness is influenced by the local natural and cultural environment. The localness is formed in the process that rural construction behaviors adapt itself to the local topography, climatic conditions, construction materials, and it is also influenced by local culture in this process.

In current rural construction, to inherit and promote the localness of rural areas, the construction behavior not only needs to adapt itself to the local natural environment, but also needs to pay more attention to the inheritance of local culture.

5 Acknowledgments

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LIVING THE SLOPE: THE SOCIAL ROLE OF TOPOGRAPHY ON PLACE-BASED HYDROLOGICAL STRATEGIES IN THE URBAN TERRITORY OF THE VALLEY OF SELEMBAO, KINSHASA

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ABSTRACT :

Nowadays African megacities are under constant pressure of hydrogeological risks due to fast paced urbanization combined to climate change effects. This paper focuses on the description of the water geographies of a sub-watershed of the Congo River nested in the dispersal urbanization of Kinshasa, capital of the Democratic Republic of Congo, within the administrative borders of the Selembao municipality. Despite his central position, the valley is weakly connected to the public utilities and is sustained by an off-grid supply system, based on the participation of several actors through various formal and informal arrangements.

The research grounds in the hypothesis that the realization of new cartographies about water management entities and water-related spatial structures entails the integration of otherwise isolated and fragmented interventions (place-based tactics) and governance levels (both ancestral -chef coutumiers- and relatively recent -municipal or district authorities).

Following a three-month period of exploration on-site, the paper firstly focuses on the description of the existing rain water draining and the spatial dimensions of its infrastructure. Through the recognition of the three main spatial elements (the plot, the road and the collector) a brief description of this multiscale system is presented in this paper, showing the multiplicity of stakeholders involved in co-producing this public service. Referring to the notion of hydrosocial territory, this paper constitutes a starting point for a new narrative of the socio-spatial dynamics of this territory, starting from the water perspective.

KEY WORDS:

Water management, hydrosocial, co-production, informality, DRCongo

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The academic literature agrees on the fact that these pressures are forcing megacities and metropolises to deal with increasing water challenges: water scarcity and water related risks such as flooding or soil erosion due to the removal of vegetation and run off of rain water (Pavlova, 2020, Davies, 2015, Van den Brandeler et al., 2019). Moreover, further pressures on the already stressed urban water management systems will be added by the effects of climate change (Davies, 2015). Even if the literature about Integrated Water Resources Management (IWRM) and sustainable water management in megacities (Integrated Water Urban Management) is a flourishing domain (Pavlova, 2020), a lack of consideration of the river basin scale is still present while addressing urban water management systems (Van den Brandeler et al., 2019).

Kinshasa, the capital of the Democratic Republic of Congo, is one of the three major megacities in Africa and the one with the highest population growth rate according to a report of the World Bank. Numbers show that, due to urban pressure, the capital of DRC will expand his surface of 50%, increasing even more the environmental risks due to an unplanned settlement of his territory (World Bank, 2018) and the increasing of the annual rainfall rate in Kinshasa (Mufwaya, C. K. and S. Muchuru, 2016).
The actual form of Kinshasa widely depends from the particular topography of its born site, from colonial-oriented planning, and from the intertwining between these two factors. Until 1960, year of the independence, the city grew and filled the whole alluvial plain along the Congo river, pursuing a colonial segregationist scheme and adopting a demographic political control in order to manage and regulate the city size that counted 500.000 inhabitants at that time (Flouriot et al., 1975). After DRC's independence in 1960, Kinshasa witnessed an exponential growth: in forty-five years, the population reached 12 million in 2005 (Kayembe Wa Kayembe et al., 2009). The urban production process was not followed by any infrastructural upgrade. New unequipped neighborhoods have been settled in flood-prone areas, where water drainage is a challenge, or on the fragile sandy hills surrounding the plain, thus increasing the risk of erosion and severity of flooding (Kayembe Wa Kayembe et al., 2016; Lelo Nzusi, 2008; Flouriot et al., 1975). **(Fig. 1)**
Water security is an ordinary struggle for the kinois (inhabitant of Kinshasa) under multiples aspects. Firstly, the accessibility to the potable water is largely insufficient to satisfy the demand of the population. Secondly, the lack or insufficiency of the drainage system increases the risks of erosion and flooding. Thirdly, the inexistence of a sewage system for above the 80% of the population is a real threat for the quality of water of rivers and aquifers (Wateraid, 2015).
In order to tackle the great challenges of water urban management, a consistent support -in terms of economic and technical support- has been provided by the main technical and financial partners[1] to the Congolese administration. The potential effectiveness of this support is however frustrated by the lack of coordination, of interventions' synchronization and a lack of communication between the different stakeholders concerned (AWF, 2015). Thus, the figure of the major intervention at the city scale is still a fragmented one, reflecting the fragmentation of the institutional frame around the water and sanitation issues.

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1   such as Banque Africaine du Dévelopement, World Bank, Agence Française du Développement , Coopération Technique Belge , Japan International Cooperation Agency, Eurpean Union , African Water Facilities, …

The valley of Bumbu stream-case study

The geological constraints and challenges for an urban sustainable development in Kinshasa have been explored and documented in recent past, leading to the recognition of three main geomorphologic elements through which the flood local regime can be analyzed: "the Congo River, the tributary streams, and sloping planes. The first two are affected by more than one watershed that has regional scale. The third is governed mainly by local conditions and individual subwatersheds" (Lateef et al., 2010, p. 15).
Starting from this threefold territorial scheme, the research recognizes the primordial importance of river basin related issues in dealing with hydrogeological threats of this territory. It aims to deepen the exploration of an individual sub-watershed, nested in the dispersal urbanization of Kinshasa, within the administrative borders of the Selembao municipality **(Fig. 2)**.
The Bumbu stream is one of the tributaries streams of the Congo River traversing the Kinshasa megacity. As the cartographie of the previous pages shows **(Fig.1)**, it flows in one of the valleys surrounding the plain, were informal settlements set up between Independence (1960) and 1990 (D'Ascenzo, 2013). Since then, those valleys constantly suffered from issues that have been exacerbated by densification (Kayembe Wa Kayembe et al., 2016): their inhabitants are perpetually confronted by daily struggles to gain access to face water related threats such as: surface run off due to soil deforestation, flooding phenomena in the rainy season and shortage of potable water during the dry one, or lack of sewage system and degradation of water resources (Mutombo, 2014) **(Fig. 3)**.
The scientific literature agrees in individuating the cause of the hydrogeologic risks of Kinshasa in the particular relation between the fragile nature of the soil (Lateef et al., 2010 ; Van Caillie, 1990) and the negative impacts of urban sprawl on it (Kayembe Wa Kayembe et al., 2016; Lelo Nzusi, 2008). But, even if from the geoscientific point of view the problematic has already been well described, a spatial analysis of the fragmentation of water management practices is still missing.
This paper, using the existing geoscientific literature as starting point, intends to go beyond the mere physical implications of water insecurity, describing this territory "*as spatial configuration of people, institutions, water flows, hydraulic technology and the biophysical environment that revolve around the control of water",* along with the definition of hydrosocial territory given by Boelens (Boelens et al., 2016), and in contrast with a mere bio-physic approach of the matter of water management. The aim is to avoid a technocratic approach to the problematic as well as to avoid the proposition of some forms of good governance capable of tackle once for all the water insecurity problems. Instead, the approach will consist in reading the hydraulic grid as a structuring (or revelatory) figure for some specific forms of social organization around water management. The description of a specific river-basin nested in the urban area of Kinshasa, will try to highlight the societal responses and conflicts embedded in a situation of manifold water insecurity: to reveal the project embedded in this territory (Secchi, 1992; Corboz, 1983).
The draining machine.
The main structure of the draining machine is the residual system of open-air canalizations built in the late in the late 80s (Kayembe wa Kayembe, 2020). The system has some clear logics: drain as fast as possible the rain water from the top of the hills to the bottom of the valley, preserving the rich neighborhoods and the main roads from the high risks of erosion due to the fragile nature of the soil. The Bumbu river, as the other tributaries, are conceived as the natural spillway of the entire system thanks to the presence of collectors crossing the slopes without serving them (Katalayi Mutombo, 2014; Lelo Nzusi, 2008). This logic well reflects the segregation dynamics driving the settlement on the south-extension of Kinshasa: the drained areas are coincident with the high standing neighborhoods built between 1968 and 1975 (Kayembe wa Kayembe, 2020), while the poorest neighborhoods built spontaneously on the steep slopes are not considered by these interventions (Kayembe wa Kayembe et al., 2016). From a top-down point of view we can read the elements of

this machine (*open air canalizations, collectors, river*), but a zoom into this wide mesh is necessary to individuate the ordinary strategies of people living the slope trying to thicken its net **(Fig. 4)**.

We can then divide the system in two distinct parts: a structured and fixed part mainly installed by the public actors, and a soft part mainly maintained by the inhabitants of the valley trying to fix the holes leftover by the structured (but exclusivist) draining machine.

On this early stage of my research the paper exposes the collect of on-field qualitative data that will help to individuate, spatialize and contextualize the strategies people implement in an ordinary basis in order to fill the gap between the draining machine and the sloping sandy soil they are living on **(Fig. 5)**. Three spatial elements will be briefly described (the plot, the road, the collector) to describe three different scales of action and the shifting boundaries between public and private intervention.

<u>The slope & the plot</u>

The smallest unit of water management in the territory of the valley is the familiar plot. Different strategies are ordinary implemented by the inhabitants of the valley to respond to water related issues at the parcel scale such as recycling, retain and infiltrate. These strategies are not homogeneously spread on the territory, but rather defined by the position of the plot in relation with the slope and the main draining system. A gradient is observable descending the slope: if in the neighborhoods on top rain water is mostly evacuated as fast as possible, the plots on the slope are nearly always equipped with storage, retention and infiltration elements transforming the menacing rain water into a useful resource. The need for retaining and infiltrating water is evidently encouraged by the perception of erosion and landslides risks, which are omnipresent, and is often regulated by the "chef de quartier": the municipal authority installed in the neighborhood monitoring the deployment of retention and infiltration wells. Instead, the storage practice, is implemented autonomously by each plot in response to another menace afflicting the municipality of Selembao: the lack or shortages of the potable water supply. This strategy is employed with different degrees of efficiency: from the use of small buckets filled with rooftop rain water until the construction of reservoirs (from 10 to 30 cube meters) able to satisfy the potable water need of a family or of a small community[2] during the rainy season.

The effectiveness of these strategies, especially retention and infiltration, is nevertheless to be verified. In fact, from the on-field research, numerous conflicts emerge between neighbors due to the spillover of one plot onto another. Dimensioning, efficiency and sustainability of these devices might be worthwhile a more specific hydrologic study.

<u>The slope & the road</u>

To live in the valley means to live in constant tension between the ridge road, the main connection with the city and the axe where the markets are situated, and the bottom of the valley dominated by the river Bumbu and by agriculture (where the proximity to sources and surface water grants the access to this resource). The roads cutting the slope perpendicularly are the crystallization of this tension: the public space connecting these two layers. However, during rain events, due to the lack of water management devices, these linking roads collecting the spillovers of the neighboring plots are transformed in veritable drainage devices, continuously eroding the sandy soil and causing landslides. The cartography **(fig. 4)** shows quite clearly the relation between these elements (in blue) and the erosions phenomena (in red): these roads are incrementing the distance between the bottom of the valley with the ridge-roads, rather than connecting them.

But, even if the problematic and its repercussions on the flooding events in the valley floor are well known, the public intervention of the O.V.D. (*Office des Voiries et Drainage*) is limited to landslides <u>events menaci</u>ng a main road on the ridge or a high standing neighborhood (Kayembe wa Kayembe,

2   The notion of community is here circumscribed to any group of people sharing the same menacing entity, for example: all the people living in a zone subjected to shortage of potable water, or all the people living on the road causing erosion.

2020). This lack of public interventions, let emerge some collective practices of protection, preservation and maintenance. In fact, during the on-field explorations, we noticed numerous spontaneous clustering of people around the roads´ water management. The observed practices include the sharing of the expenses for the attenuation of the erosion heads or the direct implementation of safeguarding interventions, such as the limitation of the traffic on some roads in order to prevent any eroding event that could endanger the community.

<u>The slope & the collector</u>

The collector is the main public infrastructure serving the draining machine and materializing its selective logics of intervention. It serves the uphill draining network, but once crossing the slope its capillarity is suddenly reduced to zero and its only objective is to reach the valley floor as soon as possible. But the observation of its functioning during the rainy events showed that his capillarity is perpetually implemented by the inhabitants of the slopes: the collector has become a living infrastructure, capable of attract some sort of habiting practices dealing with his presence.

In fact, through the slope the ramification of the collector is implemented by the individual initiatives of the inhabitants trying to get the chance to be served from this infrastructure: secondary drainage systems and dikes redirecting overflows are enlarging the area served by this infrastructure (picture). But the cohabitation with such an instable territorial device demands also some ordinary maintenance implementations: in fact, during some special intense events, the collector is subject to overflowing, strongly menacing its own integrity and the integrity of the neighboring plots. What is interesting to observe is that the constant situation of instability of this device is taken over by the inhabitants themselves: this dynamic of substitution of public maintenance service is constantly blurring the boundaries between public and private intervention on public space and infrastructure.

Towards the description of an hydrosocial territory

The observations briefly exposed in the previous paragraphs, using the drainage water service as entrance point, try to materialize a constant tension between public action and off-grid intervention in the river basin of Bumbu river. The notion of coproduction (Ostrom, 1996) seems to become more and more relevant in the matter of water drainage system, as well as in the access to potable water supply (Bédécarrats, 2019). The emergence of spontaneous groups for the preservation and maintenance of roads for example are the reflex of the emergence of "a consciousness of self-worth among these residents who become aware of their own central contribution to progressive social change" (Mitlin, 2008, p. 358). In the failure state context that Congolese urban worlds represent (Trefon, 2008, De Boeck & Baloji, 2016), more and more attention have to be given to the way the access to basic needs is granted or improved by individual or communitarian interventions off-grid: the observation gathered in this paper have to be completed and compared with the other water systems related to it: potable water supply for instance. The brief description of the three elements (plot, road, collector), expanding the sphere of action of the public draining machine, tries to let emerge the spatial and the operational patterns of new forms of governance around the water manage system. Every practice or system of practice represent a different form of governance that is worthwhile a deeper observation and description in order to spatialize and to let emerge the complex hydrosocial territory structuring the urban life in the valley.

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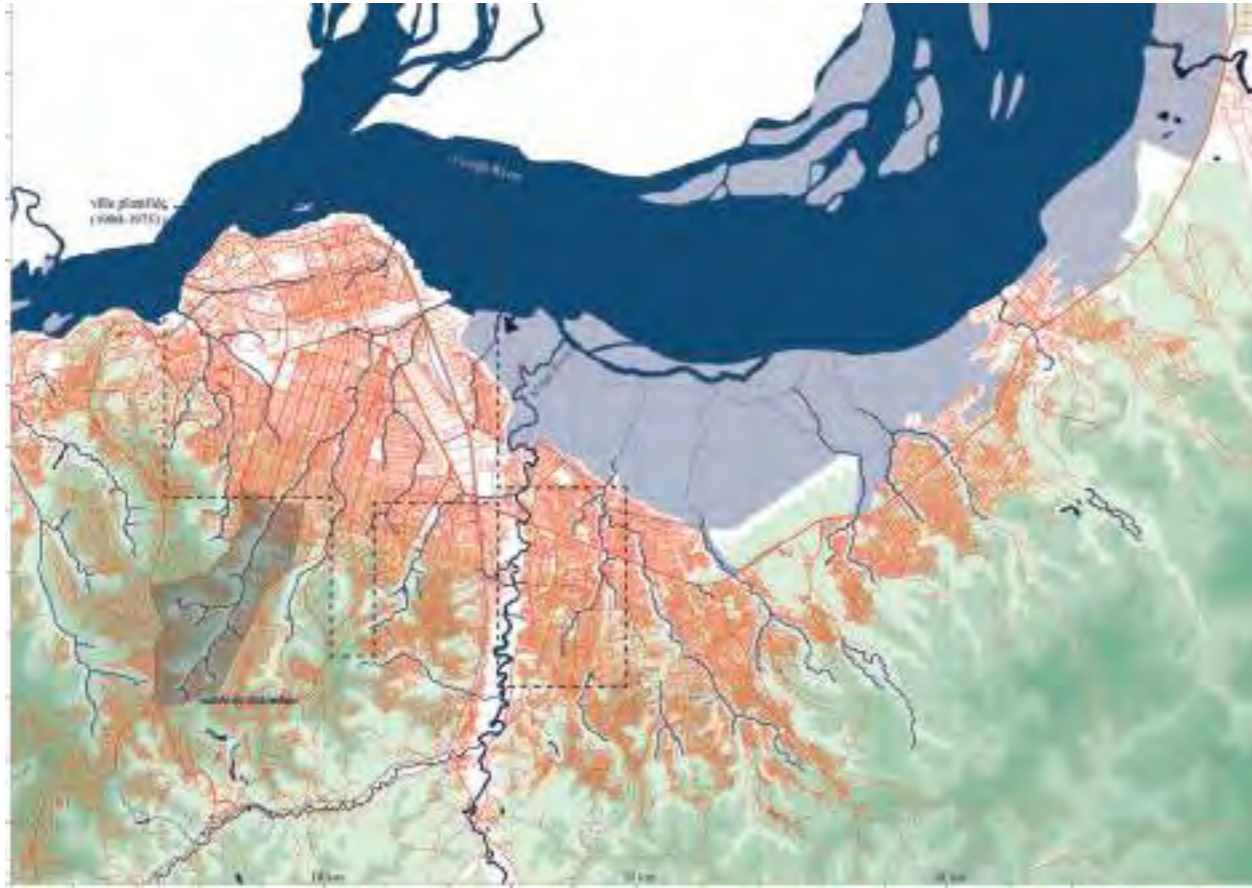
Figure 1: Road pattern of Kinshasa in relation to terrain relief and the main hydrographic network, with the Selembao municipality shaded (map by Eneko Abriesqueta, Iris Ramas, Luana Rivière and Géry Leloutre; Faculty of Architecture, ULB—optional course ADP—2015–2016; graphic layout by Pietro Manaresi)
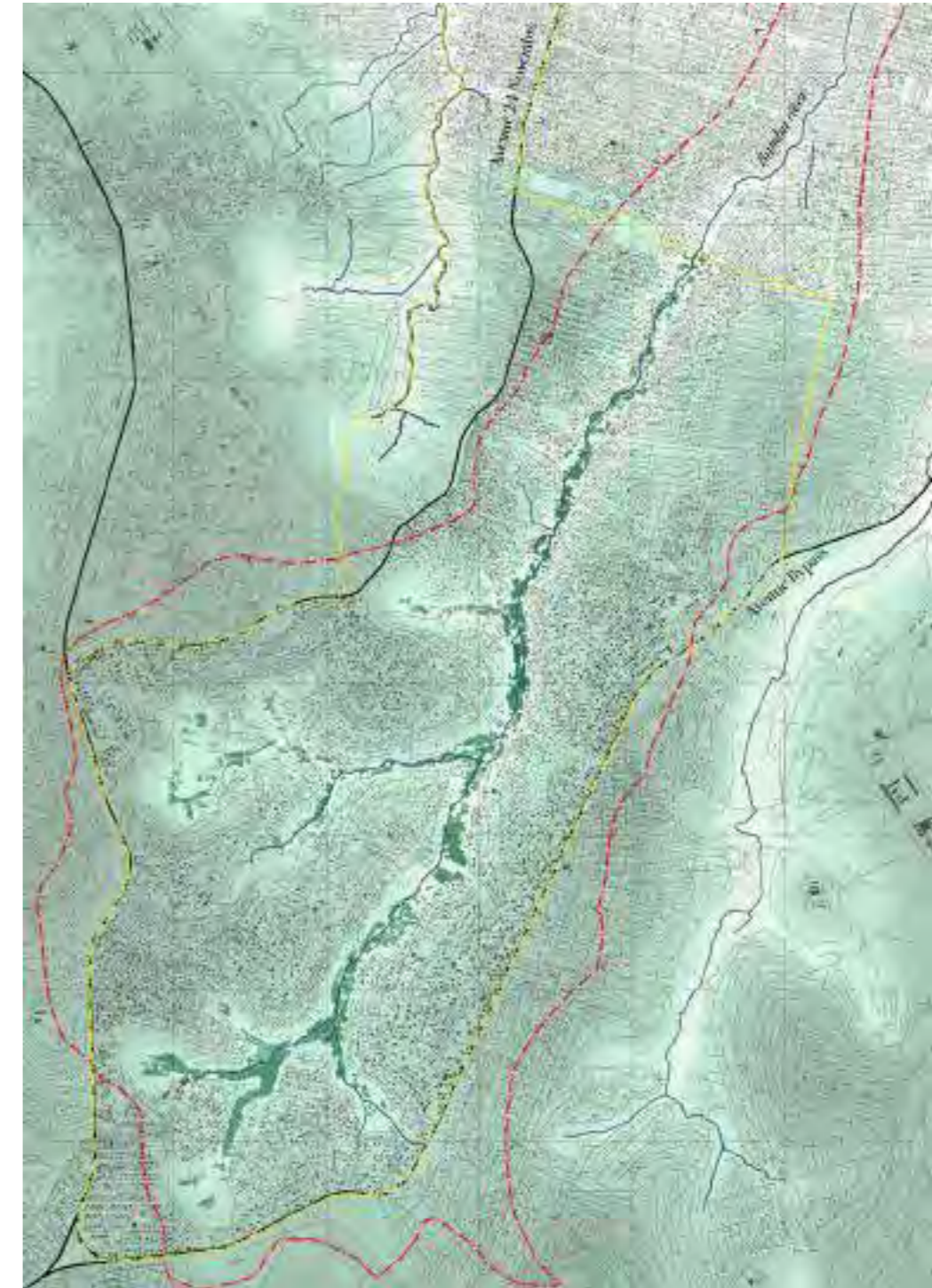
Figure 2: Map of Selembao, depicting the cultivated fields on the bottom of the valley and the main roads on the ridges. The administrative borders of the Selembao municipality are highlighted in yellow, while the borders of the Bumbu river basin are in red. Map by Pietro Manaresi

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Fig. 3: General view of Selembao's urban landscape, 2022. Photo by Pietro Manaresi
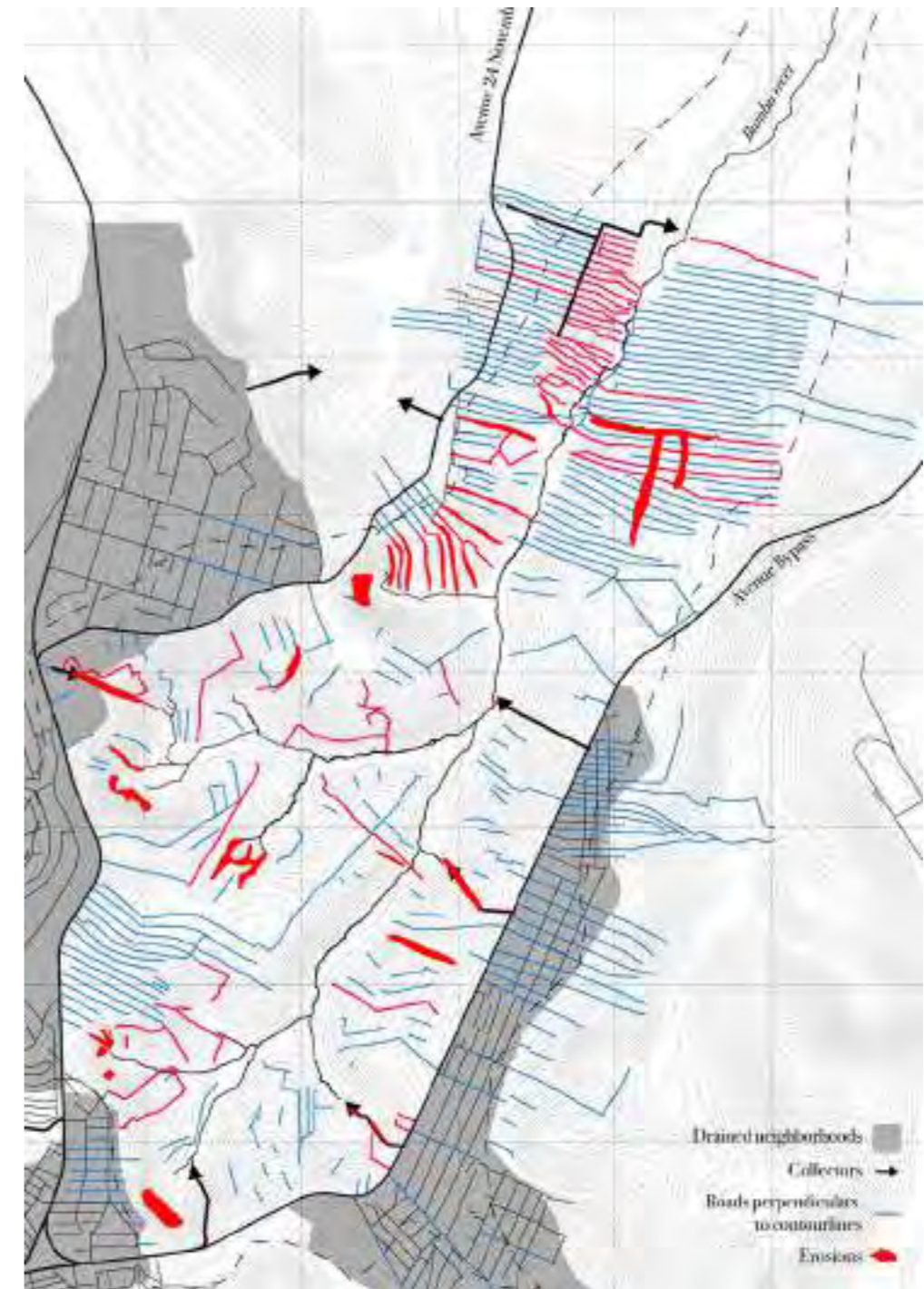
Figure 4: Map of the draining machine and the erosion phenomena. Map by Pietro Manaresi

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Figure 5: "Living the slope": a view of the distribution of plots through the slope,
in the valley of Bumbu river, 2022. Photo by Pietro Manaresi

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THE GREEN CITY BY AGRICULTURE AN ECOLOGICAL PARADIGM FACING CLIMATE CHANGE

2-B-5

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ABSTRACT

The consuming, sterile and unsustainable city cannot be a habitable space. The factors that contribute to the vulnerability of this spatial entity are such as pollution, degradation of air quality, uncontrolled and anarchic urbanisation, heat islands, climate change, and poor management of resources, green spaces and natural areas. Agriculture is a new component whose presence in an urban context emanates from a collective awareness of rethinking the city. A resilient, fertile, green city and a pleasant living environment for society. Indeed, urban agriculture, this ecological paradigm, is becoming one of the solutions among others that contribute to the adaptation to climate change and to the creation of cool islands. Research has been carried out in the laboratories of higher institutes since 2000, voluntary projects in hanging gardens in agriculture have been carried out in the north of the country and public gardens have been transformed into shared gardens in the city of Erriadh in the governorate of Sousse. These gardens are the most neglected and degraded in Tunisia's urban and suburban neighbourhoods. For this reason, the inhabitants of these neighbourhoods have sought solutions with their own means, without any regulatory framework, and they have appropriated these public gardens and converted them into agricultural gardens. Through this article, we try to show the importance of urban agriculture as a tool for city management and also its primary role in adapting to climate change. The example of the Erriadh city is a concrete case like others that show the close relationship between the city and agriculture even if the two concepts present at times relations of interdependence and conflict.

KEYWORDS:

urban agriculture, ecological paradigm, climate change, adaptation, resilient city.

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INTRODUCTION

Agriculture is a new component whose presence in an urban context stems from a collective awareness of rethinking the city. A resilient, fertile, green city and a pleasant living environment for society. With a growing demand for a functional living environment of high environmental quality, the urban space appears to be one of the major challenges in terms of nature space. In this space, there are other spatial occupations than the urban (buildings, services, infrastructure etc.) which represent the image of a developed and green city. Green here can be materialised by landscaped green areas, natural areas and agricultural areas. Agriculture in this context can also become a producer of other values, nature and landscape goods and dedicated to other social uses such as recreational uses. In contrast to this image, there is the consuming, sterile and unsustainable city, which cannot be a habitable space. The factors that contribute to the vulnerability of this spatial entity are such as pollution, degradation of air quality, uncontrolled and anarchic urbanisation, heat islands, climate change, poor management of resources, green spaces and natural areas. In order to improve the image of the green city and to remedy the problems of vulnerability, researchers, scientists, public and private actors, NGOs and civil society are aware of the need to rethink urban planning and development according to society's needs for a more resilient living environment and environmental quality that meets the objectives of sustainable development. Indeed, agriculture can be an opportunity to ensure the sustainability of cities. In this context, we are led to define the conditions for the contribution of agriculture to the development of cities, in compliance with the requirements of sustainable development. Research has been carried out in the laboratories of higher institutes since 2000, voluntary projects in hanging gardens in agriculture have been carried out in the north of the country and public gardens have been transformed into shared gardens in the Erriadh city in the governorate of Sousse. The latter are the most neglected and degraded in Tunisia's urban and peri-urban neighbourhoods. The example of the Erriadh housing estate is a concrete case like others that show the close relationship between the city and agriculture, even if the two concepts sometimes present relations of interdependence and conflict.

I.   Materials and Methods

This article seeks to show the role of agriculture in an urban context in the face of climate change. How can it participate in the sustainable management of cities? and how can it be considered as a tool for the development of the city according to new logics? in order to understand the processes of transformation, functioning and adaptation of the new city with a "horticultural component", given that the understanding of the new reality of a space implies rethinking the analysis of the dynamics of the evolution of this space (Soulard, 2005). In order to answer these questions, the method used is based on a diachronic analysis of the evolution and transformation of the urban space of the Erriadh City. An analysis of the results of surveys that were conducted as part of a professional master's thesis subtitled "Urban agriculture a new opportunity for the future of public gardens in the city Erriadh Sousse", allows us to know the logic of operation of this spatial entity and to understand the needs of society in terms of production of urban landscape in agriculture. The guiding idea behind this study is the regeneration of the city through agriculture in the face of climate change. Agriculture here has several functions, we seek to identify its functions and to evaluate its conditions of sustainability and to draw a strategic orientation for the sustainability of this new component of an urban context like that of the Erriadh city.

II.   Results

1. THE ECOLOGICAL PARADIGM OF URBAN AGRICULTURE

Agriculture is often considered by urbanites and environmentalists as a source of pollution because of the chemical fertilisers and pesticides it uses, but also as a source of bad odours due to livestock farming. However, agriculture helps to recycle organic waste from the city and to protect sloping soils from erosion. Moreover, agricultural production near urban markets reduces transport and related pollution. Amédée Mollard specifies that "agriculture, by producing agricultural and food goods, also produces positive and negative "environmental services", both market and non-market, which the broad notion of multifunctionality attempts to capture, for example. These are functions that cannot be separated from agricultural production and that have existed for a long time, but which have not always been taken into account by private or public actors" (Mollard et al., 2002). (Mollard et al, 2002). These functions have not been brought to the forefront, their situation was marginal, given the essential preoccupation of public policies to produce more. This model of intensive production, combining the modernisation of techniques and the restructuring of farms and rural areas, is at the origin of negative impacts on the environment and quality of life. For this reason, researchers (agronomists and economists) want to find a solution that rectifies the negative relationship between agriculture and the environment through methods of productive combinations, based on the following concepts: externality and public goods. Indeed, the environmental services created by agriculture do not yet have a legal framework in the market because their situation is closely linked to market failures that are combined with the existence of externalities and public goods. Externalities represent a variation in material and immaterial welfare, related to the environmental impacts of production. In the case of agriculture, these externalities can be positive (amenities, landscape) or negative (water or soil pollution). For agriculture to be ecologically sustainable, it must participate in programmes to conserve and safeguard natural resources. Paule Moustier states that: "Sustainability in the ecological sense refers to the preservation of basic natural resources used by the farm or affected by agricultural resources. (Moustier and Fall, 2004). Under the above conditions, the best solution is for agriculture to be organic, i.e. not using synthetic inputs. But when this activity is urban, can it be organic? The answer is that "in an urban environment, in a context of strong pressure on natural resources, the question of the sustainability of agriculture is crucial" (Moustier and Fall, 2004). It is in fact a threatened and threatening form of agriculture, threatened by urbanisation as well as by the new practices of society, and threatened by environmental pollution. However, this activity is not the only one responsible for pollution. Luc Guyau specifies in his book "Le défi paysan" that agriculture is not the only source of pollution in an urban environment, there is also industry, domestic uses, cities [...]. This is why it is necessary to "anticipate, upstream of production, economically encourage the least polluting behaviours, invest in waste recycling. The fight for a better environment necessarily involves less polluting agriculture" (Guyau, 2000). (This idea is well supported in the National Plan for Adaptation to Climate Change (PNACC), "the transition to agro-ecology and a more resilient bio-economy will be facilitated by anticipating changes rather than suffering crises" (CERAMA, 2021).

According to Marielle Dubbeling, "Urbanisation and climate change are closely linked: home to more than 50% of the world's population and nearly 70% by 2050 (UNFPA, 2018), urban areas consume up to 80% of the energy produced in the world and are responsible for more than 70% of energy-related greenhouse gas (GHG) emissions". (Duddeling et al, 2018).

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The city as a source of pollution generating, problems and negative effects of climate change and natural disasters, can also be the support of a resilient agriculture "that is resilient to disruptions without jeopardising food security,...can adapt to changing circumstances" (Cary et al, 2016) capable of reducing vulnerability risks.

Intra- and peri-urban agriculture is now a necessity for the survival of small, medium and even mega cities. For more than a decade - according to the latest available estimate - there have been about 800 million urban farmers worldwide, 200 million of whom are engaged in market production and 150 million of whom are doing so full-time. These urban farmers produce about 15% of the world's food. Martine Padilla (2004) reports that between ¼ and 1/3 of the food in Mediterranean cities comes from urban agriculture in 2003 compared to 1/5 to 1/7 in 1990. The agricultural space in an urban context is however under pressure from several constraints that are not in favour of its sustainability. Finding solutions for this spatial entity emanates from various decision scales. Comparisons between the perceptions of the roles of urban agriculture and the actions taken for its possible maintenance in industrialised and developing countries in terms of management, protection and development of peri-urban agricultural territories, can be rich in lessons for us.

In many African cities, agriculture is the expression of an economic malaise (unemployment, under-employment, poverty) that has led part of the urban population to invent new solutions to ensure an income. (SCHILTER, 1991). In Senegal, farmers in Dakar produce 60% of the vegetables and 65% of the poultry consumed in the country. In Cameroon, urban agriculture is gaining momentum (Cour, 2004). It can be found in different parts of the city: in gardens or courtyards, on public land or on open land. The quality of these plots is determined by the fertility of the soil, by the presence of water in the lowlands or of organic fertilisers, particularly those derived from household waste. If there is no land available, due to high population density, agriculture finds innovative ways to integrate in some way into the urban space. This is the case with gardens on the roofs of buildings, on balconies, or in containers or green walls. (Hammami, 2010) And in all the forms of innovative agriculture that the RUAF calls "low space, no space".

2. URBAN AGRICULTURE IN THE ERRIADH CITY

2.1. The urban setting

The delegation of Sousse Erriadh belongs to the governorate of Sousse, located precisely at the western end of the city of Sousse where the communal perimeter is its border. It was created in September 2, 1985, it covers approximately 330 ha of surface, it contains five districts (Erriadh1, 2 and 2 Bis, 3, 4, 5, Bis) of various social categories.

The development of the Erriadh district was carried out in five stages. Work on the first section began in the early 1980s, the second section was developed along the RN12, the third and fourth sections along the RL820. Each section covers about 50 ha of total area, the last section extends over more than 100 ha along the western limit of the communal perimeter. The Cité Erriadh was originally a spontaneous housing district, welcoming migrants from all the country's governorates. It was subsequently developed and integrated as a resettlement area in the cities of Sousse.

Google Earth satellite image of the Erriadh City

Map of the administrative division of the city of Sousse

The Erriadh district was created in September 2, 1985, originally an agricultural zone for residential use. Since the 90s the city affected by the urban push of the city of Sousse and it becomes among the new districts of the governorate of Sousse with the zone of Sahloul, Sousse Sidi Abd Hamid...

The urban development it is accentuated until the year 2000, in continuation the State had taken care to develop and arranged various green spaces to live and integrate nature in the zone. However, today these green spaces have become areas suitable for gardening and agriculture. The urban sprawl remains in continuous growth until today we find collective housing, individual housing and public facilities (Amamou, 2019).

According to social studies, this delegation is distinguished by a social category of different age groups (children, youth, elderly), which makes it a more lively and dynamic neighbourhood.

We distinguish a social category of different levels: We find cultivated as well as non-cultivated owners and low and middle-income owners. This social imbalance causes a discontinuity between the populations of the neighbourhood so that integration between them becomes increasingly difficult. As a result, the social mindset is not yet aware of the importance of improving the quality of the green space and consequently the environmental quality and they are not used to having an urban landscape.

2.2. Agriculture in the city

The neighborhood has specific social practices of agricultural gardening, with plants planted near the houses at the level of the facades and with continuous maintenance.

This neighborhood has a very large number of green spaces, but with a small surface area of no more than 6,500 m². These spaces are characterized by considerable appropriation by highly motivated inhabitants seeking to green up poorly maintained public gardens.

After an urban analysis of the city, studies and preliminary surveys on the morphology of the Erriadh city, with its organized popular districts with a significant number of green spaces distributed

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in the majority in the two districts Erriadh 2 and 2 bis and Erriadh 1. These spaces are strongly appropriated by the inhabitants through the practice of gardening and agricultural activity. This is a recent phenomenon in the region of Sousse and even in the whole country, especially in terms of the transformation of public gardens into gardens reminiscent of those of shared gardens in Europe.

Gardening in front of houses (Amamou, 2019)

The images above show that the inhabitants of the Erriadh housing estate are practicing gardening in their own way on very traditional supports. One finds various recycled products such as baths, plastic cans, bottles, etc. used as planters. The phenomenon is more pronounced in public gardens. (Amamou, 2019). The privatization of public gardens by the inhabitants of the Erriadh housing estate becomes a double impact. The first impact is positive because of the agricultural practice by the inhabitants that the space becomes alive. The second is negative because of the illegal and non-legal privatization and the creation of aesthetically unpleasant spaces. The non-organizational aspect gives the city an image of the uncontrollable.

The privatization of public gardens by the inhabitants of the city (Amamou, 2019)

In 2011, and after the revolution the Tunisian state is living in chaos and insecurity, the city Erriadh experienced an unorganized exploitation by the inhabitants and on all at the level of public gardens. These spaces are becoming havens for vandalism and delinquency, in addition to other reasons linked to the poor management and non-interference of the municipality. As a result, the inhabitants of the neighbourhoods have taken the initiative to protect these spaces, such as by practising agriculture in the public gardens through the planting of fruit and ornamental trees, in order to satisfy firstly their immaterial needs for a favourable, healthy and pleasant living environment, and secondly to satisfy their material needs for fresh and local produce.

During these years the inhabitants have managed to protect their space against pollution and acts of violence and marginalisation, but with their own means, without experience or training in gardening, which has resulted in disordered, poorly organised and badly exploited public spaces.

2.3. The principles of public agricultural gardens: towards a green infrastructure

The municipality of Sousse must work through participatory approaches with the inhabitants for sharing based on the reinforcement of the capacities and know-how of the citizens in the political decision making, and the participation with the associations and the inhabitants for a pleasant living environment and according to the needs of the inhabitants.

The creation of allotments, shared gardens, family gardens, forest gardens, gardens by all and for all. Orienting future urban planning and development strategies towards urban agricultural landscapes and permaculture in order to meet the objectives of sustainable development and address the vulnerability of cities caused by global change. Through this research we propose some orientations based on the four axes or principles for the small-scale Erriadh city, and which can be avenues of reflection for other popular districts in Tunisia.

a. **Environmental principle**

The environmental principle offers numerous services for the nature of the project environment: on the one hand they have a role in regulating the climate, improving air quality, improving soil quality, fighting against contaminated and poor land, and on the other hand the valorisation of urban waste: this is the recycling of organic residual matter via the setting up of composters, hen houses, and plant shredders.

b. **Social principle**

The social principle allows multiple roles: by sharing links, knowledge, know-how and community skills through exchange at the production level (exchange of fruit and vegetable baskets), strengthen social cohesion by sharing ideas and actions, in the district itself and between the districts of the Erriadh district.

The Erriadh city is well known for bringing together people from different regions and different social levels, strengthening social integration and thus creating communities around the projects that are generally organised by the associations and municipalities that are created in the framework of urban agriculture projects.

c. **Economic principle at the city level**

This principle allows families to obtain additional income, fights poverty, offers households access to cheaper and good quality food, and offers the implementation of small local projects.

d. **Landscape principle**

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The landscape principle allows for the improvement of the nature of the urban environment, the urban ambience, the quality of the living environment and the good organisation of the urban environment. To strengthen the culture of citizens on the spirit of nature and the role of public agricultural gardens, even on the psychology of city dwellers who generate negative impacts on the natural landscape.

Conclusion

Nature in the urban environment represents a major stake in the sustainable development of the environment based on the idea of restoring and enhancing existing nature, as well as agriculture in the urban environment has always contributed to the improvement of the quality of the living environment.

The redevelopment of the public gardens of the Erriadh housing estate has been based on several interests, such as the embellishment of the local landscape, the opening up and connection with the existing immediate environment, and the improvement of human well-being. This enhancement of agriculture can produce other reactions that can function the urban space towards the use of agriculture as an instrument of land use planning with environmental approaches that can mitigate the negative effects of climate change.

In order for this agriculture to be considered "environmentally friendly", society's awareness of the quality of an agricultural product must be the essential objective if agriculture is to be participatory and adapted to provide goods and services. Society's expectations must also evolve towards signs of product quality that take into account origin, environmental aspects and the preservation of biodiversity, and the improvement of the city's image through well-regulated green infrastructures and the art of natural urban composting with high aesthetic values that contribute to the creation of pleasant and functional atmospheres.

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INSPECTION OF THE DEVELOPMENT OF CHINESE RURAL ARCHITECTURE, REFLECTIONS FROM "EMPTY NEXT HOME FOR TWENTY PEOPLE"

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ABSTRACT:

In recent years, rural construction in China has been a hot topic and architects have been practicing in the rural. "Empty Nest Home for Twenty People" is a residence designed by architect Tao Lei for a farmer in Gansu Province. The whole process of this project from design to completion was broadcast on the show "Dream Home". After the show aired in November 2021, it caused huge controversy on the Internet. The focus of the controversy is mainly on the cost, the owner's needs, and aesthetics. These debates are not only the communication contradictions between architects and the public exposure in the environment of TV shows and networks but also the deeper problems about China's rural construction and development. This paper analyzes architectural cases, sorts out the whole event and comments. The purpose is to discuss how the local culture of the Chinese rural can be reinterpreted in the tide of modernization and the context of globalization, and the balance between the expression of the architect's rural aesthetic and the needs of the owners. In the vast Chinese rural with profound history and great regional differences, rural architecture carries more the collective identity of the rural society and the real needs of rural life. How the future rural aesthetics can be integrated with the needs of local users is the key to the problem.

KEYWORDS :

Rural Architecture Rural Aesthetics Architects

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1. INTRODUCTION

In November 2021, after the broadcast of the "Empty Nest Home for Twenty People" in a long-standing Chinese variety show "Dream home"[1], it caused heated discussions on the Internet. The hashtag "Dream Home's worst design comes out" has been viewed more than 420 million times on Sina Weibo[2]. Tao Lei[3], a prominent young Chinese architect who designed the project, has also been the target of criticism. The focus of the controversy is mainly on the cost, the owner's needs and aesthetics. These debates are not only the communication contradictions between architects and the public exposed in the environment of TV shows and network, but also the deeper problems about China's rural construction and development.

With the deepening of urbanization in China in the 21st century, the dualistic split between urban and rural areas is becoming more and more serious. China's rural areas are hollowing out and aging. As the Chinese government attaches great importance to rural areas, it has successively issued national strategies such as "Accelerating the construction of a new socialist countryside", "Beautiful China" and "rural revitalization". At the same time, the study and practice of "rural revitalization", "new urbanization", "traditional village protection", "ecological protection" and "healthy countryside" and other topics appeared in architecture major. JIA 2021 However, as the number of architects' practice projects in rural construction increases year by year, many problems such as abrupt architectural style in rural areas and inadaptability to rural lifestyle are exposed.

Problems have always existed, and this "Dream Home Incident" is not an isolated case. It is only that this event has exposed hidden problems to a wide range of public vision through TV shows and Internet media, which has caused such a big debate. "Dream Home Incident" deserves attention and allows us to examine the problems of architects' practice in rural architecture projects. This study will sort out the whole event and comments, analyzing the architectural cases as well as the architects' design ideas. Discusses questions about what is behind the rural aesthetics that architects need to express in their rural practice in the context of globalization, in the wave of modernization, and under the policy of rural revitalization, and how to grasp the role of architects in rural construction. This study in order to inspire future rural architectural practice.

2. State of the art

There is currently no formal literature study on "Dream Home Incident". The information mainly comes from news reports, architectural media comments, and discussions on the Internet between netizens and architects. Behind "Dream Home Incident" is the question of Chinese rural architectural practice. Since 2010, the practice of "Architectural Design Down to the Countryside" in China has attracted increasing attention in architectural journals. During this period, designers with different identities and backgrounds entered the countryside and devoted

themselves to a new round of rural construction. Zhou Rong, associate professor of the School of Architecture at Tsinghua University, believes that China's rural construction is not uniform because of its complexity and particularity. Architects need to carry out rural construction in accordance with the actual situation of the countryside.(Zhou 2015) In the related research, most of the literature research on the thinking of the architect's role in rural architectural practice is the experience of architects in the process of rural practice, which has reference significance for this research.(Lu, 2016; He, 2015; Yu,2016)

In summary, the previous research results provide some basic reference and research pavement for this aspect of the study. However, these studies and cases are mainly about rural experience-based architectural projects that drive rural economic development, or public cultural buildings in rural areas, and lack discussions on residential design related to villagers' lives in rural areas. Does rural architecture in the countryside serve city people or country people? Have the architectural practice projects carried out by architects in the countryside really improved the living space of the villagers? Is the living space of villagers being squeezed in another way from the city? This study intends to focus on the problems in the development of rural architecture in China from a new perspective by analyzing the "Dream Home Incident", which is a hot topic of public discussion on the Internet.

3.Methods

The object of this study is the residence designed by architect Tao Lei for farmer Du Xingchang in Yagushui Village, Shuiquan Town, Baiyin City, Gansu Province, China. Since the construction project was completely presented from design to completion in the sixth installment of the eighth season of Dragon TV's "Dream Home" broadcast on November 21, 2021, this study will mainly sort out and analyze the content information presented in the program in the case analysis part. In addition, the extensive discussion on the Internet triggered by this event also needs to be sorted out in this study. Information will be obtained and discussed through the following three network platforms:

(1)Discussion of extensive netizen : posts under relevant topics in Sina Weibo. Sina Weibo is one of the major social software in China and the largest Chinese social media platform in the world. Each message of no more than 140 characters has become a social medium for Chinese architects to discuss architectural design and publish their personal observations due to its brevity and convenience.

(2)Discussion of netizens with certain professional background: Q&A discussion post on Zhihu[4]. Zhihu is a website that invites questions from people with relevant expertise. Many of the people who answered the questions had architectural backgrounds, including many authenticated users, architects, designers, university students and well-known scholars. The collation of relevant information of Zhihu is helpful to collect evaluations from different perspectives.

1	The TV show "Dream home" is a show that invites well-known architects to remodel homes for ordinary people who want to improve their lives.
2	Sina Weibo is a general term for microblogging, but normally understood as Chinese-based mini-blogging services, including social chat sites and platform sharing. From Wikipedia:https://en.wikipedia.org/wiki/Sina_Weibo
3	Tao Lei is the founder of TAOA Architects and the winner of the China Youth Architecture Award.

4	Zhihu is a Chinese question-and-answer website where questions are created, answered, edited and organized by the community of its users. From Wikipedia, ink: https://en.wikipedia.org/wiki/Zhihu

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(3)Discussion of mainstream media articles: WeChat public Account[5]. In 2011, it formed the mainstream media of architecture network through wechat public account. This study will collect relevant articles published in the wechat public account of architectural design-related media and non-architectural design-related media.

4 . Case study description

4.1.Background and the needs of the house owner

Figure 1. Original building layout and surroundings.

The theme of the TV show "Dream Home" broadcast on November 21, 2021 is "Renovation of the Northwest Empty Nest Home". The project is located in Yagushui Village, Shuiquan Town, Baiyin City, Gansu Province, China. The owner of the house, Du Xingchang, is 68 years old and lives in this village with his wife. Du's house is a typical northwest rural enclosed building, with the kitchen and living room on the east side, and 4 bedrooms on the north and west sides (Fig.1). Du and his wife raised their five children to college by farming, raising sheep and working in coal mines. Now the children have settled down and live in different cities. Du's children thought rural life was inconvenient and wanted to take care of Du in the city, but Du was reluctant to follow them because he could not bear to leave the land and rural life where he had lived and worked all his life. Du hopes to rebuild the 40-year-old house built by his father to improve the living environment in the future, so that the children can adapt to life in the countryside when they return home together. And Du also put forward his idea that the new house is a two-story building with an interior corridor (Fig.2).

5   WeChat is a Chinese instant messaging, social media, and mobile payment app developed by Tencent.WeChat users can register as a public account, which enables them to push feeds to subscribers, interact with subscribers and provide them with services. From Wikipedia, ink: https://en.wikipedia.org/wiki/WeChat
6   "Dream Home" Season 8, Issue 6. China Dragon TV's, 2021(11). link: https://www.bilibili.com/bangumi/play/ep431801/

Figure 2. Du at friend's house[7]

4.2 Architect's design concept and performance
Tao Lei, the architect who took over Du's old house reconstruction project, started the design work after investigation. Tao believes that Du's new home should be a rural building that adapts to the development of the times and faces the future.⬜"Neither cater to the trend of urban life nor simply copy the rural housing, but in line with du's pursuit of rural life vision of the new rural architecture."[8]The design features of this project can be summarized as the following four points:

(1) Follow the original enclosed building layout. Most of the existing dwellings in Gansu Province are built with enclosed courtyards. The roofs are high on the outside and low on the inside to form an inner slope. Most of the doors and windows are also opened to the inner courtyards to resist the frequent outbreaks of wind, snow and sand in winter and spring. Tao continued this traditional practice, not only responding to the local natural climate, but also taking into account the living habits and spatial memory of the Du family. In the functional layout of the new building, basic living facilities are added and two moving lines of indoor and outdoor are created to facilitate use in different seasons(Fig.3).

Figure 3. The floor plan of the new building.[9]

7   "Dream Home" Season 8, Issue 6. China Dragon TV's, 2021(11). link: https://www.bilibili.com/bangumi/play/ep431801/
8   "Dream Home" Season 8, Issue 6. China Dragon TV's, 2021(11). link: https://www.bilibili.com/bangumi/play/ep431801/
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(2) Use local construction materials. Tao chose three local materials -- red brick, wood and concrete -- to build the new house, referring to local architectural styles, as well as the Du family's lifestyle and budget.

(3) Using the authenticity of materials and structures to express architectural aesthetics. Tao wanted to use different combinations of red bricks to create a variety of textures, with a rhythmic beauty and a hollow design can also reduce wind pressure. Tao is committed to reflecting the building itself with authentic materials and structural beauty (Fig.4).

Figure 4. Red brick masonry design process.[10]

(4) Create rich spatial experience. Three courtyards are interspersed in the building to obtain the rich spatial experience of constant change. The interior corridor is narrow and dark, and the bright light from the courtyard at the end of the corridor is intended to create a sense of spatial change as people walk through the interior space(Fig.5)
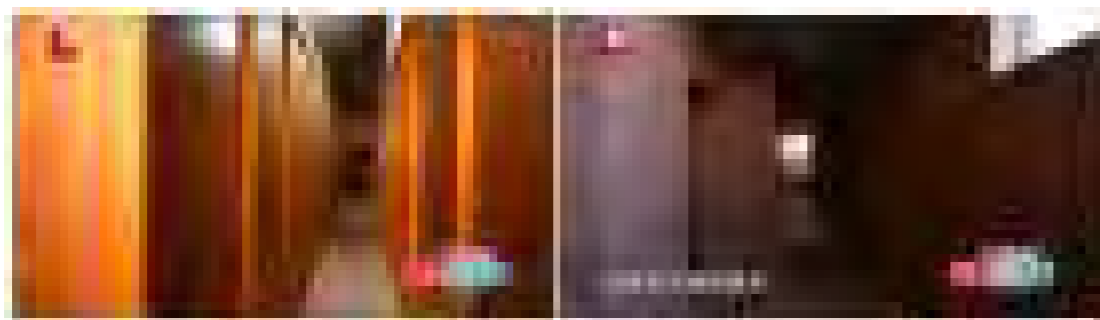
Figure 5. Indoor corridors.[11]

These design concepts of Tao, such as "house closed to the outside world", "pursuit of authenticity of materials", "exploration of different space dimensions", ""rich spatial experience of changing scenery while moving", etc., are also reflected in his own residential design (Fig.6). He emphasizes the poetic daily living space and creates a spatial atmosphere through the combination of the interior space with the natural landscape and climate. Tao 2018.

10   "Dream Home" Season 8, Issue 6. China Dragon TV's, 2021(11). link: https://www.bilibili.com/bangumi/play/ep431801/
11   "Dream Home" Season 8, Issue 6. China Dragon TV's, 2021(11). link: https://www.bilibili.com/bangumi/play/ep431801/
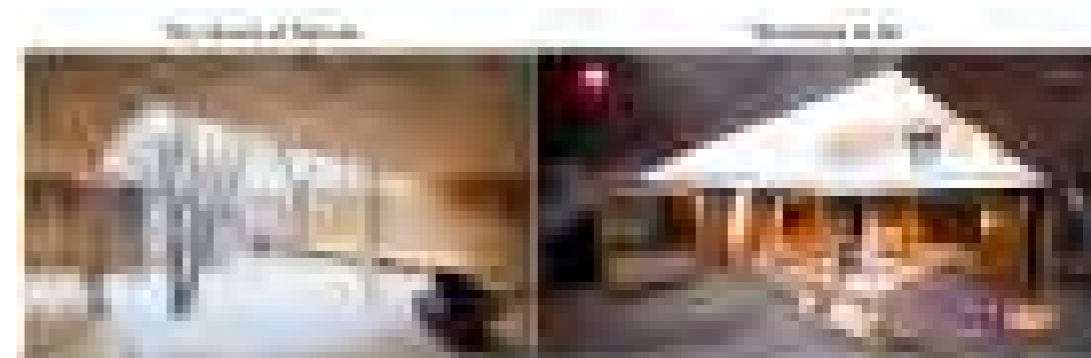
Figure 6. Tao Lei's house and Du's house.[12]

4.3 Problems in the construction process

The construction process of this project was not smooth. Three main problems occurred:

(1) Lack of workers and slow construction process caused by the difficulty of construction. First of all, Tao designed several varied ways of red brick construction, but it was difficult for local workers. The construction team had to coordinate workers from other places to the site in Gansu, which affected the progress of the project (Fig.7).

Figure 7. The masonry process of red brick walls.[13]

(2) The problem of exceeding the budget cost. The main problem is that the civil construction cost is too high. First of all, the construction of red brick walls, integrated concrete roofs and terrazzo floors are difficult to construct and the longer construction period makes it necessary to hire skilled workers from other cities at a higher price. And longer construction times are pushing up worker costs. Secondly, in the construction process, the price rise of Concrete and steel building materials in China also caused the overall cost rise.

12   "Dream Home" Season 8, Issue 6. China Dragon TV's, 2021(11). link: https://www.bilibili.com/bangumi/play/ep431801/
13   "Dream Home" Season 8, Issue 6. China Dragon TV's, 2021(11). link: https://www.bilibili.com/bangumi/play/ep431801/

(3) Logistics stagnation under the impact of COVID-19. At the end of the renovation, furniture and other items needed were not delivered and installed due to COVID-19 control. As a result, the interior of the building was still incomplete at the time of the broadcast. This also led to the fact that when the program was broadcast, the interior of the residence was still not fully completed.

4.4. Influence after the broadcast of the program

Finally, at a cost of 1.326 million yuan ($197,574), Architect Tao led his team to build a red-brick courtyard house with a floor area of about 200 square meters, made of reinforced concrete and red bricks with local characteristics (Fig.8). Architect Tao introduced the design of the new home to Du and Du's family. Du and his family were very happy in the show, and affirmed and praised the new home. But after the show aired, it immediately received numerous negative comments from netizens. The following mainly selects relevant information from Weibo, Zhihu and WeChat public accounts to preliminarily screen and sort out the extensive discussions on the Internet caused by "Dream Home Incident" after the program was broadcast.

Figure 8. Whole and partial pictures of the building..[14]

First, immediately after the show aired, there was a lot of topical discussion on Weibo. So far, the lead reads: "The worst design of the Dream Home has appeared, and the red brick house is really incomprehensible." The hashtag # Worst Design of Dream Home #has been read about 420 million times and discussed 70,000 times. "Some villagers said that they feel that the red brick house that cost 1.326 million yuan ($197,574) is not as good as their own house that cost 60,000 yuan $8940 ", "The designer's subjective will is obviously too strong" and other related topics are also discussed a lot. Weibo has a wide range of users, most of whom do not have a professional background in architecture. From this, we can see that most people hold a negative attitude towards "Dream Home Incident".

This was followed by a Q&A post about "Dream Home Incident" published in Zhihu on the second day of the Show. "What do you think of Tao Lei's spending 1.32 million yuan($197,574) on rebuilding a house for an old man in the countryside in Dream Home, and the owner wanted a two-story building, but the architect built a red brick house in the style of a public toilet?" .[15] More than 19.9 million views and 3,041 answers to the question. Many netizens who answered this question in Zhihu have architectural professional background. Compared with weibo, they have organized the incident more deeply, analyzed architectural space, and discussed from many angles, with each answer having a longer length. But most of the comments on "Dream Home Incident" were negative. Netizens' discussions and questions focused on the following aspects:

(1) Questions about the construction cost. The red-brick houses, which are so rough they look like raw materials, cost more than 1.3 million yuan ($197,574), far exceeding the general level of tens to hundreds of thousands of yuan for self-built houses in rural areas.

(2) Questions about heat preservation and heating. The lowest temperature in winter in Baiyin area can reach about minus 18 degrees Celsius. Wind, snow and sand are very common. However, there are many hollow designs on the walls of houses, and the thermal insulation effect is doubtful. Moreover, the use of floor heating for heating in rural China has not been popularized at present. For villagers, the relatively high cost will make floor heating useless.

(3) Questions about the convenience of use. The first is that the hallway inside the house is very narrow and dark. The bathroom does not have wet and dry separation and handrails, which lacks consideration for the future life of the elderly. The kitchen and dining area are very small, not meeting the needs of the elderly and large family gatherings of 20 people.

(4) Questions about ignoring the needs of the owners. Du's original ideal new house is a two-story building, although Tao added a second story to the bungalow, placing two bedrooms on the second floor. However, this design still became one of the examples of later netizens criticizing Tao for "ignoring the client's needs".

The article about "Dream Home Incident" published by the WeChat Public Accounts also received a high number of page views. It can be roughly divided into non-architectural design-related and architectural design-related WeChat Public Accounts. After statistics, an interesting phenomenon emerged, that is the different attitudes of the two types of WeChat Public Accounts. Non-architectural design-related WeChat Public Accounts are mainly , among which the mainstream media "Global People" original article "1.32 million yuan to build a rough house? Tao Lei was scolded?" was published on November 23, 2021, with 44,000 views. The article mainly interviewed a number of industry experts and architects' views, and was generally critical. Articles from other media are also have a critical attitude. Architectural design-related WeChat Public Accounts published more articles and sustained attention for a longer period of time. Among them, the original article "Star Fault or Public Opinion Violence? -- On" Dream Home Incident "has been read more than 100,000 times. The article sorted out and analyzed the Incident, refuted the online criticism, and believed that "Dream Home Incident" was a maliciously manipulated public opinion violence. There are many voices in support of Tao Lei's design concept in the articles published on the WeChat public account related to architectural design, which are believed to be due to the contradiction between architects and the public's

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14   "Dream Home" Season 8, Issue 6. China Dragon TV's, 2021(11). link: https://www.bilibili.com/bangumi/play/ep431801/

15   Link: https://www.zhihu.com/question/500522945/answer/2237209229

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cognition. But there are also many articles with critical voices, which have launched reflections on Chinese architectural education and the localization of Chinese architecture.

5.Discussion

5.1 Reflections on rural aesthetics behind the controversy

After sorting out the comments on "Dream Home Incident" from different positions of the public, media and architects, we can see the differences in their ideas and communication problems. This study believes that this difference comes from the different evaluation criteria of rural architecture, that is, what is a good rural architecture design? Judging from the new home designed by architect Tao for Du, whether it uses local red brick materials, or follows the traditional enclosed building layout, or pursues the true beauty of materials and structures, as well as the design that considers various landscapes concept, we can see his pursuit and expression of rural aesthetics. Different people have different understandings of rural aesthetics. Although Tao wants to complete a new rural building that does not cater to the trend of urban life and is suitable for The Times, as a residential designed for villagers living here, does tao neglect the investigation and response to rural life and rural culture?

Figure 9. Comparison of kitchen and dining areas in new and old houses.[16]

In the new house designed by Tao, the kitchen, dining area and living room where modern appliances are arranged are separated from each other and become three independent spaces. This practice is common in urban housing, but in traditional Chinese rural housing, the cooking and eating areas are often linked together to form important living spaces. The behavior of gathering dinners on important festivals in rural areas is not just a meal, but an important

16   "Dream Home" Season 8, Issue 6. China Dragon TV's, 2021(11). link: https://www.bilibili.com/bangumi/play/ep431801/

activity to enhance feelings and maintain family members. Cooking, eating, making dumplings, watching TV, playing games... Family members may do different things, but they will be active in the same space (Fig.9). However, in the new house designed by Tao, it is difficult to meet such rural living habits.

As mentioned above, the space in rural housing is not clearly divided into various functional areas, and it is common to eat, sleep and meet guests in the same space. This makes the Spaces have the characteristics of cross use. Although there seems to be no clear spatial order, the characteristics of rural family culture are hidden behind it，and it happens that this ambiguous spatial characteristics also helps to form a relatively intimate family life mode. For example, in the cold winter, the location of the heater, which is the main source of heating, is the center where family members gather. The heater is not only a tool for heating, but also interrelated with other events. Although the architect Tao placed the furnace in the corner of the passageway connecting the sitting room and eating area in the new house, this position obviously deviates from the central position of the living space, and also lacks the possibility of association with other life events (Fig.10).
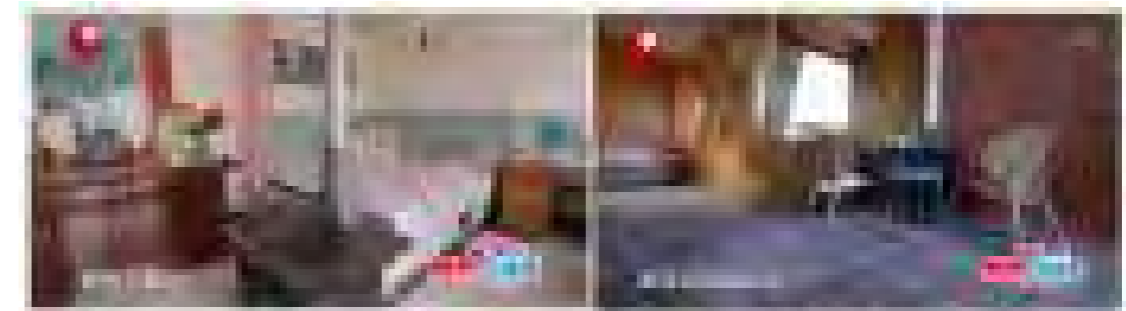
Figure 10. The location of the heater in the new and old houses.[17]

Let's go back to the reason why the owner commissioned the renovation of the old house at the beginning: Du and his wife in the village were reluctant to follow their children to live in the city because they were reluctant to live in the countryside. So what is the countryside where Du is reluctant? The couple's son once said: "Parents are reluctant to be here, the yard, the fields, the neighbors, the familiar customs and the intimacy between people."[18] In fact, the design requirements of this rural couple were made clear at the beginning, that is, rural life and rural culture behind. This rural-specific way of life is associated with emotions, and it is a precious, simple and nostalgic nostalgia that we miss. Rural aesthetics is not only about the natural landscape of the countryside, but originates from the rural life rooted in the rural local conditions. There is nothing wrong with architects' pursuit of rural aesthetics, but we need to think more deeply about what rural aesthetics is.

17   "Dream Home" Season 8, Issue 6. China Dragon TV's, 2021(11). link: https://www.bilibili.com/bangumi/play/ep431801/
18   "Dream Home" Season 8, Issue 6. China Dragon TV's, 2021(11). link: https://www.bilibili.com/bangumi/play/ep431801/

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5.2 Reflections on the role of architects in rural architecture

For villages, architects are outsiders after all, and the practice of architects in rural areas must answer a question: who is it designed for? Through the program, we can see that Tao wanted to use the most basic materials and techniques to make an interesting design, but such a design is not suitable for local workers in a short time. Faced with this problem, he said: "Builders should have the spirit of craftsmanship to build perfect brick walls. I want to convey something about the spirit of architecture through construction." [19]There is no problem for urban construction teams with professional processes and technologies to realize architects' ideas as much as possible, but it is difficult in rural architecture. Cooperation and inheritance with local villagers are more economical and meaningful.

6.Conclusion

This study focuses on the hot issue of Internet discussion triggered by the "Empty Nest Home for Twenty People" rural architecture project designed by tao Lei in the Chinese variety show "Dream Home". And through "Dream Home Incident" to examine the 21st century Under the special national conditions of China's rural architecture development problems. By analyzing the architectural cases and architects' design ideas through the information presented in the program, and by collating the relevant discussions on Weibo, Zhihu and WeCha Public Accountst, we observed the differences in the evaluation of "Dream Home Incident" by the public, architecture-related industries and media. "Dream Home Incident" has indeed triggered the architects' group to pay attention to and reflect on rural architecture, which has its positive significance.

Aside from the issue of public opinion violence related to "Dream Home Incident",this study only analyzes from the perspective of architectural design. Tao Lei's design ideas have aspects that are worthy of recognition, but also have aspects that lack consideration. First of all, the rural aesthetics that architects seek to express in their rural practice is not only about formal beauty. Rural aesthetics contains the unique way of life in rural areas, and this way of life is associated with the beauty of emotional experience. Second, for the village, the foreign architect is just a passerby. The main body of the village is the villagers, and a good rural building should be used by the local people for a long time. Architects should observe, think and design from the perspective of users while giving full play to their strengths. Architects should use their own strengths when designing buildings in rural areas, and at the same time try to observe, think and design from the user's point of view as much as possible.

The limitations of this study lie in the lack of first-hand data from field research and interviews, as well as the lack of universality in the analysis of a single case. Subsequent research will continue to focus on the practice and development of rural architecture in China and collect more valuable cases for comparative study.

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TEACHING RESEARCH ON URBAN BLOCK SHAPING AND ARCHITECTURAL DESIGN INTEGRATING LOCAL ARCHITECTURAL FORM:
NEIGHBOURHOOD VITALITY RENEWAL AND ARCHITECTURAL DESIGN BASED ON TRADITIONAL BUILDING FORMS IN EASTERN ZHEJIANG

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ABSTRACT :

It faces urban problems in global urbanization, such as the loss of historical memory, the dense old blocks, and the lack of attractive activity space. The renewal control and architectural design of urban blocks that inherit the local architectural form and continue the local people's lifestyle are the keys to creating a dynamic partnership and place belonging space, promoting human interaction, integrating tradition into modernity, and serving residents. In the design teaching, the case as the traditional block of Ningbo in China, this paper studies the block renewal control policy and architectural design method based on the teaching concept of the integration of Ningbo local buildings form such as street texture, courtyard layout, architectural space, structure and regional construction techniques, from three aspects of urban design control regulations, an architecture integrating traditional form and modern technology, and public communication. In urban and architectural education, it is of great significance for the scientific cognition of urban space, the fine control of urban design based on relevant urban and architectural regulations, the narration of urban historical stories, the continuation of people's living memory, and the experience of regional skills.

KEY WORDS:

Urban Block Shaping, Architectural Design, Spatial Vitality Renewal, Local and Traditional Forms, Teaching Research

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1 BACKGROUND

Cicheng, Ningbo, is a thousand year old county town, which carries the formal characteristics of the traditional architecture of eastern Zhejiang, such as the street and alleyways, the courtyard houses for neighbourhood life, the ancestral halls and pagodas for public communication, the four waters returning to the hall, the high walls and narrow alleys, and the regional techniques of carving in fishing villages. The design is an expression of the value of the organic fusion of tradition and modernity to meet the needs of people's activities of belonging to places. The spatial revitalisation and architectural design of old neighbourhoods,, which inherit traditional building forms and perpetuate lifestyles, is an expression of the value of the organic fusion of tradition and modernity, meeting the needs of people for place belonging and activity.

The teaching of urban design and architecture based on the conservation and organic regeneration of historic and cultural cities covers training programmes on historical and cultural knowledge, urban knowledge, typical traditional building types and morphological features, architectural design and construction, etc. Bearing in mind the various needs of the current social development, planning and design from the single building to the overall coordination of the urban public space. The aim is to learn scientific and effective research and analysis methods, architectural design under multiple constraints, real problems oriented to the inheritance of regional culture and construction, as well as the practical significance of urban design control and the improvement of the quality of the urban spatial environment through teaching training in conceptualisation, analysis and design generation, and construction. Understand the relationship between design and research and the value of research to design teaching, based on the integration of undergraduate studies.

Take Ningbo University's undergraduate architectural design work as an example this graduation design takes the actual site of a typical public building-based neighbourhood renewal and architectural design in the ancient county town of Cicheng, Ningbo as the scope of teaching and research. In this project the requirement was to come up with an architectural design of public buildings according to the special historical, cultural and materials in the surrounding environment that respond to the need of people.

2 ANALYSIS OF THE CURRENT STATE OF THE SITE AND BUILDINGS

Site Location Figure 1
Block of Daximen section of Ningbo, Cicheng. Firstly, the site is located in Ningbo a sub provincial city in North east Zhejiang province, China, which is one of China's oldest city and it has been an important commercial port since the Tang dynasty. Secondly, Cicheng is an ancient county town in the northwest of Jiangbei district in Ningbo that has last more than 1000 years, which is an ancient walled city dating from the 8th century when it was renowned for it handicrafts, with its long history, it is known as the "most charming ancient town south of the Yangtze River" for its beautiful scenery, city walls and abundant cultural relics. The third, Cicheng has obvious regional advantages and convenient transportation, about 15 kilometers away from downtown of Ningbo, more than 20 kilometers away from Ningbo Lishe airport, and about 38 kilometers away from Beilun port, there are multiple buses in Cicheng, with a journey of 15-20 minutes, and railways and highways in Cicheng, and Hangzhou Bay passage runs through Cicheng and enters Ningbo.

Figure 1. Aerial map of Ningbo and Site location

Existing Buildings, Construction Material and Landscape Figure 2
The existing buildings on and around the site are traditional residential houses, tea factories, retail shops, offices, cultural buildings, etc., mostly with tiled pitched roofs, brick and concrete structures and wooden constructions, etc. However, it is mainly a dense area of traditional residential houses, very lacking in public space and basic service facilities to attract people's activities, and the quality of the environment The quality of the environment is poor.

Construction materials of buildings on the site are made of hollow concrete blocks and some other are made of fired bricks. The roofs of most buildings are pitched roof covered by tiles. Concrete is used as paving material especially on the street inside the site and some stone paving by the side of the main roads and on walkways. Building styles on the selected buildings are mainly residences, shops and factory buildings, such as single storey traditional residence, single storey newly constructed shops, 2 storeys traditional residence, renovated multi-storeys apartments and traditional multi-storeys apartments.

Buildings cover almost the whole ground, the vacant spaces are usually used as car parking. However on the side of some budlings, by the streets, plants and flowers are planted, furthermore some occupants have small private gardens. The ratio of greenery and landscape on the site is very low.

Figure 2. Existing Buildings, Construction Material and Landscape

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3. DESIGN CONCEPTS AND METHODS OF TEACHING AND LEARNING

The creation of vibrant neighbourhoods and buildings that attract and facilitate people's interaction and the integration of tradition into modernity, serving local residents, surrounding factory workers and visitors to the ancient town, and providing a space for leisure and fun. The entire site space is divided into three zones, divided by an aqueduct that carries on the symbolic or living water source of the ancient city of Zhedong into three parts: the traditional Zhedong garden, the commercial complex with a fusion of tradition and modernity, and the modern garden with an exhibition hall, which also serves as a link between the different historical memories of Zhedong Cicheng.

After analyzing the site we found that it was mainly surrounded by traditional Residential building and there is a lack of attraction places nearby, no proper layout of buildings and the existing ones had poor maintenance. Being located in an ancient county town our main goal was to revitalize the zone by creating an attraction center for the people divided in 3 categories: The residents, the workers from the surrounding factories and visitors coming to visit the ancient county town of Cicheng. These people all need one thing in common; the need of an interesting place different than their usual one where they can spend some time.

So, our approach in this revitalization project, we mainly focused on programs that can attract and promote people's interaction. We designed new buildings, renovated some existing ones and turned them into a commercial complex, facing the main the road on the east, created a traditional Chinese garden, close to the south road and a modern park having an exhibition hall. Ningbo played a role as a major commercial port, This design is kind of a conection between different period of time from the marchand period to a more cultivated community with garden design to a modern time with an urban park.

4. BLOCK VITALITY RENEWAL AND ARCHITECTURAL DESIGN BASED ON TRADITIONAL BUILDING FORMS

Master Plan of the Site Space Vitality Renewal Figure 3
We divided the site in three zones that are separated by an artificial water channel created following the old tradition of city creation near a source of water which symbolize life or existence and the shape of that canal comes from the Chinese character ren " " as the main focus of Our design(people) and these zones are connected by several bridges. The water for the artificial channel comes from the river on the south.

We designed a car and bike parking near the main road on east the jiefang road, as the commercial complex and the garden are only for the pedestrian and the park bicycle are allowed and have their own bicycle parking. The car parking is located by the main road the jiefang road and it can accommodate 28 cars, with each spot measuring 2.5*6m. The back façade of of the Block 6 building has specific places designed for poster and advertisement panels facing the parking area.

Figure 3 The Site Vitality Renewal and the Space Design Effects

Architectural Design of Commerical complex Figure 4

Being among the oldest human activities, and in the history of Ningbo as an important commercial port commerce play a capital role in social interaction. Nowadays shopping is also some people's hobbies. We decided to keep the commercial complex as we already have some shops on the site we wanted to put them together so that it can be easier for people to move from shop to shop.

The Design And construction style, on the site especially where the commercial complex is located the existing building are one story building. We kept the structure of one exiting building and then the others were demolished to build brand new building that integrate modern and traditional style, in terms of materials, structures and shape used in the design. The whole commercial complex follows the traditional courtyard building layout and slope roof.

Plan organization, the plan is organized in 2 zones according to functions and into 6 blocks considering their design style. With coiurtyard serving as publics siting spaces.

Figure 4 Commerical complex that blends tradition and modernity

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Block 1 is the only existing building renovated. We kept the same structure and the interior plan reorganised. It used to be the shop of capital good and we trnasformed it into shops that icludes western food Restaurant, juice and fruit shops, bakery and a candy shop having a total of 336 sqm.

Block 2 has two building having the same design a fired brick structure for the ground floor and a wooden structure for the second floor. The build on west has 4 cicheng food speciality restaurant organised with the service area on the ground and the sitting places on the second floor.The building on the south has 2 super markets. The total floor area of both buildings is 616 sqm.

Block 3 is designed as a transition Space between the two zones(A & B). It is designed with a modern design style on the grournd floor and a traditional wooden structure on the secondn floor. By this design we wanted to blend the two different period and design style.It designed to accomoddate fuctions like pub, and starbucks type of shops and terraces on the second floor. The total floor area is 480 sqm.

Block 4 is designed with contemporary design taking inspirations from traditional building by it shape using concrete fired bricks and glass. It is designed for services that involve electronics gadget and a bank. The total floor area is 369sqm.

Block 5 is completely designed using traditional materials; stones and wood structures. It is designed for shops where cicheng traditional objects can sell, such as garments, necklaces, etc. the total building area is 385,5 sqm.

Same as block 4, block 6 is designed with contemporary design taking inspirations from traditional building by it shape using reinforced concrete, wood and glass as building materials. It is designed for beauty salon. Cosmetics shops, jewelry, casual styles clothes and shoes. The total building floor area is 517.5 sqm.

Traditional Zhejiang East Garden Figure 5

Our site is located in the historical district we believe you can not narrate the history of a Chinese district without talking about its architecture in which the traditional Chinese garden is an important element.

The design of our garden follows the typical layout of Chinese garden imitating the natural order, a non linear layout more of natural curves, water pond and plants. The garden is not to be seen at once it is designed to lead into a promenade with different sceneries along the walkways. We try to give it a more natural appearance by the use of natural elements such as rocks, water ponds, flowers. Some of the walkways are covered to protect the visitor from harsh weather, we designed some other structures such as pavilions and free standings walls with some openings to create viewing frame.

Figure 5 Design of Traditional Zhejiang East Garden

Architectural Design of Urban Park with Exhibition Center Figure 6

Our aim in designing a park is to create a place where residents and workers from nearby buildings can do some outdoors activities , that's why in our design approach for the park is an open green space with no many large trees, having more open spaces and a designated playground with sport facilities and sitting places.

We designed the exhibition center as an underground structure and a reminder of primary cave dwelling that blend with the park landscape following the slopping roof of the traditional Chinese building and it can be perceived as small mountain in the background of the classical garden. The exhibition will be a more cultural oriented where traditional Cicheng's craftsman will expose their works and visitors have the possibility to experience some basics handicraft skills in a workshop inside the exhibition center.

Plan Organization, keeping in mind the courtyard plan layout. The main functional zones are organized along an axial corridor. We have an administration zone near the main entrance, 3 exhibition halls for traditional cicheng handicraft work and a workshop where visitor can experience how the craftman works. The exhibition center a total of 1502.8 sqm.

The circulation, we designed a main axial circulation the gives to different exhibitions zones and along the corridor giving to the courtyard we designed different natural scenery such as an artificial water cascade and a garden so that user can still enjoy the view like in classic Chinese garden when moving from one place to another on a ramp. As the volume are interior platforms are on different height to make the promenade more interesting.

Figure 6 Design of Urban Park with Exhibition Center

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5. CONCLUSION AND DISCUSSION

The Traditional Zhejiang East Garden are an important element in the narrative of the historical story of Cicheng. The design continues the non-linear layout of the gardens with water ponds, pavilions, curving cave doors, rocks and plants that mimic natural curved elements, and the garden moves from step to step, with different landscapes with rich stories laid out along the pedestrian promenade.

The commercial complex responds to the history of commercial interaction in Cicheng, the port of Ningbo. The design integrates existing shops to facilitate the movement of people between them, retains the existing building structure, demolishes others and updates the design with a new commercial building. The building adopts a traditional Zhendong courtyard layout and sloping roof, with materials, structures and shapes that blend modern techniques with traditional spatial forms such as modern brick and glass, traditional wood and stone to present the Zhendong commercial living space. The building plan has six functional areas such as dining, shop terrace, electronics, beauty and the sale of ancient city items, with a patio courtyard as a public open space between them.

The modern garden with a traditional craft hall creates an open space for people to move around outdoors, the hall is a ground floor structure with a traditional sloping roof, a traditional craft hall and workshop, allowing visitors to experience the traditional working methods and skills of Cicheng craftsmen, a more culturally oriented exhibition space.

The aim of this research is to understand design issues through research and interviews; to learn the types and strengths of traditional buildings such as study halls, pharmacies, temples, residential houses and khao-shek and county offices, as well as the local construction methods through mapping and analysis; to read literature on relevant theories, and to translate the knowledge gained into theoretical knowledge and design through specific design research. The study of design methods and teaching concepts, from the architectural monolith to the public space of the city, is designed to meet the demands of contemporary society, rapid urbanisation, the lack of local regional memory, and the contradiction between the needs of modern life and traditional space.

ACKNOWLEDGMENTS

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TYPOLOGICAL STUDY IN HISTORICAL TOWN RENEWAL PROCESS:
EXAMINING URBAN DESIGN PROJECTS IN CHANGTING, CHINA

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ABSTRACT:

It is well known that the study of architectural typology plays an important role in the conservation of urban historic districts, helping to identify the age of historic buildings and their classification, establish the value of conservation objects, and lay the foundation for the formation of conservation strategies. Recently, extensive urban renewal efforts in China have shown that the revitalization of historic districts plays equal to their preservation and is even more challenging. Based on our urban renewal practice, we can find that typological research also plays an important and crucial role. This paper attempts to reveal the role of typology in the urban renewal process and to clarify the connotations, evolutionary causes, and constraints of building types through the examination and analysis of three levels of urban renewal projects in the historic old city of Changting.

Based on extensive field research, this thesis first examines the role of typology in the delineation of conservation areas in the overall urban regeneration, and also finds that the zoning of urban form based on building types is useful in helping us understand the process of historical city formation. Secondly, through the arrangement analysis of historic streets and buildings, the paper discovers the composition characteristics of the traditional urban tissue in Changting Old Town, providing a design basis for district regeneration. Thirdly, through the analysis of the difficulties and dilemmas in the renewal of historic districts, the limitations of traditional building types and the necessity of new types arising in the social transformation are emphasized. In addition, the possible morphological characteristics of new building types are demonstrated based on practical projects.

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INTRODUCTION

It is well known that architectural typology plays an important role in the conservation of urban historic districts, helping to determine the age of historic buildings and their categories, establishing the value of conservation objects, and laying the foundation for the formation of conservation strategies. In China, however, recent extensive urban renewal projects have shown that the revitalization of historic districts is as important as their preservation, and is more challenging. Because of change of use in the built environment, it always not so easy to define the boundaries of the conservation area, and the building fabric in the historic districts is always broken, increasing the difficulties of the old city revival. What's more, satisfying both traditional style and the contemporary needs is a hard thing.

For Chinese historic districts with more complex situations in modern society, the application of typology in the design of urban regeneration is a key consideration. As time goes by, the type of living space changes in response to the socio-economic system changes, family structure changes and cultural integration[1]. In practice, the continuation or transformation of building types in traditional districts varies because of the changes in residents' lifestyles. If the traditional type has mutated to a certain extent that it no longer corresponds to the needs of local people, then it is necessary to consider the translation of the traditional building type. So typology will not only provide evidence for conservation strategies, but also provide references for further renewal design of the historic districts.

After World War II (1945), the urban typology school used architectural typology to trace the evolution of the city, and to explore how architectural design adapts to the inheritance of traditional memory and the needs in a new era. They all regard architectural type as an experiential existence that expresses collective consciousness[2], and use typological analysis to recognize the historical process of a single building's transformation, so as to interpret the overall texture of a town. And a city is a combination of architectural types in the process of change[3]. Architectural typology was introduced into China in the late 1980s, and since around 2010, architectural typology has been widely involved in inspiring and evaluating various architectural and urban renewal designs. The common cognitive method in China is to extract, abstract, translate and reconstruct the type based on historical memory[4][5][6]. Besides, some scholars' research involves the typological analysis of building facades and building groups[7]. However, typology research in Chinese urban renewal focuses mostly on districts with rich historical connotations, and concentrates on preservation and repair, while there are few studies on ordinary old city renewal.

On this basis, this paper uses the design-oriented multi-level typological analysis method to clarify the connotation, evolution reasons and constraints of building types, so as to reveal the key role of typology research in the urban renewal process. The case selected in this article is the Changting old city, the "Capital of Hakka" in southeastern China, located in Changting County, Fujian Province. Changting old city is adjacent to Wolong Mountain in the north, and the Ting River passes through the east of the ancient city from northeast to southwest (Figure 1).

Figure 1 Location of Changting old city

This paper investigates and analyzes the three-level urban renewal project of Changting old city. Firstly, based on the type of Hakka house in Changting, the traditional street structure is inferred, the functional distribution and evolution characteristics of the area are analyzed, and the specific conservation area is delineated; secondly, the composition characteristics of the traditional urban tissue is identified according to the inferred street structure and the house arrangement; Finally, combining the composition of the traditional urban tissue with the characteristics of new building types, the paper can provide a design direction for the regeneration of street blocks and buildings.

1. Hakka culture in western Fujian and Hakka houses in Changting

1.1. The influence of Hakka culture in western Fujian on the house type

Due to the migration culture and regional climate, the Hakka house in western Fujian combines the courtyard-style forms of the Central Plains in the north with the open-space forms for the rainy and humid climate of the south, resulting in a unique form of the Hakka house[8]. The local residents in western Fujian worship their ancestors, and are often brought together by the same family name. This lead to the fact that the Hakka people attached importance to the construction of the ancestral hall, which is usually combined with the house to live in[9].

During the Song dynasty (960-1279), there were frequent trade exchanges, a large population, high land prices, and high building density in the city, resulting in many small and medium-sized houses with three Kai and two or three Jin, its basic elements are mostly the lower hall, the main hall, the upper hall, the Ju room and the yard (Figure 2, a, c). The layout of the local typical courtyard is axisymmetric, and the space form is closed outside and open inside. The hall is regarded as the core of the family house, consisting of a central Bright Room and two side Dark Rooms.

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Figure 2 Typical courtyard type and family culture

Among the house, the two sides Dark Rooms in the lower hall are used as bedrooms or service rooms. In some courtyards, the front room is omitted, and the main hall is directly entered from the fore-yard. The Bright Room in the main hall is the social space, which is the most important space in the entire courtyard. Various social relations are reflected here, such as kinship relations, power relations, and religious relations (Figure 2, a). The front part of the main hall is open, and there are no doors and windows to maintain ventilation. Dark Rooms of the main hall are the living space of the elders, often accompanied by a storage attic. The Bright Room of upper hall is used for ancestor worship, with the ancestral tablet enshrined in the middle. Dark Rooms of the upper hall are for the youngest to live or as a service space for sacrifice. If there is only one yard in the houses, the main hall and the upper hall are integrated, serving as a space for living, ceremonies and ancestor worship. Local people often set up a "heaven and earth table" in the yard in front of the upper hall, and put incense burners on it to burn incense in the morning and evening for sacrifice. The yard size on the axis is about 2:1 or 1:1 (Figure 2, a)[10][11].

For a big family, the rooms in the house is arranged in appropriate positions according to the custom of orderly eldest and youngest, male superiority over female. The hierarchy in a house space ordered from highest to lowest on the vertical axis is of the main hall - upper hall - lower hall, and horizontally as high left and low right. In kinship relations, the hierarchy of distribution in the use of the house from highest to lowest is eldest - younger boy- younger girl- servants, and if there are many children in the family, the lower the generation, the further away from the main hall they live[10][11]. In addition, at the entrances, some buildings have Eight-character doors, with the Bright Room at an

angle of 150 degrees to the Dark Room for ventilation. On the facade, there are also distinctive door decorations with different materials (Figure 2, b)[9].

1.2. Field research on houses in Changting old city

1.2.1. Research methods

Based on the living culture of Hakka houses, the traditional buildings in Changting can be identified in the field research.

The satellite map was first studied to get a preliminary idea of the roof form in the area. Then, a field visit to the area was conducted. The research scope of the old city is from Wolong Mountain in the north, outside the city wall site in the west, Tingsi Highway in the south, and Tingjiang Lane in the east, with a total area of 178.82 hectares. Bounded by Ting River and Zhaozheng Road, the entire old town is divided into three large areas, A, B and C. Within the city are Area A and B, and outside the city is area C. 58 numbered areas (Figure 3) were further divided according to the walkable streets, and 4819 building units within the area were investigated. Along the walkable streets, each building along streets was carefully inspected through map markings, photography, audio and video recording, and size recording to investigate its basic information such as the floors, business formats, quality, material, number of Kai, the form of wall, roof form, whether there is a door decoration or a yard, construction area, building ownership and structure. The information that this study focuses on is whether it is a traditional courtyard type and the street facade characteristics of each building. This can be obtained by photographing the yard, the wall form facing streets, facade material, door decoration, and the image of walking along streets.

Figure 3 Research area division

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1.2.2. Research results

As a result of the research, 464 well-preserved traditional style courtyards were identified in the area, 153 in Area A, 210 in Area B and 101 in Area C. Among these courtyards, there are 14 courtyards with the wing-room. Most of these courtyards are distributed along the Ting River. Inside the city wall, they are distributed densely on the east part of Area A and B, and scattered on the west part of Area B; outside the city wall, they are distributed densely on the whole of Area C (Figure 4, Figure 5).

Figure 4 Investigation result
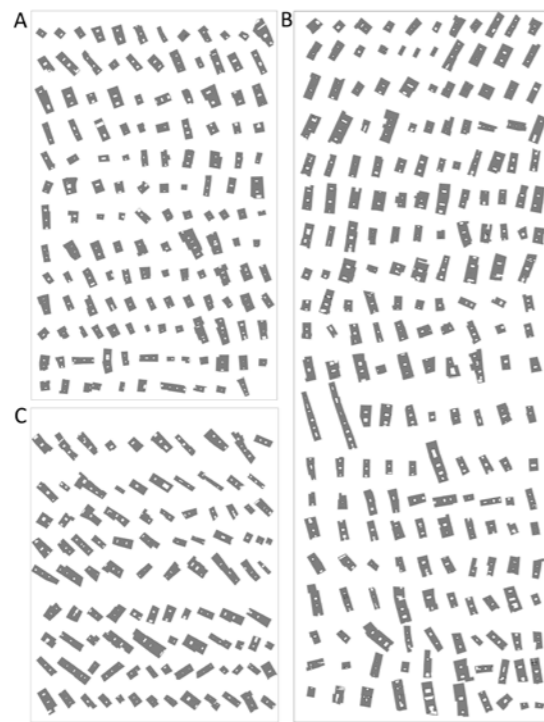
Figure 5 The collection of cases in Changting old city

1.3. Characteristics of the building type

1.3.1. General characteristics

The width of the house is mostly concentrated in the range of 8-16m for the three Kai courtyard. The depth of a single Jin of a courtyard is 6-18m, and the total depth can be obtained by multiplying the single Jin depth of a multiple Jin courtyard. In some cases, the total depth needs to add the depth of the front room and the depth of the back yard. The number of the courtyard Jin in the area is mostly between one and three, with the maximum number of the Jin being seven.

1.3.2. Characteristics of typical courtyard plan

Most of the traditional houses in the area are well-preserved courtyards from the Ming and Qing dynasties, with a few built during the Republican period.

As in Figure 6, No. 17 house with one Jin along Nanda Street (Figure 6, a) represents the basic extension unit. The Zhang's House (Figure 6, b) is a standard three Kai, two Jin courtyard. The Hui's House (Figure 6, c) is extended vertically into a four Jin courtyard with no front room and direct access into the front yard. It also has a half Jin yard as the service space. Six Jin and seven Jin ancient courtyards appear in Area B (Figure 6, d).

A number of large family temples and shrines also exist in the area. The Li's family temple (Figure 6, e) is the total ancestral hall of the surrounding Li's family and the room size is much larger. It also has a front ancestral outside space. It often provides space for family members to attend rituals and provides accommodation for those doing business and studying[8]. The Qiu's House (Figure 6, f) has a front outdoor space, which is used for parking, livestock, activities or a garden. The wing-room and back room of the house also provide accommodation for students who come to the old town to study[9]. The Lai's house (Figure 6, g) and the Wang's house (Figure 6, h) are also characterized by the spatial arrangement of wealthy families.

Figure 6 Typical courtyards

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1.3.3. Characteristics of typical courtyard facade

Traditional courtyards along streets are generally low, mainly 1 or 2 floors. Their roofs along streets are all sloping. Walls form along streets are mainly cornice, and the cornice, gable and yard wall are mixed in the whole research area. Building facades along streets are mainly made of brick, rammed earth and timber, and less stone. The length of the traditional brick facade accounts for the most significant proportion of the traditional facade length, at 32%, with rammed earth second at 23% and timber in third place at 20%. In addition, the entrances of courtyards are marked with distinctive door decorations with different materials to indicate the courtyard's hierarchy and to reflect the social status of the family. There are 259 distinctive door decorations, accounting for 15% of the total number of door decorations. Distinctive door decorations are mostly located on the facades of traditional materials, cornice wall form facing the street, and strongly associated with the traditional courtyard (Figure 7).

Figure 7 Facade characteristics

2. Typology and the conservation area
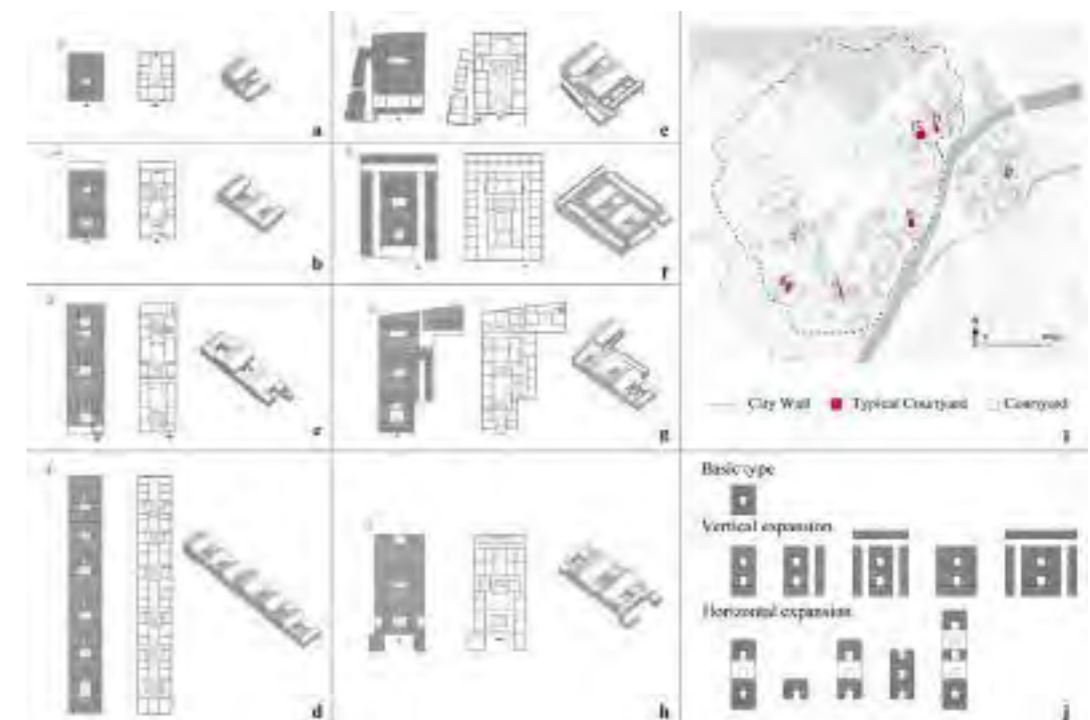
The essence of "conservation area" is to delineate the boundary of the conservation area.

To delineate the boundary of the conservation area, firstly, the street structure based on traditional types can provide a reference route for the boundary of the conservation area. Secondly, analysis of historical land utilization based on type can help identify areas of conservation significance. Thirdly, the quality of the building type, that is, the experience of walking along the streets, can help define the boundary of the conservation area.

2.1. The structure and current situation of traditional streets

To identify the traditional street structure, firstly, the ancient road network can be extracted from the historical map as a reference (Figure 8, a).

According to the "Map of the Ancient City of Tingzhou in the Qing Dynasty" (Figure 8, a, c)[12] and the "Map of the City Site Transformation of Changting (Tingzhou) in the Past Dynasties" (Figure 8, b)[13], it can be seen that the ancient city of Tingzhou is backed by Wolong Mountain, with the eastern city wall following the Ting River, showing a pattern of "Buddha hanging the bead" as a

whole (Figure 8, d). The city is crossed by Zhaozheng Road, carrying traffic inside and outside the city. The traditional road network of the ancient city, which developed from the Tang Dynasty to the Ming and Qing Dynasties, is clearly visible. At the same time, five bridges were gradually built over the Ting River and its tributaries since the Song Dynasty for the convenience of commercial trade (Figure 8, e). There are two axes in the area. The central axis within the city is parallel to the Ting River and runs through the north and south city walls. The other axis is perpendicular to the Ting River and connects the inner and outer city (Figure 8,f).

Figure 8 Extraction of ancient map elements

Secondly, the structure of traditional streets can be inferred according to the traditional courtyard type. Taking a slice near the Ting River in Area B as an example, firstly, the dense distribution of traditional streets can be located based on well-preserved courtyards on both sides of the streets (Figure 9, a). Next, the entrances of courtyards can determine the main streets and back streets (Figure 9,b). Then, in Area B on the south side of Zhaozheng Road, the traditional courtyards are separated by the modern public building Tingzhou Hospital, which destroys the integrity of the texture, so the connectivity of the traditional streets in this region is inferred. Therefore, the ancient street structure shows up (Figure 9, c, d).
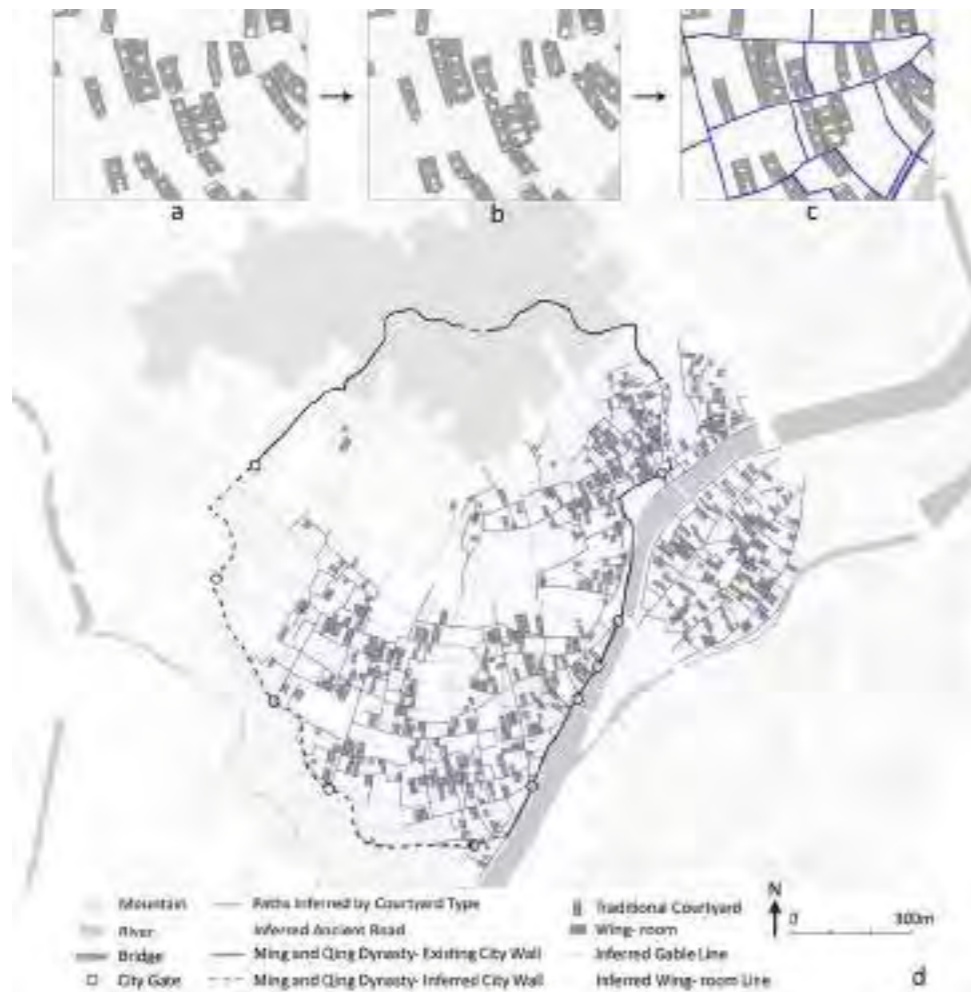
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Figure 9 Conjectured traditional street structure

Finally, a more accurate street structure can be obtained by combining the road network extracted from the ancient maps with the inferred traditional streets.

2.2. Historical land utilization

According to the historical land utilization analysis in the old city, it is possible to understand the historic buildings and traditional street blocks of conservation significance.

First of all, in terms of building ownership, most of the historic public buildings with traditional characteristics in the area are concentrated at the foot of Wolong Mountain, on the north side of Zhaozheng Road, such as the Tingzhou Examination Institute for education, the City God Temple, the Tibetan Temple and the Tianhou Palace for religious beliefs, the Gospel Hospital, the former residence of Mao Zedong, the former site of the Red Army hat factory with revolutionary background, Etc., and also a small number of ordinary private houses. On the south side of Zhaozheng Road and the east side of Ting River outside the city, there are most traditional private houses, interspersed with a few historic public buildings (Figure 10, A).

These historic public buildings are of great conservation importance. Among them, the historic buildings along the city's central axis are particularly noteworthy when delineating the scope of the conservation area, including Beiji Pavilion, Tingzhou Examination Institute, Sanyuan Pavilion, and Baozhu Building (Figure 8, f).

Secondly, in terms of the functional development of historic districts, there are currently four well-preserved ancient streets: Dongda Street, Nanda Street, Diantou Street and Shuidong Street (Figure 10, B)[14]. Nanda Street was formed in the Tang and Song Dynasties (736-1279), and more traditional houses such as deep depth houses were concentrated around Nanda Street (Figure 10, a). Surrounding Dongda Street in Song and Yuan Dynasties (960-1368)(Figure 10, b), Diantou Street in Ming and Qing Dynasties (1368-1912)(Figure 10, c), Shuidong Street in the Republic of China (1912-1949)(Figure 10, d), as well Zhaozheng Road, there was mixed commercial and residential area, with more prosperous economy and more lively scene (Figure 10, A). Therefore, the traditional building area centered on these ancient streets needs to be paid attention to when zoning the conservation area.
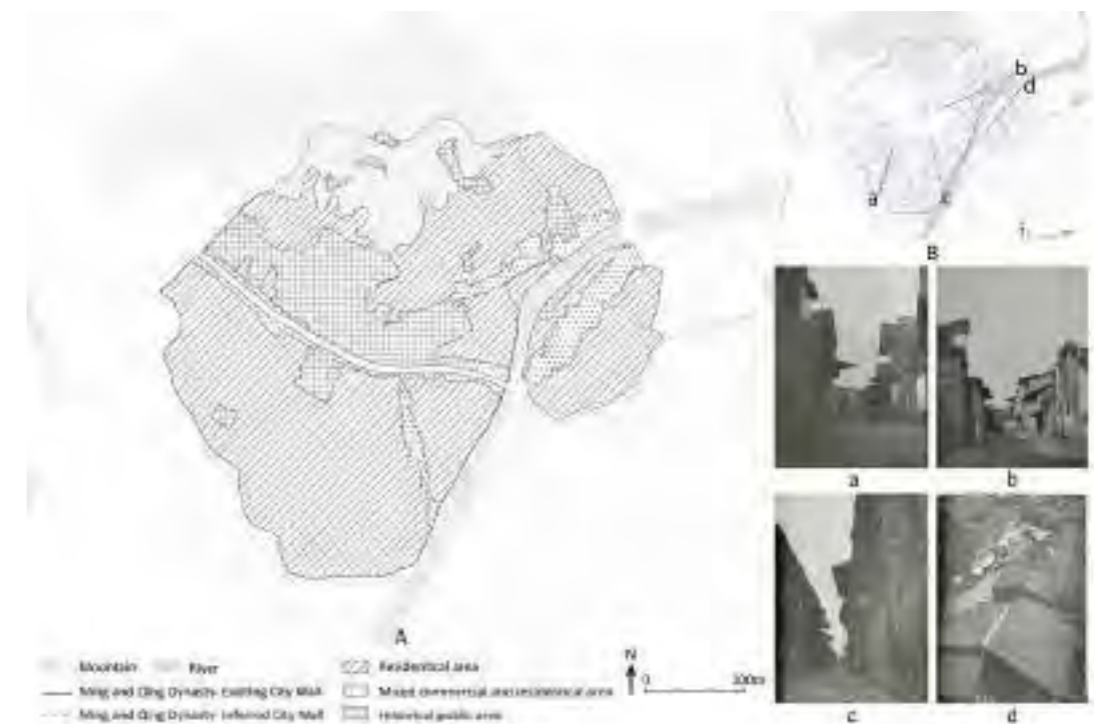
Figure 10 Historical land utilization

2.3. Delineation of conservation area boundaries

Based on the analysis of the inferred street structure and historical land utilization, the boundaries of the conservation area can be clearly defined based on the quality analysis of the courtyard type. That is to say, according to whether the houses on both sides of the street are the courtyard type that can evoke a sense of traditional experience during the street walk, the boundary of the conservation area is defined.

In the old city, the western edge of Area B and the northern edge of Area A are relatively vague, and it is not easy to determine the specific boundary. However, through the detailed analysis of the building facade and the walking experience through the actual photos of streets, the edge of the conservation area can be determined (Figure 11). In addition, the historic public buildings outside the conservation area are recommended for individual preservation.

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Figure 11 Analysis for determining boundaries of the conservation area

3. Typology and traditional urban tissue

Within the scope of the conservation area, the characteristics of traditional urban tissue can provide a basis for the shape control and design of street blocks in urban renewal.

3.1. Composition of the traditional urban tissue

In order to analyze the characteristics of the urban tissue more conveniently and clearly, this study firstly abstracts two gable lines from a courtyard type on its plan to represent it. This kind of volume still implies various information about a courtyard type, including the courtyard outline, inner yards, entrance, the width of the courtyard, the depth of a single Jin and the number of the Jin in the courtyard(Figure 12, A). At the same time, it is possible to infer the gable lines of other former courtyards in the area on the basis of the existing wall foundation line in the plan. As a result, the arrangement of streets and houses in the area is highlighted (Figure 12, B).

On top of the traditional urban tissue, four typical slices with the size of 200 x 200m were selected (Figure 12, a, b, c, d).
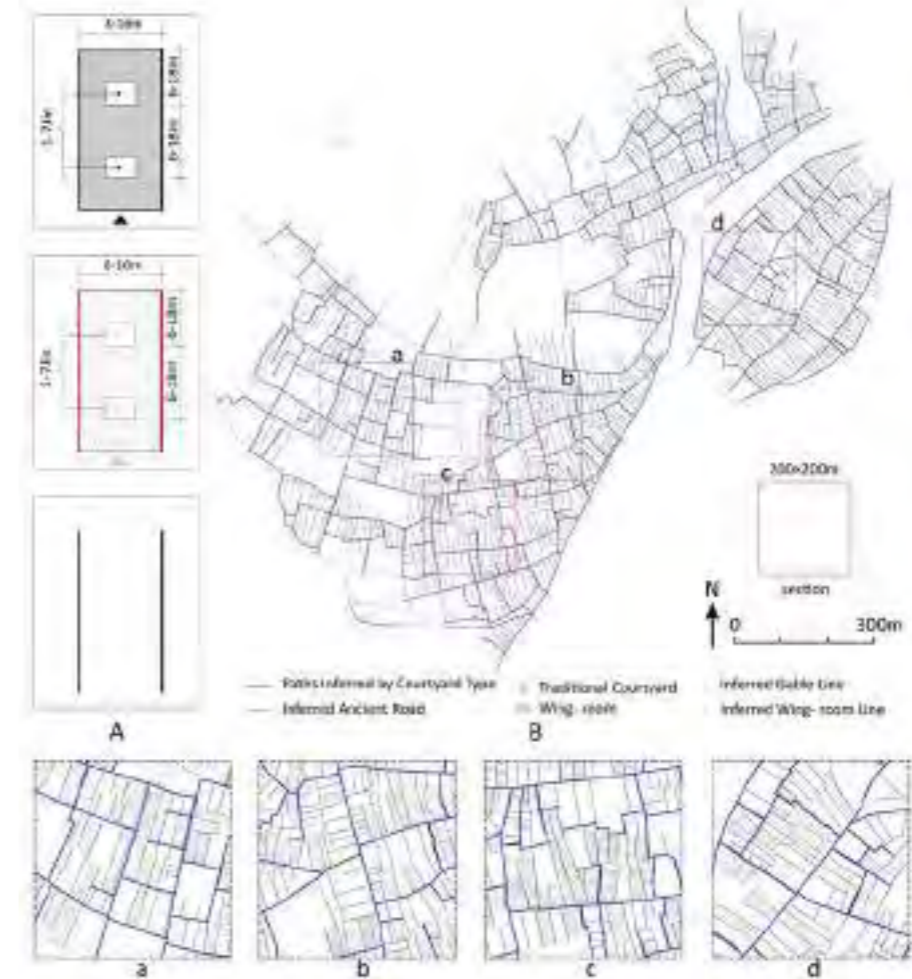
Figure 12 Composition of the traditional urban tissue and selected slices

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Figure 13 Typical arrangement of streets and houses

3.2. Characteristics of the traditional urban tissue

(1) The arrangement of houses in the street block

In an ordinary street block or small size street block, there is usually one courtyard with 1-3 Jin running through the entire street block, or there are two courtyards with 1-3 Jin arranged longitudinally back to back. There are 5-6 typical three Kai courtyards arranged horizontally in the ordinary street block. In a wealthy street block, there are two multiple Jin courtyards arranged back to back. In Area B, there are also cases where super-long ancient courtyards and common courtyards are arranged back-to-back (6+2 Jin, 7+1 Jin), or 3-4 three Kai courtyards which have 2-4 Jin are arranged through a street block (Figure 13, a). There are 10-12 three Kai courtyards arranged horizontally in the wealthy street block.

At the same time, there are cases where courtyards with different widths are relatively combined vertically in a street block, that is, a five Kai courtyard or a courtyard with wing rooms corresponds to multiple ordinary three Kai courtyards vertically (Figure 13, c). In the horizontal direction, there are cases where courtyards with different lengths are juxtaposed, that is, a multiple Jin courtyard in the horizontal direction corresponds to multiple courtyards with 2 to 3 Jin (Figure 13, b).

(2) Direction of houses on both sides of the street

According to the direction of abstracted gable lines in the town plan, it is found that most of the courtyards are oriented north-south in the street block, echoing Wolong Mountain, and perpendicular to the east-west street (Figure 13, c). Meanwhile, the direction of the courtyards on both sides of the north-south oriented Nanda street is parallel with it (Figure 13, a). On both sides of Diantou Street, there are many retail shops with opposite entrances, and the direction of these houses is perpendicular to the street (Figure 13, b). Next, there are arcades on both sides of Shuidong Street. Arcades regularize the edge of buildings, and courtyards with the arcades are built perpendicular to Shuidong Street (Figure 13, d).

(3) Street connections and accessibility

Due to the different sizes of the street blocks, there exist the T-junction road connection mode (Figure 13, a, b). In addition to entering the courtyards from the main street, in some larger street blocks, there exist straight and L-shaped alleys in the street block to lead to inner courtyards.
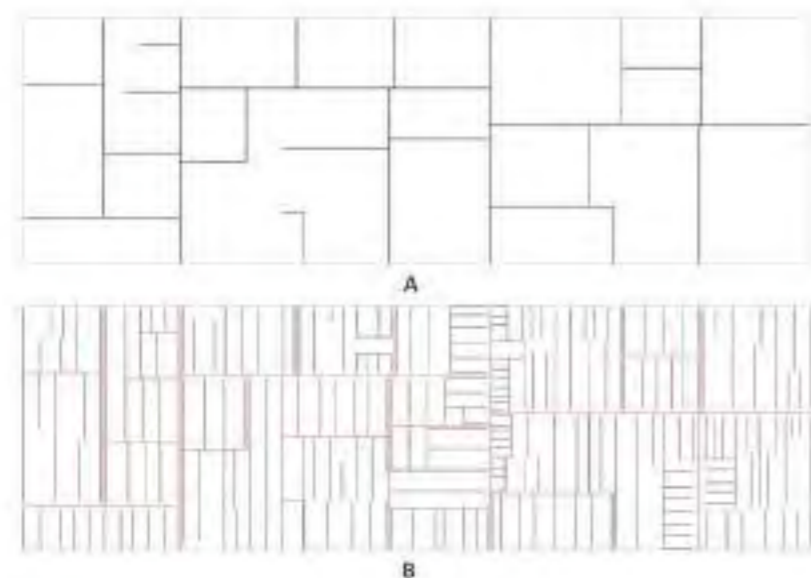
3.3. Rehabilitation of the traditional urban tissue

Based on the composition of the traditional urban tissue, the block to the northwest of Shuidong Street is taken as an example of historic district revival (Figure 14, a).

Viewed from the site plan of the renewal design, on the one hand, the volume of buildings conceals gable lines which represent the arrangement of traditional courtyards. On the other hand, the walking paths in the block are the continuation of the traditional street structure (Figure 14, b).

Figure 14 Site plan

4. Processes of building types and generation of new types

The evolution characteristics of the traditional type and the causes for the generation of new types can help recognize the importance of accepting new types, and provide guidance for architectural renewal design, so as to continue the traditional style and conform to the development of contemporary society.

4.1. Processes of building types

From the Tang to the Ming and Qing Dynasties (736-1912), the houses in the old city were mainly three Kai courtyards. During the Ming and Qing dynasties, commercial trade was frequent on Diantou Street, and a number of courtyards with front retail stores (front-store-back-house) appeared on both sides of the street, or several separate shops were set up along the roadside. In the period of the Republic of China (1912-1949), there appeared the form of the courtyard with a front arcade learning from Xiamen city on both sides of Shuidong Street, where trade was also frequent. The front arcades along the roadside can protect pedestrians from sun and rain when walking under them. At the same time, land prices became expensive from the west to the east in the whole area. Therefore, In order to save the land area and reduce rental prices, the form of lower-store-up-house

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also appeared.

The evolution of the traditional courtyard type has not always been continuous in the long-term transformative processes. The period of the Republic of China also saw the emergence of new foreign cultural influenced building types, such as the church due to the war context. After 1979, new building types such as department stores, corporate office buildings, hotels, as well as schools and hospitals, emerged in the old city. In addition, traditional residential houses were constantly renovated by local people and divided into smaller units for subletting to multiple tenants. The yards were connected by outdoor paths, and the original private space is transformed into an open space shared by several families, resulting in a new layout. There are also many illegal additions, indicating that the traditional spatial forms are no longer adequate for the daily needs of the local residents.

4.2. Requirement of new building types

In the new era, when the way of daily life has changed, is it still necessary for the traditional courtyard type to exist? If the traditional type can still exist, should it be an extension of the traditional type or a variation of the traditional type? From the perspective of contemporary reality, the purely traditional courtyard type has limitations in the daily use of local people and can not drive local economic growth. Therefore, it is necessary to accept new building types and translate the traditional building type.

At present, the Changting old city lacks dynamic large-scale shopping malls and cannot fully integrate into the era of rapid development. In order to meet the requirements of contemporary society and promote the economy of the city, it is necessary to analyze the characteristics of the emerging building type-- shopping mall. Take a common modern shopping mall in China as an example (Figure 15, a). It is found that the modern shopping mall is large in size, diverse in shape, and mostly open in the interior space, making the layout more flexible. Furthermore, it is found that in the modern shopping mall, the road is surrounded by different stores, and escalators or lifts are installed in a vertical direction. At the same time, a hall will be set up in the plan as a public space for gathering and staying (Figure 15, b).
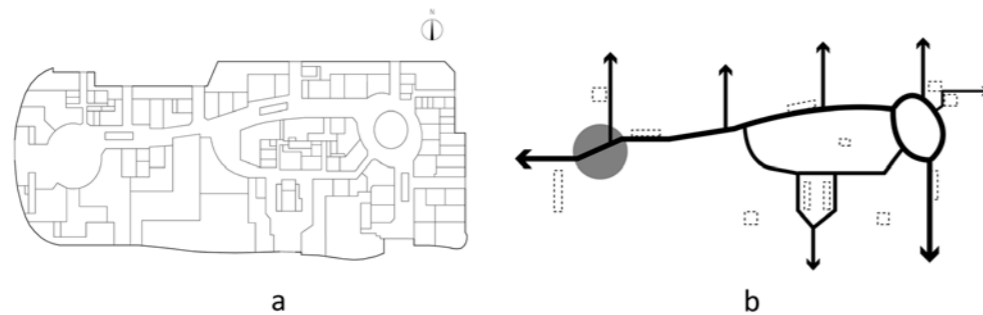
Figure 15 Layout analysis of a shopping mall

4.3. Generation of the new building type

Based on the historic district revival, the building renewal design is based on the example of the site of the southern part of Shuidong Street block.

First of all, the functional orientation of the renovated plot is the large shopping mall. Secondly, some traditional elements are preserved and continued in the plot. 1) Composition of traditional houses analyzed by gable lines above can be reflected in the roof form (Figure 16, a, b). 2) Composition of

traditional streets can be reflected in the retained walking paths (Figure 16, c, d). 3) Both stilted buildings along the river and arcades along the street are traditional building types that conform to regional characteristics, so they are preserved and repaired (Figure 16, e, f). Then, combined with the functional requirements and layout characteristics of the shopping mall type (Figure 16, c), the internal space of the traditional type is opened, and the hall for staying as well as the vertical traffic space are configured. This approach makes it fit the way the big mall works. Finally, a new building form can be presented.

Figure 16 Generation of the new building type

This new building form can be regarded as a traditional building type or a new building type. On the one hand, its roof form and walking paths still continue the traditional urban tissue, with the connotation of the traditional type. On the other hand, although the original streets are still

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preserved for walking paths, the function has changed, and the commercial operation mode and usage of the open space show that this is a new type.

5. Conclusions

Typological research plays an important role in the process of urban renewal. On the basis of a complete understanding of the traditional type, the type can help to zone the conservation area, analyze the characteristics of the traditional urban tissue, and determine the design direction.

When delineating a conservation area, the type can first help infer the structure of streets, including 1) positioning and recognizing the range of areas where traditional streets are densely distributed. 2) Identifying the courtyard entrance, determine the main street in front of the entrance and the street behind it. Secondly, the type can help understand the function and development characteristics of the area. Finally, according to the walking experience of the courtyards types on both sides of the streets, referring to the traditional street structure and functional characteristics of the area, the boundary of the conservation area is clarified.

When analyzing the traditional urban tissue, type can 1) help abstract the expression of the house type, and make the analysis of urban tissue characteristics easier; 2) determine typical slices. 3) Identify the arrangement of streets and courtyards.

When designing a new architecture, the type helps to recognize the importance of accepting new types according to the evolution of the traditional type and the background of the generation of new types. Therefore, by combining the composition characteristics of the traditional urban tissue, the design direction is determined.

In conclusion, the research on the traditional building type can further help to solve the problems encountered in the process of the historic districts regeneration. However, it also needs to combine the aim of design and other design strategies to achieve the historical town renewal. In addition, the generation of new types is necessary. As people's lifestyles change according to the social context, the corresponding spaces that accommodate their daily activities also need to be transformed. Some living spaces are spontaneously changed by local people according to the change or use, while designers can guide the regeneration of the historic districts based on the typological research. All in all, whether it is the continuation of traditional types or the insertion of new types, it is the way people live that is the most fundamental element for whether the building type needs to be changed in the process of urban renewal. It is also the most scientific cognition.

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THE IMPACT OF GROUP MIGRATION ON SPATIAL FORM IN AN ANTHROPOLOGICAL PERSPECTIVE: A CASE STUDY "ANCIENT YAO VILLAGE IN THE QIANNAN REGION OF CHINA" AS AN EXAMPLE.

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ABSTRACT:

The Baiku Yao is the most widespread of all the Yao villages in the Yao Mountains of Libo County, Guizhou Province, China. In the past, the Baiku Yao used to migrate frequently, as they were called the "gypsies of the East" because they used to cultivate their land by slash-and-burn and move from one mountain to another when they ran out of food.
As they kept moving, their way of life and physical space changed. However, with the influence of the Han Chinese way of life and the entry of the market economy, what was considered 'backward' and 'primitive' in the Yao Mountains is constantly being changed by external forces, most notably the transformation of the living space. During rapid modernization, the Baiku Yao of the Yao Mountains has shifted from hunting to settlement but have continued to migrate. During this period, the way of life, livelihood systems and social relations of the Baiku Yao has undergone tremendous changes, and these changes are reflected in the changes in the Baiku Yao living space, and the reinterpretation of the forms of space provided by the government.
The anthropological perspective allows for a more complete interpretation of the entire study from a holistic perspective. Therefore, this paper focuses on the causes and spatial forms of the three migrations of the Baiku Yao ancient villages, using anthropological fieldwork methods and drawing certain conclusions. The group migrations of the ancient Yao villages in the Qiannan region can be divided into three broad categories, which present changes in social relations, traditional customs, and contemporary changes in spatial form.

KEYWORDS :
Baiku Yao group, Migration, Changes, Constancy

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The Baiku Yao are a subgroup of the people who call themselves "Buno", named after the knee-length white trousers worn by the men, and live mainly in Baxu and Lihu Yao townships in Nandan County, in the north-western part of Guangxi Zhuang Autonomous Region, and Chaoyang, Yao Mountain Township in Libo County, Guizhou Province China(Figure 1).

The Baiku Yao is recognized by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as one of the best-preserved ethnic groups and has been described as a "living fossil of human civilization".

The Baiku Yao group is the most widespread in the Yao Mountain, Yao Township of Libo County, Guizhou Province, China Figure 1. In the past, the Baiku Yao used to migrate frequently, as they were called the "gypsies of the East" because they used to cultivate their land by slash-and-burn and move from one mountain to another one when they ran out of food. As they kept moving, their way of life and physical space changed. However, with the influence of the Han way of life and the entry of the market economy, what was considered 'backward' and 'primitive' in the Yao Mountains is constantly being changed by external forces, most notably the transformation of the living space.

Figure 1. Mapping of Libo County, Guizhou Province, China.

The Baiku Yao is an ethnic group that crossed over directly from a primitive to a modern form of social life, and still retain the social and cultural information of the transition from a matrilineal to a patrilineal society. The cultural legacy of the matrilineal society is most prominent in the pre-marital interaction between the sexes. In relationships, the woman often takes the dominant position, actively chooses, and boldly pursues, the woman chooses the man and dominates him, and the man is in a subordinate position. After marriage, the woman lives under her husband and is subordinate to the man's leadership.

Baiku Yao women are skilled in weaving and still retain a complete set of hand-made techniques (Figure 2). It takes a year to make Baiku Yao costumes, as each of its processes is influenced by the seasons, weaving, spinning, embroidering, and painting patterns by themselves in more than thirty steps.

The Baiku Yao costumes are divided into men's and women's costumes, festival dresses and casual dresses, and their costume patterns are mainly decorated with chicken flowers, reflecting the worship of chickens by the Baiku Yao people. The men's festival dress looks like a male chicken, as the feet of this dress are the tail of a chicken and the sides are the wings of a chicken. The white trousered Yao men's white trousers are embroidered with five stripes of red flowers on the knees, which are said to be the bloody handprints left by the Yao kings during their wars with foreign clans and embroidered on their clothes as a reminder and a symbol of their clan totem. The design is that of a chicken, and every woman in Baiku Yao knows this design and can tell exactly where the chicken's head and feet are.

The summer dress of the Baiku Yao women consists of two pieces of cloth, one at the front and one at the back, which is worn casually on the shoulders, while nothing is worn underneath, so that the female breasts are visible in the side view. If you bend down to work, you can see everything. The "two-piece Yao" comes from the summer dress of the Baiku Yao women. The fact that Baiku Yao women do not cover their breasts is not a sign of eroticism, but rather a sign of the supremacy of maternity and reproduction.

The unique Baiku Yao costume shows that in ancient times, the Baiku Yao already learned to use abstract ethnic-cultural symbols to express their interest in life and cultural meaning, which has an important place and value in the costume culture of China's ethnic minorities.

Figure 2. The Baiku Yao's Daily life

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During rapid modernization, the Baiku Yao, in the Yao Mountains, shifted from nomadic hunting to settlement, yet continued to migrate. During this period, the way of life, livelihood systems and social relations of the Baiku Yao has undergone tremendous changes, and this change is visually reflected in the changes in the space in which the Baiku Yao live, and in the reinterpretation of the given spatial forms provided by the government. After three migrations, the Yao Mountain inhabited by the Baiku Yao is now divided into three villages, the first being Lapian Village Groups 1 and 2, the second being Lapian Village Group three and the third being La Dongji New Village (Figure 3).
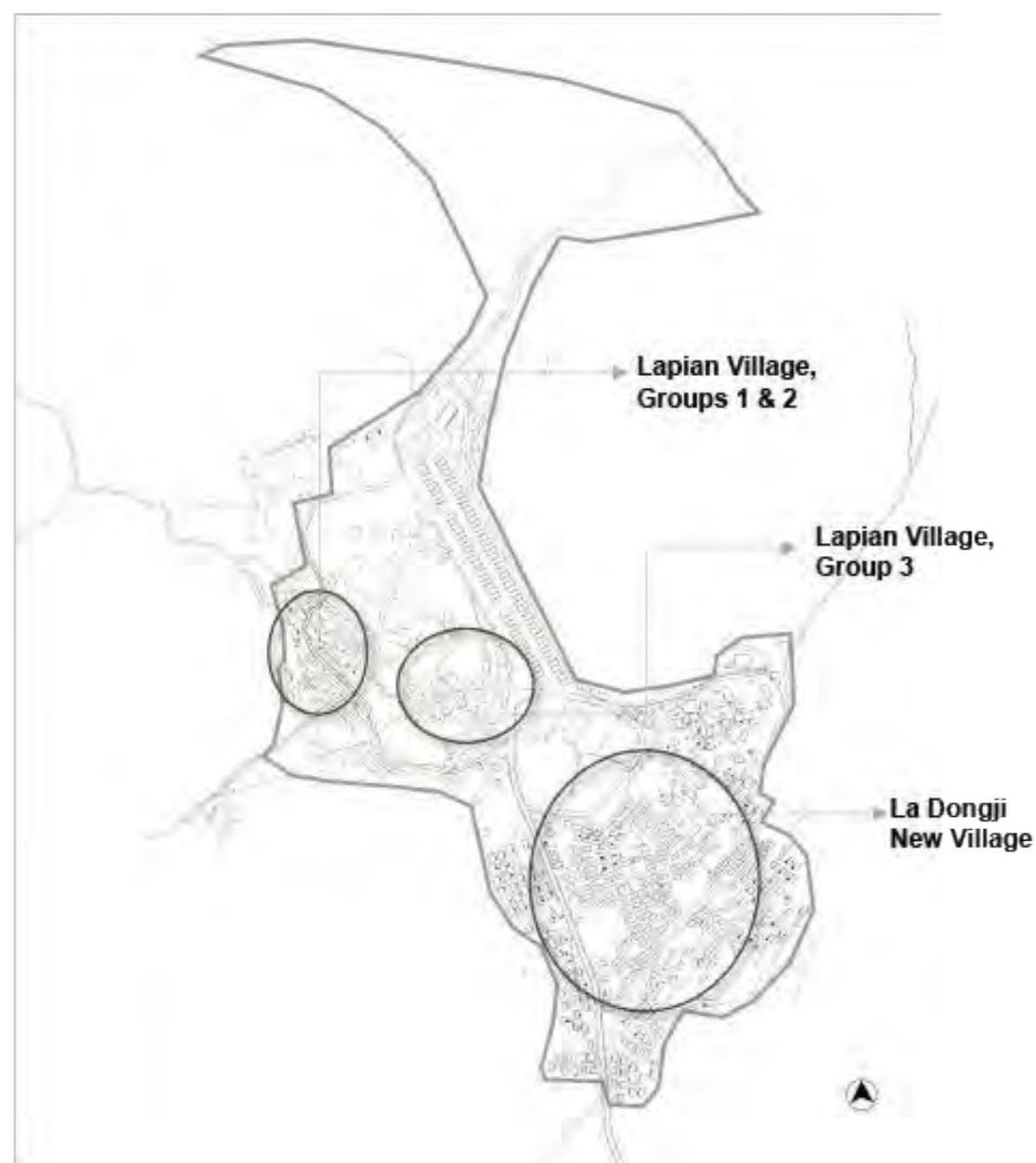

Figure 3. The three relocation sites of Libo County

Fieldwork in Yao Village

The research period was from early to mid-July 2020, and a total of 31 valid research samples were collected. The original addresses of the first batch of relocated villagers were: Chaosha Group of Mushroom Village, Ladong, Laozhai and Dongmeng Village, and the forestry genus of Lapian Village.

The addresses of these villagers are now in the second phase of La Piece Village. The reasons for the migration of this group of villagers are related to the relevant policy intervention of the Libo County Government. The residential buildings have changed from the original two-stored wooden buildings to two-stored wooden tiled houses. During this experience, we chose He Family as the example to discuss the impact of group migration on spatial.

Three points were summarized during the research through interviews with successive generations of the He family in Yao Village Figure 4.

1. Over the past hundred years, from the 1920s to the present, the He family has undergone nine relocations.

2. The reasons for migration range from the influence of more spontaneous factors such as family separation and marriage to a combination of external and spontaneous factors such as policies and poverty alleviation and relocation.

3. The change in residential location shows a clear pattern of agglomeration relative agglomeration——relative dispersion——relatively dispersed——dispersed.

Figure 4. The migration history of the He family

The impact of group migration on spatial

● **The first migration(1920s-1980s)**

As the head of He Family, Guangtian He with his family members lived in Bangao Group during 1920s to 1960s.In this period, Guangtian He with his family members lived in Bangao Group,Yao Village.The changes in his family members and him have separated in lifestyle and living space. From the perspective of labor, they usually grew just on their way without policies or requirements from the government as before. However, it is now influenced by "China's policy of land enclosure to the household"[1] it is no longer up to the individual to decide what to plant, but to rely on this policy to grow wheat or rice, which is then handed over to the village branch and

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1   The main difference between the contract system and the people's commune is that the peasants contract the state's land, and the state peasants enter into a contract which stipulates that after the peasants have handed over a considerable amount of their agricultural produce to the state (the so-called "package production to the household" or "package work to the household"), the rest of the surplus grain is left to the peasants were free to dispose of the rest, which could be sold in the free market. This changed the production model from that of the collectively managed production teams or production brigades to that of a single peasant household, where the peasants managed and produced, distributed, and ran their own business. However, the land remains in the collective (state ownership).

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receives its share of the income. In the old days, "the fair"² was more about the villagers from Yao Village selling the food and vegetables they grew for a certain amount of income, but at this stage it was more about buying the seeds, livestock and other necessities needed to support the whole family. Similarly, a real phenomenon that emerged during the fieldwork was that villagers used to keep three different types of livestock cows, chickens, and pigs, but at this stage, they were more likely to keep chickens, while pigs and cows were no longer the main choices of the villagers in Bangao group, Yao Village, because they were not easy to clean and remove the manure for hygiene reasons.

In addition, during the actual field research, I also focused on the changing needs of the villagers in terms of their spiritual life (or what could be called cultural life) during this period. For example, the traditional Chinese festival includes the custom of celebrating the Ghost Festival, also known as the Zhong Yuan Festival, on which villagers would worship the god of the fields, which is also known as Zhai Tian Tou. Apart from being a custom since the Han Dynasty, it is also often combined with the Qiushe (also a custom of putting the head of the landlord on the cooking stove to pray for food and clothing) around the autumn equinox. Villagers usually worship the god of the fields at the crossroads of the fields with vermicelli dough, chicken, millet, melons, and vegetables to wish for a good harvest. Also, in the wooden fenced houses they live in, a red charm is put on the beams (according to an interview with an old man, this red charm is locally known as "mending the beams") to pray for the safety of the family. The Baiku Yao group is not only put red charms on the beams (above the house), but also hang small devices made of red charms in the corners of the house, also known as "bao zi bridges", which are commonly used in the space of a family with a newborn child to bless the child's health and safe growth. This is also known as the "child protection bridge", which is a small device made of red talismans, but unlike the "child protection bridge", the "child seeking bridge" is a small device made of red talismans. Unlike the "child protection bridge", the "child seeking bridge" is usually placed underneath the house (at the corner floor) and is often found in family spaces where the birth of a new child is desired as soon as possible. In the case of the He family in the report group, the presence of both devices in the same space is because two small families of two brothers from the He family live in the same space. One of the more interesting points of discovery was that bamboo poles were also found hanging from the roof of the He family's residential space. Upon enquiry, it turned out that this was the third male of the He family (the youngest son of Guangtian He), hoping that he could get married soon, which is why the bamboo poles were hung so that other girls in the village would know that a single young man was waiting to be married in this family. The above is a summary of the findings of the field research on the lifestyle of the Guangtian He family, followed by a discussion of the living space, which is a small, self-built, two-stored wooden building set back from the mountain. The kitchen is a separate space, part of which is divided for cooking food for the livestock, and two fire pits (fire pits are a combination of rooms and tools that are fixed in the room to make a fire for cooking and heating) are in the middle of the kitchen. The bathroom was located outside (an open space made of stone, not private and long abandoned). As the first phase of the Ho family's lifestyle was investigated and interviewed from fieldwork research in 2021, which could only be summarized from interviews with some of the surviving members of the He family, the small wooden building still exists, but it has been abandoned and only one of the He family's relatives lives there.

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2   The fair is a Chinese folk custom, known in the south as "catching the field", "catching the mountain" and "taking advantage of the market". A bazaar is a form of trading activity that takes place on a regular basis and is mainly a form of trade organization left over from a time or region where the commodity economy was not well developed, also known as a bazaar. (The market is an essential activity in the lives of working people and has a certain periodicity.

- **The Second migration(1980s-2000s)**

In the second phase, the He family moved from the Bangao group to Dongmeng village (relocating on their initiative). In terms of lifestyle, there is no change from the first migration. In terms of spiritual (cultural) life, new ancestral tablets have been added to the living space (ancestral tablets are tablets dedicated to the ancestors of past generations in the traditional Chinese culture of ancestor worship), with the ancestral tablets facing the direction of the rising sun and with their backs to the mountain, which according to the eldest son of the He family is due to respect for the ancestors. There is also a ritual of cutting the bull during worship. When someone in the Baiku Yao family dies, the family of the deceased sends someone with a bull-cutting knife to report the death to the uncle before the funeral is held. Once the uncle saw the bull chopper, he knew what was going on. The following day, the uncle led dozens of people, carrying bronze drums and wind buckets, to the home of the deceased to play. The bronze drum is a sacred relic of the Baiku Yao, and when it is inaugurated, people kill chickens, set off firecrackers and hold a drumming ceremony at the place where the bronze drum is buried: "Oh, bronze drum, we have come to honor you, ask you to speak and beg you to tell our ancestors to bless us with good winds and rain and good harvests." Only after these words are the drums taken out for the funeral. After the funeral, the same ceremony is held to honor the drum and bury it so that it will not run away. The day before the funeral, the bronze drums are played to "open the way" for the deceased so that more people will hear the drums and come to the funeral automatically. The bull cutting and burial are very sacred to the Baiku Yao people. They believe that the bull is the fruit of their predecessors' business and should be accompanied by them. Before chopping the bull, a stake about 2 meters high is cut up and a bamboo ring is placed on the stake, then the bull's nose is tied with an iron ring and a long hemp rope is tied to the outside of the scorned ring so that the bull can turn around the stake. Before the bull is cut, the families of the deceased line up according to gender and each feeds the bull with the ears of grain they are holding, worshipping the bull, and crying over it. At the end of the ceremony, the shaman, who presides over the cutting of the ox, scatters white rice while reciting the merits of the ancestors, the experiences of the deceased and the memory of the deceased by the descendants. After the recitation, the bull cutter takes the knife from the uncle and cuts the bull. After the bull is tied down, the blood is poured into the prepared wine, and then the blood is sprinkled on a bamboo sketch to toast the drummers, friends and relatives, and the people.

- **The Third migration(2000s-now)**

In the third stage, the Ho family moved from Dongmong village to Lapian village (the government requested a unified relocation). In terms of lifestyle, all three sons of the He family have their own families and careers. The youngest son, Jigao He, is currently a math and PE teacher at Yaoshan Primary School and according to him, there is now very little need to rush to the market, as there is a supermarket in Lapian Village where you can buy the necessities of life at any time, while they have opened a kiosk on the ground floor of the house to sell drinks and snacks to supplement the household. In terms of spiritual (cultural) life, a political life began, requiring party meetings, organizational meetings and talks with the public, while the He family also had a varied family life, taking the children to nearby scenic spots. In addition, the ancestral tablets were kept as they always were, towards the door, a custom that is retained to this day. In terms of living space, the government has unified an area collectively known as Lapian Village, consisting of small two-stored buildings made of wood, tiles, and masonry, the first floor of which consists of a bedroom (resting area) and a bathroom, the ground floor of which consists of a kiosk (commercial space), a kitchen, a living room, and a bathroom. In the kitchen space, the fire pit has been abandoned and no longer has any value.

Conclusion

The change in the fire pits shows a shift from a monolithic structure centered on the fire pits to a partitioned house based on functional divisions, reflecting the shift from a holistic mindset in which Baiku Yao do not separate things from themselves to a "modern" dichotomy of subject and object. The first period is characterized by the retention of the straight house form, where the entrance door opens on the side of the hill wall, while the second, third and fourth periods are all horizontal houses. In the first period, when the house was self-built, the firepit was located near the center of the house, and around it was distributed various representations of the house's functions, such as the cooking area, the pig's food pot, the water tank, and the loom. In the second period, when self-built houses were built, the various functional areas began to be differentiated and the firepit was relegated to a corner of the house, mostly located at the center point of a quarter or sixth of the space of the house. In the first, second and third periods, washing was mostly distinguished from the space of the toilet, with washing either at the front of the house or at a tap inside the house, and bathing taking place at the back of the house with the toilet being a small, separate house. In the third period, when the houses were self-built or provided by the government as through-houses, partitions of space other than bedrooms began to appear inside the house, such as the production room where the loom was located, the storage room, the kitchen, the fire pit exiting the public space to the kitchen, and the only space that was not partitioned was the cultural space represented by the ancestral tablets and the living and guest space represented by the television.

From the first migration, there was a growing tendency to separate the production space from the living space and to specialize the whole spatial form. The reasons for this are, on the one hand, the shift from holistic thinking to a 'modern' dichotomy of subject and object, which was influenced by the Western influence of the Han Chinese in recent times, and the influence of the Yao people through contact and exchange, and, on the other hand, the government-led efforts to spread modern house interiors to the Yao Mountain region in the context of poverty alleviation and development. However, as the research sample is mainly focused on a few generations of the He family, the findings are not sufficiently generalized, and the sample size is not large enough.

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FACED WITH METROPOLIZATION : RETHINKING THE TEACHING OF DESIGN PRACTICES THROUGH THE LENS OF TRANSITIONS

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ABSTRACT

Teaching design in relation with the challenge of transition cannot be dissociated from a reflection on the evolution of professional practices and the status of the designer. The seminar entitled "Rethinking metropolisation, building a world in transition" initiated in 2016 at the National School of Architecture and Landscape Design of Bordeaux is a teaching program where such reflection takes place. Based on field work conducted in France and abroad, students participating in this seminar are asked to examine these evolutions.

This critical thinking approach to metropolisation processes aims to identify alternative models of urbanization and to analyze their social, political, economic and spatial implications. After six years since it was founded, and the production of nearly 80 master thesis and articles, the work carried out in this seminar represents a significant corpus on the above mentioned issues. The purpose of this communication is to present these contributions. More than an exhaustive presentation, it aims to analyze this corpus while establishing a bank of knowledge on this subject, and to shed light on the pedagogical evolutions which affect the transmission of the necessary skills.

The key place of transdisciplinary knowledge and the plurality of profiles of teachers involved in this seminar (architect, economist, geographer, landscaper, urban planner, sociologist) are highlighted. As an indication, issues in design processes such as grassroots skills, acting collectively, participative democracy are addressed to highlight key evolutions. It is the challenge of a new professional ethic enabling the re-connection of things and beings by associating the resources of the earth beyond their exploitability which is also addressed. In this context, rethinking metropolisation does not imply the rejection of this process, but to rethink its characteristics in order to formulate reconnecting scenarios between urbanization and territorial and human resources in the era of the Anthropocene.

KEYWORDS :

métropolization, transition, ressource, participative democracy

Teaching in a school of architecture cannot be dissociated from a reflection on the evolution of professional practices and the status of the designer: the knowledge and skills that are transmitted to students so that they can find their place in society.

The identification of this knowledge and skills - their renewal and diversification – has constituted both the condition and the vocation of the seminar " Rethinking metropolization, building a world in transition"[1] since its establishment in 2015 at the Bordeaux National School of Architecture and Landscape.

The central subject that drives the reflection in this seminar is the paradigm shift that is required in the field of architecture and landscape design in the face of the ecological crisis. This shift is embodied by the concept of transition. The final objective of the seminar is to lead the students to develop a critical look at this process, to write a master's dissertation whose main expectation is precisely to explore this new professional horizon that is imposed in the context of transitions.

This article aims to give an account of both this subject and this objective. Firstly, we will expose the way in which the paradigm shift embodied by the notion of transition is approached, taking into consideration the particularity of the academic and professional culture of the architect: the singular place given to the spatial dimension of the issues addressed. Secondly, we will evoke the exercise of the master's dissertation itself: on the one hand, the pedagogical protocols put in place over years of experimentation and, on the other hand, the main themes and academic debate on which the students' work is based.

In conclusion, a form of inventory will be created, based on seven years of work and production of the seminar, in order to select the main study aims which nourished the debate within the students' work, considering the growth of the ecological crisis experienced during the past two years.

1. Elaborating critical thinking frame works on transition versus urbanization

Exploring the transition paradigm shift can be done in many ways, depending on the topics addressed and the disciplines convened. The spectacular growth of the academic literature in this field over the last few decades bears witness to this (Markard, J, Raven, R., and Truffer B., 2012). In this regard, a set of precepts will be formulated to guide the reflection conducted in the seminar and the approach followed by the students in their research. Specifically, there are three critical thinking frameworks about urbanization processes and spatial project practices that will be examined, and which operate at different levels in the production of student work.

1.1. Identifying the agents and spatial realities of transition

The first of these frameworks is based on the following postulate: the notion of transition is not only endowed with a temporal value linked to that of change, but also a spatial value according characteristics of places. Implementation of the transition process are spatially located. (Hansen & Coenen, 2015). In this regard, a unifying notion is proposed for the transition process based on the cases studied: the notion of *spatiality*. By *spatiality*, we mean the geographical dimension of the phenomena studied (Levy &Lussault, 2013). The dimension is plural, because this notion refers to all scales of inhabited space: from the territorial scale to the domestic scale. It is by taking into account the geographical and situated dimension of the transition process that we can avoid the sometimes universalizing and homogenizing character of certain analyses (Guillot & Versteegh, 2018).

This situated and spatially embodied approach to transition is based on a body of work from the PASSAGES research center at Bordeaux Montaigne University[2]. As Christine Bouisset and Sandrine Vaucelle (2020) point out in a recent work from this research center : "the analysis of the geographical dimensions of transitions therefore presupposes the observation of locations and changes that

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1   https://rlm.hypotheses.org/
2   https://www.passages.cnrs.fr/

affect places. But it cannot be satisfied with this. The notion of spatiality also refers to the practices and constructions by which geographic actors inhabit, think about and represent the world"[3].

Through the notion of spatiality, a common methodological characteristic emerges in the reflection engaged in this seminar: on the one hand, to explore the paradigm shift embodied by the transition through situated cases; on the other hand, to go back and forth between the identification of agents and stakeholders of the transition, and the physical, morphological, and even phenomenological analysis of the studied situations

Whether it is a question of redistribution of activity, short circuits, relocation of food production, recycling or reuse of construction materials, or all these different modes of doing and symbiotic relationships that transition introduces, one prerequisite is essential: to unravel the political issue by establishing the link between human commitment (political, economic) at the local level and spatial reality, and in particular the fact that these actions are bottom up processes. Tackling metropolization with transition is therefore fundamentally a political action. Hence the fieldwork that constitutes an essential component of the seminar for the writing of the dissertation. In this respect, meeting the agents of the transition through the survey work is an essential step

1.2. Developing a critical approach of the heritage of modernity

A second framework of thought introduces another aspect of the rupture represented by transition : a rupture of an ontological and historical order aimed at questioning the trajectory of modernity that has guided the action and the spatial project. In the 1990s, Bruno Latour (1995) suggested a form of warning that today has acquired particular force in view of the acceleration of the so-called environmental crisis: the need to engage in a form of rupture with the 'productivist' economic system on which of our living environment is based.

"Modernizing or ecologizing" (*moderniser ou écologiser*) were the two postures that were offered and are still offered to us today. According to Latour, "to ecologize a question, an object, a data, is not (only) to put it back in its context, to create an ecosystem for it, it is to oppose it, term by term, another activity, pursued for three centuries and that one calls for lack of a better term, modernization"[4]. And this author adds: "to ecologize means to create procedures, allowing to follow a bundle of quasi-objects whose links of subordination remain uncertain and which thus obliges us to adopt a new political activity adapted to their follow-up"[5].

According to this perspective, we are entitled - and even obliged, in our opinion - to develop a critical apparatus on the intellectual heritage of modernity in the field of architecture and landscape. We are thinking in particular of the logic of sectorial and functionalist thinking of human activity in its relationship to space (from which the famous zonings are derived) to the detriment of a complex (Morin, 1990) or "ecosophique" (Guattari, 1989) thinking.

In the disciplines of space and project, this sectorial approach, has notably nourished a form of apprehension of the world and the human space a set of binarism that we will try to untie, notably within the course that we dispense in parallel. As an example, one could evoke the rupture of the

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3   « L'analyse des dimensions géographiques des transitions suppose donc l'observation des localisations et des changements qui affectent les lieux. Mais elle ne peut s'en contenter. La notion de spatialité renvoie en effet également aux pratiques et aux constructions par lesquelles les acteurs géographiques habitent, pensent et se représentent le monde ».

4   « Ecologiser une question, un objet, une donnée, ce n'est pas la remettre dans son contexte, lui créer un écosystème, c'est l'opposer, terme à terme, à une autre activité, poursuivie depuis trois siècles, et que l'on appelle, faute d'un meilleur terme, modernisation »

5   « Ecologiser veut dire créer les procédures permettant de suivre un faisceau de quasi-objets dont les liens de subordination demeurent incertains et qui obligent donc à une activité politique nouvelle adaptée à leur suivi ».

forms of living that one assigns between the urban and the rural in the reading of our human settlements; between what would be of the order of the public and the private in the spatial organization of the human activities, etc.

This modernist and sectorial approach of the human space and its development is essentially also at the source of a form of division of the professional cultures, and competences in the teaching of the project. Faced with the stakes that we face today, is there not more convergence and commonality than divergence and difference? This is the option taken in this seminar where various disciplines are represented.

1.3. Beyond modernity : exploring other cultural heritages et design practices

Finally, "Rethinking metropolization, building a world in transition" means unraveling another form of relationship to the world that stems from modernity : the dual relationship between nature and culture (Descola, 2014). This is the third critical thinking framework that we are introducing as a preliminary, and in parallel to the conduct of this seminar. It is at once ethical, anthropological and philosophical.

Unraveling this relationship will mean, in this case, introducing a crucial issue: the relationship we have with the earth's resources in the transformation of our human settlements. By earth resource, we mean its material dimension, which is the one most often called upon when we evoke this notion in the project disciplines. Whatever the scale and the nature of the work built, any act of transformation of our living environment requires the use of material resources, and thus engages a modification of the physical conditions of the place. (Fievé et Guillot, 2020)

These stakes crystallize a set of debates highlighting, in particular, the question of the local resource in the project, the putting forward of practices shaped by the contextual constraints of realization and the reinterpretation of vernacular practices. But resource is a notion that we must also understand in its immaterial dimension. Beyond basic needs (supply of raw materials and energy, food or therapeutic uses, etc.), we must take into account the resource as part of a disinterested approach, based on a relationship with the living world and the landscape, which emphasizes the links between architecture and its environment and from which the diversity of living cultures stems, as shown by works in anthropology (Descola, 2005) , human geography (Berque, 2010) , and environmental philosophy (Larrère, 2018).

This dual approach to the notion of resource, which must be understood simultaneously, brings to light the challenge of transition represents on at least two levels.

In terms of professional ethics, the particularity of the political dimension of which the act of building is a part is brought to light, as well as the status of the designer within a larger group of actors. In this respect, and as the restitution of these practices shows, the issue of the resource implies a form of professional commitment on the part of the designers, which at the same time requires them to free themselves from conventional practices. Through their fieldwork, students are led to identify actors who have integrated this level of requirement into their actions.

On the anthropological level, the notion of resource questions the singular cultural and historical trajectory in the West that has been at the foundation of our relationship with the Earth's natural resources and the productivist and extractivist system on which our societies have been built for several centuries (Audier, 2019 ; Charbonnier, 2020) .The purpose here is therefore to explore other cultural heritages that have existed or still exist today, and in which another relationship to resources, progress, technology and modernity has developed. This raises the question of the status of the Earth's resources and the perception that other societies have of them as a living environment (Berque, 2011). In this regard, the opportunity offered to students to spend time abroad, outside the West, allows them to explore this field.

2. The master's dissertation : tools, method and objectives

The dissertation writing exercise is the place where these three critical thinking framework are summoned at different levels, depending on the choice of subjects treated by the students. A master's dissertation is a document of at least 80 pages which, through its content, attests to the student's ability to grasp a subject that he or she must 'problematize' in order to formulate research hypotheses, a method of investigation, and objectives based on a specific field. This exercise is carried out over three semesters. A form of progressiveness in the formulation and acquisition of research and writing tools is followed.

2.1. Elaborating a progressive pedagogical approach.

The first semester is dedicated to the acquisition of these tools. It is a propaedeutic semester. The acquisition of the tools takes place through attending courses and especially through two short exercises.

The first exercise consists of conducting a review of an article. The review exercise has different virtues: beyond the acquisition of knowledge on a subject, it is also a way for the student to understand the approach taken by the author: hypothesis, method and study case. Students also learn how to "read" a scientific articles, what a bibliography refers to, etc. This exercise is based on the choice of an article from a corpus that we have progressively built up over the first three years. The next paragraph outlines the nine themes that today unite both the reference corpus and the students' work, right up to the formulation of their thesis. It is the students' choices on selected topics, associated with the debates we hold simultaneously, that these nine themes have been selected.

The second exercise asked to the students during the first semester is to write a short article. In a short period of time (8 weeks and 4 sessions) it is naturally not possible for the student to write this article based on a substantial fieldwork. This is the exercise they will be asked to do the following semester. Nevertheless, this first research exercise is the means to initiate the student to 'problematize' his/her subject and to structure a critical and reflective thought on a subject of his/her choice. Moreover, this exercise, in addition to the review, is also the moment when the student will, through the nine themes, appropriate a field of reflection that will allow him/her to choose a subject that he/she will develop in the following two semesters within the framework of the thesis.

The second semester is allocated to the exploration of the subject that he/she prefigured in the previous semester: at the theoretical level (by reading academic works related to his/her subject) and at the practical level by choosing a concrete situation that will be studied in situ; this is the survey. In this seminar, particular importance is given to the survey from which the student will develop his reflection and conduct his demonstration. This relationship to the field - and the long time it is given - is essential to avoid the pitfall of a theoretical and discursive approach to the subject taking precedence over concrete analysis, namely, to account for its spatial dimension and the actors who are engaged in transition actions. However, the challenge of this semester is that, while carrying out this investigative and field work, it progresses in the formulation of questions and the problematic that it intends to develop. It is therefore essential that a reading activity be conducted simultaneously. This semester ends with the production of an intermediate dissertation of about thirty pages, which will include a statement of the finalized question and problems, a presentation of the fieldwork, a provisional plan of the dissertation, a bibliography and a first iconographic file.

The last semester is devoted to writing and re-writing the dissertation in its final format. A set of writing conventions that have been outlined in the first semesters must be respected. Particular attention is paid to the illustrative apparatus and the visualization of the study case and its spatiality. The supervision by the teachers is carried out within the framework of small work groups of 2/3 students whose dissertations deal with a common theme. This semester ends with a defense and the presentation by each student of a 15-minute power point

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2.2. Main themes and academic debates of students' works

Since its inception in 2015, a set of unifying themes of the different issues related to metropolization and transition, in its various meanings, have been identified. In connection with each of these themes, an inventory of student production (articles and dissertations) has been made. This inventory, updated every year according to the contribution of the students' work, can be consulted on the website of the seminar.

2.2.1. Feeding people, building the landscapes of tomorrow

The mechanization and industrialization of the agricultural system have disrupted our landscapes, as well as the economic and societal balances that once presided over the dialectic between the urban and rural worlds. How can we rethink this spatial and territorial dialectic today? How can we integrate the issue of food into a planning system dominated by the urban? What form of cultural and spatial representation would lead to a renewal of the current production/distribution/consumption system in a logic of transition? (keywords: consumption, agriculture, redistribution, food, territories, short circuits)

2.2.2. Imagining the "share" society

Historically, the rise of contemporary capitalism and urbanization have inscribed our societies in the same spatial and behavioral logic: more separation of functions, more mechanization of bodies and more individualization of tasks. In relation to this logic, metropolization constitutes a form of crowning achievement. The transition is understood here as the moment when we witness a reversal of these trends: the emergence of other values based on sharing, mutualization, and a form of questioning the hold of speed and mechanization in daily life, as suggested by the "slow movement. What repercussions will these changes have on the organization of our living space? (keywords: sharing, metropolis, carpooling, collaborative, co-working).

2.2.3. Rethinking the tools of the urban and metropolitan project

After the decline of the urban plan and the advent of the notion of urban design (*projet urbain*), urban planning has entered a new era, both in theoretical discourse and in practice: that of responding to the challenges of metropolization and ecological transition. In what way do these challenges re-interrogate and reshape previous urban planning practices: its principles, objectives and actors? In what way do they lead to the implementation of new tools and new methods? (keywords: urban project, urbanism, planning, citizen involvement, gentrification).

2.2.4.Territorializing metropolization

In its forms of establishment and in its relation to the territory, metropolization is similar to a vast process of "de-territorialization" of our societies, made possible by the deployment of a vast system of transport and communication infrastructures, associated with the massive use of fossil fuels. One of the major challenges of the transition is to rethink this logic from a relocalization perspective: to imagine new narratives aimed at thinking differently about our relationship with the Earth and its resources and with the landscape. (keywords : mobility, networks, landscape, local).

2.2.5. Scripting and spatializing the "new ruralities

Metropolization is a process that has been largely built on power and competition between cities, with the dominant demographic consequences being the growth of cities and peri-urban spaces. At the same time, this process has been built on - and deconstructed - another geography and other forms of settlement: the rural territories. In this context, it is legitimate to question what we will call here "The other side of metropolization": the cultural and landscape heritage constituted by the rural space. How can we think about its future today? How can we build a form of equity between territories in a globally metropolized system? (Keywords: rurality, hyper-rurality, renewal, tourism, representations, prospective).

2.2.6. Recycling and resilience as a theme

Unlike "sustainable development", the notion of "ecological transition" induces a questioning of a set of principles, on which the organization of our contemporary societies is based, especially in the economic field. In this respect, it calls into question the principle of indefinite growth and suggests the implementation of a new cycle of production of wealth and transformation of our living environment, based on other principles: those of 'degrowth', recycling or resilience. How do these new cultural and economic approaches to our living environment displace and recompose the logic of spatial projects? (Keywords: transition, ecology, reuse, social and solidarity economy).

2.2.7. Other ways of living in the world, other ways of settling in it

Metropolization and globalization are two processes that have jointly contributed to the transformation of the way societies inhabit the world. However, these processes have not worked in a unique direction, nor towards a standardization of lifestyles. On the contrary, they have "imprinted" their marks in a differentiated manner according to the places and populations that reside there, favoring both the resurgence of local specificities and the development of numerous forms of hybridization. In the complexity of these processes, what new forms of habitat are taking shape? (keywords: inhabiting, habitat, informal, squat, heritage, migration, self-construction).

2.2.8. Other ways of thinking about action and of practicing the project

The transitions movement aims to progressively change a set of organizational principles on which our living environment is based. But what about the method that presides over the implementation of these principle changes. In what way would the transition result in the advent of new forms of theories and practices of project design? Would it lead to, or induce, new forms of hybridization of knowledge and disciplines? Can we see the emergence of a form of professional transition referring to an evolution of the status of the designer within society and the forms of expertise associated with it? (keywords: installation, tools, practice, profession, representation, competition, interdisciplinarity).

2.2.9 The public space in all its states

The process of metropolization reactivates and reformulates a key agent in the thinking of cities and urban places: the public space. How is this agent reformulated, here and elsewhere, in France and abroad, in urban centers, in the suburbs, but also in rural territories? In what way does the transitions movement offer keys to understanding and unique modes of action for rethinking this essential dimension of the foundation of our democratic societies? In what way, in our time, should this agent be perceived and approached differently? (keywords: informal practice, multi-mobility, pedestrians).

3. Towards the education of a "citizen architect"

After six years of practice, it is possible to make a micro-inventory of master's dissertations. Beyond the nine themes, it is possible to make connections between the briefs by social subjects of common interest. These topics are also a reflection of the evolution that is taking place in professional practices and in the commitment of students to become involved in the transition.
First of all, there is a set of topics which raises to different degrees what Augustin Berque (2021)

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calls oecumene grip ('*prise écuménale*'), in which the resource constitutes one factor among many to qualify 'human ways of interpreting territory'. Berque questions the notion of resource as being made 'out of the ground', which is not only a physical operation, but 'an *opération écouménale*'; that is, an "eco-technical-symbolic operation that is fundamentally onto/logical (both logical and ontological). Through this notion, he denounces the productivist and extractivist system on which our society is based in its modernist trajectory.

Renewal of the forms of food production, renaturation of urban spaces, recycling and/or reuse of materials in construction, rehabilitation rather than demolition, etc., all these subjects work in a common direction: to rethink our relationship to resources and the living environment, to act differently in the transformation of our inhabited space.

In line with this issue, from a geographical perspective, another subject of reflection is needed to rethink the development of large cities in conjunction with the growth of the metropolization process: the negative externalities generated by this growth on the daily lives of inhabitants in particular. In this regard, another field of reflection has emerged: that of exploring the territorial question and the various issues specific to the development of small towns and the countryside from a territorial equity perspective. It is also referred to the "habitability of the world" (Latour, 2021).

Through these two subjects, the question of the nature of human settlement and our relationship to the territory is clearly posed. The notion of spatiality, as evoked above, is also evoked by the new forms of spatial recomposition induced by these actions of transition: from the territorial scale to the architectural scale. The process of metropolization in its economic side, its foundations in the productivist market economy and the forms of competition on a national and international scale is also questioned. The example of Bordeaux, and the change of urban policy, following the municipal elections since 2020, constitutes a subject explored since then.

In addition to these themes, a third subject of interest stands out. Based on another observation, it is driven by another ambition: to work towards the production of more social justice in the transformation of the world and of human settlements. In this "Age of Access" described by Rifkin (2000), the transition suggests a counter-model for the most disadvantaged, based on solidarity and sharing: whether in terms of housing, transportation, and other areas. For example, the growing interest of students in the issue of migration and the reception of migrants attests to this evolution. In this respect, it is also a key evolution that we can see taking shape through these forms of support and the skills they require from architects: that of asserting their qualities as mediators. These qualities of mediator naturally echo a set of approaches and postures in the approach of the spatial project based on a bottom up approach. In this case, a singular figure stands out in the profiles that we form, which I will call here, according Rusty Smith: the "citizen architect"[6].

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6   "Fixin' to Get Ready To : The Education of a Citizen Architect" is a title of a conference given by Rusty Smith on 27 octobre 2011 at the School of Architecture of Saint-Etienne. Rusty Smith is a member of Rural Studio. The Rural Studio is a design-build architecture studio run by Auburn University https://media.st-etienne.archi.fr/fixin-to-get-ready-to-the-education-of-a-citizen-architect-rural-studio-rusty-smith/

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THE ROLE OF TRANSITIONAL ENVIRONMENTS DESIGN: A NEW PARADIGM IN HONG KONG

2-D-2

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ABSTRACT:

Globally, urbanisation is being challenged by radical instabilities and shifts brought on by social polarisation, climate changes, uncomplimentary economic cycles, and the lingering urban-rural and hyperdense dichotomies. This has further pushed the urban landscape to its limits, forcing the holistic re-examination of design capacities that seek to develop hybrid solutions, as provocation for biodiversity, test resilience, over and above the task to develop variable urban futures.

Following generations of urbanisation that has typically involved unsustainable building practice, the development of more sustainable development paths is clearly a vital part of this challenge. This has led to a questioning of some of the central tenets of sustainable urbanism that have emerged over the last fifty years, including urban regeneration. The process of regeneration, if you consider it to mean making part of the urban fabric as good as it was before and furthermore to add on, becomes challenged once you accept that, from a sustainability point of view, what was there before was not good enough and the precept of zero growth does not exist within the living dimension.

Transitional environments advocate for something quite different, as they do not seek to look backwards and rather embrace something new, and from a sustainability point of view, with more potential. Transition is defined as 'the process or a period of changing from one state or condition to another.' As such, and in the context of transitional environments, transition relates to a regenerative approach to design that encompasses an understanding and a responsiveness to geographical, environmental, and societal change embracing the multiple spheres of a socio-ecological model.

This paper highlights the multi-disciplinary nature of this response required by focusing on how transitional environment design and methodology can be both understood and taught. The paper will conclude with new approaches, teaching methods and student responses to this new paradigm, in a multi-disciplinary manner that is based on a rooted understanding of the local socio- and eco-system processes.

KEYWORDS:

transitional environment design, ecology, new paradigm of teaching

A Transitional Environment, we argue, is a term used for acknowledging changes and more specifically to describe a new form of hybrid space and habitat that has emerged within and around the contemporary city. Transitional environments, therefore, include typically the edge of an ecosystem and for instance those at the transition point between continental and marine environments, which may also be called coastal environments. It includes Delta, Lagoon, Estuary and Tidal flats, that differentiated with depositional environments with three general types: Terrestrial (on Land), Marginal Marine (Coastal), and Marine (open ocean) (Fan, 2013). The world delta was used by the Greek philosopher Herodotus about 490 B.C. to describe the triangular-shaped alluvial plain formed at the mouth of the Nile River.

We can classify three types of deltas: river dominated delta as a large volume of sediment, tide dominated delta has many linear channels parallel to the tidal flow and perpendicular to the shore, wave dominated delta that make deltas much sandier than other types of deltas (Dalrymple, 2007). An estuary is the marine-influenced portion of a drowned valley, and a drowned valley is the seaward portion of a river valley that becomes flooded with seawater when there is a relative rise in sea level (Ibid). They are regions of mixing of fresh and seawater. And the lowest energy part of the estuarine system is the central lagoon.

However, due to the climate and sea level change, particularly through density variations because of changing water temperature, the estuarine nature and system is changing, but it caused by tides, wind, waves, and the influx of rivers. The projections of the IPCC (Fifth Assessment Report, 2022) suggest a rise between 0.4m (0.26 - 0.55m) and 0.74m (0.52 - 0.98m) by 2100. This will lead to enhanced erosion of coasts, temporary or permanent inundation of coastlines and islands as well as the destruction of ecosystems due to salinization. (Heidelberg, 2019). Recent research has outlined the emergence of 'dead aquatic zones' since the 1960's (Malmquist, 2008). The inability for marine life to prosper due to these factors, has alarmingly doubled with each decade. Although a global threat, Hong Kong and its environs are particularly threatened, faced with land scarcity, rapid urbanisation of its collection of islands and the continuation of reclamation projects that reconfigure and shift urban and aquatic shorelines. Reduction of water volumes, coupled with urban sprawl, unbalances traditional eco-systems, making marine life significantly more challenging.

Within the urban design and planning context of Hong Kong in particular, the 262 outlying islands, forming an archipelago that represents a land area of 1,104 km2, these often-fragile transitional environments include existing rural settlements (fisherman villages) and a rich biodiversity. Also, if many islands are already urbanized with build areas, they are also subject to even larger and pressurizing expansions as part of development proposals. However, these proposals tend to offer only a limited acknowledgement and engagement with their island or coastal locations and surrounding natural habitats (Gutierrez and Choi, 2021). Regarding this current situation, there has been an increased focus on new approaches to problem solving that look to the natural world for solutions from the loss of biodiversity, depletion of natural resources that require new approaches to problem solving.

Transitional and regenerative design has emerged from a growing understanding that societal transformation is needed to ensure that a more sustainable future can be reached, and that design (Meta-design) has a key role to play in these transitions. This design approach acknowledges and advocates for linkage in social, economic, political and ecological systems in a holistic and local manner that is specific to each environmental context; a form of 'cosmopolitan localism' (Manzini 2009; Sachs 1999).

This paper represents the post graduate programme in design teaching for transitional and regenerative design at Hong Kong Polytechnic University, including case study projects from students for the uninhabited island of Kau Yi Chau and the inhabited island of Peng Chau in Hong Kong. These two case studies are used to discuss and reflect on the global and local issues and opportunities highlighted in the sustainable development goals (SDGs) (see figure 2) established by the United Nations.

Figure 2. UN Sustainable Development Goals (source: www.un.org)

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02. New direction for the education in relation to transitional environments design

Within the field of design education, institutions are focusing on this climate change emergency by seeking to develop courses that can prepare students for the interdisciplinary range of skills and understanding that is required to address this. Working between and across the established educational disciplines of urban design, landscape design, geography, ecology and biology, Carnegie Mellon University in Pittsburgh established the Transition Design Institute and has been offering courses in Transition Design since 2014. From September 2022 the Hong Kong Polytechnic University will begin offering a master's programme in Transitional Environments Design.

By taking inspiration from natural, uninhabited conditions, this design direction takes a quite different approach to the contemporary directions in urban regeneration that have emerged since the mid-twentieth century, from Jane Jacobs onwards. In linguistic terms, regeneration refers to making something as good or successful as it was before, and in this sense regenerative design can be linked to social ecology (Bookchin 1996) and localism. When looking to nature for inspiration in a biomimicry approach (Beynus 1997), and to 'greenfield' and coastal sites, we look to the natural habitats, systems and species that were functioning and successful long before the arrival of the city and assess the ways in which these can be learned from and adapted to become part of the contemporary city or in Janine Beynus' words, life creates conditions conducive to life. (Beynus 1997).

Transition designers are temporally aware and design for the 'long now' (Brand 1999). They draw on knowledge and wisdom from the past to conceive solutions in the present with future generations in mind. They study how large sociotechnical transitions have manifested throughout history (Geels 2010; Grin, Rotmans, Schot 2010; Shove and Walker 2007) and draw on the wisdom of pre-industrial indigenous societies who lived and designed sustainably in-place for generations (Brown 2013; Papanek 1995; Whitt 2001).

03. The meaning of 'transition'.

The concept of transition is central to a variety of contemporary discourses and initiatives concerned with how change manifests and can be catalysed and directed in complex systems. These discourses are found within academia, non-profit and community sectors but are often unrelated to each other or to the field of design. The concept of Transition Design acknowledges and draws from all these approaches. In that respect, the Transitional Environments Design Master (TED) at the Polytechnic University School of Design covers subjects like Design for the Biosphere, Regenerative Design, Design for change and Systems Thinking from biological and ecological perspective towards the definition of new living environments. The various subject aspires to act as an integrative to educate a generation of designers qualified to work in transdisciplinary teams developing transition solutions. From that perspective we can draw two major and complementary (also sometimes in opposition) directions in term of handling the process of transition namely the socio-ecological and the techno-ecological transition.

a. Transition at an urban, regional, and international scale: The socio-ecological transition
The Great Transition was a term first used in 1964 by the economist and systems theorist Kenneth Boulding. In 1995 the Global Scenario Group began to produce a series of reports identifying multiple future-based planetary scenarios and strategies for change that could lead to the 'Great Tran-

sition' (improved quality of life, reduced poverty and inequity, human solidarity, enriched cultures, and protection of the biosphere). In 2003 the Tellus Institute launched the Great Transition Initiative (GTI), an international network of more than 40 scholars and activists who seek to develop and mobilize a planet-wide citizens transition movement. The concept of the Great Transition has also been adopted by several leading think tanks such as the New Economics Foundation. (Raskin et al 2002)

The socio-ecological transition appears also at the beginning of the 60's under the extensive work of Murray Bookchin who regards the necessity to transform the society and the human settlements (the urban) in regards of ecological consideration. This movement will find a lot of echoes with activist movements but also with other disciplines of knowledge such as the first awarded female Nobel prize in economy Elinor Ostrom and her research on managing the commons.

From all those sources, the Transition Towns was founded in Totnes, UK by Rob Hopkins in 2005. It has since grown into an international network (Transition Network and Eco-villages) of communities working to develop local resilience and autonomy and expand their capacity to respond and 'bounce back' from external perturbations such as economic downturns, climate change or disruptions to energy systems. Transition Towns develop local food and energy systems, alternative currencies and support the development of local businesses. (Hopkins 2008)

b. Management and Innovation: The techno-ecological transition
Transition Management Theory & Sustainability Transitions Originating in Northern Europe within the academic fields of Innovation Management and Technology Assessment, these theories focus on how societal transitions happen. These approaches have been used as practical tools by the Dutch Government to manage the radical transformation of the energy systems in the early 2000s. These theories represent the convergence of sustainable development research, technology forecasting, social ecological and economy impact analysis and the fields of social history and construction of technology. They study the coevolution of technologies and their uses to conceive how innovations can be introduced into society to enable new ways of living and working. (Elzen et al 2005; Geels 2010; Grin et al 2010)

Modes of urban governance conducive to the development of green urbanism in the Western context (Beatley, 2012), and from a generally theoretical perspective, have been the subject of a growing body of literature (Andonova, Betsill, & Bulkeley, 2009; Bulkeley, Castan-Broto, Hodson, & Marvin, 2011; Floater, Rode, Friedel, & Alexis, 2014; Global Commission on the Economy and Climate, 2014; Intergovernmental Panel on Climate Change [IPCC], 2014; Khan, 2013; World Bank, 2014). Yet, few studies examine in detail the genesis and developing practices of green urbanism within an existing and evolving mode of governance in a market economy (Newman & Matan, 2013), not to mention a socialist transitional market economy, such as in China. (Mee Km NG, 2019)

c. Transitional Design in China

China is now in the process of transitioning its economy from 'a phase of rapid growth to a stage of high-quality development' and 'building an ecological civilization' (Xi, 2017). Carbon mitigation has become an inherent concern of domestic development in addition to an international responsibility. In 2017, Lin, Wang, Wu and Qi estimated the potential influence of China's national system on possible redirection and technology innovation to provide evolving transitional environment solutions.

One innovative project within a transitional environment on the outskirts of Shanghai is Chongming Island. Designers Arup propose an ecologically friendly and self-sufficient city that features zero

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carbon emission, state-of-the-art urban agriculture technologies, and a power system exclusively supplied with alternative energy sources (Chang, 2017).

Part of the design of this project includes the development of a software based on an Integrated Resource Management (IRM) model. The IRM model uses GIS data and simulates various data input/ output under different scenarios. The types of data this program can incorporate include information of landscape design, socio-economic indicators, transportation, logistics, building design, energy supply and consumption, water system, and waste management (Page et al., 2008; Roberts, 2010). The most important contribution of the IRM model is its integrated, systematic platform that enables real-time communication and evaluation. This platform facilitates coordination between different planning sectors, as experts can see how changes in the design of one sector may affect other sectors and the final master plan (see Figure 3).
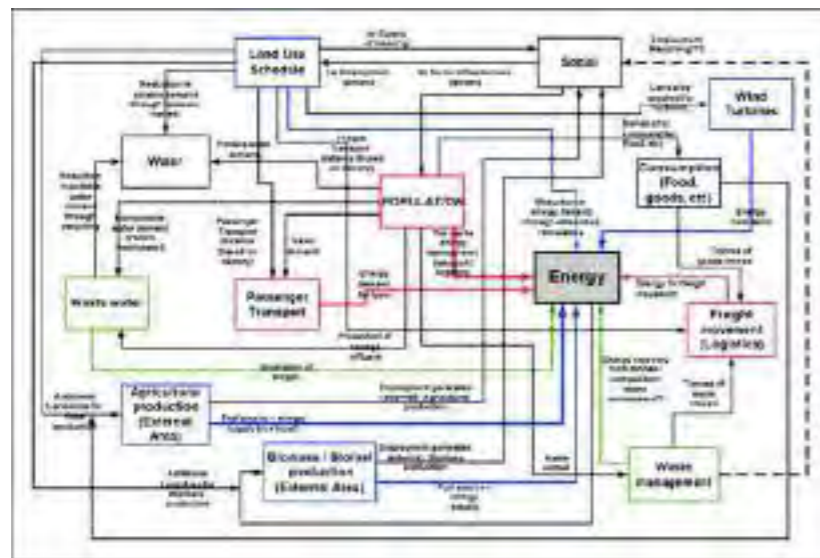

Figure 3. Integrated resource management model (source: Page et al. 2008)

In comparison, there are very limited research and design solutions for aquaponic farms or seaweed in marine parks and not much transitional movement to create eco-urban development yet in Hong Kong, rather there are series of reclamation to build new towns are still on going. However, currently in the micro scale of transitional design with technology has been invented to use natural resource to control the sea level and set up solar panel, wind turbine, roof-top garden, and vertical green buildings, but except not many strategies and solution to use sea resources and nature yet.

04. Case study projects

The case study sites include the islands of Kau Yi Chau and Peng Chau, with design responses and solutions to the environmental and social, and anthropological aspects and challenges that were found.

This paper particularly delivered two different local islands in Hong Kong. One is an uninhabited island called 'Kau Yi Chau' located West-South of Hong Kong. The other Island is an island called 'Peng Chau' located in north-eastern coast of Lantau Island in Hong Kong, with village life and farms.

Kau Yi Chau is an Island located between Lantau Island and Hong Kong Island that is approximately 400 metres in diameter and rises 120 metres at its peak. The island is not currently inhabited or publicly accessible, but with its location between the business and administrative centre on Hong Kong Island and the Hong Kong International Airport it has long been identified as a location for land reclamation through an expansion of the island for development purposes. A proposal was first put forward in the 1980s by local Hong Kong developer Hopewell Holdings chairman Gordon Wu and it is now an integral part of the government's proposals for "Hong Kong 2030+" (see figure 4).

Figure 4. Lantau 2030+: Towards a planning vision and strategy transcending 2030
(source: Hong Kong Planning Department, 2021)

Within Kau Yi Chau, the first project is highlighted the issue of the link with the conserve areas of high ecological value and several significant problems with erosion, lack of accessibility on the islands, and retreat of vegetate habitat. Considering that, the design strategies proposed to generate a new existence of the island while improving its marine ecological environment. The strategy of active- protect- regenerate has been applied to different scenarios to achieve the gradual transformation of the landform and construction of the biome. (See figure 5).

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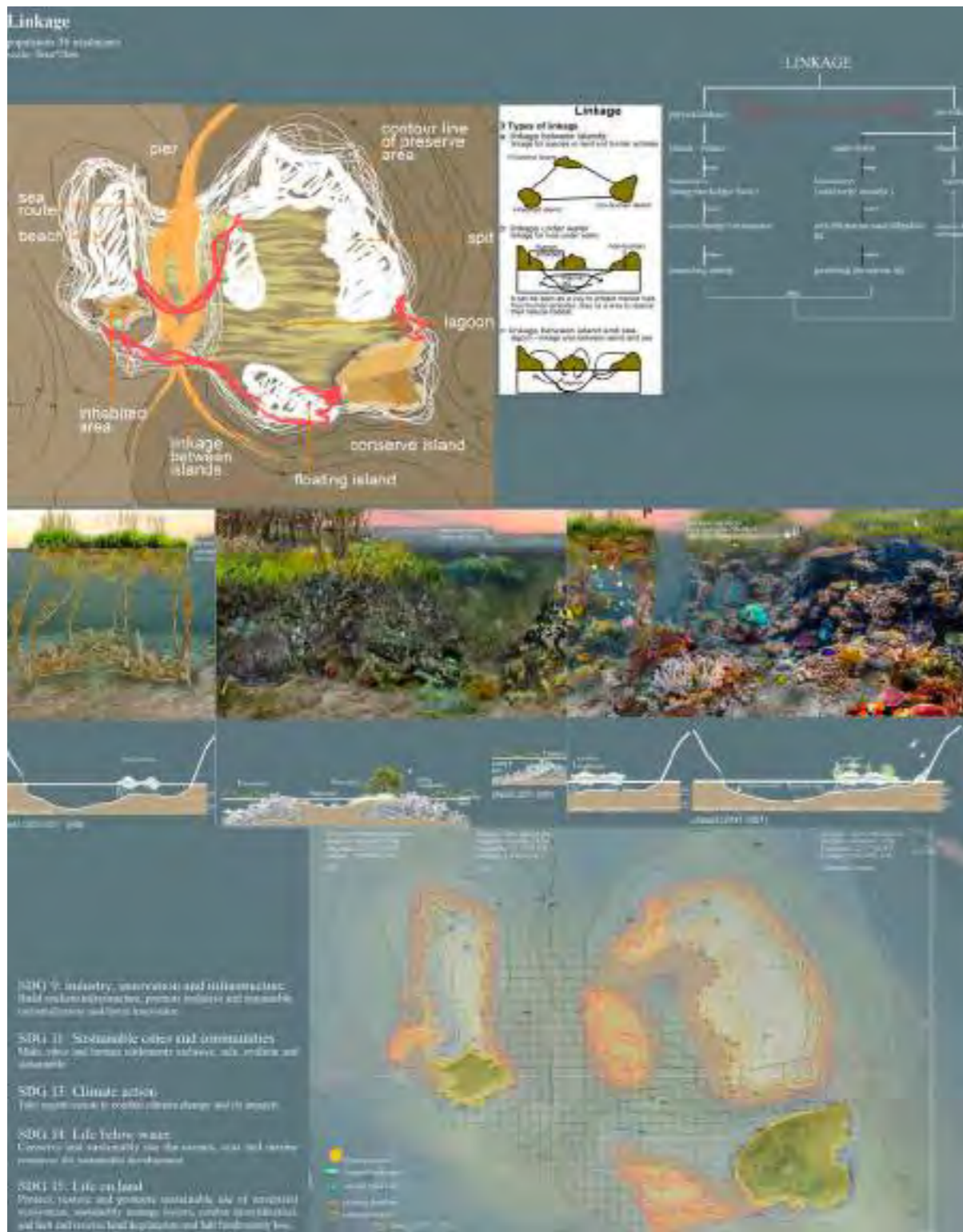
Figure 5. Linkage (YanDan Li, Urban Environments Design, School of Design 2021)

This project (see figure 6) proposes a new ecosystem populated by migrant birds and marine animals as renewal habitats applied to the theory of natural metabolism. Focusing the design input using natural light, local trees, marine animals, and insects to create a new sustainable and resilient ecosystem and food network.

Figure 6. Ecological Island (Yu Xin Hu, Urban Environments Design, School of Design, 2021)

This project (see figure 7) targets to address the UN Development Goal Nos. 12 (Responsible Consumption and Production), Goal 13 (Climate Action), Goal 14 (Life Below Water) and Goal 15 (Life on Land). The design approach creates a coffee farm in Kau Yi Chau, with potential employment for 1000 residents and farmers. Future high-yield farms will help to maximize food production and yield and are also open a new cycle of production and local waste resource as a recycle model for other Islands to follow.

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*Figure 7. Microcirculation of Future Food scape and Coffee Island
(Yiran Wu, Urban Environments Design, School of Design, 2021)*

As a comparison study, the following section describes a larger island within Hong Kong that is currently inhabited by 6500 people and has been critically analysed to discover the current spatial network and ecological network of both human and natural resources.

*Figure 8. Peng Chau Urban morphology and cluster,
(source: Du Yue and Dai Yiwen, 2022)*

Peng Chau is situated east of Lantau Island and west of Hong Kong Island, with an area of approximately 1 square kilometre. Except for emergency vehicles, no other cars are allowed on the island, and bicycles and walking are the primary means of mobility (Hong Kong Government. 2016). As a result, the island's environment is currently focused on village life, with a local community and farmers with bananas, mango farms, together with a vibrant and varied terrain and landscape. Around the town there are areas of high-density housing, hilly terrains with scattered houses, remote mountains with banana farms, and unpopulated rocky areas, a miniature representation of Hong Kong except for mass transportation.

On the east side of the island, there is a steep cliff with very little vegetation, while on the west, there are several houses situated on the coastline and built on the slope. The largest population demographic is the 55-75 age group, who tend to live and work locally on the island, followed by the 30-40 age group, who tend to commute to other parts of Hong Kong every day to work.
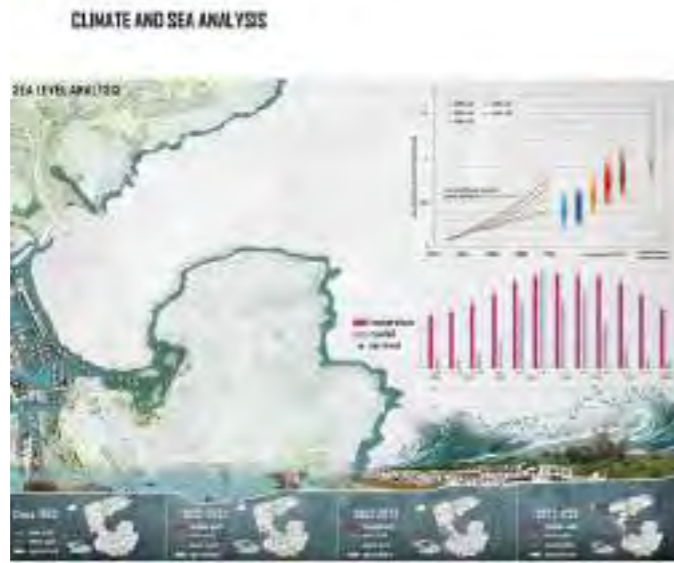
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Figure 9. Climate and sea level Changes and it's impact in Peng Chau
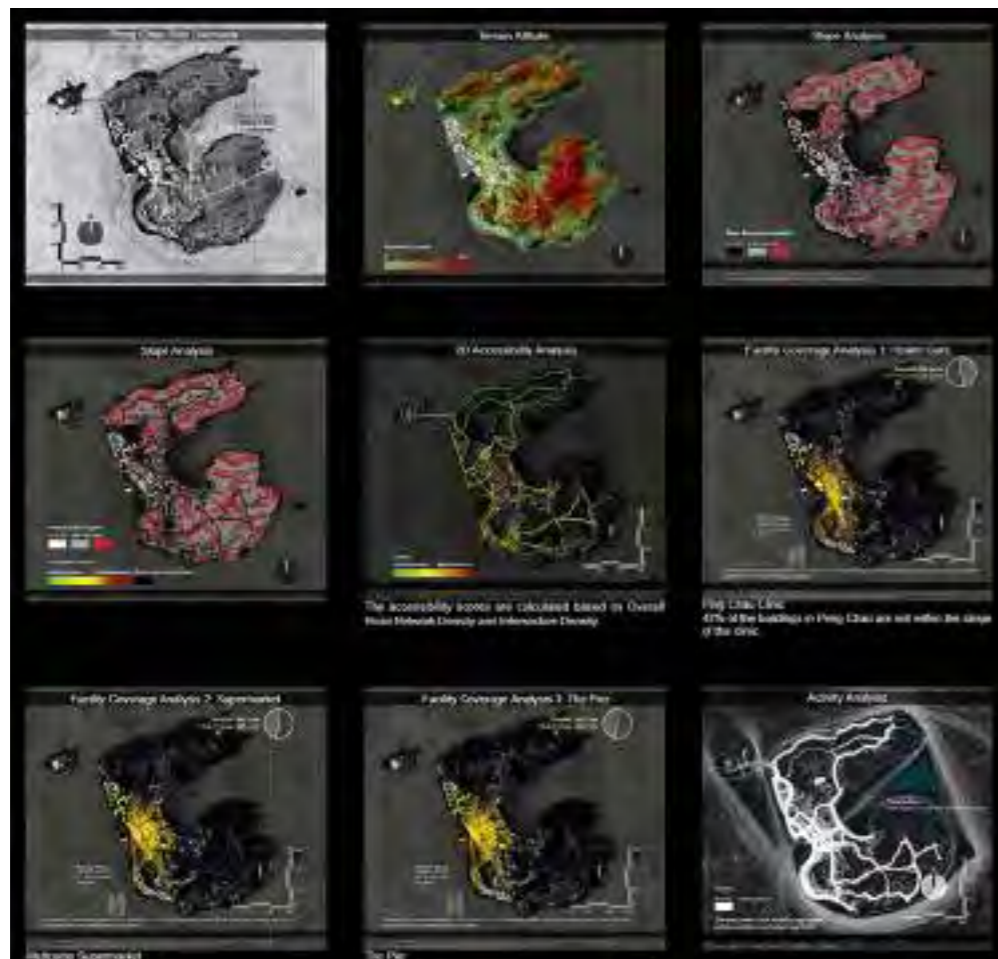*(source: Du Yue and Dai Yiwen, Urban Environments Design, School of Design, 2022)*

Hong Kong currently sits at the bottom of the list of countries as global solar energy providers (Worldback, 2020), and the use of biomass as an energy resource is also not significant. Understanding this local characteristic, one can see the potentially promising and reliable energy sources including wind that could provide a renewable power source for the island. Working from this perspective, this group of students (see figure 11) proposed improvements to the current centralized and conventional-fuel-dependent energy production and distribution network. They introduced a self-sufficient decentralized energy network that provides much more energy-resilience for the community, made possible by advanced smaller bladeless wind turbines.

Figure 11. Electric consumption in PengChau, (source: Cheng Shumei and Cheng Tian,
Urban Environments Design, School of Design, 2022)

The project conducted computational fluid dynamics analysis using Simscale.com and set the wind direction and velocity based on Peng Chau's wind data from local authorities (Hong Kong Government. 2022), using southwest, east, and northeast wind as the direction parameter. The analysis gets the indicates that there are abundant wind resources present in Peng Chau, especially on the southeast part of the island with the highest terrain. Additional wind condition analysis was carried out on the selected North-East site area. The time limit was set to be no longer than 5 hours to produce the most accurate simulation possible. The same parameters were used, and the result was stacked by the sections of multi-directional results. The overlaid result with the ocean surface wind velocity acquired a complete wind load map of the selected Site area of Peng Chau.

Figure 10. Urban Morphology analysis (source: Cheng Shumei and Cheng Tian,

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The formula below used to acquire total energy usage statistics of Peng Chau:

$$\sum_{k=1}^{n^*} x_k = x_1 + x_2 + x_3 + \cdots + x_n$$

$$x_k = \alpha_k \times \beta \times \delta \times \gamma_k$$

x = One piece of equally divided zone of land of Peng Chau

k = The code of the zone ($k = 1, 2, ..., n$)

n^* = Total number of equally divided zones in Peng Chau

α = The amount of rooms within the designated two dimentional zone

β^* = Average domestic household size = 2.6

δ^* = Average electric power consumption per capita per year (2017) = 5397 kWh.

γ = Average amount of floors within the designated two dimentional zone, counted manually

Appendix

β^*: Data source: https://www.censtatd.gov.hk/en/web_table.html?id = 217

n^*: $\dfrac{0.99 km^2}{0.05 \times 0.05 km}$ = 396

δ^*: Data source: https://www.ceicdata.com/en/hong-kong/electricity-production-consumption/electricity-consumption-clp-power-per-person = 5397 kWh
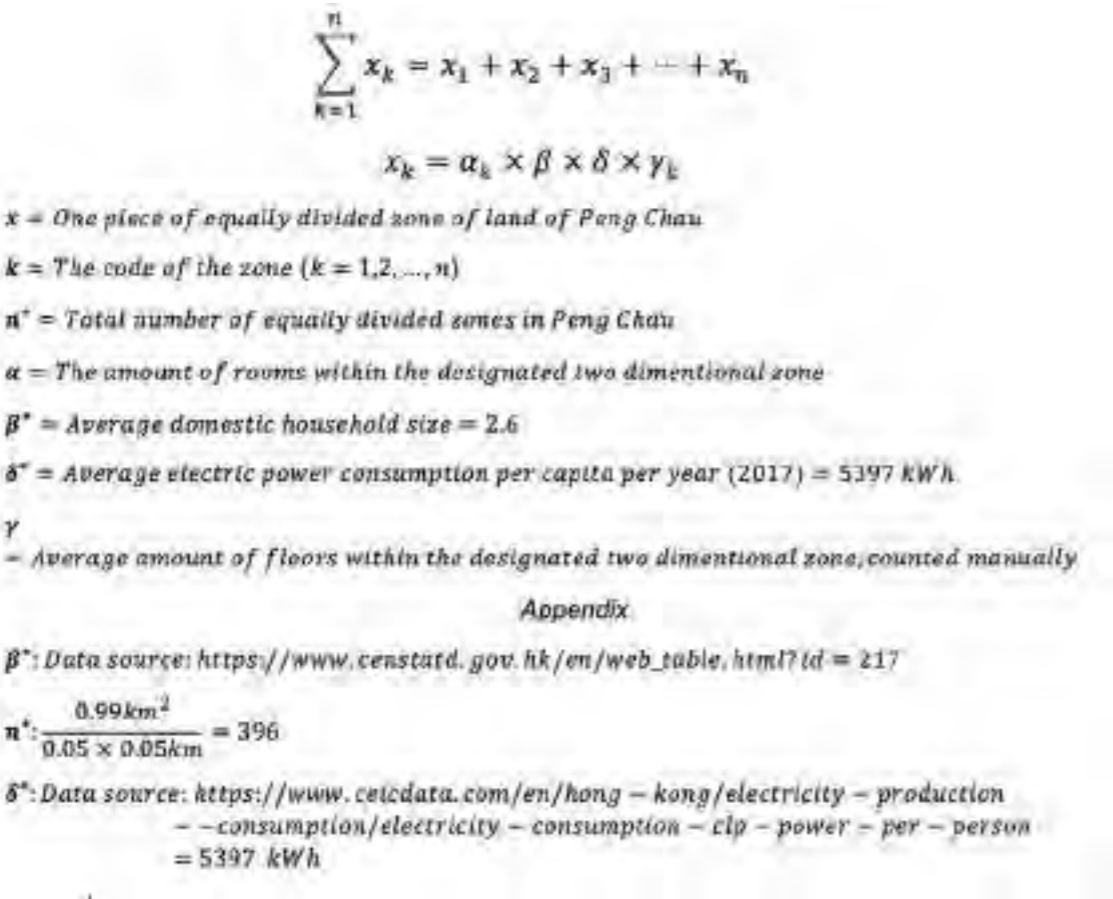
Figure 12. Electric consumption per year,
(source: Cheng Shumei and Cheng Tian, 2022)

The total electricity consumption of Peng Chau could be estimated at 64,166,666 kWh per year on average using the formula. Given the data, the project further developed to discover the energy generation information of modern wind turbines. One 3.6 million watts offshore horizontal axis wind turbine generates around 12,000,000 kWh per year (Inspire Energy. 2020), which means that six would be needed to fulfil the energy requirements of Peng Chau.
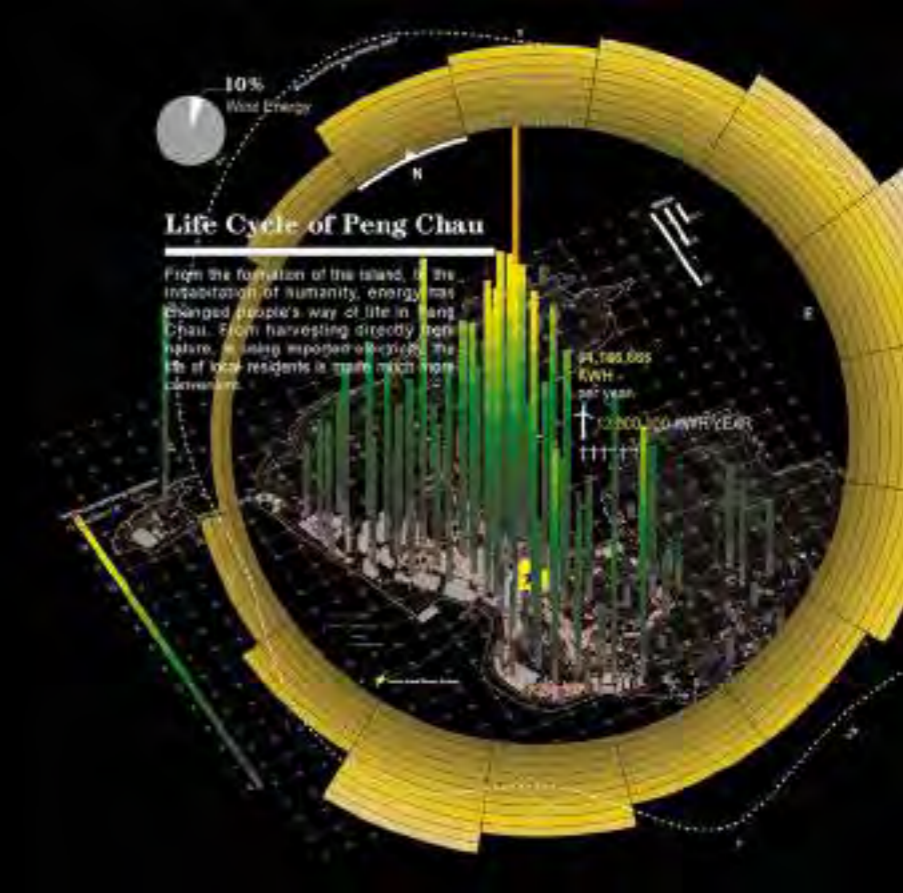
Figure 13. Energy life cycle in Peng Chau (source: Cheng Shumei and Cheng Tian, Urban Environments Design, School of Design, 2022)

Related research states that "Urban areas accounted for 67–76% of global energy use and 71–76% of global energy-related CO_2 emissions" (IPCC, 2014, p. 90), and without mitigation, global mean surface temperature will increase 3.7°C to 4.8°C by 2100. In addition, Urban land cover, according to the IPCC (2014), is projected to expand by 56–310% between 2000 and 2030. The United Nations (UN, 2014) estimate that by 2050, the urban population in Asia will increase by 61%, amounting to 1.28 billion people. Hence, how cities are going to be built and (re)developed will be vital for humankind in combating climate change.

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The second student project is to design a 'Living Botany Environment Design (LBED)' in Peng Chau, based on the existing scattered farmland, building typology, and local vegetation and trees. The project aims to find a design solution that can adapt to the expected rising water levels over the next 100 years. Then the project used the specific vegetation types including mangroves in a way that can link the offshore and onshore farming communities as an evolving eco systems.

Figure 14. Regenerating ecology and urban system,
(source: Du Yue and Dai Yiwen, Urban Environments Design, School of Design, 2022)

Figure 15. Future farm typology and ecology,
(source: Du Yue and Dai Yiwen, Urban Environments Design, School of Design, 2022)

05. Discussion & Conclusions

Transition environmental design, from our perspective, shifts the emphasis within design education, highlighting the co-influences that mitigate both the analysis and projected futures of urban settings. Although the outcomes may seem conventional in their material and formal compositions, they each mirror transitional thinking in the broader sense, respectively with a unique problematization of socio-ecological or techno-ecological transitions. This allows for the consideration of other conditions, beyond the conventional disciplinary requirements, advocating greater inclusiveness within design schemes. The inclusion of fauna species, modes of production and energy consumption as part of new design scripts fuses other material questions within taught pedagogy.

Secondly, the various combinations and influences that play out within the transitional context, reframes the 'design-in' versus 'the design with' ecology challenge. Such deliberate moves towards the full absorption of ecology, biosystems or bionetworks to become foundational requirements within the practices of planned urban settings, still remain under-explored. Moreover, with the possibilities of 'other' material and scalar connections, we remain optimistic in the production of alternatives in developing new criticisms suitable for biomimicry, biophilia or regeneration frameworks.

Thirdly, although the cases discussed focus on the scale of islands, or contained landmasses within a wider aquatic context, they nevertheless highlight the deeper significance of scale and transitional questions. The scale of individual islands, what is contained on each island, as well as the external relations to larger operational conditions, at either the micro or micro scales, remains ever unfolding in the framework of transitional thinking. The choice appropriation and in some instances, scalar fluidity, challenges the conventional boundaries through which design presents alternatives. In this light, transitional thinking demonstrates the importance of inter-scalar values, as eco-technical conditions with specific material implications.

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Fourthly, design-research in the transitional design paradigm, will in our view become more dependent on other types of enquiries to inform their design enquiry. The dependance on more sociological factors in an ever-increasing data driven world, forces design thinking to redirect its pathway of thinking across domains of mathematics, value indices, artificial intelligence systems, smart service industries and innovative business models. How, or in what format this merger of data sciences with design pedagogies occur, will remain a key test within the educational models of transitional frameworks.

In conclusion, urban regeneration brings back underutilized assets and redistributes opportunities, increasing urban prosperity and quality of life (UN-Habitat, 2021), thus linking energy-efficient and sustainable urban development. The redevelopment of decaying, run-down or underused parts of urban areas with the intention of bringing new life and economic vitality is also crucial. Transitional environment design and strategies calls for new approaches based upon a deep understanding of how to design for change and transition within complex systems (Irwin 2011). This knowledge and the new skillsets require an integration of specialisms in science (biology and ecology), philosophy, psychology, social science, anthropology, humanities, and computer science. It will therefore challenge existing design paradigms.

The series of projects from the students in the programmes at the School of Design, The Hong Kong Polytechnic University presented in this paper indicate the areas of study and focus within the tuition and design of transitional environments. There is a coevolution of social-ecology, technologies, and their uses to conceive how innovations can be introduced into society to enable new ways of living and working (Elzen et al 2005; Geels 2010; Grin et al 2010) and with how changes can manifest and be catalysed. These give indications of the opportunities for an urban development that ensures the sustainability not only for Hong Kong, but also at an international level.

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THE ROLE OF THE INTERNATIONAL URBAN DEVELOPMENT MODELS
IN ENHANCING ARCHITECTURAL EDUCATION

2-D-3

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ABSTRACT:

This paper scrutinizes the role of the international urban development models in enhancing educational offerings in architecture and urban planning with particular focus on the UNESCO's Historic Urban Landscape initiative. The paper recognizes the limited use of such role and sets out a dual task for research, tackling the initiatives and tackling education. Using a postgraduate assignment as a test bed for exploring the UNESCO Historic Urban Landscape approach (HUL), the paper anticipates a contribution in raising awareness of international initiatives as a source of learning and in showing how academic programs can capitalize on the opportunities. The assumed effect of the international urban development models on higher education is vast. However, the offerings of the architecture and environmental design programs worldwide do not seem to take full advantage of the models' role, particularly as related to ecology and heritage issues. Hypothesizing the educational role of the international models of urban development, this research effort, first, examines the international urban development initiatives and collaborative models with particular reference to the HUL approach; next, elucidates a postgraduate assignment administered during the Fall 2021 academic term at Bowling Green State University (BGSU) dealing with the HUL approach. Methodologically, the paper draws on the doctrinal documents and updates of the UNESCO World Heritage Centre and other international organizations, mainly those relevant to the HUL approach. The paper further makes use of the empirical data extracted from the student reports and presentation materials involving the assignment consummated in the postgraduate course mentioned above. The paper's contribution resides in turning our attention to the role of the initiatives of UNESCO and other international bodies in enhancing the offerings of architectural schools worldwide. The research will further reveal pedagogical opportunities for capitalizing on the initiatives' role in the lecture halls of architecture schools.

KEYWORDS:

Urban development models, HUL, architectural pedagogy

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1 INTRODUCTION

In the way of scrutinizing the role of the international urban development models in enhancing educational offerings in architecture, this Section introduces briefly the HUL model and the BGSU pedagogical setting, then defines the research framework including rationale and objectives and research design.

1.1 THE HUL MODEL

Elwazani et al[1] described HUL as follows:

Sustainable development in general and the application of sustainable principles in particular assume diverse manifestations. The series of principles and guidelines for sustainable development that have emerged worldwide since the 1970s fueled governmental and advocacy programs on the national and local levels. Notable among those are the UNESCO principles, which, in turn, have resulted in a diffusion of initiatives and applications by Member States. Of particular interest to our study is the 2011 UNESCO's Historic Urban Landscape (HUL) approach focusing on the role of cultural heritage in sustainable development. The HUL approach is holistic and interdisciplinary, addressing inclusive management of heritage assets to guide change in historic areas. The approach is grounded in layers of the community interconnected "values" to serve as a point of departure for urban development management. The HUL Approach accommodates six steps and four tools that have been followed in pilot applications and case studies in cities worldwide.

Table 1 below hints to the vast scope of the HUL theoretical model. The HUL initiative's originators left it to the desiring urban jurisdiction to interpret and adjust the model to suit local capabilities and limitations. Cities and towns who adopted the model to guide or check on their development plans invested considerable resources and prolonged schedules, some in years, to complete the task.

Text in bold in Table 1 defines the scope designed for the Historic Urban Landscape Study, the assignment given in the postgraduate course Arch 6510 in Fall Semester 2021.

Table 1. The HUL theoretical model frames the interface between the six critical steps and the four tool categories.

Note 1: NA, Natural Assets; **BH, Built Heritage Resources**; IH, Intangible Heritage Forms

Note 2: Text in **bold** defines the elements of the study scope. See also Sub-Section 3.1 Overview

Critical Steps	Tool Category			
	Community Engagement Category	Knowledge & Planning Category	Regulatory System Category	Legal Tools Category
Step 1 **Survey & Mapping**	□ NA □ **BH** □ IH	□ NA □ **BH** □ IH	□ NA □ BH □ IH	□ NA □ BH □ IH
Step 2 **Consensus/Values**	□ NA □ **BH** □ IH	□ NA □ **BH** □ IH	□ NA □ BH □ IH	□ NA □ BH □ IH
Step 3 **Assessing Vurnebility**	□ NA □ **BH** □ IH	□ NA □ **BH** □ IH	□ NA □ BH □ IH	□ NA □ BH □ IH
Step 4 **Integrating in Development**	□ NA □ **BH** □ IH	□ NA □ **BH** □ IH	□ NA □ BH □ IH	□ NA □ BH □ IH
Step 5 **Prioritizing Actions**	□ NA □ **BH** □ IH	□ NA □ **BH** □ IH	□ NA □ BH □ IH	□ NA □ BH □ IH
Step 6 **Partnership & Management**	□ NA □ **BH** □ IH	□ NA □ **BH** □ IH	□ NA □ BH □ IH	□ NA □ BH □ IH

1.2 The Pedagogical Setting

The HUL model was brought to bear on the pedagogical objectives of Arch 6510 (Sustainability Systems), a Fall 2021 postgraduate course offering, through the assignment "Historic Urban Landscape Study". The assignment involved reconciling the course aims with the HUL comprehensive expectations. The course is set to fulfill the "Ecological Knowledge and Responsibility," a flagship criterion of the National Architectural Accrediting Board requirements that the accredited architecture program of the BGSU Department of Architecture and Environmental Design adheres to. On the other hand, the HUL approach involves negotiating the interface between the six steps and the four tools framing up the approach. Such steps and tools are left to the approach's implementers to interpret and adapt for the project in hand. The four two-person groups of the class were to research and locate, in the UNESCO urban development jargon, a human settlement (a town or a city) as the subject for applying the HUL approach.

1.3 Rationale and Objectives

The offerings of the architecture and environmental design programs worldwide do not seem to take advantage of the available international models for urban development, including the HUL model. Therefore, this paper, first, explains the international organizations' programs, particularly the HUL model, and their use in academic settings with the promise to revealing the potential of enhancing the offerings of architectural schools. Second, the paper discusses the pedagogical setting at BGSU where the HUL model was used in the postgraduate class with the promise of revealing the advantages of using the model.

1.4 Research Design

The paper draws on the doctrinal documents and updates of the UNESCO World Heritage Centre, particularly those relevant to the HUL approach. Similarly, the paper will draw on the published works on HUL applications as well as on the pedagogy using urban contexts. The paper further makes use of the empirical data derived primarily from the pedagogical requirements set for the assignment and from the responses of the student groups consolidated in the submission materials. As the assignment prompted students to develop their work in response to two specific issues—defined below in Section 3—these responses, consolidated in a report and presentation materials per group, fed into the paper research information and analysis. The selection of a discrete human settlement, a city or town, as the subject for the group's HUL Study provided a platform for comparative analysis to arrive at how the issues are dealt with by the four groups across the four subject cities.

2. THE THEORETICAL FRAMEWORK

The Historic Urban Landscape takes a keen interest in the natural environment and cultural heritage as related to the well-being of communities, worldwide. UNESCO and other international bodies have developed, implemented, and published series of programs for sustainable development and heritage protection over the decades; HUL is a 2011 addition. In this Section, I will reflect on the conceptual and applied works related to the nature of HUL, international organizations' efforts to enhance urban sustainability and heritage, and efforts of higher education institutions reaching out to international resources in these areas to boost their offerings.

2.1 On the Nature of HUL

The 2011 HUL Guidebook ushered to a spark of interest on the part of cities and communities for considering the adoption of the model. The Guidebook is adamantly clear about curating for healthy urban ecology and protected built heritage in ways conducive to urban development and economic success[2]. As cities and urban jurisdictions typically have ongoing term plans, the expectation for the HUL approach is to reconcile with the structure of city plans. Buckley and Fayad echoed this expectation in applying HUL Recommendations to Ballarat, Australia where, already were in place, "the practices established by the Australia ICOMOS Charter for Places of Cultural Significance, (The Burra Charter)."[3] Further, Silva underscores the challenges to heritage managers inherent in applying the HUL Recommendations within the contexts of "plurality, poetics, and politics of urban heritage of the regions in question."[4]

Some voices raise concern about HUL Recommendation in relation to the promise advanced by Article 5 of the 1972 UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage. Rodwell questions the effectiveness of the Recommendation in integrating the values of urban heritage in planning policies[5]. Yet, in what deems an appropriate step to assess the status of the HUL Recommendation, the UNESCO World Heritage Centre conducted a survey distributed to all member States. The results show that 55 member States out of invited 193 have participated in the survey[6]. This rather low feedback rate together with seemingly uneven responses to the survey questions point to the need for readjustment plans by the Centre. Still, some Recommendation implementation projects have shown bright spots. In a critical evaluation of the implementations completed for Cuenca, Ecuador and Ballarat, Australia, Pérez and Martínez promoted the expanded opportunities of HUL for considering heritage principles and authenticity[7].

2.2 International Organizations' Efforts in Urban Sustainability and Heritage
Of relevance here is the development of the United Nations Sustainable Development Goals (SDG) and the agenda for their implementation[8].

> The 2030 Agenda for Sustainable Development was launched in 2015 to end poverty and set the world on a path of peace, prosperity and opportunity for all on a healthy planet. The 17 Sustainable Development Goals (SDGs) demand nothing short of a transformation of the financial, economic and political systems that govern our societies today to guarantee the human rights of all. They require immense political will and ambitious action by all stakeholders.

The goals have well-defined spheres and clear focus. For example, Goal 11, Cities and Communities—clearly related to HUL—incorporates public spaces, transport and access, and urban pollution. However, the world-wide progress towards accomplishing the goals is not so far satisfactory[9]. The challenge of integrating 17 goals and 169 sub-targets requiring "new governance framework"[10] may have accounted for such slow progress.

In the cultural arena, UNESCO similarly has a long hand. The organization conducts programs and activities in enhancing diversity in cultural expressions, intangible cultural heritage, and world heritage. For example, referring to the propagation of diverse cultural industries, Vlassis pointed to the role of UNESCO in linking culture and development[11]. The UNESCO Convention on Safeguarding of the Intangible Cultural Heritage has articulated a broad categories of cultural heritage manifestations including oral traditions and expressions, performing arts, and traditional craftsmanship, among others[12]. Meissner[13], and Stefano et al[14], discussed the contribution of intangible cultural heritage to sustainable development and the role of UNESCO in this regard. Yet, an early global event in line of the overarching mission of peace by means of an across the board recognition of the accomplishments of diverse national cultures is the 1972 Convention concerning the Protection On of the World Cultural and Natural Heritage. Linking culture and nature for sustainable progress, the Convention "has become one of the most successful UN instruments for promoting cultural diplomacy and dialogue on conservation of cultural and natural heritage."[15]

2.3 Higher Education Institutions and International Resources
Unsurprisingly, higher education took notice of the potential of international resources and the value of collaboration for urban sustainability and cultural heritage. These resources include UNESCO and other international organizations as well as peer institutions, city agencies, and civic organizations. The assortment of ways and levels that educational institutions world-wide have adopted to shape their academic offerings and research outreach can be imagined to be extensive. To make the point, a distinct example is highlighted. This case study example of eminent university collaborations with a world organization and some city departments comes alive in the Yokohama Urban Design Sketchbook project. The Sketchbook "is a citizen engagement and co-creation methodology

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for urban design at the neighborhood level. It leverages cross-sectional sketches and drawings to translate citizens' visions and ideas of urban areas into concrete proposals of urban design."[16] Interestingly, the international outreach of this collaborative resource has garnered applications (of the Sketchbook methodology) for Panama City, Panama in 2019 and Barranquilla, Colombia in 2020[17].

Other examples for bringing urban development projects to the educational settings materialize vividly in Cuenca, Ecuador and Ballarat, Australia—this time dealing with HUL implementation[18]. In Cuenca's case, the HUL study emanated from the support of two main participants, the Universidad de Cuenca and the Faculty of Architecture and Urbanism, and the National Secretariat for Higher Education, Science, Technology, and Innovation. Two graduate theses supported the HUL study plan. In the second case of the City of Ballarat, Deakin University and Federation University had partnered in 2013 with Context Pty Ltd, a third party the City commissioned, to develop the Mapping Ballarat's Historic Urban Landscape Study. The work of a doctoral candidate had aided the study[19].

3. THE PEDAGOGICAL SETTING

3.1 Overview

The BGSU course Arch 6510 addresses sustainability and resilience mandated by the National Architectural Accrediting Board (NAAB) Criterion "PC.3 Ecological Knowledge and Responsibility". This criterion says: "How the program instills in students a holistic understanding of the dynamic between built and natural environments, enabling future architects to mitigate climate change responsibly by leveraging ecological, advanced building performance, adaptation, and resilience principles in their work and advocacy activities."[20] The holistic alignment of the criterion and the fact that its fulfillment is a task shared by a number of courses in the BGSU Master of Architecture professional degree program provides the opportunity for our Arch 6510 to expand to the urban realm investigation, in this case, through the HUL Study assignment. Heritage protection as an inherent measure for negotiating ecological change is a strong premise of the course.

A full HUL application to a city or town can take years to complete; this is unthinkable for our academic exercise scheduled only for four weeks. Hence, the design of our HUL Study assignment has established the following: a) out of the three types of heritage, only the Built Environment Heritage (BH) is considered; and b) out of the four tool categories, only the Knowledge & Planning Category and the Community Engagement Category are considered (Table 2). These adjustments were made to still work within the anticipated learning outcomes.

Under such demarcation, the HUL Study assignment brief prompted the students to attend to two calculated issues:

– Issue One: With a focus on the Built Heritage, assess the status of the Human Settlement in the area of "Knowledge and Planning Tools" by the using the HUL Six Critical Steps.
– Issue Two: With a focus on the Built Heritage, assess the status of the Human Settlement's programs and activities that support the community engagement and public participation across the HUL Six Critical Steps versus the Knowledge and Planning Tools.

Table 2. Pedagogical issues in the context of the HUL Recommendation

Issue One		Issue Two
Knowledge & Planning Category	HUL Critical Steps	Community Engagement Category
Built Heritage (BH)	Step 1: Survey & Mapping	Built Heritage (BH)
	Step 2: Consensus/Values	
	Step 3: Assessing Vurnebility	
	Step 4: Integrating in Development	
	Step 5: Prioritizing Actions	
	Step 6: Partnership & Management	

The students had the option of choosing their group partner, and accordingly, four two-member groups were formulated. An initial task for the two-person groups was to locate a human settlement, a city or site, as the subject for their HUL Study. The group characteristics and the chosen subjects of the HUL Study depict in Table 3.

Table 3. Group characteristics and the subject of their HUL Study

Characteristics	Groups			
	Group 1	*Group 2*	*Group 3*	*Group 4*
Membership	Two	Two	Two	Two
Discipline	Architecture	Construction	Architecture	Architecture
Domestic or Int'l	Domestic	Int'l	Domestic & Int'l	Domestic
HUL Study Subject	Bowling Green, Ohio	Hampi (Group of Monuments), Karnataka, India	Kirtipur, Nebal	Perrysburg, Ohio

3.2 Issue One

This issue was prompted to students as follows: With a focus on the Built Heritage, assess the status of the Human Settlement in the area of "Knowledge and Planning Tools" by using the HUL Six Critical Steps. The Guidebook, on the other hand, asserts that the knowledge and planning tools "should help protect the integrity and authenticity of the attributes of urban heritage. They should permit the recognition of cultural significance and diversity, and provide for the monitoring and management of change to improve the quality of life and urban space."[21] Among other things, the Guidebook identifies these tools with key words such as planning, GIS, big data, morphology, policy assessment, etc.

The HUL six critical steps together with facilitating questions were presented to students as shown in Table 4.

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3.3 Issue Two

This issue was prompted to students as follows: With a focus on the Built Heritage, assess the status of the Human Settlement's programs and activities that support the community engagement and public participation across the HUL Six Critical Steps versus the Knowledge and Planning Tools. The Guidebook, on the other hand, asserts that community engagement tools "should empower a diverse cross-section of stakeholders to identify key values in their urban areas, develop visions, set goals, and agree on actions to safeguard their heritage and promote sustainable development"[22] Among other things, the Guidebook identifies these tools with key words such as publicity, dialogue and consultations, community empowerment, cultural mapping, etc.

To facilitate the groups' engagement for responding to Issue Two, no structured guidance was delineated. Instead, "Hints for responding to Issue Two" consisting of key engement phrases taken from published literature and reports were given. This loose format was intended to energize students' own research for the definition and methods of community engagement.

Table 4. The Critical Steps and corresponding facilitating questions

Critical Step Statement in HUL Literature	Facilitating questions for responding to Issue One
1. To undertake comprehensive surveys and mapping of the city's natural, cultural and human resources; [**Survey & Mapping**]	What are the BH resources associated with the Human Settlement (HS)—the subject of the study?
2. To reach consensus using participatory planning and stakeholder consultations on what values to protect for transmission to future generations and to determine the attributes that carry these values; [**Consensus/Values**]	What values does the HS community attach to its built environment heritage? What are the attributes of the built environment heritage that might derive from the HS moderated values? What are the precedent experiences of participatory planning related to the HS built environment resources?
3. To assess vulnerability of these attributes to socio-economic stresses and impacts of climate change; [**Assess Vurnebility**]	What are the agents of threat to the HS built heritage, climatic and human?
4. To integrate urban heritage values and their vulnerability status into a wider framework of city development, which shall provide indications of areas of heritage sensitivity that require careful attention to planning, design and implementation of development projects; [**Integrating in Development**]	To what degree the built environment heritage resources are integrated into the HS community development initiatives?
5. To prioritize actions for conservation and development [**Prioritizing Actions**]	Has there been any action prioritization in precedent initiatives and plans for conservation and development of the BH resources?
6. To establish the appropriate partnerships and local management frameworks for each of the identified projects for conservation and development, as well as to develop mechanisms for the coordination of the various activities between different actors, both public and private. [**Partnership & Management**]	What are the partnerships and local management frameworks for the built heritage resources' conservation and development projects? Are there mechanisms for the coordination of the activities between different actors, both public and private?

4. METHODS: SETUP AND ANALYSIS

4.1 Methods: Setup

The student responses as related to both Issue One and Issue Two were compiled and analyzed from the reports and presentation materials submitted by the four groups. Further, the following data treatment parameters were established:

– First, four learning factors were established for measuring the student learning related to both issues (Table 5).

– Second, to evaluate the degree of the group's assumed learning against these factors, a learning scale of four levels was devised where:

4 = High Level; 3 = Good Level; 2 = Average Level; 1 = Low Level.

– Third, the assumptions about effectiveness of learning include: a) Level 3 represents effective learning; b) Taking groups *individually*, one level difference in learning (performances) across the four measuring factors is reasonable; exceeding this is an indication of uneven learning within the group's work; c) Taking groups *collectively (the whole class)*, one level difference in learning (performances) across the four measuring factors is reasonable; exceeding this is an indication of uneven learning across the groups' work.

Table 5. Learning factors for measuring the student learning

Learning Factor	Abbreviation on Figure Charts
a. Interpretation and rendition: how soundly the group members have understood the intent of the HUL language and how appropriately the members rendered their understanding	a. Int.
b. Breadth & Amplitude: The scope and reach of the discussion in terms of the relevant questions and points covered	b. Bre.
c. Depth & Profundity: The particularization and clarity of the discussion of the relevant questions and points covered	c. Dep.
d. Quality & Standing: The organization and coherence of the discussion giving a cross cutting reflection on student engaged learning	d. Qua.

4.2 Methods: Issue One

4.2.1 COMPARISONS

Towards the assessment of the status of the Human Settlement in the area of Knowledge and Planning Tools (Issue One), the following comparisons are made.

– How each group performance fairs across the four factors is compared in Figure 1.

– How the four groups performances fair across the four factors is compared in Figure 2.

– How the learning levels fair (and add) across the learning factors are compared in Figure 3

Learning Factors	G1	G2	G3	G4
a.Int.	2.5	2	2.5	3
b.Bre.	1.5	1	2	2.5
c.Dep.	1.5	1.5	2	2.5
d.Qua.	1.5	1	2	3
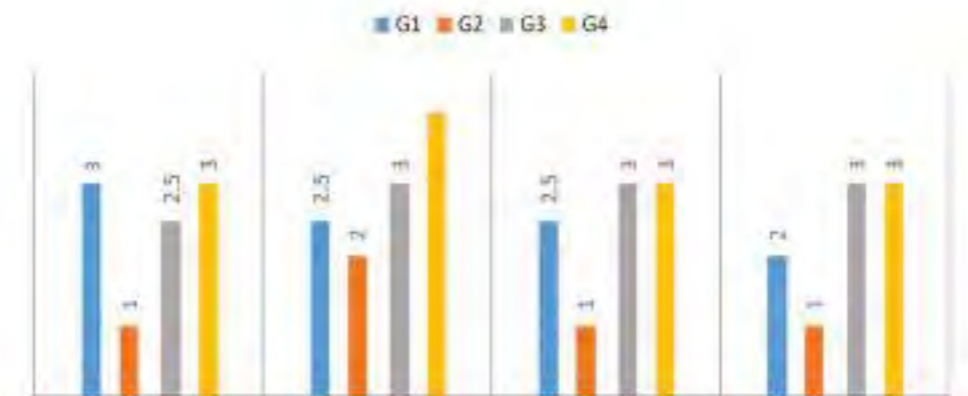
Figure 3. How the learning levels fair (and add) across the learning factors

4.2.2 OBSERVATIONS

The charts of Figures 1, 2, and 3 associated with status of the Human Settlement in the area of Knowledge and Planning Tools prompt some readings:

– Individual group performance across the four factors fluctuates within a gap of one level (Figure 1). This one level difference is reasonable and indicates effective learning. Taking groups collectively, learning performance rises to three levels gap; this is indicative of uneven learning and is below the assumed learning effectiveness across the four groups.

– Measuring against individual learning factors, the four groups performances fluctuate within a wide gap of two levels (Figure 2). This is indicative of uneven learning and is below the assumed learning effectiveness across the four groups.

– Taken collectively, the four groups performed the highest in the Breadth & Amplitude (Bre.) learning factor with a tallied score of 11.5 (out of 16); the four groups performed the lowest in the Quality & Standing learning factor with a total score of 9 (out of 16) (Figure 3) . As a tally of 12 indicates effective learning (3 levels times 4 factors), the most robust performance of 11.5 is still shy of effectiveness datum.

4.3 Methods: Issue Two

4.3.1 COMPARISONS

Towards the assessment of the status of the Human Settlement's programs and activities that supports the community engagement and public participation" (Issue Two), the following comparisons are made.

– How each group performance fairs across the four factors is compared in Figure 4.

– How the four groups performances fair across the four factors is compared in Figure 5.

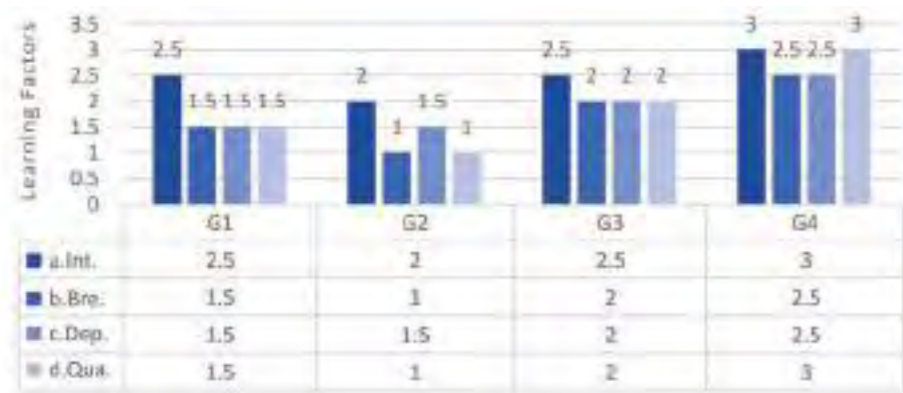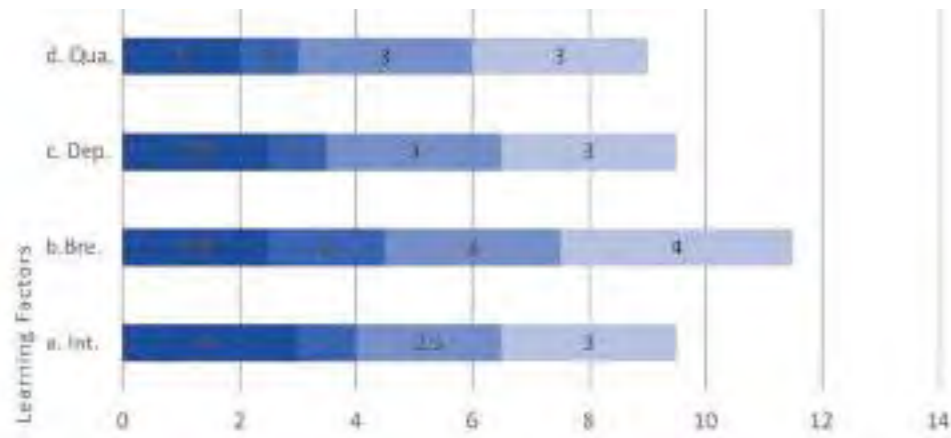– How the learning levels fair (and add) across the learning factors are compared in Figure 6.

	G1	G2	G3	G4
a.Int.	3	1	2.5	3
b.Bre.	2.5	2	3	4
c.Dep.	2.5	1	3	3
d.Qua.	2	1	3	3
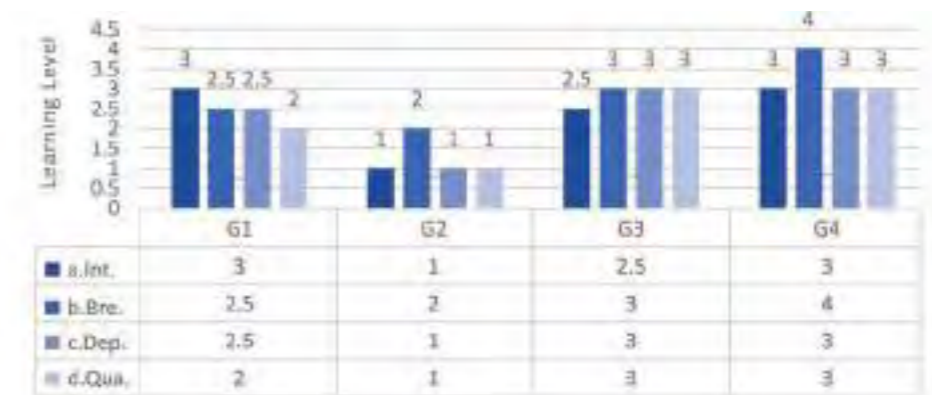
Figure 4. How each group performance fairs across the four factors

	a. Int.	b. Bre.	c. Dep.	d. Qua.
G1	3	2.5	2.5	2
G2	1	2	1	1
G3	2.5	3	3	3
G4	3	4	3	3
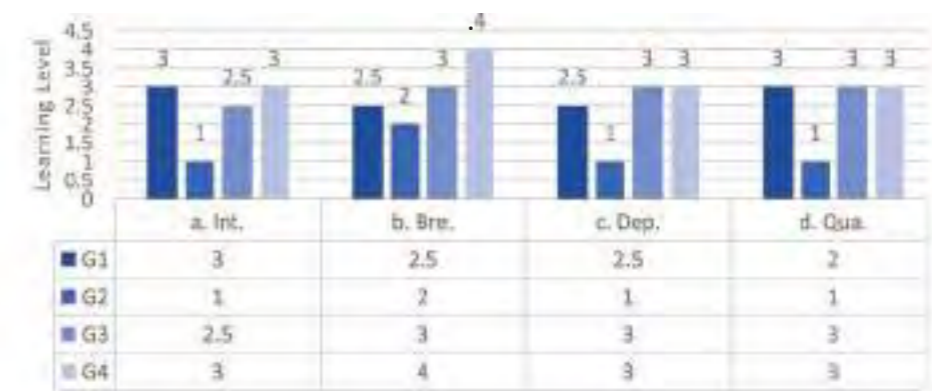
Figure 5. How the four groups performances fair across the four factors

	a. Int.	b. Bre.	c. Dep.	d. Qua.
G1	2.5	1.5	1.5	1.5
G2	2	1	1.5	1
G3	2.5	2	2	2
G4	3	2.5	2.5	3

Figure 6. How the learning levels fair (and add) across the learning factors

4.3.2 OBSERVATIONS

The charts of Figures 4, 5, and 6 associated with the status of the Human Settlement's programs and activities that supports the community engagement and public participation prompt some readings:

- Individual group performance across the four factors fluctuates within a gap of one level (Figure 4). This one level difference is reasonable and indicates effective learning. Taking groups collectively, learning performance rises to two levels gap; this is indicative of uneven learning and is below the assumed learning effectiveness across the four groups.

- Measuring against individual learning factors, the four groups performances fluctuate within a wide gap of two levels (Figure 5). This is indicative of uneven learning and is below the assumed learning effectiveness across the four groups.

- Takin collectively, the four groups performed the highest in the Interpretation & Rendition learning factor with a total score of 10 (out of 16); the four groups performed the lowest in the Breadth & Amplitude learning factor with a total score of 7 (out of 16). This is not a tolerable accumulation for collective learning in the class.

    As a tally of 12 indicates effective learning (3 levels times 4 factors), the most robust performance of 10 is still shy of effectiveness datum.

5. CONCLUDING MATTERS

This paper has focused on scrutinizing the role of international urban models in enhancing educational offerings in architecture. This aim has been addressed through two main tasks, each coupled with a research promise. The first task is explaining the international organizations' programs, including Historic Urban Landscape model, and their use in academic settings with the *promise* to revealing the potential of enhancing the offerings of architectural schools. The second task is discussing the pedagogical setting at BGSU where the HUL model was used in a postgraduate class with the *promise* of revealing the degree of succ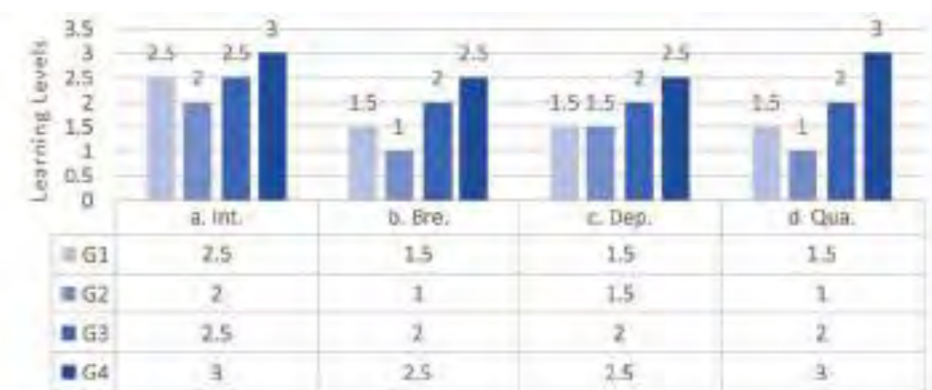ess in using the model. The concluding thoughts on these two broad tasks are organized below under the Sub-Sections: Leading Conclusions and Supporting Discussions.

5.1 Leading Conclusions
5.1.1 International Organizations' Programs and Their Use in Academic Setting
UNESCO and other international programs are rich sources of guidance on urban development models, strategies, and practices. HUL is a relatively recent model that a growing number of cities worldwide have adopted to further their sustainable and heritage goals. In this sense, the record of success seems mixed; for some it needs to align with global agendas, particularly the 1972 UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage. However, the fact that the model is a flexible framework to be subjected to the interpretations of the adopting jurisdictions that operate in a wide spectrum of financial and technical conditions may account for the uneven results. The UNESCO assessment events such as the "Second Consultation" of 2019, are milestones for continued improvement.

The potential of UNESCO and international agencies for contribution to higher education is plausibly huge. The interface of these agencies and higher education is evident in bringing university departments or research units to partaking in the application of a development model or strategy to a city or region. With the World Bank support, Yokohama Urban Design Sketchbook project involved universities and city agencies. In the cases of HUL application in Cuenca, Ecuador and Ballarat, Australia, the participation of university programs proved to be substantial.

However, evidence for using the HUL model in academic excercises from within and closely coached to meet architectural course requirements seems hard to locate in the literature and on university platforms. While plausibly exists, such use can only be meager at best.

5.1.2 Pedagogical Setting at BGSU and the Use of HUL
In tone of the discussion above, taking advantage of the HUL model through the HUL Study assignment at BGSU to examine domestic and international urban judications seems to be uncommon. In its structure, process, and output, the assignment was a first-time event amounting only to an academic experiment. The experimental nature of the assignment has indeed been a catalyst for reflections to arrive at a set of research discussions tying conclusions, limitations, and recommendations pertinent to the pedagogical setting. This reflection has been exercised on seven pedagogical parameters: pedagogical alignment, scope of the study, selection of sites, modality of work, duration of the assignment, work output, and work evaluations.

5.2 Supportive Discussions
These discussions relate closely to the seven pedagogical parameters spelled out in the "Pedagogical Setting at BGSU and the Use of HUL" above.

5.2.1 Pedagogical Alignment

Conclusions: The HUL Study supports the NAAB criterion "PC.3, Ecological Knowledge and Responsibility."

Limitations: Grounded in research, the HUL Study could also serve other NAAB criteria.

Recommendations: Consider the assignment for meeting also the NAAB Criterion PC.5, Research and Innovation.

5.2.2 Scope of the Study

Conclusions: Focusing the study on the Built Heritage Resources only (and excluding the Natural Assets and Intangible Heritage) is appropriate. Also appropriate is the consideration only of the Knowledge & Planning Category and the Community Engagement Category of tools to interact with the seven critical steps (Issue One and Issue Two, respectively). This set-up facilitated a manageable task context.

Limitations: The loose instructions given to complete Issue Two (community engagement versus the 7 steps) to turn the students' attention to obtain data on their own have not worked satisfactorily. On the average, teams have not produced well-articulated responses to Issue Two.

Recommendations: Release a structured methodology for completing Issue 2, including parameters and approach(s).

5.2.3 Selection of Sites

Conclusions: The site selected were two in Ohio and two in overseas locations (Nepal and India).

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Influenced largely by the students' country of origin, such mix yet provided a favorable exposure germane to the intent of world programs and university education. The selected study sites provided a balanced composition in line of the desired exposure to domestic and international contexts.

Limitations: The course and the assignment were not designed with writing a research paper in mind. The balanced distribution of sites was a result of the moment circumstances.

Recommendations: While international students support the diversity of sites for the study, attempt to design a favorable mix of domestic and international sites regardless of the students' country of origin or cultural background.

5.2.4 Modality of Work

Conclusions: The class composition of eight students resulted in four two-person groups. This arrangement has worked, generally speaking.

Limitations: The scope of the study would have worked better with three-student groups to give better results within the tight duration of the assignment.

Recommendations: Attempt to grow the number of the class population to give flexibility in group composition, exposure, learning opportunities.

5.2.5 Duration of the Assignment

Conclusions: The four-week duration for the assignment was tight.

Limitations: This tight duration has affected the students' refinement of the assignment, and consequently, the measured performance.

Recommendations: Plan for a six-week time for the assignment under the observed conditions. Modify commensurately under different conditions.

5.2.6 The Work Output

Conclusions: The requirements for a report and visual presentation materials were appropriate.

Limitations: The quality of writing and oral presentations was uneven among the groups.

Recommendations: Propose for improvement in methodical writing and source documentation.

5.2.7 Work Evaluation

Conclusions: The group work has been evaluated by criteria and weight scale appropriated for this paper.

Limitations: Although germane to the evaluation completed at the end of the assignment period, the evaluation presented in this paper reflects follow-up notions relevant to nuances of research, rather an academic grading of work.

Recommendations: Readjust the assignment class evaluation process for next class administration to align with the evaluation process presented in the paper.

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PEDAGOGY AND URBAN DEVELOPMENT IN JAKARTA AND SAN FRANCISCO

2-D-4

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ABSTRACT :

Our project proposes to engage urban development in Jakarta and San Francisco from the perspectives of Urban Planning and International Studies. While planners learn tangible skills to apply in specific situations, International Studies students bring an interdisciplinary, comparative model to the collaboration.

Stage 1: Students from USF will visit Jakarta in January 2023 for an immersion course. The course will introduce students to dynamics and challenges of urban development in the Global South while exposing them in to techniques of urban planners, regional government, developers, and foundations who seek to promote sustainable development in one of the world's fastest growing cities. Students will have the opportunity to meet with students of Urban Planning at Tarumanagara University and engage in a faculty-led workshop on planning in Jakarta and San Francisco. The outcome will be a policy proposal for urban development in Jakarta.

Stage 2: The next stage is for Urban Planning students from Jakarta to review and offer critiques of the proposals from USF's Urban Development class. Later in spring semester, Professor Santoso will come to San Francisco and lead a workshop with International Studies students. Students from Jakarta will engage in online presentations from San Francisco on urban development, from professors at USF and urban experts there. Then they will have the chance to develop their own policy proposals for San Francisco.

Stage 3: The end goal is to develop research collaborations between the two cities that integrate perspectives from cities in the Global South and the Global North and an article on conducting research collaborations based on field exercises. It is important not only to promote better understanding of the challenges in divergent localities, but also to propose interdisciplinary, transnational approaches to a range of development topics. Further, the project would give students a role as researchers in these collaborations, as well as providing them agency to develop innovative planning solutions alongside faculty.

KEY WORDS:

Urban Planning, International Studies

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Our project proposes to engage urban development in Jakarta and San Francisco from the perspectives of Urban Planning and International Studies.

While planners learn tangible skills to apply in specific situations, International Studies students bring an interdisciplinary, comparative model to the collaboration. For both students of Urban Studies and International Studies it is not enough just to have knowledge about the other parts of the world, because the contemporary praxis of both professions is moving away from preparing programs, analysis or evaluation towards bringing academic knowledge and experiences to bear directly in the real world. Any real-world proposal developed in an academic context requires an adequate response to the local-specific characteristics of the location, which will influence the success or failure of this project.

One of the central elements of this collaboration is to examine contemporary urban development from a transdisciplinary perspective (Darian-Smith and McCarty) but another important dimension of this collaboration is to explore urban development dynamics in the Global South and North and to collaborate across this divide working through institutions on both sides of it. While there has been ample exploration of cities in the Global South by scholars from universities in G-7 countries, and "Western" norms have often been applied to emerging urban developments in the Global South, there have not been enough efforts to explore comparisons across this divide (Robinson, Roy and Ong). Simply put, there has not been enough North-South research collaboration in urban studies or international studies that examines cities in both domains. Our project seeks not only to develop a research program comparing urban development and contemporary dynamics in Jakarta and San Francisco, the but long-term goal is to use pedagogy at our respective institutions to seed cross-regional research and promote equanimity in assessing global challenges for cities in the 21st century (Masschelein). Further, a comparative method in our research program has the objective not only to compare a number of urban indicators in both cities but to understand the intrinsic characteristics of each city. In this way, the capacity to identify the relevant local-specific characteristics can be developed. This exercise of the knowledge of "drawing the city near" (Simone) is very closely related to concrete competence of the acting experts (urban denizens) who are engaging in various lifeways in these environments (Lefebvre, De Certeau).

Such a project begins with exploration and the first stages of our collaboration will be carried out in the coming academic year (2022-2023). After initial planning between our respective universities, the first stage is to develop a course for University of San Francisco MA students in International Studies to visit Jakarta over Intersession in January 2023, where they will be joined by both undergraduate and graduate students in a multiple-day seminar/conference, involving professionals in urban development from Jakarta, including developers, government authorities, planners, nonprofits, community activists and artists/artist collectives. The USF course will also involve visits throughout the city to experience various aspects of it first-hand. At this stage, the four distinct domains for exploration include: Traditional Areas (kampungs and marketplaces), Modern Commercial Areas (Central Business District), New Towns/Gated Communities, and State-controlled Public Areas/Tourist Zones. The class will last two weeks and, for the final project, students will work in groups to present policy proposals for urban development in these four areas. While these will not be complete until the end of the visit, students from Tarumanagara University (UNTAR) will review and provide critiques of these policy proposals, with their efforts coordinated by Professor Santoso and other faculty at UNTAR. These responses to the policy proposals will be incorporated into a publication of this set of policy proposals for a special issue of the online international studies journal *Globus*,

housed at the University of San Francisco.

In spring semester of 2023, Professor Santoso will be invited to the University of San Francisco as a Keynote Lecturer and he will present his own research on Jakarta urbanism to the USF community. While Professor Santoso is in San Francisco, the International Studies department will collaborate with other departments and programs to host a workshop to discuss urban development in San Francisco that will feature faculty and experts from this city. Students at UNTAR who were previously involved with the USF students will participate via Zoom and the workshop will constitute part of their own research program at UNTAR, allowing them to develop proposals for San Francisco. It is hoped that we can find funding in the year ahead to allow UNTAR students to visit San Francisco either in the summer of 2023, or the following January, 2024. Their research on San Francisco, when complete, will be reviewed by students at USF so they can provide feedback and critiques. It is hoped that this research by UNTAR students can also be published in *Globus*, perhaps accompanied by recent research from UNTAR professors, whether on San Francisco or Jakarta.

This first year of research and pedagogical collaboration will be the prototype that will determine how successful the collaboration will be, how much interest students will have in this program, and how well the universities can work together. Ideally, it will lay the groundwork for a longstanding collaboration between faculty and students at both universities. The USF Immersion course on Urban Development could travel to Jakarta bi-annually and it would make sense, if funding can be established, to have UNTAR students visit San Francisco biannually as well, whether in January or in the summer months. Such a program would provide the impetus for further research collaboration between faculty, but it would also provide opportunities for numerous policy proposals for urban development to be put forward and be published. This work is comparative not only in its research approach, but it involves students of Urban Planning and International Studies to learn from each other, and to work on cities that they are not familiar with. It will also provide an opportunity for students to provide their own expertise on the cities where they reside to scholars coming from abroad. In this way, this project promotes asset-based education, mutual understanding and cross-regional comparisons, but it also seeks to build alliances and to promote urban amelioration in both sites. The faculty of each university and their respective networks of urban experts will bring a wealth of material for the benefit of students from other universities. The transdisciplinary and transnational comparisons will allow for greater mutual engagement and understanding.

Stepping back to consider the benefit of this model for faculty research, and the potential to contribute to the disciplines of Urban Planning and International Studies, there are considerable benefits for such a collaboration. It is fair to say that in the postcolonial context, most of the experts on Urban Planning/Urban Studies are concentrating on cities in their own countries, whether in the Global South or North. One of the markers of intellectual and political sovereignty is that each country produces its own experts that guide urban growth and development, from architects, to planners, to experts on urban politics and society (Kusno, Shatkin). While the research of such scholars circulates in a global environment, and much of it is published in English, organizations like the IFoU are part of a network that connects international scholars, furthering partnerships and disciplinary collaboration. In such environments, a significant number of scholars of Urban Studies are engaged in research outside of their home country but most of these explorations involve scholars from Europe and North America traveling to locations in the Global South to learn about developments there (Robinson). Some scholars from the Global South have become experts on cities in the Global North, to be sure, but there is a perceived need to explore other locations, and more recently developed cities since so much has been written on established capitals such as Paris, London and New York. A wealth of collected volumes in Urban Studies demonstrates how much urban research

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has become a cosmopolitan practice with research on various global cities around the world sitting side-by-side. Yet efforts to build an interactive research paradigm in Urban Planning and Urban Studies are too rare, and this almost never positions comparisons between cities in the Global South and North, except to track the influence of one upon the other. Our program addresses this gap and seeks to build mutual knowledge-sharing and collaboration by setting aside hierarchies between the world's contemporary cities.

International Studies, as an interdisciplinary field, is perhaps more prone to comparative study but work on urban development is not prominent in this field and the general trend for comparative studies is to seek similarities rather than to work to overcome the limitations posed by differences. Thus, one finds there will be more comparisons among Asian, African, or European contexts than trying to compare across these contexts. While international collaborations among scholars are more common, these research interests are rarely reciprocal. An American scholar may work with an African scholar to study an African city or cities, but it is rare for them to work together also on an American city, for example. Part of the limit is the traditional conception of Area Studies, which treats the globe as a series of distinct parts with experts who primarily limit themselves to maintaining one region of expertise. Indeed, being an expert in Asia, or even Southeast Asia, is a tremendous undertaking. And yet, some of the most interesting issues in International Studies, from security to the environment, are ones where cross-regional research would greatly benefit the field as a whole and provide a sense of issues such as uneven development, the impacts of neoliberal economic policies, or degraded ecosystems, to name just a few. While there is a tremendous difference in resources between cities in the Global South and those in California, and thus a significant divergence in terms of capacity, in both locations one finds tremendous gaps between wealthy and poor residents, ecosystem limitations, transit capacity challenges, and development driven by providing housing for upper-middle class residents.

In brief, there are strong reasons to turn to reciprocal research models at this moment in history. Turning to specific themes for comparative study among students and faculty, they can be selected from a number of actual problems which are relevant for both cities related to the process of globalization such as: changes in land use and urban structures; the impacts of urban transformations on specific social groups or communities in particular, or urban lifeways in general; the rise of the consuming city (commodification, privatization and commercialization); digitalization of the urban metabolic system (online shopping, transportation, smart cities, and the effects of social media on human relations).

Our project seeks to address previous imbalances by building cohorts of students with reciprocal engagements in each other's cities. These students will follow parallel academic tracks in International Studies and Urban Planning but they will both develop a similar understanding of shared dynamics, opportunities, and spaces of mutual engagement even while they evaluate the differences. It would be naïve to suggest that divergences between cities in the Global South and North could be overcome through a course of study and research planning, but such steps are intended to make a positive contribution to intellectual investigation and mutual respect among scholars of different nations and distinct disciplines.

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WAKING UP IN ANTHROPOCENE:

RETHINKING A COLLABORATIVE SOCIETY IN RESPONSE TO PRE-CRISIS PRODUCTION INDUSTRIAL PORT AREAS CASE AS A CRITICAL ZONE PARADIGM BETWEEN GLOBALIZED PRODUCTION MODEL AND LOCAL ECOLOGICAL MUTATION

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ABSTRACT

The Anthropocene's state is critical, but not lost. Up until now, it has revealed Mankind's ability to artificialize natural environments in order to maximize profits and pursue Capitalism's frantic chase for productivity. Pre-crisis models of port industrial areas respond throughout the world to the same logic of obsolete mono-productive places.

The research we lead, aims to consider existing productive infrastructure in port industrial areas as reversive catalysts for new social and ecological growth. The pre-existing infrastructures are generous enough to take on, beyond their primary functions; new lively interfaces. The monumental dimensions taken from port industrial typologies (wastelands, hangars, cargo railway…) allow us to repurpose the margins of this hugeness to introduce social bond.

At the nexus of biotic and abiotic infrastructures, the industrial port territory has the potential to transcend an ownership economy into an economy of usage, through bountiful land and logistic infrastructures. To rethink an urbanized Gaia, we need to reinstate collaborative intelligence in human and natural systems. Redefining our productive system in its relationship with all kinds of resources shifts from extraction to regeneration. Ecosystems are progressively restored while still producing more values. What was waste in one system is source material for another.

It is first and foremost about freedom. This freedom of action brings the territory alive; it is the soil from which the innovative system of the new societal model may grow. The acceptation of risk and the appropriate answer to that which we cannot control is not found in a conflict to win the power balance, but rather is contained in the collective intelligence which freed the soil to give it back its resilience. The symbiotic lens is a newfound sensitivity towards the responsibility each and every one of our actions hold. The symbiotic lens asks us "Who is in control?" and calls for action.

KEYWORDS

Industrial-port-area, Anthropocene, Reversive grounds, Circular, Symbiotic

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INTRODUCTION

Ruthless logics have been applied through zoning and masterplans to separate working areas, living districts and leisure facilities. Monofunctional areas emerged as hyper systems and autonomous forms: paragon of all virtues, just too good to be true. Disconnected from their context, uprooted from their grounds, they managed to recreate artificial human conditions, struggling with any form of life that could disrupt productive growth.

As part of the production global model, ports are the commuters of this systemic economy. This gateway hyperconnected to the globalized system is contextless. Beyond fences, the autonomy of port industrial areas appears as a hold up of collective grounds. No bypass, no view, but noise, odor and visual pollution for locals.

Port lost their magic; airports have stolen the show. Once looking towards the sea when talking of great journeys, we are all looking at the sky to imagine the road of those big flying vessels. At least up until the Coronavirus Crisis that paralyzed a system that should have been redesigned much earlier.

Perhaps, ports are not the means of transportation plebiscited for human journeys any more, but they remain the most used for freight. Logistic platforms become more and more heat islands. Workers operate in fully artificial environments so that neutral productive conditions are guaranteed. Nature is relegated to the bangs, where it can grow without impeding. Still, on artificialized lands left dormant for future needs of the industry; ecosystems are finding their ways through cracks in the concrete grounds.

With the emergence of sustainable mindsets, the usual production processes and exchanges are no longer adequate. Instead of confronting nature and productive sights, one might bind their strengths to create a hybrid intelligence.

This essay aims to highlight initiatives in port industrial areas that shift beyond ecological transition toward a new model of society using existing infrastructure and local resources.

This paper discusses, the role port industrial areas, as a systemic typology, can handle in rethinking our local production in light of recent crisis. It calls for rebuilding a social capital by reversing artificial/polluted grounds reserved for industry expansion into multipurpose urban spaces in the metropolis.

CASE STUDY DESCRIPTION

Industrial port areas: A systemic typology of a globalized world

After being locked down and the pandemic collective experience, both states and individuals have been willing to exit the crisis, several hoping to go back to the former world, the one that was shut down by the pandemic. But at the same time, and for the first time so heartily, many voices began to raise to denounce an outdated model based on irresponsible habits of production and consumption.

Metropolises face a crucial dilemma: to become more and more competitive at a global scale, they are implementing strategies to attract more inhabitants as well as industries and jobs providers. In the meantime, the physical space to welcome the so-called newcomers is a scarce resource. To guarantee their growth metropolises have invaded lands and outskirts off their initial boundaries. The weight of the human footprint has surpassed what the biosphere can bear. Privileging a model of growth that acts against the soils that guarantee our biosphere, it is no longer a matter of ecology but of civilization to restore a model that has to fulfill both requirements: welcome density of uses, people, jobs resources and to preserve our common living heritage: living soils capable to welcome life and biodiversity.

There are not many ways to restore a livable biosphere: the only way is to build collectively a symbiotic system that combines productive infrastructure and biotic infrastructure.

Industrial port areas respond to a typology of over-artificialization of the territory that can be found in every metropolis of the world, considering that most of the cities that became metropolises have been settled close to a waterway. The transformation of natural soils into abiotic artificialized grounds illustrates the concerns of the XXth century putting above all interests: economic growth and productivity.

Industrial port areas are exposed to climatic hazards and sea rise level, not to mention intensifying storm events, and extreme precipitation. Most of port installations are below the sea level, protected by artificial measures such as digs. They will not handle for long. Plus, the mutualization of port areas with high-risk technological sites make those areas a time-bomb if collective measures are not being taken. But ports and shipping cannot do it alone: They must partner with their host communities and other stakeholders to advance solutions.

From the local to the global scale, society depends on maritime transport to enable life as we know it. More than 3,000 ports around the world serve as transfer points for energy products (coal, oil, and gas), manufactured goods, and raw materials. These include massive container ports to small niche ports that serve one type of freight (for instance petroleum, coal, grain, or fishing). Ships move raw materials and finished products around the world's waterways, bringing jobs and improvements to quality of life. Without maritime commerce, the global economy would grind to a halt. Cities, in fact, have grown and thrived thanks to the ports they host, with other infrastructure developing outward from the seaport and advantaging the city in myriad ways. Ports, and their cities, enjoy economic advantages from their locations, but these estuarine areas also tend to be critical from an ecological perspective. Indeed, port and industrial activities have an impact on groundwater table, fauna & flora, and environment. Nonetheless, artificial grounds do not allow any kind of reversive use of soils in its current state.

In terms of efficiency, observations are that ports, terminals and shipping are facing enormous challenges to reduce emissions whilst there is limited collaboration among them. Speed optimization (just-in-time principle) and enhanced planning on routing and turn-around time in ports are important steps, but require that parties join efforts and share data.

Finally, while there has always been space, now space management becomes a real issue, so much that several ports are transforming their logistic to save place and time.

From a local blockage to global supply chain crisis

The global supply chain was thrown into chaos due to the Suez Canal incident. On 23 March 2021, the Suez Canal, one of the most heavily used shipping routes, was blocked by vast container ship

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– the Ever Given. Affecting over 400 vessels scheduled to pass through the Canal in the East-West and West-East directions. Such vessels experienced a dilemma of the use of routes and schedules. Other victims included vessels that were scheduled to arrive at/pass through the Canal, shippers, consignees, ship operators, ship owners, and container terminals. About USD$ 15 to 17 billion has been held up. At a local level, this global crisis resulted in supply shortage in stores, and inflation of prices in all fields.

The tragic last couple of years has revealed the drifts of our modes of consumption. Despite the distance between production places and consumption places, the unprecedented breakpoint of the distribution chain calls on us to rethink our production systems. Offshoring our production places to emerging countries or less regulated countries with low wadge workers has been a convenient way to build unbalanced relationships between north-south countries, relying on a hyperconnected network of gateways by air mail, seaborne or using land roads and railways. Through this rhizomic network, almost all the planet could easily shift from production area to consumption area or to maintain ambivalence.

Hypothesis

As global population increases, especially in cities and coastal areas, and as nations strive to improve their citizens' quality of life, international shipping likewise expands. Current forecasts project a doubling of cargo movement by 2040.
In the meantime, metropolises have reached the boundaries of their "urban patch". Sharing leftover spaces untouched by urbanization will become more and more conflictual between stakeholders.
The French government launched the program "Zero Net Artificialization". Territories, municipalities, departments and regions are called upon to reduce by 50% the rate of artificialization and consumption of natural, agricultural and forest areas by 2030 compared to the consumption measured between 2011 and 2020.

The complexity of both adaptation and mitigation requires the scientific community, policy makers, and the port authorities to work with other stakeholders to find financially sustainable solutions that also consider environmental and social concerns. To become more resilient to the impacts of climate change and to play a role in mitigating the acceleration of climate change, port decision makers will need to implement new strategies that range from, to design, to practices.

Civilization Nonsense

The territory of analysis aims to consider cities as a living area[1] by including the peri-urban ring and the potential for agricultural activities that can be found there.
The food metabolism of our territories may seem absurd: on average, in the 100 urban areas analyzed, 98% of the food is composed of "imported" agricultural products, while at the same time 97% of local agricultural products are "exported".

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1   Food autonomy in cities: state of play and challenges for the French agri-food industry, Utopies, position paper 12, 2017
In order to measure the stakes, UTOPIES assessed the degree of food autonomy of the first 100 French urban areas. The calculations were made using the LOCAL SHIFT® local economy simulator.

Indeed, on average, the degree of food autonomy of the first 100 French urban areas is 2%: the proportion of local products in of agricultural products incorporated in the various food products (raw, processed, transformed or cooked) consumed by local households remains very marginal. In other words, 98% of the content of food consumed locally are imported. And the reason for this is in no way a lack of food production in the territories in question, since at the same time 97% of the local agriculture of the first 100 urban areas ends up in food products consumed outside the territory.

Problematic

What if port industrial areas could develop a local symbiotic governance based on circular economy and local stakeholders to restore leftovers spaces as a collective capital?

01.Symbiotic governance: a resilient generic typology shifting towards a glocal economy
Hypothesis 1a: A generic typology resilient enough to adapt to post-covid era
Port industrial areas because of their adaptive generic typology can become the epicenter of industrial ecology in every Metropolis

Hypothesis 1b: Circular economy connecting local and global
Port industrial areas can become local circular economy, using both global network and collective intelligence of local stakeholders.

02.Reshaping inert grounds into a resource providing new uses
Hypothesis 2a: Lively soils
Port industrial areas can become fields of experimentation for reversing artificialized/ polluted grounds in lively productive and protective lands.

Hypothesis 2b: Resourceful Freespace
Locked land reserves for future industry expand can become adaptive ephemeral shared places necessary to bring the port and the city closer together.

STRATEGIES TO RESTORE LEFTOVERS SPACES AS A COLLECTIVE CAPITAL

01.Symbiotic governance
Towards a collaborative rather than competitive economy in port industrial areas
Seaports are essential for global trade-led development, and for the 'Blue Economy'. They provide access to global markets and supply-chains for all countries, and are integral to maritime transport, as well as fisheries, offshore energy development, and many economic activities in coastal zones. With over 80 % of world trade volume carried by sea - from port to port -, they are crucial infrastructure nodes that underpin global supply chains and are key to future trade and development prospects, particularly of developing States which currently account for around 60 % of goods loaded and unloaded globally. At the same time, ports are particularly exposed to various natural hazards, due to their locations along open coasts or in low-lying estuaries and deltas; their setting makes them susceptible to impacts of climatic hazards such as rising sea levels, storm surges, waves and winds, riverine and pluvial flooding.

[MATTER] In addition to generating new forms of technical and organizational cooperation

between socio-economic actors, they also promote the diversity of skills and expertise within territories. Though strategic in scope, these approaches are first and foremost based on real, concrete projects (steam networks, energy transition demonstrators, industrial closed loop recycling of industrial co-products, etc.). In some cases, they are raising new questions about our relationship with resources, the role of economic operators, or the need to develop port infrastructures.

To balance an "all oil" economy, this industrial ecology has to find consequently other port authorities' incomes, which in many cases are still based on land rental and port fees and are therefore dependent on the quantities of bulk liquids and solids passing through them.

Port spaces develop worldwide several initiatives to fulfill circular economy and industrial ecology ambitions. They all have in common a symbiotic lens: creating closed circuits for recycling and re-using matter, energy and waste. These circular economy and industrial / territorial ecology strategies represent an opportunity, and a potential means of securing the resilience and future of industrial port territories. As an example, the AMARCRETE project aims to valorize discarded ship mooring lines, which are currently not recycled, for applications in the concrete industry. Labelled by the *Pôle Mer Bretagne Atlantique* and co-financed by the *ADEME [2]*, the study consists in determining the feasibility of incorporating fibers from recycled mooring lines into concrete. This innovative project, which is part of a sustainable development approach, has environmental (waste reduction, natural resource savings), economic (energy savings) and environmental (energy efficiency) benefits.

[ENERGY] Ports innovate as well in recycling oil residues, to minimize environmental footprint on local biotopes. As a matter of fact, ECOSLOPS has developed an innovative technology to upgrade marine oil residues to produce new fuels and light bitumen, allowing to regenerate 98% of the fuel residues. The major innovation brought by ECOSLOPS in the treatment process of collected slops lies in the integration of a vacuum refining step after the traditional treatment process which is based on the separation of elements (sediments, water and hydrocarbons) followed by water treatment. The ECOSLOPS industrial site is the first in the world to produce new fuels 100% compliant with international standards: gas oil, industrial fuel oil and bitumen. With its integrated and innovative approach, ECOSLOPS offers port infrastructures, waste collectors and ship owners an economic and ecological solution that complies with international and European regulations concerning the collection and treatment of slops.

Again, concerning innovation in the energetic field, ports tackle fossil energy to the root, imagining port vehicles whose only emissions are... water! Through this first concrete application, Edeis and KU LEUVEN *Solhyd* hope to make Saint-Malo (France) the world laboratory for green hydrogen for port applications. Productive plants of Green Hydrogen have also been launched by the Port of Bordeaux (France) to

Current projects involving decarbonization illustrate change in the mindsets. In the same manner as Hummingbird Movement[3], each point of the global map is acting at a local scale to change the global conditions. This more "territorialized" approach that looks for solutions to re-use and recycle flows of CO2 within the local industrial and agricultural sector. Global and local

approaches complement one another, and contribute to ambitious decarbonization goals. They are repositioning the industrial port space as a strategic node in the interface between globalized traffic and optimized resource management (industrial and agricultural "co-products", energy recovery) on a local scale.

The World Ports Climate Initiative[4] assists ports through showcasing projects that reduce greenhouse gas emissions and improve air quality. For example, the WPCI created a new Environmental Ship Index scheme. The ESI creates an incentive for shipping companies to reduce the impacts of their vessels and earn the right to claim a high standard for environmental responsibility and to fly a "clean ship" flag. Terminal operations, too, emit pollutants and new regulations are requiring ports to upgrade their equipment. "Cold ironing," for example, allows ships to utilize shore power rather than relying on their own shipboard power plants, resulting in lower port emissions and opportunities to utilize cleaner energy from the local power utility.

[PLATFORM] Logistic is evolving, taking advantage of new technologies and Big Data. Ports all over the world are integrating AI into their port infrastructure among them, Port of Shanghai and the Port of Singapore. Port of New York and New Jersey developed a five-year plan to implement AI, Port of Hamburg has implemented Machine Learning modules. Those innovations result in gain of space; indeed, stock management has been enhanced, thanks to artificial intelligence. BlueCargo [5] offers port terminal operators and cargo handlers a solution for optimizing the storage area for cargo containers. In the storage area, containers are stored in stacks of 1 to 5 containers high depending on the terminal. When a truck comes to pick up its container at import, all the containers above it have to be moved and then replaced to reach it. Because of this lack of visibility on the exit of the containers, the terminal must continuously perform stacking and unstacking movements. These numerous parasitic movements are costly for the terminal and have an impact on the quality of customer service: truck waiting times, etc. Blue Cargo builds an artificial intelligence able to reduce these parasitic movements with a new placement of the containers.

In the same time, the container itself, is being requestioned and optimized. The overall cost of each container takes on a new dimension: ecological. This shift towards ecological adaptation is not candid; indeed the ecological prism impeding an economy of means in all ways (compacity, transport, turnover, storage) does not cost more, on the contrary.
According to a study led by the 4Fold company, "40% of container transport on land is empty. At sea it's 20%. Foldable container could save "up to 37% in costs and CO_2."[6]
As a consequence, for local platforms, foldable shipping containers create more room on vessels, docks, trains and trucks.

Those logistic optimizations allow to regain ground space, that can be reversive, sharable and multipurposed. This gain is an opportunity to restore a dialogue between cities and port industrial areas. These alternative interstices, if they are placed at the interface between port and city could become a support for social capital and shared identity.
Finally, there are opportunities to build a model combining industrial infrastructures and natural ecosystems. Overlapping human and natural layers allow a better production in absorbing floods or any kind of climatic hazards and is suitable for a resilient productive area.

02.Reshaping inert grounds into a resource providing new uses
Reversing Anthropocene action: Converting leftover spaces into lively resourceful Grounds

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2   Agence de l'Environnement et de la Maîtrise de l'Energie
3   "The Colibris Movement", the common name of the Colibris Association, which takes its name from the hummingbirds, is an association under the French law of 1901 that was created in 2007 in France. It is a movement based on citizen action, which links personal transition and societal transition. It encourages everyone to "do their part" to initiate the ecological and societal transition.

4   On 12 May 2017 the International Association of Ports and Harbors decided to set up a World Ports Sustainability Program. Guided by the 17 UN SDGs the program wants to enhance and coordinate future sustainability efforts of ports worldwide and foster international cooperation with partners in the supply chain.
5   Founded in 2018, BlueCargo is the premier platform for empty container returns.
6   Impact study made by 4 fold https://4foldcontainers.com/

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Port-industrial areas still have land at their disposal when metropolises can't push further their urban print. It is one of the last space available for testing grounds for industrial symbioses, in the form of a complex, dense and varied network of flows of goods, utilities, and services. Some of these territories are now banking on industrial ecology and the circular economy as real differentiation strategies, enabling them to gain comparative advantages, nationally and internationally.

"Disused spaces" and "vacant spaces" don't embody necessarily the same nature.
In any case, they are left vacant during the transformation of the port industrial area, they offer possibilities to restore a collective appropriation of neglected grounds.

[Vacant spaces] They can be left vacant on purpose, waiting for activities expansion. They are a land bank for industrial growth. These can be called "Dormant Grounds" when we refer to the unassigned terrains compared to the surrounding active industries. In some cases, the grounds are untouched but privatized, in other cases they are already artificialized or built.

[Disused spaces] We could call them "Brownfield, Derelict land, Degraded and Deteriorated land or buildings", previously occupied they are referring to abandoned spaces, obsolete infrastructures and in some occasions contaminated and polluted.

In certain cases, grounds match both definitions.

In this strategy of finding a new economy based on a strong collaboration between port and city, temporary use can foster new dynamics. A new governance has to be found before any physical action. Temporary use is the activity taking place outside the ordinary functioning of the real estate market. It can be driven by creative milieus, activist and community uses, promoter of culture and counterculture, as new approaches to urban space.

To simplify actions on the so-called available lands let's imagine two scenarios, both reversing unused grounds into symbiotic interfaces.

Reversing grounds
Port industrial areas are often exposed to pollution due to former activities. This pollution can take many forms due to the large spectrum of contaminants in considering that surface pollution and deep pollution do not raise the same issues. Polluted grounds are most of the time expensive to restore, that is the main reason why they are steel available. Restoring lively soils is a matter of time and tools to reach a habitable environment. Time can become a tool as well, when using Phyto-depuration processes. The ecosystem chosen to depollute one kind of pollutant, becomes an extractor of Anthropocene former activity and helps restoring progressively neutral soils. In the meantime, of the depolluting process, growing trees reduce the heating islands in continuous concrete tarmacs. Trees can be converted in biomass and generate energy when they are not able to absorb soil contamination. In terms of use it can be thought as a pedagogical park. This strategy was applied in the SPL Strasbourg-Deux Rives, in the development of the Citadelle, Starlette, Coop and Rives & Port du Rhin districts in Strasbourg. Soil reclamation is at the heart of the implementation of a circular economy approach on an unprecedented scale. The objective is to treat and recycle, on site, the 266,000 m3 of contaminated soil (sterile or polluted) by the site's industrial past, without evacuating or bringing in any from outside. Called Valozac, this

operation is based on a study of the characteristics of the area and its soils.

Dealing with artificialized grounds
Sometime it is not suitable to reverse ground nature into natural soils. Various reasons can lead to dealing with existing concrete grounds: budget, time, technical complexity. The budget implemented might be inadequate to initiate soil reversion, contaminants below grounds could be too complex to encapsulate, a political project launched but yet not operative. In any case Time becomes a tool to
 Though, leftovers space still have the potential to restore a link between metropolises and their port.
In this case, some alternatives are the introduction of alternative uses and ephemeral appropriation. Resilience can be reached by a multipurpose ground, support of activities opened to the city.
Using available spaces, in their current condition, present some advantages. On the contrary to polluted grounds, they are ready to use. Difficulty is no more on restoring livable conditions but to find new kind of agreements and conventions between port authorities and temporary operators.
In 2015, the Ground Control ephemeral Bar was emerging in Paris, settled in a 3-hectare-large former depot and repair place for trains, unused since 2009. The place hosted a wide recreation and cultural place with a pétanque area, hen house and a garden, a bar and snack place. When sitting on deckchairs on the abandoned tracks visitors could watch and hear the trains passing by nearby. Concerts and performances, as well as a flea market took place there. Ground control was seen as a "living place". A convention for temporary use was signed between the organizers, specialized in event management, with the French Railway Company, SNCF. The company then benefited from a use – and rent - of the space before the site is demolished in 2016 for the reconstruction of social housing.

Bottom-Up actions are emerging as expression of direct democracy. People stand for their collective rights including public places, and alternative uses 7.

For a long time looked at with an amused or even condescending look, transitional urbanism seems today to have acquired its letters of nobility. From the enchanted parenthesis of the wasteland, the transitional has today become a new tool in the palette of planning and development, and one that is acclaimed by city professionals. This is because it is at the crossroads of major developments in urban planning, which tend to make the activation of territories a full-fledged dimension of planning: the increasing complexity of urban projects, the lengthening of timeframes, the need to invent new ways of associating "urbanites" with a city planning process that is struggling to open up to the general public.
Emerging new needs or new forms of cooperation leads inhabitants to a collective responsibility. Temporary uses can become a successful experience in term of inclusivity and alternative to institutional urban culture. Governance model are emerging, fostering revitalization and activation of unused grounds supported by agreements on the terms of land use. As an example, In Philadelphia (USA), a civic project was launched by the Public Interest Law Center in 2013, called "Grounded in Philly". The website/platform facilitates the shift from vacant land into community gathering places.

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7   Jacobs,J., 1961, The Death and Life of Great American Cities, Random House, New York, p.324

CONCLUSIONS

As gateways of the globalized world port industrial are at the edge of the collapse. Built on a quantitative economic model it can only remain as it is if we consume more and more. Despite its dramatic situation, the biosphere is preparing to accommodate more and more people as our resources dwindle. The coronavirus crisis of the last two years have led us to stop our race towards the planet Mars, to land, on earth.
Port industrial authorities understood the necessity to adapt to climate change, certainly to rebrand their polluter image but also because the extraction of natural resources in collective soils force us to act immediately. This shift towards industrial ecology is encouraging on many levels. Industries, local stakeholders, local authorities begin to align their visions for a collective society. Port industrial areas have the potential, through their typology and the size of their infrastructures, to accommodate new uses, new resources and new users. But this move won't come alone. It will have to be supported at all scales and continuously push forward.
Logistics optimizations, the use of new technologies, especially IA and Big Data and the implementation of new collaborative tools tend to show that logistics zones reduce our land requirements for the same quantity of goods processed.
In the meantime, the collective conscience and political actions call for a sobriety of our actions on the soils that welcome us.
It is necessary to move away from a monofunctional model. The commercial zone at the entrance to the city, the industrial-port zone, the sports ground, and the storage warehouses are all monofunctional typologies that need to be hybridized and reinvented in order to redefine the desirable criteria of a dense, productive city that pools its resources.
By proposing versatile soils, whose logistics will be able to ensure an optimized rotation in order to free up the maximum amount of space possible on already artificialized areas, we will limit urban sprawl on agricultural areas. Part of the answer lies in the redefinition of these port areas. The reversion of urbanized soils to natural soils is necessary. This removal of our urban systems should not be seen as a step backwards. On the contrary, it is the sobriety of our actions and the progressive deconstruction of these hostile environments, whose conditions of habitability can only be maintained by artificial systems, that will make the soils of the Anthropocene habitable.

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ETHOS AND TYPICALITY AS A HINT AT THE RESTORATION OF THE CRISIS OF REPRESENTATION AND DWELLING

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ABSTRACT:

Recently, the idea of the 'smart city' has become dominant in academic and practical discourse. It focuses on developing new 'types' of cities by harnessing and applying new 'technologies', without paying much attention to supporting the everyday lives of those living in them. Many experts are worried that smart cities, in their frantic search for 'tendency', 'type', and 'technology', have no room for 'situation', 'people', or 'story'. Would it then be possible to 'dwell'—in its truest sense—in a smart city as an epitome of state-of-the-art technology?

In this new era of technological advancement, what would be the roles and responsibilities of architecture in overcoming this crisis—a collapse of reliability—at different levels of relationships, between humans and humans, nature and humans, and things and humans, and revitalising localness? What about architectural education? Which approach should it take—artistic or instrumental?

Against this backdrop, this study aims to explore the potential and possibilities of local education and architecture, distinguished from the globalised model, through the ideas and philosophies of Aristotle, Martin Heidegger, and theorists of the phenomenology of city and architecture Dalibor Vesely and Peter Carl. Based on this theoretical foundation, we will examine three cases of small collective housing and private housing in Seoul, Korea, to discuss how a new way of representation, through 'ethos' and 'typicality', would surmount the limitations of the existing instrumental representation, to expand the horizons of production, creation, and communication

KEYWORDS:
Phenomenology, Ethos, Typicality, Situation, Representation

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INTRODUCTION

Modernism in the twentieth century led to a crisis in urban planning, design, and architecture, as spaces became homogeneous and neutral, focusing exclusively on efficiency, convenience, and technology.

Given environments—the climate, geography, and local customs—were disregarded, disrupting the sense of encounter, invitation, and communication encouraged by traditional architectural elements and leading to societal fragmentation. How has this crisis been addressed by smart city theories and practices in recent public discourse? The discourse on the smart city emphasises the development of cities through the application of technologies, which tend to be subordinated to the life-world. Many experts are concerned that smart cities are focussed on trends, types, and technology and lack people and stories. Are we convinced that a smart city can achieve a true sense of dwelling?

In Korea, the composition and configuration of programmes of traditional dwellings have undergone rapid modernisation and substantial changes. For example, the Madang, or yard, a key element of traditional housing, has been replaced by hallways, living rooms, balconies, and pantries in most contemporary houses. Accordingly, the traditional Madang, the place for visitations, encounters, and everyday communication about social events and festivals, is not easily found today. This study examines how the typical interactions of the Madang, derived from the Korean ethos, have been reorganised and reduced. Drawing on philosophical concepts and phenomenological theories, the study scrutinises the strategies and practices manifested in contemporary housing. We discuss how architectural research, education, and representation can help surmount the limitations of dwelling and representation while expanding the discourse and practice to new horizons of production, creation, and communication.

What are the roles and responsibilities of architecture in attempting to overcome the crisis of dwelling and restore reliability and localness inscribed between humans, nature, and things? What kind of architectural education and approach is required? Aristotle[1] and Heidegger[2], as well as phenomenological architectural and urban theorists Dalibor Vesely and Peter Carl[3], advocated achieving the richness of daily life and a true sense of dwelling. Primarily, phenomenological theorists argue that modernism and modernists made cities homogeneous; they strived to overcome the crisis of representation and dwelling and restore their articulated strata of reliable relationships by rediscovering the life-world—daily life habits, situations, and features associated with their places and regions[4]. This study focuses on ethos and typicality as ways to rediscover the life-world and overcome the crisis of dwelling and representation.

Ethos and typicality comprise the common ground, communicative structure, and communicative movement between people. To restore the reliability between multi-layered relationships—human, nature, and things—we must urgently 'rediscover' the ethos and typicality of the region and place. Since a represented city or architecture derives from the common ground and habits accumulated over a long period and is not a repetition of invention and creation of an autistic way of living, but are deeply imbued with the sense of a 'way of life' for all[5]. Thus, researching, rediscovering, and practising ethos and typicality are the first steps to escaping the vicious circle of exhaustive and autistic instrumental representation to implement dwelling in the true sense and promoting reliable relationships.

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1 Aristotle, the ancient Greek philosopher, believed that it would be impossible to build a stable polis if the ethical foundation is not well established. In other words, life in the polis requires 'politics,' but politics is only possible when ethics serve as the fundamental, common ground of the society. To help understand ethics, Aristotle explains that ethos comprises the moral virtues, habits, and character of a society. Ethos is not simply a habit intertwined with an individual's daily life but a kind of commons that embraces customs, traditions, and institutions accumulated among people in the same place, that is, the polis. Simultaneously, Aristotle emphasises that the ethical foundation—ethos— cannot guarantee the welfare of the polis; it is important to establish law—nomos—to maintain the political system. He clarifies that nomos and ethos are inseparable in the maintenance of the polis. For instance, if the nomos does not reflect the ethos in daily life circumstances such as social norms, citizens will not conform to or follow the nomos.

2 The German existentialist philosopher Heidegger offered an alternative interpretation ethos than Aristotle drawing from the philosophies of Sophocles and Heraclitus. He reminds us that the ethos of the dweller lies at the root of the dwelling place. According to Heidegger, one can grasp and feel the ethos of residents in the layout, composition, setting, form, and purpose of a building—especially a dwelling place. However, he states that ethos does not define the elements of all spaces nor persist in a fixed state. Residents reconstruct and complete the elements, including the composition, setting, and form of the space and place; they also fine-tune the relationship between things and people through their daily lives in temporality, according to their lifestyle. Initially, the space is built to meet the needs of the residents, but spaces and places are not immediately completed.

3 Dalibor Vesely and Peter Carl, widely known as theorists of phenomenological architecture and cities, explain that the reckless introduction of an attitude towards natural science based on positivism and the development of modern science and technology had a profound effect on architecture, which traditionally had the integrating role of humanistic and artistic communication. They remark that the outcomes of modern cities and architecture converge into a geometrical arrangement, composition, and form through the application of mathematical calculations, predictions, and technology. Therefore, the rich spectrum of interpretations, imaginations, and stories of places, people, environments, and ethos is compressed homogeneously and flattened into a single horizon. In particular, they express an urgent sense of crisis about the contemporary architectural trend that mechanically produces architecture and is obsessed with instrumental representation, objects, and types. 'Autistic' institutions created without awareness of the diverse situations and stories constituting our lives are highly likely to exist only for a small group. Ethos, situation, and typicality, they stress, are strong means with which to overcome this situation. Daily life is not simply a fragmented and autistic situation that is isolated and repetitious. This is because various ethos and the typicality of situations accumulate in daily life, such as sitting at the table and eating with family, going to work, and relaxing. To summarise, there is a 'depth structure', layers of human history, tradition, culture, language, custom, gesture, memory, and habits that intertwine in various combinations, reorganised into infinite life stories, and expressed as the 'common situation' of everyday life.

4 In 1968, a group of Anglo-American phenomenological architecture and urban theorists emerged. They were rooted in phenomenology and hermeneutics advocated by philosophers such as Edmund Husserl, Martin Heidegger, Maurice Merleau Ponty, and Hans Georg Gadamer and maintained the theory and practice for the restoration of the humanistic values and ontological status of architecture to overcome various side effects, including the alienation of everyday life that was taking place due to rapid industrialisation and urbanisation. Han, S. W. & Baek, J., 2021.

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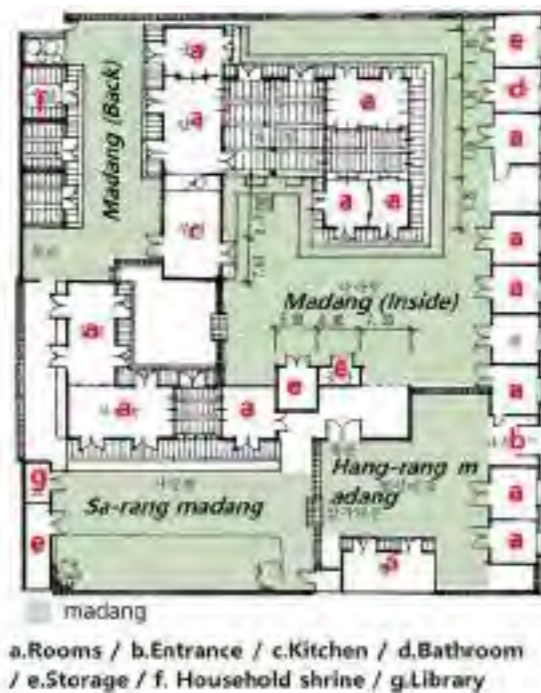## 2. The Change of Space Composition and Configuration of Korean Housing

Image 2.01 Traditional wedding in *Madang*.
Source: Jeon, D. H., 2020.

How were *ethos* and *typicality* inherent in Korean houses? This section examines how *ethos* and *typicality* manifested, faded, and subsequently disappeared due to the changes in the '*Madang,*' the courtyard in a traditional Korean style house, *Hanok*, in the modern and contemporary eras.
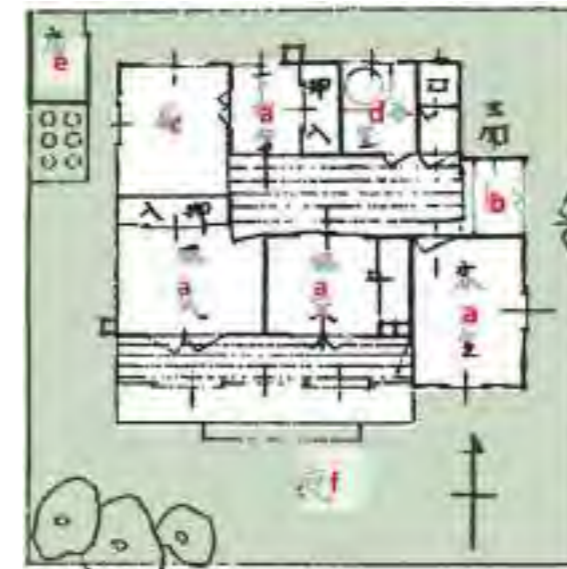

Image 2.02 Threshing in *madang* Rcture (Left), Panoramic View (Mid), and Sarangchae(Right) of Jung Jae-young house in Yeongcheon.
Source: artbank.com(left), Cultural Heritage Administration National Heritage Portal (Right)

Hanok was among the most typical housing in Korea, and it was characterised by a variety of Madang, which are outdoor spaces between the compartmentalised buildings of a residential compound. The Madang of a Hanok was a space for rites and rituals, housework, and production and consumption. It was a 'common open field' where family and village events—big and small—were held.

a.Rooms / b.Entrance / c.Kitchen / d.Bathroom
/ e.Storage / f. Household shrine / g.Library

The village ritual festival, Gut, which was a religious ceremony with accompanying feasts and traditional music—Nongak and Pungmul— was also held in the Madang[6]. Young and old alike interacted through folk traditions held in the Madang; adults communicated with each other and prepared food together, while children played traditional games. These events were not simply one-off occasions, but greatly influenced the sense of spiritual solidarity among all people in a village, while they conducted their religious ceremonies. Furthermore, family events such as weddings, funerals, birthday parties, and commercial events such as visits from salespeople called Bobu-sang also took place in the Madang. The Madang was not limited to the boundaries of the house because it was an external space where people wore shoes; it was a traditional space unique to Korea that bridged the inside and outside, embracing everything from various rituals and festivals in the village that mediate the relationship between human, nature and God to the intimate daily lives of the family.

Image 2.06 Floor plan of. Toshi- Hanok in 102-1, Gahoe-dong.
Source: Seoul History Archive., 2018.

madang
a.Rooms / b.Entrance / c.Kitchen / d.Bathroom /
e.Storage / f. Madang

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In the 1920s, under the influence of Japan, the 'Munhwa Housing'[7] style was introduced to Korea. A major feature of the Munhwa Housing style[8] was that it featured a family-oriented space, unlike the Hanok, which was centred on hospitality. The traditional Madang space was reduced and eventually merged with the Maru, an in-between space of rooms, ultimately replaced by the living room. In the 1930s, the 'Toshi Hanok'[9] was developed and predominantly built to address rapid population growth and the resultant housing shortages[10]. Unlike the traditional Hanok, where the Madang was situated between the compartmentalised buildings in a compound, the Madang of a Toshi-Hanok was a courtyard surrounded by the bedroom, kitchen, Maru, and bathroom integrated into a single building as they are in Munhwa Housing[11]. Although the Madang of the Toshi-Hanok was like the traditional Hanok—for instance, it was outdoors where people kept their shoes—its uses and characteristics were different. While the traditional Madang was accessible to outsiders, the urban Madang was closed to outsiders and mostly used by the home's occupants as a place for housework, gardening, and occasionally receiving guests. Thus, the role of the traditional Madang as a place for village solidarity was partially lost in the Toshi- Hanok, but the space still functioned as a place where bonds could be formed among members of the house.

a.Kitchen / b.Bathroom /c.Rooms /d.Vestibule

South Korea was devastated by the Korean War, and there was an urgent need to build new housing types, giving rise to government public housing[12] projects, starting in the 1950s. Yeong-dan housing, a new housing type, was characterised by the floor plan with the 'Maru' space in the centre, connecting the vestibule and individual rooms, similar to the modern housing style[13]. Notably, a vestibule began to be incorporated in Korean housing types where shoes could be removed and put on indoors[14]. Accordingly, the traditional Madang and Toenmaru, a porch along the outside of a room, which had accommodated various outdoor activities, disappeared with the introduction of the contemporary floor plan that mainly accommodated indoor life. The Maru was a different space from the Madang, where diverse subjects met and communicated. Most houses built during the rapid modernisation of Korea emphasised the independence and privacy of individual rooms, and the Maru was recognised as merely a passage from the house entrance to its rooms. At this time, the modern heating systems had not yet completely replaced traditional systems[15], and the Maru was too chilly for the family to gather. Therefore, the utilisation of individual rooms was emphasised, and family common spaces, such as the Madang, were de-emphasised[16].

Contemporary apartment buildings follow the centralised floor plan, with minor modifications to the interior space. One of the major changes over time is that ondol heating, the conventional heating system, has been gradually replaced by central heating power using briquettes or oil, thereby freeing the kitchen space. As the kitchen is connected to the living room, the kitchen, living, and dining (LDK) plan form the common space in apartments today[17]. Production and support spaces that were in the Madang—toilets, Jangdokdae[18], flower beds, etc.—are now indoor and classified as the auxiliary spaces of the apartment—bathroom, utility room, balcony, and so on. This centralised floor plan in which individual rooms surround the LDK space has become the mainstream floor plan type for contemporary Korean apartments.

The traditional Madang with no boundaries between the public and private spaces, embraced the various strata of relationships formed in everyday life between humans, nature and things. In the modern era, the role and function of the Madang as an outdoor space where people wear shoes was reduced as the living spaces of houses became concentrated indoors. This shift is supported by the appearance of the vestibule and the hallway between rooms. As the relationship between rooms was reset for intimacy and privacy, independent and private activities of individual family members were emphasised. Concurrently, typical public, daily life activities decreased with the separation of the Madang from the outdoors.

Image 2.11 Living-Dining-Kitchen (LDK) Plan of Banpo apt. 3rd block & Dogok Dunchon apt. (Left), Living-Dining-Kitchen House in contemporary house. (Right)
Source: Do, Y. J., 2017. pp.61-70. (Left), Jeon, E. J., 2017. (Right)

Image 2.12 Daecheong in Hanok (Left),
General living room in contemporary apt. (Right)
Source: Encyclopedia of Korean folk culture (Left),
Park, J. W., 2021. (Right)

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3. CASE STUDIES: METAPHASE HOUSING IN SEOUL

Today in South Korea, there is a movement to counter the post-war architecture trends in small and medium-scale private housing, as seen in a few interesting cases in Seoul. These architectural projects incorporate ethos and typicality, arising in transitional spaces between the city and architecture and reinterpret traditional culture and customs, such as the Korean ethos, where a person removes their shoes when entering a house. Moreover, these attempts and practices are aimed at restoring the sense of encounter and invitation that was lost in the process of modernisation in Korea. This section illuminates the institutional implications and lessons that can be drawn from three case studies—Tiny Second Home in Urban, built in 2018; Harvest Mansion, built in 2019; and Rainbow Inn, built in 2020—to overcome the crisis of representation and dwelling concerning its programmatic, configurational, and spatial aspects.

The South Korean architect, Taebyoung Yim, founder of Mundoehoje, borrows the biological term metaphase to emphasise that his works are not complete when they are built but keep evolving, just as cells of an organism are always dividing and growing. Yim says that most apartment plans separate private and public activities through the boundary created by the front door of the complex, although this does not serve to classify and divide spaces into two domains distinctly.

Image 3.02 Metaphase House Diagram
Source: Magazine Brique

Interestingly, he prompts various everyday encounters and invitations by transforming, overlapping, and rearranging the public and private domains. Furthermore, he reinterprets and expands ambiguous interstitial spaces such as the Madang, Daechong, Maru, living room, and vestibule. He seeks a mediating architecture for inducing people to meet again in the in-between spaces—a vestibule—and encouraging newly emerging relationships in modern society. He considers these as some of the crucial topics of his research and practice.

Yim illuminates that the core programmes of housing can be divided into four categories: bedroom, living room, kitchen and dining room, and bathroom. The kitchen and dining room comprise the main programme and serve a common function in both residences and hotels[19]. As he is dissatisfied with the fact that the kitchen and dining rooms are only used three to four hours a day, he suggests spatially separating the living room, bedroom, and bathroom programmes for better use of those spaces. His architectural ideas and strategies are developed through various projects, especially the three architectural projects covered in this paper.

Yim's neighbourhood platform at the boundary between city and architecture can be seen in the first case, the Tiny Second Home in Urban. The function of this building is to serve as the second home within a city for a retired baby boomer, a villa in the city centre. The client owns another home and commutes to the second home every day and wants the house to serve two functions: first, a space for meeting friends, and second, a space for reading and writing. Yim applied his architectural ideas by placing the kitchen and dining room on the ground floor as independent spaces and placing the library, living room, and bedroom on the upper floors.

The ground floor is a semi-private space with doors in the kitchen and dining room, allowing visitors to come and go freely, while the first, second, and attic floors are completely private spaces where the client can study and rest. This separation creates two parts to the house that can be occupied by different people simultaneously. In the future, it is intended that the ground floor will be transformed into a café, workroom, and meeting room to serve the neighbourhood.

Image 3.03 The Section of the House.
Source: Tiny Second Home in Urban / mundoehoje | ArchDaily

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The ideas of the architect led to detailed spatial planning and settings for this house. The kitchen and dining room are considered private areas, although they are on the ground floor for convenient access; hence, a guest may not feel psychologically comfortable. This is the key reason why tiles were used on the ground floor, as guests do not need to remove their shoes. The architect wanted a visitor to feel as if they were entering a restaurant or café so that semi-private or semi-public programmes could be filled and actively utilised in private spaces. The ground floor space is actively used by the various family, friends, guests, and locals to stop by and have a cup of coffee with the owner.
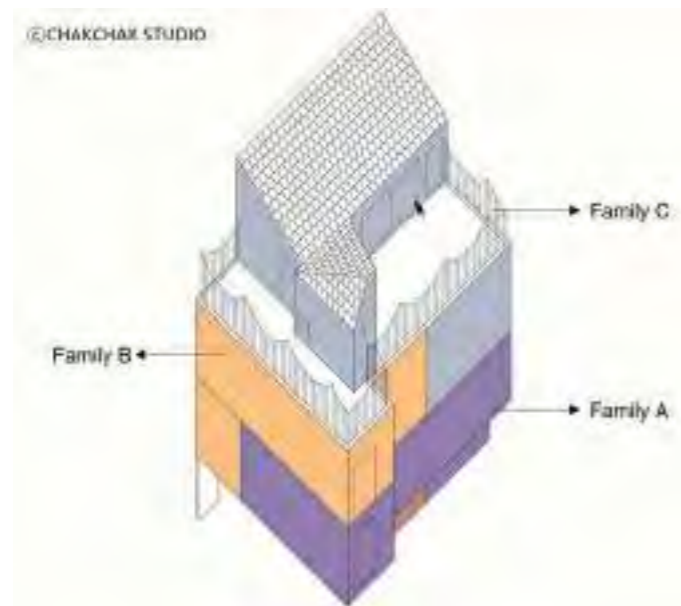

Image 3.04 Composition Diagram
Source: Chak Chak Studio

The Harvest Mansion, designed by Chakchak Studio, is another example of how interstitial innovations can be achieved[20]. This collective housing is for three families: family A lives on the ground and first floors, family B lives on the first and second floors, and family C lives on the second and third floors. The division of spaces becomes blurred when the families use each other's vestibule and terraces. For example, family A uses their living room to have coffee or breakfast in the morning, drink together on family C's terrace, and have a conversation while watching TV in family B's dining room[21]. This daily usage pattern is possible because the vestibule was not planned as a typical entrance space with a single purpose to remove and put on shoes[22] but was designed to be used as a kitchen, dining room, library, studio, meeting room, and so on. Furthermore, the vestibule floor is tiled so that neighbours and guests can access the space wearing their shoes. The residents say that they initially thought of the 'extended hall' as unfamiliar to use; however, after three or four months, this space went from ambiguous to useful. It can be used for various purposes, such as leash walking the dog, washing feet in the sink, welcoming guests, and work meetings[23].

The vestibule spaces are not always used as private spaces. Those spaces are equipped with sliding doors; when the doors are opened completely, a short alley is created instantly; the residents use them semi-privately by opening doors. One of the residents said that when all the front doors were open, she felt as if all the families were living in the same home because she could hear their daily activities such as the sound of washing dishes[24]. Although the house is at the end of an alley, the residents can encounter several of people in the café on the ground floor. The café is an in-between buffer space between the people in the neighbourhood and the residents of the house or between the community and the house.

Image 3.05 Section of Rainbow Inn.
Source: Rainbow Inn. mundoehoje | ArchDaily

The third example, Rainbow Inn, is a simple but significant case. It was built in 2020, and three young writers rent it at below-market rates. The building provides social housing in a mixed-use building with three distinct programmes: a café, an office, and a hotel. In the previous two cases, the ground floor space expands into the vestibule, allowing participation and communication between the residents and the neighbourhood. In this case, a sense of belonging is created among residents through the 'common hall'. Three residents live on the upper floors and share a common entrance and hall; their sense of living together in the same home is strengthened when they remove and put on their shoes in the common hall space. A café on the ground floor and a small hotel for one person on the first floor were designed to establish contact and communication with the residents, neighbourhood, and visitors.

4. CONCLUSION: THE SENSE OF ENCOUNTER AND INVITATION

'We try to fill the need by providing houses, by promoting the building of houses, planning the whole architectural enterprise. However hard and bitter, however hampering and threatening the lack of houses remains, the proper plight of dwelling does not lie merely in a lack of houses'. Martin Heidegger, Building Dwelling Thinking, 1951

In South Korea, the housing shortage is being met with new apartment complexes. What architectural practices and what type of education should be pursued in their design? Simple reapplication of technologies and superficial and aesthetic obsessions? Or an excess of sensory stimuli to embody a particular atmosphere?

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1 Aristotle, the ancient Greek philosopher, believed that it would be impossible to build a stable polis if the ethical foundation is not well established. In other words, life in the polis requires 'politics,' but politics is only possible when ethics serve as the fundamental, common ground of the society. To help understand ethics, Aristotle explains that ethos comprises the moral virtues, habits, and character of a society. Ethos is not simply a habit intertwined with an individual's daily life but a kind of commons that embraces customs, traditions, and institutions accumulated among people in the same place, that is, the polis. Simultaneously, Aristotle emphasises that the ethical foundation—ethos—cannot guarantee the welfare of the polis; it is important to establish law—nomos—to maintain the political system. He clarifies that nomos and ethos are inseparable in the maintenance of the polis. For instance, if the nomos does not reflect the ethos in daily life circumstances such as social norms, citizens will not conform to or follow the nomos.

2 The German existentialist philosopher Heidegger offered an alternative interpretation ethos than Aristotle drawing from the philosophies of Sophocles and Heraclitus. He reminds us that the ethos of the dweller lies at the root of the dwelling place. According to Heidegger, one can grasp and feel the ethos of residents in the layout, composition, setting, form, and purpose of a building—especially a dwelling place. However, he states that ethos does not define the elements of all spaces nor persist in a fixed state. Residents reconstruct and complete the elements, including the composition, setting, and form of the space and place; they also fine-tune the relationship between things and people through their daily lives in temporality, according to their lifestyle. Initially, the space is built to meet the needs of the residents, but spaces and places are not immediately completed.

3 Dalibor Vesely and Peter Carl, widely known as theorists of phenomenological architecture and cities, explain that the reckless introduction of an attitude towards natural science based on positivism and the development of modern science and technology had a profound effect on architecture, which traditionally had the integrating role of humanistic and artistic communication. They remark that the outcomes of modern cities and architecture converge into a geometrical arrangement, composition, and form through the application of mathematical calculations, predictions, and technology. Therefore, the rich spectrum of interpretations, imaginations, and stories of places, people, environments, and ethos is compressed homogeneously and flattened into a single horizon. In particular, they express an urgent sense of crisis about the contemporary architectural trend that mechanically produces architecture and is obsessed with instrumental representation, objects, and types. 'Autistic' institutions created without awareness of the diverse situations and stories constituting our lives are highly likely to exist only for a small group. Ethos, situation, and typicality, they stress, are strong means with which to overcome this situation. Daily life is not simply a fragmented and autistic situation that is isolated and repetitious. This is because various ethos and the typicality of situations accumulate in daily life, such as sitting at the table and eating with family, going to work, and relaxing. To summarise, there is a 'depth structure', layers of human history, tradition, culture, language, custom, gesture, memory, and habits that intertwine in various combinations, reorganised into infinite life stories, and expressed as the 'common situation' of everyday life.

4 In 1968, a group of Anglo-American phenomenological architecture and urban theorists emerged. They were rooted in phenomenology and hermeneutics advocated by philosophers such as Edmund Husserl, Martin Heidegger, Maurice Merleau Ponty, and Hans Georg Gadamer and maintained the theory and practice for the restoration of the humanistic values and ontological status of architecture to overcome various side effects, including the alienation of everyday life that was taking place due to rapid industrialisation and urbanisation. Han, S. W. & Baek, J., 2021.

5 Wurman, R. S., 1986. pp.190, 209-210.

6 Lee, C. S. & Hong, S. N., 2013. pp.22-27.

7 In the late 1910s, the style of Munhwa Housing became popular in Japan due to the influence of the general welfare movement. Some scholars in Korea use various terms such as Culture House, Culture Housing, and Cultural Residence.

8 Traditional houses were court-type housing; circulation between rooms was inefficient, and lighting and ventilation were not considered important. Munhwa Housing has a centralised floor plan in which the main rooms face south, and the auxiliary spaces are on the north side. Rooms are arranged to create more efficient circulation. Lee, K. A., 2006.

9 Toshi-Hanok is also known as Doshi-Hanok, and Dosi-Hanok in English, which represents the same housing type. Since Toshi means city, Toshi-Hanok refers to a residential type formed in an urban area. It is a new type of Hanok that was transformed from a traditional Hanok in accordance with the modern parcel system.

10 Park, C. J. & Jeon B. H., 2002. pp.95-106.

11 Jeon, B. H. & Kwon, Y. C., 2012. pp.158-162.

12 Houses constructed by the Joseon Housing Corporation influenced by the Japanese housing style in 1941.

13 Lim, C.B., 2011.

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14 The concept of the vestibule was introduced to Korea by the Western.

15 Until the early 1970s, traditional ondol heating systems were used in apartment buildings, and it was after the mid-1970s that briquettes and oil boilers were introduced. Unlike modern central heating which uses briquettes or oil, the ondol could not efficiently heat an entire house due to limitations of the mechanical system.

16 Some houses built after the 1960s displayed a transitional phenomenon where the characteristics of the traditional Hanok arrangement were not completely adapted to modern life but applied superficially. For example, Samil Citizen's Apartments, the first public housing apartments to be built in the late 1960s, were based on a superficial application of the features of a traditional Hanok. The floor plan indicates a flower bed on one side of the entrance to the front door, and an external shed is attached to the side of the door. Also, an additional entrance leads directly to the kitchen and a shallow attic above the kitchen. There is a low window between the master bedroom and the kitchen, as the two spaces have a height difference. This unique floor plan included features of the traditional style that were superficially adopted. The Samil Citizen's Apartments is a seven-storey building, and the lower floors are used for commerce while the upper floors are residential.

17 Jeon, B. H. & Kwon, Y. C., 2012.

18 Crock storages of sauces and condiments

19 Yim, T., personal interview, 2021. Oct. 11

20 Taebyoung Yim lives in the house with two families, and he has suggested the direction of this project as a director and planner by commissioning another architect, Daegyun Kim, to design his house.

21 Park, C. (n.d.)

22 Yim, T., personal interview, 2021. Oct. 11.

23 Lee, W. J., 2021. p.42.

24 Kim, Y. S., 2020, Jan. 20.

SPATIALIZE THE COMPLEXITY OF A FOOD SYSTEM IN ITS SCALES, FLOWS AND MODELS:
THE LEVER OF SOCIO-SPATIAL NODES AND RURAL RELEVANCE IN THE DIFFUSE URBAN CONTEXT,
STUDY OF SCHOOL CANTEENS IN THE MUNICIPALITY OF TOURNAI

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ABSTRACT:

The article proposes through the study of a concrete food system, that of the school canteens of the Belgian municipality of Tournai, an analysis of the modes of governance and coexistence of agricultural and food models by a complex systemic approach of the territory. The study of this coexistence, in its relations of hybridization and confrontation, intends to deconstruct three binarities in the consideration of the territorial food fact: that of the local and the global, that of the social and the spatial and that of the conventional and the alternative (talking about food and agricultural models). Three binaries to which the approach of spatialization presented in the article adds that of urban and rural, in particular in the context of the study, that of diffuse urbanization. The article explores in its various parts and results how the complex and systemic approach deconstructs these binaries. It concludes on the contributions of the complementarity of models and methods to address the territorial complexity of the food fact. It invites us to compare the analytical and methodological framework with other study contexts in order to verify or refute the results that we envisage as new research hypotheses.

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The article proposes through the study of a concrete food system, that of the school canteens of the Belgian municipality of Tournai, an analysis of the modes of governance and coexistence of agricultural and food models (van der Ploeg , 2021) a complex systemic approach to the territory (Moine 2006).

He intends to make an analytical, methodological contribution to these situations of coexistence considered as poorly informed and poorly treated in the scientific literature (Cerdan & Loudiyi., 2021). The study of this coexistence, in its reports of hybridization and confrontation, intends to deconstruct the three binarities that the American Planning Association (2007) raises in the consideration of the territorial food fact: that of the local and the global, that of social and spatial and that of conventional and alternative (talking about food and agricultural models). Three binaries to which our approach to spatialization adds that of urban and rural, especially in the context of the study, that of diffuse urbanization (Grosjean, 2010).

The article explores the contributions of the complex systemic approach to deconstruct these binarities from a problematic: How can the school canteen be described as a socio-spatial node? Its development aims to meet several objectives: What is a socio-spatial node? In what way can school canteens be considered as such? In what way are situations of double coexistence levers of project? What does the approach of a located urbanism and its methodological implications bring? Two parties develop these issues.

The first part specifies the search posture. It is complemented by a scenario, placing the case study in the context of diffuse urbanization (Grosjean, 2010; Indovina & al., 1990). It also develops the field work from which the data were collected. It analyses the contributions of interdisciplinarity between the human and social sciences and the spatial disciplines in the study that concerns us.

The second part identifies and develops the two criteria for categorization (network-criterion and management-criterion) of the school food system that have made it possible to identify its network of actors. Collected by an inductive method, the approach to spatialization of data, described in the third part, seeks to identify levers to make of the food fact a component of the project of territory accompanying the logics of transitions (Geels, 2002; Smith et al., 2010).

Finally, the conclusion goes back to the main results of this study and discusses the avenues of mobilization of the latter.

Systems, complexity and processes:
The case of the territorial food fact in a diffuse urban context.

As we mentioned in the introduction, this study aims to spatialize the complexity of a concrete food system, that of the school canteens of the Belgian municipality of Tournai.

Systems, Complexity and Process: Epistemological Posture

This postulate places research in a position that is intended to be systemic. In the context of urban or territorial studies, we mean by system "*a set of elements, affected by different characteristics, and the relationships between these elements and their characteristics (attributes). […] Systemic or self-organization is used to explain the organization and evolution of systems with fundamental*

complexity" (Choay & Merlin, 1988) [Our traduction].

Applied to the territory, the systemic posture no longer considers it solely as a physical construct but rather as "*a set of relationships […] results of co-evolution between human settlements (organized on a cultural basis) and the surrounding environment (organized on geological and biological bases)*" (Magnaghi, 2014) [Our traduction]. The study sees the territory as this relational ensemble between spatial and social data.

The complexity of the territory (Moine, 2006) from a systemic point of view is also due to the fact that it integrates different subsystems which themselves are organized within it, such as the food system, the subject of the study.

The study of a food system aims to capture "*how people organize themselves in space and time to obtain and consume their food*" (Malassis, 1979) [Our traduction]. Like the territory, the food system mobilizes human organizational modalities as well as spatial (and here also temporal) considerations. This rapprochement between the system of territory and the subsystem of the food system evokes the principle of the totality of complex systemic thinking (Leloup, 2010), which consists not only of considering the part in the whole, but also the whole in the part.

The study explores this complex systemic thinking from a place of school canteen. A hypothesis located to establish the relationships and scales between this whole (the territory) and one of its parts (the food system).

Another concept taken up by the definition of Magnaghi in this study is that of co-evolution reports (Magnaghi, 2014) within the territorial system. This consideration leads us to study the territory in its situations of coexistence (van der Ploeg, 2021) and emerging governance networks and food models. Their identification seeks to observe how they participate in territorial processes of food security (Fournier and Touzard, 2014) and food territorialization (Magnaghi, 2003) (Bonnefoi and Brand, 2014) from a food transition perspective. The territory sees itself as a dynamic space.

The Municipality of Tournai – A diffuse urban context

The research situates these dynamics in a concrete space to grasp a reality on the ground: the town of Tournai.

It presents an urban centre surrounded by a village network inscribed in an agricultural fabric. Agricultural areas represent 13,342 hectares or 62% of the municipal area (Interreg AD-In Project, 2020).

This situation is anchored on the one hand, in history since these villages were previously autonomous. In 1971, the amalgamation of municipalities in Belgium annexed them to the city of Tournai, making it the largest municipality in the country. And on the other hand, by the characteristic morphology of the Belgian territories, the diffuse tissue. This model differs from the "centre-periphery" model found in other contexts. Its main specificity is the interweaving of urban and rural models into the whole fabric in favour of a mix of uses rather than a concentration of activities in the urban centre. Figure 1 represents this diffuse character of the urbanisation of the municipality of Tournai which is characterized by "*a substantial mass […] not only of population but also of services and productive activities […], a dispersion of this mass in a territory large enough not to present a phenomenon of high density and intensity, […] a high level of horizontal connection between the various points of the territory*" (Indovina & al., 1990) [Our traduction]. This particular fabric between built and agricultural spaces reveals a diversity of agro-spatial structures (Verleene, 2020).

Figure 1 – The diffuse territorial context of the municipality of Tournai (Hautecoeur, 2020).

This approach is also reflected in the methodology used to carry out this study. Data collection is intended to be interdisciplinary (socio-anthropology and urban planning) in an inductive approach

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based on field experience.

In the study, the research field is considered the "*space of a practice that has the capacity to construct spatial forms*" (Labussière and Aldhuy; 2012). The terrain articulates this relationship between space and society, between social and spatial forms.

This section describes how sociological data (networks of actors and governance) have been collected to provide the descriptive basis for the work and the contributions that the spatial disciplines have made in the interpretation of these data.

The data collection was carried out through a participatory observation work (Lapassade, 2002) within a collective peasant and citizen (CAT)[1] which, following the obtaining of regional funding, works in partnership with the City of Tournai to develop a vegetable workshop for collective catering in the town. In this context, it carries out an audit of all those responsible for communal school canteens in order to identify their needs in terms of fruit and vegetable supply so as to size up and study the feasibility of this processing tool.

Information on the network of actors and the way in which the canteen is managed was thus obtained through interviews[2] with the heads of establishments.

This involvement within the collective makes this analysis an action-research (Bazin, 2018). It demonstrates the contributions that the inductive approach allows in the understanding of territorial dynamics for the benefit of concrete and localized knowledge.

All these field data, mostly sociological, were then spatially translated through a cartographic representation. This approach situates the data in their spatial and territorial context (descriptive time).

First presented in the form of an overview, they are then approached from an interpretative perspective. This second phase made it possible to identify the particular territorial situations (*situations of double coexistence*) and initiate a project dynamic based on the results of the study, the social-spatial nodes and the rural relevance in the territorial food project.

Interdisciplinarity is mobilized in a report of complementarity of methods. The methods of observation-participant and research-action allow the descriptive framework, the collection of data from lived experience. The spatial mapping method interprets the data and generates the results of the study for a prospective purpose by exploring the diversity of spatial forms, particular to diffuse urbanization, in their ability to make project and this by a localized urban planning approach.

The following points develop this approach on the basis of the analysis of the food system of Tournaisians school canteens. First by an identification of its actors and then by a spatialization of these data.

Identify the network of actors in the school food system: the network-criterion and the management-criterion.

The study of the food system of school canteens of the municipality of Tournai is initiated from its network of actors. To identify it, the study is based on two categorization criteria. The teaching network (network criterion) to which the institution belongs and the mode of management of the

1   Ceinture Alimentaire du Tournaisis – Collectif Citoyen et Paysan

2   Two interviews with canteen managers in autonomous management were conducted individually. Two further interviews were conducted in a collective manner, one with all those responsible for the fundamental free network and the other with all those responsible for the secondary free network. The data concerning API restoration were obtained by members of the citizens collective who were able to visit the premises of the company. The data from Hanssens Catering was obtained by a personal visit, accompanied by the collective, in their transformation workshop.

Information about the producers was obtained through the work conducted within WCB and their listing files of local producers.

canteen (management criterion).

Network criteria – Decision-makers

The education system distinguishes two categories according to the public or private status of the authority which assumes responsibility for the institution (organising authority). It should be noted that since education is a Community competence in the Belgian institutional system, all are subsidized by the Wallonia-Brussels Federation.

The free network (44)[3] is organized by a private organizing authority (ASBL, dioceses, religious congregations). Governance is located at a local level where actors are identifiable as individuals or groups of individuals.

The official network (37) is organised by a public body, either the municipality (23), the province (9) or the Wallonia-Brussels federation (5). Governance is at an institutional, global level. Their identification refers to administrative entities.

The first observation of this categorization is the status of free schools in their ability to integrate several scales of governance. These institutions reveal an articulation of the latter by the dissociation of the organisational scale and the subsidising scale Indeed, the organisational level, by the private status of the organising power of the institution, is located at a local and site-specific scale. The level of subsidisation is at the supra-communal level, the Wallonia-Brussels Federation, which is itself linked to the policies pursued at national and European level. Open network schools integrate different levels of public policy. Thus, if one considers the school canteen of these schools, it is considered as a special space for the elaboration of territorial food policies on the scale of the different institutional levels (Figure 2). The network criterion therefore identifies the decision-makers.

Figure 2 - The establishment of the open network to identify the organisational and subsidising actors, the decision-making actors. (Hautecoeur, 2022).

Management criteria – Operational actors

The space of the school canteen brings the second criterion of categorization, that of the mode of management of the canteen, itself of two orders.

The management granted (61)[4] is based on outsourcing the preparation of meals to catering companies via tendering or public procurement systems for public entities. It is made according to two modes of delivery, the hot connection and the cold connection. In the first case, the meals are delivered cooked and heated. In this case, the establishments no longer have space dedicated to the kitchen. In the second case, they are delivered cooked and the establishments then have a heating point, usually made available by the catering company.

The autonomous management also called direct management (6) is based on internal management. It involves human and technical resources on site.

While the situation in the Walloon Region shows a certain balance between the granted management (47% of school canteens) and the autonomous management (53%) (Antier & al. 2020), the schools of the commune of Tournai are mostly in granted management. It represents 91% of schools for which data were obtained, or 61 schools out of a total of 67 schools. This choice of management method can be explained by the labour and equipment costs generated by autonomous management.

3   Number of institutions affected by the categorization criterion.

4   For this criterion, only the 44 free schools and the 23 municipal officials are considered. Data for the provincial and community official were not obtained.

Integrating the management method into the analysis calls together the supply network of school canteens is all the components of this food system and the operational actors involved. They complement the decision-makers revealed by the "network criterion". They are reproduced in Figure 3.

In the context of the study, the "management criterion" also reveals the coexistence of agricultural and food models (van der Ploeg, 2021). To enrich the analysis, we rely on the typology of food models proposed by Fournier and Touzard (2014)[5] which is based on "*both structural characteristics, co-ordination principles between actors and different quality conventions*". (Fournier & Touzard, 2014). The analysis of the relationship between the "management criterion" and the actors in the food system makes it possible to draw up various observations.

Canteens in internal management are based on two food models: the domestic model and the proximity model. They develop a food model based on the notion of proximity, both geographical and relational[6] (Perrin & Soulard, 2017).

A geographical proximity where each of the six schools concerned work with producers located within a 30 km radius of the establishment and a relational proximity where the distribution of vegetables involves a maximum of 1 intermediary (proximity model). In most cases, it is carried out by the producer himself, he is a full player in the food model.

One of them is also developing its own vegetable garden (domestic model) managed by the school community and thus partly meets its vegetable needs.

By looking at the producers involved in the supply of these school canteens under autonomous management, the study shows that everyone practices methods of production from unconventional agricultures (organic market gardening), any alternative crop model to the conventional agro-industrial model (de Lestrange, 2022).

The internal management of school canteens seems to activate the development of unconventional agriculture, via isolated producers, based on a network of proximity.

Canteens in licensed management involve two other food models: the convenience model and the agro-industrial model.

Two schools are part of the first model by granting the management of their meals to a local caterer located in downtown Tournai. They mobilize the principles of the commercial world combined with the conventions of the domestic through relations that are not very contractualized, more based on interpersonal relationships of trust (Fournier & Touzard, 2014).

The other 59 schools in the open network are part of the agro-industrial model. They work with two catering companies that are part of the logic of the commercial and industrial world based on mass production and processed products (Ibid.).

The first catering company is a Flemish company «Hanssens Catering» whose central kitchen is located 31 kilometers from Tournai (Waregem). It delivers 30,000 meals/day in Belgium and 36 of the free management schools granted in our study. It is partly supplied by local farmers in conventional or reasoned agriculture, and on Flemish logistics platforms whose products are derived from conventional agriculture.

The second catering company is a Belgian branch of the French company «API Restauration» whose central kitchen is located 42 kilometers from Tournai (Cuesmes). It provides 1265 meals/day for the municipality of Tournai, that is the 23 official communal schools and a school of the free network which joined the public market of the city to grant the management of its meals to this company. API Restauration follows a supply model similar to that of Hanssens, based mainly on products from

conventional agriculture. However, a clause in the specifications of the City of Tournai for its school meals imposes on the catering company a share of organic products in its preparations. The API supply network is therefore hybrid with fruits and vegetables produced by the Tournaisis market gardeners' group[7].

At first sight, these first elements invite us to think that school canteens in licensed management promote the maintenance of the dominant model of conventional agriculture and agro-industry. However, the point has to be qualified. When it is accompanied by public policies (restrictive clauses in the drafting of specifications) favouring the integration of products from non-conventional agriculture, it allows the development of these alternatives no longer through isolated producers, as may have been raised in the direct management, but via gatherings of producers who come together to meet the quantities requested by these sectors of collective catering. The logic of alternative production is therefore no longer isolated but collective and could be considered as a lever for the coherent structuring of unconventional agricultures at the scale of the studied territory.

Figure 3 presents a first synthesis of the links between the mode of management of the canteen, the operational actors of the food system and the food models based on our case study. It reveals the links between governance, management and the resulting food models. This approach goes beyond the strict opposition between conventional and alternative models in favour of a coexistence of models that is more concrete and nuanced. The school canteen thus asserts itself as a catalyst of the scales of governance of the food system and its models.

Figure 3 – School canteen management identifies the operational
actors of the food system studied and the coexistence of food models. (Hautecoeur, 2021).

Mapping to identify specific territorial situations

Special territorial situations
The analysis, which has so far been mainly descriptive in order to identify the network of actors involved in school restoration in Tournai, focuses in this part on the spatialization of these data. It studies the contributions of the spatial approach in the study of a concrete food system following its analysis in terms of actors.

In order to seek the complementarity between the descriptive analysis of the actor network and the spatialized analysis, we use the same categorization criteria that we used in the previous point: the "network criterion" and the "management criterion".

The spatialization of the latter is first carried out in the form of an overview. It corresponds to a general, descriptive state of affairs. A second cartography identifies specific territorial situations in a spatial project perspective integrating the scales of governance and spatial scales of the food models mobilized.

Figure 4 - Use of network and management criteria to identify
specific territorial situations. (Hautecoeur, 2022).

The overview uses the «network criterion» (Figure 4 - (1)). It shows a dispersion of schools in the communal territory. The urban centre concentrates the majority of schools but the map shows that each village on the outskirts of the municipality has one or two schools.

It is within this village periphery that the particular 6 situations are identified (Figure 4 - (2)). In

5   For a description of the 5 food models see: Touzard, J.M. & Fournier, S., 2014. La complexité des systèmes alimentaires : un atour pour la sécurité alimentaire ? VertigO, Vol.16 (1).

6   The study concerns the supply of fruit and vegetables.

7   14 farmers in unconventional agricultures who have developed a common crop plan to meet the larger quantitative demands of operators such as API.

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these 6 villages, free and official communal networks coexist. This data is the first lever for synthe-sizing the different governance scales of the network criterion presented in the previous point. It should also be noted that all these schools are of the same type, they are nursery and/or primary schools (basic education). This data allows a comparative basis in terms of the consumer audience (eating habits, average quantities).

The application of the «management criterion» to these particular situations (Figure 4 - (3)) high-lights a second coexistence within these villages, that of the food models presented in the previous point, related to the mode of management of the school canteen. This observation is the second lever of synthesis integrating this time the spatial scales related to the modes of production (un-conventional and conventional agricultures), their flows and their situations in our context of study.

Figure 5 spatializes these flows from two situations of coexistence that integrate the two modes of governance (free/official) and the three modes of management (granted Hanssens, granted API and internal) identified. The models of proximity and convenience, by their geographical and relational proximity allow a precise spatialization of food flows (identified flows). Conversely, the agro-in-dustrial model through the multiplication of intermediaries, and in this case, mostly the catering company, lacks transparency on the origin of the products, these flows however material cannot be located (unidentified flows). However, the catering company API, by integrating the group of 14 farmers in its supply network, activates local food flows. The collection of the productions is central-ized with a market gardener of the group before joining the central kitchen. Thus, this spatialization identifies the diversity of territorial food flow scales and the relationship they maintain with the management mode to which it refers.

*Figure 5 – Spatialization of food flows from two coexistence situations
(governance and food model). (Hautecoeur, 2022).*

Outcomes – Socio-spatial Node and Rural Relevance
The spatialization of data and these flows results in the results of this analysis.
(1) Taken independently, the school canteen integrates on the one hand the different scales of gov-ernance by the teaching network of its institution and on the other hand the different food mod-els by its management. It articulates social and spatial data. This finding leads to considering the school canteen as a socio-spatial node, a node from which a system such as the food system can be described and analyzed in its components and socio-spatial scales. The node appears as a stable referent to read the complexity of the territorial system.
Figure 6 summarises this concept via the canteen area and the data that could be presented in the article. The canteen is now only a space for food consumption, it is a lever to understand the terri-torial food system in its scales and flows.
The notion of node also refers to the point idea. A point that relates a particular urban object (the school canteen) to a production system generating a good or service (the territorial food system) (Kébir, 2004), thus integrating broader scales. A point located in the territory in favor of an inductive urbanism from the places and the inhabited spaces.

*Figure 6 - The school canteen as a socio-spatial node, a lever for analysing
the complexity of a concrete food system. (Hautecoeur, 2022).*

(2) Taken in a plural way, the study of Tournai school canteens reveals *situations of double-coexis-tence*. The coexistence of modes of governance (criteria-network) that activates the social scales (decision-makers in the food system) and the coexistence of food models (criteria-management) that activates social scales (operational actors) and spatial scales (model of proximity, domestic,

amenities and agro-industrial) of the food system.
According to Cerdan & al. (2021), research on the coexistence of food models is part of three epis-temological postures[8]: functionalist, balance of power, transition . The posture of the study is that of the transition. It questions coexistence in its ability to bring out new models and how they can be designed and managed. The posture is therefore that of a project approach.
These situations of double-coexistence appear as project locations. They help to rethink the local food system through its governance networks and production scales. The study shows that canteens under autonomous management promote the development of individual unconventional agricul-tures while the conceded management participates in the collective structuring of these agricul-tures to exist against the agro-agricultural model.and its mass production capacities. This structur-ing is also leverage of territory project.
A territory project hypothesis that can also be explained by their situations. They are all registered in rural outlying contexts. They attest to the rural relevance in the context of Tournaisien, and more generally of a diffuse urbanism. They highlight the uniqueness of these rural areas, which are often reduced to agricultural activities (Rieutort; 2012). These situations affirm rurality as a project space conducive to the reorganization of productive (nurturing), educational and residential functions as well as the emergence of new forms of governance (Ibid.) in favor of a territorial diversity that inte-grates the isotropy (Secchi; 2006) of the diffuse territories.

These situations of double coexistence, spaces of synthesis, are therefore propitious to think the project of territory in a systemic vision integrating the complexity of food models and governance networks.

Conclusion

The located study of the food system of school canteens of the commune of Tournai provides an analytical and methodological framework for the understanding of situations of coexistence of food models, and networks of actors involved in the collective restoration of schools in favour of a complex, or non-binary, systemic thinking of territorial processes.

The analytical framework is based on the two categorization criteria used by the study to identify the network of actors in the food system studied.
The "network criterion", based on the education network (free or official) identifies the decision-makers. The specific study of schools in the open network by its distinction between organisational authority (local scale, located actors) and subsidiarity (supra-local scale, institutional actors) deconstructs the local/global binarity. It reveals a articulation of these scales of governance. An articulation that, now identified, could be the subject of a precise research on the modalities of implementation of food policies of each of these scales in the Belgian context.
The "criterion-management", established on the mode of management of the school canteen (grant-ed or autonomous/internal), identifies the operational actors, integrating the components of the food system of the school catering. The analysis shows a link between the way in which the canteen is managed and the food models involved in revealing its coexistences. It also shows how uncon-ventional agriculture emerges and fits into food models, both local and agro-industrial. The vision goes beyond conventional/alternative opposition in favor of hybridization of models. A case-by-case

8   For a complete description of these epistemological postures, see: Gasselin, P. & al., 2021. Gou-verner la coexistence et la confrontation des modèles agricoles et alimentaires dans les territoires, in. Van der Ploeg., J.D., Coexistence et confrontation des modèles agricoles et alimentaires. Quae, Paris.

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analysis, micro-located, of these non-conventional agricultures would be relevant to identify their production methods and their territorial anchorage in the Tournai context in comparison with the conventional model.

The methodological framework is that of interdisciplinarity. Socio-anthropological methods (participatory observation, interviews and action-research) provide the data that are the descriptive basis of the study (the network of actors). The spatial methods (spatialization by cartographic retranscription) propose an interpretation of these data in a territorial project perspective integrating the two levers resulting from the study.

The first, the school canteen as a socio-spatial node. It articulates spatial scales and governance scales from a place. The project of territory is envisioned from its inhabited spaces, its organizational modalities and the scales that the latter summon. Additional time would be necessary to consider the inscription of these places in their physical geographical context (topography, hydrography, built spaces). The socio-spatial node attests to the interdependence of social and spatial considerations in the understanding of a territorial system.

The second is strictly derived from the spatialization of data. It brings out the situations of double coexistence by the superposition of the criteria network and management. Their situation, in the rural villages of the commune, underlines the relevance of rurality, in the diffuse urban context, to the planning of the territory. The view from rural life is a hypothesis of the construction of complex relationships between rural and urban spaces, especially in these diffuse tissues marked by the hybridization of these spatial models.

This article concludes on the contributions of the complementarity of models and methods to address the territorial complexity of the food fact. It invites us to compare the analytical and methodological framework with other study contexts in order to verify or refute the results that we envisage as new research hypotheses. It also invites the study to be included in a temporal approach in order to study the coexistence of long-term models by integrating the vegetable project carried by the collective citizen and which will complement the situation presented here. A new data that requires current flows and governance modalities and questions the territory's complex and dynamic systemic approach in its evolutions and representations.

Figures

Figure 1 – The diffuse territorial context of the municipality of Tournai (Hautecoeur, 2020).
Figure 2 - The establishment of the open network to identify the organisational and subsidising actors, the decision-making actors. (Hautecoeur, 2022).
Figure 3 – School canteen management identifies the operational actors in the food system studied and identifies the coexistence of food models (Hautecoeur, 2021).
Figure 4 - Use of network and management criteria to identify specific territorial situations. (Hautecoeur, 2022).
Figure 5 – Spatialization of food flows from two coexistence situations (governance and food model). (Hautecoeur, 2022).
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Les espaces bâtis

Les espaces agricoles
En clair - Elevage
En foncé - Grandes cultures

Les réseaux
Autoroutes - Routes locales
Voies fuviales - Voies ferrées

Figure 1 – The diffuse territorial context of the municipality of Tournai (Hautecoeur, 2020).

National (Belgique)
International (Europe)

Communauté
(Fédération Wallonie-Bruxelles

Echelle globale (acteurs subsidiants)

Echelle locale (acteurs organisationnels)

Direction
Personnel

Elèves
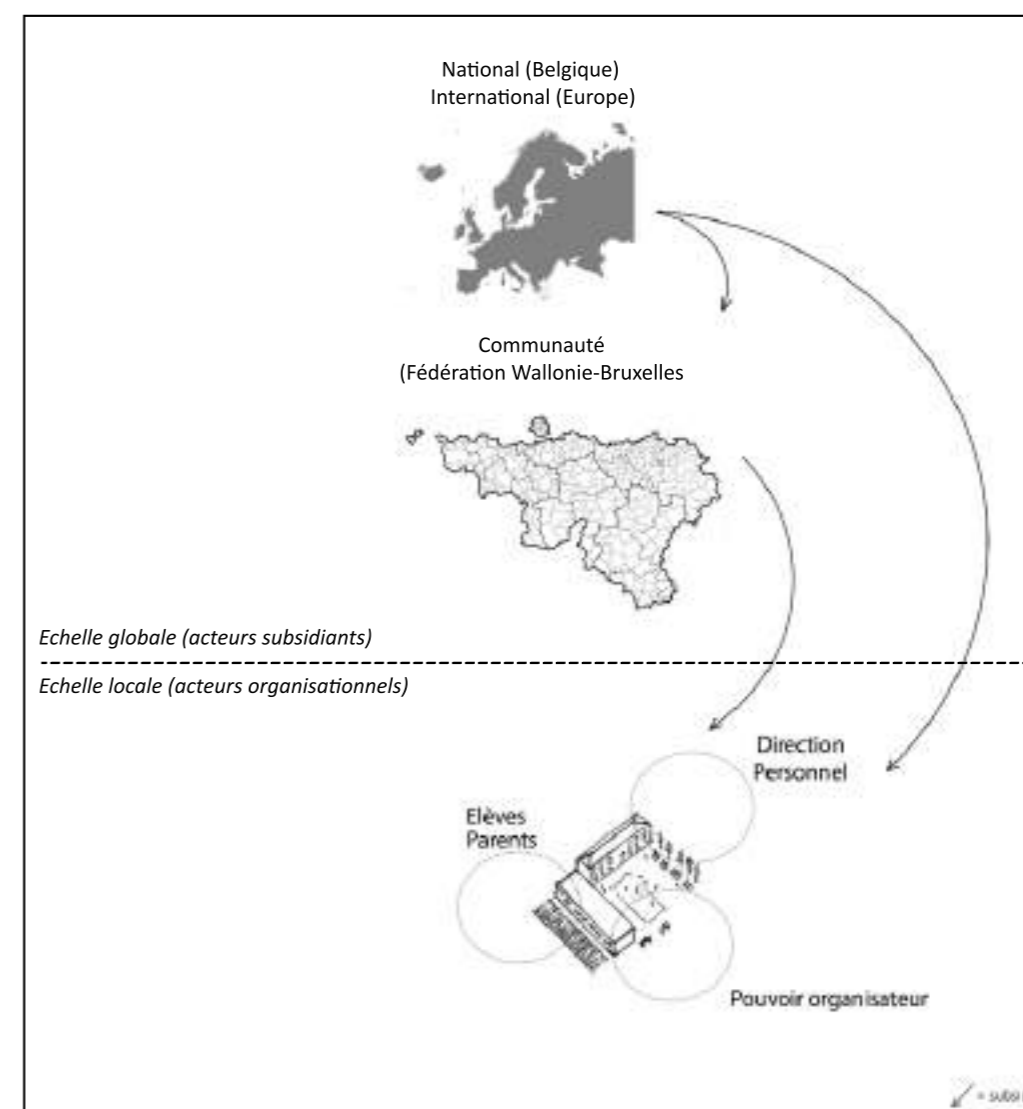Parents

Pouvoir organisateur

= subsides

*Figure 2 – The establishment of the open network to identify
the organisational and subsidising actors, the decision-making actors. (Hautecoeur, 2022).*

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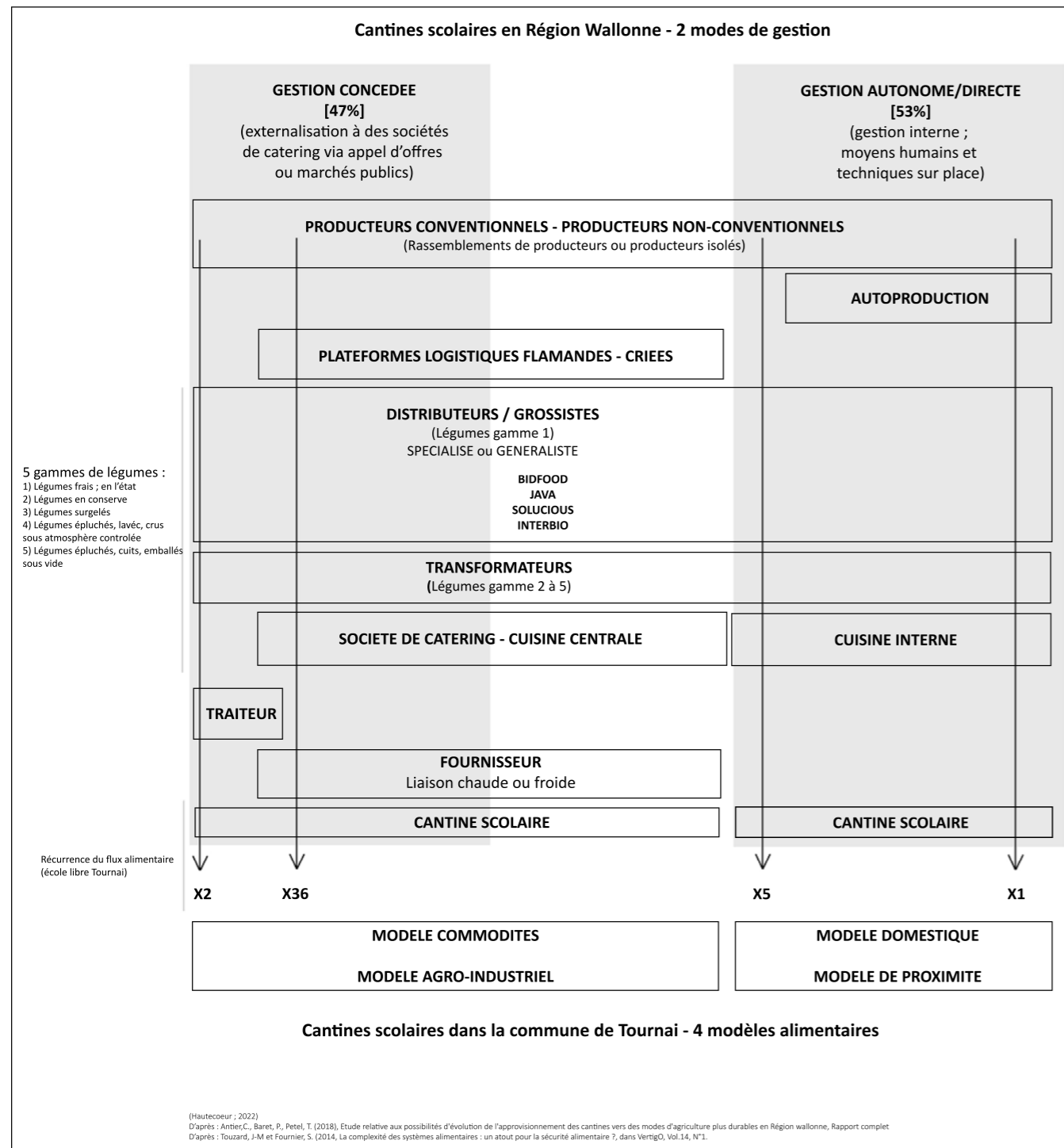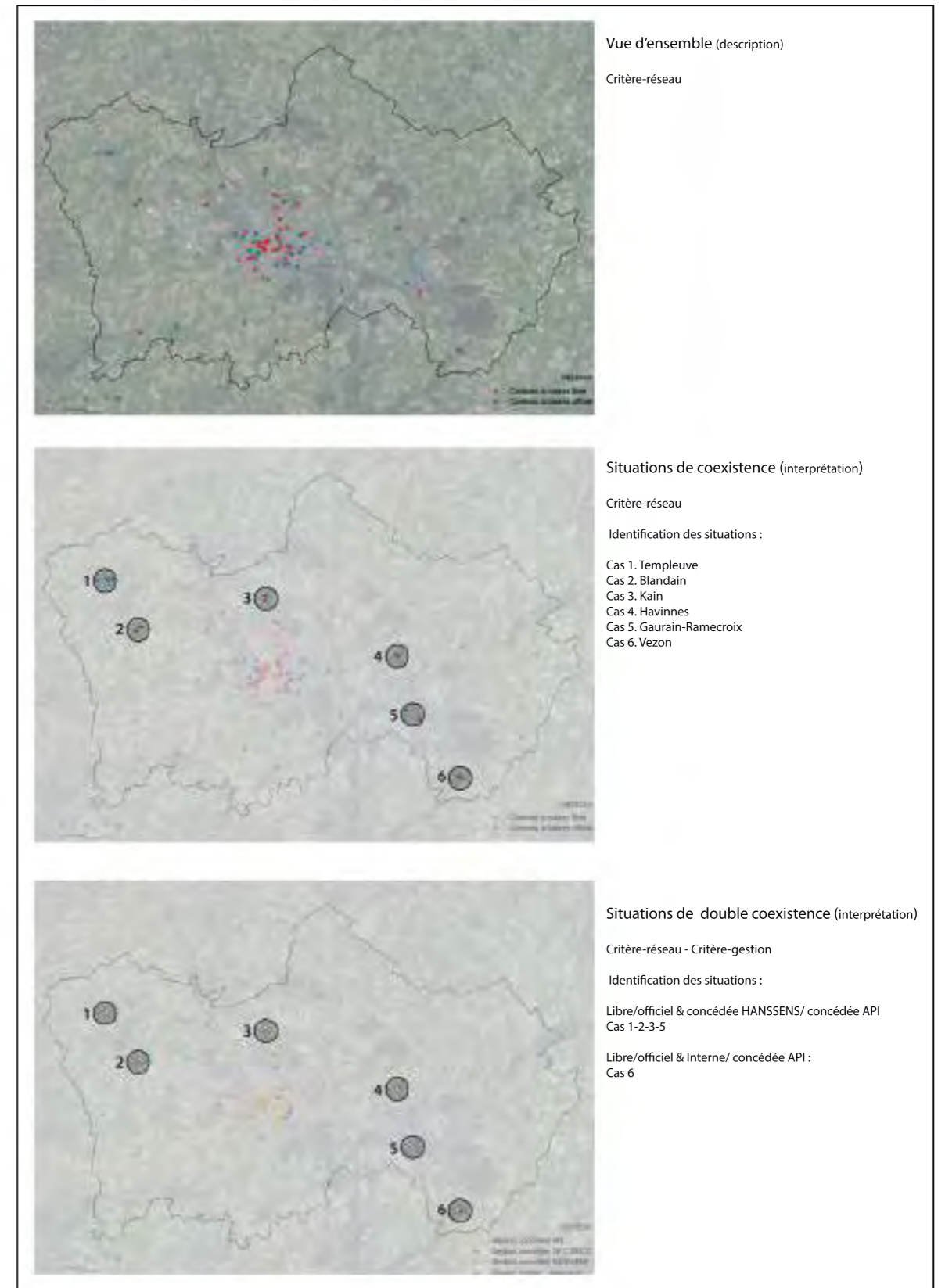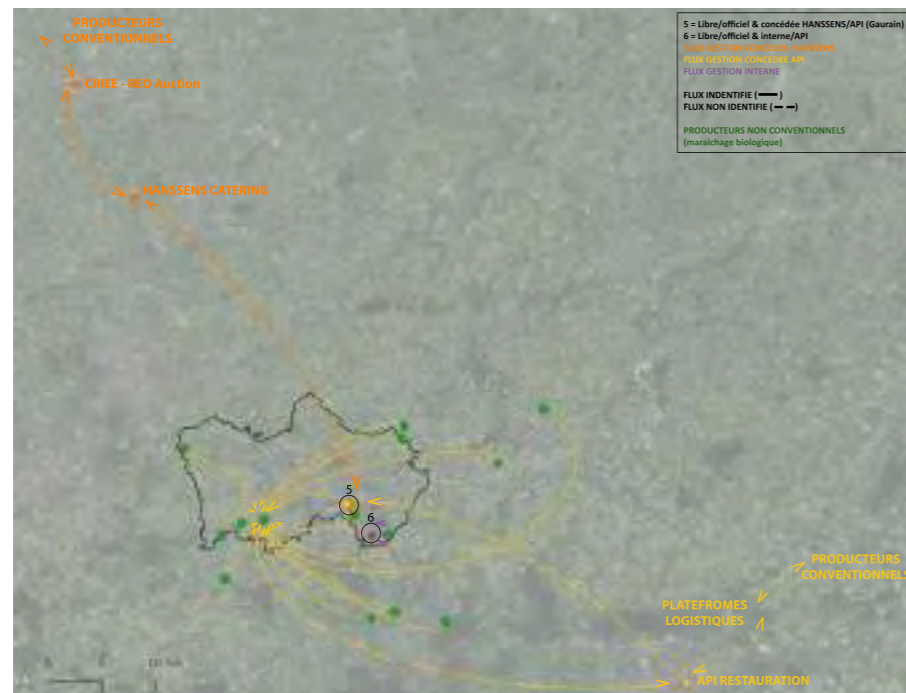I ENSAP BORDEAUX

Figure 3 – School canteen management identifies the operational
actors in the food system studied and identifies the coexistence
of food models (Hautecoeur, 2021).

Figure 4 - Use of network and management criteria to identify
specific territorial situations. (Hautecoeur, 2022).

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Figure 5 – Spatialization of food flows from two coexistence situations (governance and food model). (Hautecoeur, 2022).
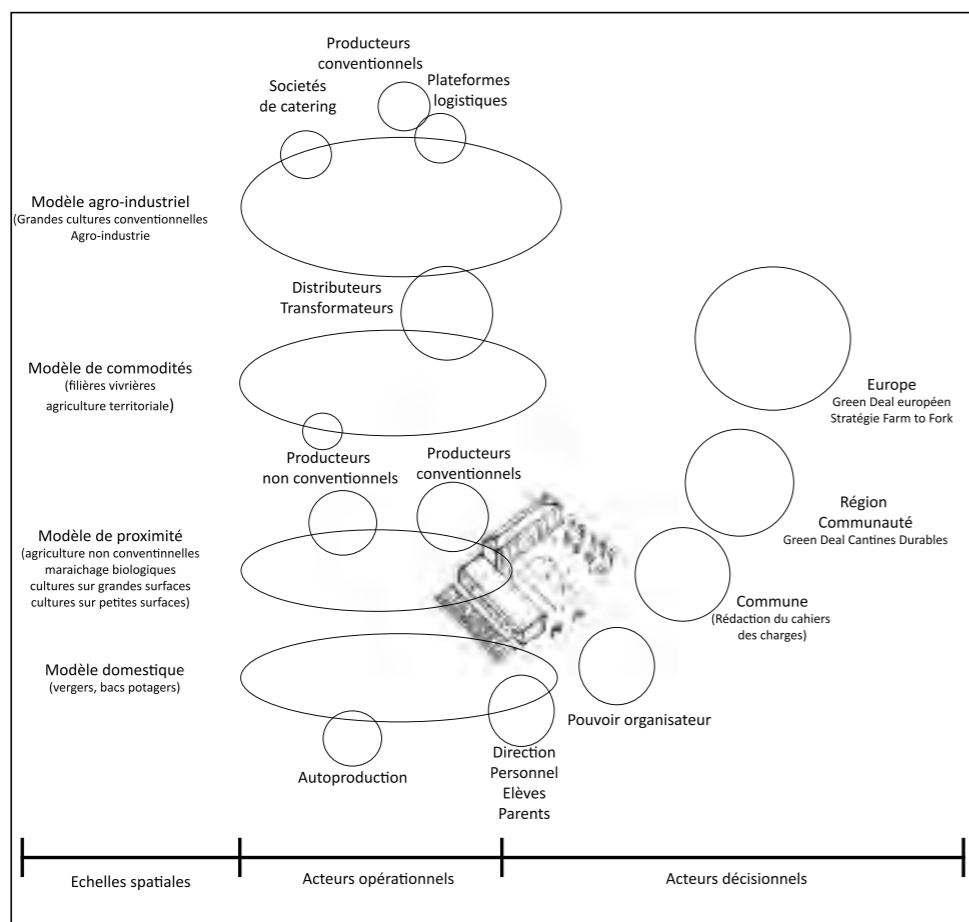

Figure 6 - The school canteen as a socio-spatial node,
a lever for analysing the complexity of a concrete food system. (Hautecoeur, 2022).

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INVENTORY OF LOCAL RESOURCES FOR A NEW MODEL OF PROJECT: BETWEEN PEDAGOGY, RESEARCH AND OPERATIONAL CONTEXT

2-E-3

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ABSTRACT:

Since the 1990s, we have been experiencing major changes, between sustainability and digitalization. These new paradigms are modifying our way of being-in-the-world. Matter and energy are now issues, to think with frugality. Successive crises amplify these phenomena and show that most of our models have expired, including those of architecture, project and their teaching.

To respond to these socio-economic-environmental challenges in the field of architecture, we propose to think differently: to substitute our analytical thinking with complex systemic thinking; to substitute the concepts of territory and landscape with those of bioregion and *milieu*; to no longer place human at the center of everything, but as part of a whole; to no longer do and take what we want, but to think from what we have, our resources. To reach this projectual reversal, we are developing a multiscalar cartography to inventory resources of the Région Sud (France): bio & geo sourced materials, know-how and natural energies. We study them through the constructive and bioclimatic arrangements of rural vernacular architecture.

This work is carried out in a master degree seminar, where the pedagogical arrangement articulates, the seminar which produces the knowledge, to tutorials which experiment them, to studios which put them in situation.

Moreover, this inventory has three components: pedagogical, scientific and professional.

. the research component develops a reproducible method and produces new knowledge on the constructive resources of our territory;

. the pedagogical component allows students to learn research by research and to mobilize it for project;

. the operational component disseminates the knowledge produced via a website to help professionals to design in a frugal way.

Our objective is to develop a critical framework, applicable in different contexts, that shows the potential of local resources, in an open and creative approach, to generate new models of contemporary architecture.

KEYWORDS:

Bioregion, milieu, matter and materials bio and geo sourced, climate, know-how, rural vernacular architecture, cartography, model, design

EVOLUTION OF SPACE DESIGN PARADIGMS

Since the 1990s, we have been experiencing major changes, between sustainability and digitalization. These new paradigms are modifying our way of being-in-the-world. Matter and energy are now issues, to think with frugality. Successive crises amplify these phenomena and show that most of our models have expired, including those of architecture, project and their teaching.

To respond to these socio-economic-environmental challenges in the field of architecture, we propose to think differently: to substitute our analytical thinking with complex systemic thinking [MOR01]; to substitute the concepts of territory and landscape with those of bioregion and *milieu*; to no longer place human at the center of everything, but as part of a whole [FLA01, TIN01]; to no longer do and take what we want, but to think from what we have, our resources [FIE01].

To reach this projectual reversal, we are developing a multiscalar cartography to inventory resources of the Région Sud[1] (France): bio & geo sourced materials, know-how and natural energies. We study them through the constructive and bioclimatic arrangements of rural vernacular architecture, considered as close as possible to an «architecture of the soil» towards which to tend, because designed and built from short circuits, little transformed materials, implemented by artisanal know-how, with a moderate impact on the environment. For this, we use the corpus of the *Enquête sur l'Architecture Rurale[2] 1425*, of which we give a contemporary architectural reading, with regard to ecological problems. If the glance is retrospective, the aim is prospective, even projective.

For over a year[3], with students, we have been developing this inventory in the framework of a master's seminar on «Project Materials»[4] at ENSA-Marseille[5]. It produces knowledge that is experimented with in tutorials, then put into situations in studios.

In addition, this inventory has three components: educational, scientific and professional.

THEORICAL CONTEXT

Architecture and urbanism consider territory mainly from the point of view of its planning, focusing on the city and the suburbs. Rurality is often neglected. In order that, in a necessity of «short circuit», it does not become a simple reservoir of constructive natural resources, which would risk to plunder it because of an unquestioned extractivist logic. This research aims to think the territory differently, by producing a knowledge about it. By crossing geography, anthropology, philosophy, history, architecture and by trying to get rid of our modern binary western vision, opposing nature/culture, subject/object, matter/spirit, we try to go beyond the logics of productivist progress, in order to find a peaceful and benevolent relationship with the Earth.

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1   Previously: Provence-Alpes-Côte d'Azur.
2   Survey on Rural Architecture.
3   Work is in progress and will be done over three years.
4   The title of the seminar plays on the theoretical confusion maintained by Gregotti between the conceptual materials of the project and the building materials of the architecture. We work to distinguish them and highlight their relationships [GRE01].
5   Ecole Nationale Supérieure d'Architecture de Marseille.

A complex world of multiplicity

Contemporary thought can no longer refer to machinist approache, characteristics of modern industrial society, rooted in the thought of the eighteenth century and which has spread widely in the Western world in the twentieth century [MUM01, GIE01]. Concurrently, since the early 1900s, scientific works have shown the complexity, multiplicity and chaos theory [GLE01], which can only be approached by systemic thinking [VON01]. In particular, space is no longer considered as a uniform and empty expanse [FEY01], but as a field of forces and natural forms are shaped by a morphogenesis process, proceeding by active interactions between matter and energy [THO01]. To think complex is to focus on *reliances* [MOR02], «the act of linking and relinking oneself and its result» [BOL01], this essential work on the links is the main way to understand and interpret our world, to improve the relationship between human beings and their *milieu*[6].

Bioregion, milieux, reliance, médiance

In order to understand our environment differently, we adopt a bioregional approach, in an American sense. It is an unstable but open notion, with a transformative capacity, and thus projectual. It carries a hypothesis [ROL01] of renewal, which requires «a fine understanding of the functioning of natural systems, a subtle perception of the specificity of places, the development of appropriate techniques, and hard physical work of the type that makes you sleep well at night» [DOD01]. It is a *milieu* "definable by natural (rather than political) boundaries, with a geographic, climatic, hydrological, and ecological character capable of supporting unique human and non-human living communities" [THA01] that can thrive on these natural potentials.

Bioregion is a multiplicity, composed of a thousand *milieux* (social, natural, technical, cultural, etc.), which intertwine and overlap and which we are «invited to think in terms of interdependence, totality and evolutivity, of composite units of exchange, of interaction, even though all too often technocratic, disciplinary, and economic logics separate, objectify, and even instrumentalize» [YOU01]. So, we also mobilized the concept of *mediance*, «dynamic coupling of the being and its *milieu*» [BER01], where «our existence is immanent to the reality of the things of our *milieu*». Brought back to the architecture, this one must «go up of the history and the milieu», without mimicking the ancient forms.

To consider the *reliance* and the *mediance* is to adopt the point of view of the interdependence and the multiplicity of *milieux*, like a system of «eco-techno-symbolic relations of societies and humans to the Earth» [NUS01].

Evolution of the relationship between matter and spirit in design

If for Vitruvius [VIT01], the knowledge of the architect proceeds first of all from the practice, which is realized in the manual work from matter; conversely, Alberti [ALB01] opens the modern era of the project by founding it on the drawing, which allows to mentally project forms independently of any matter (hylemorphism). Today, Ingold [ING01], among others, proposes a new reversal: thinking making as the confluence of forces and matters, although the maker has a form in mind, it is not the form that creates the work, it results from the maker's engagement with that matter (morphogenesis).

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6   « A milieu [...] requires an understanding of the interactions and naturo-cultural dynamics of interpenetrations and interdependencies, whether between climatic, mechanical and chemical, biotic or cultural factors. But as soon as the attention is focused on a specific habitat, namely on the way of being in the milieu, it is in terms of «between» that it can be described. » [YOU01]

Now, for some years, in French literature, matter or material, whose distinction is not always clear according to the authors, or more explicitly the notion of *MaT(i)erre(s)*[7], is now posed as a catalyst [NUS02]. The result is new forms of design and project practices, characterized by a professional, ethical and even political commitment.

Matters, materials and even climate[8] [GAI01] are now included in the broader notion of resources, whose etymology[9] [FIE01] and expanded use implies a vital relationship between living beings, including humans, with their *milieux*. Moreover, in French, the term seems to be synonymous with a "retour aux sources"[10], with renewal and hope – a potential for new narratives for architects.

Resurgence of making and architectural design

As a corollary, there has been a revaluation of making in many fields [SEN01], including architecture [LEF01]. This phenomenon also questions the modern separation between making and thinking, as well as the devaluation of manual work, of practical knowledge, opposed to intellectual activities and theoretical knowledge [BAR01]. This dichotomy between design in the workshop and construction on the building site (adopted during the Renaissance) is at the basis of the very definition of the project, reflection and action, accompanied by iterations between the two [BOU01]. Thus, the recognition of making, of gestures that accompany it and participate in the construction of thought [GUE01], puts in crisis the process of design and construction, the discourses and representations of architecture, and the place of *MaT(i)erre(s)* and therefore, the associated know-how [LOC01] in project.

In this close relation with matter and materials are at stake: the embodiment [GOL01], the role of sensory-motor experiences and in particular gestures in cognition; and affordance [GIB02], i.e. their potentiality, according to their intrinsic characteristics, to propose a use according to the perception that we have of them. Implicitly, this (re)places know-how at the center of the project process, not only in construction, but from the design stage, and even in a more global socio-economical-technical process, on the scale of building production modes, in particular of sectors, which must be thought differently than from the single dominant industrial model.

Rural vernacular architecture

The *Enquête sur l'Architecture Rurale 1425*[11] is a very large investigation for which some forty architects have criss-crossed the French departments, to carry out surveys and produce 1660 monographs. It is the first study of this magnitude, moreover multidisciplinary. The objective was to classify the forms of rural habitat, to document their distribution, to reveal the relationships and constants between geography and human production. At that time, two discourses were opposed: those who praised the regional architecture for its adequacy to its environment and to rural lifestyles; those who said that it was outdated, doomed to disappear with the associated techniques and know-how, to which it was thus useless to turn, thus legitimizing the call of modernity, haloed by the functionalist and machinist progress.

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7 « MaT(i)erre(s) wants to explain the link established by the architecture between the spirit and the matter and that of the relation between nature and technique, returning to the insistent idea of the Nietzschean interrogation to know which world we want to live in. » [YOU03]

8 Moreover, inexhaustible, unlike material resources.

9 Ressource (from old french resource – verb: resourdre) : « to resurrect, to raise, to put back on its feet » [from latin resurgere : to stand up, to appear].

10 Return to the roots.

11 Or EAR 1425 or Chantier 1425, conducted from 1941 to 1946, by G-H. Rivière, museologist, founder and first director (1937-1966) of the museum of Arts and Popular Traditions in Paris.

Some twenty years later, this corpus has been updated (new surveys, photos, models, one hundred more monographs) to constitute the *Corpus de l'architecture rurale française*[12]. The objective was to: document traditional architecture that risks disappearing with the enthusiasm of the neo-rural-ists; continue the study of their forms and functions; found a policy of conservation and enhance-ment of the architectural heritage. Twenty-three volumes are published[13].

To accompany this work, we do not neglect the literature on regionalism [TOU01], especially critical [FRA01, FRA02, FR03], nor recent postures of local architecture [MAG03, STE01] and rural modernity [GAU01], but we rather accompany our work with other studies on rural architecture and treatises on the art of building from the period of construction (eighteenth and nineteenth centuries), so as not to oppose vernacular and scholarly architecture, whose relationships are more subtle than opposed.

INVENTORY OF LOCAL RESOURCES

We establish *reliances* within our method, thus between ideas, as well as between representations produced and what they represent, thus between the represented. We borrow from geographers and anthropologists, while bringing their methods back into the field of architecture and its representations (maps, figures, narratives [YOU02]), in order to produce knowledge about *milieux* of the *bio-Region Sud*.

On the one hand, we map the *millieux* and constructive resources, to highlight their *reliances*, effective or broken, precondition for a projective vision. On the other hand, we experiment and categorize the transformation of these resources in rural vernacular architecture. In terms of narratives, our inventory lays a general framework, and it is up to each designer to seize it and invent his own, specific to his projects in situation.

Sources and corpus

Data

We use freely available data, from official and academic platforms[14], which we process with GIS procedures. They allow us to describe *milieux* from several geographical points of view: mathematical (cartography, topography, etc.), physical (soils, climate, etc.) and human (cultures, cities, architectures, etc.)

Rural vernacular architecture

We also mobilize the *EAR 1425* for its corpus, composed of road diaries, sketchbooks (surveys), photos, monographs, synthesis maps and models. We chose it for its systematic scientific approach and because it is a vast collection of singular examples, analyzed and classified according to the same criteria [SOB01]. Additional bibliographic work allows us to deepen our understanding of traditional constructive techniques [DOY01, MAS02].

In each region of the survey, Provence, Comté de Nice and Dauphiné, we have selected about fifteen specimens, in order to illustrate the different materials and skills used. We use the synthesis maps,

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12 Corpus of French rural architecture, conducted from 1969 to 2001, by J. Cuisenier, ethnologist, second director (1966-1988) of the museum of APT.

13 Which: Dauphiné [RAU01], Provence [BRO01], Comté de Nice [RAY01]. The whole forming the medieval Provence.

14 IGN: Institut National de l'Information Géographique et Forestière), BRGM: Bureau de Recherches Géologiques et Minières, DRIAS: regionalized climate projections made in French climate modeling laboratories (IPSL, CERFACS, CNRM).

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often missing in the archives, not very precise and not systematic (fibers and wood are poorly represented), mainly to check our own maps.

The typology of construction processes proposed by the EAR, crosses architectural elements (wall, framework, roof) and materials. However, Leroi-Gourhan [LER01] has shown the pitfall of classifying objects by materials. He proposes rather to consider the action of the man on the matter according to its properties and the tools used. The classification by construction elements is not either, each one being able to be in a great diversity of materials. And, the *EAR 1425* does not make a typology of natural energies, but the writings include many data, from which we categorize the bioclimatic arrangements of rural architecture.
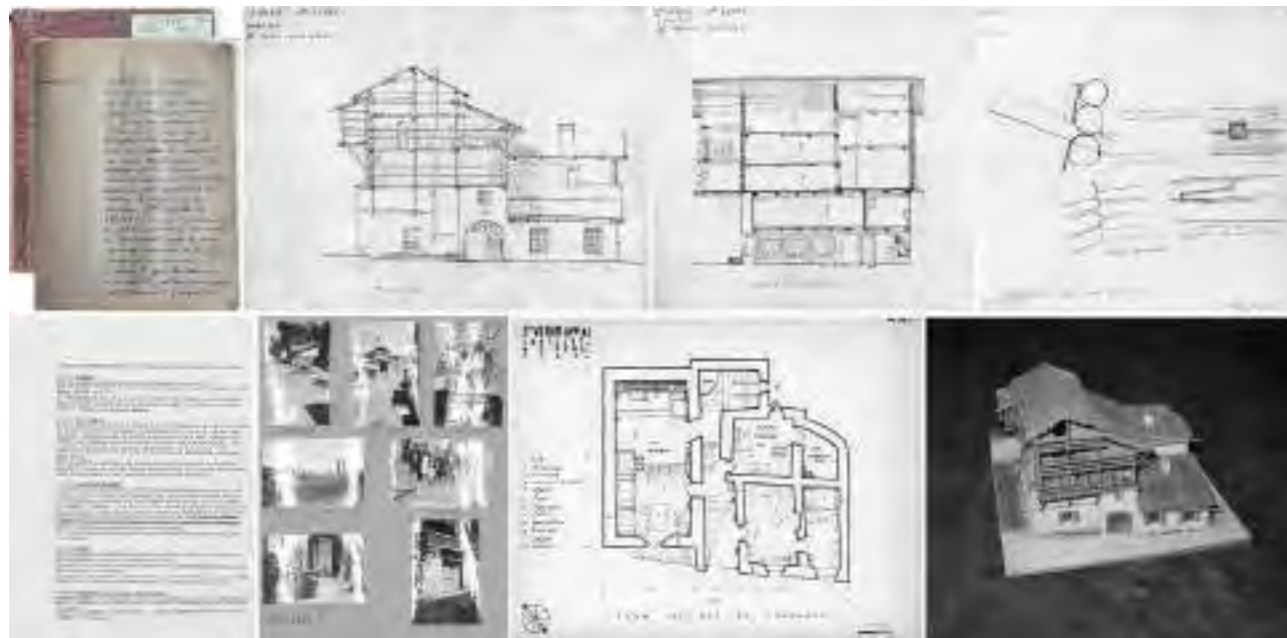
MuCEM-Archives Nationales, EAR 1425 files, 1941-1946, Hautes-Alpes:

roadbooks 17W48-17W49, sketchbooks 17W126, monography 17W387, M. Bauhain, architect,

1942-1944, MODEL 1975.10.30, G. RONDET, MODEL MAKER, C. 1975.

Cartography: milieux and constructive resources

Map

In order to capture the complexity of the *milieux* that make up the region in a systemic way, we produce map sets, according to several criteria and objects:
. Cutting and multiscalarity: As the maps are digital, their parameters and degrees of definition depend on zooms operated, to measure qualitative relations between the represented objects. Cartographic scales are no longer fixed, but crossed, which allows a relative immersion.
. Temporality and space: We work with current data (2020), past interpretations (1950) and models of future states (2100) - rising temperatures, rising waters, seasonal and nycthemeral cycles, etc. In order to position ourselves in a perspective of anticipation, therefore projection. In addition,

current and future climate changes will modify habitable areas.
. Inventory and identification of constructive resources: bio and geo-sourced materials, climate, specimens from the corpus of rural architecture.
. Thickness and complexity: Between serendipity [YOU02] and abduction [BES01], we proceed to various crossings of data, by the superposition of the maps, thus by the simultaneous vision of several layers [BON01] constitutive of the *milieux*, in order to show the *reliances*.

Milieux of study

We focus on the *Region Sud*, whose we redefine its limits, by the complexity of its thickness, rather than its administrative extent. In a bioregional approach, we have analyzed and crossed geographical data, such as: geology, watersheds, relief, hydrography, vegetation cover and climate. Each map forms a layer and the superimposition of the whole shows the tangle of the *milieux* and thus circumscribes our field of study, with blurred limits assumed.

Thickness of milieux of the Region Sud: watersheds, reliefs, forests,

climate, geology. M. Gilouppe, A. Miglio, © LMdP 2021.

Matters and materials

We locate the deposits and potentials (quarries, crops, forests) in bio and geo-sourced materials (fibers, wood, earth, stone) and the places of extraction and transformation into materials for construction (quarries, sawmills), past (such as closed quarries), present or models for the future (evolution of vegetation cover in 2100[15]). By potential, we mean that the presence of rice crops in such and such a place does not imply that there is also insulation made from this fiber. If the sector exists, we locate the extraction and transformation sites; if it does not exist, it is a potential[16].

For example, for wood, we map each tree species used as timber (softwood: larch, pine, fir, spruce), as we can differentiate softwoods from hardwoods or represent everything on a single map, all with different levels of definition, depending on the zoom. Then, by crossing the maps, we show the *reliances* between the distribution of the various species according to the geology, the watersheds, the climate and their use in architecture (past and present).
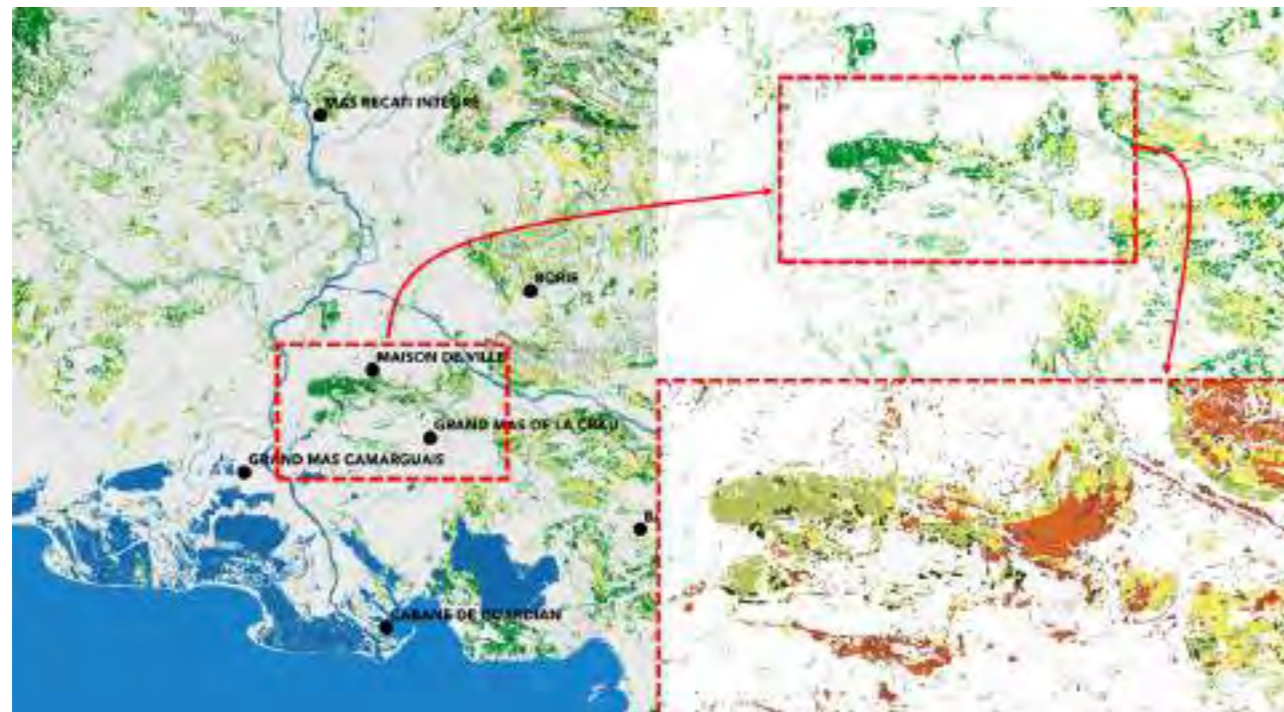
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15   IPCC assumptions and research on land cover evolution (Badeau, et alii., 2007).
16   This can help strengthen emerging sectors or create new ones.

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Provence: geology, trees, fibers, C. Arnould,

J. Maillard, B. Misandeau. © LMdP 2022.

Provence: tree species (softwoods hardwoods), dynamic maps change of definition according to the zoom. C. Arnould, J. Maillard, B. Misandeau. © LMdP 2022.
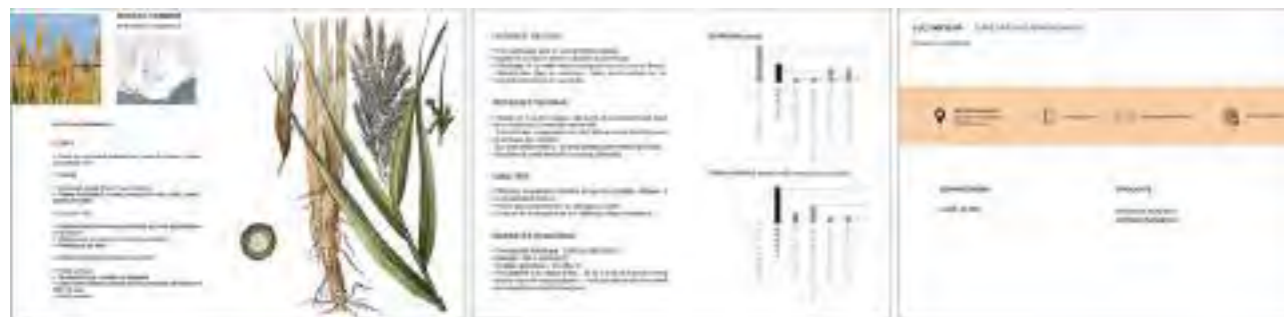
Material files (common reed): identity with qualitative, quantitative and technical criteria. Professional files: directory of producers and/or company. L. Chasteney, O. Tourette. © LMdP 2021.

Soil architecture

We have mapped specimens from the *EAR 1425* corpus, for their exemplary characters, crossing geology-hydrography-matters-climate. Eventually, we will add other architectures of the survey, increased by the urban architecture. Finally, we will it with contemporary buildings.
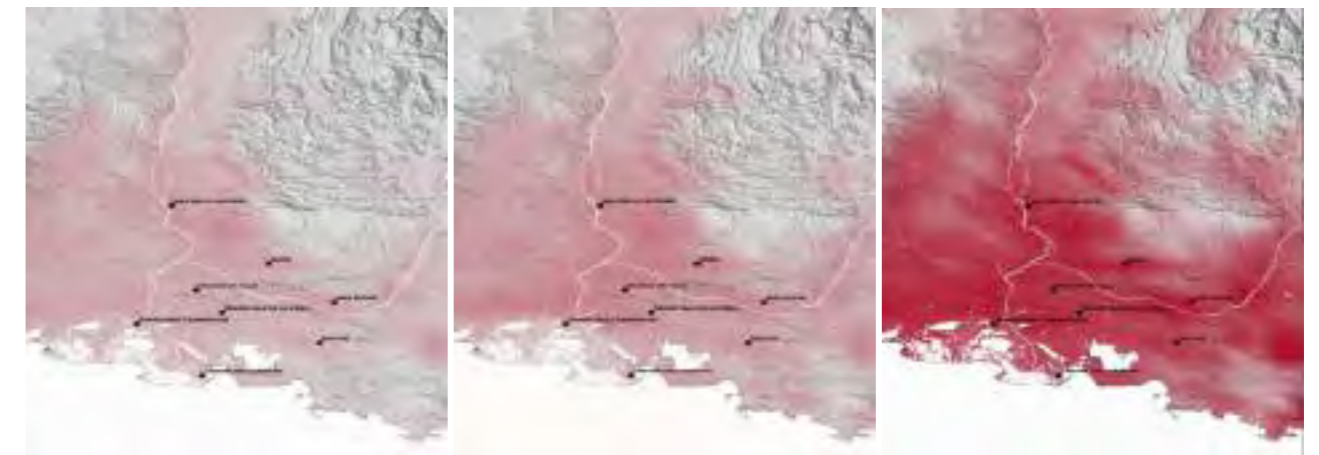
Climate

We work with climate data produced by Meteo France using the ALADIN63[17] modeling method. We use historical (1951-1971), recent (2000-2020) and modelled data to predict future climate change (2050, 2100) (RPC4.5), to map macroclimatic characteristics and potentials, such as solar radiation, precipitation, wind speed, risk of overheating and heating needs in winter, while taking into account their evolutions.

The objective is also to consider the climate as a constructive resource, it is necessary to materialize and map it, in order to be able to exploit its specificities to define general strategies of design. However, the scale at which we work does not allow us to evaluate microclimatic characteristics of a specific site. This work is left to the designer, in each specific project situation.
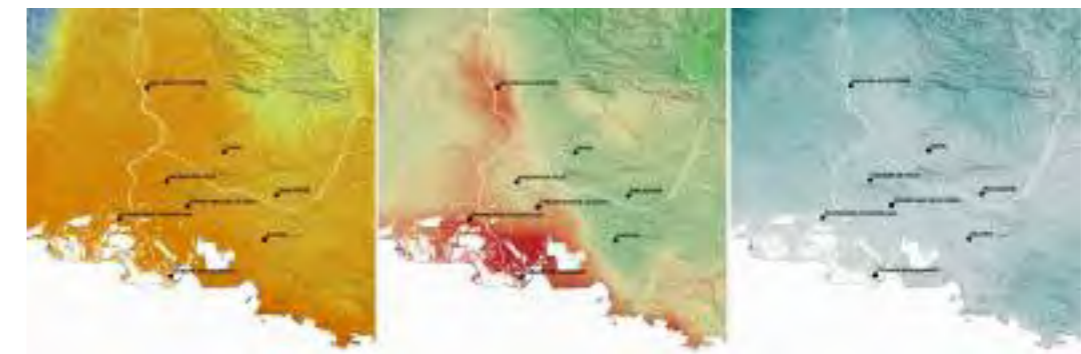
Provence: temperature, wind, precipitation, annually 2020.
C. Arnould, J. Maillard, B. Misandeau, © LMdP 2022.

Provence: days when temperature exceeds 32°C (overheating), 2020.
C. Arnould, J. Maillard, B. Misandeau, © LMdP 2022.

17   Ministère de la Transition écologique, DRIAS https://drias-prod.meteo.fr/okapi/accueil/oka-piWebDrias/index.jsp.

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Experiments and categorizations: constructive and bioclimatic arrangements

To complete the cartography, we analyze the processes of transformation of natural matters (earth, stone, wood, fibers) and energy sources (sun, water, wind, earth, biomass), into spatial, constructive and bioclimatic arrangements. It is a question of identifying the know-how at work through sequences:

. *milieu* > matter > material > materialization (conception & construction) > materiality > recycling.
. *milieu* > climate > energy > protection/capture > storage/distribution > evacuation.

In these transformative processes we do not focus so much on their results as on what allows their very transformation, the know-how. Anthropic, they carry the (inter-)actions that we have (or not) with our *milieu*, through architecture.

We do not want to define a «guide of good practices», showing closed constructive or bioclimatic solutions, but to propose open and abstract logics of action and assembly to feed the technical imagination of the designers and arouse analogies, in order to reinterpret them in contemporary situations[18].

Active visual and haptic manipulation of materials

In order to show the transformative potential of material resources in rural vernacular architecture, we favor experimentation with physical models, as they have the particularity of articulating making and thinking, abstraction and reality [OEC01], isolating phenomena, while maintaining a global and complex understanding of them. Thus, we actively and haptically [GIB01] experience the constructive arrangements of the buildings, in a logic of "learning by making", in reference to experiential learning methods [DEW01] and embodied knowledge [WIL01]. Making re-drawings and mock-ups, homological to actual building processes, allows for the links of ideas, intuition, embodiment and translation of experience [MAS01, ELZ01]. In particular, haptic activity allows for a specific form of understanding and analysis through the spatialization of gestures. Drawing and manipulation are followed by stages of intellectualization, as knowledge is developed not through the action itself, but through reflection on that action [KOL01, SCH01].

Categorization of constructive know-how and arrangements

The processual and sequential character of technical activities allows us to translate them into operating chains[19] [LER01, MAU01, MAG02]. We formalize them through the production of written documents, drawings and photos, resulting from observations during the making of the models, such as:
  . Operating chain from matter to material;
  . Operating chain from material to implementation.
The aim is to highlight a double affordance: that of the material, related to its physical and mechanical properties, at the time of its transformation into material of construction in a constructive module; and that of this last, related to its dimensions resulting from complex relations, environment-material and man-technique, in the constructive arrangements which it allows.

18   « The reproducibility and the transmission, as well of the gesture as of the procedure takes place by 'figurative' representations or figures which make possible the repetition of these operations, and consequently their transmission and their reinterpretation. » [ROU01]
19   Sequence of actions associating gestures-tools-knowledge, allowing the transformation of a raw material into an artifact and which aims at the observation, description and analysis of the know-how (techniques and associated tools).

The elementary operations identified in the operating chains of know-how are translated into action-verbs that we classify in an *assemblothèque* (from assembly and library). Conceived as a conceptual framework, it shows : links between these action-verbs and materials used in the construction of rural vernacular architecture categorized according to the physical properties (plastic, stable solid, fibrous, flexible, semi-plastic) [LER01] of the natural matters. Thus, we have:
  . A general *assemblothèque;*
  . An *assemblothèque* for each specimen of the corpus.
The *assemblothèque* shows that certain action-verbs and therefore certain gestures are common to different matters and/or materials, which makes it possible to establish analogies and crossbreeding of techniques.
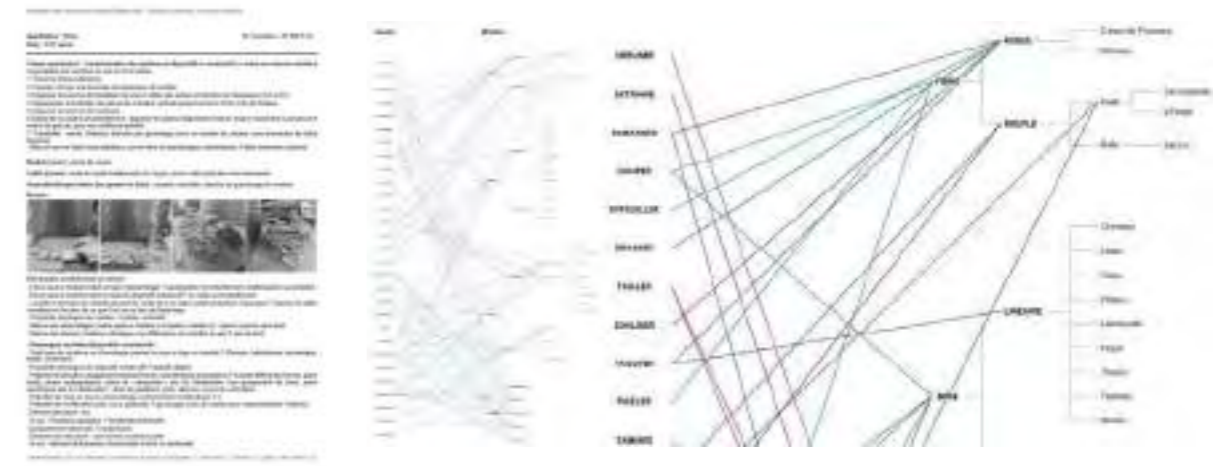
Operating chain files. C. Giai-Checa, L. Martinez; General assemblothèque and extract.

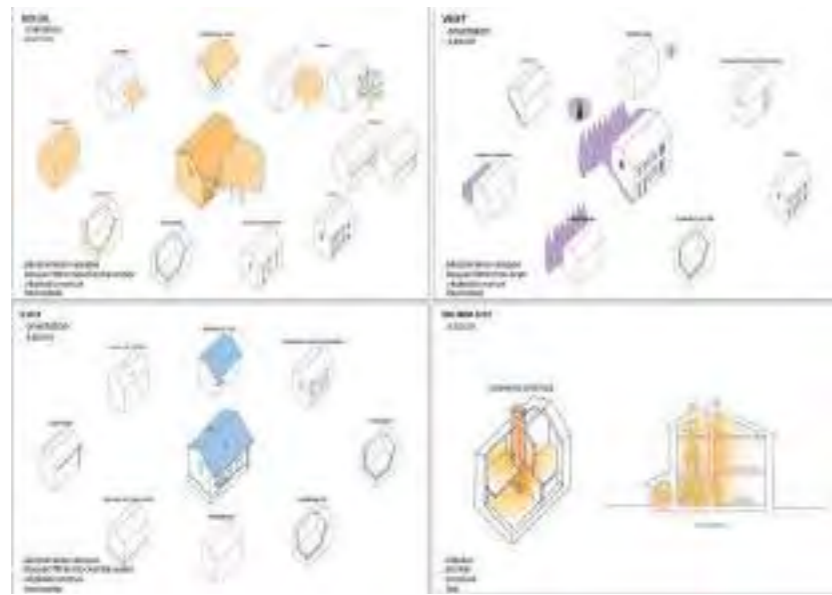*C. Arnould, L. Daubol, E. Meerschman, C. Kuhn, © LMdP 2022.*

Categorization of bioclimatic know-how and arrangements

The transformation of natural energy sources is analyzed and categorized from the various strategies identified in the buildings of the *EAR 1425* corpus. We cannot always verify the comfort of the indoor environment, because they were built at a time when the climate was different and sometimes the buildings no longer exist or have been modified. However, we can have a critical analysis of their original comfort, which is not always considered satisfactory today, but nevertheless optimum according to the material means available at the time.

We first drew (plans, sections, axonometries), thus abstracting, then classifying these particular cases into generic arrangements. In the same way that the matter precedes the materials, here we have: orientation, geography of the site, cycles (seasonal, nycthemeral), energy sources (sun, air, water, earth, biomass). Then, we show and categorize the human actions (know-how) allowing to balance these energy flows in the architecture: by blocking, filtering, storing or letting them pass, with spatial arrangements (exterior, envelope, interior), composed of natural (vegetal) or built elements (according to physico-chemical and thermal properties: inertia/insulation, absorbing/reflecting, waterproof, color), fixed or mobile.
One of stakes is to represent these immaterial flows, so that architects can import them in their

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figures, to take into account the climatic phenomena by design[20].

*From energy sources to generic bioclimatic arrangements.*

N. Pignard, L. Ferrari, © LMdP 2022.

THE CABANE DE GARDIAN[21]

Here is a particular and significant example from Camargue, the *cabane de gardian*:

Bring out reliances between milieu and resources

Our dynamic cartographic shows the thickness of the Rhône delta and highlights the *reliances* according to the nature of local resources. The soil, which is very flat and threatened by rising water, consists mainly of sand, clay and is gorged with brackish water. Emergent plants that can be used as building materials are rushes and phragmites. There is not much wood. Monthly temperatures rarely fall below 10°C in winter and often exceed 30°C in summer (over 70% humidity), the *Mistral* (cold northern wind) reaches over 100 km/h in gusts. Matters available to quickly and simply build modest houses adapted to this *milieu* are: clay, wood and reed.
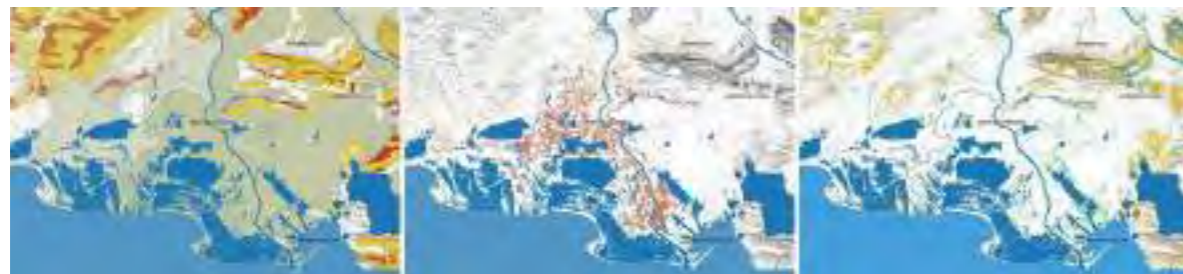

Carmargue: geology/hydrography/topography; fibers (wheat/barley/rice/lavander/nuts); trees (soft-wood/hardwood). C. Arnould, J. Maillard, B. Misandeau, © LMdP 2022.

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20   In a project, what is not drawn is not think.
21   Bull keeper's hut.

Learn and experiment spatial and constructive reliances

The redrawing (plans, sections, details) of the hut from the archives, which must often be completed and detailed, allow us to understand its spatial and constructive qualities: relationship to the site, organization of uses, constructive and bioclimatic arrangements. The implementation of materials is experimented in models, with all or part of the building. They are made with materials and techniques similar to reality, reproducing in a homological way the know-how and gestures of the builders.
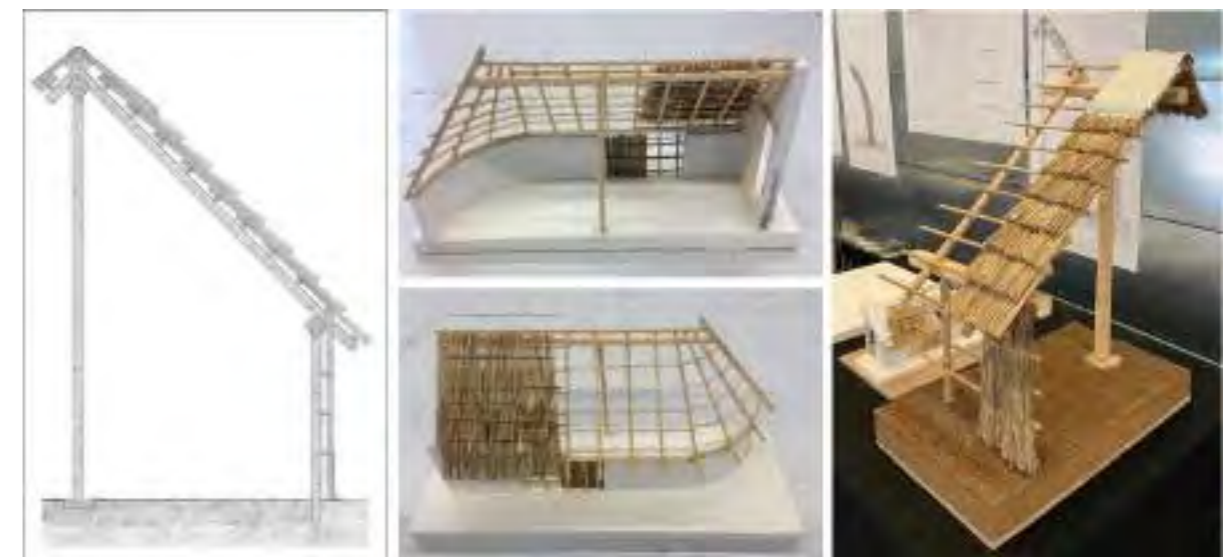
Cabane de gardian, Camargue: site model, geomatrical set, half model, half section. A. Albertos, B. Bonetti, A. Lazaud, L. Chastenet, O. Tourette, A. Cosculluela, B. Houlis, R. Duprez. ©LMdP 2021-2022.

Documenting and abstracting milieu-matter-material reliances

For a traditional harvest by boat in the ponds, in winter, to have dry reeds, the operating chain is:
  1. Catch an armful of reed of the width of the sickle.
  2. Fold it to the side.
  3. Cut sharply.

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4. Sort out and remove the featherlike a comb, even out.

1-2-3-4. Repeat three times to form a bale (approx. 60 cm perimeter, arm's width).

5. Bind with a rush or metal wire.

6. Store, stack.

The "bale" module relies together: material properties (slight, flexible, waterproof, long, durable), human being (body dimensions, loads that can be handled), its know-how and tools, *reliances* which the metric system and industrialization have erased.

Picking is done with the only human energy, but it is tiring and uneconomic. However, it maintains the marshes while respects the ecosystems, whereas the mechanization that has replaced it creates ecological disorders. Associated with other phenomena (pollution, gossips), this resource is dwindling.

Operating chain 1: From reed to bale. © LMdP 2022.

Documenting and abstracting material-materialization reliances

The plan of the hut has a rectangular base, with a gable facade to the south, that carries a gabled roof that turns over to the north, hipped over an apse.

Before the laying of the reed, are built: a clay ground (possibly with mortar and aggregates - without foundation), in which is planted a primary structure in elm, more or less squared, on which is nailed a secondary structure in willow (flexible when green and very hard dry).

1. Untie the reed bale and make five *manons* (a circle made with both hands). Beat the sharp side on the ground, clean and equalize it. Bind with a rush or metal wire.

To realize a vertical element (wall):

2. To make a row, lay the *manons* very tightly, on the ground, sharp side down, on the secondary structure. Sew on inside.

1-2. Repeat as many times as necessary to make a row. Ditto for second row if necessary[22].

To realize a sloping element (roof):

2. For the lower row, put the *manons* very tightly, sharp side down, on the secondary structure. Sew from inside.

1-2. Repeat as many times as necessary to make a complete row.

4. For the following rows, place a parallel wedge at about 30-40 cm from the bottom of the previous raw.

5. Put *manons* as in 2, with an overlap of 2/3 on the previous row. Sew from inside, using a wooden dagger to cross the reed already laid.

6. Repeat as many times as necessary to make a row until the last row.

7. For the ridge, cut to equalize the upper part of the *manons* or turn them over to the finishing (tiles and mortar).

The implementation is easy, fast, with only human energy. The know-how and the assemblies are archaic. This sector is disappearing

22   Not in the operating chain of the reed: Apply lime mortar on the bottom of the wall and on internal partitions.

Operating chain 2: From bale to row (wall, roof). A. Cosculluela, B. Houlis, ©LMdP 2022.

Enunciate and categorize making

The *assemblothèque* of the *cabane de gardian* is mainly composed of simple assemblies (knots, nails). The action-verbs of the reed almost all refer to the manuality of operations, as there are few tools. The vocabulary is derived from weaving and sewing. It is also used for others, such as the cane of *Provence*, but could be transposed to other materials by analogy.
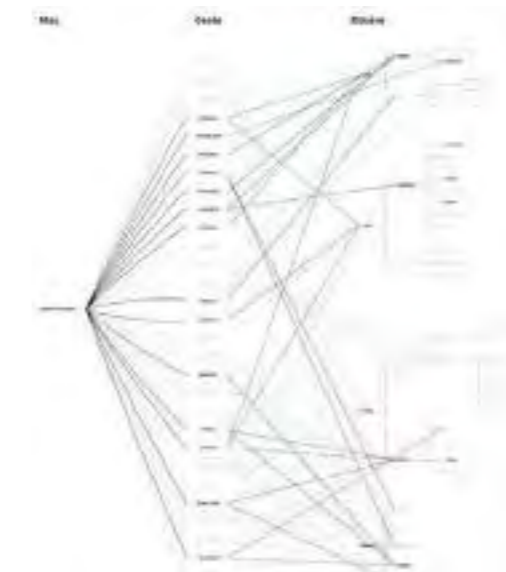
Cabane de gardian: Assemblothèque for clay, reed, wood.

E. Meerschman, C. Kuhn, © LMdP 2022.

Abstracting milieu-climate-energies-arrangements reliances

Bioclimatic spatial arrangements to transform energy sources in the cabin are:

. Orientation/Site: North-South implantation, often on the edge of a pond. The flat ground and the open environment do not allow the inclusion of a natural periphery in the bioclimatic arrangements.

. Cycles (seasonal, nycthemeral): Little impact on overall organization and uses. A canopy (branch structure covered with reeds in summer) provides shade in front of the entrance.

. Radiation & light: Little or no natural or constructed arrangements on the periphery. The reed envelope is sometimes covered (totally or partially) with white mortar to reflect radiations. There are no or few openings, small and to the South, possibly in the East-West axis. In general, the reed, laid tightly, forms the entire envelope. It is a good thermal (and phonic) insulator.

. Wind & ventilation: The hut may be located near a tree, to the North, to protect it from the Mistral,

they are rare in the marshes. Also, in the North, the rounded wall and the roof limit the wind. When the wind blows hard, the hut is moored with a rope connecting the axial crosspiece of the apse that protrudes from the roof to a stake anchored to the ground. The interior air is evacuated through the chimney, the door and any windows.
. Rain & water: The steep slope of the roof (45°) allows rapid drainage of rain. The waterproofing of the ridge is ensured by a row of tiles laid on a lime mortar, sometimes spread on all or part of the roof, or even on the walls, especially the southern one, often exposed to rain[23]. Some mortar surrounds the bottom of the reed envelope.
. Ground: The clay, by its inertia, ensures a little coolness inside in summer.
. Heating: Heat is produced by a chimney (bricks) leaning against the gable.
. Others: A curtain or a mosquito net protects the openings.
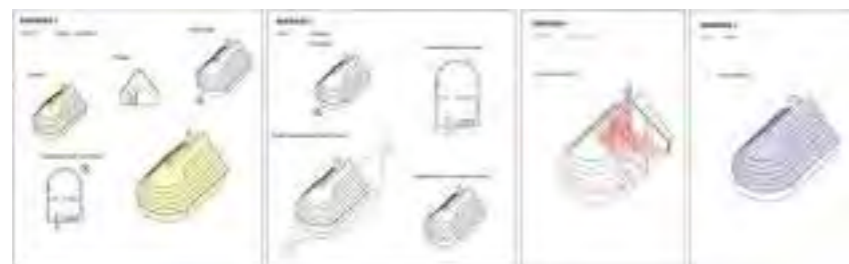
From energy sources to generic bioclimatic arrangements.
E. Meerschman, C. Kuhn, ©LMdP2022.

KNOWLEDGE THROUGH: RESEARCH, PEDAGOGY, PROFESSIONNAL PRACTICE

Our project is ongoing. So far, we have focused on Provence (southern delta of the Rhône), to develop a scientific method. We will now work on the two other watersheds of the Region Sud (Durance and Argens-Var). Afterwards, it should be tested in other contexts and on other corpus.

Research and knowledge

This research develops a reproducible method which, by crossing maps and analyzing material and bioclimatic arrangements through drawing and manipulation of physical models, produces new knowledge on the constructive resources of the Région Sud, highlighting *reliances* they maintain with the *milieux* from which they originate.
From an R&D perspective, this knowledge opens up to the development and test of new contemporary assemblages for the inventoried resources.
In addition, from this inventory, it will be possible to quantify and manage resources and energy emitted for their extraction, transformation and routing, by modeling the incoming/outgoing flows, over a given time and territory (metabolism).

Research and pedagogy

Research and pedagogy are closely linked in our seminar. Students participate in the definition of methods, the search for sources and the production of knowledge, while working on cartography, bio & geo sourced materials, know-how, natural energies and rural vernacular architecture. Thus, students learn research by research.
The specific nature of the knowledge on local resources that emerges from our method, based on crossing of multiple data, physical manipulation and categorization, is transformative, promoting re-interpretation and creativity and opening up to mediation. This allows for enunciation and abstraction (figures and symbols) of know-how, which permit architects to mobilize them in an analogical manner in design[24]. The relationship between local resources and design is not direct, our proposition focuses on transformative potential of resources and on mediation, to foster the reinterpretation of local resources and frugal techniques in a fully contemporary and creative way and not to blindly reproduce idealized and anachronistic past architecture.
Moreover, the knowledge emerging focuses on the *reliances* between *milieux*-resources-human-architecture, developing in this way a holistic and systemic vision, where the project may be primarily about (re)establishing *reliances* with their *milieu*.

Research and professional practice

We want the school of architecture itself to be a resource for the professions of architecture, urban planning, landscape and design. So, we are currently designing a website[25] to disseminate the knowledge produced to help professionals to design in a frugal way. However, it will be accessible to all and free. It will make available the data, information and knowledge produced by our research. It will include our five entries (cartography, bio and geo-sourced materials, know-how, natural energies, rural vernacular architecture). Along each path, the user will always be able to switch to one of the other entries and locate himself by returning to the map.
Moreover, this inventory allows the reinforcement of emerging sectors or the creation of new ones, and even the creation of an economic dynamic.

TOMORROW TODAY

Our multiscalar cartographic inventory of the constructive resources (bio and geo sourced materials, natural energies) of the Région Sud, of the related constructive and bio climatic know-how and arrangements, stemming from the rural vernacular architecture, constitutes an original knowledge on this territory, while showing the *reliances* between *milieux*-material-human-technique. Thus, we wish to work towards a more virtuous use of natural resources reusable and renewable in the construction. Being aware of the weight of the construction industry in the current ecological crisis and the risk of possible detour of this inventory by extractivist logics and appropriation of resources, linked to the economic and industrial model, we propose a holistic and systemic approach, deeply linking materials, know-how and *milieu*, to foster a different point of view, based on the development of *reliances* and contrasting current profit-based and environmentally-killing logics.
Therefore, our seminar aims to train future architects to project complex in a complex world, with a double commitment: intellectually, through research, by participating in the definition of methods, the choice of sources and the production of knowledge; and physically, through experimentation

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23   Variant: The South gable wall is built in bugets (limestone modules: 2 palms x 2 palms x 2 em-pans), from the quarries of Beaucaire, recovered from neighboring buildings, which allows a better waterproofing and also to have inertia (sunlight in the South, support of chimney). Sometimes, the wall is partially turned over on the East and West sides, helping to bracing.

24   « Rather than sticking to the technique, the procedure of invention at work in the project would consist rather in taking off from it to become operative. The mediation would be consequently the very condition of the existence of the imaginary. » [ROU01]
25   It is financed by the CROA-PACA and the DRAC-PACA.

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with the transformation of local natural building resources; all with the objective of understanding the *reliances* and therefore the stakes of the *milieux* of intervention. The aim is to learn how to design, build or rehabilitate a sustainable contemporary «architecture of soil» that is more respectful of our environment. The purpose of the project is perhaps no longer, or no longer only, to produce buildings, but to repair or weave these *reliances*.

It is a question of giving ourselves the means to think and do tomorrow, today, because we are no longer/not in ecological transition, we live every day with climate change. And, in the Mediterranean, it will be one of the most radical in the world[26].

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26   GIEC, 6th climate change assessment report, August 9, 2021.

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HOW WE WILL LIVE TOGETHER?

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ABSTRACT:

The *City and Territory* course entitled "How we will live together?" (titled borrowed from the 17th Venice Architecture Biennial held in 2021) of the Turin Polytechnic's Bachelor of Architecture degree was an opportunity to build and test a working group of researchers and students who would spend four months discussing the question of a project marking the transition from multiculturalism to 'multi-naturalism', as Eduardo Viveiro de Castro suggested in the 2020 Taipei Biennial. It was an opportunity to construct a new narrative of the city of Turin that overlaps climatic aspects, environmental resources, urban practices, and spatial characteristics. The question at the core of the course was: how can we learn, map, and analyse something that is not human, and how can this become the subject of a territorial project that puts coexistence at the centre of its agenda. The aim of this paper is therefore to analyse the experiences made within the course that tried to trace design strategies that emerged from an unprecedented reading of the city.

The succession of numerous crises in recent years - economic, financial, democratic - the radicalisation of racial and gender conflicts, and the insidious convergence of environmental and health crises have confronted us with the precariousness of our being on earth. "What to do when our world begins to crumble?" asks Anna Tsing in her latest book (2021). What is the role of a profession, urban planning, so concerned with imagining and designing the future in a situation where there seems to be no future at all? The awareness of the vulnerability of our bodies and the precariousness of our existence on Earth (Butler, 2013) obliges us to rethink, within our disciplines, certainties linked to the myth of progress and modernisation that still mark "the very fabric of all that exists or can exist" (Consigliere 2019). As obsolete as the latter two notions are, our society and economy are still steeped in the creed of economic growth and scientific progress in the hope that "humans will manufacture themselves through progress" (Tsing, 2021) and build the world that best represents them. So, what is the role of design in this seemingly catastrophic context?

State of the Art. A new plural research

Thus, what would seem to be emerging is what Cristina Bianchetti calls a new and broad plural research in our knowledge centred on the themes of defense, protection, and support for life and living. The theme of 'livability', i.e. the protection and defence of life in a condition of 'disruption' (Tsing, 2021), places the relationship between human and non-human bodies at the centre. These are all issues that resurface in all their urgency within the major exhibitions of recent years: at the XXII Milan Triennale (*Broken Nature*, 2019), at the XVI Istanbul Biennial (*The Seventh Continent*), at the XII Taipei Arts Biennial (Y*ou and I Don't Live on the Same Planet*, 2020), at the XVII Venice Architecture Biennial (*How we will live together?*, 2021), and at the Turin Democracy Biennial (*Un pianeta, molti mondi - One Planet, Many Worlds*, 2021). The centrality of these themes also resurfaced in recent years in a multitude of researches (and research groups) in the territorial sphere that configure new alliances and new competencies to address these issues. They are researches such as *Feral Atlas* (edited by Anna L. Tsing, Jennifer Deger, Alder Keleman Saxena and Feifei Zhou) or the work developed by Forensic Architecture (at the Goldsmith University of London) that construct new forms of multidisciplinarity, explore radical geographies and constitute themselves as instruments of protection and life support. Moreover, an extensive literature, ranging from philosophy (*Quando la casa brucia*, Macerata: Quodlibet, 2020; Elena Pulcini, La cura del mondo. Paura e responsabilità nell'età globale, Torino: Bollati Boringhieri, 2009; Rosi Braidotti, Posthuman Ecologies: Complexity and Process After Deleuze, Lanham: Rowman & Littlefield, 2018; Donna Haraway, *Staying with the Trouble: Making Kin in the Chthulucene,* Durham: Duke University Press, *2016*) to anthropology (Bruno Latour, *Facing Gaia: Eight Lectures on the New Climatic Regime,* Cambridge: Polity, *2017*; Anna Tsing, *The Mushroom at the end of the World: On the Possibility of Life in Capitalism Ruin*, Princeton NJ: Princeton University Press, 2015) is increasingly at the centre of the debate on territorial and urban design in a multidisciplinary key.

Methods. Descriptions, interpretations, and strategies:

This intense debate suggests, on the one hand, abandoning the technocratic and functionalist scenarios on which part of the design tradition of Modernity was built, but also to think outside the pacified projects built in the wake of a Landscape to be protected and enhanced, typical of the 1990s, but rather to reconstruct a lexicon around the terms: coexistence/co-existence and conflict/contamination. To do this, it is necessary to construct an integrated reading between descriptive aspects, quantitative information, critical observations, and qualitative analysis of the territories. It means looking at the relationships that human bodies, non-humans, and the environment build with and into the space, whilst at the same time at how exogenous variables determine the change of experiences, practices, and values.

The design exercise is divided into two main phases. The first descriptive and interpretative phase of the territory (fig. 1-7) aims at designing a project not just as a practice of modifying the territory, but of further knowing it. In this first part, some significant features of the territory investigated are therefore described starting from four main themes: water, soil, vegetation, and non-human animals. All four themes focus on the relationship of coexistence (conflictual, pacified, exploitative, etc.) between humans and the environment. The descriptive exercise opens up new interpretations of the Turin metropolitan territory that construct new imaginaries linked to the coexistence project. In order to do so, integrated readings are constructed between descriptive aspects, quantitative information, critical observations, and qualitative analyses, looking at the relationships that bodies and elements build with and in space, but at the same time how exogenous variables determine the change in experiences, practices, and values.
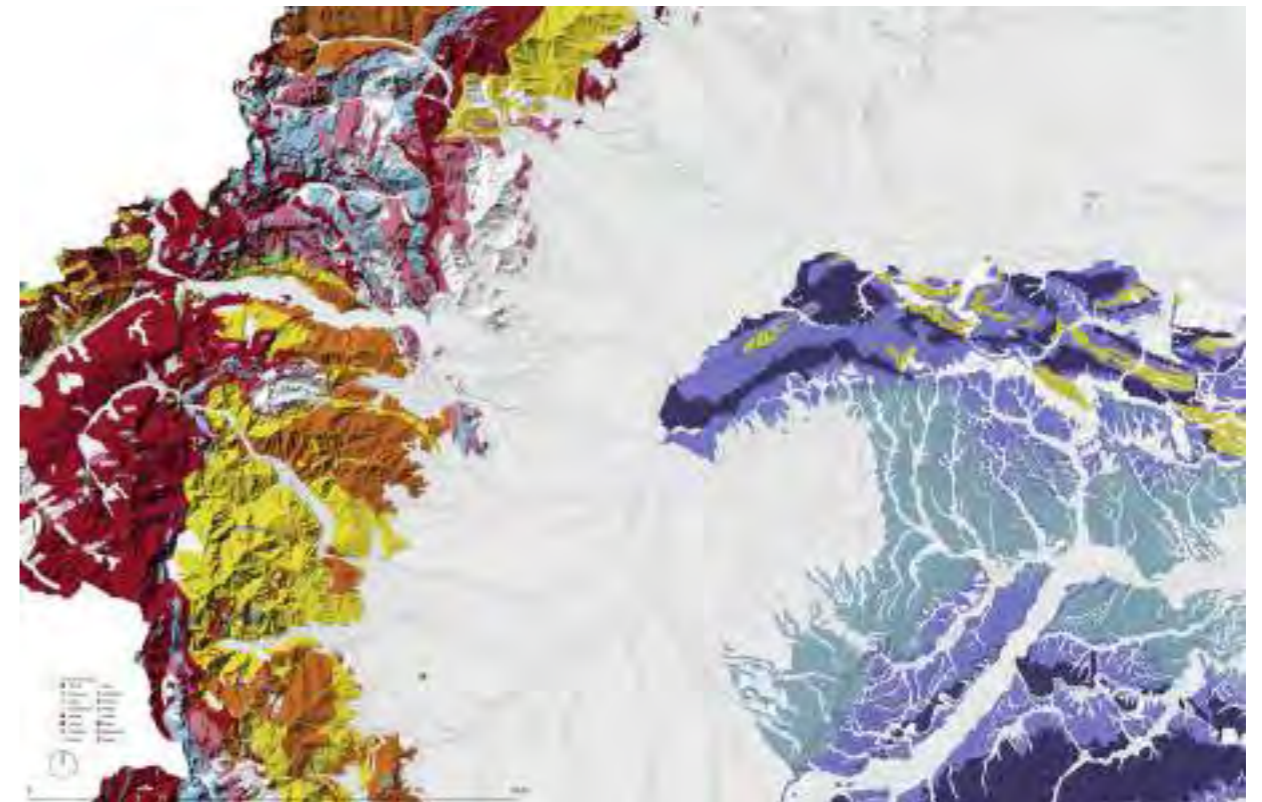
Fig. 1 Geolithology. Turin metropolitan area.

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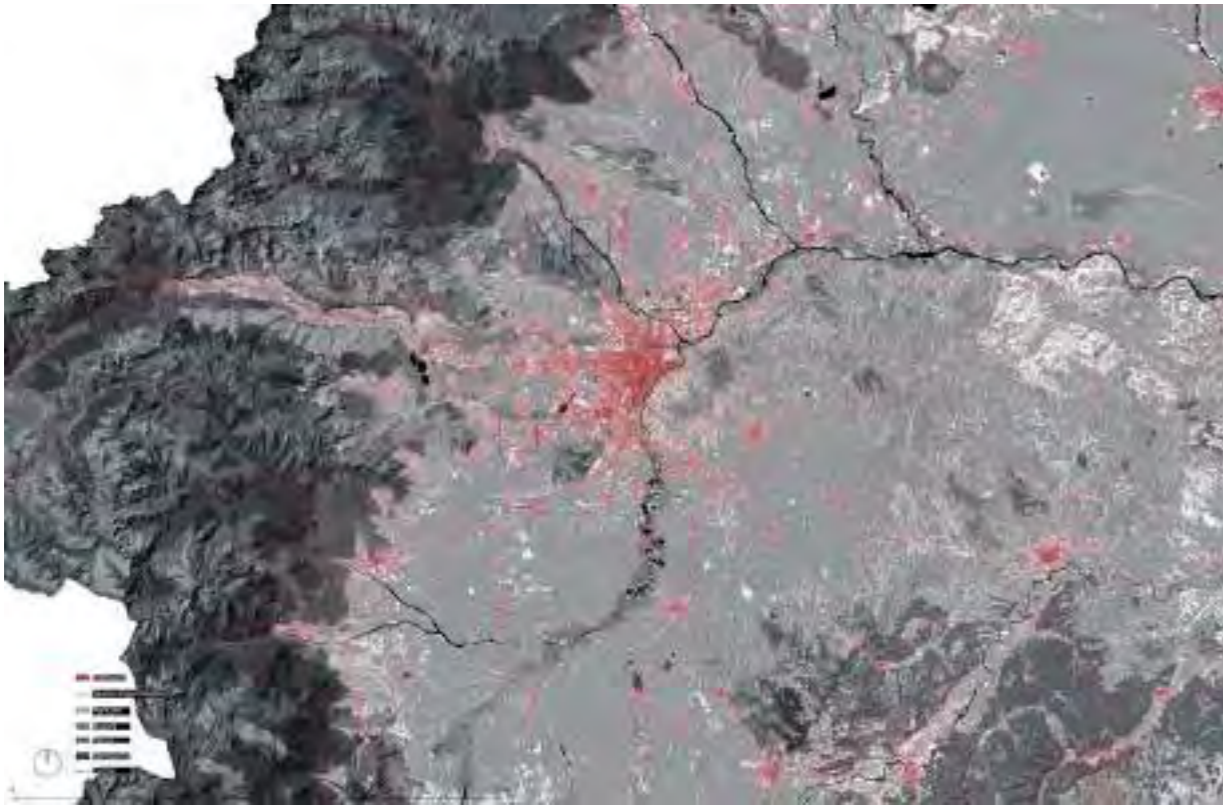
Fig. 2 Permeable and impermeable soils. Turin metropolitan area.

Fig. 3 Water system. Turin metropolitan area.

Fig. 4 Hydrogeological risk. Turin metropolitan area
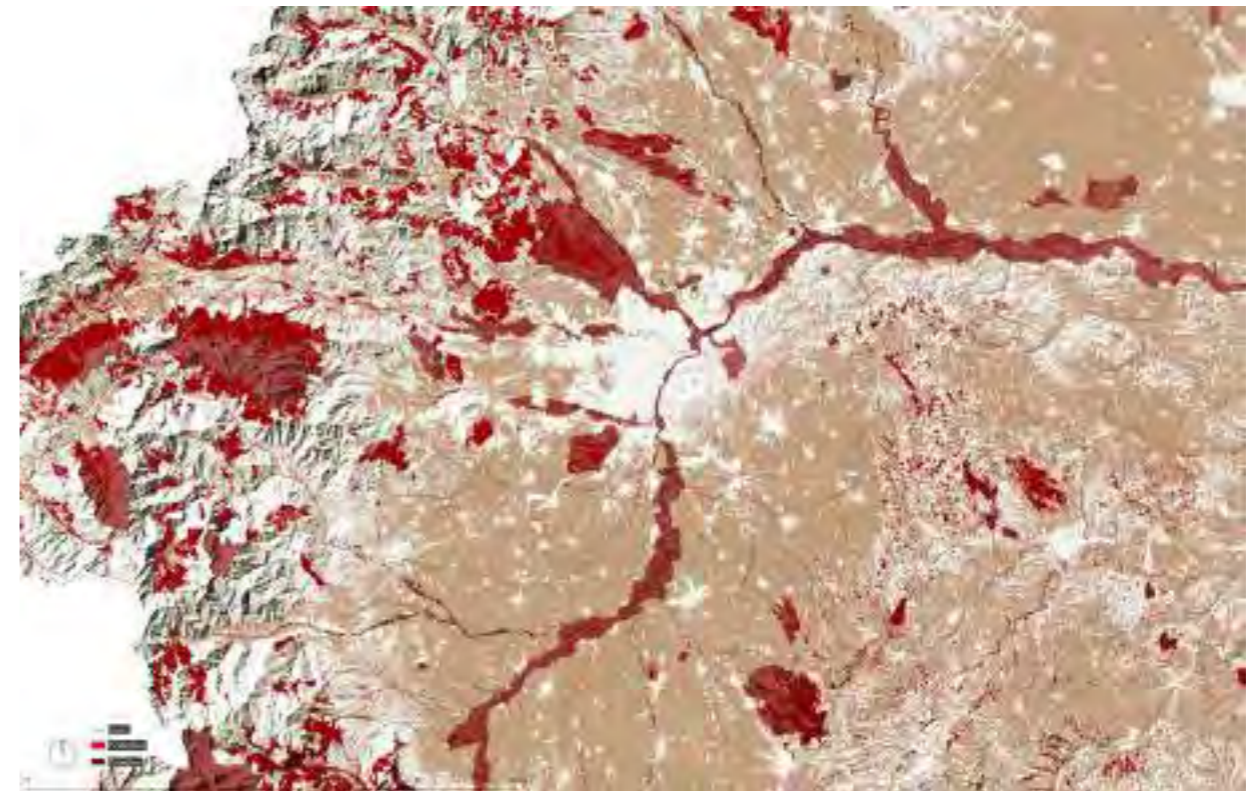
Fig. 5 The uses of vegetation. Turin metropolitan area

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Fig. 6 Parks and protected areas. Turin metropolitan area.
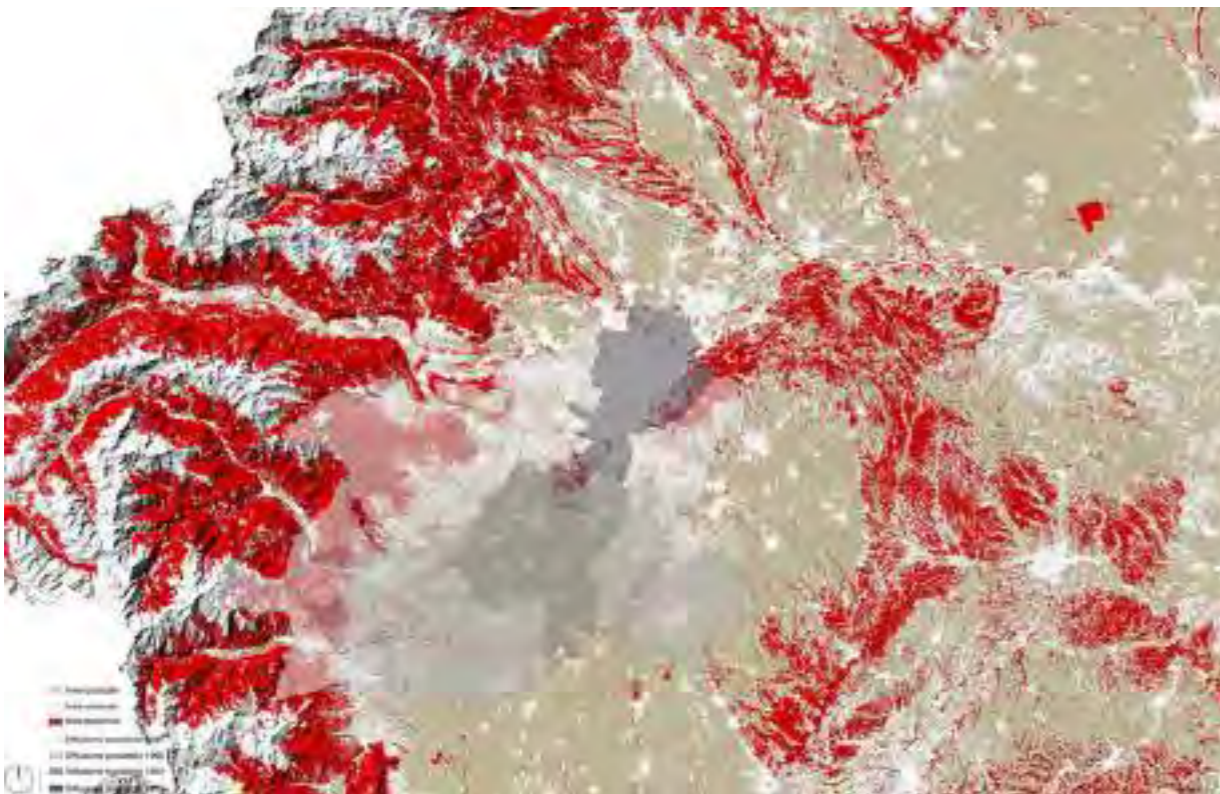
Fig. 7 Spread of the grey squirrel (invasive species). Turin metropolitan area.

The second phase tries instead to outline design strategies (fig. 8-9) that focus on the idea of coexistence between humans and non-humans, using the interpretations made previously in an articulate manner. The project area is that of the confluence of the Po and Stura rivers, a fringe area to the north of the city of Turin, which is characterised by the presence of urban parks, housing buildings of different types, productive spaces, and large commercial platforms — a piece of the city representative of what we call the contemporary city.

Fig. 8 A project made of rooms for coexistence. Confluence of the Po and Stura rivers, Turin.

Fig. 9 Sous les pavés, la plage! Depaving and renaturalisation strategy.

Confluence of the Po and Stura rivers, Turin.

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Case study description: Turin, Anthropocene territory

The area chosen to test a post-anthropocentric coexistence project was the metropolitan area of Turin in the far west of the Po Valley. The Po Valley, a large plain area that extends in the north of Italy, is an interesting field in which to explore this issue given its combination of strong characteristics of urbanisation and industrialisation, that make this territory one of the most polluted areas in Europe. This is where the European Commission's area quality standards are not reached for NO2, PM10 nor O3. Further, the topographical characteristics of this area - surrounded on three sides by major mountain ranges (Alps and Apennines) - strongly influence the local climate by causing weak winds that lead to a greater accumulation of pollutants. The Po Valley thus presents itself as an area heavily marked by human action in close contact with large environmental infrastructures (which are also highly anthropised) such as the Alpine and Apennine Mountain ranges or the Po River delta.

In this complex territory, the metropolitan area of Turin constitutes an excellent terrain wherein to test some issues related to a new project of coexistence between man and the environment, given some of its particular and ambivalent spatial characteristics. First of all, Turin is the Italian industrial city *par excellence*, home of the national automotive industry throughout the 20th century and still today the site of important industrial plants. It is also one of the most polluted cities in Italy, thanks in part to a rather unfortunate location (at the bottom of the Po Valley). But Turin is also one of the Italian metropolitan cities with the largest amount of green areas, boasting about 55 square metres of green area per resident. This ambivalence between purely extractive features and a large natural infrastructure means that the city has been chosen as a testing ground for an urban and territorial project of coexistence.

The descriptive and interpretative phase of the course, divided into four relevant topics (water, soil, animals and vegetation), then investigates the territory on a metropolitan scale by incorporating heterogeneous urban and non-urban ecosystems. From the Alpine areas to the west, to the hilly areas to the east of Turin, via the Plain with the city of Turin at its centre. The anthropised landscape is also quite varied, with the city of Turin at its centre studded with minor and diffuse urban centres, articulated metropolitan agricultural areas and large industrial and commercial platforms. The design strategies put to the test — "A room project" and "*Sous les pavés, la plage!*"—, on the other hand, focus on the area of the confluence of the Po and Stura rivers in north of the city of Turin, a fringe urban area that combines particularly rich urban, productive and natural features.

Results. Atlas and Design Strategies:

The course condenses an unpublished atlas of the Turin territory that focuses on the theme of coexistence, constructing a discourse through images. Through different territorial readings we observe a territory through an original point of view that focuses on soils, water, non-human animals, and vegetation, in a city often reported in all other terms (meaning the factory city). A number of issues from here emerge that we find interesting: by investigating the presence of non-human animals in the Turin metropolitan area, different types of relations with man materialise. Firstly, a relationship of competition (wild boars, nutria, squirrels, usually invasive species), secondly a relationship of protection (through the numerous local protected areas, places that aim at nature with conservative and patrimonial approaches, however not always with virtuous results) and thirdly a relationship of exploitation (linked generally to the widespread and concerning presence of farm animals in the area). The resulted vegetation atlas describes a reality that is rich, but at the same time in little contact with man; parks and reserves, although numerous, are often poorly planned and the relationship is often one of distance and separation. The territory, though rich in water (nonetheless now increasingly subject to the effects of climate change), and even the soils, would require an overall

project given the large presence of mineralised soils inherited from an outdated Fordist past.

Moreover, through the construction of two design strategies, it tries to test how urban and spatial design can provide an answer to the question of coexistence that is not simple, obvious or straightforward. It does so by avoiding somewhat Franciscan clichés of looking at nature as a place of redemption and purity, but by making the issue more complex. The first strategy implemented (titled "A project of rooms") tries to think of the project area as a series of different rooms; here coexistence is a question of separations, of limits and enclosures, more or less light, of thresholds, openings, and closures. The second strategy (entitled "*Sous les paves, la plage!*"), on the other hand, works on mineralised industrial soil by depaving and re-naturalising large areas. Vegetation and soil are used as real project materials that construct different spatialities: open spaces where coexistence has more traditional characters and opaque spaces imagined as a refuge, places of evasion and more intimate and close relationships.

Conclusions. A (not-naive) Project for Coexistence:

The current pandemic crisis, with its zoonotic origin, makes it necessary to rethink in all its complexity the relationship between human and non-human species with a view to renewed coexistence. This is a theme that is not new to the disciplines that deal with territorial design, but which in recent years has had a strong acceleration with increasing public attention (exemplary in this sense is the "Fridays For Future" movement born in 2018). The feeling is that the 'great acceleration' (McNeill and Engelke, 2018) that began after the Second World War - a period in which the Anthropocene entered a new era in which humanity increasingly conditions global ecology - is reaching a critical point (Longhin, 2021). In this sense, ecological thinking disrupts the idea of the human species above - or at the centre of - a nature that is dominated and exploited for the benefit of a specific subject, humans (Povinelli, 2017), considering instead "nature, a living whole that includes without distinction humanity, plants and animals, but also rocks, winds, water, the common mechanisms of the planet, considered in turn a living being" (Clément 2011, p. 45).

During the first phase of the pandemic crisis, the rhetoric of the 'reconquest' by non-human species of contemporary territories was the focus of media attention. Uncritical celebration of a wilderness that did not reckon with either the zoonotic origin of the crisis or the massive presence of farmed animals (if we remind ourselves that some 70 billion animals, excluding fish, are bred for human consumption every year) that allowed for the much-celebrated solidity of the food chain during the harshest months of confinement. From this perspective, the territory is celebrated as a space of reconnection between different species, as a space of creation of new ecosystems in which the human habitus reunites with non-human species, ceding spaces and rights to them. However, the crisis has clearly shown how the fracture has been generated by forced proximity between systems that are now too distant. It forces the project to address this issue in its complexity (social, economic, cultural) from the point of view of ecological impact, public health, and, not least, from an ethical point of view (Martin Sanchez, 2021). It eventually is what for Martha C. Nussbaum (2020) remains the greatest challenge of our time: the extension of 'the cosmopolitan tradition to non-human animals and the natural world'.

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TOPIC 3

NEW IDEAS ABOUT "NORTH-SOUTH" RELATIONS FOR STUDYING TERRITORIES IN TRANSITION

Although global changes may affect all parts of the planet in similar ways, the way to address them differs depending on each country's state of development. But this state may vary widely depending on geopolitical relations between different regions, themselves constantly evolving. Moreover, the criteria used to measure a country's relative level of development are subject to ongoing debate, opposing for example the gross domestic product (GDP) and the more inclusive human development index of (HDI), at a time when the former's implicit assumption of economic and material growth is in crisis. Regions considered less developed from the perspective of productivism may therefore provide knowledge that is helpful for crisis-stricken regions that are facing global changes in other latitudes. This theme seeks to present research and teaching that exemplifies new "North-South" relations.

LOCALNESS IN WATER-SENSITIVE URBAN DEVELOPMENT FOR BHUJ AND KOZHIKODE, INDIA

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ABSTRACT:

Outdated, updated, or not, the Brandt Line continues to provide a divide between 'North' and 'South', suggesting a dichotomy between the world's 'developed' and 'developing' regions, respectively. To reduce the contrast between the two, and in response to the challenges posed by urban growth and climate crisis projections globally, the Water-Sensitive Urban Design (WSUD) concept presents valued guiding principles for practice in the field of integrated urban design, planning and water management. Accompanying the WSUD concept, the Urban Water Transitions Framework (UWTF) facilitates the assessment of the progress of an urban environment towards the ultimate 'water-sensitive city' by means of illustrating the developmental steps through which to transition, differentiating more from less developed. By reflecting on the notion of water sensitivity by the hand of water practices and natural and altered hydrological processes in the case study cities Bhuj and Kozhikode in India, the article aims to cast light on contextual and cultural conditions and elements, challenging or contradicting the conventional Northern developmental progress put forward by WSUD and the UWTF. Through examples of barriers for water-sensitive urban development originating from striving for modernity, as opposed to opportunities for water-sensitive urban development which lie in pre-urban development local water practices, the article calls for a consideration of, and emphasis on, localness when assessing the state and potential of urban development.
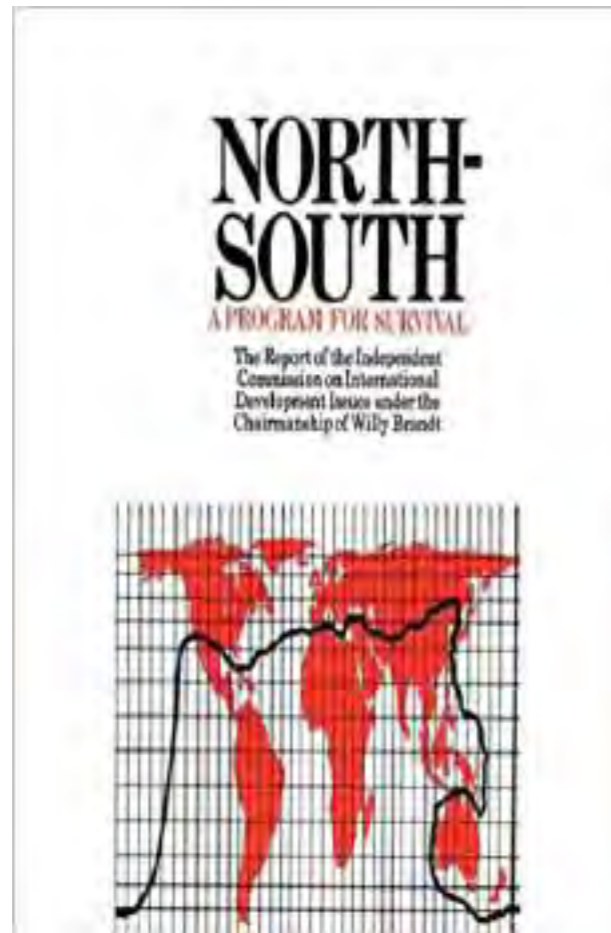
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Figure 1. Report of the Independent Commission on the International Development Issues (1980) cover

The 1980 cover of the first report of the Independent Commission on International Development Issues, titled 'North-South: a program for survival', showed a red world map with a black line circulating the globe and cutting through continents to separate two hemispheres (figure 1). Imprecisely and metaphorically referred to as North and South, the two parts of the world represent rich versus poor or developed versus developing, respectively. The black line, now known as the Brandt Line, after commission chairman and former German chancellor, Willy Brandt, originates from the global development process triggered by the Industrial Revolution. The North-South divide was first understood from the perspective of industrialization, whereas the high quality of life attained by the industrial front-running countries turned out to be the actual aim of the development process, and industrialization merely the means (Solarz, 2012). The global economic inequalities it illustrated and called to reform forty-two years later mostly remain present (Lees, 2021).

Strikingly, the Brandt Line world map shows overlap with the map reviewing global inequity in the countries responsible for the current climate crisis, in terms of greenhouse gas emissions, and the countries carrying the burden of its impacts (with the exception of Argentina, Brazil, and China in the South) (Althor et al., 2016). Besides the short-term urgencies of development highlighted by the North-South dichotomy, the current climate crisis additionally introduces long-term uncertainties on how to develop (Burton, 2004) to countries both above and below the Brandt Line. Worldwide, countries are facing more irregular and unpredictable extreme weather and climate events and affected local natural and human systems (IPCC, 2014). Its impacts, however, are arguably equally driven by urban development-driven land use and land cover modifications and the consequential abruptions of the hydrological cycle.

A concept for the integrated approach of (re)development of the urban environment considerate of underlying and embedded hydrological processes and urban water cycles is Water-Sensitive Urban Design (WSUD). Emerged and successfully operationalized in 'the North' (i.e., Australia) (Brown and Clarke, 2007), WSUD is considered fit to address urban and climatic challenges, while delivering additional benefits, in a wide range of contexts (Rijke et al., 2016) and is therefore gaining interest globally. The site-specific relevance of the WSUD concept and approach in the South, however, remains questioned (Bichai and Cabrera Flamini, 2018). Transferability concerns come to light as WSUD gets mainstreamed, originating both from prior conceptualization and novel contextualization, when development principles of WSUD turn out to be dysfunctional, insufficiently inclusive, or even invalid in certain contexts.

This paper aims to highlight what water sensitivity implies in the South, opposing the direct imposition and validity of WSUD as the conventional urban development concept from the North, but alternatively approaches the WSUD concept, focusing on the localness and uniqueness of a context, its culture, and what is and what isn't in place, as elements of an already present kind of water sensitivity to function as entry points for urban development. To do so it 'travels' to Bhuj and Kozhikode, two secondary cities in 'the South' (i.e., India). The hierarchical order of cities suggested by 'secondary', in light of this study, refers to their subnational size and administrative role. Such cities frequently experience poorer initial conditions and lacking infrastructure and service provision, whereas, unlike the common perception, secondary cities collectively are confronted with the most

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pressing urban population growth (Roberts, 2014). Especially in India, as the country is facing both the world's highest levels of urbanization and population growth (UN DESA, 2019). At the same time, secondary cities remain underexposed in studies and both academic and non-academic literature on urban development and their urban water management infrastructures (Roberts, 2014) which results in lacking or fragmented data availability and lacking data collection resources (Lindley et al., 2018), when, in fact, WSUD is rather data-intensive (Lerer et al., 2015). In light of general urban water management challenges to address, Bhuj and Kozhikode represent secondary city contexts enduring drought and excessive rainfall, respectively.

State of the art

Beyond (re)developing the urban environment considerate of hydrological processes and urban water cycles, the WSUD concept intends to integrate the water management practices (i.e., those engaged with the urban water cycles and the protection and conservation of the aquatic environment in urban areas) with urban design, planning, and implementation by operationalizing the collaborative and multidisciplinary nature of urban design (Wong, 2006). The WSUD concept has successfully been adopted to a WSUD approach in the contexts of primary cities worldwide (e.g., in Australia, Germany, the Netherlands, Singapore, United Kingdom, United States), proving its suitability to address urban and water challenges in a broad range of climatic conditions (Abbott et al., 2013), yet, only in the North.
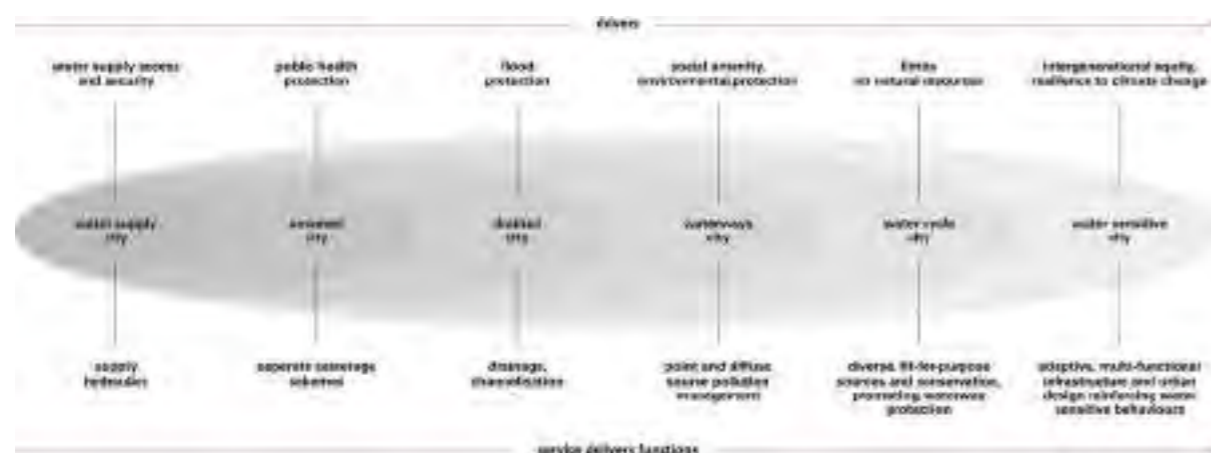

Figure 2. Urban Water Transitions Framework (adapted from Brown et al., 2009)

The ongoing water-sensitive urban development progress in such primary cities is outlined in the Urban Water Transitions Framework (UWTF) (figure 2) (Brown et al., 2009) to accompany WSUD in assessing the state and progress of urban water management and differentiating more from less developed. It sets out typical cumulative developmental steps through which cities transition in their pursuit for water sensitivity. The ultimately developed city state is the 'water-sensitive city' (following the water supply city, sewered city, drained city, waterways city, and water cycle city) which is underpinned by three principles for practice (Wong and Brown, 2009): firstly, to use cities as water supply catchments with a diversity of fit-for-purpose water sources and infrastructures, secondly, to provide ecosystem services, and, thirdly, to generate the socio-political capital to enable water-sensitive behaviour.

Literature, however, highlights transferability concerns regarding the generic experienced qualities from the conceptualization of WSUD as an approach to transition to the water-sensitive city with, as well as regarding the contextualization and limited applicability of WSUD in cities with differently established urban water practices and management. To reflect on North-South relations and the development dichotomy, the article focuses on the concerns arising with the UWTF as a development model. The UWTF fails to recognize the possibility of coexisting city states within an administrative boundary or watershed. When parts of the city lack water supply or stormwater drainage infrastructures whereas other parts are provided, the progress which the UWTF assesses in fact refers to retrofitment in developed parts of the city and to development in others (Fisher-Jeffes et al., 2017). From this perspective, WSUD might be short of promoting equity alongside environmental sustainability and short of identifying opportunities to bypass the Northern development steps and directly implement water-sensitive system alternatives, even in parts of town without basic services.

Methods

Following an extensive literature review on the state of the art of WSUD and its transferability concerns, the key effort around the scarce data availability of the secondary case study cities was the chronological compilation of information on water practices and water infrastructures in the two cities from a multitude of disciplines to assess past urban development and define present problems. This chronological overview provided the basis to distinguish and define local paradigms of water development trends and the paradigm shifts between those, explaining the establishment of the present urban environments, the challenges and entry points for water-sensitive urban development, and the constructive or problematic relations between nature and built form. The key findings from those overviews for Bhuj and Kozhikode were verified through online workshops with local stakeholders and will be provided under 'Case study description'.

The defined paradigms and shifts are not just seen in history but still manifest in the present-day cities as residues from prior periods. By hand of those residual water practices, investigating and reflecting on their discrepancy with conventional WSUD as a Northern urban development approach, this article calls for an alternative approach to WSUD and its intended ideal universal water-sensitive city. One focusing on past and present context and culture, and their already existing water sensitivity, as entry points for water-sensitive urban development. Ultimately, this reflection is used to necessitate a consideration and conservation of localness when assessing and addressing the state, potential, shortcomings, and progress of urban development, especially in the South.

Case study description

Bhuj, India

Bhuj is home to the headquarters of India's westernmost district Kutch, located in the state Gujarat. It had a population size of approximately 150.000 at the latest Indian government census in 2011 (Office of the Registrar General and Census Commissioner India, 2011) of which 33 per cent resides in slums, occupying six per cent of the city's area (Jaimini, 2016). Its location on top of fault lines is at cause of the city's history of earthquake disasters (e.g., in 1918, 1956, and 2001) and are a striking condition of influence to local groundwater processes. Being located in a hot desert climate, the city knows an
average yearly rainfall of

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Figure 3. Bhuj and its history of catchment expansion (adapted from Raman, 2014) and current problems (author, 2022)

324 mm and average temperatures ranging between 10,0 (January) and 39,4 degrees Celsius (May) (IMD, 2015; 2016).

To cope with drought seasons and increasing demand, Bhuj has a history of watershed expansion by connecting the original Hamirsar catchment area to neighbouring lakes and watersheds and ingenious interventions to maintain those connections (figure 3) (Raman, 2014). The current watershed within which Bhuj is located has heights ranging from 25 to 275 metres above general mean sea level and conveys water towards the Rann of Kutch, a salt plain desert 70 kilometres north. Despite the expansions, due to earthquakes paralyzing parts of the enhanced watershed, and due to high salinity of the soil (CEPT University, 2016), current local water sources do not succeed in meeting the ongoing increasing demand for household consumption and lakes are commonly dry. Beyond their frequent dry state, lakes are also irreversibly disappearing due to their lacking recognition in statutory documents, permitting dumping of earthquake rubble, encroachment, or development, instead of preservation. Since the 2001 Gujarat earthquake, Bhuj is for water supply heavily dependent on external sources provided by the 225 kilometres long Kutch branch canal from the main Narmada canal with its original source 700 kilometres away from Bhuj (Sheth and Iyer, 2021). Furthermore, local water distribution infrastructure is deficient, resulting in unequal supply, especially disadvantaging slum areas. The online workshops additionally highlighted the lacking awareness regarding the state of local water sources and the perceived ease of access to water provided by external sources, leading to a false sense of water security, overextraction, lacking conservation, and a general loss of traditional water conscious knowledge and practices.

Kozhikode, India

Kozhikode, also known as Calicut, is seat to the namesake district government in the southern state Kerala and had a population of approximately 550.000 at the 2011 Indian government census (Office of the Registrar General and Census Commissioner India, 2011) of which 19 per cent lives in informal slum settlements, covering an area of 386 hectares (Town and Country Planning Department, Government of Kerala, 2017). The coastal city is situated in a strikingly undulating coastal plain at the foot of a large watershed which abruptly rises up into the mountains of the Western Ghats, reaching heights of approximately 2500 meters. In a local climate characterized by monsoons, the orographic precipitation of the Southwest Monsoon encountering these mountains between June and September contributes most to the relatively high total average yearly precipitation of 3054 mm, but is accompanied by the Mango Monsoon in April and the Northeast Monsoon between October and November. Temperatures range between 22,8 (January) and 33,6 degrees Celsius (April) (IMD, 2015; 2016).

Both in remote site research and the online workshops, (unplanned) land use change (figure 4) in combination with lacking water resource management (i.e., both in terms of water quantity and quality) stood out as the key disrupters of water-sensitive urban development and improvement. However pressured stormwater drainage was by the landform of the relatively flat coastal plain adjacent to steep mountains causing heavy orographic monsoon precipitation, in the past the use and maintenance of the valleys of the undulating terrain as nature or water-related and nature-based religious and cultivation practices, such as worshipping virgin forest patches (called sacred groves) or cultivating rice in paddy fields, secured the processing of these extreme water flows (Bhagyanathan et al., 2017). Now, the relatively flat terrain is facilitating unplanned sprawl in all directions land inward up to the mountains. These land use and land cover changes makes the terrain less and less capable to process the excessive monsoon rain (figure 5). It limits processes of rainwater harvesting and groundwater recharge, which the terrain and its use and maintenance by local communities used to protect. On the one hand, this results in increased runoff and flood risk. On the other hand, together with over-extraction of groundwater through open-wells (which remains the major source of water supply) and excessive groundwater outflow through man-made canals (e.g., the Connoly canal, dug for inland transport in colonial times), this results in groundwater depletion and reduced flushing capacity, which consequently results in saline water intrusion. Drainage infrastructure and solid and liquid waste management in Kozhikode are in general lacking. Both ground- and surface water bodies and remaining natural areas (including the Kottuli wetlands with a status of national importance (MoEF, 2019)) additionally suffer from the latter as it causes the habit of waste dumping. Drainage is further obstructed by this waste dumping, siltation, and encroachment of natural drains and wetlands, increasing flood risk.

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Figure 4. Kozhikode watershed with urban sprawl (adapted from NRSC, 2019)

and flood prone areas (adapted from NCESS, 2010) highlighted (author, 2022)

Figure 5. Schematic section of the Kozhikode watershed and its urban and atmospheric, surface, and sub-surface hydrological processes (author, 2022)

Results

Bhuj and Kozhikode both are examples of cities in which the state of service delivery varies over parts of the cities with development urgencies in respect to all urban water cycles. The lacking state and development of service infrastructures, however, results mostly from the unique set of site and culture specific variables, such as local climatic, topographical, geological or seismic conditions and local practices of informal settlement, landfilling, or urban sprawl. Such sets of variables inhibit conventional Northern development proposed by WSUD. Instead of a universal ideal of the water-sensitive city as an urban development goal and a universal definition of what is water sensitivity, formulating and defining these per context, considerate of localness and site variables would facilitate the envisioning of a site-specific plan with local entry points and opportunities to guide urban development in each urban context. The case study descriptions cast light on challenges and entry points for water-sensitive urban development in Bhuj and Kozhikode.

Opposing WSUD retrofitment of primary or Northern cities to cities as water supply catchments with diverse fit-for-purpose water sources providing ecosystem services, secured water supply in Bhuj faces increasing dependency of remote sources as its population grows. Despite the earthquake-prone area calling for a less centralized water supply network, local site conditions hinder independency and decentralization. Unlike following the UWTF to address Bhuj's development urgencies, contextual and cultural entry points can enable immediate water-sensitive urban development, despite potential ongoing developmental deficits. The potential of water sensitivity in Bhuj might rather be about the unfolding of the city's water management history of 'engineering' the natural and expanded catchment to the full set of destitute local hydrological processes, such as rainwater harvesting, in a sensitive manner. Especially when linking those to water-sensitive use and development of the urban environment and sensitive individual use of water through cultural and societal site specificities of Bhuj, enforcing tailored regulations for, for instance, water extraction and (dried-out) lake conservation, and increased awareness regarding consumption and traditional water knowledge and practices.

Kozhikode's undulating topography equally calls for decentralized supply and sewerage networks and its pressuring urban growth and monsoon climate demand an emphasis on developing stormwater drainage and flood protections infrastructures. The latter is complicated by the informal and unplanned nature of settlement, landfilling, and waste dumping practices in, or in proximity to, natural water ways and wetlands. Alternatively, regarding and (re)operationalizing the undulating terrain as such a drainage and flood-reducing infrastructure is an opportunity to secure a similar, yet more locally water-sensitive, performance. Residual local and traditional water knowledge and practices, which were once prevailing, are site specific and culture and society bound means and entry points for water-sensitive urban development. Assigning an 'infrastructural' status to the sacred groves and paddy cultivation, alongside regulations to secure that status, conserving the residual areas where these remain, and expanding and duplicating them in the depressions of the undulating terrain can facilitate the convergence and deceleration of the high stormwater runoff and stimulate infiltration and percolation. Such hydrological processes ultimately safeguard food provision, cultural and spiritual values, biodiversity, groundwater quantity and quality (also for supply), and the landscape's and city's resilience to perturbations (Bhagyanathan et al., 2017).
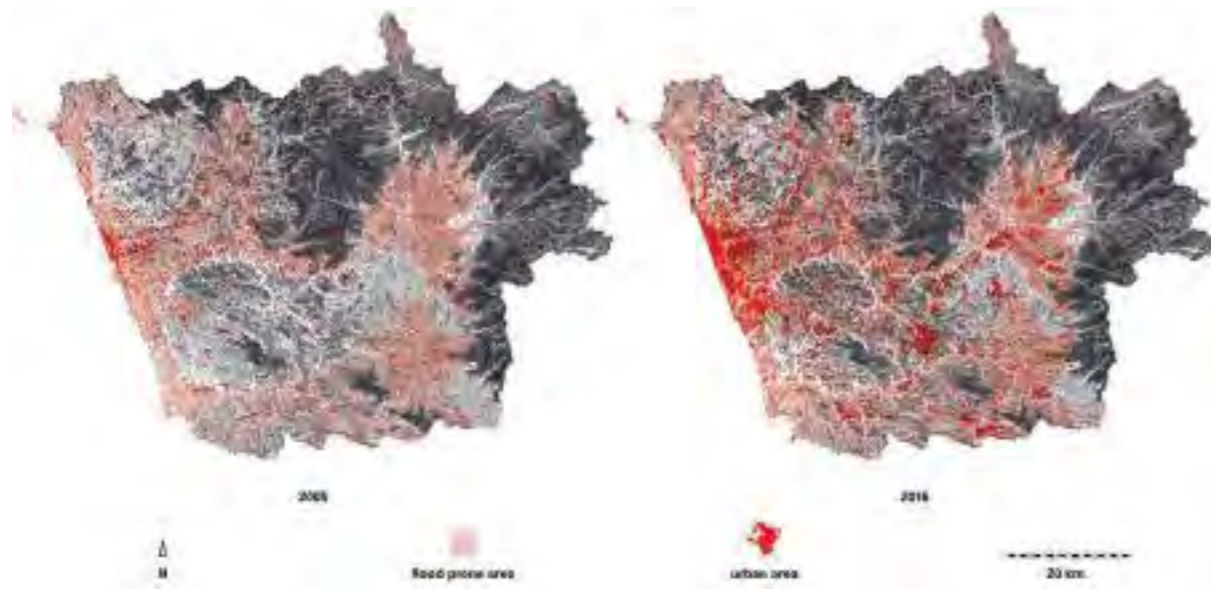
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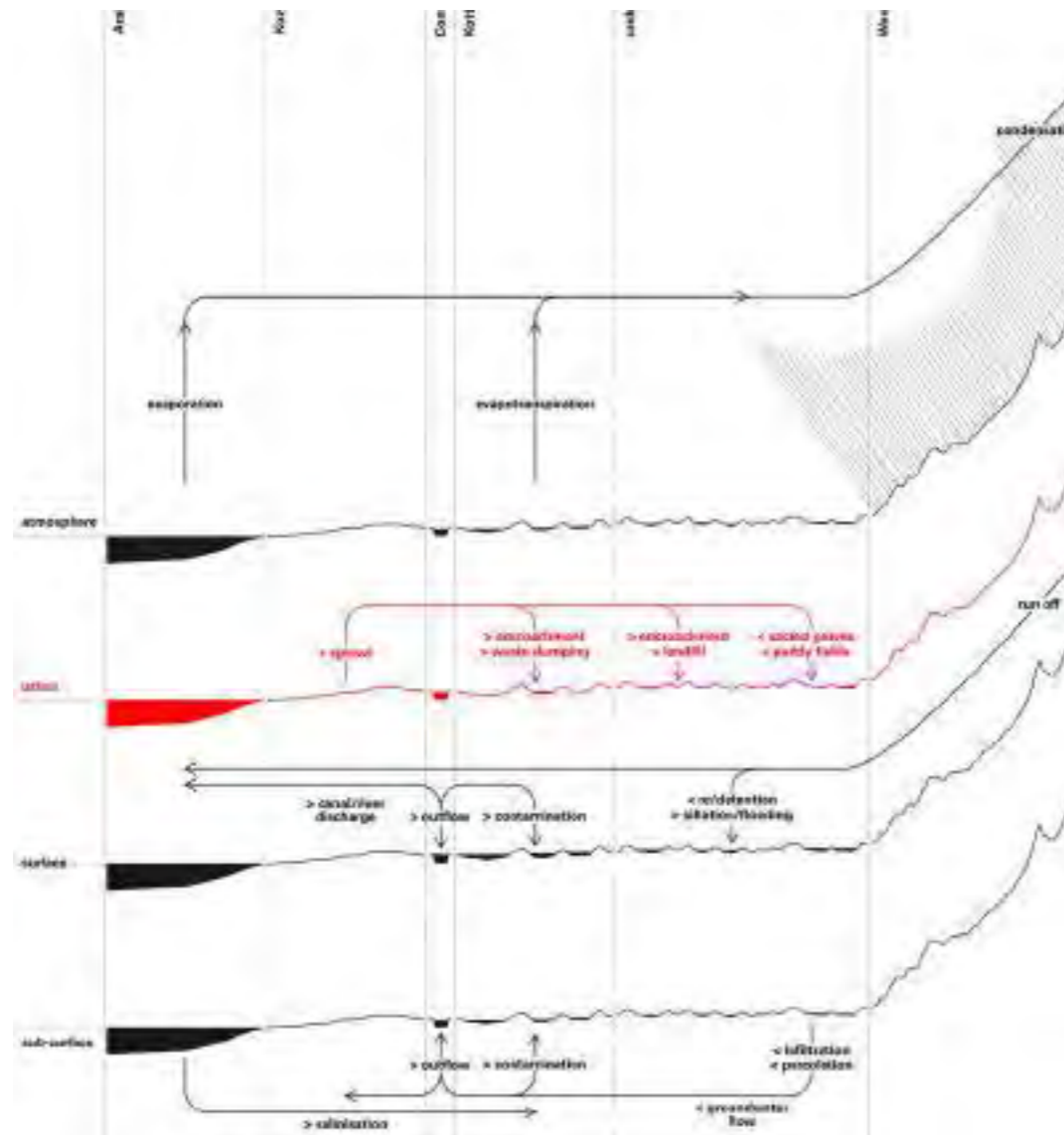
Conclusion

The Brandt Line, coined over forty years ago with the intention to overcome the economic inequalities between what lies North and what lies South of it, still mostly remain in place to date (Lees, 2021). Reflections of these inequalities in urban environments North and South show ongoing infrastructural deficits and development urgencies in the South and novel development uncertainties in both the North and South, further pushed by economic, societal, and, above all, climatic changes (Burton, 2004). Such urgencies, uncertainties, and inequalities trigger the production of knowledge and approaches to address them. Among those, the WSUD concept emerged from the Northern primary city context (i.e., in Australia) in response to the water infrastructure and urban development challenges posed by urban growth and climate crisis projections, gaining following globally and purported universal validity by means of local successes. The ways to address deficits and global changes, however, depend on each context's state of development and a set of site specificities, enabling or disrupting development.

The secondary Indian case study cities, Bhuj and Kozhikode, highlight how multiple states of development and states of service delivery infrastructures can coexist within their administrative boundaries. Such differences and deficits imply a long way to go for these cities to develop to the aspiring water-sensitive city ideal portrayed by the UWTF. Reviewing the city's water related development trends and the residual local water practices and cultures, however, allude to an alternative and ready existing type of water sensitivity, despite the deficits. One which is not in the first place concerned with the (projection of the) ideal future performance of the urban environment, but rather with the qualities of past and residual water practices and water knowledge and the opportunities to regain and stress those. Approaching water sensitivity and WSUD through past and present site specificities and culture of a context facilitates the assessment of the state and potential of the urban environment and the design and planning for situated development.

This alternative approach of WSUD does not mean the article questions or undermines the value, innovation, and prior success of WSUD. Reviewing water sensitivity in light of North-South relations, however, attenuates the differentiation between more and less developed contexts established after the Brandt Line. The act and tendency of drawing lines recalls Da Cunha's (2019) explanation of the invention of rivers through the drawing of a line separating land from water. A separation which used to be dynamic and have a fluctuating spatial dimension, reduced to a static line to facilitate an efficient operationalization and cultivation of the landscape on one side of the line and the river on the other side of the line. A separation deemed necessary for colonizing India. The construction of the line as embankment or dam had economic implications and did facilitate a form of development, but it also initiated a cultural shift in which natural phenomena like rain and water discharge, which used to be celebrated, became associated with efficiency, uncertainty, and fear (Da Cunha, 2019). Further development of the urban environment and its water management infrastructure therefor calls for 'decolonization', as an effort of unlearning urban design, planning, and water management approaches, to the extent that they are based on Northern urban development, and allow for localness as entry points for situated urban development. Decolonized (Water-Sensitive Urban) design (Schultz et al., 2018) would enable and support local appropriation of the WSUD concept and its application fit for the cultural context by local urban design, planning, and water management practitioners with stronger ties to the culture and history of places, embedded in local water practices and knowledge. It will not dissolve North-South contrasts but offer a shift in perspective, from the distinction between 'developed' forerunners and 'developing' followers, towards a collective situated water-sensitive urban development endeavor.

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CRITICAL URBAN WATER LANDSCAPES:
A NORTH-SOUTH RESEARCH-BY-DESIGN UNIVERSITY NETWORK FOSTERING THE CO-TRANSFER OF KNOWLEDGE FOR URBAN AREAS CHARACTERISED BY CHANGING WATER REGIMES

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ABSTRACT:

In the rapidly developing urban regions around the globe, the opportunity to link local urban development with actions targeted to prevent ecological catastrophe has become an imperative. Cities situated in geographical locations characterized by changing water regimes, such as flood exposed urban sites in deltas, on the coast, or along rivers, are particularly critical. Suggesting prevention or adaptation measures in these sites requires a process of interaction between diverse governmental bodies, civil society, and private actors – which is not easy in times of economic and political turbulence.

Hence our commitment aims to activate stakeholder involvement and to facilitate a multidirectional knowledge transfer, recognizing the various levels of interactions necessary to advance both knowledge and action on site, within an ever-decreasing local government budget, and an ever increasing complexity of issues to be addressed by ever more tailor-made strategies – this prompts the quest for new knowledge *transfer* methodologies, responsive to both the local sites/ locally active site actors, and the global knowledge community/ globally active researchers.

The question is then if sustainable socio-territorial transformation can be supported by a *co-transfer* of knowledge, catering to the different demands? Such a transfer concept relies on the co-creation of urban transformation knowledge while also involving the co-creators in the act of continuously translating their knowledge to each other and to different socio-political contexts and geographical locations.

KEYWORDS:
urban water landscapes, research-by-design, knowledge co-transfer

Transdisciplinarity as a basis

As academic disciplines *and* professions, urban planning, urban design and landscape architecture deploy the theoretical force of reasoning *and* practice-driven actions. So doing, they model a particular approach to science. Since the 1990s, this has been known in academia as *transdisciplinarity* or Mode 2 science – where those other than scientists become included in the process of knowledge production. Helga Nowotny, social scientist, former European Research Council president and one proponent of this shift, has forcefully argued that science can no longer be practiced by isolated scholars, sitting in academic ivory towers researching abstract issues and offering up their findings to society for implementation (2016, 2001). Scholars of the design disciplines have long understood that the knowledge creation process of planners and designers – a designerly way of knowing – includes practice as well as research (Rittel 1977, Schön 1983, Simon 1996). Design, their followers argue, should be recognized as a Mode 2 knowledge production field, distinct from Mode 1, which is modelled on the natural sciences. Academia plays an important role in this knowledge production process, bridging disciplines and geographies, and ensuring links to professional actors, public authorities, and civil society in their respective localities.

Beyond Best Practice as a methodology

To frame the transdisciplinary foundation and the pluralistic actor constellation of our networked research-by-design approach, we use *Beyond Best Practice*, a method derived from Design Thinking (Diedrich, Kahn & Lindholm 2015), based in an emergent discourse of site theories (Kahn, A. and Burns, C. 2021), stringent enough to capture the complex project set-up academically, and flexible enough to allow for ongoing adaptation practically. Beyond Best Practice takes aim at accepted value-systems and conventionally silo-ed working methods grounding two types of practice activity: professional practice and academic practice. It proposes a framework of research operation:

- a *Motivation* derived from acknowledging problems in need of reformulations
- a process developed through *Collaborations*,
- a method based in *Conversations*,
- a mindset deploying *Speculations*
- an application through *Revaluations*

With their focus on end-game scenarios best practice-based urban development models disregard in-situ qualities, and often lead to generic, '1-size-fits-all' solutions. Conversely, appreciating (in the double sense of recognizing *and* increasing) in-place value lies at the root of 'site-specific' urban transformation. The activity of picking up best practices, whole cloth, from one situation and dropping them down in another suggests a blind faith in what worked 'over there' coupled with blindness to the as-found site conditions and in-place resources characterizing 'over here'. In calling for a move 'beyond' best practice one can question that blind faith and see past that site-blindness – to recognize site-specific potentials, qualities and values already existing in place. A key motivating bias of this methodology might be stated thus: for best practices to accrue value, they must be translated, not simply transplanted.

A viable urban transformation model must produce concepts and processes applicable in more than one place, over time. It needs to include *generative* strategies. This means to detect, interpret and communicate the conceptual and fluctuating aspects of design and planning processes, often overlooked. To be made intelligible these 'evolutionary' elements need a theoretical framework of a kind other than usually connected to end-scenario-driven planning, and design as form-making. We argue this framework can be retrieved from Design Thinking (cf. Lawson & Dorst 2009, Brown 2009, Cross 2007). Design thinking constructs relationships between things previously perceived as unrelated; it separates what has previously been tightly associated. It creates new value by 'crossing the line' (in English – 'acting unacceptably'), messing with and disrupting what we have been taught as the 'right way' to work. The first action in a Design Thinking model is to 'design questions', to ponder the problem from various angles (general and specific) until a meaningful question can be found. By framing and reframing problems, Design Thinking offers an alternative to "solving the wrong problem" by importing a best practice answer that may not actually apply.

Networked studio teaching with students based in Buenos Aires, Malmö and Delft

The Complex Cities Studio, developed by the Urbanism Department of TU Delft and the School of Architecture, Design and Urbanism of the University of Buenos Aires (2006-2018), focused on different socio-physical urban conditions within the Buenos Aires Metropolitan area and was organized on a pre-agreed agenda negotiated between universities, governmental, civil and private parties. Their aim was to investigate the forces that determine the formation of the metropolitan structure, the potential arising for urban regeneration and how to construct spatial strategies for socio-spatial integration with an integrated and collaborative approach as well as the socio-spatial conditions for development. Taking a relational approach between stakeholders and networks, the involved students explored the need and potential for collaboration of diverse actors in a common search for development based on socio-spatial integrative strategies. This approach defined the main goals of understanding the dynamics of an urban metropolis in a developing country. This included the metropolitan /urban analysis approaches at different scales, the diverse actors and their interests, and recognizing the many systems (functional networks, natural systems) that define the metropolis, the relationship and interactions between diverse stakeholders with divergent interests, the impact on urban development and the distribution of costs and benefits. The exploration of synergies between changes brought by globalization forces in the existing city and the influence (or not) of planning tools, interventions and strategies as well as the exploration of how the performance of the water system can be addressed under a more integral perspective for development. The intent was also to explore, through an urban design intervention, the potential programs and spatial strategies of development by applying research-by-design methodology and to develop a design strategy for socio-spatial integration.

The studio project 'Critical Urbanity: Water cities – Marginal cities', a partnership between the Landscape Department at the Swedish University of Agricultural Sciences in Malmö and the School of Architecture, Design and Urbanism of the University of Buenos Aires (since 2017) introduces a global and cross-disciplinary perspective into learning processes. The objective of the project is to teach young professionals and researchers to reflect critically upon and devise concrete, sometimes hands-on, actions to overcome exclusion in urban landscapes, specifically those characterized by changing water regimes. Climate change and globalizing economies are global challenges that have an impact on the spatial organization of urban sites on a local level. Educating young landscape architects and urbanists from different global localities together intends to address both the global

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dimension of designing urban water landscapes, and location-specific differences. At the same time, the project immerses young professionals and researchers with different origins and upbringing into specific local and disciplinary contexts, enables them to develop critical conversations and transferal thinking in a global context. The task for them, in each studio, has been to conceive strategies, toolkits, methods, actions and prototypes targeted at local problems instead of promoting a global recipe for local problem solving with would be impossible to succeed. In summary, the project aims to formulate local pedagogical formats for teaching and research across continental, cultural and geographical boundaries.

Re-valuing knowledge from one studio project to the next

Our exploration of co-transfer methodologies has been conducted from the ground up, in focalising on select examples. The *Emscher regeneration* in the Western German Ruhr region has been used as a reference case to co-transfer knowledge to the *Reconquista river sanitation plan* in greater Buenos Aires, Argentina. Insight gained from working with the Reconquista project has prompted transfer of lessons learnt to the *Frihamnen urban transformation* in Göteborg, Sweden. Currently, knowledge transfer is being launched to inform the ongoing *Südliche Friedrichstadt regeneration* project in Berlin, Germany. The selected transformation projects had already been organised as 'urban living labs' in practice by their local authorities, each of them differently, and according to their local complexities. Yet, a common methodology has been adopted to participate in these projects as academic actors focusing on design studios where students developed spatial designs scenarios and experimental development proposals. As teachers and researchers conducting these studios in a networked research-by-design approach, i.e. in collaborating and conversing both with actors on the site level, and with each other on the academic level, we have been able to work 'beyond best practice', to raise *and* re-value knowledge from each of the individuals studios in order to make it travel from one project and one place to the next (Janches, Diedrich and Sepulveda, in publication; Diedrich & Janches 2016).

Co-transfer of knowledge – an exploration through ongoing studio teaching

Design must be enriched by technical and theoretical knowledge on subjects such as policy, ecological urbanism, transport infrastructure and forthcoming others to keep up with the discipline as it transforms. From topical design questions, research and education can introduce theory and practice of design action and design philosophy. Integrating students into real life challenges enriches local discussions and prompts involving aspects of landscape architecture, planning and urban design, through collaborations and conversations with partners (institutions, governments and communities). From morphological considerations to socio-cultural implications, the integration of thinking across the three disciplines allows us to understand different interpretations on how an urban space can unfold in continuous transition. We have explored urban dynamics and the role of people in different scenarios in the Global South and Global North through exchange programs between our universities and programs to develop opportunities for improving some of the physical and social erosion and the environmental stress that characterize each area as well as to understand possible inertias for integrated urban growth.

These academic exchange programs have been achieved by developing co-transfer approaches for new concepts in landscape, planning and design, and for decision making under uncertain conditions in rapidly changing environments in order to enhance the conditions for the sustainable development. The intention of each studio was to devise urban strategies that would affect the in-between spaces so that they become places for the generation of new forms of civic activities and starting points for the revitalization of each area. Each program has also aimed at rethinking the existing public urban landscapes, in order to create alternative means and strategies for broader social interaction. As researchers, we want to deliver knowledge usable in any situation, without delving into a generic formula. Instead of advising *what to do* we venture to question *how things get done*. Instead of a prescriptive 'best practice recipe' we look for habit-inhibiting generative forces: ways of thinking, ways of problem framing, ways of value spotting, ways to fuel processes of communication. Therefore, we subscribe to an understanding of design 'as transformation', which involves a change from one state to another, it oscillates between finding out what is there and testing what it could become. The existent drives the design, many actors are part of the design. This is not form as object but trans-form-ation as process.

Figures

Fig. 1

The principles of Design Thinking encompass five stages - 'Emphathise, Define, Ideate, Prototype, Test'. The Beyond Best Practice approach translates them to 'Motivation, Collaboration, Conversation, Speculation, Revaluation', suggested as an iterative process characterising research-by-design. The last stage, revaluation, allows to generate knowledge from one studio project to the next, often prompted by geographical and in-tellectual deviations.

(sketch: Lisa Diedrich)
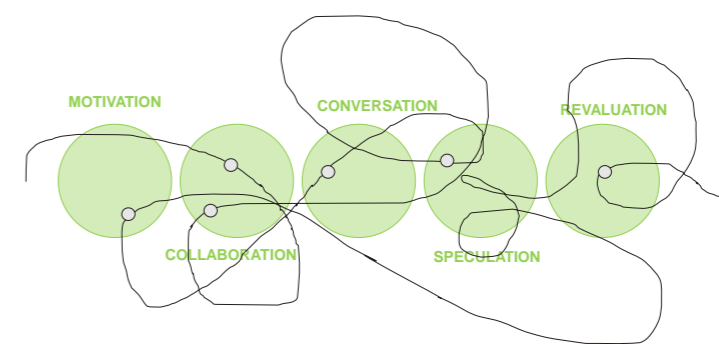
Fig 2

In the Critical Urbanities exchange project, linking the Swedish University of Agricultural Sciences in Malmö and the University of Buenos Aires, students studied post-industrial landscapes and their narratives on both hemispheres. In this research-by-design proposal, the students relate the German IBA Emscher Park project with the intended transformation of the Reconquista River area in the Buenos Aires metropolitan region. For the students, the river can turn from source of pollution to source of solution if local actions and spatial change along the river are mobilized to support overarching aims enshrined in the UN Habitat's New Urban Agenda.

(drawings: Sophie Wiström and Caroline Axelblom, SLU)
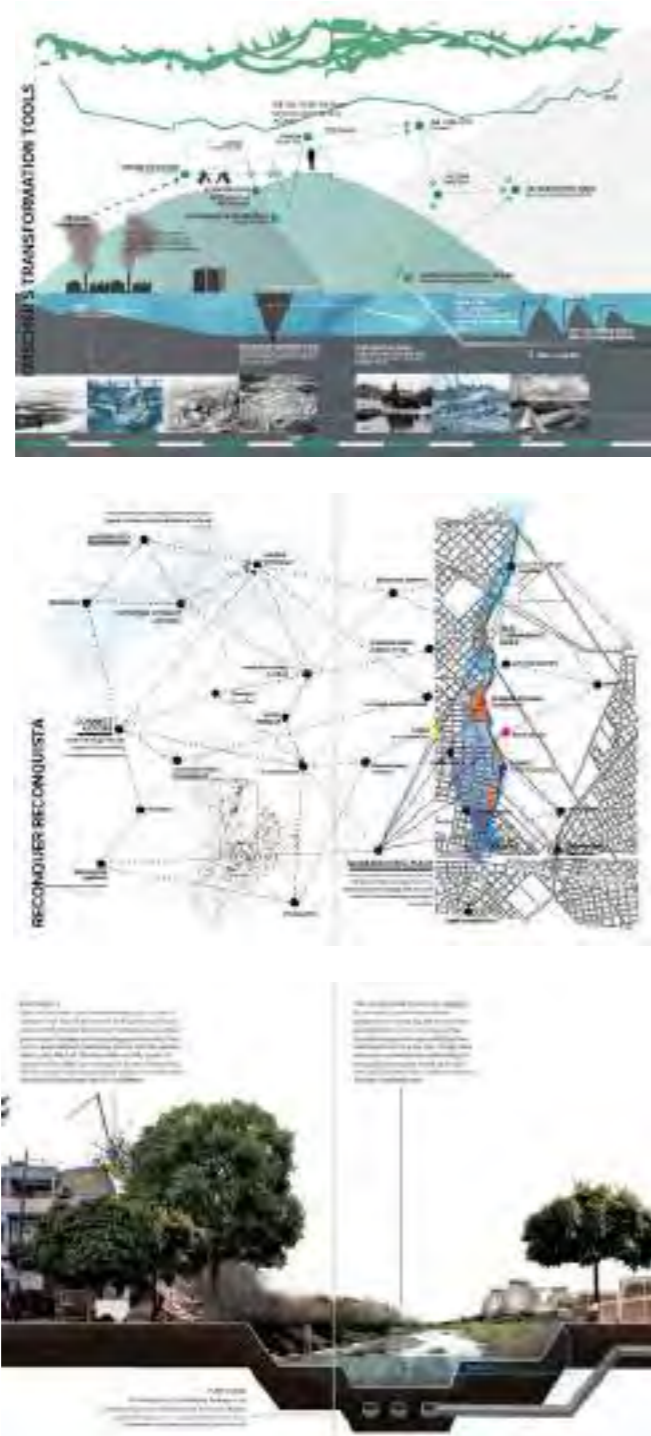
Fig. 3

In the Frihamnen Studio at the University of Buenos Aires, conducted during the pandemic, the Argentinian students worked at distance on the Swedish harbour site of Frihamnen in Gothenburg, supervised and in close contact with the educators of SLU Malmö and their local network. Intertwining their urban design knowledge with Landscape Laboratory ideas, they identified the water as a fluid public space, hosting a series of floating elements which can be displaced and adapt to whichever situations emerge over time.

(drawings: Joaquina Fiorito, Camila Adamo, Bartolome Rimoldi, FADU)

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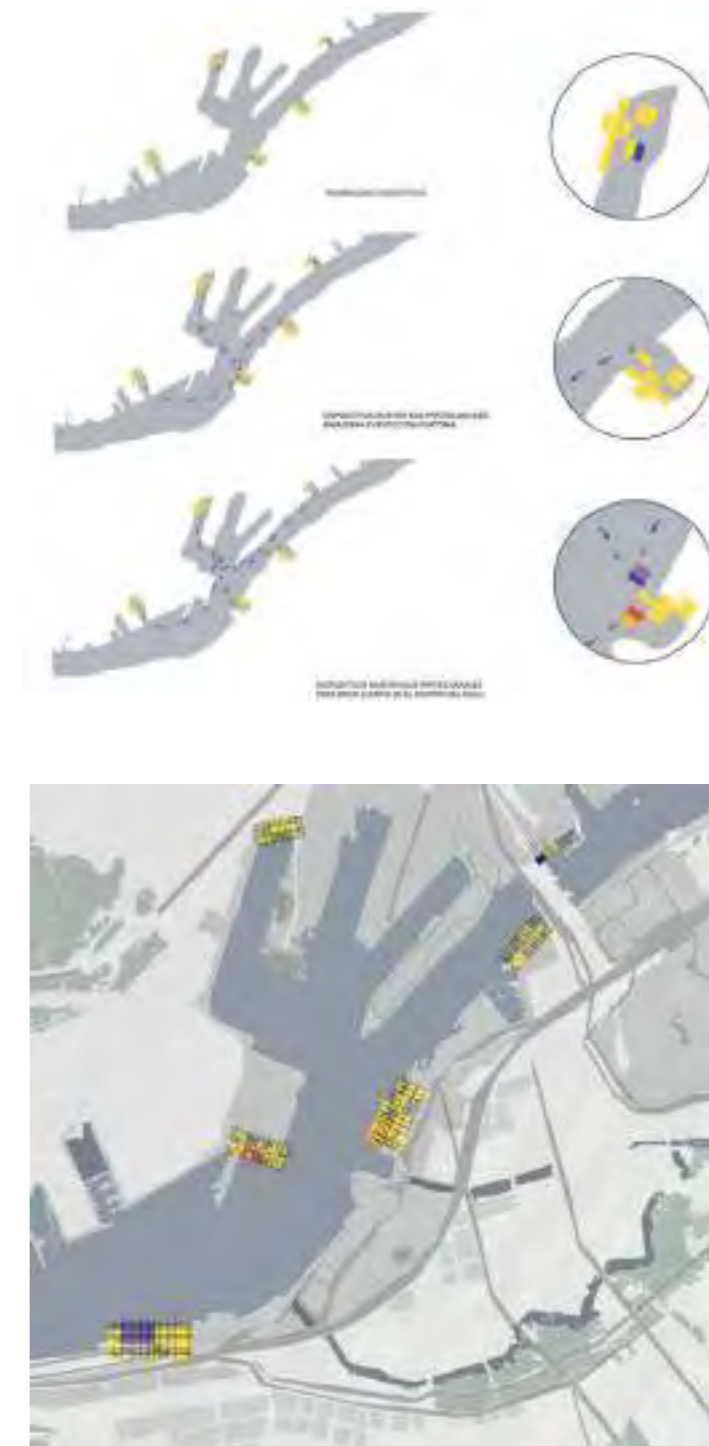
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DIGITAL COMMONS: DECOLONIAL URBANISM IN DATAFIED SOCIETIES

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ABSTRACT:

Looking across the data-infused societies, this paper rethinks how data is being collected, analysed, and integrated into contemporary modes of public and private governance and life. Through a comparative study, the authors interrogate their understanding of what constitutes a 'common' based on different cultural and historical contexts and discuss the challenges in reconciling digital literacy with public purposes across geopolitical landscapes. Paralleling three cultural and historical contexts, this paper is a self-critique on how to design interventions that may reproduce, amplify, or diminish structural violence in respective public systems. In such interrogation, what becomes apparent is the increasing mediation of our day-to-day urban life and the reproduction of conflicting values across physical to digital domains, especially in how data is being extracted and its downstream uses. By questioning how social innovation can be reorganised and developing a literacy around the 'digital', this paper aims at opening a cross-cultural dialogue and pondering on means to inclusive and democratic practises that might show alternatives to a primarily Eurocentric episteme, and how this may be translated into urban spaces.

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In the increased acceleration of datafication across the globe, normative understandings of the "common good", which used to be within the purview and borders of nation-states, have begun to give way to the concept of the "global common good" (Hollenbach, 2002). The question weighs on the means by which a 'common' is conceived, with 'good' as the measure.

Both direct and representative democracy, which employed universal suffrage as its core mechanics to the conceivement of a common good, are deeply rooted in the question of 'Greatest Happiness of the Greatest Number' - a fundamental axiom raised by Jeremy Bentham (1776). Contemporary western democracy is a procedural manifestation of Bentham's utilitarian measure, where a 'common' is the normative ethics conceived through voting as a measure of consensus. By such equations, the idea of 'Greatest Number' may marginalise the 'anomalies' or the outnumbered, forming a zero-sum game between conflicting values, with 'Greatest Happiness' identifying the common good with pleasure. Going back to Bentham's (1776) book, A Fragment on Government, he stated that 'the obligation to minister to general happiness, was an obligation paramount to and inclusive of every other'. In this sense, the structuring of an inclusive common is to take actions that are evaluated by their consequences on human happiness, but inclusive to those who are 'others'. Within an urban setting, the question of 'others' brings to the table the idea of 'citizenship' - those who are eligible to participate and considered a citizen of the community (Rhodes, 2004). In the game of 'general' and 'others', the frontline has migrated from intra-city to inter-nations, and the question is not simply the identification of citizens, but how to understand across diverse cultural landscapes, where a reductionist abstraction would unlikely suffice.

Situating this within today's geopolitics and urgencies in cultural pluralism, it further problematises the synthesis and alignment of interests into a common good, diversifying the 'what' and 'how'. Before answering what can be a 'common', it demands an understanding of how the 'good' is conceived in all forms of culture beyond western epistemology. In the search for answers, we may come across ideas that seem completely 'undemocratic', or even, 'uncivilised' (Said, 1985). In order to prevent us from falling into the same trap of colonialism and design interventions based on a singular understanding of civility, we must try to look through the eyes of the 'others', who inherit from their own histories and traditions - a cultural literacy. Especially in a data-infused global society, such literacy is also one of the digital, as we are constantly bombarded and contested by information of the 'others'.

It is with these ideas in mind that this paper sprung up to explore the entanglement between cultural and digital literacy and decolonial urbanism, and their impacts on the (re)structuring of 'commons'. By zooming out across international contexts, this paper hopes to provoke alternative thinking on local challenges. The authors, who are Ugandan-African-American, Chinese and South American living in London, search through their cultural traditions to critically review the potential of public purpose designs that may reproduce, amplify, or diminish structural violence in respective systems. This paper first attempts to diversify the notion of 'common' with a comparative etymological study of English and Chinese languages. It then searches deeper into datafied urbanism, questioning how data was generated from a Euro-historical perspective and its relationship to urban forms and spatial configurations. Finally, it tries to debunk what (de)colonisation may mean with respect to data representation and argue a 'global common good' that needs to be contextualised and articulated to specific geographies.

1. THE COMMON

The word 'common' is an adjective, hypothetically reconstructed from Proto-Indo-European language, *ko- "together" and *mei- "to change, go, move", "with derivatives referring to the exchange of goods and services within a society as regulated by custom or law"; from Latin, *communis* means "public, shared by all; general, not specific; familiar, not pretentious" (Etymology, n.d.). These roots raise reflections on how the 'common' 1) is not static, but to move or act together; 2) it can also be a verb in its sharing processes - commoning - that leads to a common; 3) with a general connotation of normative and normal. On one hand, it represents the interactions between individuals; on the other, it seems to imply the undermining of individuality into norms. The multifacetedness of its connotation is further amplified by its derivatives - communal, community, communism, and communicate - a common through changes and exchanges.

CHINOIS

Fig. 1. The Constitution of Athens by Aristotle that details the constitution of Classical Athens in four papyrus rolls dating back to 78-c100 and the Brexit agreement from 2018. Image credit: Digitised Manuscripts UK, The Guardian.

'Common' can also be a noun - in 13c. "a fellowship or brotherhood"; in 14c. "people of a community or town, freemen, citizenry;" in 15c. "land held in common" (Etymology, n.d.). Its connotation dates back to the ancient Athenian democracy of citizenry defined by participation and exclusion and procedurally executed through the act of debate and vote (Tridimas, 2011). Those eligible for citizenship are Athenian males over 20 years; freemen, not a slave; with land - a property held together by citizen sovereignty (Thorley, 2005). In the 6th century BC, the advancement of such a city-state constitution shows advancements in civility and democracy, with a citizen size of ~30,000 governing a total population of ~300,000 (approximately the size of contemporary Iceland), it created a sense of involvement with a unified purpose, even though the efficiency of the system was debatable (Thorley, 2005). On the other hand, issues with which the Athenian polity had to deal with are not directly comparable to the complexity of today's context. For instance, the Brexit agreement alone comprises 1246 pages and 67 million UK citizens can hardly fit in one physical

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forum space to debate (EU, 2021). This highlights that the definition and constitution of a 'common' have to be consistently redefined, where voting is one of the many means to an end, and debating - communication, exchanges and literacy are ways to align interests and mitigate conflicting values. In any case, 'there is no continuity in the development of a democratic ideal, and we have to remember that this ideal is not by any means shared by everybody today' (Thorley, 2005).

Fig. 2. (a) The Pnyx in central Athens - one of the most important sites in the creation of Athenian democracy - was where popular assemblies were held and had the capacity to hold 6,000 citizens. (b) The area outside the Palace of Westminster in London, where more than a million gathered on the issue of Brexit. Image credit: Shutterstock, Daily Mail.

Today, the largest population is China, with over 1.4 billion. If a 'common' is the sole aggregate of individualistic values, the scalability of such a distributed system is challenged by an incremental threshold to which it may not hold itself together; much like the limit to a single cell organism within the Earth's energy chain, which challenges the membrane-to-volume ratio that determines how nutrients and other molecular compounds may permeate and exchange between the organism and its larger environment (Lang, 1998). This raises interest in how Chinese culture constitutes a common at scale.
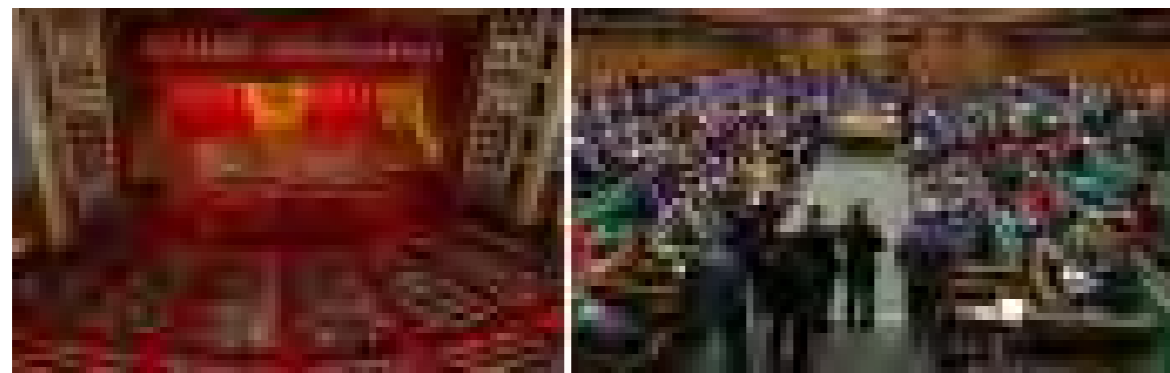

Fig. 3. The National People's Congress of PRC and the Parliament of UK. Image credit: East Asia Forum, House of Commons.

One of the most notable and recent uses of the word 'common' is from a Community (or common body) of Shared Future for Mankind - an idea put forward at the 18th National Congress of the Communist Party of China - it aims at taking into account the reasonable relations of other countries when pursuing national interests, and promoting the common development of all countries in the pursuit of national development, with the spirit that there is only one Earth for all mankind (Zhang, 2018). Here, when the word 'common' is translated into Chinese characters, it adds, yet, another layer of multifacetedness:

共 Gòng common, general, altogether, together, share
公 Gōng male, public, common, fair, metric, general, just honourable, state-owned, duke, public affairs, grandfather, father-in-law, generally, make public
同 Tóng same, with, similar, like, alike, together, lane
通 Tōng pass, through, open, common, coherent, all, logical, whole, through, communicate, connect, notify, lead to, open up, clear out, go to, know, tell, understand, authority, expert
常 Cháng often, frequently, ever, constant, common
平 Píng level, flat, average, peaceful, calm, common, flat, draw, tie, make the same score, put down, suppress
简 Jiǎn simple, simplified, brief, biographical, common
恒 Héng permanent, lasting, usual, common, perseverance

When on its own, each character has no meaning and gives an overwhelming number of meanings at the same time. A Chinese character only develops and reveals its meaning and resolution when joined by other characters. The basic arrangement comes in pairs into a 'word' (but can also be in groups of three or four, sometimes five and seven), and gives more concrete and structured meanings when paired differently, much like how a common develops itself. The following examples show how each character may pair with another to give slightly different and diverse connotations of 'common':

Gòng + Tóng 共同 means common, joint, collaborative.
Gòng + Gōng 公共 means public, common, community
Cháng + Guī 常规 means conventional, common, routine
Cháng + jiàn 常见 commonly seen
Píng + Cháng 平常 ordinary, common, usually, familiarly, mediocre
Xún + Cháng 寻常 ordinary, common, usual
Pǔ + biàn 普遍 universal, general, common, widespread
Pǔ + tōng 普通 ordinary, common, general, average
Tōng + Sú 通俗 popular, common
Jiǎn + dān 简单 simple, uncomplicated, casual, common

Focusing on the etymology of Gòng, which can be traced back to oracle bones during the late Shang Dynasty (1300-1046 BCE), the character developed itself from a hieroglyph of two hands holding a rectangular object to express the double meaning of 'sacrificial practices' and 'common' - a polysemy in ancient times. The 3000-years old 'Book of Poetry: Sacrificial Odes Of Shang' celebrated the 'small common and big common', which holds the double meaning of 'small nations and big nations' and 'small reverent/sacrifice and big reverent/sacrifice); it also mentioned the one (i.e. the emperor), who is the recipient of 'the way', small and big, to become the exemplar of all, and supported all 'as a strong steed [does its burden]' (Legge, n.d.).
The ode was a song sung at sacrificial ceremonies, it discussed the issue of attaching importance to development and auspiciousness, giving thanks to agricultural methods handed down by ancestors. The 'way' denotes the rules or laws of the 'sky' (i.e. world / universe / nature), to which the one learnt not to compete or be impatient, to be neither hard nor soft (or tough / easy in other translations); thus, received the hundred blessings learning from the ways of the larger environment, and gently spread one's teaching and valour across.

《詩·商頌·長髮》：“受小球大球，为下国缀旒。何天之休，不竞不絿，不刚不柔，敷
政优优，百禄是遒。受小共大共，为下国骏厖。何天之龙，敷奏其勇。不震不动，不
戁不竦，百禄是总。”

This ancient ode mapped the relationship between the Shang Dynasty and its adjacent nations, and inspired reflections on practises of exclusivity and inclusivity within today's multi-cultural landscapes. Reading between the lines of small and big commons, the spirit of 'seek sameness reserve differences, big common small differences' is one of the fundamental axioms between 'common' and 'governance' shared across - co-governance.

Fig. 4. Etymology of Gòng, dating back to more than 3000 years ago on oracle bones during Shang Dynasty. The Chinese character is still shared today by China, Japan and Korea, meaning the 'common'. Image credit: Zdic, Chaziwang.

2. INFORMATION COMMUNICATION AND URBAN REVOLUTIONS

The digital revolution, which has been boosted by the development of personal computers, mobile devices, global internet and cross-reality (XR) environments, has been a continuous process since the 1980s (Mystakidis, 2022). Comparable processes can be recognised and analysed throughout history to better understand and speculate on how our way of life may be affected, particularly in the rising complexity of sociality, the evolution of urban fabrics, and their responses to digital stimulation.

Before the invention of the printing press, messages and "information" were transmitted to citizens by hand or verbally; the control over the production and dissemination of knowledge and limited access to written knowledge contributed to and propagated obscurantism (Pérez & Tapio, 2010). While verbal communication connects the majority, writing is the symbolic representation of language as code used to communicate information. Through the medium of dissemination, knowledge was preserved and classified with exclusivity rather than inclusivity - on rolls, sheets, and books that was held as a treasure by a selected few who transcended knowledge and authority through religious means.

Fig. 5. (a) '[...] before the invention of the printing press, books were written, ornamented, and illuminated by hand, with unsurpassed artistry' in the European middle ages (Sears, n.d.). (b) 'In the 11th century movable type was invented […] when movable type reached Europe in the 15th century, it revolutionised the communication of ideas' (Columbia University, n.d.).

The advent of the printing press ushered in Europe's period of revolutions and renaissance, allowing for mass production of text and widespread knowledge - within a century, the number of books had risen from thousands to about nine million (Cartwright, n.d.). From the American Revolution, French Revolution to the Industrial Revolution (1760-1913), these events marked changes to both geopolitical and urban landscapes - from fortified structures organised by rings of importance to an extended machine of life. At the same time, the focus of city design shifted from simply securing enclaves of activities to an open platform with a diverse mix of functions ranging from industries to housing.

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Fig. 7. Alan Turing's Pilot ACE computer, completed in 1950,
one of the world's first digital programmable computers. Image credit: Science Museum UK.
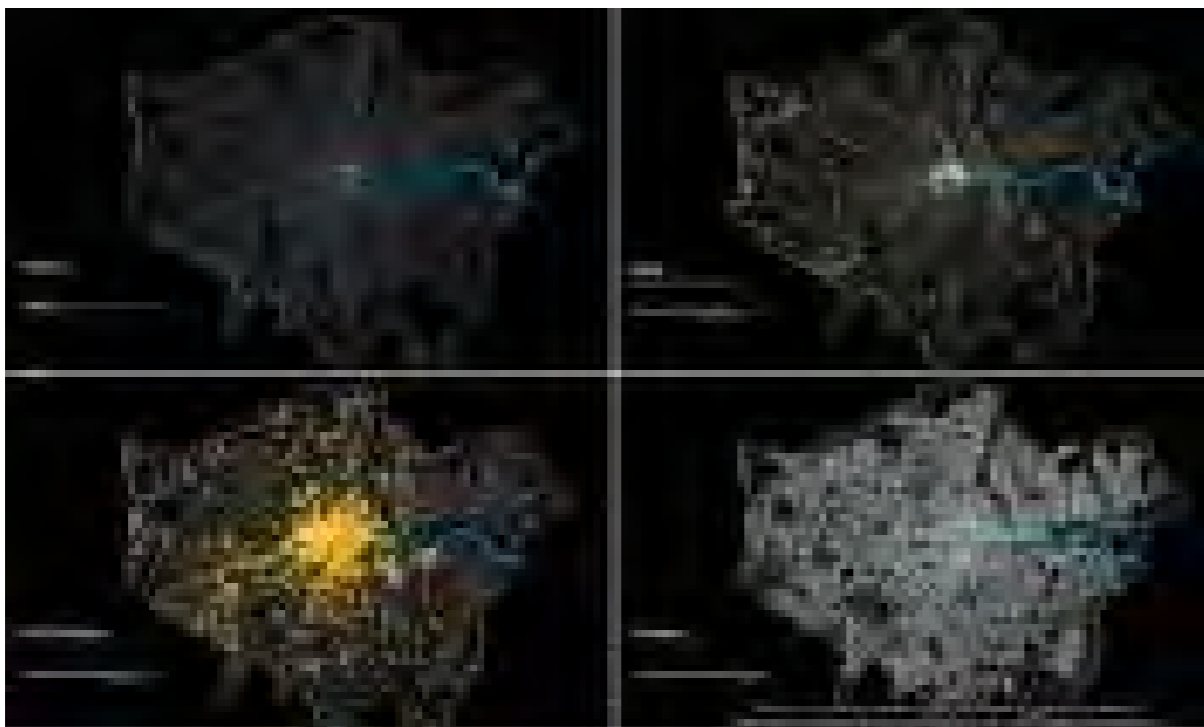
Fig. 6. The evolution of London from Roman times to today - from fortified structures organised by rings
of importance to an extended machine of life, from simply securing enclaves of activities to an open
platform with a diverse mix of functions ranging from industries to housing. Image credit: En-topia.

Alan Turing's (1936) conceptualisation of computation and algorithms marked the start of the Digital Revolution, paving the way from printing to digital content dissemination. Since the introduction of the first desktop computer in the 1960s, the widespread use of PCs in the 1980s, the rise of mobile devices in the 1990s, and the introduction of smartphones, wifi, and the internet in the 2000s, a framework of "free content creation and distribution" has been conceived to virtually every corner of the globe. Cities have undergone a remarkable process of densification, virtualisation, and the flow of varied consenting and conflicting values, conformity and contradictions in less than a century, transforming city design from a simple arrangement of services to the deduction of the ideal form of connection.

Individuals and city dwellers balance isolated living experiences with increasingly competitive and collaborative social structures. Physical commuting is becoming increasingly obsolete in the face of virtual and augmented technology and surroundings (Cipresso, et al., 2001), where we can be teleported from hours to minutes. From both physical and virtual sources, information becomes an environment, calling into question data ownership and the illusion of freedom. Information is "freely" saved in servers and clouds, and behaviours are analysed to deliver the 'best' possible urban organisation and tailored responses to individual needs. From the new North to the new South and across East and West, the free configuration of 'collective intelligence' - the common and the smart - is the new digital frontier of revolution, but also territories of colonisation (MIT, n.d.).
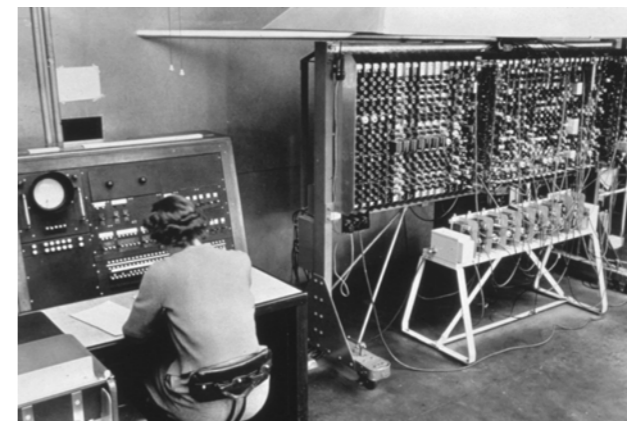
3. DATA COLONIALISM AND DIGITAL FRONTIERISM

The term "data colonialism" refers to the process of appropriating human life through for-profit data extraction and the commodification of human behavioural data. Data colonialism is characterised by emergent data relations, that through data extractionism operationalise data through digital technologies and technosocial systems to transform how people interact with each other and the world (Couldry & Mejias, 2019b; Thatcher et al., 2016). Data colonialism highlights the linkages between global patterns of power and emergent social relations stemming from data. While data colonialism may refer to the literal process of dispossession and extractivism through data, the coloniality of data emphasises the epistemic and symbolic dimensions of that dispossession in relation to knowledge and power (Couldry & Mejias, 2019b; Hong, 2020; Ricaurte, 2019).

Data colonialism explores the linkages of digital capitalism to racialized and gendered forms of coloniality. Conceptually, this concept looks at how the matrix of domination and colonial matrix of power is reconfigured through digitalisation (Couldry & Mejias, 2019a; Hill Collins, 2000; Quijano, 2007). Just as with historical colonialism, colonial powers assumed their domination over colonised people through the reinventions of social orders and control of socioeconomic sources, today, such forms of "colonial-era oppression are being reincarnated through various data practices (i.e., collection, sharing, and analysis of data) and data relations'' (Abebe et al., 2021, p. 329). In the context of data colonialism, the logic of digital frontierism is used to promote data extractivism. The ideological basis for digital frontierism is based on claims of the epistemic superiority of quantified ways of knowing and the digital—also referred to as Dataism (Brooks, 2013; Dijck, 2014; Hong, 2020; Ricaurte, 2019). Thus, digital frontierism is epistemically legitimated through Dataism and its operationalising power consolidation of data giants through the acceleration of datafication of everyday life.

For instance, land and resources of indigenous people were presented as 'free' for the taking by colonial settlers, which was regularly legitimated through discovery doctrines of the Western legal tradition. These doctrines established that lands and their resources could not be owned and discovered by people deemed "uncivilised" or "heathen" and property values tied to land could only be realised through European groups' possession (Park, 2022). Further, the practice was legitimised through claims of European Christiandom's cultural and epistemic superiority.

This legitimation was codified into English and American common law. For example, in *Johnson* v. *M'Intosh*, 21 U.S. (7 Wheat.) 543 (1823), US Supreme Court Chief Justice Marshall in his majority opinion articulated the basis for frontierism in the context of the US (LexisNexis, 2022). He clarified that Europeans' right to take control over territories ruled by non-Europeans was premised

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on the "superior genius" of Europeans. In exchange for providing superior culture, knowledge and Christianization, he justified the European colonial settlers' control over all lands and resources from those deemed 'Others' and 'heathens'. Similarly, the pursuit of digital frontierism today is based on claims of the superiority of techno-solutionism, quantified ways of knowing, and Dataism. Epistemic supremacy is continuously used to justify the acceleration of data extractivism and datafication thus facilitating data colonialism's consolidation of power through the commodification of data relations.

Comparable to the justifications used to legitimate frontierism during historical colonialism, data colonialism justifies its practices due to the claimed epistemic superiority of datafied ways of knowing, Dataism, over other forms of socially produced knowledge. Further, Dataism is being used to justify people being dispossessed of their data through what is known as digital frontierism. Overall, the compelling logic of Dataism rests on the assumption that the pursuit of new data frontiers is in the name of research, essentially expanding human knowledge and accumulating more insights into human behaviour (Dijck, 2014). However, what must be politically interrogated is the extent to which accumulated data intelligence and knowledge will be utilised to serve the global common good. In a sense, the ideology of Dataism tries to disentangle itself from ideas of power by portraying quantified knowledge as objective and value neutral, when in reality it is deeply political.

Digital frontierism refers to the embedding of digital technologies into nearly all areas of human lives as a way of colonising our life-world through data extractivism and the systematic dispossession of people from their data (Thatcher et al., 2016, p. 999). Digital frontierism exacerbates data extractivism and presents data colonialism as an inevitable and progressive process that will bring about techno-utopian futures. Digital frontierism promotes the idea that there should be no cause for immediate concern that data value extractors (e.g., companies, governments, etc.) rather than data producers (i.e., people from whom data is harvested) may acquire property rights and protections for the data they dispossess people of each day in places as varied as one's wrist up to a smart city. They claim to only be engaging in digital frontierism practices for the overall good of society. Illustrating this idea, technological historian Evgeny Morozov (2013, pp. 5–6) linked digital frontierism to 'solutionism' offering the following critique:

> ...solutionism presumes rather than investigates the problems that it is trying to solve, reaching for the answer before the questions have been fully asked. How problems are composed matters every bit as much as how problems are resolved. Solutionism, thus, is not just a fancy way of saying that for someone with a hammer, everything looks like a nail; it's not just another riff on the inapplicability of 'technological fixes; to 'wicked problems' (a subject I address at length in The Net Delusion). . . . It's also that what many solutionists presume to be 'problems' in need of solving are not problems at all; a deeper investigation into the very nature of these "problems" would reveal that the inefficiency, ambiguity, and opacity—whether in politics or everyday life—that the newly empowered geeks and solutionists are rallying against are not in any sense problematic.

Digital technologies that are developed out of institutional needs and arrangements are mediated by social forces; thus, the techno-structures of power surrounding digital technologies must also be contextually examined through political and social relations (Morozov, 2013, p. 170). Examining the rise of Big Data's digital platforms in relation to state politics and geopolitics is pertinent in the context of all countries, especially Global South countries colonised by techno-economic hegemonies, and given states' facilitative role in enabling Big Data's consolidation of power (Morozov, 2022, p. 121). Overall, the concept of data colonialism helps to reveal how the continuities of coloniality are embedded in Dataism and digital frontierism, and can perhaps inspire a generation of decolonial resistance to domination and imagination for more just futures.

4. CONCLUSION

This paper concludes with a new set of provocations in the continuous discussion of the 'digital common', which does not simply anchor on the data subjects, but also the consensus dialogues and horizontal engagement within a global participation process, based on a reciprocal understanding of the 'others' and a fostering of agency through a shared language. Messages and ideas are often lost in translation between languages, not only in the choice of expression but the long history and tradition that each word / character inherits, which are not always shared by all. During comparative cultural analysis, one may easily over-emphasise exclusivity (i.e. differentiation) or inclusivity (i.e. sameness), falling into the traps of orientalism, where certain value judgement is being taken by one as a universal value system, especially when there is a prominent use of a language over another. As languages structure our means of thinking, it simultaneously enables and constrains the ways in which we reason about the world, therefore, monolingual mindsets in knowledge production must be challenged.

Language, as the knowledge inscribed within the most significant treasure of our human species, shapes reality in both positive and negative ways. The danger associated with information management in a worldwide environment is no longer limited to the sole question of data ownership, but also the kind of information received through the utilisation of that data. Thus, information becomes both the key to freedom and dialogues, and a new form of colonialism. A consensus dialogue is not a blind chase of agreement or consent, but ways of inclusivity that are facilitated by horizontal engagement across all cultures. Global participation must be underwritten by mechanisms of feedback and accountability directed at increasing people's capability to meaningfully engage in the digital commons as agents rather than subjects. Finally, the (re)structuring of 'commons' is simultaneously challenged and facilitated by the questions of scale - the small and big commons, the scalability of assemblies, the network and means to communication, and the limit to understanding and appropriation.

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HABITAT PROGRAM AND TRANSITION RESILIENT COMMUNITIES, ACTIONS WITHOUT BORDERS TO PROMOTES RESILIENT COMMUNITIES

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ABSTRACT:

Cities (social-technological-ecological systems) evolve as adaptive self-organized complex systems. Consequently, sustainable development of urban systems is based on their degree of adaptability and transformability to systemic change. These capacities are called resilience thinking and promote navigating through the transition process or creative destruction. We will compare several case studies in the South and North contexts, and how the new methodology Resilient Habitat Program from ASF-Int facilitates local processes of communities' ecological transitions and local capacity building and to present how research and teaching that exemplifies new « North-South » relationships favoring transdisciplinary work and promoting local actions for sustainable development.

KEYWORDS:

resilience thinking, habitat, northsouth , communities , sustainable, transdisciplinarity

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THE HABITAT PROGRAM12 WAS LAUNCHED IN 2021 BY THE ACTION WITHOUT BORDERS GROUP (ARCHITECTURE WITHOUT FRONTIERS INTERNATIONAL, ASF-INT).

This is a collaborative initiative for rethinking communities that uses transdisciplinary tools such as opinion, negotiation, and strategic vision to ensure sustainable transitions based on local capacity building and social innovation, as well as multi-level governance and codesign. This initiative is an updated version of the "Neighborhood Plan" that was implemented between 2010-19 by the UIA Action Without Borders Work Group, ASF-Catalunya & ASF-Andalucía in different neighborhoods and communities across the world such as the Vallcarca neighborhood in Barcelona[3], or Puntales in Cádiz, Spain, the Salsipuedes community in the Dominican Republic, The Bacalan community in Bordeaux, France,the Milagro de Dios community in Ibague, Colombia, and PROFAM community in Arequipa, El Perú. On the African continent it has also been carried out in countries such as Costa de Marfil or the Saharahi refugee camps in Algeria

"The PLAN BARRIO (NEIGHBORHOOD PLAN) is a methodology for analyzing the housing situation of a specific neighborhood or place, proposing the possible process for its improvement. It is an instrument of opinion and negotiation, usable by the various agents involved in neighborhood improvement, especially the citizens"[4]..

The general objective is based on creating local networks that promote sustainable transition processes through three key phases: diagnosis; implementation; and observation and communication.

BACALAN HABITAT PROGRAM CASE STUDY: DIAGNOSIS BY WORKSHOPS

Following the guidelines of the United Nations Sustainable Development Goals (SDG 2030) and specifically objective 11—Resilient and Sustainable Cities—the Habitat Program promotes "Resilient Rethinking" workshops that aim to consolidate a methodology that analyzes and identifies tipping points for urban evolutionary dynamics and at the same time predicts future processes.
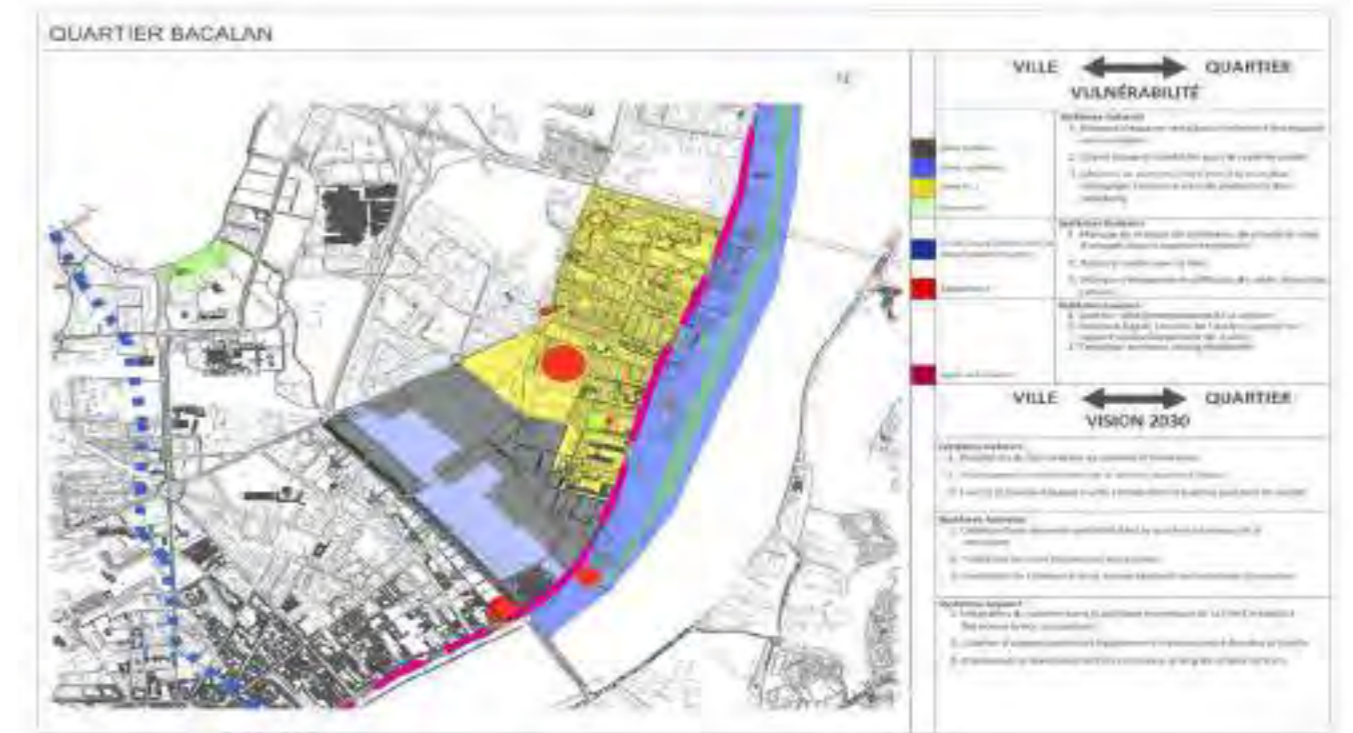
Cities (social-technological-ecological systems) evolve as adaptive self-organized complex systems. Consequently, sustainable development of urban systems is based on their degree of adaptability and transformability to systemic change. These capacities are called resilience thinking and promote navigating through the transition process or creative destruction. We will compare several case studies in the South and North contexts, and how the new methodology Resilient Habitat Program[5] from ASF-Int facilitates local processes of communities' ecological transitions and local capacity building and to present how research and teaching that exemplifies new « North-South » relationships favoring transdisciplinary work and promoting local actions for sustainable development. This diagnostic approach uses sustainability and action research so the participants can learn about urban participatory processes along with the set of tools that resilience rethinking provides in order to analyze how communities respond to global social and economic crises and tensions. The workshop design principles are based on technical documents for the local communities, which allow for the analysis, understanding and creation of a vision that anticipates future systemic changes such as climate change, the urban housing market, social justice issues, and pandemics.

There are three the phases of the workshops:

1. Mapping documents related to the quantitative and qualitative risks analysis and visioning process such the Habitat Program Mapping.
2. Identify resilient thinking indicators for the transition of social, technological, and ecological systems.
3. Apply the resilience thinking approach in terms of adaptive cycle concepts

1   2021 UIA Congress Rio, ASF-Int, Ligia Nunes, Jordi Balari, Rafael Balanzó, Pedro Lorenzo, Habitat Program: From "Plano Barrio" to "Programa Habitat"
2   Balanzó, R. et al. "We all make up the city. The city reflect us". Union of International Architects, UIA 2017 Seoul Congress. http://www.uia2017seoul.org/P/papers/Full_paper/Paper/Oral/PS3-42/O-0530.pdf

3   Balanzó, R. & Nunes, L. (2018) "Plano de Acção de Metodologia de Diagnóstico de Resiliência Urbana: O caso de estudo do Bairro de Vallcarca." PNUM2018 Congress: A Produção do Território: Formas, Processos, Desígnios. Porto, Portugal. https://pnum.arq.up.pt/wp-content/uploads/docs/PNUM2018_LI-VRO_DE_RESUMOS_v1.0.pdf
4   Lorenzo Gálligo, P.; López Mena, G. Procesos de gestión social para la mejora barrial: la experiencia de la metodología PLAN BARRIO. "QRU: Quaderns de Recerca en Urbanisme", 2020, núm. 10, p. 156-187

5   Balanzó, R. y Espinosa, M., (2021) UIA Congress Rio, Habitat Resilient Thinking Design Program (pH Resiliente): Milagro de Dios,informal city case study, Ibague, Colombia.
Documentary: https://youtu.be/3tLhKTsfu9g
Webpage: http://localprojectchallenge.org/actions-against-displacement-and-austerity/
https://www.acsa-arch.org/proceedings/International%20Proceedings/ACSA.Intl.2021/ACSA.Intl.2021.118.pdf

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The different workshops that were carried out made it possible to diagnose the weaknesses and advance proposals that can add value to the city and safeguard its memory by establishing a new balance between the neighborhood and the city. For example, in the Bacalan Community in Bordeaux, the participatory vision process promotes building skills for the community such as a Garage Moderne community-based leadership program and the establishment of a union, which empowers the people to dialogue with the local government about food transition vision, and as related to local neighbors' displacements due to gentrification.

1.

HABITAT PROGRAM IMPLEMENTATION BY COMMUNITY SELF-MANAGEMENT

The Habitat Program focuses on exploring how communities rethink spaces and rebuild themselves through resilient urban initiatives. The implementation phase promotes the transformation of vacant lots, buildings, and urban spaces through creative actions and serve as a catalyst to explore new methodologies and new roles for networks that contribute to the development of neighborhoods. The Bacalan workshop was instrumental in contributing new visions for a food transition urban renewal that included the reuse of the abandoned building and the public space surrounding it, the maintenance of the community garden, and the creation of a land trust housing cooperative that dealt with neighborhood areas that could be transformed into useful green areas as well as entrepreneurial and housing programs.

OBSERVATION AND COMMUNICATION

The conclusions drawn from each case study—the experiences and actions combined with the analysis of other cases or realities—embody an increasingly structured knowledge base, which can be disseminated in diverse ways such as community activities, publications, exhibitions, symposiums, and continuing education courses. The fundamental objectives are to contextualize the mechanisms of community development; present theoretical, political, and technical concepts that can improve living conditions; as well as exchange knowledge through case studies and collaborative actions with communities in different parts of the world.

The Bacalan experience is a good example of this. Developed within the Postmaster Rebuilding the world, developed in the School of Architecture, of the National School of Architecture and Landscape of Bordeaux. A Peruvian student of the post master, in 2020-2021 course, had the initiative to start a process of improvement of one of the urban settlements that are being developed in the city of Arequipa, Peru. Settlements that were the object of his investigation within the Post-master itself. With the help of the group ASF-Andalucia, where he did his post-master internship, he identified and formulated a project to carry out the Barrio Plan in the PROFAM sector of Arequipa, financed by the University of Seville. This was successfully carried out during August 2021 realized with the help of the local collective Ciudades, which includes urban planners from the University of Arequipa, and the participation of students from this who also participated as volunteers. The experience, in addition to making the methodology known in the area, has managed to start a process to improve this sector, which can serve as a model for other communities in the same situation.

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This sector of study is within the area known as Cono Norte. This had its origin, growth and later consolidation because it is the access road that connects the city of communicates the city of Arequipa with the traditional town of Yura and the cities of the south of the country such as Puno and Cusco, the latter being affected by terrorism in the 90s. migrating a large part of its rural population to safer cities. Their economic means did not allow them to buy or rent housing, so they formed groups for the same interest and settled in squatter settlements near the Arequipa-Yura road. Arequipa- Yura road on the northern outskirts of the city.

The difficult economic situation of the inhabitants, most of whom live on casual labour, was aggravated by the pandemic caused by COVID19. This situation was partly solved thanks to the solidarity between neighbours, supported by the local administration, which allowed them to create the community pots programme.

The workshop had the following results:
- Preliminary study of the neighbourhood from different aspects, environmental, social and economic or communication and accessibility with the city.
- Updated maps of the area and its surroundings
- The "Plan Barrio" for the PROFAM sector in Yura

The plan highlighted the shortcomings that the sector currently has in terms of communication with the city and accessibility, and primary health care or school places. Due to the dynamics that in this part of the Atacana desert is generating environmental problems caused by urban growth, the problems generated in this situation related to food security were indicated in the plan, and a series of strategic projects were indicated to correct these problems.

The workshop and the results obtained were selected as experiences of good urban practices in the fourth forum "Ciudades como Vamos" in Lima, where the experience and the results obtained were presented. Currently, thanks to the Ciudades collective, funding has been obtained from the University of Arequipa to start the improvement process.

CONCLUSION
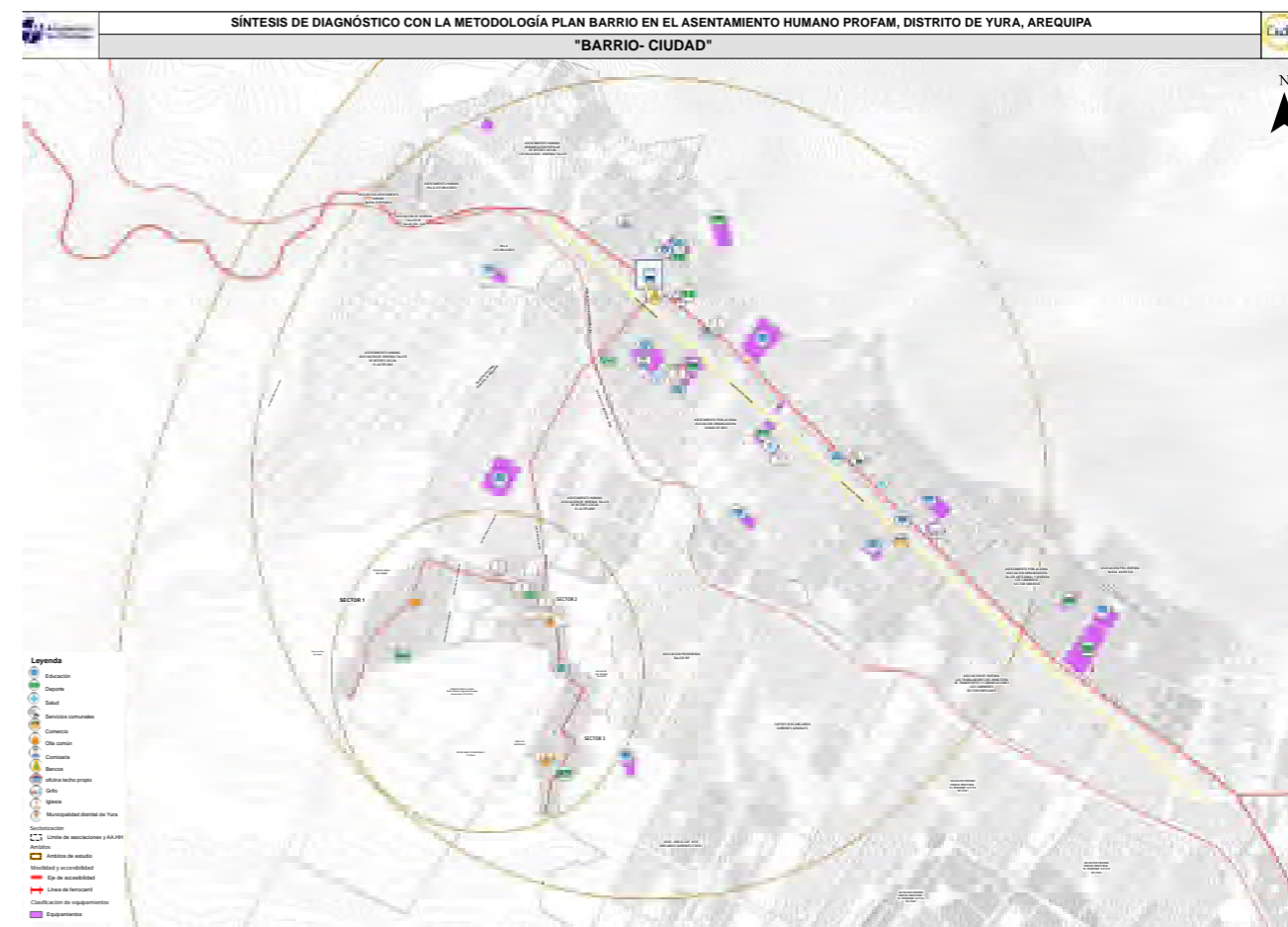
The experience of carrying out a practical workshop with the Plan Barrio and Plan Habitat methodology within the programming of a master's or post-master course, as in the case of Bacalan within the RBW post-master, in addition to contributing to the training and the knowledge of urban planners in terms of sustainable development and providing them with practical tools, can contribute directly to starting development processes in the communities where they work. Putting into practice the methodology of learning by doing

Video: https://www.youtube.com/watch?v=98x5hTbBVM4

"Habitat Program" (ASF-int)
Actions Without Borders (AWB) to promote Resilient Communities.

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MAKING WATER CULTURES GLOBALLY MOBILE: HOW KNOWLEDGE TRAVELS BETWEEN THE NETHERLANDS AND INDIA THROUGH WATER SENSITIVE URBAN DESIGN

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ABSTRACT:

The Netherlands has initiated a process of 'policy boosterism' that attempts to make Dutch urban water culture and its associated imaginary of water sensitivity fit for global export. This strategic shift depends on the collaboration of a mosaic of actors, private and non-private to promote knowledge sharing between countries. As this new dynamic emerges, urban design becomes strategic to create future visions for cities towards more sustainable relationships with water. One such vision stems from Water Sensitive Urban Design, an approach that borrows from ecological urbanism with the objective to restore water ecologies in cities. This article looks at how urban design knowledge from the Netherlands provides concepts to describe, evaluate and promote urban water as an enabler of sustainability globally. It also investigates how networks of actors from the Netherlands interact to make imaginations about Water Sensitive Cities globally mobile. This entails the packaging of a mobile water culture that, ultimately, can re-shape power relations. Considering that cities rely on privileged accesses to global networks to disseminate ideas, port cities are potential sites for 'policy boosterism'. The port city of Rotterdam, for instance, is the model city in the concerted effort to promote Dutch urban water expertise (Goh, 2020) and, in the context of Indo-Dutch partnerships, a port city was chosen for an urban design initiative: Water as Leverage in Chennai. The project acts as mechanisms through which imaginations of urban water is packaged from the Netherlands for global export. Interestingly, the principal way in which this translation happens is through the creation of an imaginary/vision/framework of water sensitivity that is appealing and meets broad societal goals. In this context, design becomes a powerful tool through which these broad visions are made 'fit for purpose' and influence – or not – local ideas of urban landscapes.

KEYWORDS:
Policy Translation, Water Sensitive Urban Design, The Netherlands, India.

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Water has played an important – if not central – role to guide where cities are located, how they develop, and the quality of living of their settlers. Under a complex relationship, cities rely on the continual availability of water to develop but are also threatened by the devastating consequences of too much water. To lay the foundation for modern urban living, a technocentric paradigm has been adopted throughout western capitalist societies to manage water and divert its natural flows through a combined set of hard infrastructures. Recently, however, the call for more sensitive and sustainable alternatives has gained force. The main assumption of these propositions surrounds issues of water management that consider the technologies of today's cities to be modelled on large centralized potable supply systems that offer little flexibility for urban communities to meet sustainable development goals and cope with future conditions such as extreme weather events and climate uncertainty (Brown, 2012). Recognizing that water infrastructures shape how cities develop and function, Water Sensitive Urban Design presents itself as potentially assisting cities to achieve a more sustainable transition. This ambitious design approach relies on conceptualizing urban water environments and communities through an imaginary that reconciliates water with urban culture and identity.

As the knowledge field of WSUD attempts to create an international support base to guide infrastructure investments in cities facing the water problems of the 21st century, The Netherlands enters the discussion with a powerful discourse. Given that the Dutch history is inextricably linked with water, the country has gained international reputation in the water sector. To promote its knowledge globally, conferences, trade missions and partnerships connect the country to different urban centers around the World. Internationally, Dutch companies are involved in approximately 10 percent of the world's drinking water supply, own about 40 percent of the hydraulic engineering market (NWP, 2020) and, in 2019 alone, the export value of its water sector was EUR 8.1 billion (WEX, 2020). The increasing relevance of water systems in city planning and architecture has brought an opportunity to boost even further the Dutch water sector by kicking off the transfer of water sensitive urban design initiatives globally.

Considering the recent upsurge of academic interest in travelling urban knowledge, this paper investigates the packaging of a policy idea from the Netherlands through a design competition. By combining conceptualizations from two sets of literature, policy mobility and policy translation, we look at how Dutch water cultures are made globally mobile through the creation of a water sensitive design initiative. Our focus is guided towards a project in India - Water as Leverage in Chennai – to analyze the role of design competitions in the formation of a new assemblage of Global-urban policy transfer for the urban water sector. According to Bell, "the future form of urban relationships to water is now open for renegotiation" and, according to the standing point of this article, this requires the support of analyses of how actors engage in the negotiation process at different scales. Critically assessing what and whose visions are being promoted or not by the WSUD approach while questioning whose voice, authority and expertise counts in this process are urgent.

State of the art

Conventional policy transfer literature has had the tendency to conceptualize knowledge travel as a rational transfer disconnected from the power relations that involve mobility and translation of ideas (McFarlane, 2011). In a different direction, in the context of water related policies from the Nether-

lands, authors have mobilized the lens of policy translation to study the Dutch Delta Approach - DDA (Minkman & van Buuren, 2019 ; Hasan et al., 2020; Laeni et al., 2021; Quee, 2021; Richter, 2020). This literature stems from a social constructivist view that reveals the centrality of transfer agents in re-modeling local policies to make them into a product for global export. These studies show that the DDA has been mobilized as a branding strategy (Minkman & Buuren, 2019) and made generic enough for export (Zegwaard et al., 2019). Existing problems of the DDA, according to translation literature, include the fact that most processes are developed and strategically promoted by Dutch water experts and policy officials whilst generating a lack of local ownership and challenging indigenization of the policy (Laeni et al., 2021). Authors, therefore, suggest that this approach needs to be re-conceptualized in more symmetrical and less hierarchical ways (Hasan et al., 2020). When applied to the analysis of coastal management policies and climate change adaptation, authors argue that translated Dutch policies may work as a key resource for local actors. The argument is that these policies serve as support to reinforce and/or change domestic discourses while creating momentum for action (Kang et al., 2022; Weger, 2019).

Another parallel set of literature coming mainly from critical geography deals with the travel of ideas with a focus on processes in which global ideas are localized. This approach is referred to as policy mobility and has been used to show the contradictory and messy ways that the localization of the DDA happens (Colven, 2020) and the roles of different actors in this process (Maas, 2019). While the policy translation and policy mobility approaches seem to agree on a focus to the relationships and agencies of key actors in the process of making a policy travel, they hold important distinctions. Policy translation, for instance, makes a much more explicit argument that the attributes of a policy play little, if any, role in how likely it is to travel (Mukhtarov, 2014). A separate set of literature focuses much more on the structural aspects of the process. For instance, authors have argued that there are structural impasses when transferring the DDA due to what Stead et al. (2008) called an unequal partnership between the Netherlands and the receiving countries (Minkman et al., 2019). Other research on the policy transfer of Dutch design approaches to urban water have shown that the preconditions of the receiver city strongly dictate the success or failure of the transfer (Yulia & Arlianda, 2020). Clearly, these approaches to policy transfer suggest a linear process as opposed to policy mobility and translation.

A growing number of literature deals with the travel of ideas from The Netherlands to other contexts, especially in what regards ideas about water. Authors are mainly interested in questions pertaining what travels and how this process unfolds. Given that the Dutch have recently embarked on a concerted effort to promote its urban water expertise, this paper focuses its analysis on how policies travel from the Netherlands through design initiatives. The phase of preparing a policy model such as the Dutch Delta Approach for global export seems to have brought significant insight but it does not touch upon the specific characteristics of how coalitions are formed through urban design initiatives. Therefore, we attempt to advance the understanding of how this field provides an imaginary of water sensitivity that entails concepts to describe, evaluate and promote urban water as an enabler of sustainability. In this process, we investigate how global-urban networks are formed through urban design initiatives while attempting to influence how cities respond to problems of water. By interweaving and not opposing the key learnings from political economy and poststructuralist readings of policy mobility and policy translation, we investigate how actors engage in a packaging of a mobile urban water culture from the Netherlands to other urban centers in the World.

Methods

The development of this paper has taken a descriptive case study strategy for its investigation as it asks "how" questions with a focus on contemporary events and does not have or has little control

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over the actual behavior of the events it studies (Yin, 2003). Furthermore, a pragmatic approach has been adopted in the way this research was conducted as it is unavoidably influenced by the personal worldview (values and political positioning) of the authors (Morgan, 2007). Drawing from a qualitative methods design, the methods of document analysis and participant observation were selected, combined, and triangulated seeking to answer the research question. This selection was made according to the extent to which the methods best supported answering the research questions (Flyvbjerg, 2006). Document analysis was used as a process of reviewing and evaluating documents in which the analytic procedure entails finding, selecting, appraising (making sense of), and synthesizing data contained in documents (Bowen, 2009). Documents included articles from media resources to provide a background and context to the processes we investigated while supporting us to track changes and developments that happened in between. Other documents retrieved from the internet such as policy documents and website statements have also supplemented our findings. Participant observation is a special mode of observation in which the researcher is not merely a passive observer but may participate in the events being studied with the privilege to perceive reality from the viewpoint of someone "inside" the case study (Yin, 2003). Participant observation is a relatively unstructured method and an inherently interactive experience (Guest et al., 2013) which will be used in two moments of this research to document my interpretation of the observed phenomena. This method served to portrayal how the social dynamics of policy sharing exercises looks like. This data was retrieved using a personal diary in which the first author narrated her observations and experience as a participant in Water as Leverage.

Case study description

With a seventh of the country's population living in coastal districts and four of its 10 most populated cities being on or near the coast, India's urban history is strongly connected to the seaside. Among the cities lying in India's southern coast, Chennai and Kozhikode represent two distinguished urban centers of opposite magnitudes and geographical position (See Map 1). Chennai has a population of over 8 million that spreads from India's coastal belt at East, while Kozhikode houses a population of 2 million in the country's coastal counterpart to the West. As the fourth-most populous urban agglomeration in India (Indian Census, 2011) and the country's fifth-largest urban economy, Chennai has exerted significant influence in the construction of national urban imaginaries. The city is currently the focus of a Dutch-India water policy exchange initiative funded by the Dutch Government and takes a design orientation to solve problems related to climate and water. The design competition called Water as Leverage (WaL) has been in place since 2018 and selected multi-sectoral proposals to tackle the complex water problems of three cities in Asia, namely Chennai (India), Khulna (Bangladesh) and Semarang (Indonesia). For each city, two multidisciplinary teams were selected and challenged to further develop proposals that would later be connected to external funding opportunities for implementation. In the case of Chennai, the focus city of this study, each of the two groups selected developed a different proposal: *City of 1,000 Tanks* and *Rise Chennai*. The process involved local workshops with stakeholders, regional workshops in Singapore with an advisory board and, finally, the resulting designs offer promising solutions that are currently being analyzed by funding agencies such as the AIIB and the FMO.

Results

The results presented here depict the role of Water as Leverage as a Dutch urban design competition in how Asian cities, particularly Chennai in India, are reassembled through a 'water sensitive' policy lens. We begin with a section that narrates how the process of mobilizing Dutch water sensitive urban design begins through an initiative of policy boosterism driven by a change in the country's development agenda. Following that, the next section makes use of how the Water as Leverage

program has been organized to depict how actors engage to translate Dutch urban water policy ideas to the Indian context. Lastly, we present the backlash of creating such an elite global epistemic community to guide a cultural change for urban water India along with an opportunity for future learning.

Boosting policy: mobilizing Dutch water sensitive urban design

In the past, knowledge sharing exercises about water was part of Dutch development aid. In that case, public institutions from the Netherlands took a funding and financing role to support less developed countries to improve living conditions. Since 2008, however, budget cuts from development assistance meant that The Netherlands had to scale down its development aid relationship with several countries. Therefore, the policy answer since then has been to shift towards more intensive trade relations in international collaboration. The replacement of "aid" principles to those of "trade" in the country's development agenda has turned international cooperation into a tool to promote Dutch commercial interests. This has resulted in a new strategy for international partnerships in the water sector: boosting the export of Dutch water expertise. In 2019, the Dutch International Water Ambition - NIWA was submitted to the House of Representatives with a dual role: to contribute to water security and safety worldwide while increasing the Dutch earning capacity, the country's potential for profit. Central to this strategic shift is the promotion of the Netherlands as a Centre of Excellence, one of the three pillars of the NIWA's strategy. In this article we introduce a way in which this is done: through boosting the Dutch water sensitive urban design approach through international design competitions.

Given the high global awareness of problems related to water, presenting the experience of The Netherlands as a successful example emerged as a clever strategy. To supply the international demand, a packaged Dutch approach holds promise to generate business opportunities through collaborations of water expertise. In this emerging scenario, the water sector becomes increasingly central for Dutch entrepreneurial activity and economic diplomacy. In 2015, a new diplomatic position was created: the Special Envoy for International Water Affairs. Through this role, the flood expert Henk Ovink boosts the international market position of Dutch water expertise under the assumption that what has worked in The Netherlands can be useful elsewhere. The Water Ambassador has worked as a senior advisor to the Obama administration after Hurricane Sandy and developed the design competitions Rebuild by Design in New York City and Resilient by Design in San Francisco. The figure of this diplomat is central to initiate a process of *policy boosterism* through the assembling of people and ideas that form a Dutch water culture and its associated imaginary of water sensitivity that is fit for export.

Modeled on the previous experience of Mr.Ovink in the US, the project Water as Leverage was launched in 2018. The WaL initiative follows the tradition of proactive integral design strategies for water management present in The Netherlands' Delta Programme (Nillesen et al., 2020). The storyline of WaL in Chennai was that water is a global challenge with local opportunities. In the words of Mr.Ovink himself, *"Worldwide, water is the connecting challenge, the number one global risk and an opportunity for transformative and sustainable impact and comprehensive cultural change".* In what regards cultural changes, the 'WaL way of working' wishes to offer a design strategy for water management with a special emphasis on bankability. Therefore, cultural change in the terms of WaL refers to how it forms an enabling environment in which innovative solutions can land (Watergezant, 2021). In the next section we show, guided by the policy translation literature (e.g. Mukhtarov, 2014), how actors engaged via the design competition in morphing and transforming ideas coming from The Netherlands to promote this cultural change in the Indian urban context.

Water as Leverage

Funder/Executer	Ministry of Foreign Affairs / The Netherlands Enterprise & Development Agency (RVO)
Cities	Chennai, Khulna and Semarang
Coordination	Henk Ovink
Consortium	Chennai Team 1: Deltares, IGCS, IIT Madras, Care Earth Trust, CUDi (Center for Urban Design Innovation, Karlsruhe Institute for Technology, Waggonner & Ball, Benthem Crouwel Architects, Arcadis and VanderSat. Chennai Team 2: OOZE VOF, Madras Terrace, Goethe Institut, Ramakrishnan Venkatesh, Vanessa Peter, IHE Delft, Rain Centre, Care Earth Trust, Paper Man, Pitchandikulam, IIT Madras, TU Delft, HKV.
Role	Design competition
Objective	Stimulate the creation of innovative urban resilience concepts in Asia Build strategic partnerships through result-driven collaboration
Approach	Resilient by Design
Output	Conceptual designs that can be translated into bankable project proposals

The translation: engaging actors in the travels of knowledge

Guided by the Special Envoy and funded by the RVO, the idea behind the project financing is that "it takes millions to invest billions wisely". Therefore, the project invests these catalytic millions with the aim of developing conceptual designs that will leverage water towards urban climate resilience. The assumption in the creation of WaL is that the generation and finance of innovative urban resilience concepts are hindered by a series of gaps existing in the early stages of project cycles. These include the lack of strategic spatial and financial planning, insufficient involvement of stakeholders early in project cycles and lack of capacity of the policy environment to support the design, implementation, and operation of the proposed solutions (WaL,). To overcome this, WaL prides itself on innovation by establishing active engagement of a mosaic of actors from the day one of projects and promoting lasting coalitions between global and local partners. Objectively, the goal of WaL was to generate bankable and scalable solutions to water problems that could be replicated in other cities and regions through an interdisciplinary design process led by public-private partnerships.

In a very schematic way, the transfer of the proposed design approach to water problems works as follows: the Dutch government through the RVO selects and funds two design teams per city, which will then formulate a design proposition supported by a workshop-based process. The charismatic personality of Henk Ovink and his role as a networked expert is central to build coalitions that conceive and justify the need for a Dutch approach to Global water problems. Acting as a knowledge broker through WaL, Ovink's role is to raise awareness about Chennai's water problems while introducing a translated Dutch approach to the local audience. To enable the translation, the design competition has served as a platform through which multi-disciplinary teams made the portfolio of Dutch businesses look and feel more Indian. In this process, the partnerships of Dutch businesses and research institutes with local professionals in the consortium teams was central. Each of the selected teams was composed partly by professionals affiliated to Dutch institutions and companies and partly affiliated in India. An important exception, however, included the New Orleans based Architecture business Waggonner & Ball that owned experience with building the Dutch Dialogues initiative in the United States and was, therefore, an important asset.

The collaboration of the design teams with local stakeholders was built through a series of three workshops that counted on the experience and reputation of UN-Habitat to hold participatory processes. To include a community perspective in these workshops, the project counted on the partic-

ipation of the Partners for Resilience group which consisted of Wetlands International South Asia, Indian Red Cross (Tamil Nadu) and Red Cross Crescent Climate Centre. Two regional workshops to share the results with an international review board and potential financiers (NWO, 2020). To bridge innovative urban design ideas to the interest of potential funders, WaL counted on close collaboration with the development community by incorporating their feedback and reviews early into the preparation of the pilot proposals. Ultimately, the creation of this platform for actors to engage and share their associated imaginaries of water sensitivity has generated global-urban routes through which knowledge, capital and influence may flow. In the next section we present the possible backlash of creating such an elite epistemic community to guide the future cultural changes surrounding issues of urban water.

The backlash: the problem of a globally mobile water culture

The travel of knowledge in the case of WaL has been mobilized through a set of actors and their associated institutions and technologies that give form to the informational infrastructure of a globally mobile design approach to urban water. In this process of formation, the characterization of Indian cities as vulnerable to climate change and water impacts point to a particular way of seeing urban water premised on a certain notion of the water sensitive city. In this view, urban water involves a manageable resource and considers landscape architecture to play a crucial role in a broader context of conceiving and visualizing possible improvements. Suggesting a policy learning approach in which the water policies from The Netherlands can be used as an example to improve performances elsewhere, there is a danger to the approach initiated by WaL. If the epistemic confidence of the Dutch approach to water remains unquestioned, its operationalization may bring significant limitations in the enabling of a cultural change in the field of urban water. By delimiting the scope of debate in the global-urban networks it creates, the translation exercises of the Dutch approach through design competitions may potentially obscure local contingencies and marginalize a range of alternatives.

The Room for the River[1] scheme from the Netherlands, for instance, has entered a phase of "international spinoff". For densely populated delta regions of the globe, this imaginary of resilience offers pathways to adapt to river overflows such as the creation of park areas and new building typologies for controlled flooding (Smith, 2011). On the other hand, it disguises the activities of displacement and relocation that the model inherently requires which may translate to mass evictions of poor families in countries of the Global South (Yarina, 2018). In a similar vein, the designs that have resulted from WaL are bound to guide specific interventions in the future and, therefore, producing winners and losers. In this process, the knowledge it creates can play a central role in articulating what acceptable relationships with water in Chennai are and can be, and for which and whose values. Therefore, breaking the boundaries of the elite epistemic community responsible for the formulation of these visions is necessary to achieve more equitable imaginations of water sensitive cities. If the globally mobile water culture that WaL is proposing is not tied to commitments with justice, it is likely that it ends up resonating with the values of the already privileged and most vocal sections of Indian society.

To overcome the tendency for urban water policies to travel via the routes of an elite epistemic community that is not sufficiently sensitive to contingencies, the role of global expertise in promoting a change in local water cultures must be reframed. While the Dutch approach to WSUD provides significant knowledge about urban water systems, the multiple paths of development traced by cities

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1   The Room for the River is a Dutch government design plan that aims to address flood protection by creating more room for rivers in the Netherlands, allowing surrounding areas or rivers to be inundated during periods of high water levels.

in the Global South indicate a complication to general approaches to issues of urbanization. While this points to a challenge to the actors engaging in the WaL project, it also represents an opportunity for experts if they are not only wishing to apply their expertise but also willing to learn. For instance, the experience of those already attempting to enact cultural change from the grassroots level can bring significant insights on alternative routes towards a water sensitive scenario. The potential difficulty to the application of this idea, on the other hand, is that is does not meet the National policy goal discussed in the beginning of this piece – that of bringing profits back to the Netherlands. In that case, actors might feel tied to trace a particular route that stops them from engaging in such partnerships.

Conclusions

The aim of this study was to understand the role of Dutch design competitions in how Indian cities are reassembled through a 'water sensitive' policy lens. We have shown that the strategic shift from 'aid' to 'trade' in the development agenda of The Netherlands has called directly at the Dutch water sector due the increasing international market opportunities. This emerging shift brings the private sector to engage in activities that were previously confined to the role of the development sector forming new coalitions and alliances. In this scenario, the promotion of knowledge sharing between countries is not a responsibility of State institutions alone but rather depends on the collaboration of a mosaic of actors, private and non-private. What seems to be a fuzzy coalition is the formation of a new assemblage that translates water sensitive policy ideas originated from the Dutch context to meet demands globally while also benefitting Dutch businesses. The principal way in which this translation happens is through the creation of an imaginary of water sensitivity that is appealing and meets broad societal goals. To achieve this, design competitions such as Water as Leverage play an important role in reassembling Indian cities as water sensitive. In this context, actors engage in the formation of an epistemic community to envision water sensitivity for the Indian urban context. Despite the success in terms of building a global-urban network to guide cultural change towards water sensitivity, the creation of an elite epistemic community through which knowledge, capital and influence may flow has its dangers in terms of equitability. In this context, it is likely that the future trajectory of transfer of urban water policies based on the argument to rethink the approach that has solved many of nineteenth century urban problems becomes far from smooth and unproblematic (White, 2016). For instance, the assumption that the inflexibility of existing technological and design components is accountable for impeding a transition to a sustainable scenario is still questioned. Moreover, the translation of the Dutch approach to contexts of the Global South encounters significant challenges. Nevertheless, exercises of policy mobility in the context India-Dutch collaborations for urban water may bring significant opportunities for learning if coalitions break the boundaries of elite epistemic communities.

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HYDROPOWER AT THE FRONTIER OF URBANISATION: MEDIATING COSMOVISIONS AND THE CLIMATE CRISIS IN THE BRAZILIAN AMAZON.

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ABSTRACT:

The Belo Monte Hydroelectric Dam on the Lower Xingu River has severely affected the river's water pulse and threatens a multitude of endemic species and indigenous nations. A great number of dams are expected to be constructed in the years to come in the Amazon river basin which will bring further devastation. Historically, Indigenous and local populations have always opposed such endeavours and the preservation of biodiversity and forests within their territories is crucial to decelerate and revert climate change effects. Indigenous nations steward and protect over 80% of the world's biodiversity even though they are only 5% of the world's population. Despite this, defence of indigenous rights and land demarcation has been slow. Moreover, recommendations to expand hydropower generation have gained traction to enable the energy transition, as seen in last year's Glasgow COP26.

This proposal exposes the impact of Belo Monte dam on human and non-human existences and proposes an analytical framework which envisions the territory through a multitude of perspectives as well as various management arrangements. This framework intends to propose methods which can facilitate shared occupation and enable the coexistence of diverse groups in the region through policy and design.

The limits of urban practice when acting over such territories must be questioned and re-defined. If our field intends to position itself within such regions, we must begin to propose an alternative paradigm which can adequately territorialize cosmopolitics. Is *Cosmourbanism* achievable?

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1. INTRODUCTION

Hydropower Infrastructure is a fundamental artefact to comprehend the materialisation and territorialization of Brazil within its territory. Utilising infrastructure such as hydropower dams, the state consolidated its grasp over the vast Amazonian region and articulated its systems to transform a territory once considered as a green untouched frontier into a region with multiple operationalized landscapes (Brenner & Katsikis, 2020).

This paper is a product of the themes developed from Lucas de Gioia's Master in Urbanism Thesis research at TU Delft, defended in July 2021, within the Transitional Territories Studio which is part of the interdisciplinary research group Delta Urbanism of the Department of Urbanism, Faculty of Architecture, and the Built Environment. Under the mentorship of Dr.Taneha Kuzniecow Bacchin and Dr. Diego Sepulveda-Carmona, the research looked at the spatial, social and ecological impact of the Belo Monte Hydropower Dam Complex in the Xingu River Basin, specifically in the region around the Volta Grande do Xingu which happens between the Pimental Dam and the Belo Monte Dam and its reservoir in the Municipality of Altamira in the state of Pará, Brazil.

This article will be structured in 6 parts: Contextualization of the Amazon region, its people and ecology and the role of hydropower infrastructure; Defining Mediation in its varied forms and worldviews; The development of a framework to read territories through various worldviews; The Designed Results applied to the Case of Belo Monte and the Xingu; A critical review of the designed outcomes; and finally, concluding reflections for further research.

This paper proposes a discussion regarding the approach of Urbanism as a practice towards landscapes rather than presenting applicable solutions. The value of the work presented lies in the questions posed to our practice. Recent urbanism theories (Landscape and Ecological Urbanism) have brought forward alternative paradigms sensitive to natural and social conditions to counter the effects of the modern project in the production of urbanization.
However, in territories such as the Amazon region, existences have developed other forms of territorialization, and if we are to appropriately redefine our field's practice within such landscapes, we must also define its limits in terms of design methods.

2. Contextualising Hydropower Infrastructure and the Brazilian Amazon.

Brazil has an extensive layout of rivers which are considered viable for hydroelectric infrastructure implementation. During the military dictatorship (1964-1984) Hydropower infrastructure was seen as a crucial tool for development and territorial control. The legacy of this project still lives on today, since 62% of Brazil's energy needs are supplied by hydropower, consolidating its place in the nation building imagination of Brazil.

Since colonisation, South America has always been a territory of resource extraction given its fertility and resource material richness. From then onwards, urbanisation was developed in conjunction with resource extraction throughout the continent (Riséiro, 2012). The provision of large and reliable amounts of energy was necessary to sustain this economic model, normally at close range to extraction sites which in many cases, were in complex topographical and sometimes inaccessible areas (Moretto et al., 2012).

The Amazon rainforest plays a vital role in sustaining life on the planet. It represents 60% of the world's remaining rainforests (Butler, 2019; World Bank Group, 2019; WWF, n.d.) and is responsible for global ecosystemic dynamics, providing water for 70% of South America (Butler, 2019), via its roughly 390 billion trees which act as a crucial carbon sink, a third of all worldwide carbon stored by tropical forests (Butler, 2019). Because of deforestation, the amazon's hydrological cycle as a whole is close to a tipping point. The transformation of vast amounts of the forest into savannah and semi-arid shrublands are leading to cataclysmic and irreversible degradation (Lovejoy & Nobre, 2019; IPCC, 2022).

The Brazilian Amazon is home to around 180 diverse indigenous nations which have resisted and learnt to re-exist within this changing forest ever since European settlers colonised the land. Indigenous people have inhabited and constructed the forest for millennia (Durán Calisto, 2019; Tavares, 2016). Regions and territories under their stewardship have seen little deforestation (Moloney, 2020) and have even enhanced the biodiversity given that their forms of forest management allow for its regeneration (Durán Calisto, 2019).

Within the Amazon sits the Xingu River Basin, home to one of the most significant and extensive nature reserve corridors in the world, with around 28 million hectares, 56% of the basin's total area. This corridor is home to 19 nationally recognized indigenous territories which house 24 indigenous nations (Guerrero, N., Junqueira, P. et al., 2012).
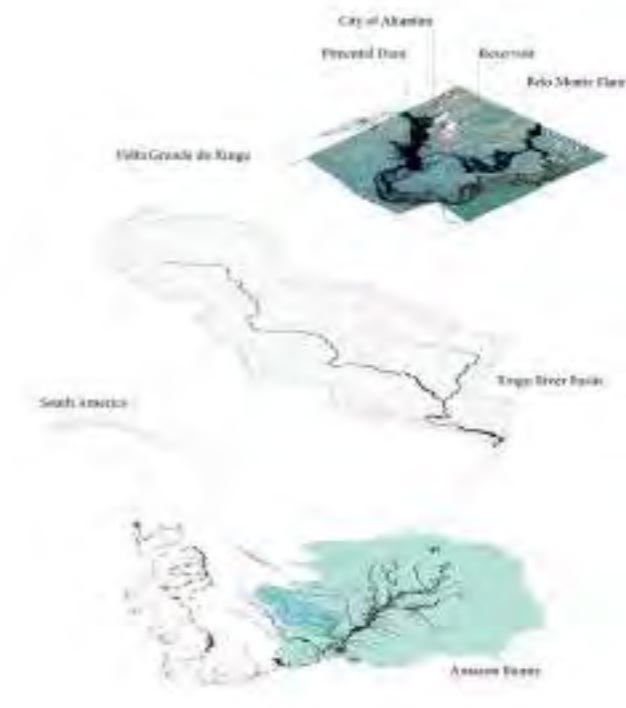
Figure 1. : The Xingu River Basin. Source: The Author, 2021.

The basin sits within the amazon's "deforestation belt", an area at the frontier of processes of extended urbanisation (Monte-Mór, 2014), presenting the highest numbers of deforestation in the whole Amazon region. The basin's fauna and flora is mostly protected within the areas demarcated as

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indigenous or ecological reserves and sustainable extraction reserves (*RESEX: Reservas Extrativistas*) although most deforested municipalities in the country lie within the basin.

Figure 2. : Characterizing the Volta Grande do Xingu. (1) The Reservoir (2) Belo Monte Hydroelectric Dam (3) Lucicleide Kurap of the Munduruku village of Dace Watpu has a moment with a pet parakeet after washing dishes in the Tapajos River in Para State, Brazil. Sources: Wikicommons and Aaron Vincent Elkaim, 2016.

The Xingu River is characterized by a rocky river bed and large river islands, but it is in the Volta Grande do Xingu, on the lower river section that an extension of around 130km of rapids and waterfalls forms an impressive natural landscape, home to 26 of the 63 endemic species of the basin. The variation of water levels throughout the year can vary from highest to lowest by a factor of 10, drastically altering the landscape, its ecologies and the survival of native species.

2.1. Political Considerations.

The land known as Brazil today, is characterized by exploitation and extraction since its colonisation. Although there have been large changes in culture, society and its spatial configuration, the approach towards the natural landscape remains one of domination. (Tavares, 2016). During the military regime of the 1960s-80s, the state feared the loss of sovereignty in the Amazon and envisioned its integration in service of the country's modernization and development through investments in large infrastructure projects and strategic territorial urbanisation (Becker, 2001; Brandao, & Siqueira, 2013; Calisto Duran, 2019; Kozlowski, 2020).

Infrastructure projects followed planned and designed vectors of occupation (Tavares, 2016), which looked to promote urbanization in strategic regions with high natural resource deposits. Consolidating national sovereignty in this region was primordial for a government which planned an Amazon to serve long term economic development aspirations to fuel industrialization of the highly urbanised southern regions of Brazil (Becker 2015, 2010, 2001; Nascimento, 2017). With the global oil crisis of 1973, national development energy plans shifted towards Hydropower which was a more reliable and endogenous source of energy (Kozlowski, 2020; Nascimento, 2017).

From a socio-technical perspective, hydropower embodied both the supply of and a tool to consolidate power. Infrastructure serves as both vector and is a catalyst of a specific form of urbanisation, known as *extended urbanisation* or *frontier urbanism:* (Becker, 1988; Monte-Mór, 2014) Strategic in terms of proximity to resources and logistic routes as well as geopolitically consolidating the state's presence in the Latin American region. Infrastructure is essential for the reproduction of urbanisation and its networked explosion over the hinterland, extending relationships of core and periphery throughout the territory, (Graham & Marvin, 2002) serving capital accumulation through the transformation of nature into commodities. This operationalization of the territory radically

transformed social relationships as well as established common notions of dependency between urban and hinterland. This capital agglomeration functions at a networked and planetary scale, where many zones of primary commodity production are not articulated directly to major cities or metropolitan regions, but "to other productive landscapes of cultivation, extraction, processing and distribution, which are in turn embedded and intermeshed within an intercontinental logistics space" (Brenner & Katsikis, 2020).

2.2. Ecologic / Climatic Considerations.

Hydropower demands serious attention regarding its ecologic and climatic effects locally and globally. We must consider the viability and complexity of *sustainable* discourse which argues in favour of hydropower as "clean energy", and thus, in times of climate crisis, reframes this infrastructure as a viable replacement for carbon based energy production given its considerably smaller greenhouse emission effects comparatively. At the 2021 26th COP in Glasgow, Hydropower saw considerable institutional support and even a strong push to receive direct investment from climate bonds, enabling this technology to be promoted as a plausible solution to transition into more sustainable forms of energy generation, despite their acknowledged ecological and social "negative externalities". (International Rivers, 2021). In the most recent IPCC assessment report, Hydropower is presented as a viable and mostly positive alternative, where most of its negative impacts and externalities are subject to mediation procedures (IPCC, 2011).

Due to the historical development of hydropower implementation in the Amazon, ecologies have suffered greatly presenting loss of biodiversity and habitats, unregulated river pulses and still water, sedimentation and disrupted fish migration(Fearnside, 2006; Guerrero, N., Junqueira, P. et al., 2012). The disruption of the Xingu River pulse by the Belo Monte Dam saw a stretch of about 130km critically reduced in waterflow, disrupting ecologies and habitats to a point where many species risk serious threat of extinction. Road infrastructure built to access dam construction sites facilitated encroachment in protected areas of forest degrading the biodiversity even further to a level which threatens the basin's capacity for water provision(Guerrero, N., Junqueira, P. et al., 2012; ELETRONORTE, 2009).

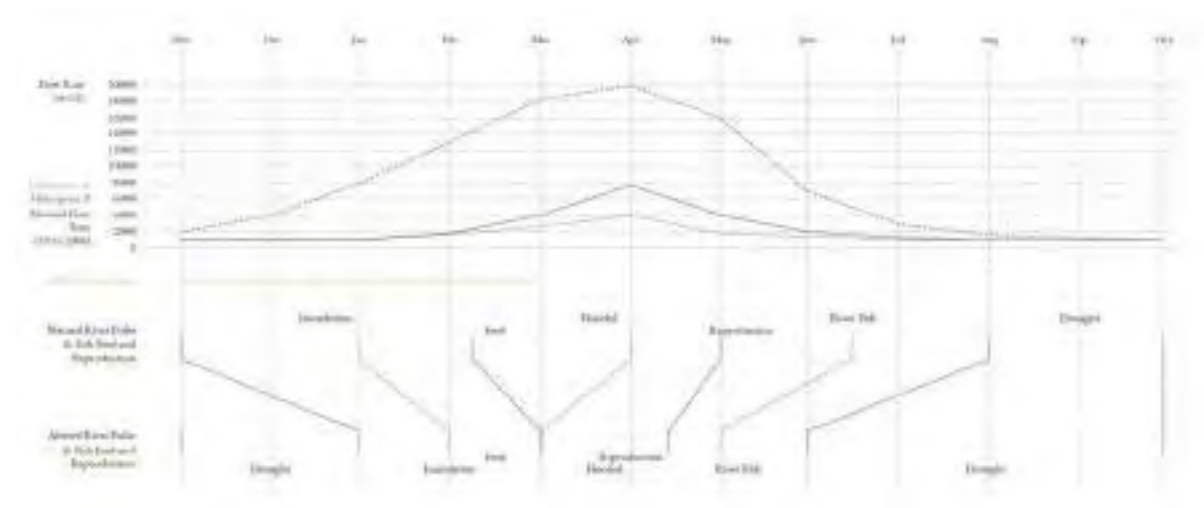*Figure 3. : Consensus Hydrogram & River Flow Diagram.*
Source: The Author, 2020. Data: De Olho no Xingu, 2019.

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On the southern continental regional scale, the Xingu River Basin sits within a continental water system, where its springs are directly dependent on the precipitation brought by what is called the "Continental Biotic Pump" (Lovejoy & Nobre, 2019). The respiration process of the Amazon rainforest pulls a great volume of moisture from the Atlantic ocean, deep into the continent. When it hits the Andes mountain range the moisture is diverted to the Southeast of the continent, precipitating over basins, water reservoirs and crops along the way.
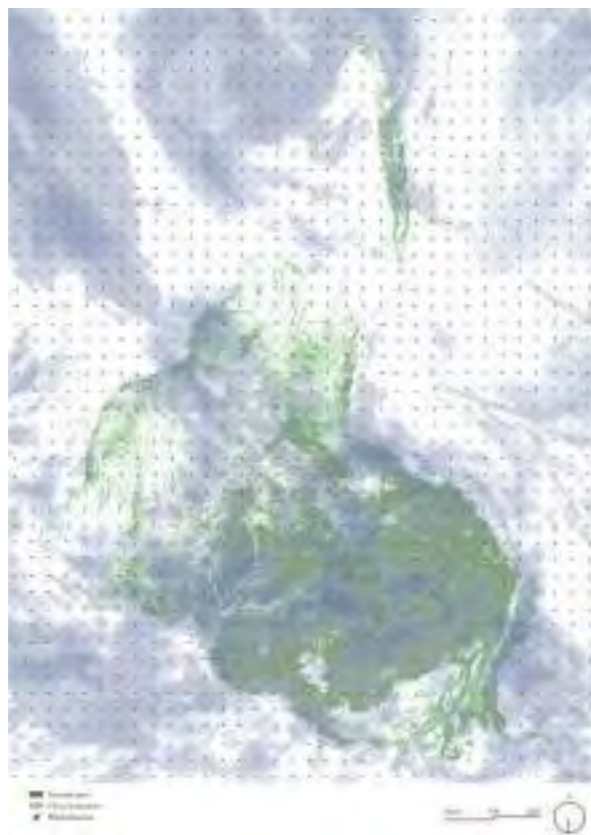

Figure 4. : The Continental Biotic Pump.
Source: The Author, 2020. Data: Lovejoy & Nobre, 2019.

2.3. Societal / Cultural Considerations.

Brazil's Constitution of 1988 protected Indigenous rights by securing their ways of life, defining territorial demarcation and even self-governance levels within these territories. The recognition of the indigenous existence, prior to the existence of the state itself, was a radical shift from a legal perspective, recognizing Brazil's embedded colonial condition. Nevertheless, the model of development replicated in the Amazon still does not favour the demands and rights of local existences but of the larger urban centres and economic corporations of Brazil and the world.

Prior to the 1988 Constitution, the Brazilian state looked to indigenous nations as non-citizens since they were not under state influence, (Tavares, 2016; Castro, 2002; 1996). "integrating" only granting citizen rights, even if they were left impoverished and unassisted. All Indigenous State institutions formed were conceived to regulate and control their territories and bodies (Castro, 2002; 1996). Through various overlapping processes of demarcation and claims from a multi-agency process of territorialization, the amazonian landscape assumes different characteristics and uses leading to a fragmented occupation and uneven development, overlapping intentions of preservation, stimulation and exploitation.
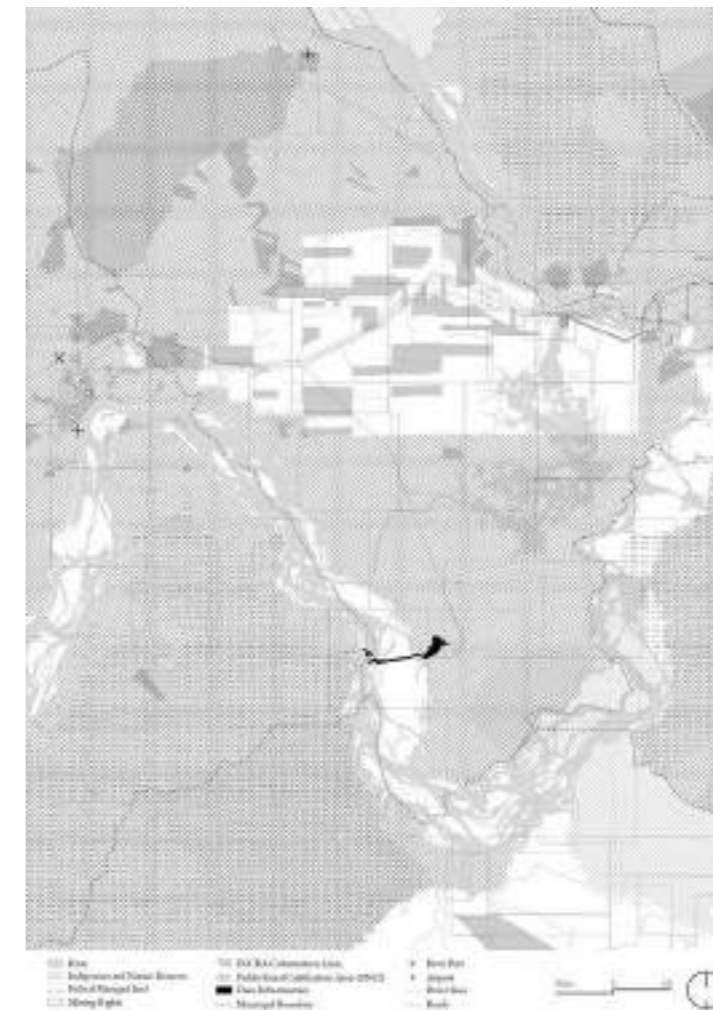
Figure 5. : Sovereignty: A Patchwork of Territorial Claims. The Author, 2021.

In the lower Xingu River, The Juruna (Yudjá) canoeing and riverine People inhabit islands and peninsulas. After continuous colonial persecution most of this nation fled upstream while a few held back in the Volta Grande do Xingu region, intermarrying with settlers and other indigenous groups. Because of the construction of Belo Monte Dam, fish ecosystems were disrupted which threatened the livelihoods and traditions of these people, forcing them to move from their lands and into new urban peripheries, further losing touch with traditional ways of life (Guerrero, N., Junqueira, P. et al., 2012). Belo Monte and plans of other dams in the basin, mobilised the Juruna and all other basin nations to resist the implementation of these projects.

Local and indigenous populations comprehend the importance of maintaining the land and ecologies stabilised so that their needs can always be cared for, allowing for sustainable processes of inhabitation and even natural biodiversity enhancement (Durán Calisto, 2019; Tavares, 2016). This is due to their cosmovision which defines all living beings as humans, even rivers and mountains, and not as commodities (Krenak, 2019; Castro, 2002; 1996).

Modernity's requirements for consumption and nature's capacity to sustain this model has led to the desynchronisation between natural, social and economic systems (Recubenis Sanchis, 2020). This is defined as the Anthropocene, driven by the impact of human activities on the Earth System

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(Steffen et al., 2015). The impact of this geological epoch has affected our climate and ecosystems, threatening earth's biodiversity. Although all life will face the consequences of desynchronization, some are already experiencing this more than others. Indigenous people are already living through an extinct version of their world, only being able to re-signify their existence into one: resistance towards modernity. The climate urgency is one of *a* humanity, imposed upon every existence on the planet. This "humanity" is battling to save its own existence, not of every existence (Krenak; 2019).

The modern worldview is but one of a *multiplicity* of worldviews which exist on earth. For Amazonian indigenous nations, nature isn't a resource for mercantile exchange and exploitation but rather a system of life where humans and their activities are a part of the system, not above it (Krenak, 2019). Cosmopolitics (Stengers, 2010) presents a theory of the existence of more than ethnographic perspectives on a "single world" (the common "thing"), to one where we actually inhabit a pluriverse. When referring to Amerindian indingoeus peoples' cosmologies, we should not "refer to different cultural perspectives on the same "thing," but to altogether different (albeit not unrelated) things" (Latour, 2004). The urgency here lies in developing a conversation on equal terms with shared intentions.

3. Mediating Worlds.

Mediation is one of a variety of procedures to solve conflicts, and is fundamentally based in voluntary participation of the involved parties, where an intermediary facilitates communication between parties with the intent of enabling them into taking responsibility for resolving disputes (Brandao Barrios, 2020; Brogan & Spencer, 2007).

Within modernity, mediation is structured within jurisdiction constraints and processed by institutions which view mediation as an alternative practice, not commonplace (Brandao Barrios, 2020). The notion of fair justice within modernity has been conceptually constructed through punishment of the offender. On the other hand, Brandao Barrios (2020) explains that in indigenous communities "justice is to restore the peace and equilibrium within the community, and to reconcile parties". In this sense, the purpose is not to punish but to restore coexistence conditions. This is important to consider when proposing ecological and social mediation in the case of Belo Monte in the Xingu River.

There are important examples of how Modern institutions and legislations have attempted to reimagine entirely their processes of governance from a indigenous worldview approach in South America. Ecuador approved a new Constitution in 2008 repositioning the state's perspective and its apparatus towards Nature with the indigenous concept of Pacha Mama (Mother Earth). This allowed for nature and human life to be equally represented (Gudynas, 2019). The Sao Paulo - Brazil Guarani Green Belt State Legislation Proposal in 2016 (PL181/2016) seeked to strengthen Indigenous lands around the City of Sao Paulo giving them Biosphere Reserve Rights and extending and patching other existing nature reserve areas forming a green belt around the city to sustain ecosystem services (Bonduki, 2021). This patchwork allows for the strengthening of ecosystemic dynamics, facilitating their governance and accountability.

3.1. Procedures for Territorial / Spatial Mediation.

In the case of Belo Monte Hydropower Dam and the Xingu River mediation must intrinsically consider spatial and territorial implications. Given that Urbanism is a practice that necessarily influences and manipulates space, the possibilities for *mediation by design* over frontier territories of modern urbanisation must be revised. As Boehnert (2018) explains "Design mediates social relations (...) that shape how we live and the ways we experience and relate to each other and to the material space we live in. Design can also work to normalise new circumstances and relationships by making ideas, artefacts and spaces seem acceptable, even when grave injustices and ecological harms are done." In this way, Design has the intrinsic capacity of mediation since it may act as an interface to produce common space for dialogue and coexistence within and with space.

If the conflicting territorial conditions present are a consequence of territorial planning and occupation strategies of a Modern worldview, then we must look at paradigms which critique it. Ecological Urbanism (Farr, 2011) proposes the necessary paradigm shift to deal with the systemic complexities of such frontier territories in the Amazon. This is given that it defines and proposes design and urbanisation from the landscape and its ecologies, to achieve more coherent and balanced designs, especially in face of issues such as climate adaptation and spatial justice.

"We need to view the fragility of the planet and its resources as an opportunity for speculative design innovations, rather than as a form of technical legitimation for promoting conventional solutions. By extension, the problems confronting our cities and regions would then become opportunities to define a new approach. Imagining an urbanism that is other than the status quo requires a new sensibility—one that has the capacity to incorporate and accommodate the inherent conflictual conditions between ecology and urbanism. This is the territory of ecological urbanism." Mohsen Mostafavi (2010).

Figure 6.: Positioning Ecological Urbanism. Source: The Author, 2021.

3.2. Mediation Principles: Identifying Values for Coexistence.

Through indigenous practices for mediation (Brandao Barrios, 2020), effective synchronisation of landscape transformations and social systems changes could be achieved to reconcile worlds and cosmologies. To begin proposing mediation we must identify their values. "Worlds" have been organised into three groups to facilitate the alignment of desires and intentions with existing field

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conditions. These are: Modern, Local/Indigenous and Nature. The conditions to which these relate/perceive one another points to possible relationships of conflict and/or alliance, helping indicate fronts for meditation designs.
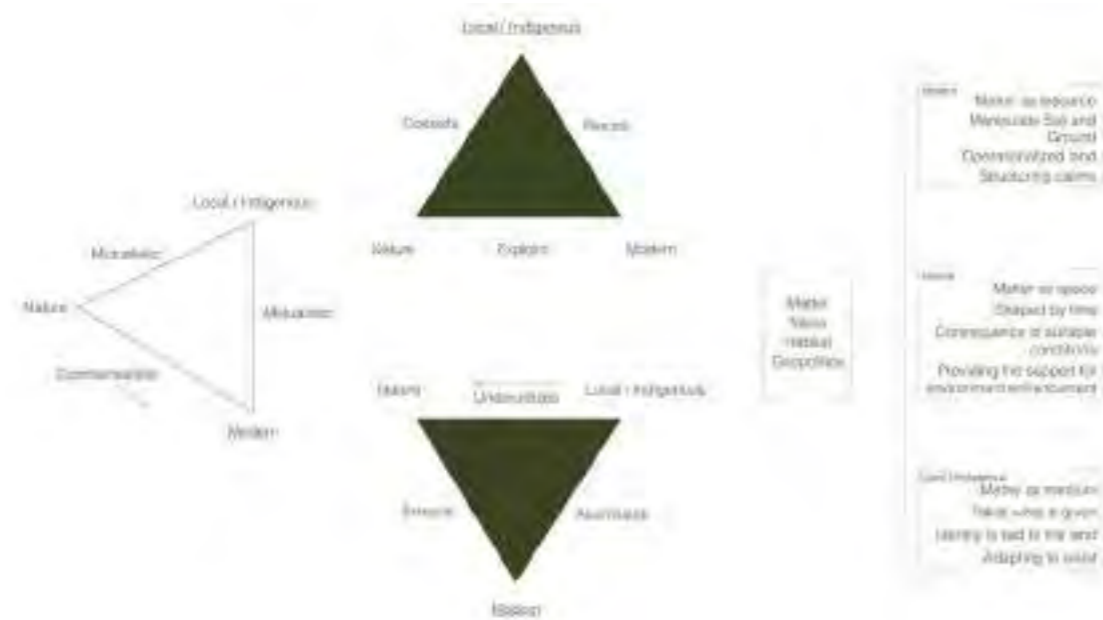

Figure 7. Diagram of Values. Source: The Author, 2021.

3.3. Synchronisation to achieve balance.

The concerning issue at hand with this investigation revolves around values, human presences and territories which are out of sync with each other as well as within themselves, from their own doing or by force of others. The question of synchronisation is fitting when we comprehend the physical scales and timeframe of systems at play, from the individual to community, river basin to territory and nation to region.
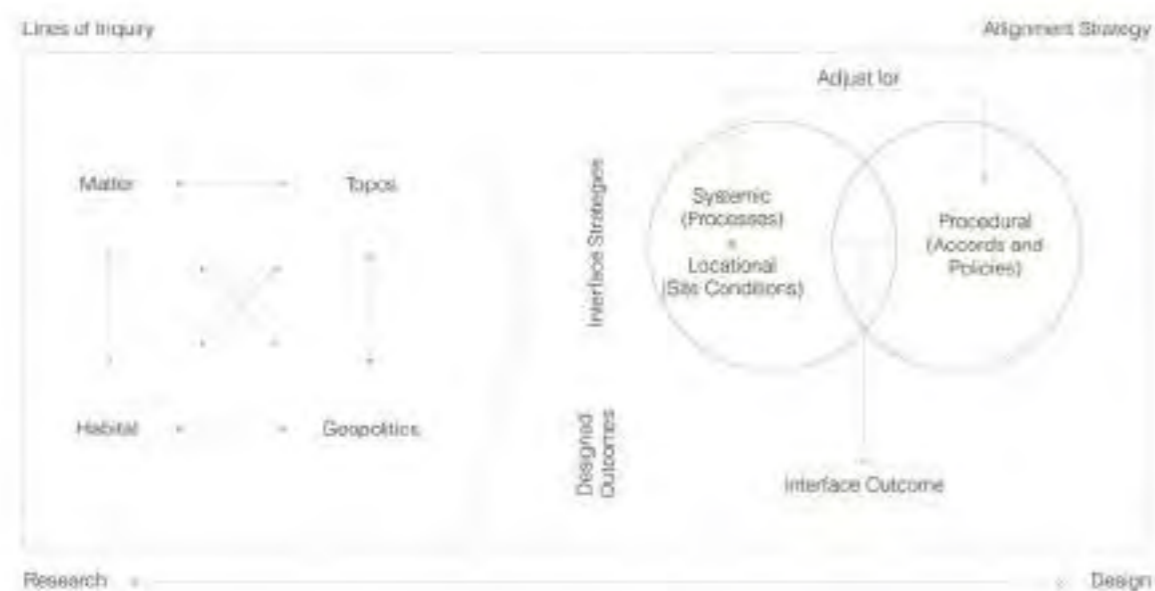
Figure 8. Lines of Inquiry Approach. Source: The Author, 2021.

Developed within the Transitional Territories Studio research framework, the project reads the territory and its constitutive systems utilising four themes of investigation as lines of inquiry: Matter, Topos, Habitat and Geopolitics. These focus the research development for a comprehensive assessment of the state of things, facilitating the identification of interrelated systems of the Modern, Local/indigenous and Natural worldviews.

The Four Mediation Principles are informed by the guidelines of Ecological and Landscape Urbanism (which require readings of landscape dynamics to propose spatial interventions and that these are specific to landscape conditions in question) for a more coherent alignment between ecology, landscape and society with Urban Design, and Mediation Principles in the modern and indigenous systems of justice which deal with conflict management for coexistence and reconciliation.
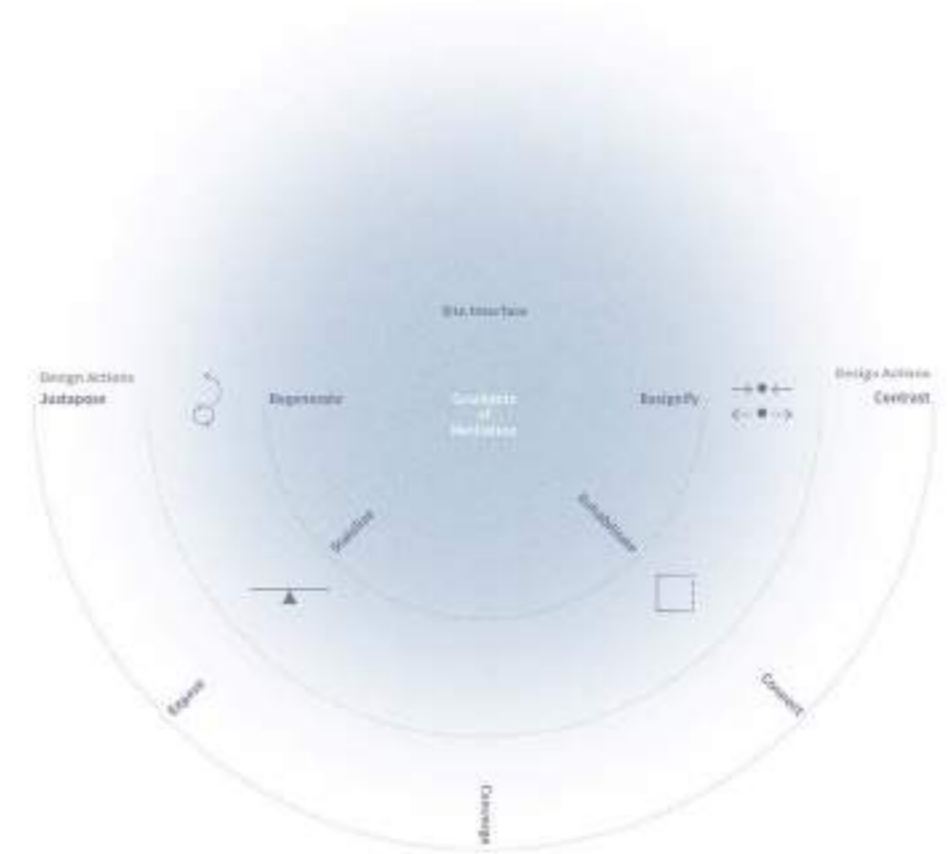
Figure 9. Mediation Principles. Source: The Author, 2021.

(i)Re-Generation process guides ecological and social systems, towards recovery from damage, renewing their systemic capacities, functionality and integrated synergies. *(ii)Stabilisation* processes act on systems that are deregulated and disturbed but not yet destroyed, focusing on achieving balance between parts. *(iii)Rehabilitation* considers that systems have been in some degree permanently damaged and only partial remediation can occur. Lastly, *(iv)Re-signify* considers that systems are damaged or disrupted beyond repair and proposed designs may only aid with repair on symbolic or metaphysical levels.

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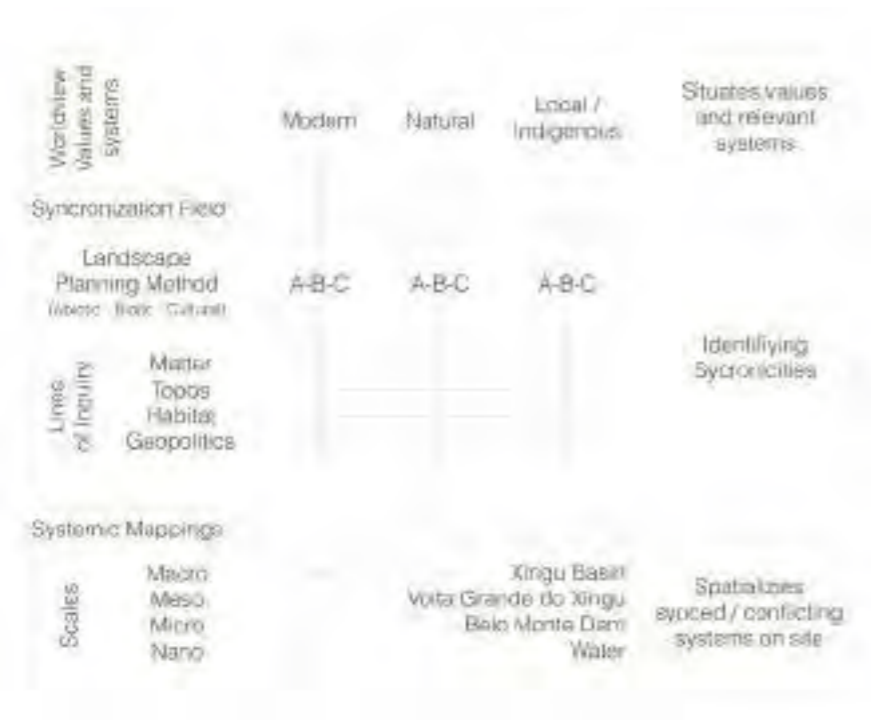
Figure 10. Analytical Framework. Source: The Author, 2020.

4. Results: A Synchronisation Framework for Reading and Designing Territorial Worldviews.

We must embrace other perspectives of the territory to comprehend the distinct elements which compose cosmopolitical values beyond our own worldview constructions. This framework is proposed in the spirit of attempting to facilitate cosmopolitical dialogue. That is if we are to in fact, act critically in territories which are already being altered disregarding their cosmologies.

The Synchronisation table below, is the beginning of this attempt, proposing a framework to cross read worlds, the landscapes and territories. The table utilises the Lines of Inquiry, to approach the territory from different layers of territorial conformation (diverse interrelated systems) together with the Abiotic-Biotic-Cultural Landscape reading framework.

Figure 11. The Table for Synchronisation. Source: The Author, 2021.

The Synchronisation Framework utilises the identified dynamics, categorised with the Synchronisation table and arranges these according to a territorial system which is identified through the Lines of Inquiry for synchronisation. These are then organised in terms of their synchronisation potential through specific aspects leading to categorized themes for Systemic Mappings. In the context of Belo Monte and the Volta do Xingu area, these are:

1. Water Flow;
2. Ecological Sustainability;
3. Basin Connectivity and
4. Territorial (re)Settlement.

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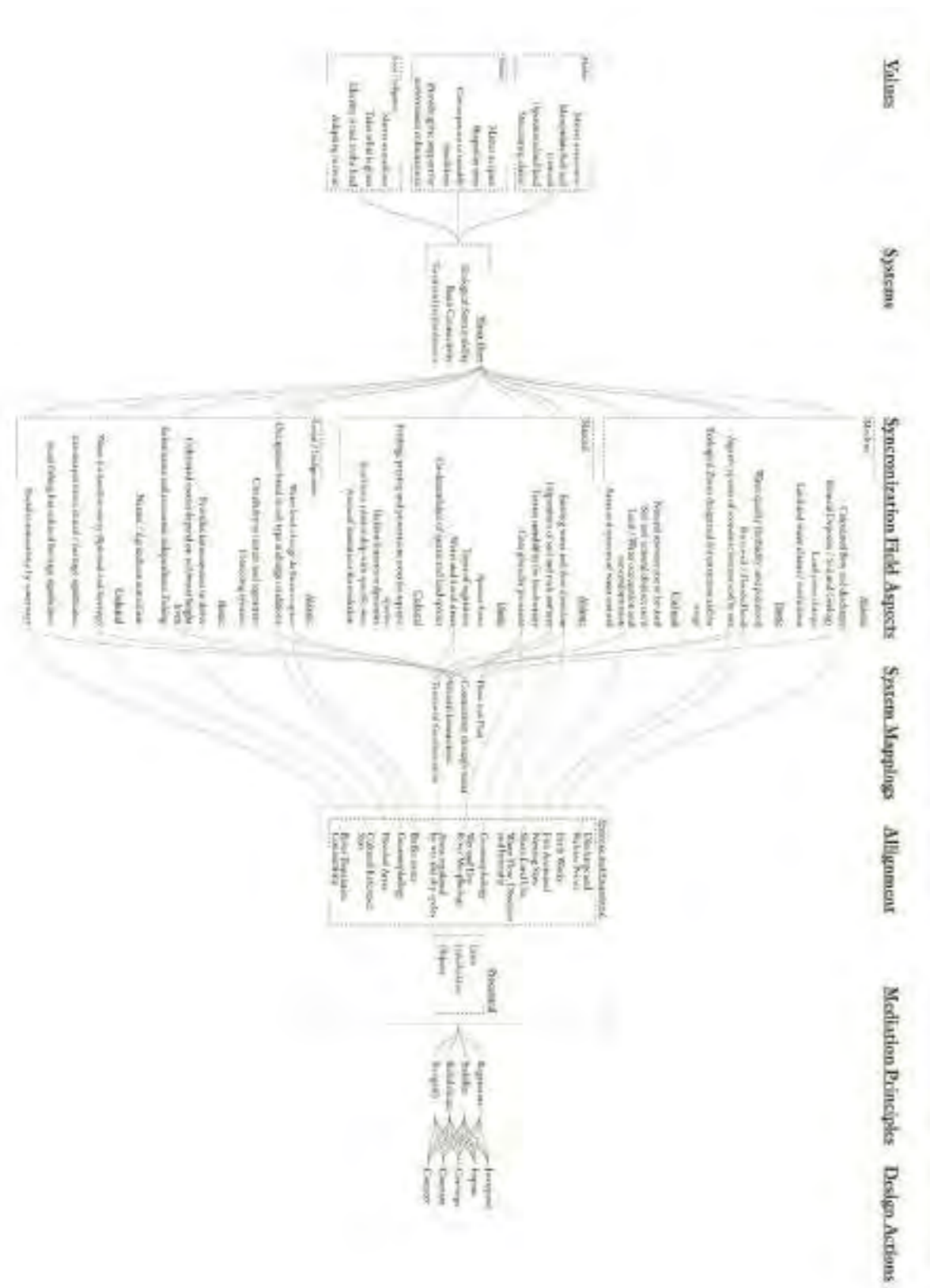
Figure 12. Synchronisation Framework. Source: The Author, 2021.

Through the Systemic Mappings methods, the Alignment Strategy is built up utilising the identified Systemic and Situational mapped elements and their consequent alignments with procedural aspects such as Laws, involved stakeholders and identified objects from the Synchronisation Field table. With these elements we have identified the specific elements needed or part of the system in question. Mediation Principles indicate which strategy must be utilised to achieve mediation in the given system, site and involved aspects. By utilising the Design Actions, spatial propositions can be placed to achieve and set a designed mediation strategy.
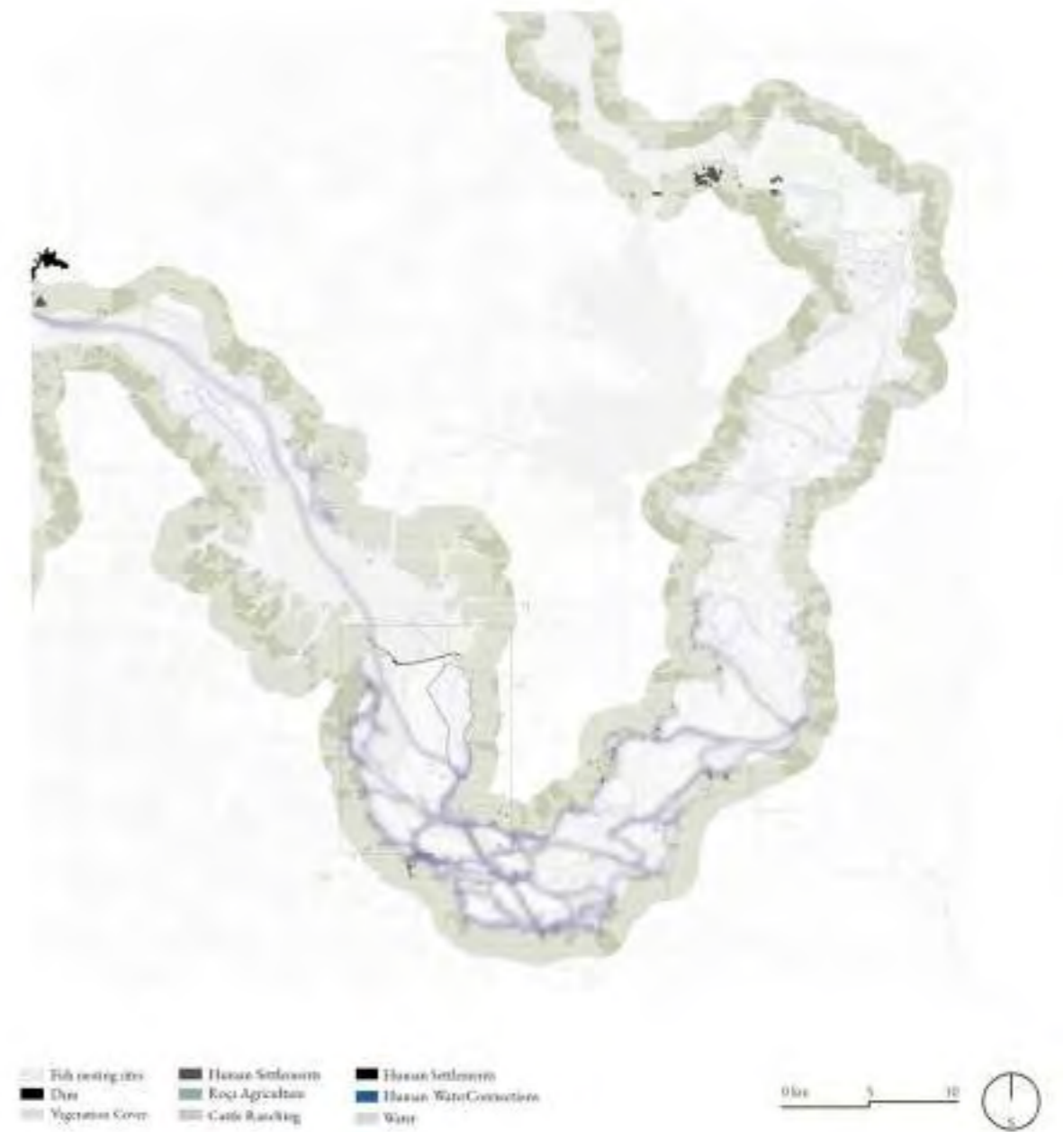
Figure 13. The Systemic Mappings for Water Flow Systems in the Volta Grande do Xingu. Source: The Author, 2021.

From the Water Flow Systemic mappings, Mediation Principles are selected which can answer to the needs of synchronisation of these systems. The location just after the Pimental Dam in the Volta Grande do Xingu river bend has the most potential to receive Design Interfaces for meditation which can bring the most impact on the water flow.

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Figure 14. Designed Dam Interfaces for mediation masterplan. Source: The Author, 2021.

The re-naturalization of this branch of the river, will allow for fish to return to their natural nesting and feeding cycles in the area, reconnecting species throughout the river basin. Allowing for the natural river pulse to occur and natural river movements to flood forested land areas will facilitate the entry of fish species which are dependent on falling fruit to sustain their diets and so guarantee their cycles of nesting. This is possible with a constant open flow of water through the dam, with a design that considers the reservoir's need for water storage as well as the river pulse water level

changes which guarantee the cues for fish given by the river's movement. The partial opening on Pimental Dam is designed to permit water flow levels in accordance with the permitted hydrograph projections from IBAMA(2019) and ELETRONORTE (2009), whilst maintaining the natural pulse dynamic of the river.
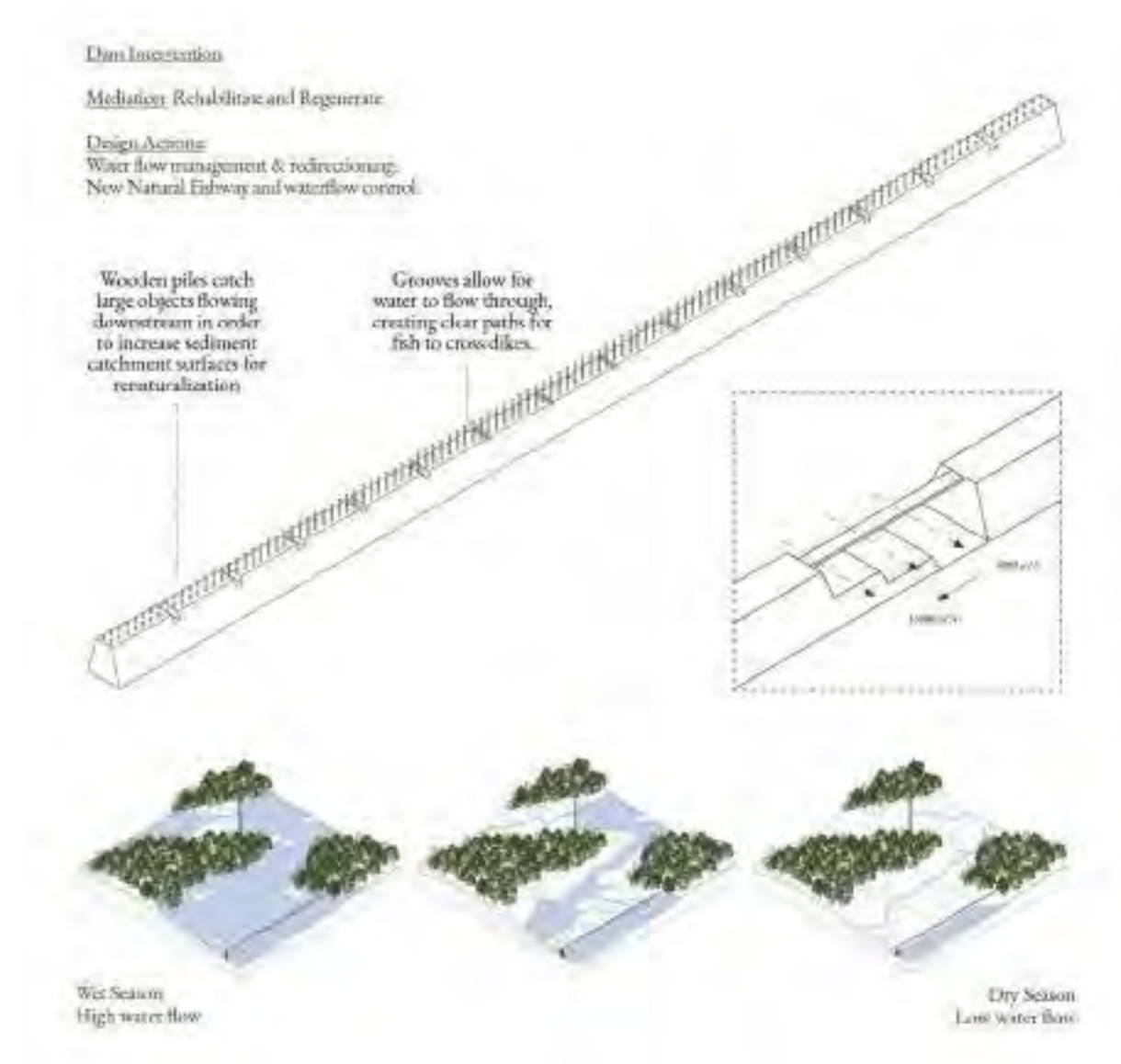
Figure 15. Dam Interfaces: Strategic openings and renaturalization dams. The Author, 2021.

Dikes are strategically placed downstream directing and concentrating constant flowing water to sustain river ecologies and social activities. The dikes are designed to capture sediment through time, and eventually be covered with vegetation, re-naturalizing the landscape.

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Reduced Water Shore Intervention

Mullion: Resignify

Design Actions:
Re-connection of isolated shore populations

Wide pullout
to drag canoes
along

Floating
platforms
which adjust to
water level.

Access stairs to
reach riverbed
along route.

Wet Season
High water flow

Dry Season
Low water flow
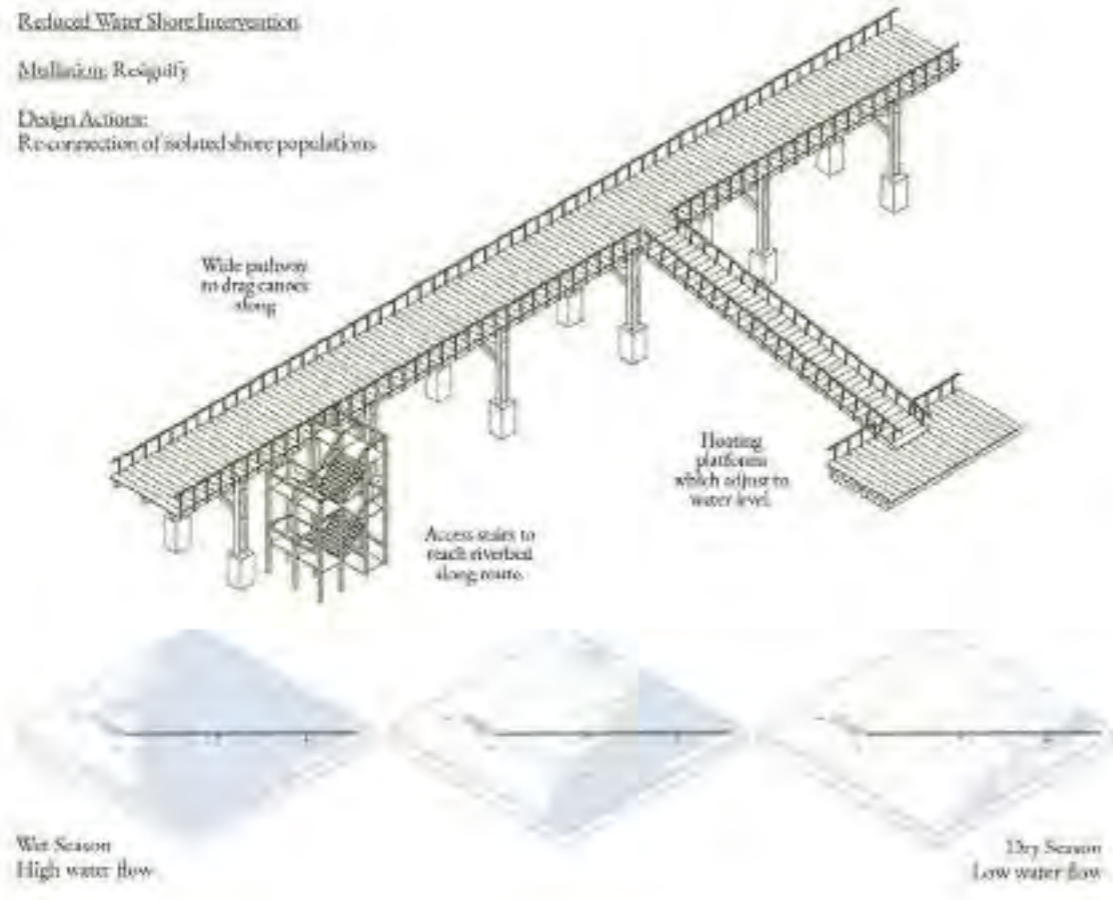
Figure 16. Pathways for reduced water flow re-connectivity. Source: The Author, 2021.

Given the re-direction of water, some parts of the river will become permanently dry and of difficult accessibility given the rocky river bed nature. Pathways would be constructed to connect communities with the water and river islands, helping to maintain their way of life connected to the river.
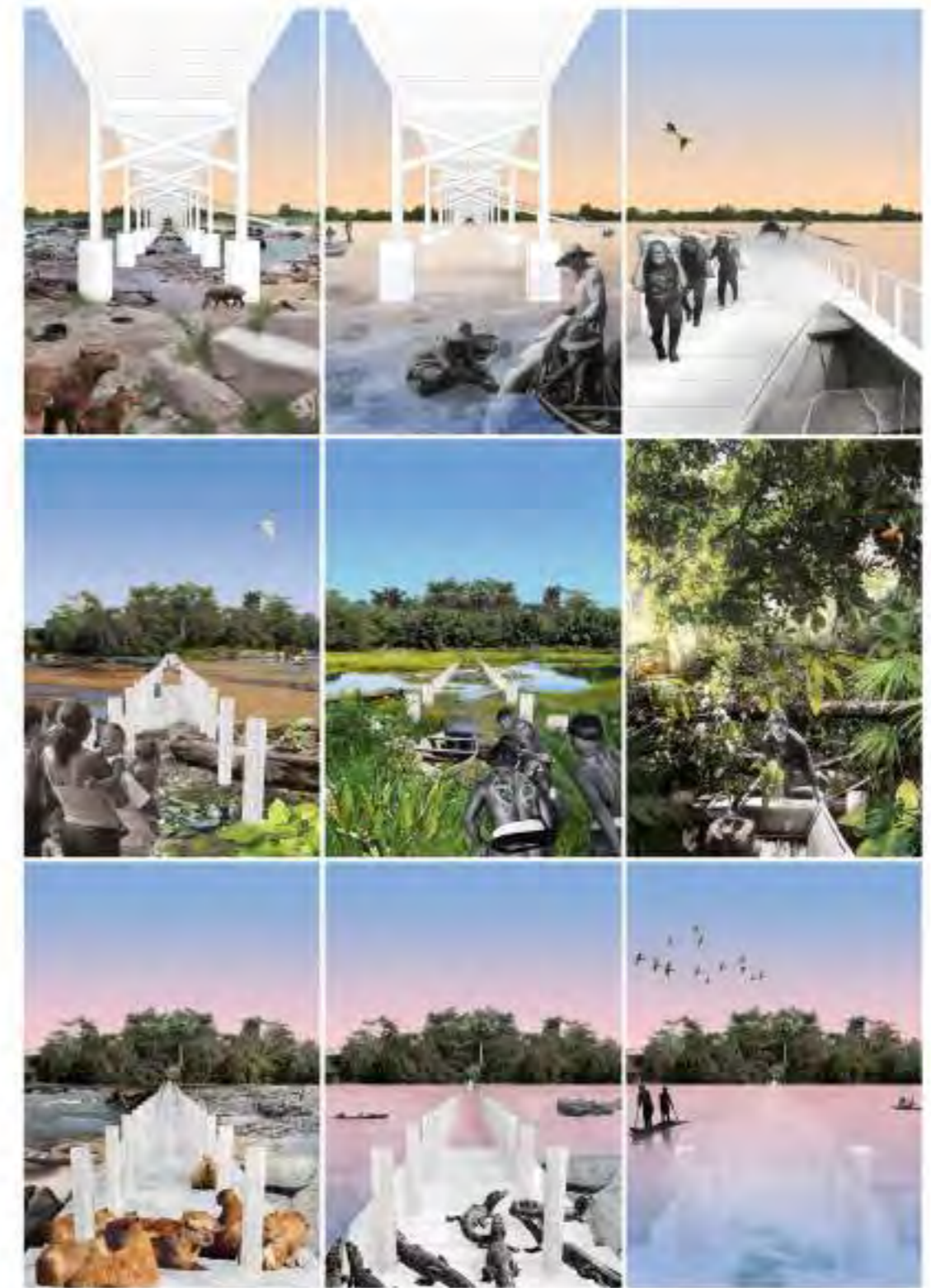
Figure 17. Visualising designed interfaces. Source: The Author, 2021.

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5. Critical Review.

This research project attempts to devise an Analytical Synchronisation Framework for mediation in frontier territories of modernity utilising the Belo Monte Dam as a case study for its applicability. The utilized methodology is fundamented within theories of Landscape and Ecological Urbanism, challenging the capacities of our field to propose designs in territories with varied cosmovisions. The limitations of our practice become evident when we attempt to comprehend other forms of existence utilizing its tools. These urbanism theories are still embedded within the ethos of our civilization and Moderniy's paradigms.

The complexities of the context and knowledge applied to read it, as well as the design tools and methodological limitations are embedded into the proposed design speculations. However, we were aware not to incorporate knowledge or speak for cultures from a place of certainty but attempting to read their culture, worlds from within their own cosmovisions.
For this reason, our process of Research by Design is one which embraces explorative possibilities rather than the pursuit of certainty and deterministic design solutions.

The study considered the ethical implications of whom it attempts to speak with and for as well as minding the limits of the research regarding cultural appropriation and misinterpretation. Design proposals should be scrutinised by local and indigenous stakeholders, since these would still influence and disrupt traditional practices and cultures, in the same manner that the dam did, even if to a lesser degree or in good intention.

Ultimately, the best "solution" will always be the Dams dismantlement to achieve re-synchronization. We can state that there is no space for Large Infrastructure projects within the Amazon that can secure social and ecological balance and sustainability. All efforts to propose systemic changes through design and governance systems cannot address the enormity of the problem caused solely by the existence of the dam. We must reaffirm that this research is coming from a position of Landscape and Ecological Urbanism and does not attempt to propose radical or revolutionary solutions, but rather, through mediation reveal and propose conditions for systemic change and synchronisation.

Our field is strictly limited to its binding origins in modernity, constructed with a gaze to the world from within the city. Our current planning and design tools are unable to deal accordingly to such spaces and values, falling short to deal with these varying world models since the application of our paradigms do not translate, or simply, reduce such cosmovisions as simply religion or myth.

We need to re-evaluate how we position ourselves and our profession when approaching such spaces of action, not anymore from a standpoint of a colonial tool, historically speaking, but as enablers and conduits for the desires of sovereignty and autonomy of those people and their worlds. Urbanism needs to reconceptualize its capacities by recontextualizing its foundations seeking from the origin to acknowledge and accept plurality in design action.

Solutionist approaches acting on such conflicting territories not only risk falling short of truly addressing the main problem, but through the proposed mediation recommendations, suggest that compatibility is achievable, thus further perpetuating rhetoric in favour of infrastructure projects within these regions.

Figure 18. Situating Cosmourbanism. Source: The Author, 2021.

6. Conclusions and Reflections.

As a tool of the state, Hydropower infrastructure is designed to colonise and integrate territories and bodies into the apparatus of the nation-state of Brazil, in detriment of the existing ways of life that do not conform to this project.

More recently, Hydropower has gained traction in intergovernmental panels and conferences to tackle the consequences of climate change, even though numerous studies show just how damaging these infrastructures are to the environment and those who have done the most to defend it. Although Brazil requires energy to sustain its growth aspirations (and even this is open for discussion) much can be done to develop a better mixed grid, de-centralized and adapted to regional conditions

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Figure 19. The Brazilian Green Energy Landscape in 2020:
(Hydro, Solar and Wind Energy generation). Source: The Author, 2022.

Acknowledging the territory as a pluriverse is fundamental to sustain a plausible future for what is known as Brazil. We have seen that other nations, which included indigenous nations, have benefited from embracing this multiplicity in face of the social and ecological challenges ahead, especially for the South American region - deeply exploited and impoverished. Institutions that are dedicated to strengthening natural and indigenous relations must be put in centre stage to steer legislation and procedures that will guarantee and sustain values and practices for ecological preservation.

Government and society should acknowledge the importance of a forested Amazon for sustaining energy production, agriculture and water supply for national and regional security. Deforestation will lead to catastrophe, sending the nation into irreversible economic and social collapse. This paradigm shift is essential and should be encouraged also with National Security policies. All urbanisation, territorialization and operationalization through infrastructure projects were implemented to serve

Brazil's modern project of territorial domination in the Amazon. To begin a renewed process of inhabitation in the region, it is essential to promote processes of planning and governance which originates from within the region, for its own sustenance rather than to only serve other regions.

Reviewing administrative municipal boundaries and indigenous and natural preservation territories would be necessary, not in terms of geographical limitations and delineations for control but rather in terms of their field conditions and in favour of local lifestyles. This would enable sustained landscape management and governance according to ecological and social systems. Other forms of governance arrangements grounded in local landscapes, dynamics and millennia self governance of its nations and peoples, proven capable of sustaining systemic equilibrium, would be essential. With the incorporation of these populations in counselling and management organisations, preservation and productive ecological processes would certainly be enhanced, giving the region a strong position in the productive matrix of the nation and strengthening its autonomy. From basin councils to Energy governance boards, local populations would consolidate their position as "stewards of the forest" and rivers.

The research project questions the critical capability of our field to propose designs in such territories. The importance of visualising worldview asymmetries and its conflicts is essential in such territories. For this reason, Urbanism must claim its role in thinking and proposing designs which can act accordingly in and for these "frontier" territories. The synchronisation framework approach begins to unveil a model that could aid in the comprehension of such conditions, and possibly allow for actions to take place in a non definitive and solutionist way. In order to move beyond the limiting urbanism paradigm embedded within the hegemonic worldview and biased by its modernist foundations, it is necessary to seek the territorialization of cosmopolitics theory. Would cosmourbanism be possible?

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AN ATLAS ANALYSIS OF THE DUTCH DELTA KNOWLEDGE TRANSFER IN THE VIETNAMESE MEKONG DELTA: LESSONS TO LEARN IN MEETING THE ECOLOGICAL TRANSITION

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ABSTRACT:

The research aims at presenting an atlas-oriented analysis of the knowledge transferred from the Dutch Delta Management experience built in the NorthWest European context of the Rhine Meuse in the Netherlands to the South East Asian context of the Vietnamese Mekong Delta. These North-South relations deltas must face the ecological transition, however, regarding contrasting deltas and differing geopolitics, yet sharing comparative histories in addressing the need to meet the deltaic challenges posed by flooding and sea-level rise.

As hydraulic specialists in flood risk mitigation, Dutch Delta Management experts have transferred their knowledge globally to meet the challenges through strategies proposed by the Dutch Delta Approach. Furthermore, the Mekong Delta serves as a successful process of several cases completed in South East Asia. Therefore, the research proposes to build an understanding of the master planning processes completed through the cooperation between the Dutch ministry and the Vietnamese government in collaboration with experts in the field since the 1970s, mainly through a study of key master planning processes and strategic atlases completed across three periods of collaboration: 1) the Netherlands Delta Development Team (NDDT) in the 1970s; 2) The 'Master plan for the Mekong delta in Vietnam' (NEDECO) in the 1990s; and 3) The Mekong Delta Plan, (MDP) completed in the early 2010s.

Moreover, the research considers lessons learned between the two countries and the need to rethink the knowledge building and transfer approach and look at it from another perspective. Today, the impact of climate change and anthropogenic hydraulic processes serves as a basis for exchanging ideas and experiences about the ecological transition between two very different contexts that have undergone similar impacts in environmental crises.

KEYWORDS:
Dutch Delta Approach, Vietnamese Mekong Delta

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THIS PAPER AIMS TO PRESENT ATLAS-ORIENTED RESEARCH ON THE KNOWLEDGE TRANSFERRED FROM THE DUTCH DELTA MANAGEMENT EXPERIENCE BUILT IN THE NORTHWEST EUROPEAN CONTEXT OF THE RHINE-MEUSE-SCHELDT DELTA IN THE NETHERLANDS TO THE SOUTH EAST ASIAN CONTEXT OF THE VIETNAMESE MEKONG DELTA (VMD). THESE NORTH-SOUTH RELATIONS DELTAS MUST FACE THE ECOLOGICAL TRANSITION REGARDING CONTRASTING DELTAIC HISTORICAL CONTEXTS AND GEOPOLITICS, YET SHARE THE NEED TO ADDRESS FUTURE DELTAIC CHALLENGES POSED BY CLIMATE CHANGE AND SEA-LEVEL RISE. THE RESEARCH EXPLICITLY INVESTIGATES HOW DUTCH KNOWLEDGE TRANSFER IN THE DUTCH DELTA APPROACH (DDP) HAS BEEN REALIZED IN THE VIETNAMESE MEKONG DELTA THROUGH THE SYNTHESIS OF FORMAL DRAWINGS OF ATLASES, MASTER PLANS, AND HYDRAULIC PROJECTS, WHICH HAVE DRIVEN THE DELTA'S FUTURE VISION BY FACILITATING THE DECISION-MAKING PROCESS BETWEEN THE VIETNAMESE MINISTRY AND ITS CONSTITUENTS.

The Netherlands and the Vietnamese Mekong delta share some crucially similar vulnerable territorial characteristics, both with a history of responding to threats resulting from the impact of Climate change and sea-level rise. They are presumably comparable deltas, heavily dependent on water management for survival, historically draining out fresh and salt waters to reclaim land for urbanization and land cultivation. Furthermore, both countries are densely populated within designated urbanization areas (with a median of 429 to 488 people per km2 respectively for the Mekong and the Netherlands) and parallel populations of approximately 17.5 million inhabitants.
Lastly, geographically similar in deltaic landscapes, however different in geological features, these deltas each hold a total land area of approximately 40,000km2 and have appropriated around 55% of their total territorial area for agricultural production, at over 2 million hectares.

Hitherto, both countries have responded differently to the knowledge of their water ecosystems. The Netherland's practices concern more specifically the qualities of beach dunes, inner water bodies estuaries, areas of river discharge and storage, the relationship between land subsidence and groundwater and freshwater needs (in urbanized areas), sedimentation, estuary ecosystem processes (tidal waves, etc.), coastal processes of dunes and erosion, and upstream and downstream relationships (Delta Committee, 2008). In contrast, Mekong Delta societies adapted to centuries of seasonal flooding of the Mekong by living with the water and cultivating its water landscape for food (Ehlert, 2012; Liao, 2016). Thus, the locals rely on the delta water ecosystem's ability to regenerate its landscape through a process of water flush and pulse as a consequence of seasonal flooding; because it offers ecosystems services high in sedimentation and nutrients in the fresh waters, resulting in a productive land with admirable bio-diversity habitat. Local practices with 'water ecologies' followed the slow seasonal rising levels of the delta's natural floodplains, and rice was cultivated in relationship to wet and dry seasons, whereby early rice transplant and floating rice practices were completed accordingly. (Le Coq, 2001, 2005; Ehlert, 2012)
The French colonized the Vietnam Mekong Delta in the 1800s whereby water management was first introduced at the regional scale as a means of land appropriation and did not follow a planning management approach because it regarded land for cultivation and canals for water navigation for

military purposes (Biggs, 2005; Biggs et al., 2012). When the Dutch delta experts began their bilateral collaboration for the Mekong delta plans in Vietnam in the early 1970s, canals already spanned across the delta left from the French colonial period. Moreover, this logic of canal alignments from the Bassac River to the South China Sea intensified via new hydraulic infrastructure technology. Though Dutch delta polder towns were created slowly over history through community management units that integrated engineering water management and planning knowledge, urban areas were formed in response to different requirements in water drainage for land reclamation in three identified Dutch development systems, including Dike Towns, Polder towns, and Dam towns. These typologies regarded how integrated Dutch urbanization practices could be 'interweaved' as systems of engineered hydraulics, economics, and urbanism. Furthermore, since the 12th century, they have been understood and implemented at the local management scale determined by community Water Boards designated within administrative limits determined by watersheds (Meyer et al., 2015). On the other hand, the Dutch Delta Approach was renewed by the Delta Commission in the 1960s as a reaction to the devastating flood in Holland, which killed over 1,800 inhabitants, whereby technological and managerial processes superseded the town planning perspective. Therefore, I suspect that the historically Dutch polder building knowledge was overlooked, and newfound knowledge regarding the latest water technological innovations in Nation-Building became key to the knowledge transfer promoted in the Dutch Delta Approach overseas.
In response to the devastating North Sea Flood of 1953 in Holland, the Dutch Delta Works was urgently initiated in 1960 and became a 25year Delta Plan to meet the Dutch Delta Law in flood safety standards. Nation Building was instated, and a series of DeltaWorks were planned through systems of dikes, sluices, locks, levees, dams, and flood barriers to seal off the sea inlets in South Holland. And in 2008, another series began when the Delta Commission was reinstated, resulting in the report «Working Together with Water» as an integrated water management plan which encouraged environmental resilience via 'building with nature' principles. This move and the renewed 2011 Delta Program, passed into law by the Delta Act in 2012, promoted the Dutch to renew a bilateral collaboration with the Vietnamese, resulting in the following MDP 2013 report. (Delta Commissie, 2008; Meyer, 2009; Meyer et al., 2015; Meyer, 2017; Buuren, 2019; Buuren et al., 2021).
Hypothetically, it must have been the Dutch delta knowledge further developed after the 1953 flood, which modernized South Holland's estuary and was directly transferred to the Mekong delta in the early 1970s. Large-scale water technological innovations modernized the Mekong delta's existing canal and road networks to promote the industrialization of the agriculture sector via mass infrastructural networks for water works, irrigation, and logistical transport. The concern with transferring Dutch knowledge after the re-establishment of the Dutch Delta Commission in 2008 is that it overlooks centuries-old wisdom built up in the Netherlands regarding deltaic geological transformations as well as local approaches to polder management in water town building.
In the Mekong delta, there is a lack of understanding in applying how the local wisdom in the natural estuary of the delta can be modernized to ameliorate ecosystem services while creating cohesive and secure urban-rural habitat. Moreover, there is very little typological knowledge of existing built towns and how they were formed in relationship to water flows or water works. The Netherlands have identified Complex Adaptive Systems in their Rhine-Meuse-Schelt delta as a diversity of currently fragmented systems and subsystems composed of urbanization, network, and geological layers identified, which are proposed to become more synchronized together through hard and soft infrastructures and better coordinated (Meyer, 2009; Meyer et al., 2015). However, this research gap has yet to be comprehensively studied in the Mekong delta.
The Dutch began cooperating in the early 1970s and produced their first report the year before the Vietnam War ended, in 1974 (Netherlands Delta Development Team, 1974). The logic of the French colonial canals was probably more or less superseded by the new rationality of the modernized

Dutch system of drainage and irrigation; however, implemented along many of the same historical canals and extended along original alignments. It is questionable whether the logic from the French was speculated or directly based on a Dutch historical understanding of polder deltaic landscapes whereby canal systems were devised to drain out the land for reclamation.

In 2008, a delta response to threats of climate change was promoted in the renewed DDA and built up as a Dutch brand for Delta management globally, resulting in their worldwide knowledge transfer. The Dutch knowledge of water management was promoted by the Dutch Water Sector through high-level bureaucrats and implemented by embassies and engineer consultants to translate the DDA in other countries (van Buuren, 2019). Therefore, aid-based on transition-based or trade-based relationships were established between foreign governments to promote and export innovative measures for sustainable delta management and other Dutch services in infrastructure and products (Ellen Minkman, 2021; Buuren, 2021). The DDA resulted in DeltaWorks ranging from a «no regrets» measure in hard and soft infrastructural approaches implemented via institutional and private sector processes. DDA initiatives were fostered through programs in Room for the River, Building with Nature (Waterman, 2007), Coastal Weak links, and Water as Leverage (Nillesen et al.; 2021). The measures built by the Nation States led to the initiative to renew the cooperation between the Dutch and the Vietnamese, leading to the 2013 MDP report.

By 2013, the Mekong Delta plans developed in bilateral cooperation between the Dutch ministry and the Vietnamese government served as a successful case of knowledge transfer in South East Asia (Hasan et al., 2019; Ellen Minkman, 2021; Buuren, 2021). Thus, this research proposes to build upon an understanding of the atlases of master plans and their results, mainly through key Mekong delta water management reports across four periods of collaboration: 1) Netherlands Delta Development Team NDDT (1974); 2) Master plan for the Mekong delta in Vietnam, NEDECO (1993); 3) Mekong Delta Plan, MDP (2013) and 4) Mekong Delta Integrated Regional Plan, MDIRP (2020, 2022).

In 1974, the Netherlands Delta Development Team, NDDT, was delivered. This plan focused on responding to Vietnam's food shortage crisis. Although flooding was a factor in determining the irrigation of the waters through upstream, downstream, and gravity-based networks, scenarios capitalized on rice production yield within different land areas and ultimately the economic return to infrastructural investments based on each scenario. Most importantly, the scenario respected the natural flooding of the upper plains, to 'let the northern regions flood,' this would contain floods there, consequently diverting floods where more profitable agriculture could be cultivated within the central regions (Netherlands Delta Development Team, 1973, 1974; Staveren, 2018).

The atlas in figure 1 illustrates a mapping analysis of the planning period. It shows the existing conditions in 1974, whereby bordering conditions between Cambodia were not yet instated, and therefore the upstream portion of the Mekong river is considered with the seasonal flood patterns. The existing condition includes all the colonial canals from 1880 onwards (in red), which the French left after Vietnam regained its independence in 1954.

The NDDT plan shows sensitivity to the natural floodplains and the swampy lands to the North, with a designated planning zone of unprotected flooding deemed uncultivatable (in blue). The yellow zone surrounding the upper Mekong rivers, is planned as semi-protected floodplains whereby rice could be cultivated during drier seasons. The plan is notably built upon concrete knowledge about gravity-based drainage, whereby water flow is naturally directed from the river levee and along the subtle slopping deltaic plain. Moreover, the NDDT reports demonstrate great sensitivity to the demographics of farmers, and it is supported by the proposed farming habitat and canal parcel typology, based on how complementary water systems of gravity drainage and irrigation pumps could be developed depending on on-site parameters (Netherlands Delta Development Team, 1973, 1974). Lastly, the mapping analysis reveals that the designated gravity zone (shown in a widened gray dashed line) is precisely aligned with the first layer of major French colonial period canals built parallel to the Bassac river, about 15 to 20km away.

Figure 1: Mapping synthesis of NDDT 1974 period (by author)

Consideration for flooding and salination emerged in the Master plan for the Mekong delta in Vietnam report (NEDECO, 1993) with environmental impact assessments. The plan was sensitive to inundation for environmental reasons by restricting the control of flood waters in watersheds to allow for regenerative natural processes such as flushing and sedimentation. The chosen planning scenario was centered on the non-abstraction of water and supported by an economic assessment; the moderate scenario proposed no additional water abstraction and full flood protection in designated cultivation areas with no further rice intensification necessary to meet food production objectives (NEDECO, 1993; Staveren, 2018). The 1990s marked the Green revolution period whereby the «all rice policy» was supported by investment in waterworks. Driven by the economic liberalization policy, the master plan attracted large investments in infrastructural works, consequently shifting authorities' responsibility over to Public-Private Partnerships. Nevertheless, planning was still based on environmental factors, and flood control was only accepted as a means of sustainable flood management in the upper regions.

The mapping analysis in figure 2 illustrates how formerly French colonial canal delineated zones became divided by secondary canals (in light red), narrowing the watershed management units into elongated parcels to better drain and irrigate the land for intensified rice cultivation. In addition, the very first vision for three distinct areas (which would persist to the current date) was proposed; they include 1) An area for partial flood control designated in the upper alluvial region (in blue hatches), 2) The intensified irrigation for rice production with flood control in the central region (in yellow hatches), and 3) The brackish area aligned from the transition between fresh and saline waters along the coastal region (in violet-blue hatches). These three zones mark the economic objective for producing three major types of food: rice, high variety rice, upland crops, and aquaculture. The coastal region is delineated by projected saline intrusion lines (in dash blue line) based on seasonal tidal waves, marking the separation between paddy fields or upland crops and aquaculture farming ponds. The first large hydraulic projects are proposed mainly in the 'rainfed' saline zones situated in the inner coastal region (in gray fill zone within dashed gray lines), enabled by extended canals, dikes, and sluice gates and, further supported by extended road networks between major cities.

Figure 2: Mapping synthesis of NEDECO 1993 period (by author)

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The Mekong Delta Plan (2013) reports scientific findings of increasingly urgent threats of Climate change in sea level rise, salination, and subsidence in the delta. Promoted by the 2008 Delta Committee, it was formulated in cooperation with the Dutch ministry and retired Vietnamese reformists to communicate needs and convince the government of sustainable approaches to counter climate change impacts. As the existing rise of High Rice Varieties (triple rice) was deemed less profitable and ecologically polluting, the reformists opted to promote the Agri-business strategy out of four proposed scenarios as a solution to the socio-economic and environmental concerns resulting from intensified agriculture production (Hasan et al., 2019). This selection was driven by economic drivers for the region, as the Agro-business development plan was branded to diversify the Agro-sector via production chains to create more high-value produce (Staveren, 2018). Meanwhile, the MDP offers recommendations for nature-based, including 'Making room for the river,' which suggests innovating on new flood control water management with river restoration. (the Socialist Republic of Vietnam and the Kingdom of the Netherlands, 2013)

Although the MDP plan adopted the three NEDECO planning zones (the upper alluvial region, central region, and coastal region), the mapping in figure 3 shows a switch in the flood water control zone, whereby the upper alluvial region, once designated as full flood protection (in blue hatch) has been turned into a controlled flood zone. On the other hand, the formerly flood-controlled area in the central region in NEDECO (in green hatch) is released for aquaculture and diversified high-value food production in the MDP. Thus, the mapping analysis reveals that the plan is less urgent in responding to the anthropogenic impact of triple rice production in the upper alluvial region and supports the latest construction of raising dikes and extension of canals (see the added canal lines in red to the North). This is concerning because, in order to realize the sustainable Agri-business vision, ecological integrity needs to be recovered in the upper alluvial floodplains (whereby the flooding process provides the necessary tidal waves to flush and cleanse the delta) as a means to regenerate the land and in turn provide the ecosystems services necessary for the diversification of land to cultivate high quality produce. Meanwhile, in contrast to the NEDECO plan, the formerly intensified rice production zone is shifted into the central region, between the river estuaries, and extended to the coast.

In addition, a large-scale hydraulic project is proposed across the entire An Giang and Long Xuyen Quadrangle western region, to be implemented with further plans to fully control floods in continued support for High Rice Varieties (see gray fill within dashed gray lines). Furthermore, increasingly large-scale hydraulic projects (in gray fill within dashed gray lines) are planned along the coast and extended to Ca Mau, where most of the brackish water culture and aquaculture production occurs. Lastly, a growing amount of infrastructure investment has been made to implement mobility networks via upgrading roads and extending national roads, bridges, and highways to connect almost all major cities and towns (shown in black lines and gray urban zones).

Figure 3: Mapping synthesis of MDP 2013 period (by author)

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As a result of the success of the MDP 2013 plan, Resolution 120 (The Socialist Republic of Vietnam, 2017) was mandated to promote socio-economic sustainability as a solution to climate change impacts, with policy to support integrated planning across the municipal, provincial, and national level strategies. This move initiated the development of the Mekong Delta Regional Integrated Plan (2022) to implement the MDP's Agri-business vision through a framework of regional socio-economic development to implement projects in urban, infrastructure, and hydraulic works. The plan responds most to future Climate change risks maps and projections—revealing the increasing threats of flooding caused by river and sea tidal waves and the resulting salinity breach from the sea level rise.

Nonetheless, the mapping in figure 4 illustrates how the plan more or less aligns to the baseline parameters established and reiterated (however differently) from the NEDECO to the MDP plan. These three development zones are still present, however, extended and altered with variations of options for land diversification (shown in yellow, with different hatch patterns to show alternatives). This centrally elongated zone (yellow) was proposed within a geographic region slightly higher above sea level and situated between watersheds and right where the brackish water breaches (dashed blue line with a purple fill). This zone was designated as a diversified land zone; it forms a landscape corridor between North-South cities across the delta and serves as the key to the development of the MDP's Agri-business vision; whereby a high-value food production chain could be technologically advanced in an upland region situated in between irrigated fields and brackish cultures.

Lastly, the formerly proposed large-scale water projects are further enlarged along the brackish outer coastal edge, and a significant new water project is proposed southwest of the central region of Can Tho. These water projects continue the MDP; however, taking on more diversified land types between fresh water and saline seasonal usages and supported by an extensive addition of river and sea dikes to polder these project zones. Located in the main region for brackish culture, the Ca Mau area remains largely unchanged (within the saline area in the purple zone to the south), with the exception of added dikes presumably for future water projects.

Figure 4: Mapping synthesis of MDRIP 2022 period (by author)

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The bilateral development of the master plans since 1974, through the Dutch water management knowledge over the last four planning periods and in particular with the promotion of the DDA since 2008, is impressive; however, at times contradictory from one report to another, possibly due to shifting geopolitical attitude in response to climate change and Mekong's economic development trends. The master plan objectives shifted from a rice intensive production plan responding to the postwar food shortage in Vietnam during the NDDT period to the intensification of agriculture and flood protection (NEDECO, 1993) and the generation of an Agri-business strategy to the diversification of cropland (MDP), by looking into latest innovations in Dutch Delta Approaches in Nature-Based Solutions to water management. All these master plans and the success of the Dutch knowledge transfer in the MDP formulated key policy mandates which pushed towards more comprehensive aims, challenging the trends in rice intensification by implementing a more integrated regional development strategy with variations of sustainable development frameworks (MDRIP).

However, the development of the master plans between the four planning periods was essentially driven by geopolitics because they produced several contradictions from one atlas to another. In particular, the fully protected flood area, which restricted the control of flood waters for regenerative reasons, was initially designated at the upper alluvial region in NEDECO, but changed to a controlled flood area for High Rice Variety in the MDP. In contrast, once designated as flood control for rice production in the NEDECO report, the central region became designated for diversification in the MDP and MDRIP reports.

These changes reveal a lack of consistency in the ecological knowledge formulated regarding the delta's ecosystems and the ecological values that could be regenerated in ecosystem services for the region. This could be well developed if the Dutch delta knowledge was less branded for its technological and managerial innovations and resonated more of its centuries-old wisdom in deltaic estuary formation and corresponding knowledge in polder town building as well as the Netherland's up-to-date research aims in the Complex Adaptive System. These are two significant spatial scopes that developing deltas like the Mekong need to integrate as essential socio-techno-ecological dimensions to better address the compounded effects of climate change and the increasing state of the Anthropocene.

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TOPIC 4

NEW APPROACHES TO TECHNICAL DIMENSIONS FOR THE BENEFIT OF LOCALITIES

Long regarded as tools for growth while disregarding their negative effects on the planet, technical approaches today appear as key components for promoting new forms of development that are sensitive to environmental quality. This theme therefore considers evolutions in sector-specific approaches to cities and regions, such as infrastructure, mobility, natural resources, energy or digital technology, with an emphasis on how such approaches contribute to more sustainable forms of action.

EXPLORATION OF SOCIO-ECOLOGICAL CONTINUITIES IN GREAT GENEVA,
WEAK NETWORKS AS A TERRITORIAL PROJECT

4-A-1

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ABSTRACT

The feud between two territorial planning cultures, namely the Transit-Oriented-Development (TOD) model and the 'territories of dispersion' is resulting in the incapacity to develop a coherent territorial project respectful of the existing natural and built resources. Facing the challenges of the ecological transition, this dichotomy between two urbanization-mobility theories need to find new forms of hybridization. The introduction of the potential embodied in open spaces, and more particularly the ecological networks they support, is understood as a mean to reconsider the division between human and non-human movement. This two hypothesis demand to renew our gaze on the territory acknowledging the plurality of network necessary to support diverse and complex lifestyles and forms within the contemporary metropolis.

In the context of the Great Geneva metropolitan area, the TOD-like dominant radio-centric model is unable to address the inherited dispersed and dynamic village structure. The case study of the Pays de Gex is used as an example to locate the potentialities of the « in-between » infrastructure territory to develop an alternative discourse on the urbanization-mobility relation.

To foster an inclusive transition, the techno-economic rationality implied by TOD is insufficient and needs to be broaden. This demands to investigate weak territorial networks' ability to support the transition of practices, and foster potentialities imbedded in the plurality of urban forms. Through a research-by-design approach, active mobility and ecological capital become frameworks to reinvest the carrying capacity of hybrid territories. Such shift constitutes an opportunity to `land' in the territory, by focusing on figures of continuity defining gradients of relationship between human and non-human infrastructures. These three coexisting structuring mobility networks: strong, active, and non-human, are proposed to redefine accessibility as a broader socio-technical and ecological system, becoming the base for new conceptual and operational tools of the 'City-territory' project.

KEY WORDS:

Weak-networks, TOD, DOD, Active-mobility, ecological continuities.

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INTRODUCTION

The ecological transition raises the question of our capacity to transform the territories we inhabit to support practices capable of drastically reducing the impact of human lifestyles to guarantee the coexistence of all living beings (GIEC, 2019). The relationship between infrastructure and urban forms is at the heart of these issues, as a socio-technical spatial system (IPPC, 2014; Geels, 2004). It implies, on the one hand, the modal shift towards more virtuous modes, and on the other hand, the ability to support to transformations of practices and lifestyles (Rigal, 2018). First, these issues require to go beyond the theoretical opposition, between compact and diffuse urban forms, and their corollary, pipe and sponge-like mobility networks (Secchi ,2016), reflecting on how infrastructures and built forms can better sustain the multiple ways of inhabiting the metropolitan territory (Offner, 2020). Secondly, to get out of the current paradoxes, it is necessary to step towards a more ecocentric gaze finding new interaction with biodiversity, namely integrating ecological infrastructure as a new network of the socio-technical territorial project (Brunetta et al., 2019). The objective of the case study is to investigate potential synergies between human mobility and ecological continuity going beyond their usual opposition and showcasing how they challenge the rationality dominating mobility-urbanization debate.

This exploration is a contribution to the Hors Zone-à-Bâtir mandate, where the Great Geneva commissioned EPFL's Laboratory of Urbanism to develop a method for territorial planning in the scope of the socio-ecological transition. This article reports on a contribution regarding one of the case studied in the mandate: the Pays de Gex. It is the result of a collaboration with M. Villaret whose contribution frames ecological continuity as a territorial project. While this article proposes to look at active mobility networks, through the figure of socio-technical continuity, as a support of dispersed 'lifestyles' beyond the dominant TOD model. The objective of this contribution is to design socio-technical and ecological continuities in synergy, bringing out co-benefits, improving their respective quality and co-promotion. This conception is based on a gradient of use and landscape that articulates the distancing and the encounter between human and non-human.

STATE OF ART

The territorial development is intrinsically liked to the underlying mobility project, that is what potential access is given to whom, and how people use this ability. The challenges of the socio-ecological transitions, including the 'Zero-net-land take' (EU, 2016), invites to go beyond the theoretical opposition between two territorial cultures, namely the TOD (A) and the 'territories of dispersion' (B), in order to go towards an inclusive socio-ecological project working with existing human infrastructure or STES (C).

A.TOD

TOD or Transit-Oriented-Development is a planning model aimed at reconciling urban planning with public transport engineering. The urbanization-mobility duo is based on the development of public transport networks, understood here as part of the "strong" networks, and their capacity to structure, on a regional or even on a national scale, compact and mixed urban growth. (Calthorpe, 1993; Bertolini et al, 2012; Cervero et al., 1998). This concept experienced a major boom in the last decades in both academic sphere and planning policies (Ibreva et al., 2020; James et al., 2019). Furthermore, TOD, or ever Green TOD (Cervero et Sullivan, 2011) is today featured in most international reports (UN-habitat, IPCC, EEA, OECD…) as a sustainable alternative to urban growth, in the face of current environmental challenges (Krueger and Gibbs, 2008; Papa and Bertolini, 2015). The model is based on two pillars, which in their interaction, ensure its techno-economic rationality (Cervero, 2007): the ability to densify and to provide a competitive public transport service, creating a positive feedback dynamic based on growth. This model promotes urban development limiting land consumption through density and compactness, presented as an alternative to sprawl, while decreasing the carbon footprint of individual lifestyles, through the reduction of car-dependence (Renne, 2013). TOD is a two-scale model based on a hierarchal vision of transport modes, public transport for efficient long-distance accessibility to regional job opportunities, and proximity-based living within a radius accessible by foot, or pedestrian pocket (Bertollini, 2002). Therefore, TOD operates a critical shift in transport planning, from a Mobility-based to an Accessibility-based approach (Curtis and Scheurer, 2010).

However, the TOD model, through its 'cityist' bias (Angelo and Wachsmuth, 2015), hierarchic and a-contextual approach, 'naturally' omits the inherent qualities of the pre-existing territorial structures, whether built or natural. It requires a simplistic and homogeneous way of inhabiting the territory through a punctual notion of accessibility, driven from the work-home bipolarity, schematically drawing an inside and an outside (Qviström et al., 2018). Hence, this model negates spatial intermediate scales, despite some attempts to broaden its spectrum notably through the recourse to active modes, namely biking and walking (Lee et al., 2016, Morar et al., 2013) and modes plurality (Kagem et al., 2016). As a result of this linear approach, the model gazes upon low-build density as 'insufficiently' developed or sprawled (De Vos et al, 2014; McFarlane, 2016). Furthermore, the technical-economic rationality of transport logic (Keblowski et al., 2018) embedded in the model plays an active part in socio-spatial fragmentation (Graham et al., 2001; Viganó, 2016). Therefore, a growing literature advocates for a more balanced and heterogeneous approach to the urban-infrastructure perspective, inclusive of the specific socio-ecological realities of the sub-urban (Westerink, 2011; Newton, 2017).

B.Territories of dispersion or DOD

The dense literature on 'territories of dispersion' across Europe, sets a cohesive counter-discourse to the normative TOD model. Through site-specific research, they define heterogeneous urban patterns as a necessary terrain for urban exploration in the search for inclusive and sustainable territorial organization. Hence, it operates a shift in the urban practice, which aims to « learn from the complex self-regulating orders already present in the urban fabric » (Vigano, 2017: 89) rather than to orientate growth. A.Brès even proposes the acronym of DOD or Dispersed-Oriented-Development (Brès, 2020) to define the relation between mobility networks and hybrid urban forms rooted in the historical and topo-morphological rationalities of the territory. The corollary to the discontinuous urban form is the predominance of networks over build fabric (Pope, 1996) and surfaces (Corboz, 1997). In the 'in-between' (Sieverts, 2004), rather than the rigid infrastructure, the dominant figure is that of the 'weak' networks. Weak networks are understood as the finer mesh of infrastructure dedicated to

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mobility, in opposition to 'strong' or tube-like infrastructure. They can be articulated in the territory with rather isotropic (Viganó, 2016) or hierarchical logic (Pope, 1996). Studying these networks demand to enrich the desciption of accessibility, understood as the sum of both proximity and mobility (Levin, 2020), with concepts such as porosity, connectivity, and permeability, going beyond any *a priori* modal assumption (Secchi et al., 2012). Putting forward these networks as the support of diverse and complex 'lifestyles' (Kaufmann et Ravalet, 2019) in the metropolis also challenges the usual 'dogma' of speed, spatially materialized by strong infrastructures. Reconsidering daily time-budget allocated to transport, TTB, (Kaufmann, 2021) through the frame of speed is an undervalued territorial level, conditioning the relation between movement and settlements (Dubois et al., 2021). Therefore, the research on the potentials of dispersed urban forms refuses the modern dichotomy between mobility and proximity, between time and space, and is more akin to a relational approach (Qviström, 2014), sensitive to the plurality of scales and to the site-specific opportunities between 'discrete' networks and the territory (Brès, 2015).

Nevertheless, dispersed urban forms developed thanks to the quasi-isotropy offered by the car for almost a century (Denis et al., 2009), progressively excluding other modes (Dupuy, 2011), and denying infrastructural space its' public good value (Lévy, 2011). This represents both the most critical downfall and potential for these spaces' transformation. Indeed, several prospective researches have demonstrated that alternatives to the car-base-model in hybrid landscapes requires a spatial project investing alter-modality and spatial distribution, rather than a simplistic shift from an all-car to an all-public transport system (Vigano, 2016; Cogato Lanza et al., 2021). Indeed, historical research has shown how car-dependency in these territories is due to a lack of spatial and political project able to support dispersed patterns of living rather than a fatality (Grosjean, 2010). In this regard, spatial planning concept known as 'Decentralized Centralization' in collaboration with strong public transport development, can be seen as one of such few willingly balanced urban models (Frank, 2019). In Switzerland, until the 80's, it was a clear attempt to define an optimum use of the soil while acknowledging the territorial setting as a 'humanized landscape' (Winkler, 1967).

Nevertheless, the horizontal organization of networks and urban fabric remain a source of risk for the ecological carrying capacity of the metropolitan territory and needs to be co-thought with the landscape structure.

C. Toward an ecocentric mobility: STES
While the TOD discourse is set on an opposition between human settlement and natural environment, the challenge of the 'City-territory' (Corboz, 2001) or the heterogeneous 'urbanized landscape' (Sieverts, 2004) is to consider open space as a resource to be thought 'with' (McHarg, 1969) and not 'against'. Introducing the natural elements as 'structuring agent' of the territorial and urban project (Viganò et al., 2016) allows to move away from the linear approach between urbanization and networks. However, it is not only a question of open space as attending to human needs, but an ecological challenge that remains only mildly addressed. Relation between urbanism and landscape ecological is not new (McHarg, 1969; Maumi, 2016) and is ever stronger, but remain nonetheless anthropocentric (Millenium assessment, 2005). Meanwhile, ecological continuities current planning instruments aiming at restoring species flows by connecting certain habitats (Regina, 2019) paradoxically remain little operative in the territorial project. Hence, it is necessary to renew interactions between ecological networks and human networks, to actively value a more-than-human approach as a territorial project (Metzger et al., 2017, 2019). This implies a shift from zoning to a systemic approach to foster multi-functionality within spaces (Vigano, 2012). Further steps in the integration between ecology and urban planning are necessary (McGrath et al. 2011),

embracing the urban landscape spatial heterogeneity and diversity whether 'dense or patchy' (Pickett et al., 2009). Thus, it is not only an approach to socio-ecological systems (Pickett et al., 2008) but also the integration of built infrastructure which is at stake (McPhearson, 2016). This requires tools able to « incorporate interactions among the social, ecological, and infrastructure components of urban systems » or STES (McGrath and Pickett 2011). Thus, even more than the built space, it is necessary to think about the integration of human infrastructure, in wider ontological meaning (Barua, 2021), with ecological networks in the territorial project.

METHOD

The Greater Geneva have embarked on a wide project to revise its spatial planning instruments in   to meet socio-ecological challenges. This will result in a renewed cross-border territorial vision for 2025. The Hors Zone-à-Bâtir   mandate , at the origin of this research, is part of this movement. This mandate has made it possible to explore an approach of mutual support between open space and mobility networks and the synergy that could arise from a more-than-human approach. This exploration articulated a research-by-design (Viganò, 2014) perspective with a transdisciplinary collaboration between researchers and actors of this cross-border Agglomeration.

First,   a   transdisciplinary   workshop allowed to identify current practices in the field of mobility and ecological planning. Discussions and collaborative mapping made it possible to refine our conceptual approach to socio-ecological continuities by confronting it to field practices and actors knowledge. Secondly, to foster this conceptual shift, more a-typical cartographies were produced to represent human and non-human mobilities. The maps make visible the interrelations between spatial structures, their functionalities, their daily uses, as well as the landscape qualities specific to each continuity. Then, through a process of homogenization, developing a common legend, they allowed to co-represent these two networks, despite the great disparity of the GIS data available. This cartographic method is based on GIS data, most of which open-source, which are then recategorized according to the common legend. The result is a territorial vision composed of prospective, scenario-based mapping and action principles, which makes tangible a possible transformation of the territory. This proposal is not solution-oriented, but aims at paving the way for possible interactions between two-sided territorial realities: on the one hand, current planning policies, offering certain accessibility potential to its inhabitant, and on the other hand, inhabitants capacity of appropriation of the territory, through the development in space and time of their lifestyle and practices.

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Fig.1c Great Geneva Urban strategy, 2021
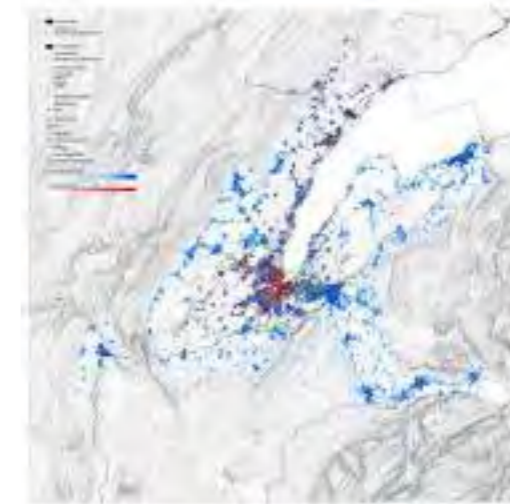
Fig.1d Housing density (Bleu) Job density (red), 2018

The region depicted in this analysis is the Northern part of the Great Geneva cross-border Metropolitan region (Fig.1a). This living basin of over 2000 km2 hosts over one million inhabitants. Since 2007, the Grand Genève Agglomeration doted itself with diagnostic and planification tools to foster a common territorial project encompassing transport, urbanization and environment. With over 600 000 migration per day in the metropolis, transport infrastructure development is at the core of cross-border collaboration . Because of the dead-end position of Geneva, the four Agglomeration Plan have tried to promote a radio-centric TOD-like planning model either reaching existing polarities or developing new compact neighborhood (Fig.1b,c). This territorial project, respond mostly to commuters' rapid travel needs induced by the economic attractiveness of Geneva, as well as the political will to limit sprawl and ecological fragmentation thanks to compact urban development (Fig.1d).

However, due to the historical dispersed village fabric structuring the urban setting (Fig.2a), nearly half of the population lives « outside » of the rigid finger-like-model (Fig.2b). Meanwhile, these villages have taken on a major part of the demographic growth in the past decades, mainly on the French side, making it impossible for transit to support this parallel urban development1.

Hence, it is necessary to understand how the relation between mobility and settlement is appropriated in this "in-between" areas. The present research is based on several observations made through the analysis of daytrips in the Greater Geneva Agglomeration. Firstly, lifestyles and practices, as defined by movement, in the Greater Geneva are relatively homogeneous regardless of the geographical setting. Second, in areas with good or poor public transport access, trips of less than 5km are predominant (66.4 to 60.9% of trips/day). Third, the differential in terms of mode between good or poor accessibility is not only, as one might suppose, a shift from public transport to individual vehicle. Indeed, the share of active modes for local distances (>5km) decreases significantly (-20%) in poorly accessible areas. Finally, there is also a significant difference on both sides of the border in terms of active mobility use (47.8% of trips for Switzerland and 28.2% for France)2.

1   Grand Genève Agglomération Franco-Valdo-Genevoise. 3e Projet d'agglomération du Grand Genève, Rapport principal, 2016.
2   Calculations made by the researcher on the bases of this work focuses on travel demand. The data on travel demand is drawn from the Mobility and Transport Microcensus (MRMT, 2015) on the Swiss side, and the Travel Survey Greater Territory (EDGT, 2016) on the French side.

Fig.1b Multimodal strategies for mobilities of Great Geneva, 2021

Fig.2a Village structure of the Great Geneva, 2021   *Fig.2b Accessibility Public transport Great Geneva, 2021*

The Pays de Gex is a paradigmatic example of the unbalanced relation within the Metropolitan area, with 30% of its active population working on the Swiss side3. It is characteristic of what studio Basel called « the other Geneva »4, structured by a linear urbanization along the foot of the Jura. This territory is a crucial landscape linking the Jura massif to the Rhône River forest, structuring major ecological corridors5, particularly for large fauna. Following the land pressure generated by Geneva, it has seen its building density doubled in the last 20 years6 with marginal investment in transport infrastructure since the 60's. The scale of the present research allows to decenter the gaze from Geneva, showcasing the stakes of this territory « in-between » strong mobility networks. Indeed, the accessibility offered by the current or planned public transport only reaches 26% of its population7. For the rest of the Pays de Gex's urban settlements, public transport is marginal, implying a strong car-dependency.

RESULTS

The exploration of socio-technical and ecological continuities led to three results: a concept of socio-ecological continuities (A) ; a cartographic analysis of these continuities (B) ; an operative project (C).

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3   Insee. Dossier complet, Intercommunalité-Métropole de CA du Pays de Gex (240100750), 2022.

4   Diener, R., et al., 2007. Die Schweiz: Ein städtebauliches Porträt. Grenzen, Gemeinden. Eine kurze Geschichte des Territoriums. Birkhäuser.

5   Corresponding to the one defined by the study of ECs for the Schémas de Cohérence Territorial (SCoT) of the Pays de Gex (fig 4a).

6   Insee. op.cit.

7   Calculation made by the researcher on the bases of the Accessibility defined at the Great Geneva scale by the Federal office for spatial development (ARE) and population squaring produced by the Territorial Information System of Geneva (SITG), through GIS processing.

A.Feedback and co-conceptualization of socio-ecological continuities.

Workshop

The transdisciplinary discussions and mappings highlighted the levers, tools and limits to the synergy between ecological continuities and soft mobility outside the building zone.

First, active mobility is addressed mainly from two angles in current planning: for local-tourists, and as feeder-mobility towards train-tram stations. The current definition of a trans-border cycling infrastructure[8] is rather a matter of bringing together communal initiatives than a territorial project, despite the awareness of the growing share of active mobilities. Nevertheless, an innovative reflection is developed on active modes capacity to support daily mobility. Exchanges rose the necessity for active mobility to be both a mode and an end. In this prospect, stakeholders enforced the importance of considering not only efficiency but also landscape quality and even cinematic perspective as a vector promoting low-speed modes.

Secondly, in current practice, human and non-human networks are mainly perceived as 'incompatible'. The dominant approach taken by the Canton de Genève consists in organizing the distancing of both networks while promoting some specific places of encounter. It was pointed out that such action could also become a strategy of 'dispersal', to deal with overpressure on natural amenities by local-tourism which manifested during the Covid-19 period. Such strategy would demand to integrate human and non-human mobilities in a reflection on dispersed and diversified accessibility to landscape amenities. However, no such approach exists in a cohesive way today, since they vary according to the sectors, legal frameworks and public service involved. Hence, they depend on the type of space concerned: city, forest, river or agricultural zone, etc. and on specific practices such as, bocage hedges9 re-introduction, river renaturalization process, agricultural initiatives, supported by tools such as the Surfaces de Promotions de Biodiversité or 'arboreal continuity'.

Conceptualization of socio-ecological continuities.

The hypothesis is based on the current approach but proposes a rupture in assuming techno-social and ecological continuities as a territorial project. The coordination of human and non-human network is aimed at finding positive interactions, improving the quality of life of all species while respecting their respective needs and coexistence potentials. It allows the articulation of the movements of anthropophilic and anthropophobic species10 with human practices according to a spatial and/or temporal gradient rather than through zoning. This approach is based on a double radicalism, going beyond the usual approaches to both human continuities (Fig.3a) and ecological ones (Fig.3b). This shift demands to analyze these two mobilities equivalently (Fig.3c), which corresponds to a cartographic challenge. Then it is possible to develop them in synergy (Fig. 3d), bringing out co-benefits.

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8   Grand Genève Agglomération Franco-Valdo-Genevoise. Schéma cyclable 2030, Cahier n°16-6, Fiche thématique, volet2, Juillet 2014.

9   We speak of bocage hedges and not of forest because this would require a change in the status of the plots.

10   Anthropophilic species are the one that are favored by human activities, aiming to create symbioses (e.g. crop auxiliaries that limit the invasion of pests). Conversely, 'anthropophobic' species are the one that avoid humans.
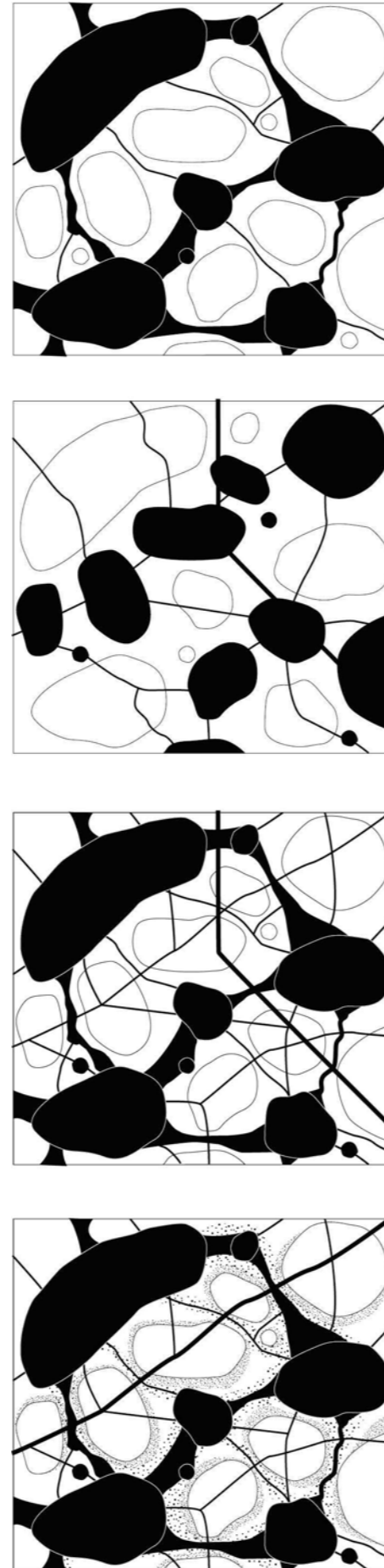
B.Mapping socio-technical and ecological continuities

Socio-technical continuities

Through a bottom-up approach, starting from the existing dispersion, the description of the socio-technical system supporting human movement attempts to visualize the spatial potential and morphological challenges defining the accessibility to both built and landscape amenities. It proposed to revert the modal pyramid, starting with the structuring capacity of active modes. Hence, the hypothesis made here take a radical shift from the car-based current mobility planning in the Pays de Gex11. The hypothesis of a structuring potential of active mobility network is supported by the analysis of daily movements. It assumes that the lack of recourse to active mobility is less related to a counter-disposition of the population than to a lack of spatial opportunity given to inhabitants to develop their lifestyle through these modes. It therefore chooses to abstract from the segregated visions of mobility networks, opposing efficient and punctual commuting logic (Fig.4a) and qualitative active touristic mobilities (Fig.4b). It allows to identify, through mapping, the capacity of the existing networks for 'alter-mobility' to support the 73.9% of daily journeys that are not work-related (52% in kilometers)12. The figure of continuity refers to the scale of the «in-between» or «dispersed proximities», generally invisible in transport planning policies, as a support to the diversity of the «lifestyle», aggregating both daily activity and leisure. Thus, soft mobility, in relation to public transport, allows to reflect on transversal and tangential continuities to the dominant radial-model. Active mobility as an infrastructure proposes a positive territorialization, supporting modal shift but also the transformation of practices. It describes a linear accessibility through a spatial and relational approach based on the effective porosity and dispersion of the territory as well as ecological rationality. This conceptual shift defines the notion of socio-technical continuity.

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11   See Pays de Gex Agglo. Schémas de Cohérence Territorial (SCoT) of the Pays de Gex, Rapport de présentation Tome 1 et 2, 2019. Available at : https://www.paysdegexagglo.fr/9294-le-sche-ma-de-coherence-territoriale-scot.htm

12   Calculations made by the researcher on the bases of this work focuses on travel demand. The data on travel demand is drawn from the Mobility and Transport Microcensus (MRMT, 2015) on the Swiss side, and the Travel Survey Greater Territory (EDGT, 2016) on the French side.
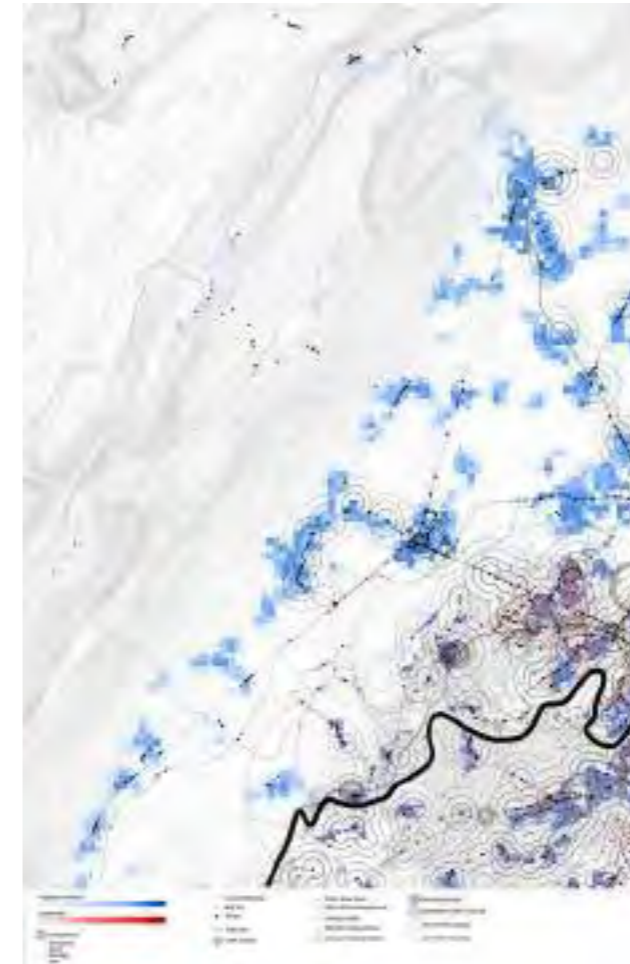
Fig.4a Commuting mobility map

Fig.4b Local tourism mobility map

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The map presented here seek to highlight the current networks and their relation to the elements structuring the diffuse territory (Fig.5). The challenge of « proximity »13, as desired by the latest agglomeration plan, is not self-evident in these spaces. The cartographic challenge is to represent the potential and the limits imbedded in the territorial rationality of the cross-border territory and to what extent an active mobility infrastructure can improve the quality of life of its inhabitants. It is not a question of representing the current flows, but rather to represent the space and the potential anchors of a structuring active mobility. At the center of this cartography are the settlements, as transmitters of movements, with the aim of describing their potential accessibility to both built and landscape amenities, to describe what constitutes the 'banks' of human flows. Built amenities are represented by a non-hierarchical aggregation of daily, leisure and touristic amenities14, thanks to open geo-localized data. It also includes qualitative or functional micro-equipments as anchoring elements for active modes.

 It does not aim to assume their use but simply to visualize their positioning on the road network as well as their relative concentration-dispersion in relation to the settlements and light public transport, and therefore the potential they offer to the inhabitants. The natural amenities and open spaces are classified depending on whether they allow free, conditional, visual or no access, defining the degree of adhesion of the existing network to the functional territory. This classification is produced by superimposing and re-qualifying the map of environments (SIPV), the classification of simplified affiliation zones of Greater Geneva (SITG). Topographical elements and strong infrastructures are considered as obstacles to accessibility.

This cartographic homogenization makes it possible to reveal a series of levers, particularly regarding the influence of morphological and planning logics on either side of the border. For example, potential cycling metric15 between villages core, the impermeability of the boarder, preventing cross-connections, or the village-centered Swiss amenities versus the dispersed and specialized French amenities. Moreover, on the Pays de Gex side, the network resembles a ladder where the transversal continuities are extremely limited, detrimental to porosity, whereas on the Swiss side the territory is finely meshed. However, the denser the human networks, the more fragmented the non-human networks. Hence, stronger natural continuities can be seen on the French side of the boarder. This particularity is mainly due to the specificities of the agricultural practices including the bocage structured French plots. Finally, although open space is everywhere, accessibility to natural 'capital' (Vigano et al., 2016) is not isotropic. It is defined by «entry points» and currently avoided by cycling networks.

This study makes tangible components, imbedded in the finer grain of the territory, conditioning human movements as well as potentials and obstacles, to support alter-mobility. Secondly, it tries to define the stakes of looking at the space of human movement in parallel to natural continuities showcasing the paradox between human and other species accessibility.

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13   See Grand Genève Agglomération Franco-Valdo-Genevoise. 4e Projet d'agglomération du Grand Genève, Rapport principal, 2021.
14   In the frame of the transition, local food production are also included in daily amenities.
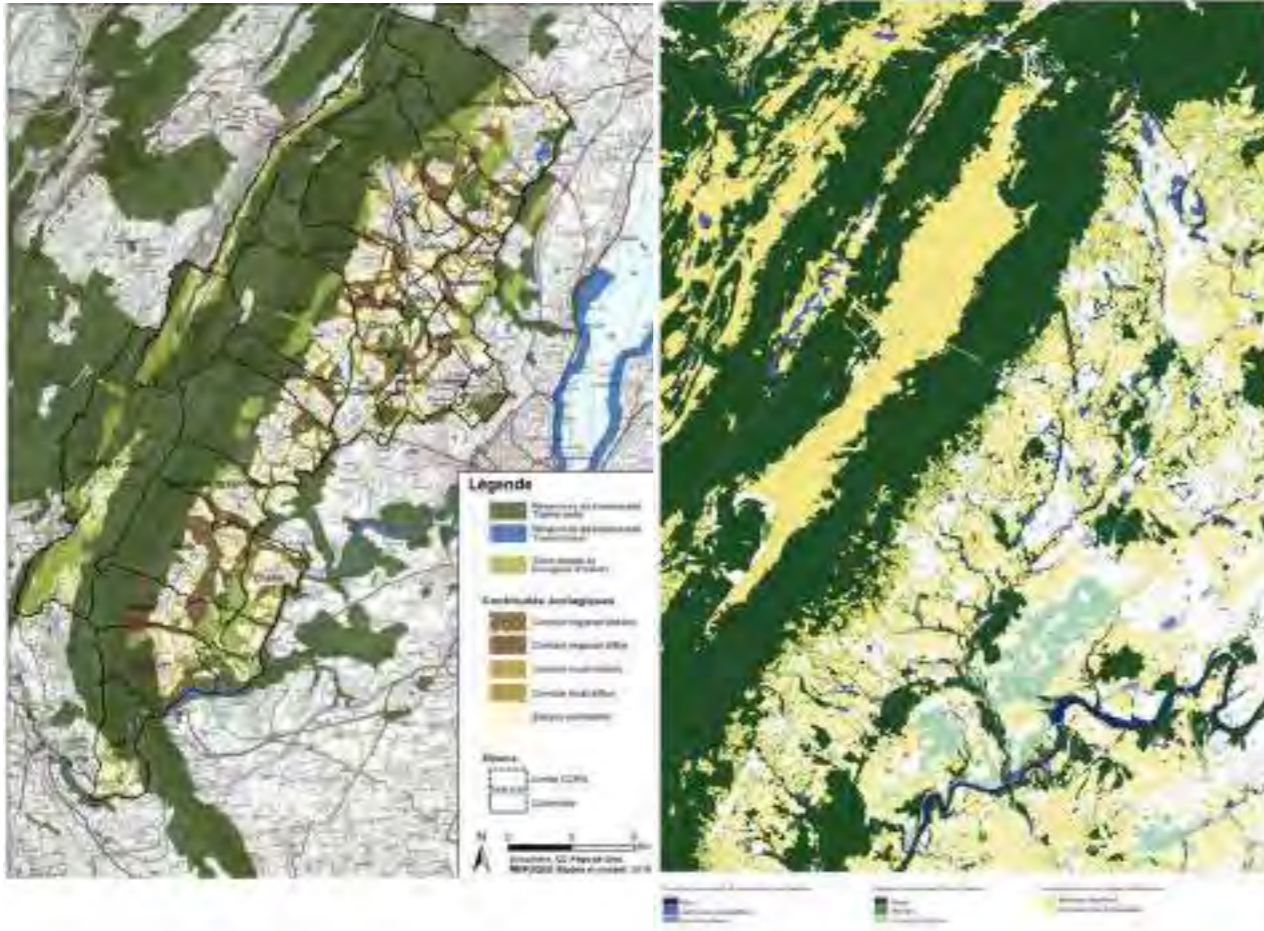15   2.4km on the French side, 2.3km on the Swiss side and 3.24km across the boarder
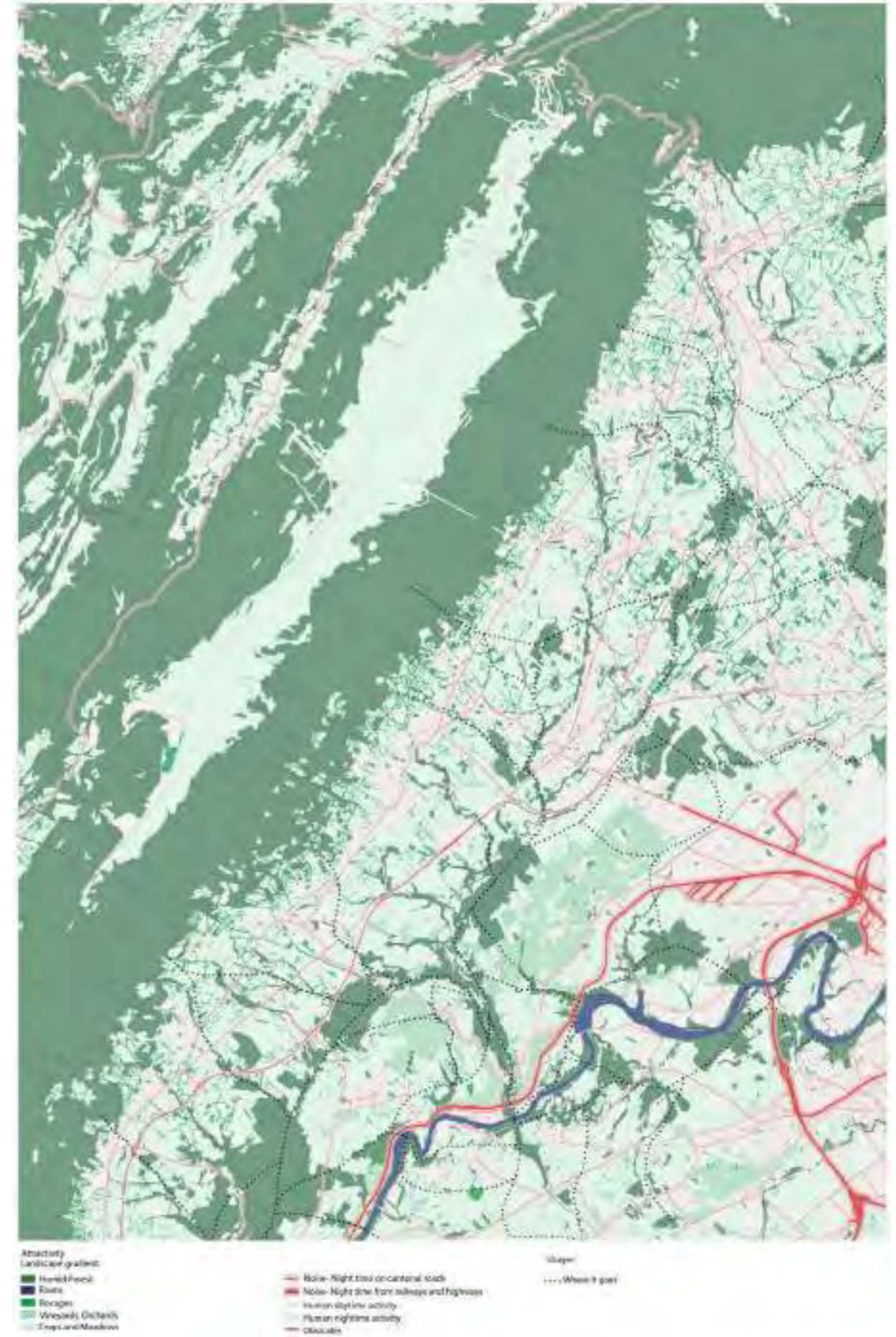

Fig.5 Dispersed accessibility

Ecological continuities.

Fig.6a Map of ecological continuities   Fig.6b Map of the landscape structures of EC

Ecological continuities are approached in the same way as sociological continuities, breaking away from the usual ecological conceptions (Fig.6a). They aim to make visible the landscape structures that interweave various habitats (Fig.6b), without delimiting any contour, while showcasing the movements of more or less anthropophilic species, here the deer (Fig.7)16. This allows to introduce the notion of 'landscape grain' as a territorial tool. This approach is developed in the article by M. Villaret.

Fig.7: Deer ecological continuity map

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16   Data available thank to: Corridors pour le déplacement de la grande faune (cerfs, chevreuils, sangliers), SITG, 2020.

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C.The project of Socio-ecological continuities

A prospective *mapping method for socio-ecological continuities.*

First, establishing the socio-ecological continuities project requires a common language, in order to understand how these networks can construct a territorial vision. The aim is to represent the prospective spaces of continuity. In order to identify what the networks currently and potentially connect (logic of attractiveness), their components (roads, bocage, agriculture, etc.), as well as their settlement rationally (large fauna avoids open hills, villages are located outside flood zones, distance reachable by bike though the road network). Here, accessibility is understood as a common ground, for both human and non-human, and depleted into a gradient. The space of movement is not seen as punctual (10min-circle or protected zone) or as unidirectional (transport infrastructure or green corridors), but through permeability, influencing the fluidity of movement of the species considered. This approach refers to the porous city (Secchi & Viganò, 2011) and the landscape gradient or bocage grain (Baudry and Boussard., in press). It makes it possible to apprehend how the intensity of use of a species is or could be dispersed in space. This mapping allows a transversal reading making tangible the relationships - beneficial or deleterious - between these two continuities.

Fig.8a Vision for Socio-technical continuity   *Fig.8b Vision for Ecological continuity*
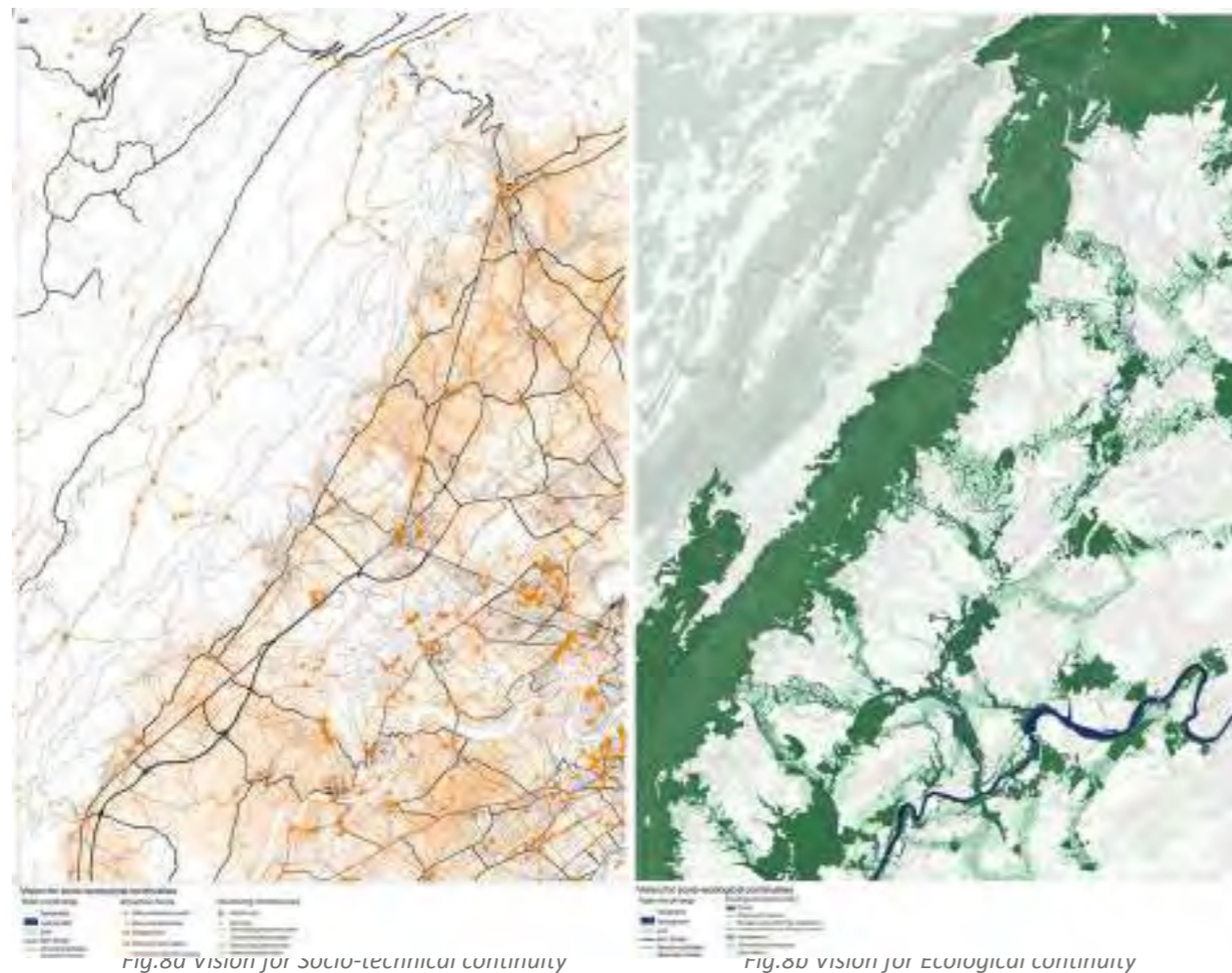
Secondly, the two atypical readings, allow to define a double prospective radicalism (Fig.8a,8b). Thus, the sociological continuities serve to revalorize spatial proximity and journeys through active mobility metric as territorial infrastructures, building on landscape quality. Assuming to re-localize mobility means improving life quality, enhancing the value of the territory, diversifying its uses and strengthening its resilience, through the reduction and dispersion of human pressure, finding

intensity and quiet areas. Ecological continuities make it possible to enhance a space of connectivity that is comfortable for non-humans, either through a process of rewilding to create a landscape roughness that distances humans and antropophobic species, or by being maintained to make the space attractive for specific species, including the human species.

Scenario for socio-ecological continuities

In this scenario, socio-ecological continuities enhance each other, revitalizing the landscape as a medium of diffuse coexistence. Their interactions changes as we move from human environments supporting human continuities to wilderness habitats supporting wildlife continuities. The sociological-technical continuities are made up of pathways, cycle-lanes and re-qualified roads which structure indifferently daily activities, leisure and tourism to propose an alternative to individual cars use. This network, taking the radical ecological project as an opportunity, proposes to give priority to active mobility and their connection to other weak networks as a mean to reappropriate the porosity of the road network. Beyond connecting components (amenity, station, viewpoint…), it defines critical interaction with the ecological network. The network's nature is subordinated to the gradient of proximity established with the landscape, determining the cohabitation of modes and practices. Questioning the mesh substance, including diminishing the car's hegemony, is an opportunity to reduce its impact and fragmentation it provokes on the landscape to foster non-human mobility.

This network therefore takes on different forms, depending on the gradient of interaction between human and non-human, from urbanize to wild, defining different operational principals. From the urban area, where it coexists with other modes of transport on specialized lanes, it then develops transversally on limited speed roads. Woodlands or rivers crossing the villages are intended for human frequentation, like public spaces (Fig.9b1,4,7,10) offering rich itineraries, also favorable to anthropophilic species. Then, through the agricultural land it seeks to channel the flows into roads where active modes have the priority, toward spaces where only active modes are allowed to develop new places of interaction and practices on the edges of the agricultural plots. For example, the bocage structure composed of fruit species, favoring certain auxiliary crops and human practices such as picking. Whereas, in areas dedicated to wilderness the point is to minimize human pressure creating hostile landscape for humans and conducive for wildlife (Fig.9b,3,6,9,12). Human mobility articulates through positive distancing, either on the edges or distanced from animal passage, thanks to landscape interventions creating buffers (Fig.9b,2,5,8,11). Active mobility corridors, taking over car roads, are also used as a device to diminish the segmentation of natural corridors. Strong infrastructure and rivers are used for critical separation between the urban and the wilderness (Fig.9b,6,2).

The valorization of active mobility as a structuring network, assuming that it can have advantages both in qualitative and in functional terms. It aims to develop a new project of generalized accessibility, capable of 'dislocating' the networks that have self-induced car-dependence (Dupuy, 2011) while developing ecological continuity. Together the socio-technical and ecological continuities improve each other, promoting the landscape as a support for coexistence.

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Fig.9a Vision for Socio-ecological continuities

Fig.9b Operation principals' sections

CONCLUSION

" Renewed proximities are inscribed in the notion of rebirth, it is not simply on a transition, but a metamorphosis that allows a radical shift. This is the current situation of human societies, that of the conditions of habitability of the earth for human beings and all livings."17 (Younès, 2022). The hypothesis presented in this contribution is in line with the conceptual shift invoked by Chris Younès. It assumes the need to find new positive interactions between the plurality of networks and actors in the territory, as well as, between planification and practices. Through the open spaces, it aims at looking at the weak networks, ecological and active mobility, and their relation, as tools capable of overcoming some of the contradictions of the contemporary urban dichotomy. In other words, putting the socio-technical network and the ecological network on an equal footing makes it possible to balance socio-economic rationality with socio-environmental rationality, rather than dealing with post-assessment logics, challenging current planning models. The approach developed here is not self-evident, it entails a shift of gaze on what can structure the transition of the territory and on the kind of relations the territorial project promotes, specifically questioning

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17   Author translation

the modern-driven paradigm of accessibility and speed. It aims to showcase what could be considered as a radical take on proximity reframing the scale and goals of mobility planning in the scope of the ongoing ecological transition. This reflection is understood as a potential exploration to go beyond the radial mobility project of the Great Geneva and foster planning strategies more sensitive to inhabitants' use of the territory.

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Fig.1b. Stratégie Multimodale, map extracted from Projet d'Agglomération 4e génération, Agglomération du Grand Genève, 2021.

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Fig.2a. Village structure of the Great Geneva. Original map developed for the Vision prospective du Grand Genève Habiter la ville-paysage du 21eme siècle by the Habitat Research Center, reworked by the F. Guichot. Data: Carte de l'état major (1866), carte Dufour (1864).

Fig.2b. Public transport access in the Great Geneva Agglomeration, F.Guichot. Data sources: Qualité de desserte 2030, ARE (SITG), Tâche bâti (SITG), Réseaux ferrés (SITG)

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Fig.6a Map of ecological continuities taken from the Pays de Gex SCoT, map extracted from the report « SCoT du Pays de Gex », 2019.

Fig.6b Map of landscape structures of ecological continuity in Pays de Gex, M. Villaret, 2021. Data sources:

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SPATIAL ALLOCATION FRAMEWORK OF URBAN CARBON EMISSIONS INVENTORY BASED ON BIG DATA AND RETHINKING OF THE EQUITY OF CARBON REDUCTION POLICY: A CASE STUDY OF XING'AN, CHINA

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ABSTRACT:

The spatial allocation of carbon emissions based on urban land-use types is of great significance for reducing carbon emissions through urban land-use plans. Previous studies only allocated the main carbon emissions to industrial, residential, commercial, transportation, and other land-use, and did not distinguish heterogeneity of carbon emissions intensity from more detailed land-use types. To better support, low-carbon management and policy formulation, a more precise allocation of a complete carbon inventory to all land-use for cities is needed. This study accounted for carbon emissions of Xing'an in 2019 by the GPC (Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories), collected various sources of big data, and designed a multi-index weight system to establish a new framework to allocate carbon emissions to different land-use types in the city according to China's latest land classification standard. The result of the vector land-use map showed a finer carbon e Mission intensity of industrial, transportation, residential, forestry, and other land-use in Xing'an , which covered all land types. By comparing carbon emissions intensity of land-use types among cities of different scales in China, this study rethought existing low carbon development policies in Xing'an, giving an insight into policy equity and differentiated development path between small cities and megacities.

KEYWORDS:

Urban carbon emissions inventory, Spatial allocation framework, land-use carbon emissions intensity (land-use CEI), Carbon reduction policy, Xing'an

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In both developed and developing countries, future urbanization will mainly occur in the periphery of the megacity and small and medium-sized cities (Anderson et al., 2015). The built-up space of big cities is already fixed, leading to the inertia of carbon emissions due to mutually reinforcing physical, economic, and social constraints, referred to as carbon lock-in (Seto et al., 2016). In contrast, small and medium-sized cities are still in the stage of population concentration and urban spatial expansion, and their industrial structure has not yet completed its transformation, leaving more room for carbon emissions reduction, which should receive more attention.

Carbon intensity per capita and carbon intensity per unit GDP are the classic indicators to compare the urban energy efficiency and emissions intensity in cities (Ramaswami & Chavez, 2013. The carbon emissions intensity (CEI) of land-use (t CO2/ hm2) is a comprehensive indicator of natural and anthropogenic carbon emissions, which can reflect the characteristics and spatial structure of urban carbon emissions (Han Ji; Zhou Xiang; Xiang Weining; 2016). Although land-use CEI has been studied extensively, few studies have been conducted to calculate the CEI of detailed urban construction land. The only studies that have been conducted focus on megacity and metropolitan areas, which are centers of carbon emissions. There is a lack of knowledge in calculating land-use CEI of medium-sized cities. Also, comparative research between cities is an important research gap. What does the land-use CEI reveal about the characteristics of cities? What are the similarities and differences in land-use CEI between megacity and medium-sized cities? What new insights can be developed into urban low carbon development pathways and upper carbon reduction policy based on the urban energy efficiency characteristics revealed by land-use CEI? These are the three questions that this study hopes to explore.

To this end, two things need to be done. First, to design a spatial allocation framework for carbon emissions that applies to most cities in China, and systematically calculate the land-use CEI from the latest territorial land use classification. Secondly, to compare the CEI of the typical megacity and medium-sized cities in China and uses this indicator to analyze the characteristics of urban emissions and energy efficiency, identify the inequities in emissions reduction policies, and identify suitable development pathways for medium-sized cities. This paper takes Xing'an (and its core city Ulanhot) as the subject of study. Xing'an is a medium-sized city, located in an underdeveloped region, rich in natural resources, with the leading industries being steel and energy industries. It is a representative city facing multiple pressures of urbanization, economic development, and emissions reduction.

2. Research Progress of Spatial Allocation

To count for the land-use CEI, current research can be divided into two categories.
In the first category, top-down data, such as the energy balance table, is used to account for carbon emission inventory. And these studies adopt the idea of "split "in designing their allocation framework. This type of research calculates the total carbon emissions of residential, industrial, commercial, and other sectors, and then corresponds to the sectoral carbon emissions of residential, industrial, and commercial land-uses, which can directly guide the land-use planning and adjustment of land-use quantities. "Inventory-land type" spatial allocation framework for land-use CEI accounting has been established, allocating energy emissions from primary, secondary, tertiary, and domestic consumption to five major categories of construction land and two non-construction land, including

industry, residence, public service facilities, transportation, warehousing and logistics, and further allocating carbon emissions from secondary industry to three detailed industrial land-use type with emissions intensity per unit GDP in the industrial sector (Jiang et al., 2013). Using a similar framework, Xiamen s carbon emissions were allocated to four types of construction land, including residential, transportation, commercial and public services, industrial and warehouse, and two types of non-construction land (Zhang et al., 2018). However, such studies cannot account for the CEI of more detailed land-use types.

The second draws on big data on emissions sources that are now openly available to create high-resolution maps of carbon. For example, using data such as vehicle GPS data (Yamagata et al., 2017; Yoshida et al., 2019), building energy consumption data (Yan et al., 2021), industrial POI or boiler energy consumption data (Liu et al., 2020), residential quarters Or the building density and building height data of the plot (Bun et al., 2019; Chuai & Feng, 2019). These studies use emissions source data with precise spatial location information to aggregate carbon emissions at any scale, so they can obtain CEI for any land-use type, general or detailed. However, the use of bottom-up data for carbon accounting has limited authority and the results are often not recognized by authoritative inventories. Inconsistency of data caliber also makes it impossible to compare the accounting results between cities.

Therefore, it is preferable to use an international common inventory to calculate total carbon emissions from the top down and then split the total carbon emissions into specific land-use types with the help of multi-source big data with location attributes. The existing research needs to be improved in two aspects: First, a framework for systematically assigning all carbon emissions to detailed land-use types across the city has not yet been developed. Secondly, the core of clarifying the heterogeneity of land-use CEI and accounting for the CEI of detailed land-use type is to establish an algorithm for assigning weights. Previous weighting indicators have been relatively simple, selecting only single weight characteristics such as population, GDP, or land area. The lack of spatial data such as building information, industry type, and traffic flow makes it impossible to distinguish the CEI of detailed land-use types, such as urban residential land and rural residential land.

Therefore, based on the latest inventory, this paper designs a systematic carbon emissions allocation framework that improves the weight allocation algorithm and uses open-source big data to allocate complete carbon emissions sources to the latest classification of land-use for city-level territorial spatial planning. This is the first study to clarify the carbon emissions intensity (CEI) of the latest detailed classification of land-use for territorial spatial planning, adding a new dimension to the understanding of urban carbon emissions characteristics and urban comparison, and providing ing important support for the study of land-use optimization theory and the evaluation and adjustment of land-use planning schemes s for future territorial spatial planning.

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3. Methodology and data

3.1 Study area

Figure 1: Location of Xing'an and Ulanhot City

Located in northeastern Inner Mongolia, China. Xing ' an has a total area of 55,151 square kilometers and a population size of 1.61 million people. The urbanized area is concentrated on 3% of the land, and over 97 % of the land is covered by arable land, grassland, and forest land, each accounting for about 1/3. Xing'an 's leading industries are metal and energy industries (including the booming clean energy industry), and agricultural and animal production. In the last 5 years, Xing'an is in the stage of rapid development. The urbanization rate is higher than 1%, the economic growth rate is higher than 7%, and the growth rate of the manufacturing and construction industries is close to 10 %.

Xing ' an has 5 banner cities, and Ulanhot is the core urban area. Ulanhot's total GDP and population density are much higher than that of other banner cities. Concentrating 25 % of the population, 50 % of GDP, and over 80 % of industrial output value, it is the carbon emissions center of Xing'an and a typical urbanized area within the territory. Therefore, the CEI of land-use types in Ulanhot has better comparability with other megacities in China, so this study calculates the land-use CEI in Ulanhot.

3.2 Inventory and data

3.2.1 The scope of carbon emissions

This study uses GPC (Global Protocol for Community-Scale Carbon Emissions) to calculate the total carbon emissions of Xing ' an. The GPC inventory is currently one of the most recognized and widely used inventory at the city scale internationally. WRI, C40, and ICLEI released the Chinese version of GPC in 2014, and Li completed the Beijing carbon emissions accounting based on the Chinese version of the GPC inventory, which was officially recognized (Li et al., 2017). The inventory includes five parts: energy, industrial processes, and product use, agricultural, land-use change and forestry, and waste management. The accounting content includes scope 1 direct carbon emissions, scope 2 indirect carbon emissions, and scope 3 other indirect carbon emissions (Fig. 1). The types of greenhouse gases include calculated carbon dioxide, nitrous oxide, and methane. Nitrous oxide and methane were converted into carbon dioxide by their Global Warming Potential Values defined by IPCC in 2014 (GHG emissions refer to carbon emissions in this study).

As the GPC is more suitable for carbon emissions accounting in built-up urban areas, while the cities in China often have a large area of non-construction land within the administration. This study improves the carbon sequestration accounting in GPC of non-construction land with the help of IPCC inventory. Using the classification of non-construction land in territorial spatial planning at the city level, the annual carbon sequestration of arable land, garden land, forest land, and grassland, and the carbon emissions (or carbon sequestration) from land-use type conversion are calculated.
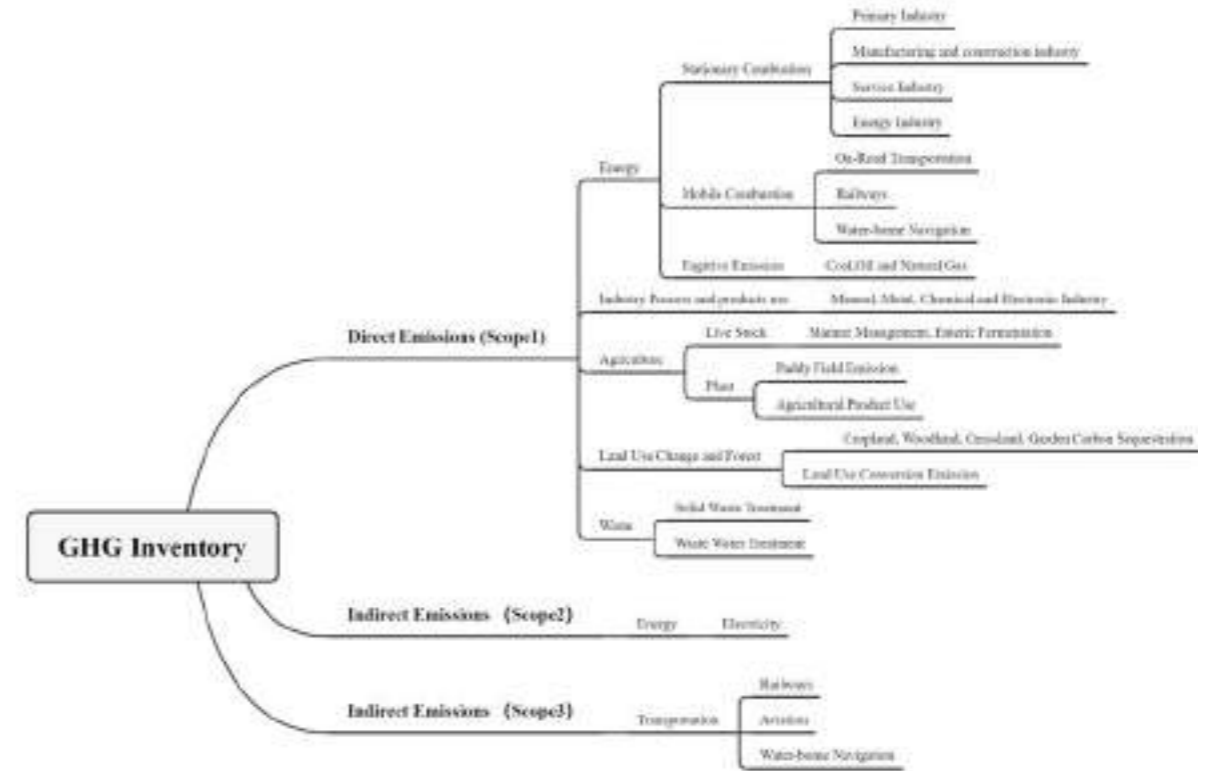

Figure 2: The scope of carbon emissions inventory

3.2.2 Data

For scope 1 direct carbon emissions, data for the energy use emission are taken from the energy balance sheet, the value-added of gross domestic product by sector and its energy consumption, and the electricity consumption statistics in the Xing'an Yearbook. For mobile carbon emissions, data on vehicles are taken from the Xing'an Yearbook. For carbon emissions from industrial processes and product-use is taken from the Xing'an Yearbook and interviews with the Statistics Bureau and the Development and Reform Commission. In the section on agriculture, data on the consumption of major energy and materials and the number of livestock are taken from the Xing'an Yearbook and interviews with the Agriculture and Animal Husbandry Bureau. The data on forest and grass is from the Forestry Annual Report and Grassland Census. The data related to waste disposal are from the Content of Information Release on the Prevention and Control of Solid Waste Pollution in Xing'an and the Environmental Quality Report; the vector map of the land use is provided by the natural resources department. For the indirect carbon emission part, the data on road and railway passenger and freight turnover are from the Xing'an 14th Five-Year Comprehensive Transportation Development Plan. In addition, the calculation uses open-source big data, including Gao De Map POI of enterprises in various industries and building information.

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3.3 Methods

3.3.1 Land-use type

Carbon emissions are allocated to a detailed land-use classification of territorial spatial planning. The territorial spatial land classification consists of two levels, with 24 level 1 land-use types, of which Xing'an has 16 categories (9 construction land + 7 non-construction land). As the master plans and detailed plans tend to give a more detailed configuration of the land, it is necessary to clarify the carbon emissions intensity to level 2. This study calculates CEI of 21 land-use types of construction land.

3.3.2 Weighting system

The carbon emissions allocation consists of two steps. Firstly, the carbon emissions of the whole Xing'an are split into administrative units. Secondly, the total carbon emissions are allocated to 21 types of land. As carbon emissions activity data is only collected at the city level, the carbon emissions inventory of Xing ' an is calculated first, and then the carbon emissions inventory of Ulanhot City is obtained by splitting according to the weighting system (Fig. 3).
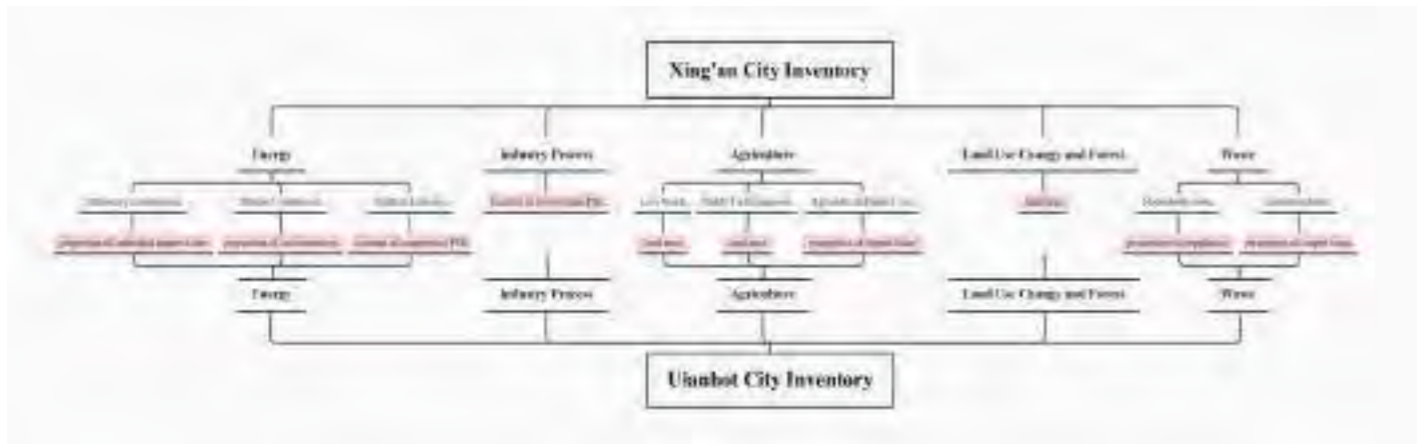

Figure 3: Weighting system

Carbon emissions were allocated to various types of land. Among them, industrial process and product use emissions, agriculture emissions, forestry, and land-use emissions, and waste management emissions can correspond to land-use types one by one, and carbon emissions from the energy sector need to be allocated to multiple types of land. Three parameters can be used to allocate industrial carbon emissions to detailed types of industrial land: product output per unit of land, carbon emissions per unit of GDP, and area (Xu et al., 2022). Among them, carbon emissions per unit of GDP are the most precise and convenient weight parameter. Carbon emissions from tertiary production are regarded as emissions from building operations. Most of the existing research allocates carbon emissions based on the energy consumption per unit area of public buildings (Yan et al., 2021). There are obvious problems with this method: not all cities collect building energy consumption data. If data is borrowed from neighboring cities, building structure and thermal insulation structure differences will cause significant errors. This study takes carbon emissions per unit of GDP as the weight for both secondary and tertiary industries emissions to develop an overall spatial allocation framework (Fig. 4).
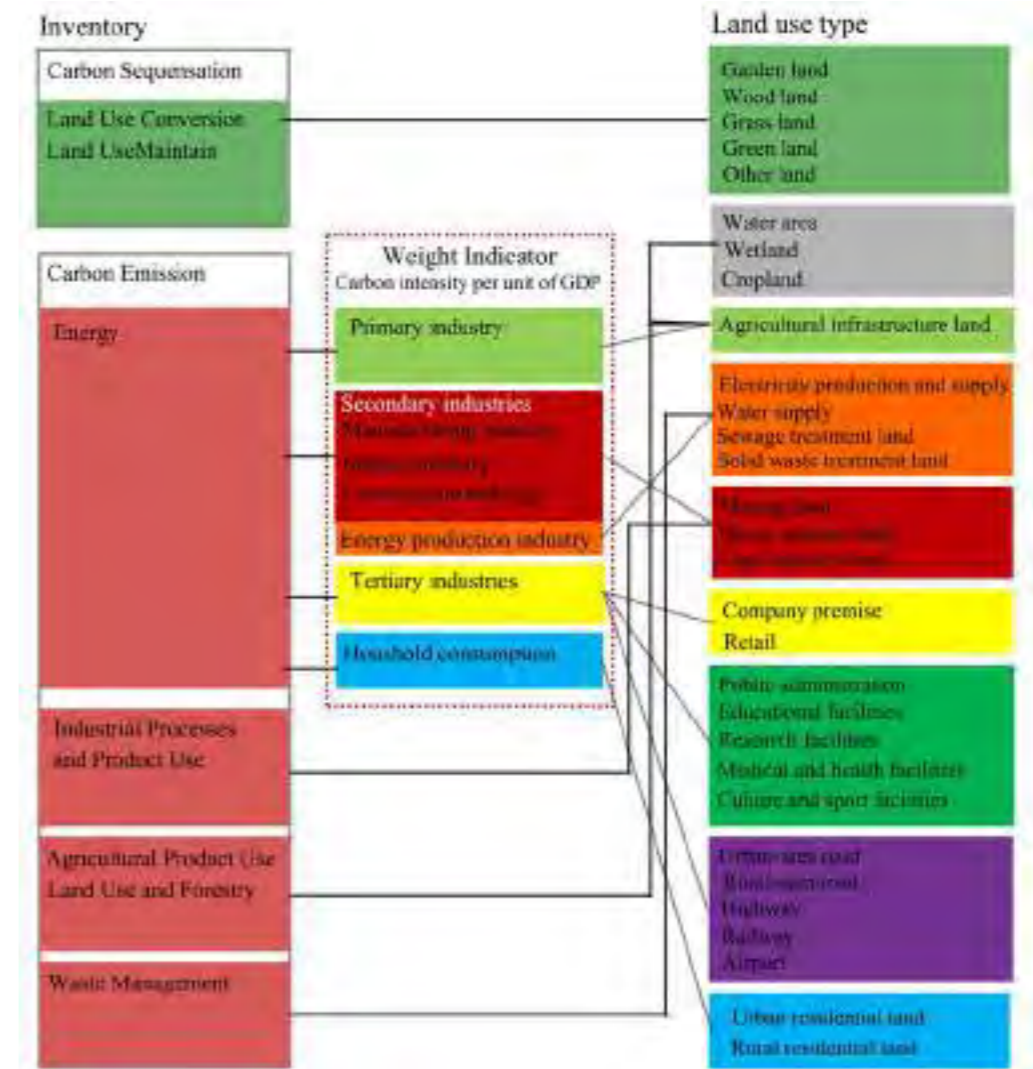

Figure 4 : carbon emissions allocation framework

4. Results

4.1 Carbon emission inventory

Xing'an has 25.65 million tons of carbon emissions and 58.21 million tons of carbon sequestration in 2019, with a surplus of carbon sequestration amounting to 1.26 times that of carbon emissions. Ulanhot city covers an area of 1276 square kilometers, accounting for 3.0 % of the territory of Xing ' an, and concentrates 38 % of carbon emissions and 3.2 % of carbon sequestration. In 2019, the carbon emissions in Ulanhot were 9.75 million tons, and carbon sequestration was 1.9 million tons, for net carbon emissions of 7.84 million tons.

The share of energy consumption emissions in Ulanhot is 58%, which is lower than in other cities (generally more than 80 %). Industry-related emissions are high, including fuel-burning emissions and industrial process emissions, which account for 74 % of the total. Ulanhot's transportation carbon emissions account for a low proportion of only 5 %, far lower than 30 % in megacities such as Beijing and Shanghai. Ulanhot's agricultural production emissions account for 8 %, which is higher than transportation carbon emissions, that is because the added value of primary production accounts for 8 % of GDP, and the primary industry is the leading industry. Natural carbon emissions mainly come from waters and wetlands, accounting for 0.2 % of the total emissions.

In terms of carbon fixation, contribution descending as forest land>arable land>grassland > soil carbon pool > garden land>urban green space> other lands . Among them, the forest land, arable

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land, and grassland carbon sequestration in Ulanhot accounted for 35 %, 27%, and 36%.

4.2 Land-use carbon emission intensity

The CEI of 7 level 1 and 21 detailed construction land types was calculated (Fig. 5). The CEI of land-use in descending order are industrial, environmental infrastructure, commercial (retail and company premise), agricultural infrastructure, public service, residential, and transportation land. The CEI of level 1 land-use types varies greatly, and the industrial CEI is 17 times that of the transportation land.

CEI varies widely within level 1 land-use types, with the highest heterogeneity types being industrial, environmental infrastructure, public service, and residential land. The CEI of heavy industrial land is more than 40 times that of light industrial land. Among the land-used types for environmental infrastructure, the emissions intensity of solid waste treatment land is nearly 10 times that of sewage treatment land and nearly 26 times that of water supply land. The CEI of urban residential land is 6 times that of rural residential land. So, it is very necessary to clarify the difference between detailed land-use types CEI.

Ranking the CEI of detailed land-use in descending order. It shows that the CEI of land-use presents a clear ladder feature. The land-use CEI can be divided into three groups, with a difference of 3-5 times between groups. Lands with the highest CEI are heavy industrial land, solid waste treatment land, and Electricity production and supply land. Land with medium CEI is commercial land and agricultural infrastructure land. Lands with low CEI include public administration land, residential land, and transportation land.
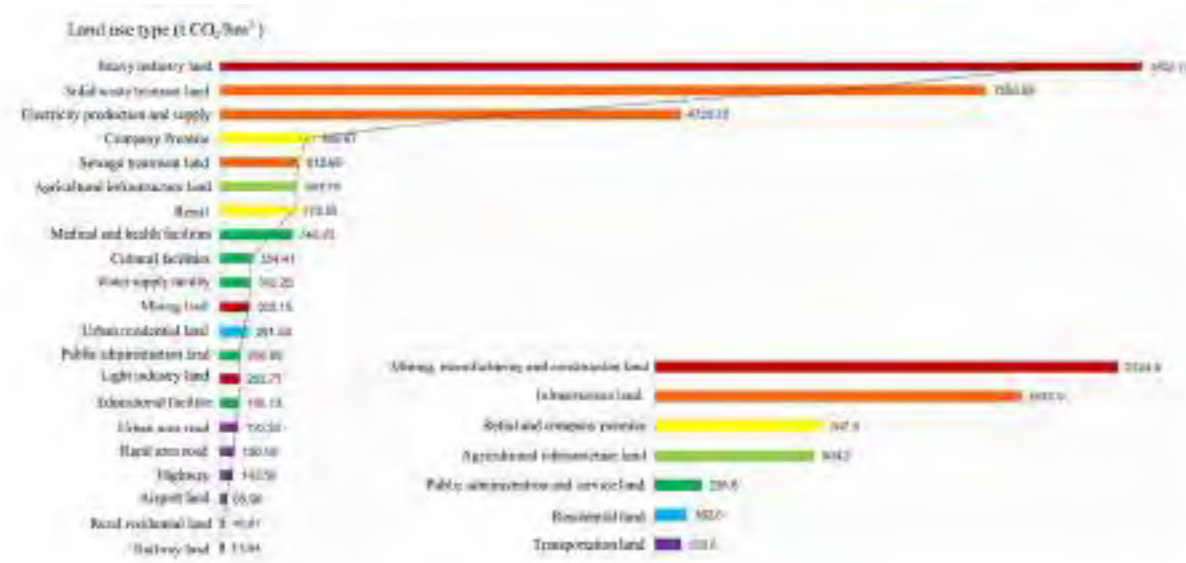

Figure 5: Land-use carbon emissions intensity (t CO_2/ hm^2)

4.3 Carbon emission spatial structure

The 21 types of construction land can be divided into three groups according to CEI as above mentioned. Lands with high CEI are concentrated in industrial parks on the periphery of the build area. The medium CEI land is small and scattered, while most of the remaining construction land types are of low CEI. Unlike the spatial structure of typical big cities such as Nanjing and Xiamen, where carbon emissions are concentrated in the city center (Chuai & Feng, 2019; Zhang et al., 2018), Ulanhot does not have an obvious trend of decreasing carbon Emissions intensity from the center

to the periphery. The carbon sequestration capacity of non-construction land can also be divided into three levels, with grassland having a higher carbon sequestration capacity than forest land and forest land having a higher carbon sequestration capacity than arable land (Fig. 6).
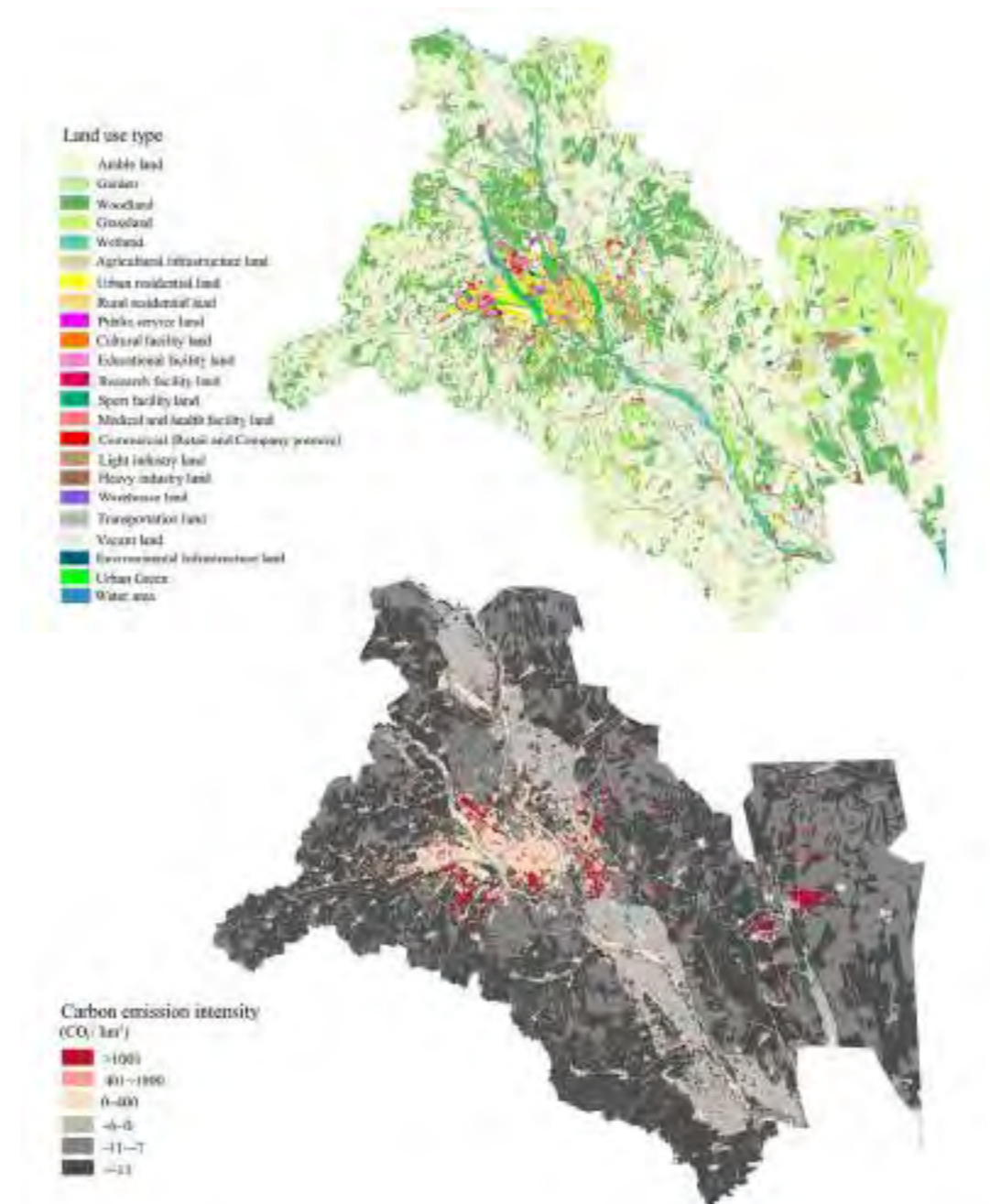
Figure 6: Detailed land-use type and its CEI or carbon sequestration capacity

5. Discussion

5.1 Land-use CEI comparison between Beijing and Ulanhot

As studies allocating complete inventory to the full range of detailed land-use types have been scarce, sufficient land-use CEI data could not be collected to complete an adequate comparison for large and medium-sized cities, and this study compares Beijing as a case city with Ulanhot.

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5.1.1 General overview of land-use CEI

In descending order, the land-use CEI of Beijing is industrial, transportation, public service and commercial, and residential. Ulanhot is industrial, commercial, residential, public administration, and transportation. The commonality is that the CEI of industrial land is the highest in both cities, while commercial and public services land are both more carbon-intensive than residential land. The difference is that transportation land is the second most carbon-intensive land type in Beijing, while it is the least carbon-intensive land type in Ulanhot.

5.1.2 Detailed land-use CEI comparison

Specifically, the difference in the carbon intensity of residential, commercial, and public service land in the two cities is relatively small. The CEI of these land-use types is determined by two indicators: density and building energy efficiency. The population density in the built-up areas of Beijing is 2.3 times higher than that of Ulanhot. If considering that building heating often accounts for nearly 50 % of (Zheng Siqi; Huo Yi; Cao Jing; 2011), the heating period of Ulanhot is 1.3 times that of Beijing, so the energy consumption of buildings in Ulanhot is 15% higher than that of Beijing. After calibrating the differences in energy consumption during the heating period and population density, the CEI of urban residential land, rural residential land, commercial land and public service land in both cities is very similar.

The transportation land CEI of Beijing is much higher than that of Ulanhot. The CEI of regional transportation land reflects passenger and freight turnover, while the CEI of urban road transportation land reflects the urban motor vehicle ownership and travel distance. As a domestic and international transportation hub, Beijing Capital Airport has 58 times more flights than Ulanhot and 400 times more passengers than Ulanhot. Private car ownership in Beijing is 33.5 times that in Ulanhot. Some studies conducted comparative studies on the total carbon emissions and their composition in large and medium-sized cities in different regions of China, they pointed out that the total amount of carbon emissions from transportation is proportional to the size of the city (Wang et al., 2012), showing that the CEI of transport land does not reflect the energy efficiency of the transport system, but more the status of the city as a transportation hub and the characteristics of urban transport trip structure.

Heavy industrial land is the only land-use type in Ulanhot where CEI exceeds that of Beijing. There are two reasons: Firstly, secondary industry in Beijing accounted for 20 % in 2011, while the share of secondary industry in Ulanhot is 40 %, and the share of secondary industry-related emissions in Ulanhot accounted for 74 %, which is much higher than in Beijing. Secondly, the electricity production and supply industry is an important category of heavy industry. Beijing is dependent on imports for its electricity, so Beijing does not have this part of carbon emissions. Ulanhot produces 50% of its electricity for export. Emissions from electricity production and supply increase the CEI of heavy industrial land in Ulanhot by 5%. The CEI of heavy industrial land can reflect differences in industrial structure and carbon leakage problems.

It can be inferred from the land-use CEI of Beijing and Ulanhot that land-use CEI can reflect the urban functions and development stages, industrial structure, and urban form characteristics. Between megacity and medium-sized cities, the determinants of the CEI of residential, public service, and commercial land are urban form characteristics such as population density. The determinants of CEI of regional transportation land and industrial land are urban functions.
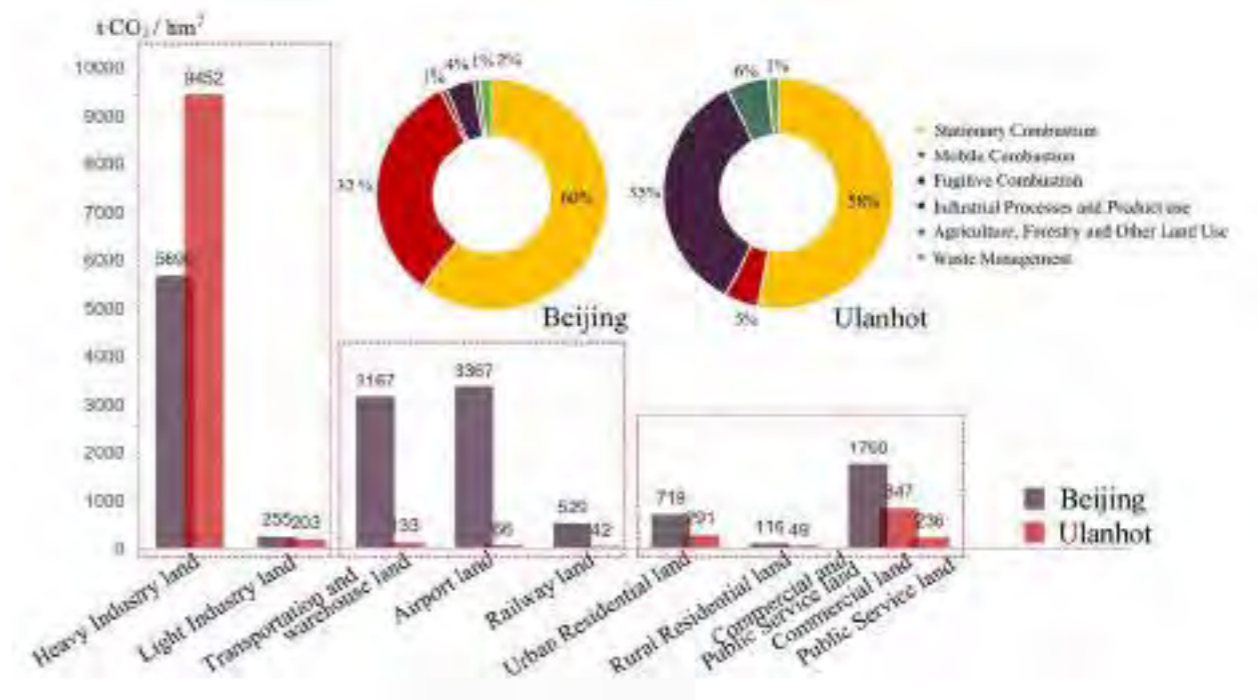

Figure 7: Comparison of carbon emissions structure and land-use CEI between Beijing and Ulanhot

In addition, environmental infrastructure land and agricultural infrastructure land have not been measured in other cities and cannot be compared to their corresponding land types, but when compared to other land-use types in Ulanhot, it can be assumed that these two land-use types are carbon-intensive. The former consists of waste treatment land, which has a high concentration of carbon emissions due to the lack of such facilities in Ulanhot. High CEI of environmental infrastructure land reflects the overburdened sanitation facilities, not the low energy efficiency. The same holds true for agricultural infrastructure land. Another factor that leads to high emissions from agricultural infrastructure land is that livestock emissions account for 70% of agricultural emissions, but livestock manure management techniques within Xing'an are still primitive.

5.2 Policy implications for Ulanhot

5.2.1 Inequity created by current policies

Judging from the absolute value and relative magnitude of land-use CEI, the main emissions reduction sectors in Beijing are the building and transportation sectors, and the main emissions reduction sectors in Ulanhot are secondary industry and agriculture. However, there is currently no low-carbon development plan for Xing'an based on economic development trends and inventories. Although emissions reduction has become one of the priorities in current urban development policies, the objectives and strategies are designed at the national or provincial level and assigned to the localities. Policies scattered across energy, industry, agriculture, transportation, construction, and environmental protection sectors, and the lack of an overall design at the city level present two problems.

Firstly, the dual-control indicators (total energy consumption and energy consumption per unit of GDP) of energy consumption seriously affect economic development. Provincial policies limit the increase in energy consumption of Xing'an from 2020 to 2025 to be controlled at 900,000 tons of standard coal, and the energy consumption per unit of GDP should be reduced by 15% in 2025 that of 2020. However, Xing'an is expected to have a GDP growth rate of 5.5%, and a GDP growth rate of 10 % for the manufacturing industry and construction industry in the next five years. Even if clean

energy reaches 18 % of primary energy in 2025, the National Development and Reform Commission predicts an increase in total energy consumption of 5 million tons of standard coal. The calculations in this study found a rise in energy consumption per unit of GDP of at least 22%. Meet the upper-level policy will inevitably affect economic development severely.

Secondly, the current policy only restricts energy-related emissions, and non-energy carbon emissions are not controlled. The proportion of non-energy carbon emissions in Xing ' an is as high as 40 %. Taking agricultural emissions as an example, from 2020 to 2025, the overall livestock stock will increase by 250 %. Even if the use of agricultural products is cut by 30 %, agricultural carbon emissions will still increase by 92.4%. It is evident that if energy consumption alone is controlled, total carbon emissions may increase significantly rather than what we expected.

5.2.2 Suggestions on policy and development pathways

The current policies will not only seriously affect economic development, but also fail to achieve the goal of controlling the total amount of carbon emissions. However, it is worth noting that the target of carbon emissions per unit of GDP reducing 15.5 % from 2020 to 2025 could be achieved. The calculations in this study find that If carbon capture technology is used to control industrial process emissions and the proportion of clean energy vehicles is increased to 40 % in 2022, carbon emissions per unit of GDP in 2025 will remain unchanged. On top of this, the restoration of forests and grasslands increased the carbon sequestration of Ulanhot by 11.8 % and reduced the carbon emissions per unit of GDP by 5.3 %. Based on these efforts, if the carbon emissions of exported electricity receive reduced (carbon leakage is taken into account for policy design), the carbon emissions per unit of GDP will continue to fall by 9.6 %. By the three steps above, Ulanhot has a good chance of meeting the target given by the provincial level.

Abundant studies are showing that major cities have decoupled carbon emissions from economic development in the context of energy mix transition, power outsourcing, industrial transformation, and technology application, as high-energy consuming and high-emissions industries move to relatively less developed areas, and direct carbon emissions have been reduced (Wu et al., 2019). In this process, the total energy consumption of megacity and the energy consumption per unit of GDP deservedly continues to decline. Although indirect carbon emissions are rising rapidly (Andrade et al., 2018), Beijing's indirect carbon emissions reached 46 % of direct carbon emissions, however, the rising indirect carbon emissions are not counted in the carbon emissions per unit of GDP, so the carbon emissions per unit of GDP in big cities also dropped rapidly. Conversely, as a place to undertake high carbon emission industries, Xing'an has not completed the transformation of its industrial structure and is still in a period of rapid development. Medium-sized cities like Xing'an are subjected to the same indicators as big cities, creating a huge inequity.

For medium-sized cities such as Xing'an the upper-level policy should control the carbon emissions per unit of GDP, rather than the total energy consumption and energy consumption per unit of GDP. In addition, inter-regional carbon transfer should be considered in the provincial level policy design. As power exporting cities and carbon sink surplus cities, Xing'an and Ulanhot should be given more total energy consumption, while leaving a buffer period for the reduction of energy consumption per unit of GDP. Small and medium-sized cities should use the inventory and land-use CEI as a basis to identify sectors with high potential for emissions reduction, develop an overall low-carbon development pathway that suits their characteristics as soon as possible, attach importance to technological upgrading, and strive for development targets through a variety of means.

6. CONCLUSIONS

Small and medium-sized cities are the main carriers of future urbanization, and the land-use carbon emission intensity (CEI) based on inventories is an important indicator for optimizing low-carbon land-use plans. There are few studies on the land-use CEI in medium-sized cities, and the comparison of land-use CEI in megacities and medium-sized cities is still an important research gap. This paper establishes a systematic framework for the spatial allocation of carbon emissions. It is the first study to account for detailed land-use CEI of all categories of the latest territorial spatial planning land classification. Based on the differences between megacities and medium-sized cities of urban industrial structure, energy efficiency, and urban form characteristics that can be reflected by the land-use CEI, this study gives implications on the current top-down carbon reduction policy.

This study found that the land-use CEI of Ulanhot in descending order is: industrial land, environmental infrastructure land, commercial land, agricultural infrastructure land, public service land, residential land, and transport land. There is a high heterogeneity of CEI of different land-use types, which proves the necessity of accounting for detailed land-use CEI as an important support for land supply and land use planning. Residential, public service, and commercial land-use CEI between Beijing and Ulanhot is small, and the main determinant is the urban form. Industrial and transportation land CEI show a great gap and are determined by the function of the city. Industrial structure and city function influence regional carbon transfer, and energy consumption control is appropriate for megacities but severely inhibits medium-sized cities in a period of rapid economic and industrial growth.

To counter the inequality created by the policy, it is recommended that the design of national and provincial policy take into account regional carbon emissions transfer and local carbon sequestration. For medium-sized cities like Xing'an, which are at a rapid economic development stage, controlling carbon emissions per unit of GDP could allow economic growth while reducing carbon emission intensity. The total energy consumption limit should be higher and allow a buffer period for the energy consumption per unit of the GDP to fall. Carbon capture technology and carbon sequestration should be given more credit for realizing simultaneous economic growth and low-carbon development.

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THE EVOLUTION OF THE SKYWALK NETWORK: A CASE STUDY OF HONG KONG

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ABSTRACT:
Hong Kong's skywalks effectively promote the mobility of pedestrians and ease the conflict between traffic and pedestrians. However, research on how the walking environment of skywalks affects the pedestrian experience has been neglected in the existing literature. This research aims to comprehensively identify potential environmental factors that influence the walking experience and discusses the impact of some of these critical factors in the case using the analytical framework. The current research is based on a literature review and field observation method. Given the findings, design features of central skywalks that affect the walking experience are proposed.

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INTRODUCTION

Skywalk is defined as a network of interconnected walkways consisting of sky bridges on streets, second-floor corridors and activity centres within buildings (Robertson 1993). This network was a new typology proposed at the CIAM conference and was widely used in North America, Canada and Asia (Yoos and James 2016).

Since the second half of the 20th century, pedestrian circulation systems in the form of skyways have complemented the traditional street pedestrian network in many areas in Hong Kong. Skywalks in Hong Kong exhibit different physical characteristics, often connect transit stations, shopping malls, office buildings and parks and is a three-dimensional network. This pedestrian network effectively improves the accessibility of the surrounding environment and promotes the efficient flow of pedestrians (Xue, Ma, and Hui 2012).

Research on the environment of skywalks in Hong Kong focuses on its formation and impact. For example, Tan and Q.L. Xue (2014) explored the evolution of the grade-separated pedestrian networks in Hong Kong; Woo and Malone-Lee (2013) researched the skywalk's validity; Murakami, Villani, and Talamini (2021) examined The economic impact of the Central skywalk on surrounding commerce. However, the number of research on the impact of environmental aspects of skywalks on pedestrian experience is limited, and pedestrian experience remains controversial. For example, in recent research, Villani and Talamini (2020) mentioned that the density of static activity in the skywalk system, such as chatting and laying down of the Filipino and Indonesian communities, might be an obstacle to pedestrians. However, Kalandides (2012) conducted a survey of pedestrians on skywalks, and pedestrians found the experience of using skywalks convenient and comfortable.

The relationship between streets' walking environment (physical and social) and pedestrian experience has been widely discussed (Johansson, Sternudd, and Kärrholm 2016; Ewing and Handy 2009; Adkins et al. 2012). Factors (physical and social) are also widely discussed and audited (Jeong et al. 2018; Dadpour, Pakzad, and Khankeh 2016; Bozovic et al. 2021). However, the research on the environmental factors of skywalks is mainly oriented to design principles to guide the practice, and the number is minimal. Few studies have examined the environmental factors of skyways that may be relevant to pedestrian experience from a user experience perspective.

Therefore, this research aims to identify environmental factors and metrics of skywalks related to pedestrian experience to answer key research questions on the walking experience of elevated pedestrian networks in Hong Kong. First, the research initially addressed this question by extracting factors from the literature that might be relevant to the pedestrian experience of skywalks. Second, this research used information obtained from field observations to identify the most relevant factors and indicators in the local context. These steps lead to the initial establishment of an analytical framework for the pedestrian experience of skywalks.

2. Walking Environment and walking experience in the literature

In human-environment interaction, human behaviour is influenced by the external environment and personal characteristics (Giles-Corti and Donovan 2002). In the study of walking behaviour, external environmental factors have been given a prominent role (Nagel et al. 2008; Knuiman et al. 2014; Saelens and Handy 2008). This paper provides a broad classification of the physical and social aspects of the walking environment. This classification provided a structure for the literature review of this study.

2.1 Physical characteristics

2.1.1 Streets

Alfonzo (2005) showed from the walking needs hierarchy that after the basic needs of accessibility are met, the rest of the physical conditions will affect the walking decision. Ewing and Handy (2009) emphasized perceived physical characteristics and identified five urban design variables related to the walking experience: imageability, enclosure, human scale, transparency, and complexity. Johansson, Sternudd, and Kärrholm (2016) complement the perceived variables related to the walking experience — aesthetic quality, maintenance and order, and greening of walking routes. Adkins et al. (2012) provided empirical evidence that a range of microenvironmental features contributes to the perception of walking. A longitudinal study by Cambra and Moura (2020) further demonstrated the impact of small-scale walking environments on the walking experience.

2.1.2 Skywalks

Although earlier research on the performance of grade separation pedestrian systems did not specifically focus on the pedestrian experience, these studies still mention factors that influence the use of skywalks. For example, research by Robertson (1988) argues that the use of pedestrian bridges, access, safety, economic activity, and design and aesthetics can affect the performance of skywalks systems. Cui, Allan, and Lin (2015) further expanded the factors for evaluating skywalks from the perspective of user experience. They proposed that skywalks be assessed regarding opening hours, facilities for vulnerable groups, signage systems, spatial structure, entry and exit arrangements, traffic, safety issues, comfort and amenities.

2.1.3 Social characteristics

The impact of social aspects of the walking environment on the walking experience has also been highlighted in several studies (Kim and Yang 2017; Kari 2016; Calvert, Jain, and Chatterjee 2015). The social characteristics are mainly derived from one theme: human activity. For example, seeing the presence of others is considered a pleasant walking experience (Ferrer, Ruiz, and Mars 2015; Middleton 2009), whereas overcrowding can be unpleasant for pedestrians (Ferrer, Ruiz, and Mars 2015).

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Characteristics	Attributes	Candidate Variables
Physical characteristics	Accessibility	Entrance and exit layout
		Street level access
		Opening hour
		Mobility Needs of mobility-challenged pedestrians
	Public transport	Bus stops
		Metro station
	Land use	Parks
		Retail
		Parking
	Signage	Signage
	Perceived urban design qualities	Imageability
		Enclosure
		Human scale
		Transparency
		Complexity
		Aesthetic quality
		Maintenance
		Greenery
	Safety	Clean
		Presence of maintainers
		Gang hangouts
	Walkway conditions	Width
		Pavement
		Obstacles
		Cross
Social characteristics		Human activities

Table1: The candidate variables from the literature

3. METHODS

This section describes the methodology used to establish the analytical framework. First, candidate variables extracted from the literature were refined (Table 1). Then, after the footbridges were sited, field analysis of the skywalks segments was carried out. This section explains the sampling method for case skywalks and then details the field survey method.

3.1 Case study: Central skywalks

Hong Kong's first pedestrian bridge is located in Central. The complex system of underground passages and skywalks that cross the Central district at multiple levels constitutes a crucial urban infrastructure that facilitates pedestrian circulation (Rossini, Roca, and Harris 2018). This sophisticated circulation network at multiple levels has generated hybrid urban spaces where the lack of distinction between the public and private spheres has not affected their everyday use (Rossini 2014).

The construction of grade-separated pedestrian networks in Central started with private developers and gradually formed a system spontaneously (Tan and Q.L. Xue 2014). The Central skywalks system has connected commercial buildings, subway stations, plazas and parks. By examining the history of Central skywalks development (Edward 2013; Tan and Xue 2016; Tan and Q.L. Xue 2014;), the research identified three sub-regions built in different historical periods (Figure 1). They exhibit different morphological characteristics, reflected in the main layout patterns and designs.
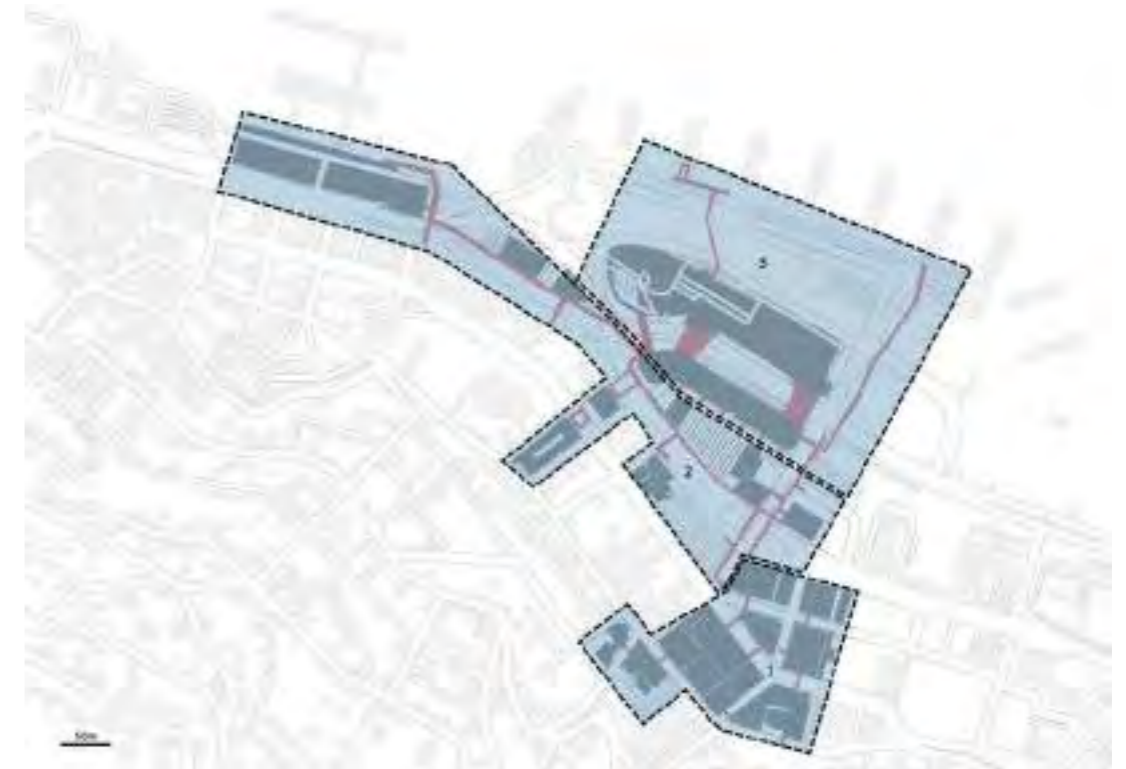

Figure 1: The skywalks system in Central. Map by Author.

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The first area is the Landmark network, built between 1965-1990. During this period, private developers established a three-dimensional pedestrian network centred on the Landmark Atrium that connects the underground traffic and the indoor and outdoor spaces of different commercial and office buildings (Edward 2013).

Second, the Exchange Square network developed between 1974 and 1988. Under the intervention of the Hong Kong government, this system connected more public spaces, for example, the west side of the Central Pier and Shun Tak Centre (Metroplan 1991).

Third, with IFC Phase 1 and Hong Kong Station completed and used, the Central skywalks network connects the park and the Central Pier.

This research focused on connecting footbridges between buildings. We select the most representative footbridge in each area to examine the walking environment (Figure 2).
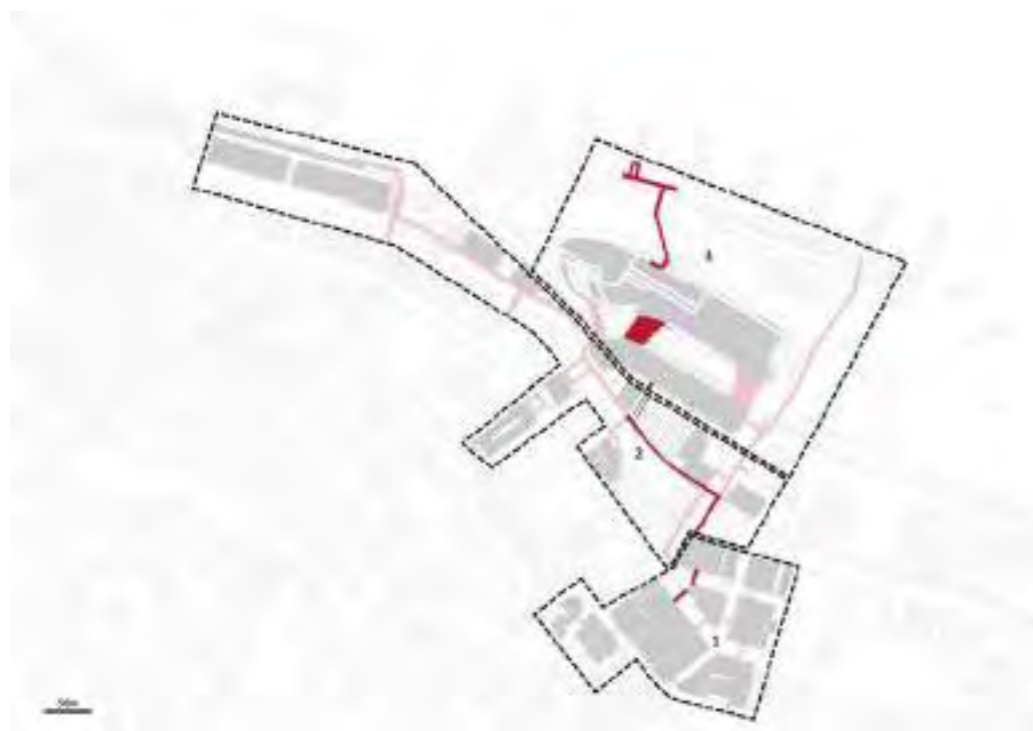

Figure 2: The skywalks segments in Central. Map by Author.

3.2 Field observations

Field observations supplement the pedestrian environmental aspects of some skywalks. Most of the factors in the previous literature are related to streets and thus may not be sufficient to account for the walking profile of skywalks. Field observations were made on the three walking routes mentioned in 3.1. We observed objects in these areas for a week (Figure 3), examining factors observed in the natural environment to see if they had been collected in a literature survey. This fieldwork identified 16 factors; that could complement more details of the skyway walking environment. For example, newly discovered "cafes, drink shops and restaurants" are added to "Land use". At the same time, we deleted the content related to vehicle traffic in the literature because this part does not apply to the separated pedestrian system. As a result, 39 factors of the pedestrian environment that may be related to the pedestrian experience were derived (Table 2).

1 footbridge segment | 1 footbridge segment
1 footbridge segment | 1 footbridge segment
2 footbridge segment | 2 footbridge segment
3 footbridge segment | 3 footbridge segment

Figure 3: The photos of segments in Central. Photo by Author.

Physical characteristics	Accessibility	Entrance and exit layout Street level access Opening hour
	Mobility Needs of mobility-challenged pedestrians	Rails Elevator
	Public transport	Bus stops Metro station
	Land use	Parks Retail Parking Coffee shop Drink shops Restaurant
	Signage	Signage
	Perceived urban design qualities	Imageability Enclosure Human scale Transparency Complexity Aesthetic quality Maintenance Greenery
	Safety	Clean Presence of security Gang hangouts Store closed Vacant space Illumination
	Walkway conditions	Width Pavement Obstacles Cross
	Facilities	Urban furniture
	Climate	Smell Natural light Fresh air Air conditioner Sound in the environment
Social characteristics		Human activities

Table2: The candidate variables

4. DISCUSSION

Perceived urban characteristics have been identified as prominent environmental factors associated with pedestrian experience (Herrmann-Lunecke, Mora, and Vejares 2021; Ewing and Handy 2009; Cambra and Moura 2020; Alfonzo 2005; Adkins et al. 2012). This research employed a field survey approach and utilized an established analytical framework to discuss the key characteristics of the examined skywalks.
- Semi-closed and closed
Footbridges in Central are covered, and some of them are air-conditioned. This feature is not only present in the elevated pedestrian network in Central but also common in grade separation pedestrian systems (GSPS) (Cui, Allan, and Lin 2015). Semi-enclosed and enclosed footbridges provide efficient climate control, protect pedestrians from the hot and humid rainy season, and improve pedestrian comfort.

-Transparency
With the regrouping and refurbishment of the shops around the central skyways, the footbridges (Alexandra Tower, Standard Chartered Bank and Mandarin Hotel) have been able to have broader views and more natural light (Edward 2013). Natural light can effectively alleviate the negative emotions of users (Brown and Sijpkes 1985) and enhance comfort.
- Human scale
Amenities are considered a key factor affecting pedestrian experience (Cui, Allan, and Lin 2015). However, indoor pedestrian systems in Central often do not provide any seating facilities or gathering spaces (Rossini and Yiu 2021), and pedestrian comfort suffers.
- Imageability
Physical elements such as windows and guard rails at Footbridges in Central are arranged in a strong sense of order, attracting attention and having a high image (Ewing and Handy 2009).
- Legibility (Complexity)
Signage systems designed by private developers and the government have different styles, and the lack of a unified signage system may cause pedestrians to get lost (Brown and Sijpkes 1985). In addition, there are still differences in the legibility of signs in different areas of the central skywalks system (The University of Hong Kong 2011).
- Aesthetic quality
Footbridges reconcile the subtle hierarchy between footbridges, interior galleries, platforms and connections (Tan and Q.L. Xue 2014), resulting in exciting design details.
- Maintenance
Private developers usually own skywalks in Central. They are all in a highly managed state. Even in certain areas, activities without the prior permission of the building management department, such as walking, chatting, meeting, and sitting, will be banned (Xue, Ma, and Hui 2012).
- Greenery
During our field survey of skywalks in Central, we found that greenery is scarce. Planter boxes are only available on the guard rails of the Exchange Square and some footbridges in the IFC Complex.

5. LIMITATIONS AND FUTURE RESEARCH

This research reviews the literature on pedestrian experience and establishes an analytical framework for pedestrian experience with skywalks. The framework allows designers and developers of pedestrian environments to systematically and efficiently evaluate the pedestrian experience of sky-

walks and thus help design safe, comfortable and enjoyable environments for pedestrians. However, this research has some limitations.

First, this research only used the literature review methods and consultation with experts during the establishment of the framework. Researchers may consider conducting interviews with residents near the case to obtain more specific information about the pedestrian environment in future studies.

Secondly, after establishing the analytical framework, this research only conducts a qualitative analysis of the urban design characteristics of the cases. Therefore, future research could use quantitative methods to assess further the impact of all potential walking environmental factors on the walking experience.

6. CONCLUSION

A review and assessment of the skywalk's spatial characteristics are critical to the successful future development of skywalks. This research, combined with future assessment research, can identify environmental factors that create a unique walking experience for the skywalks examined and can also propose suggestions for these skywalks.

A review of spatial interventions and design features can provide directions for future research. After qualitative research developments and characteristics, it is necessary to quantitatively provide more quantitative data to assess the impact of different spatial qualities on pedestrian activity and experience.

Furthermore, more skywalks systems are currently emerging in developing countries (Bhatia et al. 2022; Yang, Qian, and Zhao 2016; Steric 2019). Therefore, the architectural environment and social background of Hong Kong's construction of skywalks, the layout and design adopted, and the research of possible impacts can provide valuable experiences for developing countries.

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RESEARCH ON DESIGN STRATEGIES FOR CONNECTION BETWEEN SKYWAY NETWORKS AND URBAN FABRIC - COMPARISON OF MINNEAPOLIS AND SEWOON-

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ABSTRACT:

As the urban population explodes internationally, some cities selected the skyway(elevated pedestrian passage) for overcoming the overcrowding of urban street. The skyway had been believed in that it could not only reduce the density of city but also provides safe pedestrian environment by separating pedestrians from traffic threat. However since the development of skyway has been done with disregarding of the existing street community which contains the accumulation of human lives, the skyway brought the death of street level and eventually the decline of cities.

This research aimed to emphasize the significance of considering the relationship between skyway network and urban fabric by comparing the skyway systems in two different cities.

Minneapolis, Minnesota in USA, has the biggest elevated pedestrian network in the world. At the early stage of development in 1970s, Minneapolis struggled with the disconnection between skyway level and street level. However the city recognized the nature of human lives that cannot be separated from ground and adapted specific design strategies. Today, the Minneapolis has the most successful skyway network model.

The Sewoon Sang-ga in Seoul, Korea, designed in 1960s by a Korean modern architect, Swoo-geun Kim, is the first mixed-used building with the skyway for segregation of pedestrian and vehicle. But as the skyway was built on slum area which was originally an empty land for military purposes, it was hard to capture the significance of connections with urban fabric. Therefore it had declined rapidly and the discussions of restoration are still taking these days.

This study is important as Minneapolis skyway model can be a good example to Sewoon Sangga which has second phase of restoration ahead. Minneapolis had also similar problems in past, but eventually became an active skyway model and Minneapolis model can be one of the keys for connecting Sewoon and existing environment.

Keywords: *Skyway, Urban Fabric, Urban Planning*

1.1 RESEARCH BACKGROUND AND PURPO

For decades, today's cities have grown to accommodate rapid vehicle traffic and have degenerated into a collection of remote islands concentrated only on developing individual buildings. Jane Jacobs pointed out that if high-rise and vehicle-oriented construction continue regardless of the urban context, people will be driven out of the city, isolated in buildings, and eventually, the cities will become a "lifeless city" (Jacobs, 1961).

Skyways have emerged to attract people who no longer walk in the city to avoid vehicles and increase the connectivity of separate buildings. However, these days skyways, which are being adopted as part of urban planning in many cities worldwide, have produced new problems contrary to expectations. History shows that at the base of urban planning, including skyways, there are arguments to create a new city by leaving or demolishing the existing city, or transforming the old city center, judging that the existing city is sick and unable to function correctly.

For instance, Sewoon Sangga project started with the government's development and was pushed around and built anew. There was no time or reason to care about the surrounding urban context. With the advent of new buildings and Skyways, it was popular at first, but it eventually became a place that people rarely visited. The project implemented to revive the underdeveloped area has fallen behind again, leaving only a vast structure.

However, the Skyway system in Downtown Minneapolis, Minnesota, North America, has maintained the world's largest network and is still actively expanding these days. The city recognizes the problems early on and tries to solve them through various methods. The most notable of Minneapolis' efforts is the use of the semi-public space, which is a medium between skyways and downtown streets on the ground floor of each building.

Recently the interest in installing skyways in the city has been increasing, and so does it in Seoul. Sewoon Sangga skyway was planned to be re-established, the parts have been already built, and some parts are to be built. It is only a part of it now, but it is also necessary to consider the possibility of urban expansion. By comparing the Minneapolis Downtown Skyway System and the past Sewoon Sangga Skyway System, this study aims to lay the foundation for the correct direction for the development of skyways in the city center of Korea.

1.2 Research Subjects and Methods

Worldwide, projects that adopt skyways are diversified, and cities with skyways as part of the pedestrian system in urban planning are increasing. At the same time, voices of concern are growing along with problems caused by the installation and spread of skyways. In order to find the fundamental cause of the problems, it is necessary to look at the roots of the facility. Therefore, this study first attempts to briefly trace the skyway's origin through a review of historical literature. It focused on explaining the urban background and context that greatly influenced the appearance of skyways by introducing a small number of significant projects by period rather than detailing the origin to the present. Based on this, this research would like to examine how some limitations of the skyway plan in history originated the problems faced by today's skyways.

The skyway system in Downtown Minneapolis that takes efforts to overcome the identified problems was selected as the first example. Prior to full-scale analysis, it is necessary to understand the formation and development process and current situation of the skyway network in Minneapolis.

The skyway system of Sewoon Sangga in Seoul, South Korea, an early case of Korean architecture containing the concept of a walking deck and roof garden, was selected as the second example. Its response was great at first but was on the path to collapse in the end, differently from the Minneapolis skyway system. First, we will look at the background and opportunity of the establishment and see what value Kim Soogeun, an architect who designed Sewoon Sangga, originally intended to achieve. After that, we will look at the success and failure of Sewoon Sangga, especially the background and reason for the era when the number of users plunged.After analyzing each example, the comparison of two different systems will suggest the direction Skyway should move forward.

1.3 Skyway's Past and Present

At the base of the skyways in history lies a land that existed before constructing a new city, or denial of existing city streets and showed the ground being lost to vehicles. Referring to Le Corbusier's "Shining City," Jane Jacobs criticized that elevated streets would eventually remove streetways on the ground and turn them into desolate parks. Le Corbusier said, "Roads were originally ours," but the overall urban planning he showed was centered around a grid-patterned road system for smooth traffic.

Suppose history's skyways appear to organize and functionally divide complex cities with too many people and vehicles. In that case, today's skyways are distinctly different in that they began to be created to capture the floating population exiting the city. There is a big difference between the past cities and the present cities from the tasks at hand. If so, it can be seen that today's skyways need a different level of approach from the planning stage.

Many cities around the world have, contrary to expectations, produced new problems. The answer to the cause of this problem can be found in history. At the base of urban planning, including public streets, there are arguments to create a new city by leaving or demolishing the existing city or transforming the old city center, judging that the existing city is sick and unable to function correctly.

2. DOWNTONW MINNEAPOLIS SKYWAY SYSTEM

2.1 The Birth of Minneapolis Skyway

In 1956, when the largest shopping center in North America opened in the suburbs of Minneapolis, downtown Minneapolis began to change. With the shift of the consumer population, except for Downtown anchored businesses, many Downtown businesses left for the suburbs, and the city became a "Ghost Town"(Kaufman, 1985).

Leslie Park, the president of Baker Properties, was aware of the change and proposed a concrete plan in the early 50s. He argued that the installation of skyways on downtown streets could bring people back to the city. The skyway he proposed was not a bridge-type skyway between the buildings but a massive structure covering all of Nicollet Mall, the main street of Downtown. However, the government rejected his opinion due to concerns about the downturn of the ground level (Kaufman, 1985). Eventually, he achieved a part of the skyway plan in a complex commercial facility built on company-owned land. In August 1962, the first skyway in Minneapolis was built across Marquette Avenue to connect Northstar Complex and the Northwestern National Bank building. As the first skyway immediately increased commercial profits, he decided to add more skyways to adjacent buildings. As a result, the pedestrian volume of these buildings increased significantly, and the owners of the surrounding buildings also added skyways to their buildings. In the late 1960s, nine blocks were connected by skyways, and in the 1970s, the skyway-based developments were accelerated.
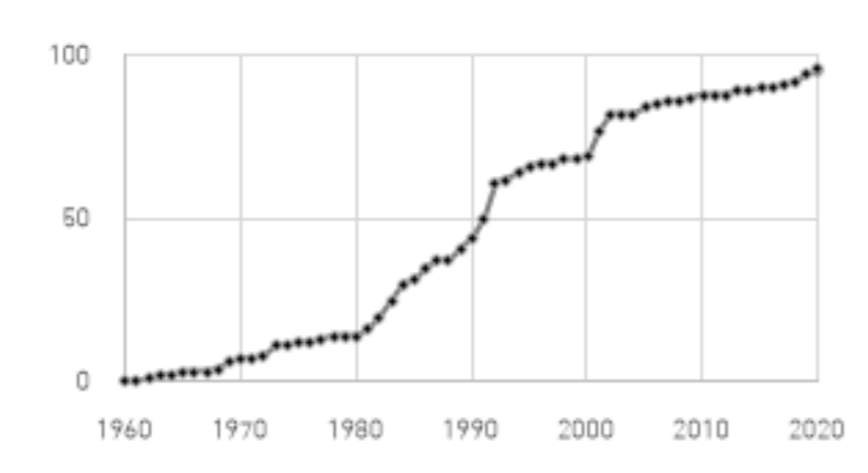
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Figure 1. The number of skyways in Downtown Minneapolis

2.2 Success and Proliferation of Skyway Network and Recognition of Problems

In 1972, the IDS Center was built on the Nicollet Mall, with four skyways. This building was the first building planned to install skyways at the beginning of the construction. On the first floor of the building, an atrium with a glass ceiling provided a good "meeting place." By the late 1970s, nearly 20 skyways were installed, and the rent on the second floor exceeded the rent on the first floor. At the same time, the city's economy, which had stagnated, recovered rapidly, raising it to a level before excessive suburbanization (Byers, 1998).
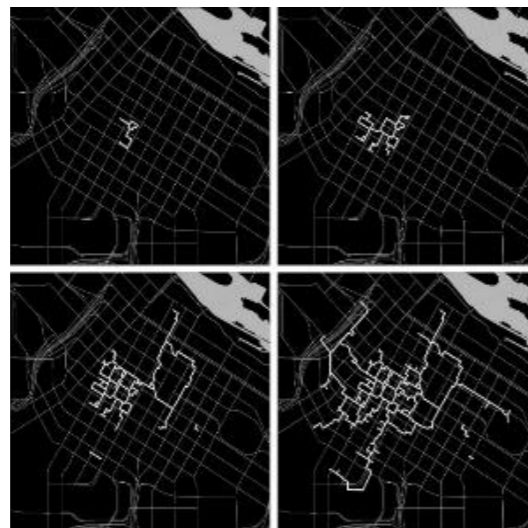

Figure 2 . Process of Spread
1970s, 1980s, 1990s, and 2010s

In the late 1980s, a few blocks of government agencies were integrated into the skyway system. This integration proved the government's support for the spread of the skyway system(Byers, 1998), which led to unprecedented rapid growth in the early 1990s. The government support contributed to the addition of about 25 skyways. Furthermore, independent small skyway networks emerged on the eastern and southern edges of the city. Except for the Hennepin County Medical Center complex (HCMC), most were amalgamated into the system in the late 1990s with the proliferation of networks(Byers, 1998). However, the vacancy rate on the first floor began to increase in the early 1990s. As the commercial diversity of the second floor exploded, the floating population naturally increased. Even though the space on the second floor was smaller, and the rent was higher than on the first floor, old stores on the first floor moved to the second floor. This phenomenon naturally led to a decrease in the population of the urban street movement, and the government began to discuss the relationship between urban streets and skyways in comprehensive urban planning to solve this problem. "Minneapolis Plan for the 1980s", a plan for the city's vision and goals to achieve by 1990, emphasized the expansion of the skyway system, the connected transportation, and parking spaces for recovering population. On the other hand, the "Metro 2000 Plan" published in 1990 and the "Minneapolis Plan" published in 2000 highlighted designs that consider the connectivity of urban streets and skyways.

2.3 Present Status of Downtown Minneapolis Skyway System

Even though other cities discuss demolition and development restrictions of skyways due to the depression of ground level, about 100 skyways connect 80 city blocks, and the Minneapolis Skyway system is still growing.

Figure 3. Map of Downtown Minneapolis Skyway System

Recently, Minneapolis Central Library added skyways through remodeling, and the newly built Minneapolis Public Service Building also has some skyways. Additionally, an independent skyway system in HCMC will be connected to existing systems within 2023. These latest additional installations of skyways show the potential for expansion into areas that have no skyways, such as Warehouse District, East Town, and Elliot Park.

According to the interview of Michael Sorensen, an architect of the Minneapolis Public Service Building, unlike conventional government offices, he tried to create a lobby for considering circulation between skyways and urban streets.To prevent the depression of existing urban streets, the Minneapolis government adjusts the institutional framework, promotes various street activities,

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and develops pedestrian-only streets. Along with the government's efforts, some efforts of private businesses have enabled the coexistence of skyways and urban streets. Because Downtown business owners recognized the importance of urban streets, they tried to provide quasi-public spaces for mediating the skyways and urban streets.

Figure 4. Left: Axonometric diagram of the New Public Service Building
Right: 1st Floor Interior of the Public Service Building

2.4 Design Strategies for Mediating the skyways and urban Streets

Figure 5. Crystal Court of the IDS Center

Completed in 1972, the IDS Center is a complex located in the center of Nicolet Mall, consisting of a 57-story IDS Tower, an eight-story annex, a 19-story Marquette Hotel, and a two-story commercial building. These buildings share a single lobby, surrounded by four buildings, and the consolation space is called the Crystal Court. The space, modeled on the Italian square, serves as an indoor park that fills the city's lack of outdoor public space due to harsh winter weather in Minnesota.

Figure 6. Site and Floor Plan of IDS Center

Entering the main entrance facing the Nicollet Mall, people could notice a giant escalator, a primary vertical circulation connecting the first and second floors. On the second floor, there is a continuous balcony space for walking along the border of the completed public space on the first floor, which

leads directly to the public street, and the escalator connects the pedestrian space with the indoor park on the first floor.

The crystal coat is an essential example of indicating the importance of public space within the network. By providing a vast atrium with a glass ceiling to the public, it functions to make a flexible connection with the ground and increase public traffic. In this space, installing facilities, such as benches, trees, and tables, creates an atmosphere like the park and provides a suitable environment for pedestrians to stay. In addition, in 2021, Infinity Edge Fountain was added through the renovation of the space, which usually serves as a decorative feature and can be used as a stage if necessary. Citizens are encouraged to hold non-profit events using this.

The most decisive role of crystal courts within the city center is to promote walking by providing pedestrians with various path options by providing space to cross a large urban block. In addition, through the formation of a large atrium connecting the first and second layers, it serves as a central point in a complex aerial network like a giant maze.

Figure 7. Detailed Images of U.S. Bank Plaza

Built in 1981, the U.S. Bank Plaza consists of 40-story and 23-story buildings, and between the two buildings, an eight-story atrium connects the two buildings. On the first and second floors, there are retail stores such as banks, convenience stores, restaurants, and cafes, and above them are offices and residential units.

The atrium between the two buildings forms a diagonal axis that allows the blocks to cross. In the center of the atrium, two different vertical circulations connect the first floor and the Skyway Level. If people enter the east entrance, people can see elevators that operate only for the first and second floors, and if people enter the west entrance, the first thing they can notice is a vast escalator. In addition, streetlight structures are lined up from the west entrance to the east entrance, and trees are placed everywhere.

In contrast to IDS Center, the U.S. Bank Plaza has benches, tables, and facilities on the second floor rather than on the first floor. Tables and chairs are on the northeast balcony, and tables and chairs are arranged along with the expanded terrace space.
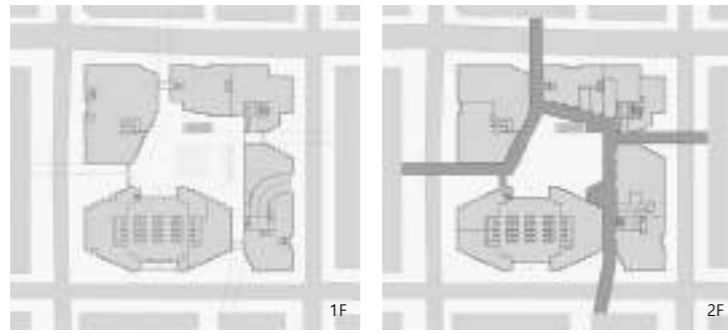
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Figure 8. Site and Floor Plan of U.S. Bank Plaza

3. SEWOON SANGGA AND ITS SKYWAY

3.1 The Birth of Sewoon Sangga

Figure 9. Appearance of Sewoon Sangga Completion

The birth of Sewoon Sangga dates back to the Japanese colonial era. During World War II, Japan placed an empty land to reduce the tremendous damage, and Sewoon Sangga was built on this empty land. As the empty land created during the Japanese colonial era was neglected until after Korean War, a shantytown was formed mainly by victims and migrants. At that time, Seoul Mayor Kim Hyun-ok took office in 1966 to reform the slummed area, which was one of the big social problems. Mayor Kim Hyun-ok not only just needed to set up a new program on the site while proceeding with the complete demolition but had to secure the publicity of the project for the justification to be established. Therefore a national project was commissioned by architect Kim Soo-geun to the extent that the government directly intervened. Kim Soo-geun designed the first multiuse residential and commercial building by utilizing concepts that were widely applied to Western architecture at the time, such as public walking decks, artificial land, and separation of steps.
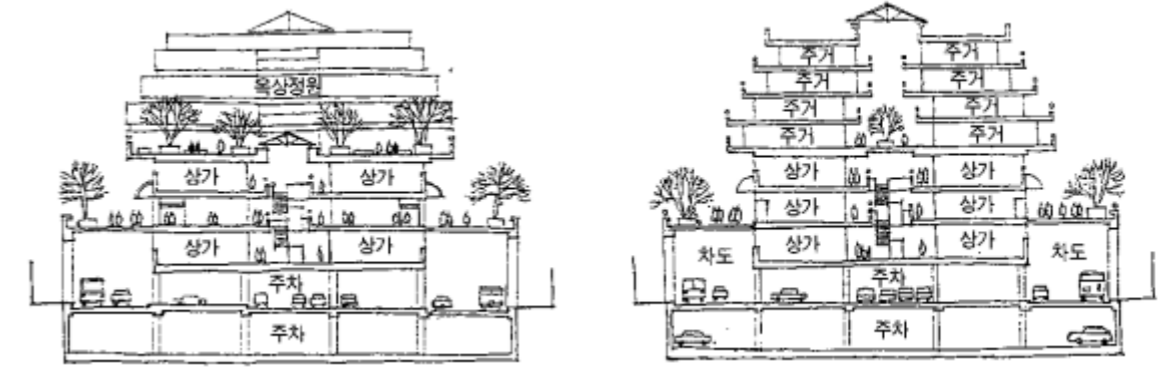

Figure 10. Conceptual Section Drawings of Sewoon Sangga

The first goal and concept were to activate the surrounding area by clearly separating cars and pedestrians. As an appropriate block was provided between 3rd and 4th streets to secure automobile passageways, the ground was composed of automobiles, and public decks were composed of pedestrian malls. Creating a new pedestrian axis regardless of the automobile was intended to link it with urban functions and activate commercial streets with an elevated artificial deck. By introducing multi-layered functions such as artificial decks, pedestrian malls, and artificial land in public squares, this groundbreaking idea aimed to suggest a new direction to Korean urban architecture, which had been limited to flat ground development.

Ironically, the second concept made it possible to live independently even if Sewoon Sangga existed alone. Despite trying to revitalize the surrounding area, Sewoon Sangga was recognized as an independent entity to prevent collisions with existing urban organizations. Kim Soo-geun tried to create an architectural city where residents living in Sewoon Sangga could live without going outside by having a rooftop garden or providing essential facilities such as a school inside the building. It was enough to feel strange about his conflicting intentions, even though his plans had not all materialized

3.2 Success and Failure of Sewoon Skyway

It was popular in the early days of the establishment of Sewoon Sangga as high-ranking government officials and celebrities moved into it. However, its popularity quickly collapsed and there were several reasons.

The central urban planning concept of Sewoon Sangga was too early to apply to the circumstance of Korea. The design was too conceptual, and only some ideas were realized. This was because it was challenging to realize and lacked communication with the construction company. The pedestrian deck, which should have been connected from beginning to end, was misplaced. The core intention to connect human movements naturally around the massive walking axis was violated, and self-sustaining life in the building did not work well.

However, the biggest reason was the lack of consideration for connection with the surrounding cities. As mentioned earlier in the critical concept of Sewoon Sangga, one of the big goals was to revitalize the surrounding area through Sewoon Sangga. However, unlike the Sewoon Sangga plan's first intention, it was separated rather than connected with the surrounding city context. It was relatively inevitable as the surrounding area was a slummed area, and a project was carried out to remodel it, but this is because it was an idea of urban structure without concern for real human life. (Jeong, 1996)

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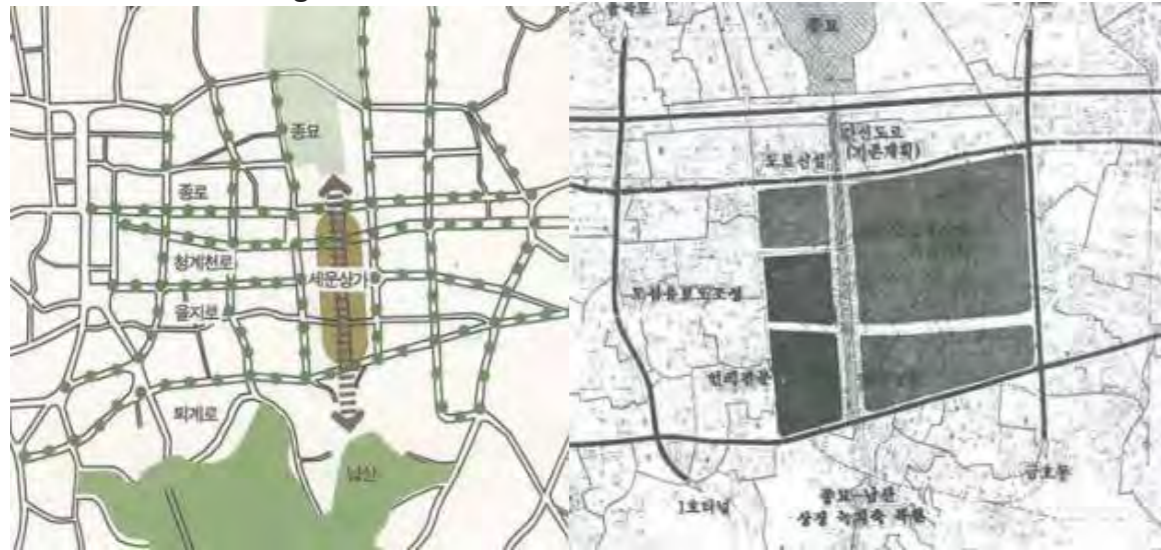### 3.3 Present 'Re-building Sewoon'

Figure 11. Urban Axis of Seoul

Discussions on demolition continued for a long time, but eventually, the government decided to preserve it in 2014. The local government named the project 'Re-building Sewoon' and designated some significant concepts.

First, the important thing was to revive the green axis, which created connectivity with Seoul before the completion of Sewoon. With the increasing need to construct the green network throughout Seoul, Securing a green axis was assured. From the restoration of Cheonggyecheon Stream, a movement to reorganize the spatial structure of the city center took place. However, because the main transportation route in Seoul was east and west, the more the green axis connecting the strong north and south is created, the more the east and west are separated.

Second, discussions on the existing urban space structure, which Minneapolis considered important about time traces, were held. Developing the city center while maintaining the old urban structure would be meaningful. However, even though it is a general commercial area, conservation-type development was judged to be virtually difficult due to the relative deprivation of residents and the need for complete redevelopment from the backwardness of the entire planet. Therefore a bypass method was adopted to borrow the context of the existing urban structure for the movement plan.

Figure 12. Opponents of the Establishment of Skyway

Skyway has become an essential element of Seewoon Sangga again. It can connect the north-south green axis without damaging the east-west connection and induce the inflow into Sewoon Sangga without destroying the surrounding urban fabric. However, without sufficient consideration of the relationship with the ground level, the current skyway is still causing many problems.

During the construction of the walking deck, there was much friction with the residents because there was no consideration for businesses on the first floor, and there was not enough persuasion. The store's sales decreased during the construction, complaining of inconvenience. Although the number of visitors increased after the construction, the increase in sales was not enough to recover the damage caused by the construction. This tells us how establishing a relationship with the land is essential for 'Re-building Sewoon,' which is about to take the next step.

4. COMPARISON BETWEEN MINNEAPOLIS AND SEWOON

Many discussions have been made to avoid repeating past mistakes, but Re-building Sewoon still had two fatal limitations. The first is that there is still a lack of connection between the elevated walking deck and the surrounding urban organization. Among the ideas designed by Kim Soo-geun, there was an effort to connect with the surrounding cities while realizing the system's limitations that lives only within Sewoon Sangga. However, since it functions only for connection, it is only used for people to circulate rather than truly utilize or enjoy the space. In contrast, Minneapolis creates public spaces for mediating the skyway level and the ground level based on considering the existing urban fabric.

The second is the lack of connectivity between the walking deck and Sewoon Sangga. The original intention was to revive the past meaning of Sewoon Sangga by connecting Sewoon Sangga, the pedestrian deck, and the surrounding urban fabric and aimed to revitalize the surrounding buildings. Though there were relatively many thoughts about the connection between the pedestrian deck and the surrounding organizations, there was a lack of ideas for connecting Sewoon Sangga and the pedestrian deck. In the case of Minneapolis, because the skyways are installed and managed by private sectors, the idea of bringing people into their buildings was essential. While Minneapolis' connection was necessary because it had to attract people to the city through the skyway, Sewoon Sangga's intention was still conceptual. Visitors stayed only on the walking deck and did not enter the Sewoon Sangga.

If the building owners of Minneapolis considered only microscopic commercial profits and were fascinated by the increase of the floating population on the second floor in the early stages of skyway growth, they would concentrate on developing and filling the second floor with commercial spaces without void space. However, the advent of the IDS Center made them realize that the consideration of existing urban fabric along with skyway space is the proper way to save the city. Since then, the lobby spaces of many buildings in the city have resembled the Crystal Courts of IDS center or have created public spaces in more new ways. Mediation spaces allowed Minneapolis to avoid the depression of urban street-level that cities with skyways inevitably faced. With various efforts accumulated, the Minneapolis Skyway system became the largest skyway network in the world.

On the other hand, Sewoon Sangga tried to build its building system without connecting to the surrounding cities, so it eventually failed. It was not difficult to get attention for a while with the advent of new type of architecture. However, it was hard to establish itself as a meaningful place for people who continuously used it.

Sewoon Sangga was established by the excessive intervention of the government to prepare for rapid urban growth, repair slums, and increase the housing supply. Also, since it was built on empty land left from the war, it was inevitable that it would lose meaning in the urban fabric. In addition, the conceptual intentions were not properly realized, and efforts to improve past errors were seen

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in the Re-building Sewoon, but it still failed to spatially interpret the connection between cities, buildings, and skyways.

5. CONCLUSION

This study looked at two cases of skyway systems: Minneapolis and Sewoon. Minneapolis is steadily growing through finding the fundamental cause of the problems of skyways and solving them positively. The skyways in history, which are the roots of the current skyways, tend to prioritize vehicles over pedestrians from the planning stage and new cities over existing cities. This tendency is passed down to today's skyways, causing the problem of ground-level stagnation. However, in the case of Minneapolis, by efficient utilization of public spaces on the first and second floors, the city can achieve the coexistence of skyways and streets.

Recently, the seeds of urban spread to public places have sprouted in Korea. The skyway of Sewoon Sangga showed the possibility of the urban spread of skyway networks for the first time in Korea, and the Daewoo Foundation Building in Jung-gu, Seoul, expanded the front space of the building to connect with Seoullo 7017, and installed skyway. However, the government of Seoul announced the demolition of the entire Sewoon on April 21, 2022, due to continued opposition and concerns over a slump in the first-floor stores. Moreover, since its first establishment in 2017, no more skyway has been added to Seoullo 7017, and it is hard to find connections with surrounding buildings or urban fabric. This study is meaningful in that it sheds light on what should be considered first for such skyway urban planning to thrive like Minneapolis without harming today's cities.

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THE CONVIVIAL RECONFIGURATION OF THE SEALED SPACE

4-A-5

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ABSTRACT:

Soil recovery floods todays urban and territorial policies and projects. Since the industrial revolution, the processes of urbanisation have literally subverted the relationship between city and soil. Soil has been sealed rapidly at high rates, reducing its essential ecosystem services such as food production, water uptake, filtering and buffering capacity and biodiversity cradle. Over the last decades, the European Union has implemented different programmes to prevent, mitigate, and compensate for soil sealing (e.g. Corine Land Cover inventory, No Net Land Take by 2050). These policies have the merit of looking at soil as a limited resource. Among various approaches, desealing is acknowledged as a strategy that help to monitor, contain, and compensate soil impermeabilization. Yet modalities and procedures of desealing are still to be defined: is desealing a technical action confined to spaces accessible only to insiders? Or can desealing be extended to the social body promoting a culture of soil care?
This contribution revisits the removal techniques —which nowadays are mainly actualized by professional insiders— focusing on processes and procedures to turn the technical space of sealed surfaces and their transformation into convivial experiences. The transformation of the sealed space during a convivial happening is intended as a moment of knowledge and discovery about the world we live in. With these purposes, two projects, JardiNation and Asfalto Mon Amour, are reviewed by looking at the involved actors, tools, procedures and spatial devices that make porous the technical space.

KEY WORDS:
Desealing practices – Convivial tools – Technical tools

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An history of sealing

Soil sealing is the extreme form of soil consumption and land degradation (Tobias, 2018).
The European Environmental Agency states that sealed soil, i.e. covered with an impervious surface, disconnects the four ecospheres (geosphere, hydrosphere, atmosphere, and biosphere): «as they constitute the earth's ecosystem, soil sealing disrupts the functioning of the ecosystem, in terms of nutrient and water cycling, and affects its ability to supply ecosystem» (EEA, 2016: p. 10). In particular, soil sealing, by reducing the space for water to infiltrate, alters the hydrological cycle and contributes to an increase in the frequency of floods and droughts (Garda, 2020; Adobati, 2019). Sealed surfaces boost the urban heat island phenomenon, by absorbing and retaining heat. Furthermore, sealing provokes loss of biodiversity, and it undermines the climate regulation and the carbon storage function of the soil (Pavia, 2019).
Soil sealing has been a pervasive operation at least from the second half of the 19th century, when the hygienic logic made its way in urbanistic practice (Pavia, 2019). Different kinds of impervious surfaces started to cover urban spaces –in particular roads and squares– and the process has been continuing massively until today (Scalenghe, 2009). Modernity built the urbanity looking at soil as a mere abstract surface which hides «what we don't want to see of urban life» (Bee, Clément, 2022: p. 145), no more than a thin layered support for mobility and accumulation.

Policies and projects beating about the soil

Today we are witnessing a change: soil protection and preservation are informing urban and territorial policies and projects. Over the last decades, the European Union has implemented different programmes to prevent, mitigate, and compensate for soil sealing. To mention some of the most relevant: Corine Land Cover (EEA, 2018), Guidelines on best practice to limit, mitigate or compensate soil sealing (EEA, 2012), No Net Land Take by 2050 (Science for Environment Policy, 2016) or even national laws as the Loi Fédérale sur l'Aménagement du Territoire (1979) in Switzerland. These policies have the merit to consider soil as a limited resource and to protect it. Among the different strategies that help to monitor, contain, and compensate its consumption, desealing practices are gaining relevance. Desealing actions, removal techniques and related procedures— which nowadays are mainly associated with the reconstruction of the built environment—are means of soil recovery, that is fertilizing the freed soil (Maienza, 2021), making the removed materials re-enter virtuous circles of recovery and, conversely, enhancing the uses and practices that sealed soil can support. The inclusion of desealing practices into policies and programmes is an essential step on the discussions about soil. It means that the already consumed sealed soil (i.e. the infinite amount of streets, squares, roundabouts, pavements, parking spaces) is foreseen as a potential resource to fight floods, droughts, heat island phenomenon and loss of biodiversity through desealing and recovery processes. Consumed sealed soil is acknowledged as a decisive urban element for the project of the territory.
However, given that desealing, on paper, is a process not only counter to soil consumption but also to what this represents, i.e. to the linear idea of development that characterised the industrial era (Wittfogel, 1956) with its technicalities and specialists, it is legitimate to ask whether, as it proliferates, it will acquire a strictly technical nature like that of sealing or not. In other words, will desealing practices only be feasible within certain technical spaces accessible only to qualified people, or rather, given the retrogressive if not subversive nature of desealing, will other avenues be pursued?
Since recently, examples exist of desealing programmes inspired by these policies that explore

practices which do not deny the technical character of desealing but are nevertheless interested in expanding the number of the subjects involved. It is the case with the Proeftuinen Ontharding (2018 - on going) promoted by the Land and Environment Development Agency –Departement Omgeving– in Flanders (Belgium). The program consists in 45 projects (Departement Omgeving, 2020) that explore the possibilities of desealing Flemish territory on several levels. Besides hypothesizing new legislative frameworks that enable the implementation of policies, a consistent part of the program is dedicated to more concrete actions-tests of demineralization that involve actively the social body.1 The aim is to bring about the economic but also cultural change that desealing implies, i.e. a reversal of the unconditional development idea for long associated to sealing, but also and foremost a culture of soil care.

Desealing as culture of soil care

Opening up technical desealing actions to a broader public is to move in the direction of what Ivan Illich calls convivial society, consisting of «autonomous and creative intercourse among persons, and the intercourse of persons with their environment» (Illich, 1973: p.18).
Accordingly, here desealing is conceived as a convivial practice that enable people to get in touch with matter, to relate to urban soil and its sealing materials. "Convivial desealing" promotes a new culture of soil care, crosswise and open to all. The involvement of the social body during technical operation of desealing is not intended as a redeeming form of participation as such, but rather as a collective way of re-appropriation of the world by doing. With this scope, doing becomes a process of learning and knowing from the inside, a condition of immersion in the world and absorption from it (Ingold, 2013).
By reviewing two known design initiatives of desealing, JardiNation and Asfalto Mon Amour, it is possible to gain a better understanding on modalities and processes which facilitate this shift. A particular attention is given to the use of the tools required for desealing, a lens through which to grasp the potential connection between sealed surfaces and social communities. These two projects, that operated before and outside the aforementioned policies and programmes, are foreseen as ground-breaking and experimental experiences in the field of convivial desealing practices.2

JardiNation, an open construction site

JardiNation is a project by Collectif Coloco&Co that took place in 2017 in Paris at Place de la Nation. From the second half of the twentieth century, Place de la Nation has been progressively transformed from a square to a roundabout, a true traffic node of Paris. Cars space was predominant and oversized. In 2015, the municipality of Paris launched a consultancy to redesign seven iconic squares and Place de la Nation was one of them. In Mars 2017, the design association Coloco&Co started a participatory process involving the inhabitants, where desealing was the crucial action for

1   For more information about Proeftuinen Ontharding see https://omgeving.vlaanderen.be/nl/vlaanderen-breekt-uit-homepagina
2   JardiNation and Asfalto Mon Amour are two design actions studied in the frame of RE-MOVE-ROME, a broader research project that investigates strategies of desealing in the metropolitan area of Rome. Also by looking at other projects and reinterpreting some of them in site-specific explorations, RE-MOVE-ROME aims at shaping the technical space of desealing to the maximum so that its convivial practice inundates everyday life, is open to many, even beyond the confines of an open construction site or a laboratory. The purpose of this stance is to better understand the extent to which learning about desealing can enable us to operate on a daily basis for soil fertilisation, water cycle, planting strategies and social behaviours and practices.

public space reclaiming. The purpose was a temporary transformation of the square pending the implementation of the renovation project. The project was developed over three meetings.

PHASE 1-DAY 1. On April 15th and 16th, during the first event, Coloco&Co organized the so-called Demolition party: the first layers of asphalt were removed. The desealing action consisted in removing the 3,5 meters wide sidewalk that was surrounding the central roundabout whose diameter is about 95 meters. Ten interested residents and users were trained to use picks and shovels to demolish the first 5 cm layer of asphalt and the 10-15 cm concrete base, then to scramble and move the substrate composed of compressed soil and inert materials. The asphalt layer was broken with the picks into a mosaic of pieces: the limited thickness of this horizon made the removal easy and immediate. Once few pieces of asphalt were removed, the demolition ravers could use the shoves as a lever to remove the remnants. Later the participants started to break the concrete base made of sand and gravel. Lastly, picks and shovels were used to turn over and decompress it, thus making space for air. The action closed with the plantation of herbs, shrubs, and trees.

PHASE 2-DAY 2 and 3. The demolition party took place other two times in the following two weekends, involving more than thirty people. During 12 working hours spread on the three weeks, the collective actions removed around 1000 square meters of asphalt. The project was made possible thanks to a group of workers who put in place a chain of concrete blocks to free from cars part of the road section (14 meters wide). As a result, the site became enjoyable, a surface available for many activities and practices in continuity with the central area of the roundabout, where it is possible to bike, skate, play basketball or even drawing and painting on the remaining asphalt.

Figure 2. Tools in action of JardiNation at Place de la Nation, Paris (France).
Credits: Coloco – Nathan Dubois

Asfalto Mon Amour, an open laboratory

Asfalto Mon Amour is a project by Gilles Clément and Coloco&Co developed over different phases from 2012 to 2018 in Lecce at Manifatture Knos, an ancient school for steelworker. There, in 2006, Sud-Est Association embarked on a process of space care, promoting a series of cultural activities such as conferences, exhibitions, artistic performances, laboratories, sports activities, movie projections that have been continuing to this day.

PHASE 1. In 2012, a series of open events, named Incontri del Terzo Luogo, focused on the large semi-abandoned car park of the site. How could almost 10.000 square meters of asphalt support a multiplicity of activities? Could this huge asphalt surface be a parking and a garden at the same time? Following the initial will "to not make any decisions other than those that could be taken directly on the site with the limited means available and the existing constraints" (Bee, Clément, 2022: p. 145), in November 2013, participants used a circular saw to make one-meter wide cuts in the asphalt and a pickaxe to remove the 8-10 cm asphalt layer, revealing the ground underneath, a base of compressed soil made of backfill materials. The removed asphalt was chemically analysed and declared inert (Bee, Clément, 2022).

This action generated other interventions. From there on, the workshop Incontri del Terzo Luogo took place twice a year, in autumn and spring. The idea was to remove the soil starting from the perimeter of the parking lot, where vegetation was already present, and progressively intervening in the central part, leaving plants to conquer the desealed surface. The car park was conceived as a e experimental quarry and the removed material went through re-use process. For instance, pieces of asphalt were collected inside a metal cage to realize benches, were used as tiles for paths or put around planted trees as a protection wall. After every cutting, the soil was turned over and the biggest pebbles were taken off. The permeable soil was either planted, either let loose to pioneer species. This way of proceeding at a seasonal pace allowed the participants to learn from the place, to better understand the regenerating dynamics of soil, to adapt to uses and needs. The six months
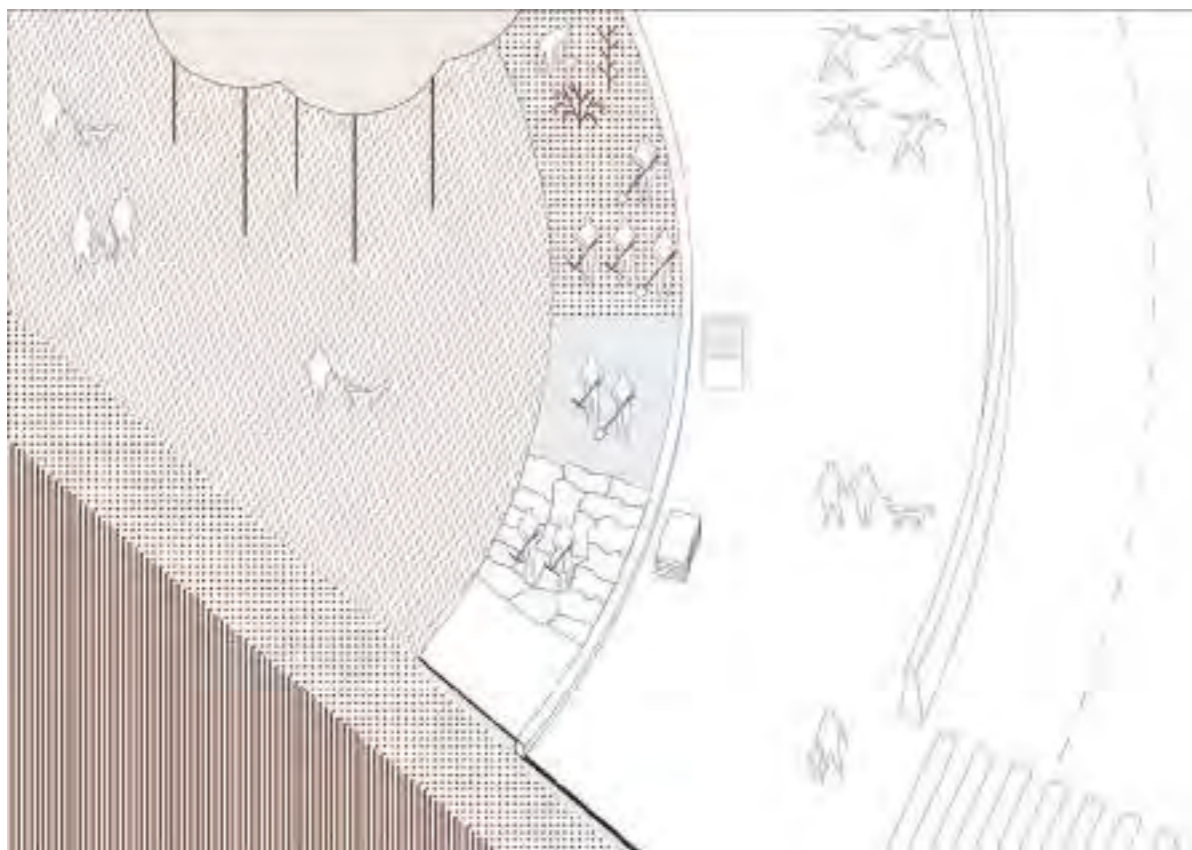

Figure 1. Processes and actions of desealing of JardiNation at Place de la Nation, Paris (France).
Credits: Federico Broggini

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temporal frame allowed to observe how precedents cuts evolved, which planted vegetation survived and which pioneer plants found their ideal place. Moreover, the desealing techniques slightly evolved, were improved, hybridised, involving different people.

PHASE 2. During the workshop in April 2014, the working group of forty people continued with other cuts close to those previously made using the same tools: circular saw and pickaxe. Once the strip was cut, the pickaxe worked as lever to lift the asphalt slab, as sheet of paper.

PHASE 3. In fall 2014, Incontri del Terzo Luogo collaborated with the enterprise in charge of renewing the entrance to the site (Documento programmatico di rigenerazione urbana, 2016). This made possible to use mechanical tools for a massive removal of asphalt: two asphalt cutting machines, one bulldozer with pneumatic drill and excavator arm were available. About one hundred people participated to the workshop: from citizens to scholars and association. After the asphalt removal, the existing soil was mixed with a more fertile one enhancing its fertility and possibility for different type of vegetation to grow. During the workshop the gardening group planted one hundred trees. Sometimes, to break the slabs of asphalt, pneumatic drill was preferred to the pickaxe.

PHASE 3. In April 2015, the workshop Spaces of Indecision hosted again different types of participants as citizens and students from different European universities.

As a result, the car park-garden looked as an archipelago of biological islands in a sea of asphalt. The islands interacted from a botanical perspective, while the sea contributed to climate regulation and ecosystem performance by preserving soil moisture, functional for plants to survive dry periods and droughts.

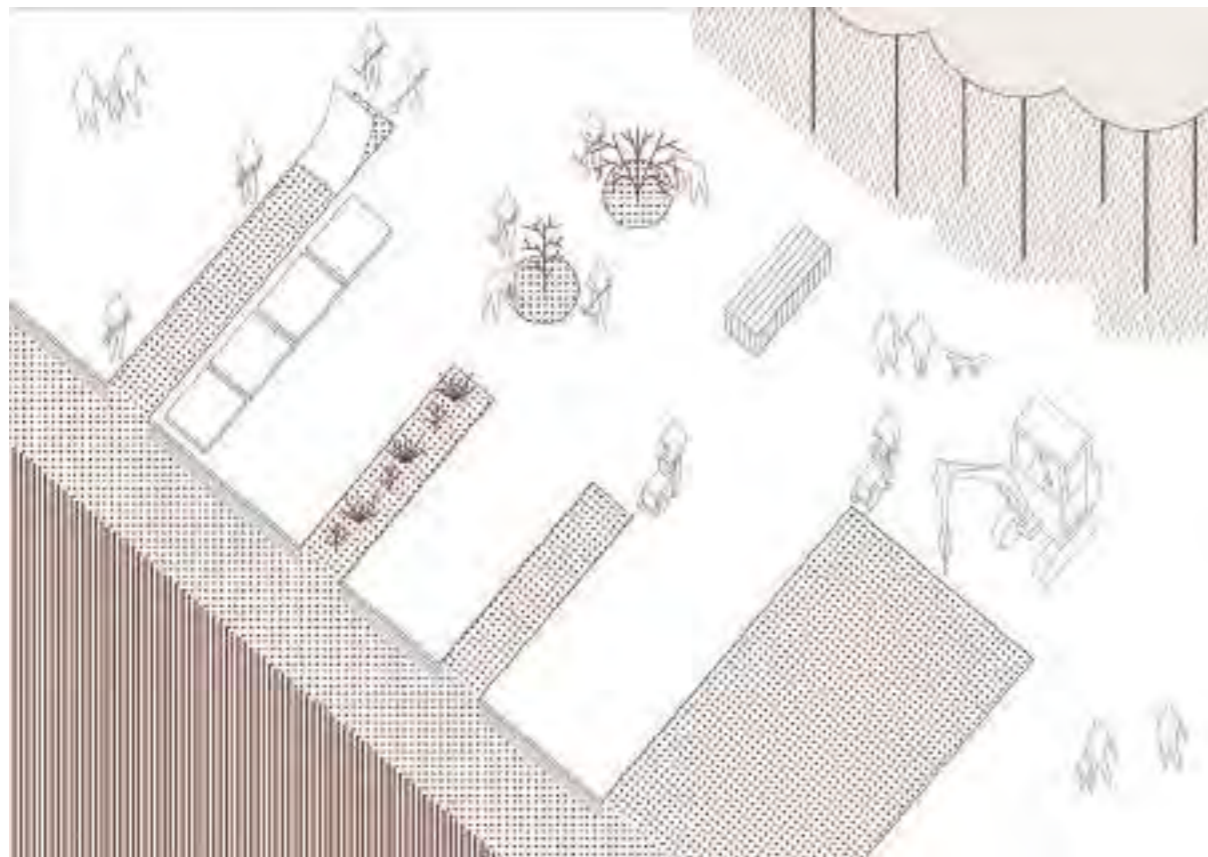*Figure 4. Tools in action of Asfalto Mon Amour at Manifatture Knos, Lecce (Italy). Credits: Manifatture Knos*

Figure 3. Processes and actions of desealing of Asfalto Mon Amour at Manifatture Knos, Lecce (Italy). Credits: Federico Broggini
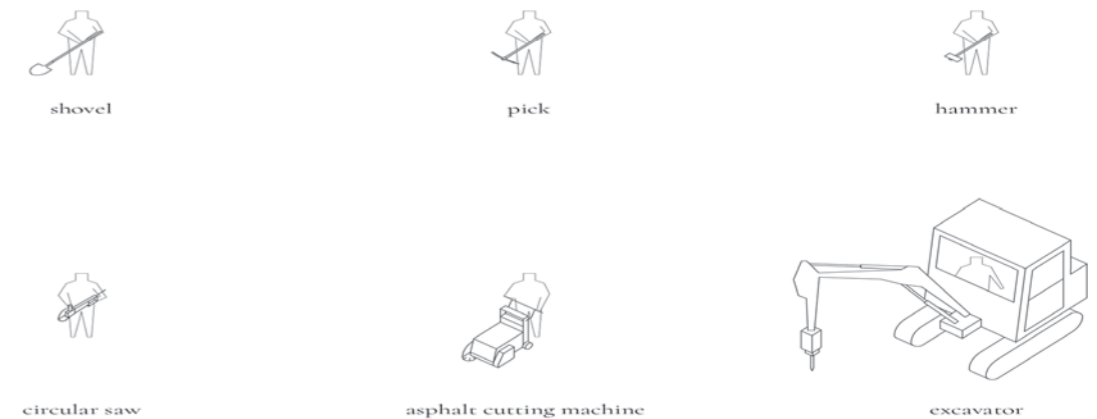

Figure 5. Desealing tools used in the two case studies, JardiNation and Asfalto Mon Amour. Credits: Federico Broggini

Making room for convivial desealing

JardiNation and Asfalto Mon Amour are two long-lasting design experiences of desealing and collective soil care. In the examined desealing practices, human engagement recurs to different kinds of tools, such as shovels, pickaxes, hammers, circular saw, asphalt cutting machines and excavators, each mediating a specific form of connection with the soil.

JardiNation is an open construction site where it is possible to experience and gain knowledge about urban soil as well as the potentialities and difficulties of its transformation. In the words of Pablo Georgieff, co-founder of Coloco&Co, "there is a great virtue in the manual practice of things. You realize what it means to transform space, matter physically resists, it's difficult, it's long, you need to have a clear goal, it's an experience that transforms the way you think and look at the space that surrounds you" (Georgieff, 2017)3. Likewise, Asfalto Mon Amour is an open laboratory where people, inhabitants, associations, students, professionals transform the space together, where the open management of the place has over time fostered experimentation (Bee, 2020). As for desealing, this space, where other rules –or no rules– play (Ibid.), turns technical to convivial, thanks to the collaboration that the enterprise specialised in construction and infrastructure works offers to the participants. If at Place de la Nation the participants intervene on a delimited and already defined area, at Manifatture Knos the entire surface is available for transformations where group of people decide how to intervene after collective discussions and agreements.

The two desealing experiences investigated in this contribution bring forth the discussion on the technical dimension and that of tools in particular. In the essay Tools for conviviality (1973), Ivan Illich distinguishes convivial tools from technical tools, two categories useful to better understand how and in what terms JardiNation and Asfalto Mon Amour make convivial the technical sphere of desealing. Accord to Illich's vision, pickaxes, shovel, hammers, asphalt cutting machines, circular saws, pneumatic hammers and excavators would fall within the technical tools. In his view, all these tools are normally used as (mere) technical tools, because they are usually employed by handled professionals. But technical tools are a form of separation and disconnection between the social body and the world. They preclude the possibility of intervention to potential users in the processes that shape their surrounding space. On the contrary, following Illich's thinking, convivial tools leave a wide space of intervention and power of making to not professional users. Throughout convivial tools, those who take part in transformative actions become more aware of their surrounding space and its functioning principles.

Both in JardiNation and Asfalto Mon Amour, all the technical tools are employed as convivial tools, that is, they extend the technical dimension of desealing to the social body. These projects make tangible the importance of involving the social body in space-making practices as a particular moment of knowledge. Desealing becomes a matter of learning from the world by doing, of being embedded in it, rather a matter of learning about the world from a peripheral position (Ingold, 2013). The desealing operation opens the doors to the world of soil, often neglected, and its fertilization. Desealing thus becomes a soil practice, a form of soil care that requires an effective engagement (Puig de la Bellacasa, 2017). The act of sealing is not demonised, rather emphasising the relational dimension with the soil is also instrumental to the valorisation of the paved soil and the reuse of paving materials.

The condition of alterity and suspension that characterises the two sites, a park awaiting renovation in the case of JardiNation, and an abandoned warehouse car park—now reappropriated—in the case of Asphalt Mon Amour, is perhaps decisive for the subversion of customary rules and technicalities, and the use of technical tools in a convivial dimension. Although these experiences represent crucial cases of opening the technical dimension to the social body, they remain with a few other isolated

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3   Translation by the authors.

cases. The desealing project, in the wake of recent policies and ongoing projects, can be decided to inspire the culture of soil care. By making it convivial to the maximum, desealing can inundate everyday life, be open to many, even beyond the confines of an open construction site or a laboratory in "suspended spaces". However, it remains to be understood whether there is a willingness to revise the rules for managing desealing sites to allow the many to also use technical tools in a convivial manner and develop a more intense relationship with the soil.

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POPULARITY INFLUENCING FACTORS OF FACTORY RENOVATION CULTURAL AND CREATIVE INDUSTRIAL PARKS ON SOCIAL MEDIA: A CASE STUDY ON BEIJING

4-B-1

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ABSTRACT:

Understanding drivers of the creative industry park is critical to increasing park use and human well-being. Previous studies have examined the impact of different factors on park use through traditional methods, which are often time-consuming and labor-intensive. We use a new type of data from social media with 41 creative industry parks in Beijing, China. Their popularity was judged according to their star ratings and the average number of comments per year on social media Dazhong Dianping. The results show that there are 3 factors (parking lot density, dining density, coordination between old and new) that affect both the star rating and the average annual number of comments, and 2 factors (building storey height diversity, number of universities and scientific research institutions) affect the average number of comments per year of the parks. Parking lot density was the only negative correlation factor. The results show that banning cars from entering the park, or designing adequate parking spaces can effectively improve the popularity of the creative industry park. In addition, improving dining density, coordination between old and new, and building storey height diversity can enhance park popularity through increase of the willingness of tourists to take pictures; retain equipment and plants to create a place of memory. It is also proposed that park operators should work in collaboration with surrounding universities to create some places for consumption activities. These all help to increase the visibility of the park. This paper can provide some inspiration for park management and planning.

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INTRODUCTION

A creative industry park renovated from industrial land refers to a park that develops cultural industries and creative economies by reusing abandoned factories and land, which is of great significance to urban renewal [1]. Due to the low-density environment and historical charm, This type of park is very attractive, like a public city park, attracting outside visitors to visit and relax. In China, the industrial heritage cultural and creative industrial park has become the third place for Internet celebrities to check in. However, not all parks are popular. Due to poor accessibility, insufficient public facilities, too few green landscapes, and poor building renovations, these parks are not very popular. The root cause may be that the feelings and needs of users are not considered. Therefore, from the perspective of users, it is very important to identify popular parks and analyze the influencing factors to improve park planning and management.

Kevin Lynch was the first scholar to implement space study from the perspective of users, where some subjects were invited to draw their impressions of the city. Later, research methods such as participatory drawing, questionnaire interview, and observation of user methods gradually emerged, which promoted the collection of spatial experience and enabled designers to get feedback on spatial preference information. However, these traditional methods are usually limited to specific locations, are time-consuming and labor-intensive, can only survey a small number of people, and may have implicit biases.

There are many studies that have investigated the impact of different factors on park popularity. There are some differences in views between different subjects. For enterprises and office workers, they prefer parks with superior location conditions, complete service facilities, and abundant human resources [1, 2]. For tourists, they pay more attention to the nighttime economy, such as coffee [3]; and they do not like office-type cultural and creative parks, because they are full of regular office buildings, monotonous venues, and lack interesting sketches [4]. For all users, some studies have found that the overall historical charm of the park, the quality and quantity of old industrial plants, the diversity of business formats, the safety and comfort of renovated buildings, and the richness of cultural activities affect people's love for the park [1, 2]. However, these studies mostly use traditional methods and data.

As parks, scenic spots, cultural and creative parks and other spaces land on the media, social media is subtly accumulating data on the popularity of spaces and user preferences: users can check in, comment on their likes and dislikes for spaces, and even give space score. And, compared to traditional methods, social media data is easy to obtain. As a result, some studies using social media data to analyze the popularity of spaces were carried out. They can be classified into two aspects: on the one hand, the number of check-ins or intensity, the number of comments,and the number of days of photo users [5] are used to indicate the popularity of the space, mainly including social media with check-in functions such as Weibo, Flickr and Twitter. Each check-in of the user can be corresponding to a POI. Many studies have proved that the number of social media check-ins and comments, and photo sharing data [5–7] (or the number of photo-user-days (PUD)) can accurately reflect the number of visits to places such as scenic spots, and can reflect the popularity of the space. For example, a study quantified the number of park visits based on Weibo check-in data, and explored the factors that can affect the number of park visits [8]. On the other hand, space satisfaction is expressed by scores or star ratings, mainly including Dazhong Dianping (DZDP),Yelp, etc. Each business point (scenic spot or store) corresponds to a POI on the geographic map, and the score of the business point is the average of all previous user scores. For example, a study based on the star rating data of DZDP, taking duty-free shops as the research object, analyzes the physical space and socio-economic factors that affect consumer ratings [9].

These studies advance understanding of the factors that influence the popularity of spaces. However, they often conduct research from one side, or the number of visits (the number of comments), or satisfaction, which may not fully reflect popularity.

 In order to make up for these shortcomings, this paper uses DZDP social media to study the popularity and influencing factors of 41 industrial heritage cultural and creative parks in Beijing. For each scenic spot, DZDP has the star rating, and the number of reviews. The analysis of the star rating and the number of comments is helpful to more accurately describe the popularity. Focusing on the research question "What factors affect the popularity of industrial heritage cultural and creative industrial parks?", the objectives of the study are to: (1) Judge the popularity of the parks according to the star rating and the number of comments ; (2) Through multiple regression calculation, find out which factors affect the star rating of the park and the average number of comments per year; (3) Focusing on these factors and the influencing mechanism, put forward suggestions on the development of the park. The results of this study can provide important inspiration for park management and planning.

METHODS AND CASE STUDY DESCRIPTION

Study area

The research was conducted in Beijing, the capital of China. In the 1990s, Beijing started the transformation of old factory projects. Since the end of 2017, Beijing has successively issued a series of policies such as "Guiding Opinions on Protecting and Utilizing Old Factory Buildings to Expand Cultural Space", "Beijing Cultural and Creative Industry Park Identification and Standardized Management Measures", etc., which constitute the development guide of Beijing Cultural and Creative Park. According to the data of the Beijing Cultural and Creative Industry Promotion Center, there are more than 100 old factory renovation parks that have been formed and relatively active, mainly distributed in eleven districts such as Chaoyang.

We are concerned about 41 parks within the 5th ring road of Beijing, an urban core, there are about 660 square kilometers area. There used to be many factories here, but as the city spreads, the factory land has been gradually surrounded by the city, and the enterprises themselves move out, and these industrial land are implanted with new urban functions, such as parks, residences. The 41 parks were screened based on literature and 2019 DZDP data, and they had both star ratings and more than one review on DZDP. The boundaries of the 41 parks were drawn based on Google Earth imagery and modified according to area of interest from open street maps, Baidu map, and planning map.

These 41 parks are both universal and unique. From the perspective of location, they are all over the city center, hinterland and edge; from the perspective of type, they include various types such as art, media, and office.

The star rating and ANCPY of park based on DZDP data

DZDP website (www.dianping.com) allows customers to publish five-level ratings overall, which is known as 'star rating'. We use the star rating of the public comment data to represent the satisfaction of the park, and the average number of comments per year to represent the visits of the park. These two dimensions can be combined to represent the popularity of the park. The parks with the average annual number of reviews are classified as the most popular parks in Category I. DZDP is similar to Yelp in China, and is the first independent third-party consumer review website established in the world. It is one of the most important APPs for people to choose their destination and target space.

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The retrieval of DZDP comments is December 30, 2019, which represents the number of stars and reviews obtained by the park as of that time. Dazhong Dianping star rating data was provided from the fall 2021 course of Big Data and Urban Planning, School of Architecture, Tsinghua University. Since our POIs and AOIs data are 2019, we use the stars and comments of DZDP in 2019. According to DZDP's annual report from https://data.iresearch.com.cn/home.shtml , the ratio of female users to male users is not much different, close to 4:6 ; young and middle-aged users are the main force, the users between the ages of 25 and 30 account for 29.53%, and the users between the ages of 31 and 40 account for 50.57%. Therefore, considering that the audience of the Cultural and Creative Park is basically young and middle-aged, DZDP is suitable for this study.

Statistical analysis

First, some factors that may affect the popularity of the park are assumed. According to previous research and actual research, a total of 25 variables were selected. Internal features include 19 variables in functional strength, architectural heritage, facility density, landscape sketches, and soft environment, and external features include 6 variables in location conditions and traffic conditions. Park areas were calculated based on the polygon layer of parks derived from the Google Earth imagery supported by QGIS. All process of data is completed in QGIS3.20.3. Functional density (Functional_dst), functional mixture [10] (Functional_mix) were counted by tool 'vector analysis-count the number of points in the polygon', building density (Building_dst), building storey height diversity (Building_ht_dvst), renovation (Renovation) were processed through tool 'Join attribute by location (summary)'. History (History) and rent(Rent) were from websites. Distance to city center (Dst_to_city_center) was calculated by tool 'Distance matrix', the POIs of variables in the facility density category and architectural areas of interest were provided from the fall 2021 course of Big Data and Urban Planning, School of Architecture, Tsinghua University. Corporation number (Corporation_nb), number of universities and scientific research institutions (Research_institution_nb), residence number (Residence_nb), bus number (Bus_nb), subway number (Subway_nb) were counted within the 500-m-buffer zone. Coordination between old and new (Coordination), material diversity (Material_dvst), green area rate (Green_area_rate), urban furniture (Urban_furniture) were drawn or calculated through Google Maps, Baidu Panorama, field research (Table 1).

Classification	Variable	Description
Function intensity	Area	The park size
	Functional_dst	POI_num/park_area, POI_num represents the total number of park internal poi (office, entertainment, accommodation, catering, shopping, science and education, parking)
	Functional_mix	- the sum (Pi* ln Pi), (i = 1, 2,... N), n represents the park POI category number, Pi represents the relative ratio of a certain type of POI to the total number of POIs in the park, the number of various POIs has been normalized
	Building_dst	Basal area/park area
	Building_ht_dvst	Number categories for building height and of terrace height
Architectural heritage	History	Years of factory establishment
	Renovation	The proportion of reserved and renovated buildings to total buildings
	Coordination	From the boundaries and center point, judge the coordination degree of the renovation and venues
	Material_dvst	The category number of building materials
Facility density	Corporation_dst	Companies, media organizations
	Culture__dst	The exhibition, museum, cinema, and theatre
	Accommodation_dst	Hotel
	Dining_dst	Food and beverage service
	Shop_dst	Shopping service
	Science_education_dst	Training institutions, science, and technology museums, planetarium
	Pawrking_dst	The parking lot
Landscape and furniture	Green_area_rate	Green space area to zone area
	Urban_furniture	Quantity, quality,
Soft environment	Rent	Spending per square meter per day
Location conditions	Dst_to_city_center	The distance from Tiananmen square
	Corporation_nb	Park extension 500 m range
	Research_institution_nb	Park extension 500 m range
	Residence_nb	Park extension 500 m range
Traffic Conditions	Bus_nb	Park extension 500 m range
	Subway_nb	Park extension 500 m range

Table 1: Descriptions of selected predictor variables.

We used Pearson correlation to analyze the autocorrelation of hypothetical factors to remove some redundant, duplicated variables. For each pair of variables, if the absolute value of their Pearson coefficient is higher than 0.5, the two variables can be considered as highly correlated, and one of the variables should be excluded [11]. When excluding, we choose to exclude external factors first. For example, the correlation coefficient of 'number of universities and scientific research institutions' and 'bus number' is 0.731, so 'bus number' is excluded and not included in the subsequent regression model. Similarly, Area and other eight vari ables are eliminated, leaving fifteen variables (Fig. 1). This correlation-based elimination process reduces the likelihood of multicollinearity in the full model. In fact, in the regression model, the variance inflation factor (VIF) for each predictor variable was less than 5.
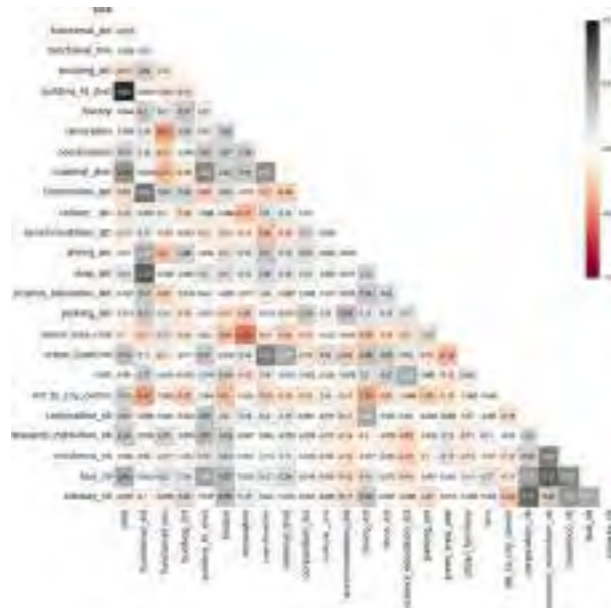
*Figure 1: Correlation examinations
of all twenty-five independent variables.*

Multiple linear regressions (MLR) [12] were used to investigate the impacts of these 15 factors on star rating and average number of comments per year (ANCPY), and examine their relative importance in the impacts. The ANCPY response variable was log-transformed because the data was not normally distributed [8]. The star rating response variable was omitted this step. We conducted all statistical analyses using SPSS 26. The regression results showed that five factors, such as parking lot density, affected the impact of parks from the dimension of star rating or from ANCPY.
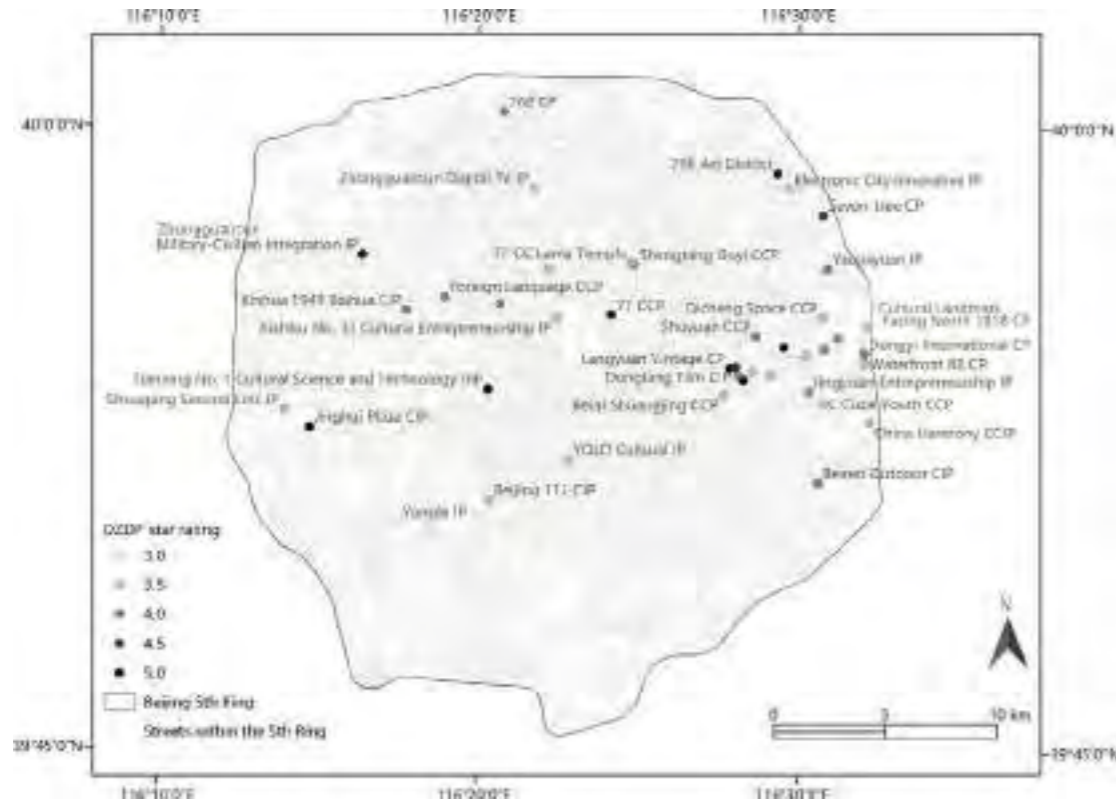

Figure 2: Distribution of Dazhong Dianping star rating of Beijing industrial heritage cultural and creative industrial parks (CP: Creative Park; CCP: Cultural and Creative Park; CIP: Cultural Industry Park; IP: Industrial Park; InP: Innovation Park; CCIP: Cultural and Creative Industry Park).

RESULTS

The popularity degree of parks based on star rating and ANCPY of DZDP

The 41 parks have star ratings ranging from 3.0 to 5.0, with an average of 4.0. The parks with 4.0 stars accounted for the biggest proportion, 41.5% (Fig. 2).

The ANCPY in the 41 parks is 1-200 except for one park (798 Art District) which has an average annual number of 641 comments(Fig. 3).

There is no large spatial distribution difference in the star rating of the park, and the high star parks are evenly distributed in the center and edge of the Fifth Ring Road. There are some obvious differences in the ANCPY in the parks. The parks with high average annual reviews are more distributed in the central area of the city, and the parks with low average annual reviews are more distributed in the eastern part of the city.

Taking the logarithmic data of the star rating and the annual average number of reviews as the XY axis, a four-quadrant map was made, and the 41 parks were divided into three types of parks. There are 16 most popular parks in Class I (high star rating and high ANCPY) ; 11 more popular parks in Class II (combination of high star and low ANCPY or combination of low star and high ANCPY) ; Class III is not popular. There are 14 parks (low star, low ANCPY) . The two are basically positively correlated, high-star rating parks having a relatively high average number of comments per year (Fig. 4).
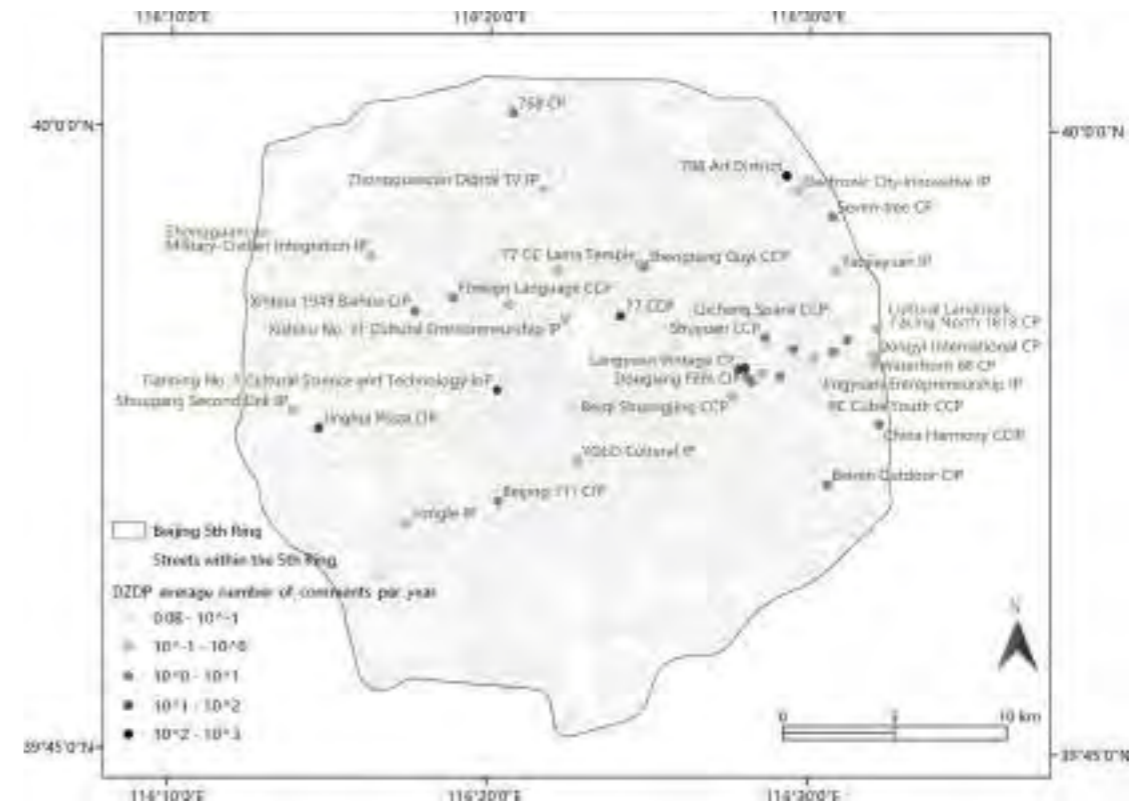

Figure 3: Distribution of Dazhong Dianping average number of comments per year of Beijing (CP: Creative Park; CCP: Cultural and Creative Park; CIP: Cultural Industry Park; IP: Industrial Park; InP: Innovation Park; CCIP: Cultural and Creative Industry Park).

The effects of different factors on star grade and ANCPY

Table 2 shows the results of the two regression models. We included both the unstandardized regression coefficients and standardized coefficients. The standardized coefficients (beta coefficients) were used to determine the relative importance of the explanatory variables [8]. The larger

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the absolute value of the standardized coefficient, the more important the variable.

For the model of star rating, the results of MLR analysis showed that three predictor variables, coordination, dining density and parking lot density, significantly affected the star rating at level 0.05. Coordination between old and new and dining density are positively correlated indicators, coordination between old and new having a stronger influence than dining density. However, parking lot density is a negatively correlated indicator. Approximately 57.5% of the variation in star rating was explained by the model (Table 2).

Variable	DZDP star rating			Ln DZDP average number of comments per year	
	Coefficient	Standardized coefficient	P	Coefficient	Standardized coefficient
constant	4.308		**	1.594	
functional_dst		-0.046			-0.076
functional_mix	-0.011	-0.116		-0.040	-0.139
building_dst	-0.487	-0.103		-2.044	-0.139
building_ht_dvst	0.005	0.269		0.015	0.292
history	-0.004	-0.138		-0.012	-0.133
renovation	-0.633	-0.217		-0.400	-0.044
coordination	0.236	0.405	*	0.599	0.330
culture__dst	-0.100	-0.126		-0.592	-0.239
accommodation_dst		0.027			0.152
dining_dst		0.359	*		0.321
science_education_dst		-0.164			-0.001
parking_dst		-0.392	*		-0.361
rent	-0.018	-0.066		-0.225	-0.266
dst_to_city_center	0.000	-0.065		0.000	-0.084
research_institution_nb	0.013	0.156		0.105	0.396
R2	0.575			0.683	
Adjusted R2	0.320			0.492	
P	0.035*				

* Coefficient is significant at the 0.05 level.
** Coefficient is significant at the 0.01 level.

For the model of ANCPY, the results of MLR analysis showed that five predictor variables significantly affected the ANCPY at level 0.05, three of them are in line with those who affected the star rating. Four of them are park characteristics (building storey height diversity, coordination between old and new, dining density, parking lot density), and one is external characteristic (research institute number). Among four positively correlated indicators, number of universities and scientific research institutes had the strongest influence, followed by coordination, dining density, building storey height diversity. Again, parking lot density is the only negatively correlated indicator. Approximately 68.3% of the variation in star rating was explained by the model.
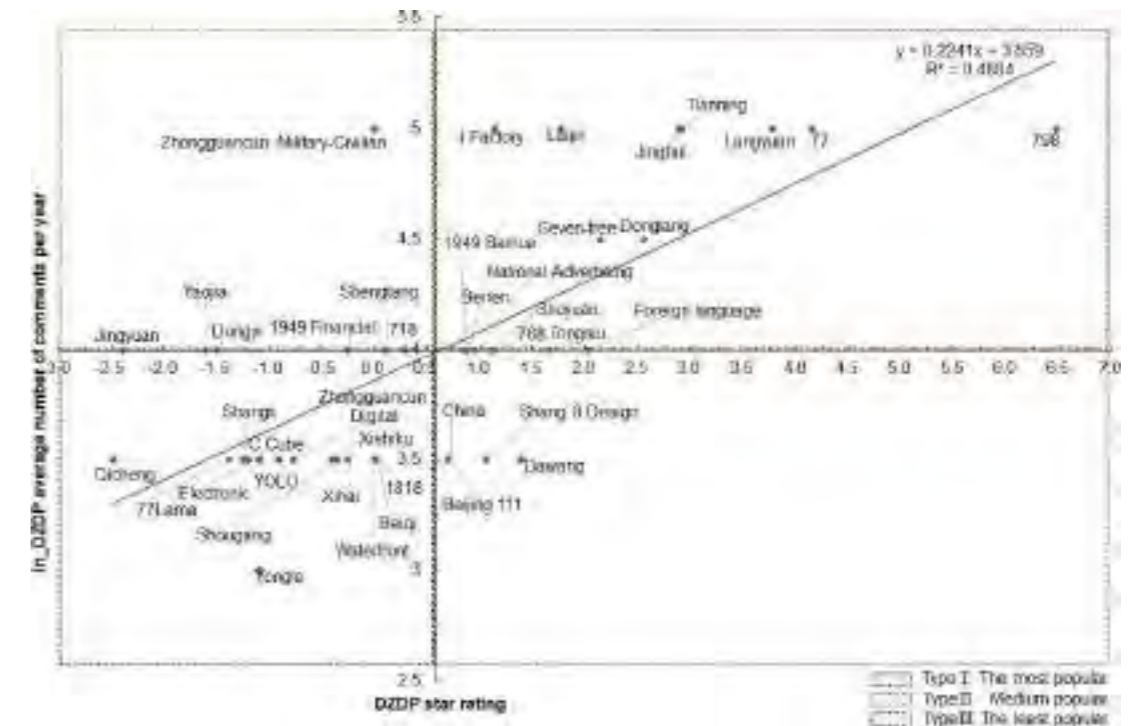

Figure 4: The popularity of cultural and creative industrial parks based on Dazhong Dianping star rating and average number of comments per year (The name of the parks are the abbreviations of the parks).

CONCLUSION

This study measures the popularity of 41 parks in Beijing through the star rating of DZDP and the ANCPY, and measures the influencing factors. From the user's point of view, the user's satisfaction, and preference are discussed.

The results show that there are 5 factors (parking lot density, dining density, coordination between new and old, building storey height diversity, number of universities and scientific research institutions) that affect the popularity of the park. Among them, there are 3 factors (parking lot density, dining density, coordination between old and new) that affect both star ratings and ANCPY. Parking lot density is the only negative correlation

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factor, which means that either cars should be prohibited from entering the park or adequate parking spaces should be designed. We also suggest that improving the coordination between the old and the new buildings or elements through antique design is conducive to shaping the characteristic style and attracting people; by retaining the diversity of storey heights, enriching organizational relationships between building modules, and skillfully setting up terraces, paths, stairs, and corridors, it is conducive to attracting tourists to take photos and comment. We also propose to create a special consumption place in combination with the characteristics of the surrounding universities, but avoid gentrification, and retain the factory parts and plants to create a sense of place. These are all conducive to increasing the popularity of the park.

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"THERE ARE MORE INSTAGRAMMERS THAN COFFEE BEANS": RETRACING WANG-HONG URBANISM IN HONG KONG

4-B-2

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ABSTRACT:

"Wang-hong" urbanism is an ever-growing trend in Chinese cities. The concept refers to the phenomenon that the (re)development of an urban district happens on the basis of the interactions among physical spaces, app-based sharing platforms, and certain aesthetic criteria. Businesses market themselves on the internet for the sake of a wang-hong vibe that could attract check-in behaviours of online influencers and their followers, who are involved in the process of shaping these places in return. As thus, it is not a new phenomenon that the newly-opened wang-hong cafes are associated with the gentrification of districts undergoing urban decay. They are criticised for not supporting local residents, culture, and businesses since the wang-hong places tend to provide homogeneous experiences instead of dynamic interactions between people and urban spaces. In particular, wang-hong aesthetic criteria heavily capitalise on local history (e.g. recreating 1980s grassroots neighbourhoods) for profit. While wang-hong urbanism is a recognised trend in Mainland China, this process is still not well acknowledged in Hong Kong. This study examines the rise of cafes, in one of Hong Kong's oldest districts, Sham Shui Po and discusses wang-hong urbanism in relation to these cafes. We investigate the drivers and barriers of the agglomeration and its influence on the existing, strong local aesthetic and identity. The influences of stakeholders are collected via in-depth interviews with store owners. Sham Shui Po has experienced gentrification to some certain extent, yet, the wang-hong urbanism that happened in the district can also be seen as a spontaneous bottom-up method to investigate changes and improvements. A new framework for understanding this bottom-up gentrification and its' impact on the promotion of spatial justice in communities is proposed. The paper underscores the importance of integrating gentrification and regeneration through design and policy guidance, maintain and enhance the cultural vitality of the district, promote the industrial diversification of the neighbourhood (rather than high-end), so to resist the capital immigration and hegemonic redevelopment and facilitate inclusive community.

KEYWORDS:
wang-hong urbanism, regeneration, bottom-up, café, spatial justice.

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Urban areas are complex and dynamic systems. They reflect many of the processes that drive the physical, social, environmental, and economic transformation of a society, and are important driving forces of many changes at the same time (dos Santos Figueiredo et al., 2022). As cities become increasingly data-rich terrains, physical spaces can in various way be converted into digital spaces. Chief among them is visual capture (e.g. images and videos), one of the most efficient and cost-effective ways of converting the fine-gain details and experiences of the city into data.

Documenting experiences of visiting particular places and sharing photos of the experience online is not new trend (Amy et al., 2021). Picture-based social media platforms (visual social media), such as Instagram and Xiaohongshu, facilitate the combination process of capturing images and geolocating certain places. These apps and services built themselves on base mapping platforms (e.g., Google maps), and adopt photo-sharing as the dominant way of social interaction. Users post geo-tagged images to these social media sites voluntarily (McQuire, 2017: 81). It is arguable that technology has occupied contemporary social life. The emergence of app-based sharing platforms greatly increases the speed and scale of the circulation of these images and texts. It changes the way in which urban dwellers and authorities can influence basic urban processes, direct to framing a novel social encounter (McQuire, 2017: 84) and the formation of place image.

The term "Wang-hong" was firstly coined in China with reference to the online presence of internet celebrities, influencers, or Key Opinion Leaders (KOLs). When applied to physical spaces the wang-hong status implies the reliance on and influence of KOLs or other internet users on particular urban spaces. More specifically the wang-hong trend can potentially boost the popularity of some places and have an impact on local neighbourhoods, communities and economies. Wang-hong urbanism entails the extension of this wang-hong trend - initially localised to just some places – to larger scales as entire districts or projecting this status to the entire city. Chinese cities as Changsha or Chongqing (second or third tier Chinese cities) are often considered wang-hong cities, with reference to specific online images of food-experiences.

Wang-hong urbanism manifests itself as the change of physical spaces due to digital wang-hong-ness as one of the material consequences (Bronsvoort and Uitermark, 2021). In this research, the concept of wang-hong urbanism refers to the phenomenon that the (re)development of an urban district happens on the basis of the dynamic interactions among physical spaces, app-based sharing platforms, and certain lifestyle aesthetics (e.g. 1980s grassroots neighbourhoods aesthetics). It enables a process that increasingly involves citizens, consumers, and social media users in the spatial coding and cultural classification of neighbourhoods (Jansson, 2019).

In the past few years, Sham Shui Po (SSP), one of the densest and economically disadvantaged districts in Hong Kong's Kowloon peninsula, emerged as the site of newly opened coffee shops, art galleries, record shops, and other speciality shops. The majority of their customers could be categorised as "hipsters", young adults who appreciate niche arts and culture. Generally speaking, when opening a café business, the entrepreneur would consider the location of the shop since it determines the target users and marketing requirements (Kickert, 2021). However, Sham Shui Po is an old district suffering from the phenomenon of "double aging", whereas ageing population trend is paralleled by fast deteriorating built environment (Jian et al., 2021). Thus, local residents in Sham Shui Po community do not conform to the target customers. On the other hand, in the digital space created by social media and city marketing, Sham Shui Po is branded as a famous and upcoming "creative district" with contrasting images of its old reputation (Lai, 2021).

The physical change and urban regeneration post numerous concerns and criticism around rise of cafes as part of a broader trend – gentrification. Meanwhile, wang-hong urbanism was accused of having the potential of excluding vast swaths of the public from access to these platforms while simultaneously giving the privileged few a powerful tool to (re)shape the urban landscape (Adams, 2009:89) and question the trend in the light of spatial justice (Jian et al., 2020).

While using user-generated social media data as a tool to decipher human behaviour is lively and well-substantiated (Shelton et al., 2015), the discourse focusing on wang-hong urbanism, namely how online influencing through social media platforms produces digital spectacle, generates urban imaginaries and eventually leads to physical change and regeneration, is notably more limited. So far, the discourse on wang-hong urbanism overlooks: 1) the identification and role of the stakeholders involved in the community change, in both physical and digital spaces; 2) the benefit (if any) the community benefit derived from such changes.

To answer these questions, this research serves as an attempt to discuss the mutual interplay between spatial production and the social construction of technology. The article begins with the presentation of a theoretical framework of understanding wang-hong urbanism in relation to literature on gentrification, and media. The context of Sham Shui Po is then introduced, as well as the methodology adopted to address the research question. Through qualitative research design, including semi-structured interviews with café shop owners in Sham Shui Po, we present the influential factors that drive the opening of cafés and portray the community from the café owners' perspectives. Through the interviews the involved stakeholders in both physical and digital spaces are identified. We then initiate a preliminary discussion on if and how the wang-hong urbanism reproduces and deepens existing urban inequalities. It is argued that an organic, bottom-up perspective of place-making is needed to understand the issue and build a sustainable future for local community.

LITERATURE REVIEW

Wang-hong Urbanism

Facilitated by technologies, especially the image-based social media platforms, daily experiences can be recorded, transferred to data and become powerful media carriers. Researchers have consistently argued that the development of digital communication technologies has increased, rather than replaced, local community relations and contributed to the sense of belonging (Boy and Uitermark, 2017). People interact with media and place at the same time as a way of conceptualising the scales of everyday life, generating geo-tagged data that can help us understand the meaning of physical locations (Zook and Graham, 2007). Places are produced and shaped by the interplay between material and virtual social processes. Physical place-based factors influence individuals' use of digital space, on the other hand, the changes in digital space inevitably affect the nature of the material world as cyberspace and place are intricately linked in a dynamic and mutual-shaping process (Zook and Graham, 2007, Bronsvoort and Uitermark, 2021).

In this study, the term "Wang-hong Urbanism" is understood as an urbanisation process that consists of the dynamic relationships among physical space, digital space, and social space (Figure 1).

To elaborate, social media has become a standard communication carrier. It permits both real-time interaction and communications at a distance (Adams, 2009:36). People invest their time and skills to communicate the visual, textual or physical representations of a specific place. During the process, people send messages of some sort to many nodes and receive information from different sources at the same time. This "media in place" generates novel intersections between online platforms and urban spaces, as well as digital images and physical places.

People are argued to utilise digital media to become place-makers (Bronsvoort and Uitermark, 2021).

People leave their footprints in digital spaces through photo sharing, depiction, and interpretation. Such investments shape the place images and formulate "place in media".
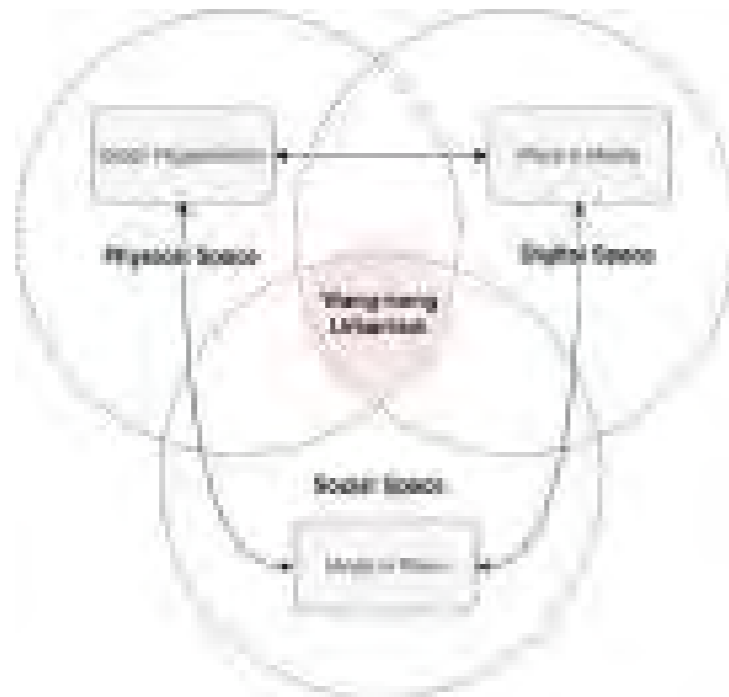

Figure 1 Conceptual framework to understand Wang-hong Urbanism

A material consequence of these relations, is the design of spaces that cater for photographing and documenting a visit of certain aesthetic for social media users. For example, by considering a place's "Instagrammable" qualities already in the in the design process. The narratives and images produced in digital spaces facilitate urban (re)imagination and, consciously or unconsciously, change physical spaces, contributing to urban change. This can happen in the form of urban regeneration or in some case, urban redevelopment.

Recently, online shopping and physical retail have been complementary in China (Kickert, 2021). Benefited from the Time–space convergence effect (Adams, 2009), the blending of offline and online business models makes it feasible and more accessible for the shop owners to reach their potential audience worldwide despite a relatively disadvantaged location.

Social media enables café entrepreneurs to keep track of different types of customers, including their favoured services (including the Instagram-worthy locations), or their taste in food and drinks. One way of doing this is by tracking customers' comments after visiting a place. This can, for example easily be done on various social media platforms. Therefore, opening an Instagram business profile does not only allow entrepreneurs to articulate their brand's story, and attract consumers by informing them about products or activities, it also allows consumers to give feed-back. Interaction between brand and consumers is thereby easily established. On the other hand, consumers are increasingly searching for unique experiences and visual spectacles that are "Instagrammable" (Wibisono and Marella, 2020). The quest for novelty, individualism and fascination has made small galleries, cafes and shops new travel destinations (Kickert, 2021). Particularly during the COVID-19-related travel restrictions many of these destinations transferred from tourist spots to local attractions, in order to attract locals.

Ineluctably, the showcase of distinctive taste includes and excludes consumers at the same time (Harvey, 2002). Social media users, especially users of geo-tagged visual social media platforms like Instagram, often tag public places that are popular, have particular aesthetics, or demonstrate high-end consumption, glamour and refined lifestyles (Bronsvoort and Uitermark, 2021), while seldomly

reflecting deep local roots. For example, in the Chinese city of Changsha, the Wenheyou restaurant reproduced a 1980s-inspired grassroots neighbourhood when designing the commercial spaces of the CBD. Its lottery entry system, price range de facto exclude large parts of the population, including the same grassroots groups who were residing in similar Danwei residential units before. Thus, the inequality of attention in social media potentially facilitates the concentration of power in the hands of the few (Adams, 2009:30).

Label a street: a space of art and culture?

Sham Shui Po has long been described as "a space for survival for the underprivileged" (Lai, 2021:1), including older residents, recent migrants, groups without stable working and housing conditions, drug addicts. Situated in the north-western Kowloon, Sham Shui Po is one of the poorest, densest and most walkable districts with a high proportion of older people in Hong Kong (Figure 2). The image of the area corresponds to cheaper rents, readily available local suppliers, various services and a high degree of social mix, which nurtures a creative, tolerant and enjoyable environment. It makes Sham Shui Po friendly to self-employment, retailers and micro-entrepreneurs (Cheng, 2013).

Figure 2 Location of Sham Shui Po district in Hong Kong

From 2020 onwards, an increasing number of coffee shops, leather stores, galleries, workshop and co-living spaces and designer clothing shops have emerged drastically in Sham Shui Po. According to incomplete statistics, there are more than 50 cafes in the district up to now. Most of these new commercial spaces are clustered in some streets. Although not at the same pace, Tai Nan Street, together with Ki Lung Street that parallels it, have been portrayed by both traditional media and social media as spaces for arts, cultural consumption, and creative activities.

While making a visual upgrade of the street image, the moving in of the cafés is at the centre of the debate over whether it marked the onset of gentrification of Sham Shui Po, and its potential influence on the long-term inhabitants of the district (Lai, 2021: 9). Gentrification refers to a rapid "upgrade" of the social status and economic characteristics of a neighbourhood. The concept is characterized by the replacement of socially marginal and working-class people by middle classes, and denotes the emergence of new service types, lifestyles and aesthetic ambiences (Zukin, 1987, Jansson, 2019).

In Sham Shui Po, second-hand street markets, low-priced stores and affordable restaurants (e.g., Cha

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Chaan Teng) that are operated and patronized by locals are deprived by the middle-class-oriented consumption space. The success of these cafés is said to increase the risk of rising rents gradually and would eventually lead to eviction and displacement. The newly opened shops are disconnected from the neighbourhood and contribute little to the formation of a sense of community. On the other hand, digital platforms are claimed to have similar effects as print media in terms of labelling a community as safe for investment (Bronsvoort and Uitermark, 2021). Commentators argued that the photos appeared in digital spaces only captured a snapshot of the community rather than the essence of the place images, which might not be able to reflect or even contradict the reality of Sham Shui Po.

Having verified the change in physical space, it is necessary to understand who were the stakeholders involved in the process of wang-hong urbanism to shed light on deciphering the phenomenon and explore alternative ways to contrast the externalities of gentrification and urban regeneration.

METHODOLOGY

The primary source of data analysed for this article consists of three parts. All the interview transcripts and materials were analysed with the assistance of the qualitative software ATLAS.ti:

First-hand data acquired from semi-structured interviews with 6 café shop owners in Sham Shui Po (Table 1). The shop owners were reached via social media platforms (Figure 3).

Table 1. Café shop owners interviewed

	Open year	Social media page
Café D	2022	Yes
Café S	2014	Yes
Café P	2019	Yes
Café C	2021	Yes
Café O	2018	Yes
Café K	2021	Yes

1) *Unobtrusive observations in the community.*
2) *Second-hand data includes online local media coverage searched by entering the keywords "Sham Shui Po", "café", "check-in", and "gentrification" and their synonyms.*
3) *Citizens' online posts and comments were used as a reference to understand their aesthetic cognition, preference and opinions towards Sham Shui Po.*

Figure 3 Instagram pages of the cafe interviewed

RESULTS

Café trend in Sham Shui Po

Café history in Sham Shui Po can be dated back to around 2014, when Café S first opened in the district. For the café founders, the interaction between baristas and customers is "where the magic happens", and "it always leads to something pretty good".

The booming trend of coffee shops took place in Hong Kong and is particularly visible in Sham Shui Po. In general, the main reasons for these founders to open a café in Sham Shui Po are three folds, namely financial considerations, community attachment, and agglomeration effect. Among these, rent is the most essential factor in location selection. The relatively low rent in Sham Shui Po enables young entrepreneurs to "test their concept of café without paying an enormous price". They can rent a decent size shop at a relatively low rental cost. On the other hand, some cafes were restaurants before beign renovated, which reduces the design cost. Second, some of the owners were raised in Sham Shui Po. They have a strong sense of belonging and feel deeply attached to this community. Their site selection is a combination of lifestyle choices and practical considerations. Third, mainly mentioned by the café owner who started their business in the last six months, the agglomeration effect, especially the café community that has been established in Sham Shui Po attracts them to choose this district.

"[Sham Shui Po is] nice and slow. … I see a good niche of people, the fashion designers, who would come here for the fabric materials or purchase the tech stuff. … This neighbourhood is just really charming. And it's also not very suffocating with all the high rises".

For the owner of Café P, this trend has a double nature. On the one hand, it reflects the ambition of small owners and their passion, which he supports. On the other side, he thought some of the coffeehouse concepts are not original, instead replicating other shops in the same neighbourhood, which risks homogenization, unfair competition and even gentrification. He also suggested some coffee shops reflect owners' business intentions to make "fast money" without contributing to the neighbourhood. He referred to this type of coffee shop as "gimmicky" as shops with only an English menu or where staff doesn't greet clients.

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Stakeholders in Physical and Digital Sham Shui Po

In general, these interviews resulted in praise of the neighbourhood and its recent development. The stakeholders identified in physical space and digital space are respectively presented in Figure 4.
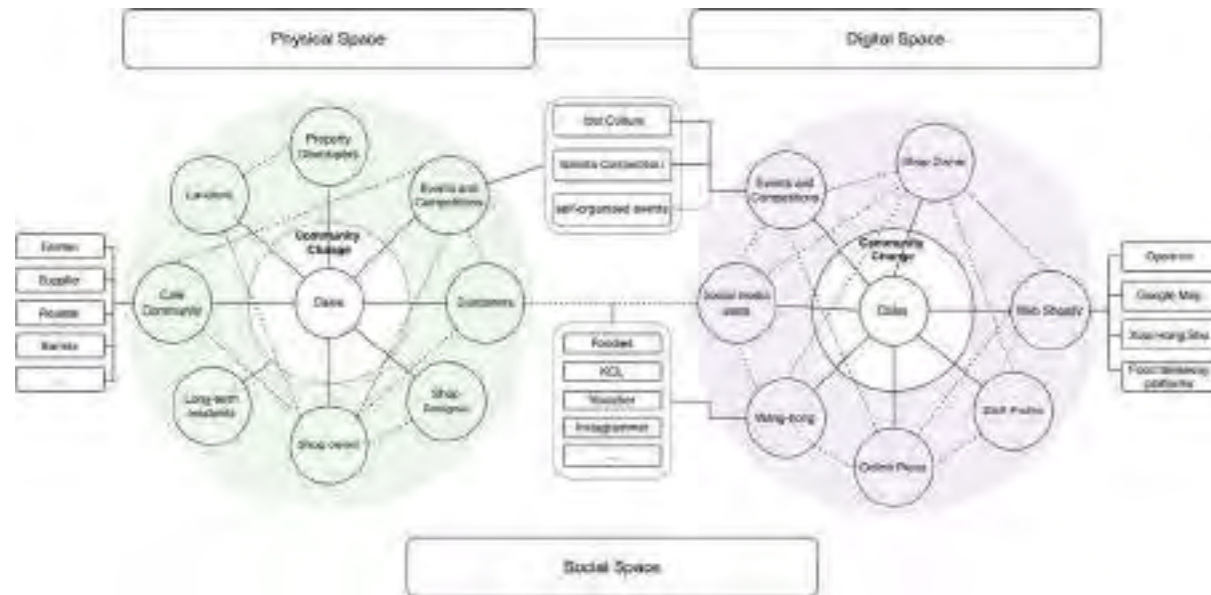

Figure 4 Stakeholders in physical and digital spaces

Shop owners, Events and Competitions that attract people's attention citywide, and Customers are stakeholders that are considered important in both physical and digital spaces. In physical space, long-term residents (including some shops that have opened for a long time), property developers and landlords are distinctively highlighted among the stakeholders, whilst Web Shopify that includes different restaurant review and food takeaway services, staff profile that triggers people's interest and online press mainly play a role in digital space. In particular, wang-hong and social media users overlap but are not equal to customers in physical space as the owner of Café S underscored that during weekdays, their customers are "mostly neighbours and people that work around nearby". In this sense, we can also safely conclude that cafés not only serve wang-hong's followers but also locals in the neighbourhood. Notably, the government or district councillors did not yet appear since they did not intervene in the redevelopment process systematically.

Physical Sham Shui Po

In both the digital community and the real world, Sham Shui Po is home to a myriad of cafés (Figure 5). Although critics exist stating that cafés in Sham Shui Po are "aesthetic sameness", each café tries to convince consumers of its unique and unrepeatable qualities through its own aesthetic taste, products and service. This usually reflects the owner's personality and business philosophy (Figure 6).

Figure 5. Cafe and other creative businesses in Sham Shui Po.

Figure 6 Old Sham Shui Po (left) and new Cafes

"Chill" was described as "the spirit of Sham Shui Po" by the owner of Café D. Unlike the local version of a café, Cha Chaan Teng (Tea restaurants), which is always busy, cafés "want you to stay and chill". Cafés provide venues for gathering, both inside the shop itself and outside on the streets. Baristas "like to use coffee as one of our media to communicate with the public". They want the core of the café to be a connection among people and set up a bridge of communication between Sham Shui Po and people from another district as a way of supporting local entrepreneurs in the neighbourhood. In addition, as mentioned by Café P, they consider "how much space should be set back for the dogs to be able to dine outside" when designing their café.

Cafés also communicate with other businesses on the street and learn from each other. Besides providing venues for communication, they're connected with the community mainly in three

ways. First, some of the cafés provide job opportunities and recruit staff who are living around the neighbourhood. Second, they develop business cooperation with other stores in the community (e.g., bakery shops, local suppliers and local food markets). Third, they target their offerings to local consumer tastes and needs and serve local customers with diverse options in terms of food and services.

Taking into consideration not only people but also pets, Sham Shui Po is regarded as an "Intersection" that connects old and new, the past and the future. In the café owners' opinion, there is a sense of inclusiveness among the old and new, with the new creative residents nurturing a community while reaching out to those in need. Cafés help gather "eyes on the streets" (Jacobs, 1992), as the owner of Café S stated:

"I feel like the small shops are helping people stay in this neighbourhood so that it doesn't become like a crime-riddled and a drug-riddled neighbourhood".

In a conversation with the owner of café C, the owner believed that it is natural that the old industries (some of which moved their production to South China, others closed down after the Covid-19 pandemic) were replaced by the new shops. People still go to the streets nearby for textile materials, and the shops closed or moved upstairs were not restaurants that locals would visit on a daily basis. Instead of seeing it as a negative phenomenon, as suggested by the owner of Café O, some long-term residents perceive the change in Sham Shui Po as new opportunities to learn new things while they are still able to maintain their old, comfortable ways of living. The owner connected the cafés boom in Sham Shui Po to the changes in lifestyles:

"Operators were trying to shift their business type to correspond to young people's lifestyles. … Sham Shui Po is still a poor old district, but [there are] more young people and [the district is] more energetic rather than several years ago".

Digital Sham Shui Po

With the rise of digital space, the cafés and the trendy, fashionable lifestyle that accompanies them, infuse these communities with a new "cool" feature (Le Grand, 2020). Almost all Cafés in Sham Shui Po have their social media pages and recognise their important roles in promoting their business. Cafés tried to make their Instagram pages look attractive because it's now been perceived as a window that facilitates the interaction with their (potential) customers, and a menu that introduces their service more directly and visually. Café owners will "repost whatever other people posted about [the café]" as a way of communicating with their customers in digital spaces.

Interviewees had different opinions about digital Sham Shui Po. For example, Café D did not invite any wang-hong to the café because these wang-hong "post photos on a daily basis of different places in the city". Some customers came with the aim of "checking in. They would not come back after they've taken all the pictures". The meaning of "check-in" behaviour overrides cultural appreciation. On the other hand, some café owners invite wang-hong to their shops, and offer them a free meal as a promotion strategy when they want more customers, especially if they were closed for a while because of store renovation or so. Normally, wang-hong's posts can attract customers from far and wide because they have a vast number of followers. The café will have more customers "after these wang-hong posted". This is also recognised as another vital factor that contributes to the café boom in Sham Shui Po (Figure 7).

Typically, wang-hong would give comments about the food, drink, service, and environment atmosphere. Those famous for promoting cafés like to depict distinctly local business instead of bringing attention to large chains. The appealing photos, mainly posted by wang-hong on different social media platforms, together with ordinary social media users, highlight the beauty of the place in a certain aesthetic way (e.g., Instagram style). While this has sometimes been explained as an unintended side-effect of "check-in" and experience sharing, it is more likely that people would patronise the cafés they saw more often in digital space (Bronsvoort and Uitermark, 2021). In this

recursive process, not only are the users able to accept the information sent by wang-hong, but they also create symbols in the digitally mediated environments experienced by others. Yet, when portraying the place in media and reassembling the city in digital space, wang-hong, or users who have more followers, usually have more symbolic power over average users.

Figure 7 Taking photos of the coffee in a pop-up cafe

Sham Shui Po's place image in digital space benefits the district with agglomeration effects and gains its reputation rapidly. People link "Sham Shui Po" with "café". The owner of Café C explained that "when people hang out in the neighbourhood, they would not just go to one specific café, they would try cafés maybe one by one". Therefore, some small shops do not need to invest a lot to advertise themselves. Some wang-hong made "café maps" with photos, comments and rates by themselves to guide their followers in digital space.

As these wang-hong selectively post cafés and other shops that represent the community, wang-hong urbanism potentially limits or facilitates people's power to engage in place making. As a consequence, in digital space, despite some overlaps, some stakeholders were cancelled (Figure 4). While old shops still have a strong presence in physical space, they are receiving considerably less attention and are almost virtually absent from digital space. They have less of a chance for their voice to be heard. A relatively purified space has been established. As warned by Bronsvoort and Uitermark (2021), these warped representations of place in digital space would inevitably have material consequences, and it is evident that without government direct, protection and guidance, Sham Shui Po will face gentrification in both physical and digital spaces.

DISCUSSION AND CONCLUSION

The analysis of wang-hong urbanism explores the interplay between digital representations and physical spaces and emphasises the role of social media in the (re)production of digital and physical urban scenes. Although we cannot isolate the impact of representations, and we cannot identify whether it was the change in physical space that caused the shift in digital space or vice versa, but it is evident that physical space and digital space shape each other in a continuous and dynamic way. The intersection between urban regeneration and wang-hong urbanism nurtures the natural change of community form, business models that are closely linked with social media, and young entrepreneurs' inspirations and enthusiasm.

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The café community in Sham Shui Po provides a strong sense of belonging and an emotional bond of collective political and social identity. Instead of creating a high-end scene, cafés in Sham Shui Po have the faith and responsibility to promote neighbourliness and locality. As the owner of Café C said they want to have a friendly and genuine connection with the community and hope to provide more affordable food and provide better spaces for communication.

Café corresponds to young people's brand-new lifestyle. The areas with the highest concentration of wang-hong shops also reflect, to a certain extent, people's consumption preferences, cultural identity, and recognition of the district. As thus, we argue that, unlike the "stage-led gentrification through large-scale renewal" (Bronsvoort and Uitermark, 2021), the bottom-up wang-hong urbanism that is happening in Sham Shui Po is one of the ways to physically upgrade some parts of the neighbourhood (e.g. few streets) and economically revitalise the pandemic-affected Sham Shui Po while coexisting with the old culture and residents as far as possible.

Cities benefit from the rise of the creative class. A healthy, resilient community relies on street-level shops and services that offer venues for sociability and preserve the sense of place and authenticity. Admittedly, there's some degree of taste-driven gentrification (Zukin et al., 2017) happening in Sham Shui Po, such as the acknowledged change of street façades (some painted by international artists), the proliferation of new pencil-towers and the rising rents. On the other hand, wang-hong urbanism risks enlarging a part as a whole, extending homogeneous image and istagrammable trends to the entire Sham Shui Po and potentially accentuating the existing spatial injustice.

However, cafés are also "victims" of this gentrification process due to the lack of rent control policies that can help prevent profiteering and cushion the negative impact of gentrification. If the government made plans to invest in urban renewal of the district without thoroughly considering the detrimental consequences for the older, local shops, it would put more pressure on the small business founders. Consequently, it would be the vulnerable low-income tenants and economically disadvantaged locals who are going to suffer most.

This research is based on one small-scale case study and therefore to a degree limited from being generalized to a larger scope. The results of this study shed light on the café trend that developed together in both digital and physical spaces and demonstrated the stakeholders in the process. We argue to embrace the wave of wang-hong urbanism, use it to activate old industry, improve economic efficiency, and enhance the community's cultural vitality. For communities to keep diverse and vivid, there must be values beyond the material, especially with the inexorable trend of smart technology that alters people's everyday life. At the same time, it would require a more in-depth understanding of wang-hong urbanism and its interplay with and impact on the production of urban spaces. Institutional frameworks are also needed to tackle the potential uneven empowerment of wang-hong urbanism, provide assistance to the disadvantaged, and to bridge gaps and transform exclusion into inclusion.

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URBAN QUALITY OF LIFE IN THE CITY OF MONTERREY MEXICO, GENERATIONAL CONTRADICTIONS ON A CHANGING AND COMPLEX CONTEXT AFTER THE 2020-21 LOCKDOWN

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ABSTRACT:

The city of Monterrey is located in northern Mexico, it is within 150 kilometers from the border with the US and has a population of around 4 million. Like many metropolitan cities worldwide it has expanded its territory in a rapid and inadequate way, leading to the known consequences of sprawl, long commutes, and decreased standards of living for its inhabitants. Monterrey has also been identified as one of the cities with the highest air pollution in Latin America and was ranked as one of the most dangerous cities in Mexico. During the years of 2018 and 2019 a survey was conducted on 150 individuals between the ages of 20 and 30, the information and the resulting statistics confirmed the initial study assumption that "Monterrey Mexico is a city with a positive perception by its inhabitants (high happiness index), but at the same time it is a city that is detrimental for its inhabitants and for the planet". When the sample of the survey population was expanded to other age groups and socioeconomic levels variations were identified and required the study to be expanded to a larger pool of participants and to be segmented in socioeconomic groups and contrasted by gender in order to be more conclusive. The study was halted during 2020 because of the COVID-19 pandemic but was continued during the second semester of 2021 and the initial results show a slightly more pessimistic view of the city by the respondents.
Based on the results of the study, a student focus group from a landscape architecture course at the University of Monterrey UDEM identified possible strategies that could be implemented to improve the quality of life conditions of the city of Monterrey.

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1. INTRODUCTION

This study on Quality of Life (QoL) is centered on the perception of individuals living within the Monterrey Mexico city downtown and its surrounding metropolitan area (MAM), it started with an assignment for the students of the Urban Landscape Architecture course that the author teaches at the University of Monterrey asking the students to write an essay on how, through urban and landscape strategies, can the city of Monterrey become friendlier to its inhabitants and the Planet and become a more equitable and inclusive city that contributes to happiness (well-being and quality of life) of its inhabitants. The assignment was applied consecutively to the students of this course during the spring and fall semesters from 2016 to 2018, to approximately 60 students. The preliminary findings were presented by the author at the colloquium "Well-being in the North and South. Explorations, contradictions, power and practices" that took place in October 2019 at Sciences Po Bordeaux in Pessac France[1].

Many of the actions (or «strategies''») proposed by the students, as expected, had to do with urban and architectural implementations. But some of them also had to do with the policies and change of social behaviors, not only with physical elements of the city and the urban environment. Five aspects that were mentioned in their essays in order of their relevance: equality of opportunities, quality of life, mobility, inclusion and urban morphology. Differences in how the younger generations view the city were also pointed out during the conversations with the students; along with the apparent contradictions in interpreting the complexities of the city.

Since subjective well-being (SWB) refers to affective experiences and cognitive judgments[2], surveying through self-report measures constitutes a valuable instrument to evaluate the city quality where the poll participants live. Thus the idea of conducting a survey specifically to find about the perception of the quality of life of the city of Monterey as viewed by the younger generations.

2. STATE OF THE ART

The "state of the art" of a given study is meant to establish a hermeneutic reference of research within the whole knowledge available at the moment about the study[3]. In the case of this study, the state of the art allows the research process to establish parallel lines of investigation with the field of urban studies, specifically applied to the urban context of the city of Monterrey Mexico.
This section has the purpose of identifying the most recent and relevant literature related to (1) studies on quality of life, well-being and happiness, (2) ways of measuring the urban quality of life and (3) characteristics of the most recent generational cohorts, namely millennials and centennials.

Studies on quality of life, well-being and happiness
The World Health Organization (WHO) defines the quality of life (QOL) as "an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns"[4]. The World Health Organization Quality of Life Brief (WHOQOL)[5] is a general quality of life survey validated for several countries and applicable cross-culturally. For this study, the WHOQOL survey was studied as a reference due to its "universality" across cultural frameworks.

Quality of life (QOL) is an elusive term, sometimes confused and used interchangeably with the concept of wellbeing. The measurement and the assessment of the quality of life may include objective and subjective indicators, as also perceptual aspects of the observed individual or population. R. Constanza et.al. have established "an integrative definition of QOL that combines measures of human needs with subjective well-being or happiness", their studies on quality of life were also used as a reference since they integrate objective and subjective indicators across a range of disciplines and scales.

In other similar studies elaborated specifically for Mexico, a National Quality of Life Index (NQOLI) was established by Garcia-Vega et.al. as a measurement tool using citizen's well being perception in combination of objective and subjective indicators. In their study, demographic characteristics were also used to perform comparisons across demographic groups.

Ways of measuring the urban quality of life
As mentioned, the measurement of the quality of life and wellbeing tend to be difficult to assess due to subjective and cultural factors. One tool that was developed to measure the individual level of happiness is the Satisfaction with Life Scale (SWLS) developed by Edward Diener[6]. It is "a short 5-item instrument designed to measure global cognitive judgments of satisfaction with one's life" it is a quick survey that takes only a couple of minutes to respond. Diener´s scale has been translated into many languages, thus its advantage as a measuring tool for this study.

Characteristics of the most recent generational cohorts
The first objective of this study is to find if there are differences in the way younger generations perceive the city of Monterrey in terms of its possibility of providing a good "quality of life". Additionally, a second objective of the study is to find if the COVID19 Lockdown had influenced their perceptions of the quality of life that the city of Monterrey provides. The applied surveys were segmented into two groups, the younger group consisting of the two last generational cohorts, the millennials and the centennials, and the older group, those belonging to previous generations. The first group includes those individuals born between 1981 and 1996 known in the literature as "millennials'', and those born between 1997 and 2003 known as "centennials".It is also common to identify millennials as generation "Y" and the centennials as generation "Z", both of these labels are frequently found in the research and scientific literature.

The millennial generation has been the most studied since the generational cohorts began to be classified and documented in 1914 with the "Lost Generation". J.Twenge has studied and documented the attitudes of the millennial generation not only about their traits but also as the first generation that adopted electronic technology, the internet and social media were adopted by them very early in their lives. Their decision making and expectations of everyday life have also been categorized as different, peculiar and contrasting from the generations of their parents, Generation X and Baby Boomers.

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1   https://calenda.org/653075?lang=en
2   Proctor C. (2014) Subjective Well-Being (SWB). In: Michalos A.C. (eds) Encyclopedia of Quality of Life and Well-Being Research. Springer, Dordrecht. https://doi.org/10.1007/978-94-007-0753-5_2905
3   Paradise Publishers. (2016). Handbook of Research methodology.
4   https://www.who.int/tools/whoqol
5   https://www.who.int/tools/whoqol
6   http://labs.psychology.illinois.edu/~ediener/SWLS.html

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As the millennial generation has entered adulthood, much attention has been given to their preferences concerning work and living habits. It is said that they prefer working remotely than in the traditional office locations, that they expect flexibility in terms of their working schedules and that they make extensive use of technology in the workplace and their personal lives. Most Millenials are adults in their 30s and some of them are entering their 40s. Many of them have formed households or are living on their own. M.Moos has studied the urban geographies of young adults in the United States metropolitan areas; he coined the term "youthification" to describe the phenomenon of young adult's gentrification of metropolitan areas in America. As millennials have globally entered the workforce, they also have in a way, become the decision-makers and stakeholders in the shaping of their cities, and it could be said that their preferences are influential not only as consumers but also as policymakers.

By now Generation Z, those teenagers and young adults born after 2003 are just about to enter adulthood. This cohort has been classified by A.Turner as a generation with a «digital bond to the Internet» and as "uniquely diverse" but also as a generation exposed to "high levels of stress" through their extensive use of social media and their "continuous digital communication". They have also been a generation affected and marked by the COVID19 Pandemic and the corresponding Lockdowns that took place in different parts of the world beginning in late 2019.

3. METHODS

The quality of life of a population can be measured by diverse indicators: economic, social, health and technological among others. For instance, the per-capita Gross Domestic Product (GPD) can measure the ability of a population to buy goods and services while the Human Development Index (HDI) can also measure other indicators of a given population such as human rights, happiness, and education. While the quality of life indicators are based on measurable data and indicators such as income, level of education, social justice and other factors, individual well-being tends to be more subjective and self-reported.

Application of the Satisfaction with life scale (SWLS) as a measuring tool
Ed Diener developed a 5-item scale designed to measure global cognitive judgments of an individual's life satisfaction. The Satisfaction with Life Scale (SWLS) instrument is an effective way to determine the individuals' satisfaction with life and obtain information about the perception of an individual or a determined group on their subjective well-being. It has been used extensively in studies in the fields of social sciences, psychology, health, and others.

4. CASE STUDY DESCRIPTION

The city of Monterrey is the capital of the state of Nuevo Leon in northern Mexico, is located between the slopes of a valley of mountains, the Cerro de la Silla and the Sierra de las Mitras which are part of the Sierra Madre Oriental ranges. Monterrey is located 534 meters above sea level and at a similar distance to the nearest seaport in the Gulf of Mexico. The southern border with the United States is 227 kilometers from downtown Monterrey.

The city was founded in 1596 under the name of the Metropolitan City of Our Lady of Monterrey. It was not until 1824 that the city of Monterrey became the capital of the state of Nuevo Leon[7]. Being mostly a small town during its first centuries, the industrialization of the city of Monterrey started

7   Cavazos, I. (1994). Breve historia de Nuevo León. México. Fondo de Cultura Económica. p. 18-19

with the Cerveceria Cuauhtemoc brewery that was established in 1890 and later became one of the key industries in the city and all the north of Mexico[8].

Urban Expansion In The City Of Monterrey
Up until the late 20th century, the city of Monterrey had a population of around 1 million inhabitants. During the 1980's the population of Monterrey started to grow due to immigration, mostly from other cities of the country, the increase of the job market and the incorporation of surrounding municipalities to the city also were factors that added to the increasing population of the city[9]. Today, the city of Monterrey is the second most populated city in Mexico, it is the center of a conglomerate of municipalities that constitute the Metropolitan Area of Monterrey (MAM) that includes twelve municipalities, totaling a population of 5,341,171 inhabitants[10]. The municipality of Monterrey is the center of the MAM with a population of 1,142,994. The extension of the municipality of Monterrey is 981 km2 while the Metropolitan area of Monterrey covers an extension of 7,309 km2 and includes the municipalities of: Apodaca, Benito Juárez, Cadereyta Jiménez, Escobedo, García, Guadalupe, Monterrey, Salinas Victoria, San Nicolás de los Garza, San Pedro, Santa Catarina and Santiago. Together these municipalities are known as the Metropolitan Area of Monterrey or MAM, each one of them has administrations and autonomous legislation. In the last twenty years, the total population of the MAM grew with the incorporation and settlement of the neighboring municipalities by 76% on average.
Based on the above conditions and data, it can be concluded that the urban situation of the city of Monterrey and its metropolitan area presents the characteristics of a city in territorial expansion with abandonment of its urban center, since the central part of the MAM has a rate of growth near zero percent, with a condition of abandonment of its old residential and industrial areas and a population tending to aging. While the municipalities of the periphery have absorbed the increase in population of the MAM of the last twenty years with high population growth rates.
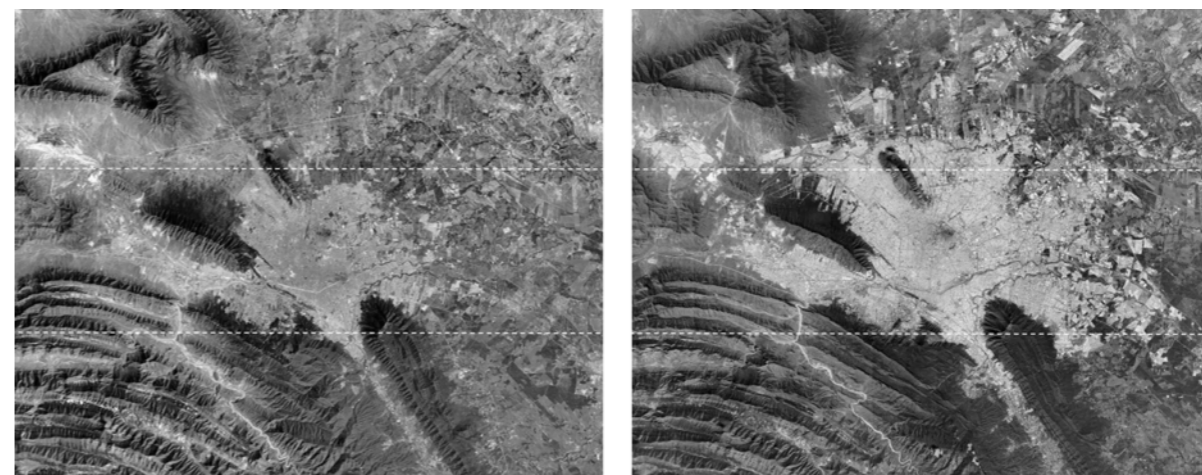

Illustration 1: Expansion of the MAM from 1995 to 2015, source: Google Earth and INEGI arranged by the author.

8   García Ramírez, F. (2006). Una Empresa a través de los siglos Cervecería Cuauhtémoc-Moctezuma. México, D.F. Ed.l Clío, Libros y Videos. p. 120
9   Maldonado V, Alarcón G. (2016) Demographic change in Nuevo León. INEGI, Realidad, Datos y Espacio Vol. 7, Núm. 3, sept-dec 2016. p.6 https://www.inegi.org.mx/rde/wp-content/uploads/2016/09/rde_19_revista7.pdf
10   Source: 2021 INEGI Population Census

Monterrey in the 21st Century, air pollution, insecurity and lockdown.

Air pollution is a public health issue in Monterrey. According to the Monterrey Institute of Technology and Higher Education (ITESM), air pollution in the Monterrey metropolitan area costs the government and individuals between four thousand and eight billion dollars annually, an amount that results from the sum of health care costs and low productivity, mainly due to absenteeism due to pollution[11]. Air pollutants come, in general, from four sources: industry, combustion vehicles, construction activities, and natural sources such as erosion and fires[12].

The second urban factor that affects the perception of the city is insecurity. The National Institute of Statistics and Geography (INEGI) prepares the National Survey of Urban Public Security (ENSU) on the public's perception of the local public safety[13]. In general insecurity is measured with the number of violent crimes, Nuevo Leon is one of the states with the highest number of homicides per capita in Mexico, with a rate of 9 homicides per 100,000 habitants in 2020. Additionally the number of femicides and domestic violence also showed an increase in the last five years as per a report by the Civic Council of the state of Nuevo Leon that conducts independent polls on the social conditions of the city.[14]

The city with the highest income per capita in Latin america

During the 20th and 21st centuries Monterrey has established itself as a multi-faceted industrial hub. The city is home to the headquarters of major Mexican multinational companies, as well as many international manufacturing facilities. The per capita income in Monterrey is higher than the rest of the country's at around US$28,500 to the country's US$18,800. Monterrey is Mexico's wealthiest city in terms of per capita income, is also considered to be the most "Americanized" city in the country[15]. Monterrey's per capita GDP grew 40 percent faster than Mexico's between 1999 and 2009, and the city also has the lowest share of population living below the poverty line (4 percent) in the region of Latin America[16].

Monterrey, generational contradictions on interpreting a changing and complex context

The McKinsey Global Institute (MGI) in its competitive cities performance analysis for Latinameican Cities assesses four areas for measuring cities' competitiveness: economic performance, social conditions, sustainable resource use, and finance and governance. In McKinsey's analysis, Monterrey

11   Martínez A., Valdez A.Calidad del aire en el área metropolitana de Monterrey. Ciencia UANL, Año 19, No. 77, Jan-Feb 2016 p.9

12   Semarnat, DGGCARETC. Guía para la elaboración de programa de gestión para mejorar la calidad del aire (ProAire), versión 1.0. 1era. edición, México, 2013. https://www.gob.mx/cms/uploads/attachment/file/69338/A1_Gu_a_ProAire_preliminar_2016.pdf

13   INEGI. National Survey of Urban Public Security (ENSU) April 19, 2022. www.inegi.org.mx/contenidos/saladeprensa/boletines/2022/ensu/ensu2022_04.pdf

14   Civic Council of the state of Nuevo León. CCNL demand for strong actions to contain the rise in violence. https://consejocivico.org.mx/noticias/2022/04/23/exigimos-resultados-contundentes-para-contener-el-alza-de-violencia/

15   OECD. Regions and Cities at a Glance 2020: Mexico (2020). https://www.oecd.org/cfe/MEXICO-Regions-and-Cities-2018.pdf

16   McKinsey Global Institute. Urban world: Mapping the economic power of cities (March 2011) https://www.mckinsey.com/~/media/mckinsey/featured%20insights/urbanization/urban%20world/mgi_urban_world_mapping_economic_power_of_cities_full_report.ashx

"performs relatively strongly across all dimensions except for sustainable resource use.''[17]

As these statistics reveal, Monterrey is a city of economic prosperity and opportunities for its residents with a relatively high per capita income and above the national level of health and educational services. On the other hand, the rates of crime and violence in Monterrey are on the national high and comparable to the most violent countries of Latinamerica. While the perceived level of insecurity is very high and the opinion of the population of the city is that it might even get worse. Additionally to the perception of lack of security, the levels of pollution in the city are among the highest for Latin America and have also become a complex issue to resolve.

The World Health Organization (WHO) defines health as «a state of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity». The question that has arisen on the contradiction of Monterrey being one of the most prosperous cities in Mexico and Latinamerica and having the highest levels of insecurity, violence and pollution; is if the perception of the younger generations remains positive after the new set of living conditions after the COVID19 Lockdown.

5. RESULTS

Method of the study:

The first stage of this study was done in 2018 with a sample composed of a total of 150 participants of which 53% were female and 47% male. The questionnaires were applied in a homogeneous proportion across three age groups: ages 20-35, ages 36-50, and over 50 years of age, and the questions were applied in Spanish, the native language of the participants. All of the respondents were related to the practice of architecture or landscape architecture. The first group was mostly students of the fourth or fifth year of their bachelor in architecture and the second two groups were graduates from the same fields of knowledge.

Initial findings of this study were included in a previous presentation by the author titled "An analysis of the practical limits of urban densification for the city of Monterrey in terms of the economy and current conditions of the city", presented at the II International Seminary of urban residential enclosures held during October 2018 at the Bolivarian Pontifical University in Medellin Colombia. Additional explorations on the perception of the younger generations about the urban living in the city of Monterrey were developed by the author during the following year in another text and presentation titled "Well-being in downtown Monterrey, generational contradictions on interpreting a changing and complex context" at the colloquium Well-being in the North and South. Explorations, contradictions, power and practices that took place during October 2019 at Sciences Po Bordeaux in Pessac France

The first COVID19 case appeared in Wuhan China in December 2019. By February 2020 the first infected person was identified in Mexico and by the end of the same month, the first case of infection was recorded in Monterrey Mexico. In March 2019 the OMS declared the spread of the COVID19 virus a "pandemic", the lockdown for the students in Monterrey started in mid-March and lasted until early 2022. Even though the lockdowns were intermittent during the years 2020 and 2021, for some sectors of the population, specifically the elderly and the student population, lockdown

17   McKinsey Global Institute. Building globally competitive cities: The key to Latin American growth (August 2011) p.4 https://www.mckinsey.com/~/media/McKinsey/Featured%20Insights/Urbanization/Building%20competitive%20cities%20key%20to%20Latin%20American%20growth/MGI_Building_competitive_cities_full_report.ashx

conditions lasted effectively for two consecutive years.

The COVID19 pandemic affected many sectors of the society worldwide; presented us with a set of new conditions of living and had numerous repercussions not only on the health of many individuals but also on their way of conceiving the future of their communities. In this regard, and to further validate the results of this study, it becomes relevant to compare the data obtained from the first survey applied in 2018 to new data obtained after the 2020-2022 lockdown.To contrast the data and results of the before and after lockdown surveys, a second survey was conducted on a similar group in February of 2022, just when a full return to normal activities was officially announced by the local government. Although the second poll group did not consist of the same individuals that were surveyed in 2018, the population characteristics (age, sample size and survey questions) were maintained.

Emphasis is given to contrasting the opinions and perceptions of the younger population group ages 20-35, before and after Lockdown, since this particular age group was the most affected by restrictions during the COVID19 pandemic.

Both 2018 and 2022 surveys consisted of five short questions specific to the quality of life in the city of Monterrey and based on the Diener's SWLS questionnaire:

1) In most circumstances, Monterrey is a city that is in its quality...
2) The living conditions in the city of Monterrey are for its inhabitants...
3) I think that my life in the city of Monterrey is...
4) I can get the important things I want from life in this city
5) If I could choose where to live with a good quality of life. I would choose to live in Monterrey

These five questions are based on the Satisfaction with Life Scale (SWLS) model questionnaire developed by psychology professor Ed Diener, which as said is a short 5-item instrument designed to measure global cognitive judgments of satisfaction with one's life (Diener). The questionnaire requires only a minute or two of the respondent's time and can be applied online.

The five original questions on the SWLS scale are: (1) In most ways my life is close to my ideal, (2) The conditions of my life are excellent, (3) I am satisfied with my life, (4) So far, I have gotten the important things I want in life and (5) If I could live my life over, I would change almost nothing. Responses are measured on a 1 to 7 scale, being 1: strongly disagree and 7: strongly agree. For the applied surveys, the scale was adapted to a 5-point scale being 1: strongly disagree and 5: strongly agree.

The questions applied and the possible responses resulted as follows:

1) In most circumstances, Monterrey is a city that is in its quality:
(1)of bad quality, (2) of poor quality, (3) average, (4) good, (5) ideal

2) The living conditions in the city of Monterrey are for its inhabitants:
(1)of bad quality, (2) of poor quality, (3) average, (4) good, (5) ideal

3) I think that my life in the city of Monterrey is:
(1)of bad quality, (2) of poor quality, (3) average, (4) good, (5) ideal

4) I can get the important things I want from life in this city:
(1)never, (2) a few times, (3) generally, (4) almost always, (5) always.

5) If I could choose where to live with a good quality of life. I would choose to live in Monterrey:
(1)would avoid living here, (2) would not like to live here, (3) not sure, (4) maybe I would live here, (5) without any question I would choose to live here

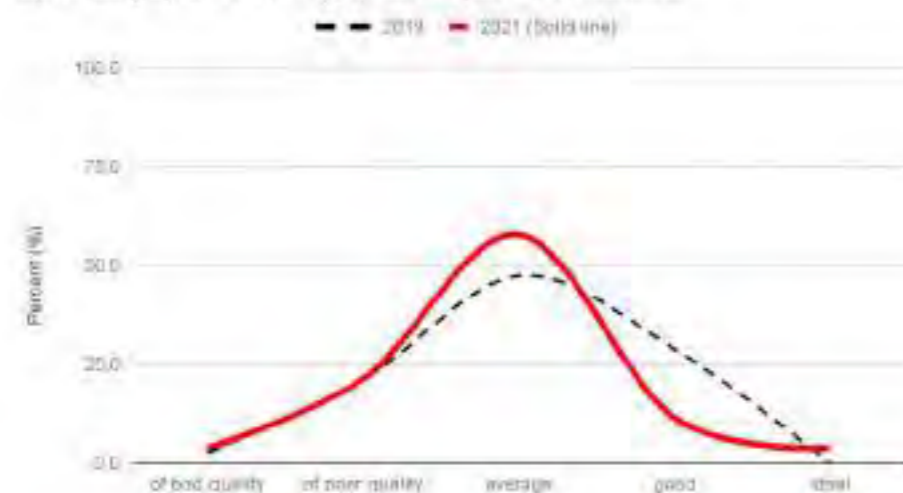Being (1) the lowest classification and (5) the highest.

The questionnaire was applied online during the fall 2018 semester and again during the spring semester of 2022 A pool of over 300 participants was identified to complete the 100 responses required for the study. At all times the identity of the participants was anonymous, participants were informed of the anonymity of the survey and the results obtained were sole for academic and research purposes. The online participants had a two-week timeframe to respond to the questionnaire, and for each group, the survey was closed once a total of 50 responses were obtained.

The obtained results were converted to percentages for each level of response and arranged on smooth line graphs for comparison and analysis one graph for each corresponding question:
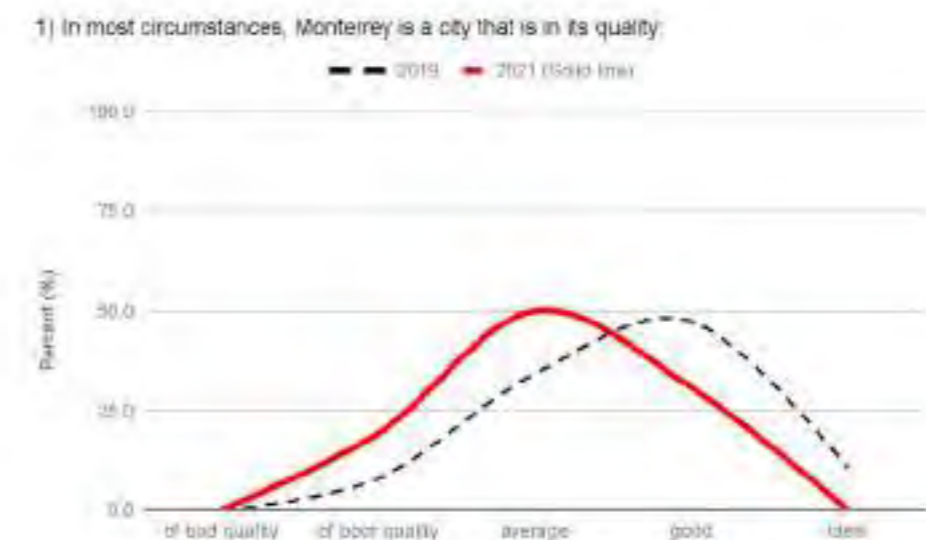

On the first question (In most circumstances, Monterrey is a city that is in its quality) the respondents tended to be more negative about the circumstances of the quality of the city after the COVID19 Lockdown. In 2018 half of the responses categorized the quality of life in the city as "good", and in 2022 the same percentage of respondents perceived the quality of life of the city of Monterrey only as "average".

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2) The living conditions in the city of Monterrey are for its inhabitants:

For the second question applied (The living conditions in the city of Monterrey are for its inhabitants), the 2022 respondents also tended to be more pessimistic about the living conditions in the city, more than 50% of individuals perceived the living conditions as "average" and not as "good" as they did in 2018.

3) I think that my life in the city of Monterrey is:
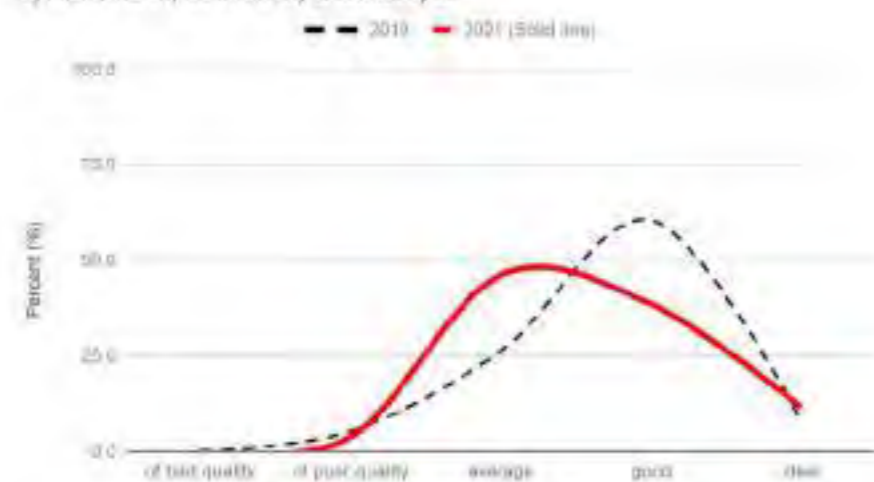
For the third question (I think that my life in the city of Monterrey is) the participants' opinion in 2022 also was more negative than in 2018 as shown on the receding curve. Most of the participants thought that their life in the city of Monterrey was "average" compared to the larger percentage that perceived it as "good" before the COVID19 pandemic.

4) I can get the important things I want from life in this city.
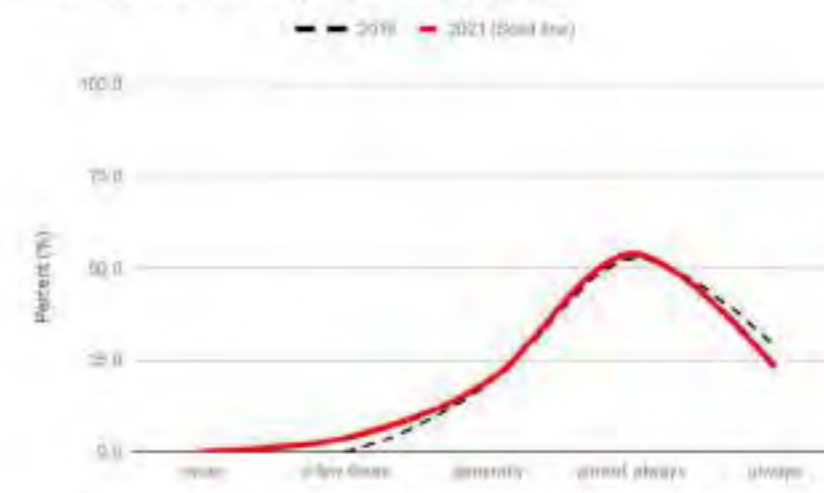
In the fourth question (I can get the important things I want from life in this city) the curve shows that the respondents' opinion was positive on the possibility of obtaining convenience and final goods "almost always" and "always". It is relevant to note that for this particular item the curve and thus the perception of the respondents remained equally positive after the COVID19 pandemic. The results follow the same curve before and after the Lockdown.

5) If I could choose where to live with a good quality of life, I would choose to live in Monterrey
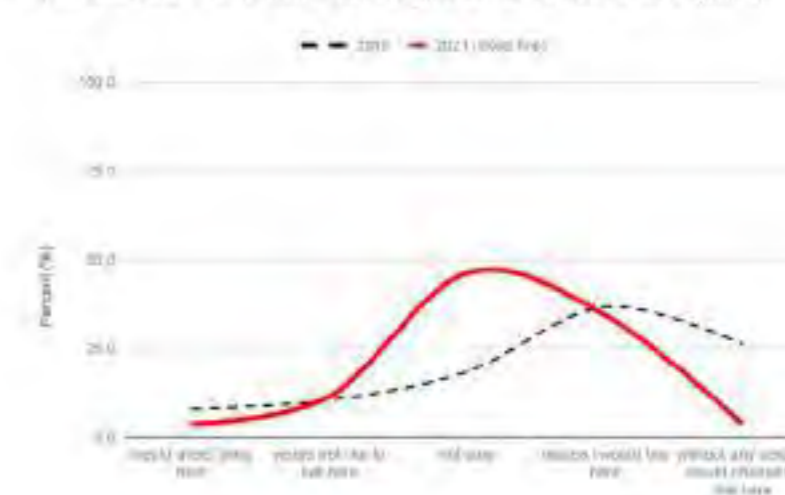
The fifth question of the survey was where more discrepancies appeared since all ranges of responses were chosen by the participants, all answers from "would avoid living here", "would not like to live here", "not sure", and "maybe I would live here" and" without any question, I would choose to live here" were chosen but still it can be noted that the curve receded from the "maybe" to not sure sectors. 50% of the participants would perhaps not choose to live in Monterrey or would altogether avoid living in the city and opt for a location with a better quality of life.

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6. CONCLUSIONS

The Satisfaction with life scale (SWLS) instrument is an effective way to determine the individuals' satisfaction with life and obtain information about its perception, or a determined group´s, based on their subjective perceptions. It has been used extensively for studies in social sciences, psychology, health, and other fields of study.

It is estimated that up to 70% of the world's population will be living in urban areas by 2050, in the case of Mexico this percentage was reached by 2010 and on the last census by the National Institute of Statistics and Geography (INEGI) 79.1 % of the population of Mexico currently lives in urban areas, an equivalent of 102.7 million people. Nearly 67% of this population is under 35 years of age18.

Although urban life generally improves the income levels and opportunities for the residents of cities, urban life is also associated with negative aspects such as inequalities, stress, pollution, and other problems related to the "quality of life". These positive and negative aspects of urban life can be assumed as contradictions to the benefits that urban life can provide.

It can be concluded, there are some contradictions in the perception of the surveyed participants about the quality of life in the city of Monterrey. For the younger cohorts of respondents, millennials and centennials, the response before the COVID19 lockdown tended to be mostly positive (I think that my life in the city of Monterrey is good). In 2018 a relatively high percentage of participants responded in positive terms about the quality of life offered by the city of Moterrey; although, if given the option they would choose to live in another urban area that would provide them with "a better quality of life" (would avoid living here).

After the 2019-2021 COVID19 Lockdown the perception of the quality of life offered by the city of Monterrey tended to be more negative, that is more pessimistic than before the Pandemic, as shown on the graphics that accompany this study.

Limitations of the study.

The main limitation identified in the study would be the chosen range of participants in terms of their representativity of the whole population of the city. The pool only consisted of professionals and students of architecture, urbanism and landscape architecture. It would be advisable to extend the survey to other participants in different income groups to verify the consistency of the results obtained. Although responses are from a varied sample of participants, the place of residence of the participants in relation to the extension of the city of Monterrey was not considered. Additional geographic data could prove to be useful for this same study and analysis.

It would be advisable to continue the research considering these two points: variations in the perception across different income levels and variations in the perception of the respondents' "quality of life" in relation to their geographic location within the city. Additionally, more research would have to be conducted as the COVID19 worldwide pandemic evolves and if additional Lockdowns would present in the future.

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18   https://cuentame.inegi.org.mx/poblacion/rur_urb.aspx?tema_P#:~:text=En%201950%2C%20 en%20M%C3%A9xico%2043,es%20de%2079%20por%20ciento

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ANALYSIS OF THE INFLUENCE OF USING THE SUSTAINABLE BUILDING MATERIALS IN THE ARCHITECTURAL DESIGN ON NATURE AND SOCIETY ON THE EXAMPLE RESULTS OF THE GREEN POLICY OF SEOUL, SOUTH KOREA

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ABSTRACT:

Amid the climate changes, more people are paying attention to what they can do for participating in the global program of sustainable development of our World. Many people from various professional spheres are working on that every day. However, in this scientific paper, we will focus only on one part of this huge system. According to the results of the fifth assessment report of the intergovernmental panel on climate change, specialists assign huge responsibility to the building and construction industries. People hope that sphere will help them to reduce the environmental footprint, which was made by many past generations. This was the reason for the direct and indirect admitted regulations in each country.

In retrospect, people formulated the terminology in the building sphere of green architecture which indicates the approach to architectural design where the main goal is a decrease the damage from the building exploitation in both environmental impact and human health. In this research, we are going to shed the light on one part of this huge system, Sustainable building materials.

The study's main objective is to analyze the main results of green policy in using sustainable building materials in architectural design and the influence on nature and people in Seoul, South Korea. One of the significant highlights of the study is to show the correlation between using eco-friendly materials which are used in a building instead of their existing analogues and the general indicators of climate changes, economic performance and human health. Many countries have their unique strategies for sustainable development and South Korea is not an exception. The government of Korea is using the Green Standard for Energy and Environmental Design (G-SEED) as the main document of sustainable development regulation, the system of certification of green buildings. Moreover, as a direct response to the World pandemic, the Korean government announced the Green New Deal plan. This document is different from others because this is going to impact not only on the climate crisis. But it will try to eradicate some aspects of society such as inequality and poverty.

Moreover, the Korean government has already implemented high-performance insulation for making public green buildings. And those changes are going to be used in others building typologies too. Over a period of 15 years, the government will work on replacing high-performance insulation materials for public rental housing (225,000 units), daycare centers, health centers, and medical institutions.

There are a lot of research works in response to the European and American background in using eco-friendly building materials in sustainable architectural design. However, South Korea possess unique strategies and plans too for using their local natural resources which can be used as successful study cases for other countries.

INTRODUCTION

Most countries across the world have unique strategies for sustainable development. Countries have instigated various systems and policies to cope with ecological effects such as global warming. Industries have brought in certification of standards in using eco-friendly materials to minimize the environmental impacts of constructions. According to the "Fifth Assessment Report of the Intergovernmental Panel on Climate Change," construction designs must apply both indirect and direct regulations to minimize environmental footprints as they carry out their operations. The Ministry of Environment manages this approach in most countries. South Korea is among the re-known countries that are trying to find the possible solution to the current global issues. However, the country has a uniquely different way of achieving the goals of sustainable development. This study aims to analyze the main results of the green policies using sustainable building materials in architectural design and the influence on nature and society in Seoul, South Korea. South Korea possesses unique strategies and plans for using its local natural resources, which can be used as successful study cases for other countries.

Transition environment and its acceptability in South Korea

The Korean model of green growth metropolis, which strikes a balance between urbanization and environmental conservation, may provide a workable answer to the problem of global warming. Concerns about the environment have been highlighted as a priority issue at the United Nations due to the terrible loss of green space caused by the indiscriminate suburban expansion focused on growth and the severe air pollution caused by the growing number of automobiles (UN). In South Korea, people are actively discussing how to improve the quality of life by developing a sustainable community that actively involves its residents. The urban plan or city development for sustainable development based on such conceptual approaches is primarily concerned with environmental, economic, and social sustainability. In response to current environmental concerns like global warming, industries throughout the globe have established a wide range of rules and procedures (Gunderson & Yun, 2017, p. 240). Direct and indirect rules have been implemented due to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change's emphasis on the building industry's obligation to lessen its environmental impact. As a result, there is a pressing need for verification mechanisms to ensure that high-performance construction materials reduce both ecological effects and financial outlays.

Historical development of sustainable aspects in South Korea

Traditionally, Korean houses had an impressive sustainable structure, because of that the traditional Korean Hanok house is considered an environmentally friendly building that was created exclusively from natural materials: wood, stone, straw and earth for walls and floors, clay for tiles, and hanji rice paper for windows and doors. Traditional Korean Hanok architecture remained relatively unchanged, as it showed in the Figure 1, from the Three Kingdoms period (57 BC - 668 AD) until the end of the Joseon Dynasty (1392-1910).
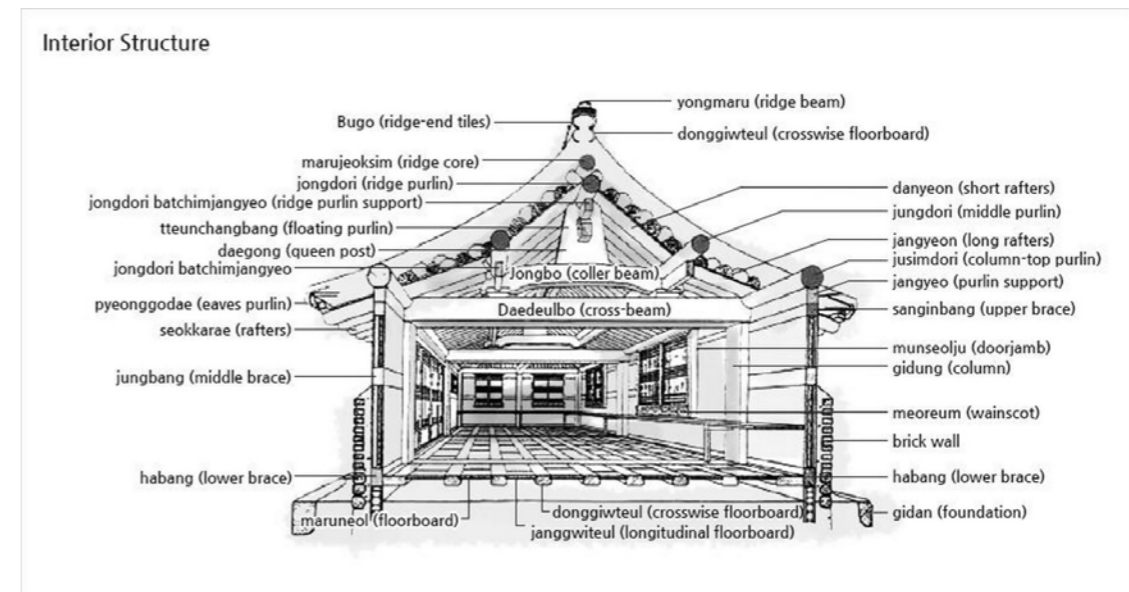

Figure 1. Basic Structure of Hanok (hanok.seoul.go.kr, n.d.)

The supporting pillars and load-bearing structures for the houses were built of wood, the walls were laid out of bricks made from compressed earth mixed with grass. The floor in the living rooms was wooden with an ondol heating system, while in the utility rooms it was stone or earthen. Doors, windows and walls were covered with Korean hanji rice paper. Hanji was also laid on the floor, which was previously soaked in vegetable oil.

Hanok buildings were built especially from local building materials and partly from renewable ones. The main building construction is located on an architrave block for house protection from ascending moisture and water splashes. Generally, buildings have two different types of floor constructions that apply to two types of rooms. The open and huge size of rooms has timber floors, which are well-ventilated (Schuetze and Hodgson, n.d.).

The main construction of the building includes a framework from timber material, where opaque infill or translucent materials are covering the surfaces of the walls between the horizontal beams and vertical columns. Translucent infill traditionally looks like openable windows which are consist of a timber grid with a covering of mulberry paper.

Moreover, the Hanok buildings had not only a sustainable operation but also traditional houses were maintained and built sustainably:

The use of environmentally friendly materials which had a high level of resource productivity minimized the overall energy and mass flow which was directly connected with building materials production.

Because of using only, the local materials, people could minimize the expenses for materials transportation and preserve the knowledge in the built environment and cultural identity.

Furthermore, using renewable materials impacted carbon dioxide storage maximization.

Durable materials and components decreased maintenance, reconstruction and renovation needs and alleviated long-term use during a building life cycle.

Most of the building materials and components could be recycled, refurbished and reused

The building design and structure were convenient for maintenance and well-adapted for the local climate conditions and building use, which could extend the building and materials life cycle.

The building framework was convenient for reuse and deconstruction which made to have a huge building structure deconstruction and choosing the specific components of the building possible (Schuetze and Hodgson, n.d.).

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According to many research works, Korean traditional houses can be called sustainable because of the economic, social and ecological aspects. However, that period of time in Korea had characterized by a small amount of population and as a result, typical single-floor houses made the low city density. In the contrast, after that, the historically important period of urbanization fully changed the city structure and people's priorities (Kim, 1994), (Kim, Choe, S.C. Seoul, 1994)

The influence of the period of urbanization on sustainable development in South Korea

Following the Korean War, South Korea underwent a rapid urbanization as many rural peasants relocated to Seoul in pursuit of better economic possibilities. Seoul's population increased from fewer than 2 million in the 1950s to more than 10 million in the 1990s, playing a significant role in the urbanization process. As Seoul expanded, the neighboring provinces of Gyeonggi and Incheon were merged into a larger area. Despite making up only 11.8% of South Korea's total land area, the region was home to about half of the nation's total population and also to a lot of economic activities.

The South Korean government has implemented decentralization policies and a national growth management policy since 1982 in an effort to reduce issues like traffic congestion, environmental pollution, and housing shortages while fostering equitable development throughout the nation in response to this mass migration and the regions rapid urbanization.

In the period from 1989 to 1997 Korean building construction industry faced sustained and long growth in building volume and the development of the economy (Green, Malpezzi and Vandell, 1994). The main reasons for the changes were affected by some factors: infrastructural projects investment, urban territories expansion, and building market liberalization mostly in the sector of housing and national policies which had the goal to increase supplying of houses and reach parity with the demand of household (Ro, 2002), (Kim, 1993).

As a result of new policies and building the project of redevelopment, many low-rise buildings and neighborhoods were demolished which contributed to previous citizens moving. The quality of used building materials and usage was significantly reduced. As for the new constructions, the low-efficiency technical systems were used to improve the profits by decreasing the cost. All of the changes did not contribute to sustainable development in the country.

Moreover, because of the financial crisis in 1997, the sector of building construction in South Korea had a previous stable growth tendency in production only at the end of the 2000s (Shin and Yi, 2019). However, the tendencies in the political and cultural sphere of the industry of building construction dramatically changed with the huge transformations of local society during the period from 1997 to 2010.

For example, the Act on the Improvement of Urban Areas and Residential Environments was enacted in 2002 (molit.go.kr, n.d.), the great interest in urban renovation was caused by the adoption of the new legislation. The official government policy concentrated on the development of public spaces through infrastructure modernization and neighborhoods at the same time (Ha, 2007). So, as a result of refocusing the attention to the sustainable development direction, in 2008, the comprehensive strategy for the development of the economy was created with the adoption of the Organization of Economic Cooperation and Development (OECD)-sponsored Low Carbon Green Growth (LCGG) framework (Jones and Yoo, 2012).

Sustainable Materials in The Architectural Design in South Korea nowadays

The green structure, exceptional framework and materials should adapt to an ordinary and supportability structure. The mounting patterns and the green business structure and administration are strategically advancing in Seoul. Figure 2 shows the different rules of green building. These rules

fuse practical development through various strategies of green development (Park, Son, Ahn and Kim, 2012). Using green materials is essential as it makes the work activity manageable and effective development systems (Alsecco, n.d.). They assist in asset effectiveness, energy proficiency, falling natural impacts, also known as Greenomics and ensuring that the practical structural materials are reasonable to the environment.

For example, currently, based on the data of the Korea Energy Economics Institute Republic of Korea is in 9th place in GHG emissions in the world. Because of that, the government is providing an active policy of implementation and expansion of the system of control for GHG and energy consumption (Roh et al., 2017), (Eleftheriadis, Mumovic and Greening, 2017). According to the analysis and as it is shown in Table 1 and Figure 1 the majority of existing building materials in South Korea with over 90% accumulated GHG emissions, according to the cut-off level of ISO 14040 (Klüppel, 2005). For example, 7 building materials: rebar, glass, ready-mixed concrete, concrete products, sectional bar, insulators and paint, there are 90% of the GHG emissions in the apartment office buildings and houses. As a result, almost all of these materials were specified as major building materials which have a negative influence on all six environmental impact categories. Especially, ready-mixed concrete was used in all of the evaluation targets and has the biggest characterization value compared with others in the list. According to the collect data, this material contributed to all environmental impact categories by more than 50% (Roh, Tae and Shin, 2014).

Table 1. Result of GHG emissions assessment (Roh, Tae and Shin, 2014).
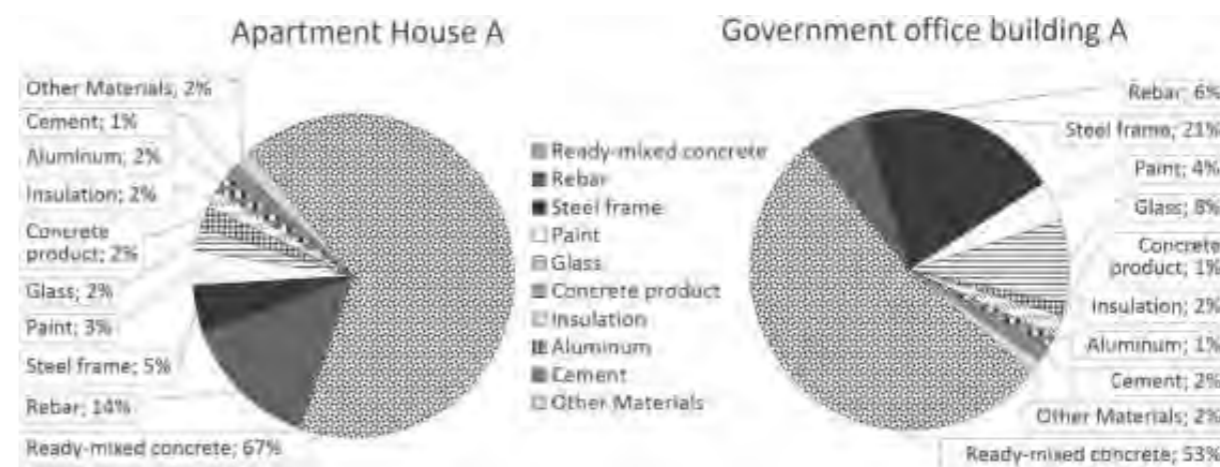
Figure 1. Results of the GHG emissions assessment (Roh, Tae and Shin, 2014).

For minimizing the environmental impact scientists created the system of assessment criteria for the GHG emissions of building materials in G-SEED (Plan). This helps various specialists to measurably specify GHG emissions of used building materials. This method can be effectively used to reduce

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GHG emissions in the building sphere.

Figure 2: Green Building Construction Rules (Park, Son, Ahn and Kim, 2012)

However, repurposing old materials has become a popular move in South Korea to design new structures and buildings. So concrete is widely used in developing packaging materials and plays a vital role in taking the larger part of building construction. That is why there is in high demand for eco-friendly concrete requiring the producers to have certifications for low-carbon, EPDs and carbon footprints (Wu, Low, Xia and Zuo, 2014). They require identifying the critical trends used in green building materials and selecting effective materials that are favorable for construction. This move has taken off in recent years, since 2018, which has increased the use of sustainable materials in the architectural sector (Alsecco, n.d.). The approach reduces various environmental effects caused by buildings and provides a favorable ecological design for efficient energy production (Wang, Tae and Kim, 2019). Therefore, the future generation will benefit from the architectural designs built under these aspects.

The Green Policies (Environmental Labeling) in Seoul, South Korea

There are three environmental labels under the green-sustainable material; Type I, Type II and Type III. Type I, also known as the "classic" Eco-label evaluate a certain product compared to other products in the context of environmental quality and other comparable functions. The product is designed to be informative and consumer-friendly (Park et al., 2017). Type II is often claimed by importers, retailers, manufacturers and distributors on the characteristics of a certain product or service. The Eco-label is "self-declared" and focuses only on the quality of the product, for example, whether the product is compostable or not (Ha, Tae and Kim, 2019). Lastly, Type III examines the environmental impacts of a certain product or service. Under this Eco-label, B2B declares the product's sustainability in its entire cycle life.

Seoul adopts two types of environmental labels. Under the Type I label, the Ministry of Environment granted the Good Recycled Certification for all products recycled with performance, how the product is friendly to the environment and excellent quality (Imachi and Mussivand, 2010). Recycling of products has since been at the spearhead of civil, government and construction materials. This

model has been in force since 1997. Till then, up to 2019, the Ministry of Trade had certified more than 1600 products in 200 companies (Gong, Tae and Roh, 2020). Under the second Eco-label, Type III, Seoul has adhered to eco-sustainability through sustainable development and carbon reduction. These two aspects have become a global problem in recent years. In February 2009, South Korea introduced its first carbon footprint certification and carbon labelling system. By the end of 2019, Seoul had certified over 2200 products in 111 industries (Gong, Tae and Roh, 2020). The low-carbon documentation was approved to build materials below the regular carbon emission of comparable products.

The green building materials information was provided by The Korea Environmental Industry and Technology Institute and the agency under the Ministry of Environment to inform people about the carbon footprint of low-carbon products and Korean Eco-Label materials. However, this database includes information from many various industries in South Korea, not only building construction. As a result, the researchers created a separate database of green building materials. Chosen for these system products were classified according to the middle category items which are used in Korea Eco-Label materials (el.keiti.re.kr, n.d.). From the list of the 23 products of the middle category the chosen materials were EL721–EL727 plastic, rubber, and wood materials; EL741–EL746 metal, inorganic, and ceramic materials; EL241–EL259 other materials. Chosen items, according to the 17 criteria for Korea Eco-Label materials certification, are improving resource circulation and reducing harmful substances, except consumable and portable products. These materials are stones, bricks, tiles, wood, adhesives, blocks, earth, waterproofing, plaster, gutters and roofing, glass, windows, insulation, paints etc.

In addition to Green Standard for Energy and Environmental Design (G-SEED), there are other laws which are related to materials and resources, such as the "Enforcement Decree of the Green Building Construction Support Act," "Green Building Construction Support Act," "Gyeonggi-do Green Building Design Standard," "Seoul Green Building Design Standard," "Green Building Certification Regulation," and "Recycled Building Materials Utilization Standard." These are included the detailed information and official standards of the materials and resources evaluation, such as the "Low-Carbon Standard," "EPD Standard," "Carbon-Footprint Standard," "GR Standard," "Korea Eco-Label Standard," "G-SEED Regulation," "Standard Construction Cost for Overpopulation Fee," and "G-SEED Operation Rules." All of the existing documents relating to the main research purpose were collected in Table 2 (www.epd.or.kr, n.d.), (www.buygr.or.kr, n.d.), (gseed.greentogether.go.kr, n.d.), (www.law.go.kr, n.d.), (news.seoul.go.kr, 2022), (www.gg.go.kr, n.d.), (www.kpi.or.kr, n.d.), (Kprc.or.kr, 2022), (gmc.greenproduct.go.kr, n.d.).

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Operating Institution	Name of Law
Ministry of Land, Infrastructure, and Transport	- Green Building Construction Support Act [27] - Enforcement Decree of the Green Building Construction Support Act [30] - Rules for Green Building Certification [32] - Green Building Certification Criteria [31] - Operating Rules for Green Building Certification [26] - Standard Building Cost for Overpopulation Fee [33]
Korea Institute of Civil Engineering and Building Technology	- Green Standard for Energy and Environmental Design Manual [25]
SEOUL CITY	- Seoul Green Building Design Standard [28]
Gyeonggi-do	- Gyeonggi-do Green Building Design Standard [29]
Korea Environmental Industry and Technology Institute	- Environmental Product Declaration Certification [7] - Low-carbon Certification [8] - Carbon-footprint Certification [9] - Korea Eco-Label Certification [10]
Resources Circulation Industry Certification Institute	- Good Recycled Certification [11]
Korea Price Information	- Korea Price Information [34]
Korea Price Research Center	- Korea Price Research Center [35] - Green Construction Materials Information System [36]

Table 2: Korean laws and provisions related to materials and resources in G-SEED (Wang, Tae and Kim, 2019).

The Impacts of Green Standards for Energy and Environmental Design (G-SEED)

The green certification system developed in South Korea is managed in an integrated manner, classified and intertwined with eco-friendly materials. The two case studies presented in South Korea indicate a positive impact on the environmental performance of buildings and economic efficiency improved through alternative materials and resources. Researchers in this work analyzed buildings that had a public function in South Korea and it was assessed based on the G_SEED version which was implemented on the 1st September 2018. The main assessment points were focused on the formulation the economic efficiency and environmental performance. The research studying was separated into two study cases: the first one concentrated on the product price and the second one on the product GWP emission factor. The first case was more effective according to the items of construction cost reduction and G-SEED. In the second case even though the results in terms of G-SEED were less effective the economic efficiency and environmental performance had good increasing progress compared with the existing materials of this building. Moreover, the results of this case study showed that if concrete would be replaced in the main building structure, which has a comparatively high cost and GWP it, could be more efficient than changing the finishing material. As a result, both case studies illustrated that the environmental performance and economic efficiency, as shown in Figure 3, would be able to improve by using sustainable materials and resources (Wang, Tae and Kim, 2019).
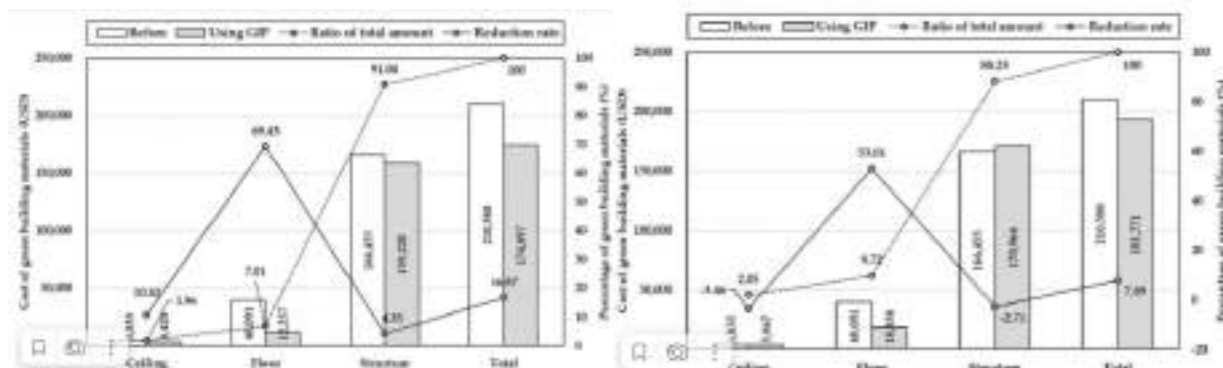

Figure 3: Results of economic efficiency analysis for Case 1 and Results of economic efficiency analysis for Case 2.

In Seoul, manufacturers manage eco-friendly materials separately hence assisting construction industries in making informed choices on the product (Farouh and Nessim, 2017). Architects directly participate in selecting materials based on the economic efficiency and the environmental impacts caused. According to various researchers, replacing concrete in structured buildings might be more efficient than changing any finished material. Work efficiency assists architects in quantifying the building materials required for sustainability (Green Building Materials and Sustainable Buildings, n.d.). Architects adopt the G-SEED to ensure that various effects contribute to green sustainability.

The main objective of green buildings is to reduce the negative effects buildings make on the environment and ensure buildings are efficient for operations. The impacts of G-SEED (Table 3) ensure that human health and environmental impacts are brought forth during sustainable construction (Farouh and Nessim, 2017). Green buildings are constructed to reduce the harmful effects of waste and pollution on human health. They are constructed with materials that require less energy to produce, using less non-renewable energy (Wang, 2014). This also contributes to minimizing emissions of pollutants into the atmosphere, in particular, substances that contribute to the creation of the greenhouse effect, global warming, and acid rain. Architects design green buildings to use more renewable energy sources and enhance recycling techniques. Figure 4 shows the new Green City in Seoul, South Korea (Wang, Tae and Kim, 2019). The green building presents an example of an environmentally friendly building designed to build sustainability within the region.

Table 3. The Impacts of Green Standards for Energy and Environmental Design (G-SEED).

Category	Direction
Environmental impacts	-Reduce the negative effects buildings make on the environment. -Ensure buildings are efficient for operations. -Materials that require less energy to produce. -Minimising emissions of pollutants into the atmosphere. -Renewable energy sources. -Enhancing recycling techniques.
Impacts on human health	-Reduce the harmful effects of waste and pollution on human health. -Quality fresh air circulating the construction. -Removing toxic substances in the aura.

Table 3: The Impacts of Green Standards For Energy and Environmental Design (G-SEED)
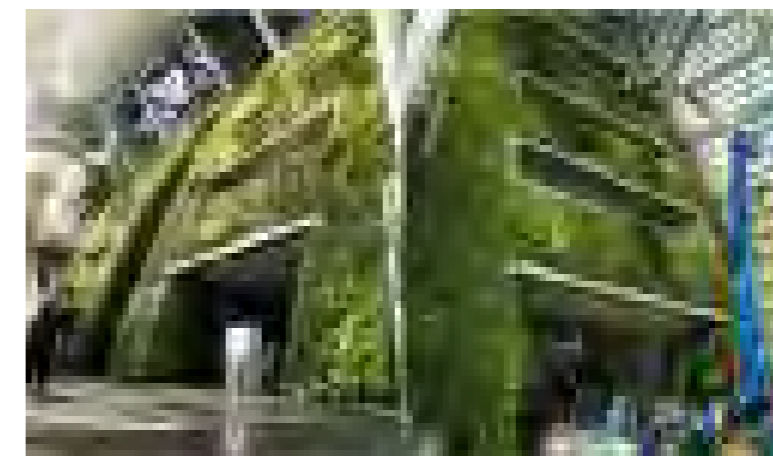
Figure 4: Seoul New Green City (Wang and Wang, 2022)

According to the statistical data, nine out of ten people in the world breathe polluted air, which harms human health and shortens life expectancy. Every year, about 7 million people die from

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diseases and infections related to air pollution. Exposure to pollutants can also affect the brain, causing developmental delays, behavioral problems, and even lower IQs in children. In the elderly, pollutants have been linked to Alzheimer's and Parkinson's disease. An effective G-SEED design uses the orientation that natural light is used to increase the energy efficiency of the construction (Patel and Patel, 2021). Quality fresh air circulating the construction and the green space promotes human health by removing toxic substances in the aura.

Green New Deal Plan on sustainable materials in the architectural design

The idea of sustainability to suggest a green-growth metropolis in the manner of Korea, where people and nature may live in harmony. Although suburban-district growth plans like the garden city are heralded as environmentally sound, they exhibit hypocrisy by harming greenbelt space, making them unsuitable for the sustainable city (Jacobson & Delucchi et al, 2019, p. 450). The goal of the Green New Deal is to create both green economic development and new jobs simultaneously. In the near term, the Green New Deal will help the economy recover from the recent slowdown, and in the medium and long time, it will help Korea's economy gain speed and propel it to the next level of green development.

South Korea continually stresses its policies for the use of green construction materials by strengthening local government regulations, developing and upgrading multiple building certification systems, and increasing environmental effect analyses. As a result, steps are being taken to ensure that various items are certified as environmentally friendly (Kim & Leeet al, 2019, p. 8826). Concrete, used in many types of buildings and containers, is crucial since it accounts for a large portion of construction expenses and environmental implications. Consequently, there is a growing market for eco-friendly concrete, and many manufacturers have lately been certified as meeting stringent standards for reduced carbon emissions, lower production costs, or a smaller carbon footprint. To remain competitive, the concrete industry must now monitor developments in environmentally friendly construction practices and make informed decisions about which green materials will provide the greatest return on investment.

- The Impacts of The Green New Deal Plan on Nature and Society

The government was able to re-evaluate its historical economic model and move toward new tactics for development after the financial crisis exposed the limitations of the conventional Korean growth model, which is characterized by local energy consumption largely dependent on imports. the South Korean government recently unveiled "Green New Deal" agenda as a means of achieving sustainability. It is a sizable government-led effort to mitigate the effects of the COVID-19 epidemic and establish the groundwork for future economic prosperity. The program was initially suggested by the ruling Democratic party ahead of the April 15th parliamentary election in 2020.

The Green New Deal, which was first put up as a post-COVID-19 stimulus package, is a sustainability-focused plan for creating a low-carbon and climate-neutral economy, aimed to revive the Korean economy by creating short-term jobs via the restoration of the country's four major rivers and the development of its high-speed train network. The government released its "National Strategy for Green Growth up to 2050" in July 2009, with goals that include reducing carbon emissions, bolstering the economy, and enhancing people's quality of life.

Markets for eco-products and large-scale investments in green infrastructure may find the proper size in cities that attract highly trained individuals and sophisticated enterprises. Green technology, such as electric automobiles and electric car rental programs, has much to gain from being tested in urban areas. The geographical development of cities impacts both economic and environmental national goals. The cityscape is crucial: As cities get denser, their CO2 emissions decrease per

person. Essential to attaining green development are synergies and complementarities between environmental and economic policies, which are more robust at the urban level (Gustafson & Rosenthal et al, 2019, p. 950). Since over 80% of the population in Korea resides in urban areas, cities will play a crucial role in promoting green development. In this first part, we look at how metropolitan areas in Korea are not only the source of the country's economic growth but also the focus of mounting environmental concerns due to their disproportionate share of the country's total energy usage, greenhouse gas emissions, and pollution. Transportation and construction are two of urban areas' most significant carbon dioxide emissions. Hence, they need special consideration in green development initiatives (Hille & Lambernd, 2020). Finally, we consider the challenges to Korea's urban population, infrastructure, and economy posed by the observed climatic changes.

- Identifying and Analyzing Implementation Challenges

Forging forward with an ambitious plan to create a sustainable economy, the government of one of the world's wealthiest and most reliant on fossil fuels, South Korea's Green New Deal, has been heralded as a watershed moment in the history of environmental policy planning in East Asia. The New Green Deal In terms of climate objectives and expected quantities of investment as a proportion of GDP, Korea and the newly filed targets, which are nothing more than conversion of previous ones, fall short of similar US and EU plans, despite including detailed lists of fully costed policy projects. Despite a lack of talented citizens and the fiscal power of a sovereign state, South Korea aspires to become a role model for a sustainable society on the international stage. Then maybe it would work to combat climate change on a global scale. President Moon's public comments suggest he is realistic about the country's prospects and is committed to steering it correctly.

Since the 1960s, rapid urbanization in Korea has accompanied the country's economic progress, as it has in many OECD nations. More people and resources have moved to metropolitan centers as industrialization has progressed (Deal, 2017). Since Korea's economy was modernized, there has been a remarkable and constant correlation between urbanization and industrialization regarding GDP share. Korea's urbanization share rose from 41% to 80% between 1970 and 2005, as measured by the United Nations' definition of urban areas. The correlation between economic development and urbanization in Korea is positive and linear. Between 1970 and 2009, the urban population share of Korea quadrupled from 40.7% to 81.9%, while the country's real GDP expanded by over 16 times during the same period. The connection between GDP per capita and urbanization rate was 0.887 between 1970 and 2010.

Unlike metropolitan areas, medium-sized cities in Korea exhibit a continuous rise in employment between 1975 and 2007. Interestingly, several medium-sized communities have had job growth rates above the national average in manufacturing. As bigger cities begin to pay higher salaries, labor-intensive businesses in manufacturing tend to transfer to smaller urban areas or overseas, leading to a sectoral shift in both larger and smaller cities encouraged by capital deepening and technological progress (Jo & Han et al, 2021, p. 9917). For instance, Cheonan experienced 14.8% annual job growth in manufacturing between 1990 and 2000, but the national number decreased to 5.7%. Cities that had fast expansion in manufacturing employment in the 1970s and 1980s have, since the 1990s, been able to establish new opportunities in services, resulting in continuous population inflow (Alsharif & Kim et al, 2018, p. 1822). For instance, the industrialized cities of Bucheon, Cheonan, and Changwon have developed faster than other medium-sized cities in terms of the population since 1975. However, medium-sized communities situated outside the Seoul Metropolitan Area with poor industrial operations typically failed to produce new employment in value-added services activities in the 1990s, resulting in a persistent fall in population.

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Sustainability and Sustainable materials for the benefit of localities

The sustainable development makes use of long-lasting, low-energy materials found in the area. Through the whole of a building's life cycle, it affords its occupants the chance to enjoy a high quality of life in a safe, healthy environment. The phases of the life cycle include the creation of raw materials, as well as their subsequent use in the building's design, construction, operation, and upkeep. The purpose of sustainability is to ensure effective use of resources, viz. fuels, water, and construction materials with least impact on the environment of buildings. Still, the building sector is so disorganized and the concept of sustainability is so complicated that only a small fraction of it really uses sustainable techniques.

Skills and innovation have also historically concentrated in large cities. The strength of Korea's economy may be attributed mainly to the country's highly educated labor force and high higher education completion rate. Korea ranks seventh among OECD nations for the proportion of the population aged 15-64 with a postsecondary degree; the most significant gains have been made in big cities, notably Seoul and cities within the Seoul Metropolitan Area. The more people there are with postsecondary degrees, and the more thriving the surrounding community will be. Growth in the size of the local labor market, which in turn helps to produce a bright and educated workforce, is one of the primary reasons cities are attractive investment destinations. Talent is both cultivated in-house and recruited from far and wide. Despite 16 negative externalities, the increasing worker number and quality cycle persists. In Korea, cities with yearly population growth rates below the national average have a lower rate of higher education completion than other cities. The population of 27 out of Korea's 68 cities grew more slowly than the rest of the country between 1970 and 2005.

Potentials of Sustainable Materials on The Urban scale

The built environment is the primary cause of energy consumption and environmental degradation in our rapidly concreting planet. South Korea has shown that by its dangerous rapid urbanization process, so by making decisions in accordance with sustainability principles in architectural design, we may create more ecological structures to lessen this impact. Although all design scales are covered by sustainable architectural principles, the material scale is where the architect may have the biggest impact. In order to develop ecologically friendly organism, Sustainable building materials should be crucial player.

The development of social ethics toward social advancement is one of the components of sustainable urbanism. Green and sustainable neighborhoods that promote safe communities that are open to all people, regardless of their race, creed, or social class, are desirable. In the latest decades South Korea had been trying to overcome these equality challenges in social ethics, the process-oriented approach of sustainable urbanization will play an analytical role forming this organism.

The likelihood that this will meet the needs of unexpected change is higher since ample space is created for regeneration activities and other environmental functions in order to deal with new uncertain developments similar to the ones that South Korea is currently dealing with. However, as there is more competition for available real estate, density becomes a factor in raising social structure complexity. The city's primary design principles include compactness, density, mixed land use, variety, and green space. The approach to sustainable urbanism provides an environment where urban form will strengthen and become more resilient when faced with uncertainty.

While providing functions and integration, urban reinforcement elements should be designed where today's ecology and sustainability approaches are gained. One of the most important parameters affecting the design is the material. With the developing technology, the desired effect can be created by using various materials together, they can be easily manipulated and transformed, not to mention

that materials warn the user psychologically, for example, wooden materials give a feeling of peace and rest, while ceramic materials stimulate creativity and imagination, concrete material gives a sense of warning and confidence, while artificial materials such as plastic bring modernity to the space. In urban reinforcement elements, both natural and artificial materials and new technological and innovative materials have started to be used. Materials such as wood, concrete, metal, glass, plastic, acrylic, fiberglass, marble, granite and brick are used intensively.

- Urban Parks

In order to protect the ecosystem and ensure its sustainability, care should be taken to use materials in urban parks closest to nature. The properties that materials should have in such built environments are as follows;

Environmentally compatible alternatives of materials should be preferred.

Local materials that do not have high embedded energy should be used. The use of waste and recycled materials should be expanded which currently what South Korea is working on.

Composites can be produced with materials with high strength in terms of different properties, which we can find missing from the green policies.

The choice should be made considering the effect of the materials used on the comfort conditions of the created built environment.

In order to prevent the material surface and environmental temperature from rising too high, materials with high heat absorption value and solar reflectance properties should be used, and the parts outside the walking area should be supported with plants.

The whole built environment should be created in accordance with sustainability criteria. With additional applications such as selecting the plants used from local species, taking measures for the recovery of waste water, and using solar panels in lighting elements, the harmony of urban parks with nature can be ensured uninterruptedly, and useful solutions can be produced by reducing operating costs.

- Smart Sustainable Materials

The use of smart materials has brought a new perspective to architecture. Formerly material against ambient conditions While it stands out with its durability, today this understanding is replaced by the element that adapts to the conditions. South Korea is still approaching smartness in the means of Smart Materials, Generally, as analyzed from the case studies we can spot that this understanding is still absent with no integration into the existing structure. Smart materials, a design that is supported as a solution to the increasing environmental problems offers important opportunities within the understanding of 'sustainable architecture'. The main goal of this approach is to be appropriate. intelligent elements designed to make qualitative changes to aid their functions, through the selection of smart elements we would ensure that building elements, construction techniques and building components are used in a more efficient way towards sustainability.

Until now, sustainable design has remained on the periphery of architectural culture, seen primarily through the lenses of technology and energy performance. However, for a sizeable section of the global populace, technology made of unprocessed earth, wood, and stone continue to symbolize not just the present, but also most likely the future. Therefore, focusing largely solely on advanced high-tech environmental control systems is unrealistic. In some regions of the world, these arrangements are culturally and economically unacceptable. Traditional building practices are very closely related to local resources and climate. These structures and building cultures were able to meet the social and cultural needs of a specific civilization. They represent those cultures in their "concrete" form.

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These communities are dependent on their environment, local resources, and land. They are also open to comparison and invention because both of those things contribute to progress, which is frequently necessary for existence.

Conclusion

Amid the climate changes, most individuals are paying attention to the current state of the green economy. Most people are participating in global programs for sustainable development. Many countries have adopted various strategic development goals for the green economy. The role of using building materials in sustainable development is more and more often discussed in the research community. Many countries have already changed official building policies according to the stimulation of replacing the existing materials with sustainable ones. Nowadays, South Korea has its development strategies for green cities.

South Korea has since been at the forefront of sustainable development design. The country has adopted various approaches, including certifications in green buildings. Sustainable materials are used to replace the existing conventional building materials. As regulated by various certifications, including Type I and Type III Eco-labels, South Korea, the country supports the evaluation of construction resources and materials under the G-SEED system. This approach has changed the phase of Seoul, one of the largest towns that have adopted the Green Building system in South Korea. Green building materials play a vital role in promoting human health and ensuring that sustainable materials are environmentally friendly.

As shown in this research, South Korea is currently using some official documents and regulations for analyzing the existing situation of the used building materials. Research works show that, currently, the majority of used materials in the building sphere have a huge impact on environmental pollution, which has a direct connection with the human physical and human health.

Furthermore, specialists in South Korea are analyzing the level of damage from using different building materials and they are trying to find alternative products for the replacement. Moreover, the level of CO2 emission is high, including due to the used existing building constructions and materials. Awareness of the reasons for the problem is already the step on the way to finding the solution. Bonuses from the government which stimulate to use of alternative materials for the building are the significant reason for quick progress in South Korea in this sphere. Full replacement of non-eco materials with sustainable ones is available only with a high level of awareness among citizens and specialists. The Green New Deal program has been a divisive topic in this context and a target for attaining sustainability at the national level. Additionally, it is true that there are a lot of difficulties and challenges. But compared to other existing programs, the Green New Deal framework would be a stronger and more comprehensive means to achieve sustainable development.

According to the study cases which were mentioned in this paper, using sustainable materials impacts not only the environmental performance but also the human health. This is a result of the close connection between ecology and people's well-being. And despite the correlation between building materials and human health is still not a well-known research sphere, however, the consequences of impaction of building items on the environment were reported in many research works. As a result, it is possible to underline the influence of the materials on human mental and physical health.

Lastly, the construction industry is specially to fault for these worldwide issues. Without a doubt, today's environment and human health are at risk due to buildings that make use of outdated or unsuitable technologies, equipment, and materials (Mastini & Kallis et al, 2021, p. 106082). In the last several decades, engineers and technologists have come to understand that using specific technologies and materials in the building sector is a significant contributor to environmental issues.

For these reasons, scientists have advocated for "sustainable" or "green" design in the construction industry. Therefore, sustainable construction aims to replace harmful building technologies and materials with their less harmful counterparts. To benefit people, the environment, and society, it is essential to investigate sustainable technologies, standards, and materials that may be used in buildings to lower their energy and resource needs (Sonnenschein & Mundaca, 2016, p. 188). Therefore, Sustainable Materials may be more humane and environmentally sound than traditional structures by using better resources like electricity, water, and construction materials.

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INTERNATIONAL EDUCATION POLICIES AND THE ECOLOGICAL TRANSITION CHALLENGE

The new stakes presented by the ecological transition have already been integrated into higher education in a structured way. This theme therefore aims to take stock of the strategy and policy tools that governments and various entities at the national scale use to align education with the matter of the ecological transition, with regard to similar actions carried out by intergovernmental agencies and supranational organizations at the international scale. The range of topics here include the multiple forms of internationalization in training programs, including student and teacher mobility, international curricula, study travel, recruiting, and the diversity of actors taking part in financing, organizing and executing these activities.

CIRCULAR CITY STUDIO: EXPLORING CIRCULARITY IN AN INTERNATIONAL MASTER COURSE SETTING

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ABSTRACT:
The concepts of "cycle" and "metabolism", withdrawn from the natural sciences, are increasingly used within the urban design and planning disciplines facing urgent issues such as climate change and environmental sustainability. From October 2021 to January 2022, the Circular City Studio course of the new Master degree of Urban and Territorial Planning at the Iuav University of Venice investigated the topic with around 40 international students coming from different backgrounds (planning, architecture, geography, political sciences, etc.). We proposed an integrated approach throughout scales and different modules which accounted for 1) the analysis of metabolic data (e.g. energy consumption, waste generation, air pollution, food flows) at the metropolitan scale of Venice, 2) the zoom into a 20km-long territorial transect connecting the mainland to the coast where to spatialize some selected topics/flows and elaborate a vision of circularity 3) the definition of n. site-specific or blueprint design interventions to concretize the vision at the local scale. Results of the studio prove the difficulty for students to handle complex data such as official statistics and sustainability indicators, and their direct transferability into the construction of robust territorial vision of transformation. On the other hand, in spite of a diversity of educational backgrounds and nationalities, there was widespread understanding of the challenge of circularity, reflecting the global challenge of a generation of students raised amid the Anthropocene.

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CIRCULARITY IN URBAN DESIGN AND PLANNING: TOWARDS A TEACHING AGENDA?

In the last decades our world has deeply changed, becoming more and more complex. Climate change, resource scarcity and socio-cultural conflicts are just some of the challenges we have to face. Territories and cities are at the forefront of this changement (The World Bank, 2019; UNPF, 2018). In order to train future planners and architects to properly manage these challenges, the Iuav University of Venice has recently launched a two-years master's degree course which is taught in English, is open to international students and deals with climate change adaptation, disaster resilience, and circular urban metabolism. Students with different curricula, from planning and architecture to natural science and political science, are welcomed to join the course, since diversity and complementarity of knowledge are considered essential to imagine and design future territories and cities.

Circular City Studio, the first-year and first-semester design studio of the master programme, addressed in particular the topic of circularity in urban design and planning. Since the 1970s, ecological notions such as 'ecosystem' and 'metabolism' have been widely discussed as tools for urban research and design within the framework of teaching activities promoted in schools of landscape, architecture and planning (see for instance McHarg, Spirn and Lyle in the US and Tjallingii in Europe). More recently, in Europe, the concept of circularity has gained prominence, not least as a result of the fascination for the concept by business and policy-makers and its diffusion within the political and administrative agenda of cities and regions. Fitting in particular with economic regeneration objectives of urban and industrial areas in decline, 'circularity' has rejoined the list of sustainability 'guiding principles', being explored in the context of teaching courses (the 2014 ULB led UpCycle Barcelona ERASMUS + workshop), architecture competitions (the 2017 Europan "Productive City"), and biennials (the 2016 Rotterdam biennale "The Next Economy"), etc. (Wandl et al., 2019, Grulois et al., 2015).

Although material and energy flow analysis are increasingly recognised as a tool for sustainability audits and environmental policy guidance, the design of circular urban metabolisms challenges spatial design and planning at different levels (Pincetl et al., 2012; Fusco Girard and Nocca, 2019) . Urban design and planning, indeed, comprise both analytical/reflecting and prospective/speculative/intuitive activities. Although there have been remarkable advances in the analysis of urban metabolism, the translation of research insights into design processes still remains tentative. Perspective endeavors involve the processing of discrete information and decisions that produce a figural outcome. In this process, the designer faces the challenge of generalizing and inducing knowledge from many sources, reducing the complexity by prioritizing certain aspects over others. At the light of this, the application of circular economy principles in urban design and planning requires at least:
i) the integration of expertise on resource flows and urban processes on real-world case study;
ii) the translation of environmental data at the spatial, urban and architectural level (translation requires work to select and assemble knowledge that is sometimes disconnected from each other but is relevant to the particular design object/site) and,
iii) the comprehension of the spatial, social, and economic principles that can trigger transformation in flow circulation.

In this paper we present and discuss the Circular City Studio programme and result, questioning in particular whether students were capable of tackling the aforementioned challenges by i) dealing with complex environmental data; ii) developing a spatial understanding of this data; and iii) proposing systemic design hints and transformations.

The Circular City Studio
The Circular City Studio aims to teach students to study and design the city and its territory through the lens of circularity. Drawn from the natural sciences, the concepts of "cycle" and "metabolism"

are proposed as a tool to rethink the territorial dimension of the material and immaterial flows that cross and shape the city (Lucertini and Musco, 2020). The studio is meant to combine design with ecology and politics to challenge students to critically address the global challenges and opportunities posed by the search for a more circular urban metabolism. The course consists of three integrated modules taught by three teachers: i) 'circular dynamics', focusing on urban resource flows, ii) 'circular planning', focusing on the spatial and regional dimension of these flows, and iii) 'circular design', dealing with the architecture and product-service design for the circular city, with an emphasis on the interlinks with the former two modules. More in detail:

Circular Dynamics aims at understanding the material and energy flows that cross the territory, at their characterization and evaluation. The module presents most conventional approaches to urban flow analysis, such as Material Flow Analysis (MFA) and Life Cycle Analysis (LCA) to allow students to have a transversal understanding of circularity and its impact on the city. It addresses the relation between flows and space, and with different economic sectors and different social activities.

Circular Planning involves a non-linear approach between the spatial investigation phase and the design and/or planning phase. In particular, the exploration of the case study includes: the qualitative analysis of urban flows and the spatialization of their impacts in the city and in the territory; the detection of salient issues and the problematization of ongoing conflicts; the territorial and urban diagnosis and the identification of possible strategies for an improvement of the present conditions; the development of a master plan and/or scenarios for the future of the territories examined. The proposed work approach intends to integrate different methodologies of investigation, from mapping to the interview, from the construction of strategies to the imagination of the future, keeping at the center the spatial reading of flows, criticalities and resources.

Circular Design aims to guide students in the translation of metabolic data into design objectives, criteria or spatial concepts. How can design, intended as projective exercise, relate to the knowledge on urban metabolism to contribute to the construction of imaginaries and processes for a socio-ecologically responsible transition? Students will be asked to rethink the articulation between flows, actors and spaces of a specific portion of the territory included in the study area. Scenarios and visions for a just transition will be constructed and communicated through diagrams and visuals proper of ecologically informed design.

Study area and flows
The Venice Metropolitan area (830.000 inhabitants and 2.500 km² of surface, including the historical city center, the hinterland and its lagoon) was chosen as study area of the 2021/2022 Circular City Studio. The area is characterized by a very rich surface water network: on the one side there is a consistent network of rivers; on the other hand, the irrigation and drainage systems constitute another, denser, order of hydraulic network. Although most of the waters of the main rivers have been diverted over the centuries to flow directly into the sea, and not into the lagoon, some smaller watercourses carry the waters of the plains into the lagoon. In addition, we must not forget that the groundwater system flows slowly from inland to the lagoon and the sea. A series of rationalities have invested in engineering and centralised interventions to shape the lagoon according to human needs and activities. This has been happening for centuries, starting with the Republic of Venice, but in the 20th century this type of intervention became extremely impactful, with serious consequences for the environment (Bevilacqua 1998; Zucconi, 2002). One of the main engineering projects, started in the late 1960s, was the digging of the Canale dei Petroli through which large oil tankers from the Adriatic Sea could reach the industrial area of Porto Marghera, generating unprecedented traffic and compromising the delicate lagoon bed (Tagliapietra and al., 2020) .

In addition to oil logistics, there are other activities that take advantage of the existing structure of the canal network, such as cruise tourism, whose large ships literally pass through the historic city centre. It is important to consider that today's traffic of both large ships and small vessels is seriously damaging the lagoon, causing the progressive erosion of sandbanks and seabeds. In such a fragile context transitioning from land to the sea, which is sparsely populated but daily traversed by thousands of tourists and commuters, and which represents an outpost for observing the impacts

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of climate change, it becomes relevant to reflect in spatial, as well as temporal terms, about present and future territorial adaptation (Magnabosco and al., 2019). An effective observation lens can be that of the interrelation between territorial metabolic cycles, we chose in particular the following: people, water, energy, food and waste. The study area was divided into 10 strips or transects (as many as the number of groups) measuring 5km by 20km and with an East-West orientation, roughly all covering a piece of mainland and lagoon.

Didactic methodology

The course is structured through a series of lectures, in which professors and collaborators provide basic notions and tools on topics relevant to the course: georeferenced data collection and analysis, urban and regional planning, and circular design. This input is completed by lectures from invited scholars who shared their research experience with circular economy projects. Students are then divided in groups of 4 to 5 students, following the maximum diversity and complementarity of profiles and backgrounds (e.g.. one or two architecture/landscape designers, one or two planners, one social scientist). Groups work collectively to identify and construct a logical and reasonable understanding about some main issues at stake in the study area related with one or two particular resource flows. Moreover, they are expected to create nexuses and develop ideas about territorial and urban design interventions to increase their circularity. Doing so, the studio follows a heuristic-participatory pedagogical approach, integrating expert and non-expert knowledge, encouraging students to collaborate with each other, sharing and periodically presenting their work to other students. Additionally, students are invited to present their work to academics and local stakeholders and receive feedback during the midterm presentation.

Scholars with backgrounds in anthropology, geography, urbanism and architecture, but also experts and activists in environmental journalism, art, cultural heritage and waste management are invited for this purpose. The presence of such diverse guests achieves two results: on the one hand, encourages students to participate in open debates fuelled by numerous points of view not on generic territorial issues but precisely on their proposals; on the other, to integrate into their work the reflections and expertise of those who have been working for a longer time and in different ways on neighboring topics or areas of study . By the end of the course, students are expected to be able to territorialize the urban metabolism of the Venice Lagoon, through the acquisition of the following skills: dealing with complex data related to environmental issues and conditions, particularly influenced by human activities; territorializing data, developing a spatial understanding of problems and opportunities; developing visions and future transformations for the territory, approached with a systemic scale-crossing design.

In order to facilitate the visual understanding and increase the comparability among the student elaborations, a color palette is given which associates different colors to different urban flows. The proposal is for students to respect the palette and use these colors in all three modules' exercises of flow and territorial analysis and design visualizations (plans, sections, and axonometries). Students are invited to progress as follows: first, to collect metabolic data and provide a macroanalysis about the whole Venice Metropolitan area, focusing on a specific issue at stake the group considers relevant to be further investigated (e.g. air, soil and water pollution, waste management, energy, food production, transportation, etc.); this scale includes the historical city, its hinterland and lagoon, as an area on which to read and spatialise the dynamics between different metabolic flows. Second, to scale down and deepen the analysis within a territorial transect of 5km x 20km, providing a diagnosis map and a planning vision and strategy for this specific area; this scale is deemed useful for reasoning in terms of strategy within a spatially-defined territorial area connecting the mainland to the coast and thus including different metropolitan conditions (peri-urban/urban, dry land/water, etc.). Third, to scale down even further picking up a specific spot in the transect where to intervene with a design proposal, whether of architecture, infrastructure, or product-service design.

The work programme is timely organized to follow up a logical sequence between the three modules over 4 months. Nevertheless, the integration of the three modules is carried out in an empirical way, through group work, and using a non-linear, transcalar approach. This means that, although in the first phase the students proceed in the progressive scaling, in the second phase of the course, the project is developed through a continuous process of testing and validation of the coherence between the different scales. The intermediate scale of the strategy, for example, sometimes led to the need to retrieve new data at the larger scale of the macro-analysis; in other cases, the detail of the design made it necessary to fine-tune the intermediate scale of the transect.

Discussion of the results

In the previous sections we have presented the focus, study area, and didactic programme of the 2021/2022 Iua University of Venice - Circular City Studio. In this conclusive chapter we present and discuss the results, highlighting in particular whether students were capable of tackling the aforementioned metabolic challenges, namely, i) dealing with complex environmental data; ii) developing a spatial understanding of this data; and iii) proposing systemic design hints and transformations.

i) dealing with complex environmental data: this exercise was quite demanding for most of the students yet needed to get acquainted with the environmental regulation. Whereas whole regional environmental databases and reports were provided, the complexity of the topics covered often led to a reconsideration of the students' ability to fully deal with them within the available time. The exercise of asking the groups to select a key issue, however, revealed some more familiar arguments and a clear positioning with respect to these by the groups. Fossil fuel consumption-air pollution and food-waste management nexus for example were selected the most. Air pollution was largely linked with both heavy traffic and energy generation in the industrial harbor of Porto Marghera (Figure 1: example of dynamic analysis).

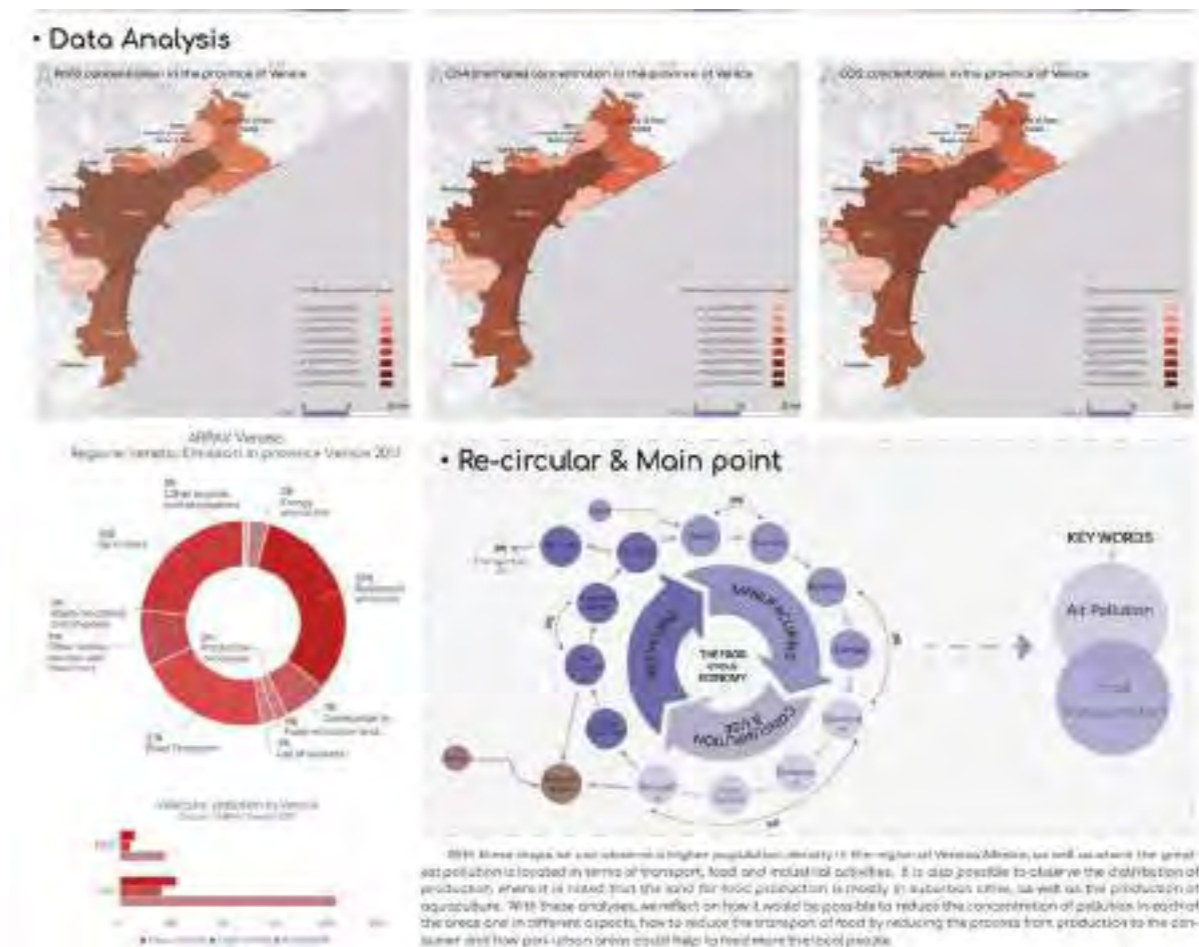*Figure 1: Example of dynamic analysis*

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ii) developing a spatial understanding for planning: this appears to be particularly useful, as the majority of students was not familiar with the context of Venice and its lagoon. Moreover, although starting from common databases, through this exercise each group was able to detect different aspects and deepen the analysis in an original and already strategy- and project-oriented manner, also according to the individual interests and backgrounds of the groups' components. A group focused particularly on issues related to the relation between land and water in the aquatic environment of the southern lagoon and its role in ecosystem services. Others have paid more attention to the connection between food production and organic waste management. Food supply, which emerges as an element of conflict between local population and tourists, between the catering offer and accessibility to fragile social groups, was rethought starting from the reactivation of the entire lagoon as a food production area, potentially capable of responding to demand. Still others have focused on the impacts and possible transformations of the industrial and energy hub of Porto Marghera and its transition towards a bioeconomy that runs with locally produced biomass. Some projects were particularly interesting, proposing original and ambitious visions, supported by quantitative data and a careful consideration of space (Figure 2: example of diagnosis map; Figure 3: example of transect map).

Figure 3: example of transect map

iii) proposing systemic design hints: starting from the previous diagnosis and visions, the groups explored possible futures for the Venice Metropolitan area, first of all selecting certain aspects and flows on the basis of which they constructed spatially-oriented strategies. In this way, they could better understand which parts of the territory could come into play and in what timeframe, namely, defining the most appropriate sequence of actions to obtain the imagined results. A stakeholder map was asked to support the vision and design intervention that presented which existing actors and resources-and which missing ones-could realize the desired transformations. A proposal, focused on the realization of new slow mobility paths in the southern lagoon's fringes that made use of local agroforestry residues (bundles of branches) serving also as an environmental protection system with different gradients, capable of promoting the conservation of biodiversity and improving water quality. One group proposed the realization of a community agriculture hub, a collective infrastructure for trading local fresh produce with Venice located in Sant'Erasmo island that could support traditional small-scale farming, potentially scaling up the model to other islands of the northern lagoon, thus fostering local food production and supply chains. Ultimately, another group worked at the interplay between tradition and innovation, proposing different neighborhood-scale compost linked with urban gardening, in which food residues are either locally composted or recycled in fish farming, according to their location along the mainland-lagoon transect (Figure 4: Example of design project).

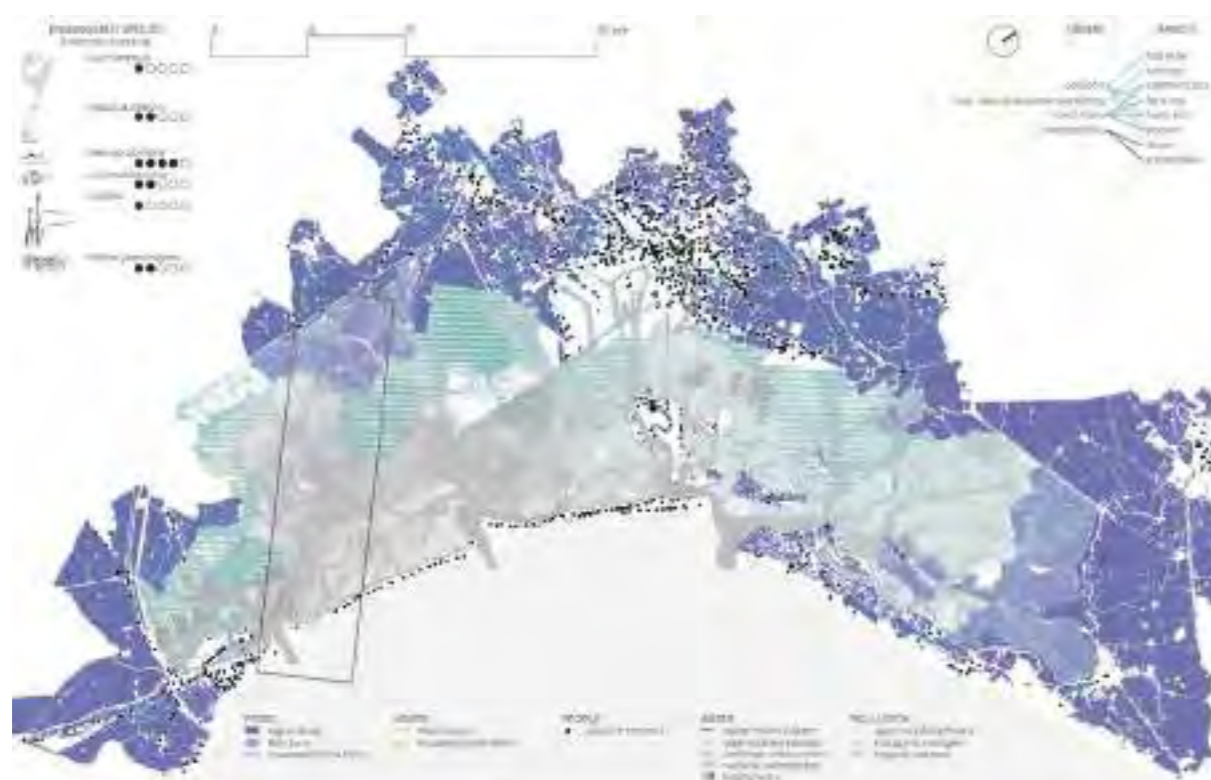*Figure 2: example of diagnosis map*

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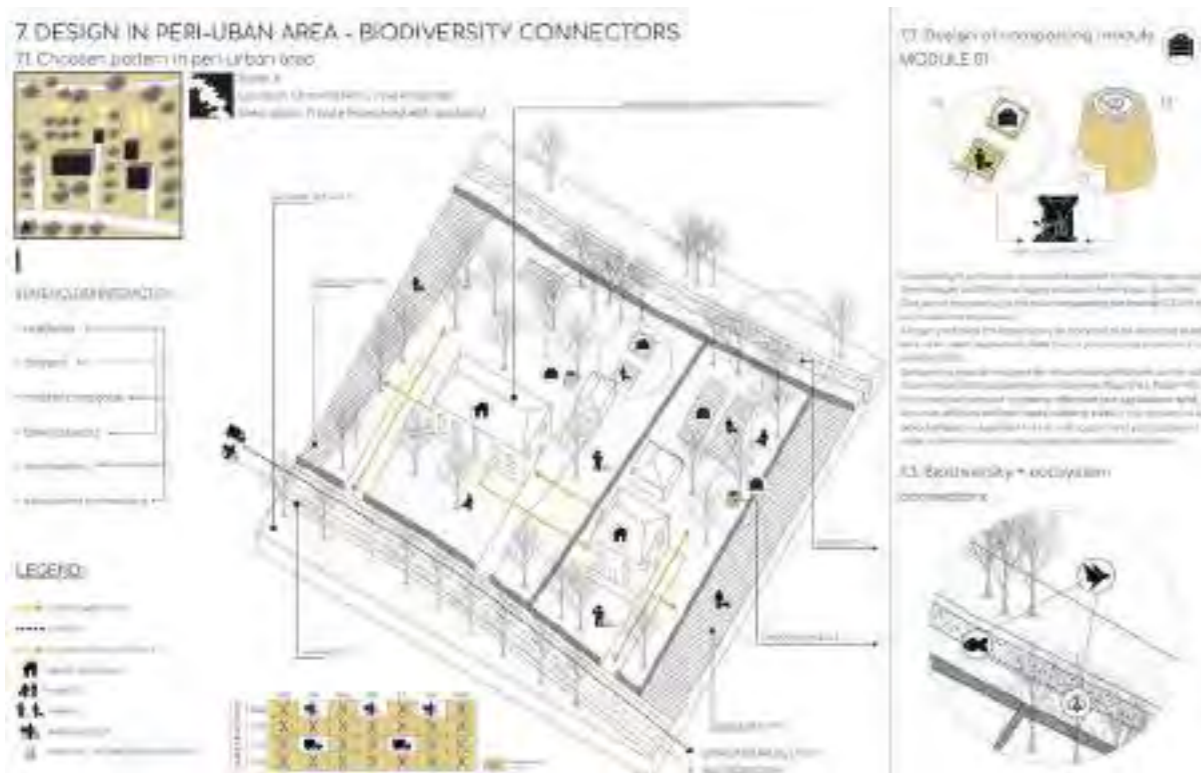I ENSAP BORDEAUX

Figure 4: Example of design project

Conclusions

Results of the studio prove the difficulty for students to handle complex data such as official statistics and sustainability indicators, as well as their use and direct transferability into the construction of robust territorial vision of transformation. Since the beginning, a main challenge was to integrate and operationalize very different analytical tools and methods and levels of understanding within a short time and heterogeneous groups which had, nevertheless, successfully overcome some initial phase of construction of the dialogue, managed in almost all cases to enhance the differences and find original sources for reflections. It must be mentioned, the difficulties imposed by the hybrid modality, as the course was mainly carried out in presence, but with some students and guests connected remotely. This made communication within the groups and work sometimes difficult. However, the students managed to organize the exchange and division of tasks, at least partially overcoming the discomfort caused by the distance.

Although complex, the topics addressed represented a stimulus for the students, most of whom were not familiar with the study area. At the same time, these "new" and partly external gazes have been useful to local students and to the group of teachers and collaborators to renew their approach to a territory now widely explored and discussed in the local and national scientific and academic debate. The ambition of the teaching staff certainly had to deal with a fast pace of work, with some logistical difficulties and uneven technical skills , especially when it came to meet design and visual assignments by those students not coming from the design disciplines. The course can be certainly fine-tuned to better meet, in the coming years, the overarching didactic aims of the Master. However, this first experience gave a substantially positive balance, with surprising results and with a positive response from most of the students. Some outcomes were particularly satisfactory, compared to all three modules, and would deserve a further detailed study, which in some cases could be carried out through a degree thesis. In spite of a diversity of educational backgrounds and nationalities, there was widespread understanding of the challenge of circularity, reflecting the global challenge of a generation of students raised amid the Anthropocene.

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ECOUNI / INTERNATIONAL «CO-TRAINING/ACTION» BETWEEN STUDENT PAIRS AND TEACHERS PAIRS, A PROMISING EXPERIMENT TO SUPPORT SUSTAINABLE AND SHARED CLIMATE TRANSITIONS

5-2

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ABSTRACT:
The climate change fight, and adaptation to these changes, is at the same time a major, local and global stake. The interdependencies between natural phenomena and the behaviors/practices of citizens, companies, communities, etc. at these scales, are so closed that the climate challenge cannot be achieved without an internationalization and internalization of knowledge faced with contrasting experiences in the North as in the South.

In this context, the experimentation of the EcoUni academic approach, based on «in situ internationalization» of climate challenges, started from the following hypothesis : a system of co-training between peers of different origins, by mobilizing knowledge, visions, contrasting experiences or even ideals, would promote intercultural empathies. These would make it possible to think about sustainable and climate just actions.

KEYWORDS :

«co-training/awareness-raising – actions» – «shared transitions» – «accompanied changes» – «pairs of responsibility» – 17 SDGs - Climate

The resilience and adaptability paradigm to climate change, often comes up against misunderstandings in the countries of the South (and still to a certain extent in the North) of the unreserved or non-responsible practices of some households, due to a lack of analysis. It also comes up against: on one part, a discouraging vision of the link between the efforts (of all kinds including financial) that remain to be made and the changes that are not very visible in the very short term; and on the other hand, the requirements that may seem disproportionate when the reality of experiences shows that «adaptability» and «resilience» is already very painfully in the most vulnerable territories and by the most vulnerable households.

In this context, the «co-formation between pairs» experimentation, must be considered as a contribution to the formation of the commons. Indeed, the EcoUni device an opportunity to share different realities, experiences and visions, but which can, by touches, impact the co-responsibility in the face of «changing worlds» with territorial and social strong gaps.

Objectives

- To support transition and resilience (local and global),

- To develop new sustainable practices to adapt to climate change,

- To train and to share knowledge and experiences lifes, with strong reciprocity.

- Facilitate the construction of commons in front of non-uniform mutations, and the social, economic, and uneven environmental costs

- Concretize the local and international «peers of responsibility», in order to impact the student's vision, as current citizens and future professionals.

Case Study Description and Methods

The experimentation of co-training between peer students (and teachers too) to meet the common challenges of ecological and climatological transitions, follows a first stage of collaborative production of knowledge on Climate and Metropolisation. Known as «ResoClima/CA», this work program was initiated in May 2021, with the support of french regional cooperation (2021 SPI-ARCHAC / «Fight against climate change, sustainable development and environmental management")

In 2021, ResoClima/CA, has been established above all as a platform and an open network of training- action and reflection on the inflections necessary to fight against climate change, promote sustainable development and support local and metropolitan resilience in the metropolitan areas of Central America.

The platform was supported by a Central American academic actor (University of Engineering of Nicaragua / UNI) and a French (Sciences Po Lyon), and by an international NGO of urban and spatial planning (Apoyo Urbano / France-Latin America). It mobilized multiple Central American metropolitan actors (technical experts from local authorities in the central metropolitan areas of Guatemala, El Salvador and Nicaragua, and other experts), other Central American academic actors (URL Landivar / Guatemala, UCA / El Salvador), environmental experts (e.g., Fundaeco / Guatema-

la), among others.

Both in the three stages of ResoClima's development and within the other components of the programme, are the foundations whic have made it possible to propose in 2022 collective international university experiments (EcoUni).

The four components were:
a) Development of a knowledge base and its territorialization, on metropolitan territorial dynamics impacting, and impacted by, the climate change.
b). Elaboration and implementation of dialogue spaces between various actors, including students, around local and national inflections to be implemented according to the contexts.
c) Design and co-animation Ateliers-Lab's, and Training Chairs, allowing groups of volunteer students/expert researchers, to put into perspective their knowledge and aspirations in the form of «preliminary projects».
d) Collaborative production of a «knowledge carrier» on dynamics related to climate change in metropolises, as well as recommendations to go further.

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In this context, born EcoUni (International University Collective Experiments / Climate) from March 2022. Coordinated by Apoyo Urbano / France-Latin America, in partnership with UNI. Apoyo Urbano coordinated the mobilization of engineering students from Centrale Supélec, Ensaia, ENTPE, and urban planning (Ecole d'urbanisme de Paris).

Mixed experimentation team: UNI students and teachers, French cooperating students of Apoyo Urbano / Central Supélec – Ensaia – ENTPE – EUP; apoyo Urbano coordinators - UNI

EcoUni seeks to co-train and co-share in a dynamic way, between student peers (and also indirectly between teachers), knowledge and experiences that could facilitate behavioral changes around common issues such as the fight (or adaptation / mitigation) against climate change. For this reason, four themes were privileged :

1. Climate and climate responsibility: understanding and imagining solutions with low-tech-low-cost inputs.

2. BioClimatism and solutions based on nature and sustainable development.

3. Food security and urban agriculture.

4. Productive - cooperative and sustainable housing.

The overall structure of international peer-to-peer training is as follows, except the experiment with the housing cooperative «Nuestro Barrio»:

Structure of the EcoUni system: 1. Courses – Classes / knowledge sharing between pairs, 2. Practical workshops on knowledge consolidation, 3. Lab's around one or more projects / plan.

- The inverted class modules are co-prepared between French and Nicaraguan students (a binomial). They take care of transferring to a group of students who have freely opted for these thematic modules. About 20 students from different levels of study, and the three different faculties (architecture, engineering, agronomy).

- The Knowledge Consolidation Workshops mobilize the same number of students, but address specific topics in a more in-depth but applied way. These extensive knowledge are co-developed between two workshops. This moment of exchange also makes it possible to think about a range of possible projects / plans, etc. that can be put into practice. In these workshops are also designed tools for communication, awareness, information towards the rest of the students of the University (panels, exhibitions, podcast, Facebook information ...)

- Labs, are specific moments during which have worked around a chosen subject: development of nudges, learning arboristic georeferencing, draft plans (of food, canopy, low tech .....)

Regarding the experiment with the housing and mutual aid women cooperative «Nuestro Barrio», the structure is simpler:

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- more collective workshops (urban project and 17 SDGs, productive capacity of the lot of the future «cooperative community», basic diagnosis…),

- ... «workshops at home», around a practice of interviews – lifestyles (current, past and expected in the coming years) by household of cooperators, drawing of housing and specific amenities to keep individually or to «collectivize» in the future district.

- Labs around the constructive project, by scenarios of development capacities in stages. This involves the concretization of the "terms of reference" for an «eco-habitat», clarifying its contribution to the fight against climate change (SDG 13) and the other 16 SDGs.

Results

The international experimentation by Apoyo urbano and the UNI, had as goal to confront knowledge / visions / ideals / experiences of young people and French and Nicaraguan teachers has made it possible to go really beyond the only «co-training between pairs». Indeed, one of the challenges of this international cooperation process was to «co-understand» the difficulties and opportunities (shared or not) existing in the implementation of local / citizen (or institutional) actions to fight, adapt or mitigate the effects related to climate change.

This active co-understanding is currently manufacturing / finalizing 5 «products», that make it possible to compare knowledge and actions likely to integrate global changes at the local level in a context of great vulnerability. To know:

- **Label « EcoUNI ».**

A framework was concretized that made possible to transmit, complete and amplify the knowledge acquired during the ResoCLIMA, work process around the fight against local –metropolitan climate change. This is in order to support the younger generations to grasp the issues and think local-global.

All this has made it possible to consolidate the knowledge of professors in the faculties of architecture, engineering and agronomy, and to facilitate co-accompaniment. In short, it is a question of a «label» of collective university experimentation of training between Nicaraguan and French student peers, but also between professors of various disciplines and French experts.

- **Id'ExCo. Ideas for collective experimentation.**

The applied process of training-action – experimentation, tested in 2021 and developed more finely currently, is in the process of allowing the formulation of a «bank of project ideas» around for chosen themes, which in fine can be labeled as Id'ExCo (Ideas of collective experiments).

Beyond that, at least one experiment per team will be set up. These experiments concern communication / general awareness actions, nudges seeking to transform specific behaviors, the design preliminary projects or pre-plans. For example, as part of the training-action 1 theme («Climate and climate responsibility, understanding and imagining low-tech-low-cost solutions»), 2 to 4 experiments are being chosen between students / teachers), namely for example: reconversion of plastics, polystyrene containers / design of garbage cans, nudges to reduce the production of plastic and using plastic glasses in university restaurants, experimentation with a water and moisture retention system when watering trees and plants of the University, etc.
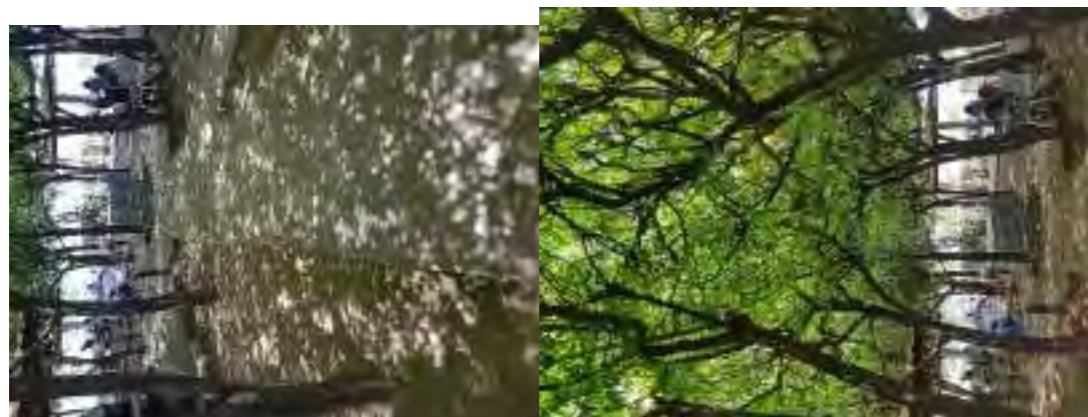

First Labs

- **« Campus Canopy Plan »**

As part of the thematic t 2 «BioClimatism and solutions based on nature and sustainable development», apart from the courses and the experimentation of the geo-referencing of arborization and internal biodiversity at the Campus, all the students are in the process of building a proposal for a «Canopy Plan». The aim is to achieve rational management of the arborization and the realization of an «island of freshness». The methodological process will then be made available to local authorities, to lead to a reflection around a network of municipal «islands of freshness / micro-forests». A current "georeferenced tree bank" will be made available to academic authorities, as well as arborization scenarios adapted to climate change.

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Des « îles de fraicheur » actuelles / Campus UNI   Current «islands of freshness» / UNI Campus

The beginning of a «vegetable garden of university learning», which will have to evolve

into a «vegetable garden of university supply»

- **«Healthy and Accessible University Eating Plan»**

As a public university hosting many young people from modest backgrounds, the institution facilitates residency – food and scholarships for some students. In parallel, 5 private «restaurants» facilitate breakfasts and lunches at relatively affordable prices.

As part of the thematic 3 / Food security and urban agriculture, a university survey on the eating habits of students was developed and administered with the student associations of the three faculties.

A series of awareness-raising posters on «eating better», «food security», etc. are being developed. But the most important thing is the planned development of the educational vegetable garden, into a «university vegetable garden» and «compost» for the benefit of university restaurants and internal management. This vegetable garden and the processes co-built with the students will not only partially compensate for the overconsumption of carbohydrates (and high-calorie drinks), but also partially compensate for the virtual absence of vegetables and fruits in university (and family) menus.

Ultimately, the formulation of a «Healthy and Accessible Eating Plan» for students and professors on campus is planned, incorporating the results of the survey. It is also in progress, the experimentation of the transition from the «vegetable garden – academic learning space» to a university vegetable garden, capable of covering this function. But also of supplying university restaurants and playing a role in improving the diet plan of students in general.

- **« Plan for Cooperative and Sustainable Housing Guide Plan «**

The thematic 4 / Cooperatives of mutual aid and sustainable habitat makes it possible to approach the problem «climate / biodiversity / food - urban project». With a widely participatory and multi-stakeholder working method: university students, teachers, cooperants, the women of the housing and mutual aid cooperative «Nuestro Barrio», the professionals of Multipro (accompanists of housing cooperatives), the NGO Apoyo Urbano.

Cooperators, students, teachers in the future site hosting 20 households / housing / productive spaces

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A proposal for progressive management («guide plan») habitat – agriculture – community carbon captures, is being developed.

Synthesis of the «reverse process» to design the space for living and cooperative activity in the plot being acquired.

In this proposal the question of access to water for household consumption and agro-Community production is raised in a country suffering from water stress and in a territory concerned by the "Central American dry corridor".

Conclusions

The positive and negative changes expected in the world, and the challenges to transform the situation, must be considered the gaps in means of all kinds at the local, national and international levels. And in these gaps, shared knowledge (generational, intergenerational and international) for action is one of the challenges.

Climate, ecological, even energy but also societal change will require the constant mobilization of new practices, reinforced by new knowledge.

The commons construction will depend on it. EcoUni is trying to contribute to this.

Recognitions

A big thank you to the entire EcoUni experimentation team, and in particular to the representatives of the student association in architecture for their dynamism and collaboration in mobilizing and raising awareness of students benefiting from this device.

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TOWARDS AN ATLAS OF THE TRANSITION:
EXPLORING REPRESENTATIONS OF TERRITORIAL HABITABILITY

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ABSTRACT :

"On ne sait plus ce que c'est qu'habiter, on ne sait même plus ce que c'est qu'un espace habitable. Quand je veux expliquer cette faillite de l'urbanisme, j'avoue que j'hésite encore. Je ne sais pas quelles sont les causes essentielles. Je crois qu'elles sont tellement multiples qu'on a une certaine peine à les analyser. Et cette perte de l'idée, ou de la représentation, de l'espace habitable, de l'espace habité, de l'espace qui est l'œuvre d'une activité humaine aussi importante que le jeu, le rire, l'amour, le travail, et qui est l'habiter... et bien la disparition de cette perception à mon avis, fait partie des symptômes qui à la fois paralysent la connaissance, et l'imagination." - Henri Lefebvre, 1972

Towards an Atlas of Transition explores the potential of representations to interrogate territorial habitability. Challenging our gaze, contemporaneity is marked by an incessant complexity: the expression of the territory and its project are challenged by uncertainty. Observing to conceive, drawing to project, the architect-urbanist models space through its representation, accompanying societies in their quest for inhabitation, their presence in the world. Henceforth critical, the habitability, such a set of factors, aspires to the control of the world by the technical control. This parametric rigidity reveals an anthropocentric vision of the spaces of life to the project of a subject, the Human. Moving away from its origin as the aspiration to a world for tomorrow, the appearance of paradoxical conditions in living spaces testify to the denial of the socio-ecological transition. The research then states the hypothesis of a co-habitability, far from a destructive presence. This new look requires a systemic understanding of living today to question the how? of a livability tomorrow, reimagining our tools of representations and assemblies, to express welcoming territories all alive. How to reverse the look, and its expression, from habitability to co-habitability? The thesis explores the Atlas as a methodological tool to describe the possibilities of an inclusive habitability. Focusing on the Leman territory, gathering knowledge through visualization as a manual of the gaze, a narrative of the inhabitation for tomorrow will be proposed.

KEY-WORDS:

Atlas / Habitability / Territory / Representations / Mapping / Narrative / Iconography / Habitat / Switzerland

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1. State of the art

Living, the expression of a gaze

To look at the city and the territory is to analyze the relations between individuals and spaces: our possibilities of being in the world (Besse, 2013). It is to give rise to conditions of life and habitat because we exist by inhabiting space (Besse, 2013). Transporting directly into the imaginary of the project, the reading of the inhabitable space seeks its potentials. Comparable to the act of colonization (Daëron, 2009), this intention joins the geographers who define the analysis of the potentialities of the context (Lazzarotti, 2013) by the term habitability. As a set of factors conditioning the existence (Duvigneaud, 1982) this notion first referred to an ideal of inhabiting beyond the Earth (Mercier, 1801; Daëron, 2009), explored visually by astronomers and their tools, leading to a new understanding of the world. Recounting an appropriation of the world (Brunet, 1992) rather than its transformation (Daëron, 2009), the visualization of a place and its potential habitability was the aim requiring an expression (Harley, 1989). As a result, the exploration of possibilities flourishes (Desimini, 2016) through representation as a tool for narrating imaginaries of habitable worlds, even to the point of relating habitability to utopia. It is through the projection of ideals that the schematization of reality (Gumuchian, 1989) in a series of parameters will subsequently impose itself in the projections of architect-urbanists. Composing space according to a hygienic utopia led to its transformation to accommodate various lifestyles. The dwelling tends from then on towards a technical device, conditioning the practices and uses and modifying at the same time the thoughts and visions of the world transcribed in the cartographies. Looking to conceive, drawing to project, the relations between types of spaces and cultural interpretations shape the territory (McHarg, 1969). Representations accompany societies in their practices and uses of the world, and the architect-urbanists in their quest to inhabit it.

Mapping to be in the world

How do we live today? Revealing a set of relationships (McHarg, 1969), the map moves away from a simple description of the world (Binois, 2016) towards a multiple object (Beconyte, 2011; Muehlenhaus, 2013). Cartography and habitability are thus able to narrate and draw a mediation with the territory (Jacob, 1992; Tiberghien, 2017), evoking the evolution of the gaze through time (Binois, 2016). Each disruption of the vision transforms the notion of habitability and its representation giving to see a world enriched with new conceptions (Desimini, 2016). Considered as a relation of factors (Fourny, 2016) designating the potential of individuals to interact with their living spaces (Mathieu, 2011), habitability thus appears limited in its contemporaneity by its parametric character. Originally expressing the narrative of a world (Lazzarotti, 2006), close to utopia, habitability asserts its symbolic value through its representation (Secchi, 2006). Considering the sensitive relations between individuals and spaces seems henceforth fundamental to compensate the unique, and contestable (Lazzarotti, 2006), parametric reading of the inhabitable space and to answer the stakes of the socio-ecological transition, upsetting all conceptions.

Towards a new narrative

The growing environmental awareness defines contemporaneity and changes our view of the world, as well as our way of being in it. How to live tomorrow? Our view, marked by the socio-ecological transition and its new problems, is questioned. Transforming our representations and projects of living, the need for a new narrative (Barrau, 2019), previously initiated by various movements (Spatial Turn, 90ies; Regional Planning, 20ies), can now be characterized as urgent. A term that is more than ever in demand, transition, can be defined as the passage between two states, or in other words: two views, two mappings, two projects. Fueled by economic, cultural, and political debates, the current condition supports the need to rethink practices and conceptions of inhabiting (Gemenne, 2019). Going beyond the intellectualization of informations, which is praised in the representation of territories (Harley, 1989), to regain credibility in the expression of the relationship between a society and its living space (Binois, 2016) can contribute to considering the problem as systemic (Barrau, 2019), and not parametric, and lead to a redefinition of livability for tomorrow. In fact, the parametric aspect of the reading tools must be overcome and enriched to move towards a new reading of space and its components (Fourny, 2016; Mathieu, 2011), as our practices and uses are now critical: we are our own threat (Barrau, 2019), locking ourselves into a hellish race between ecological degradation that degrades us in return[1]. The parameters of habitability, having guided the design of our current living spaces, participate in their decline. The lack of consideration of context, history, and geography, raised by the first works on ecology (Bennett, 1976; Club of Rome, 1968) is reflected in the representations by the expression of the power of technique.

The architect-urbanist must now take a geopolitical (Gemenne, 2019), or even biopolitical (Foucault, 2009) position by imagining, representing, and projecting a hope, a reopening of possibilities for tomorrow (Desimini, 2016). Reversing our gaze, according to socio-ecological considerations, seems crucial to discover differently, rethink our way of being in the world (Aït-Touati, 2019) and fight against an outdated understanding of the world (Bennett, 1976). Technical knowledge is no longer enough, the blind belief in science is fading away leaving room for uncertainty. The aspiration of the project of inhabiting is now different, its representation must be reconsidered (Tiberghien, 2017) to reflect the symbiosis of which it is now a question (Bennett, 1976; Bird Rose, 2019).

From habitability to co-habitability

Aspiring to a systemic thinking (Barrau, 2019) the socio-ecological transition finds its essence in the inclusive consideration of the Living, of which all existences pass through the act of inhabiting (Besse, 2013): humans (and perhaps some other living beings) exist through spaces[2]. Going beyond the parametric vision of habitation to find a narrative of interactions thus reinvents the possibilities of cohabitation (Barrau, 2019). The second obstacle of the notion of habitability seems to be its anthropocentrism. Developed through intentions of colonization and expansion of human life, the larger-than-us (Barrau, 2019; Servigne, 2015) is absent from its considerations, preventing the visualization of actions on the world around. To tend towards an ethical relation between the man, the earth and the non-humans is fundamental to inhabit tomorrow. The evidence to reformulate the notion of habitability in co-habitability presents then the hypothesis of the thesis. Aspiring to a society of the conscience (Bohler, 2019) the co-habitability tries to exceed the anthropocentric glance dictating the dwelling towards the projection, the representation, and the concretization of a glance attentive to the principles of the Living and founded on an agreement between all the beings (Servigne and Chapelle, 2019).

The Atlas, represent to rediscover

Demonstrating a look through the assembly of knowledge

Placing man at the heart of an animated world requires a rereading of the spaces of life. This ideological reversal requires a rethinking of the tools of expression of the gaze to give to see differently and to investigate an understanding of the Living worth of a narrative of co-habitability. Closely linked to utopia, the projection of habitation reveals the importance of narrative to feed optimism (Barrau, 2019) to the collective imagination from which thoughts and actions flow (Aït-Touati, 2019; Bohler, 2019). Constantly adapting to changes in the gaze (Binois, 2016), representing to rediscover (Aït-Touati, 2019) would allow us to fight against the collective denial that contemporaneity faces

1   Barrau, A. (2019) Le plus grand défi de l'histoire de l'humanité : face à la catastrophe écologique et sociale. Neuilly-sur-Seine : Michel Lafon.
2   Besse, J.-M. (2013) Habiter : un monde à mon image. Paris: Flammarion.

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(Servigne, 2015).

Combining various representations according to a purpose such as a holistic reading of territorial components and ways of life, the Atlas seems the right tool to address current issues.

A real object of knowledge, assembling geographical, cultural and imaginary knowledge of the territory (Warburg, 1921, 2012 ; Tiberghien, 2017) through its realization and methodology, the work carries (Greek Mythology) a vision, such as a program of collective ecological literacy3, likely to reverse the gaze by the emergence of possibilities. In other words, the Atlas as a methodological tool (Daston, 2012), proposes the visualization of a knowledge as the wisdom of the gaze (Didi-Huberman, 2011), an organized knowledge to consult the world.

In this perspective of documenting the contemporary situation, some attempts can be cited. Proposing a critical reading of our presence on earth, like a kaleidoscope of trends, the Atlas of the Anthropocene (Gemenne, 2019) demonstrates the effectiveness of representations through the sole use of maps spatializing the data and information of the human footprint. Dictated by the myth of precision, Terra Forma (Aït-Touati, 2019) responds to this type of approaches in an implicit but critical way, by proposing an alternative cartography manual whose intention is to question our relationship to the world, by reversing the point of view. Changing the perspective towards a world in movement and a living landscape, the map then shifts into an imagery, devoid of the credibility and relevance of the discourse. This aesthetic practice, seeking to make representations attractive to better understand the territory, results in an image dense with symbols (Ghosn, 2018) that leads to questioning their pedagogical purpose. In the same line of theoretical exploration of the visualization and scripting potential of a projected world, Cartographic Grounds (Desimini, 2016) advocates for a collaboration between precision and imagination, the lack of which is regrettable in its visual attempts. All the same, this approach directs disciplinary reflections towards a set of intellectual and practical activities, systems of actions and devices of operations, but also points of convergence of different professions and actors4. The Atlas, in its recent realizations, about the Swiss territory for example, states the power of the map to have imposed itself as a tool of knowledge thanks to its visualization and its discourse (Heinzmann, 1993; Diener, 2006; Fondation Braillard Architectes, 2021). Still distant from the world, the vertical vision of the map shows landscapes of algorithms and not of inhabitants (Baudry, 2007), as well as the Atlas assembling these images without the addition of other forms of narratives.

Beyond maps: from maps to mappings

Fleeing from the situated experience, the map took refuge in the spatialization of data to find its credibility, which led it to a hyper-diffusion, of multiple uses by various actors (Tiberghien, 2017). Overtaken by its success, it is during the 90ies that a growing interest for the description of the territory was born in the arts and culture (Cosgrove, 1999). Alongside new considerations such as spatial injustices (Spatial Turn, 1990), the landscape and its open spaces with the emergence of Landscape Urbanism. Then, this practice will be reinforced by The Agency of Mapping (Corner, 2010) proposing to consider the methods of description as tools capable of enriching the understanding of the world. Whose ability to support an alternative relationship between architecture and nature at the scale of the territory, leads to the emergence of new cartographic realities (Gissen, 2010) of which Land Art proposes an interpretative exploration. Despite its potential, the map has closed in on itself, isolating itself in an intellectualization of information to the point of sometimes becoming hermetic (Harley, 1989). Approaching a scientific radicalization by the unique expression of the data, the map is now considered as an instrument of accuracy destroying all credibility to other forms of representation and inhabitation such as iconography (Tiberghien, 2017).

Victim of a considerable trivialization, cartography is now often reduced to the sole production of scientific and topographic maps. Yet cartography, a notion subject to multiple definitions due to its various means of realization, can be understood as any abstraction of reality seeking to understand its complexity (Desimini, 2016): a multiple representation (Beconyte, 2011; Muehlenhaus, 2013).

3   Bird Rose, D., Robin, L. (2019), Vers des humanités écologiques : suivi de Oiseaux de pluie, Éditions Wildproject

4 Tiberghien, G. A. & Besse, J.-M. (2017) Opérations cartographiques. Arles : Actes sud.

The need to take a critical look at the description of the territory, often considered with fascination as precise and objective because of its potential to establish relationships, narratives, and actions,

seems fundamental today to achieve the linking of the territory project to that of socio-ecological transition.

Designing differently: towards an Atlas of the transition

Considered as an assembly of representations, the Atlas shows the richness of the notion of cartography by presenting multiple and varied visualizations (Ferrari, 2018), allowing the validation of new territorial images (Duvigneaud, 1967) likely to trigger the socio-ecological transition. Faced with the current challenges the importance of expressing habitable territories for all remains decisive (Leopold, 2013). Therefore, re-imagining our tools of assembly and expression, knowing their ideological and contesting capacities to support visions of the future through new expressions, confirms the capital role of the Atlas in the assembly of a new gaze. Considering cartography in its multidisciplinary aspect, Towards an Atlas of Transition will explore the assemblage as a method (Warburg, 1921, 2012) to interrogate the mediating role of representations in the construction of new knowledge. The systemic understanding (Barrau, 2019) of the territory, proposed by a collection of varied descriptions enriching each other, will question the ideological reversal caused by contemporaneity. The interrogation of current habitability through cartographies will attempt to address the eventualities of tomorrow's habitability. Diving into the landscapes of the everyday (Baudry, 2007) to complete the cartographic expression beyond the showcase of knowledge.

2. Introduction of the research

Research objectives and intentions

Interested in the representations of territorial habitability, the research questions their potential to serve as a tool for the architect-urbanist's gaze. Indeed, requiring a systemic and holistic understanding of the territory, the socio-ecological transition claims another reading of the space. Towards an Atlas of Transition proposes to explore new means of expression and representation to describe this new situation. Revealing an understanding of the territory based on a reversal of the gaze, the Atlas is chosen as a methodological tool to articulate territorial knowledge and projections of possible habitabilities. The intention of the research being above all to propose an understanding of How do we live today? to imagine How could we live tomorrow?

Research context

Faced with the increase in uncertainties over the last few decades, the need to take a critical look at our practices and uses of space is growing. Reinterrogating our habitability, the socio-ecological transition questions the current representations of the territory. Therefore, building a new look on the way we live to question how to live tomorrow is the project of this research. To achieve this, the role of representations of territorial habitability, and particularly of cartography, will be considered as fundamental in the construction, expression, and valorization of this new view.

Cartography is an age-old discipline and a tool for expressing the way in which man looks at his environment, which has been modified to translate different narratives and projects. Now orchestrated by the technique, the latter tends sometimes to the confusion of the subject with the existing so much the realism is breathtaking. The technological evolution lets us think that each great renewal of knowledge is accompanied by a turn in the practice characterized by new graphic operations. This observation raises an intriguing question: maps, more precise than ever, seem to

lack the information necessary to express a complete understanding of the territory. Faced with this observation, the thesis then puts forward the hypothesis that precision, which has become a "myth", hinders the systemic representation of the territory, and its habitability, thus compromising the expression of the new view presumed by the growing environmental awareness. Preconceived by the historical heritage of cartographic culture and the notion of habitability, the representations of the territory still seem to be anchored in an anthropocentric expression: the spatialization of parameters allows the expansion of man and his living space. This in a way always more precise in the visualization, to be always more concrete in their achievements.

Thus, eager to conquer living spaces, man has precipitated the cartography in multiple and diverse uses by all profiles of actors. Facilitated by the computer, the hyper-distribution has installed this type of representation in our daily life. Despite their abundance, the new look set forth by the socio-ecological transition struggles to be read. Rethinking the practice, and particularly the expression of its outdated understanding of the territory, seems necessary to affirm the relevance of representations to address contemporary issues. The incessant obsession with innovation pushes maps towards the use of ever more precise tools, questioning the means of description that are sufficiently convincing to overcome the conflict of expressing an understanding of the territory and a project of inhabiting it that has now expired. The growing challenge of the socio-ecological transition is the need to translate an increasingly complex reality, thus reversing and challenging our culture of expression and understanding of our relationship to space.

Context issues

In response to these ideological and disciplinary disruptions, maps seem to take refuge more in a practice dictated by an insatiable quest for precision. Aspiring to control the unpredictable, to foresee the uncertain, the understanding of the expressed territory is compromised. The reversal of the gaze presupposed by the contemporary context, manifesting our being in the world in its systemic conception, is accompanied by a revision of representations. Harmful to the systemic comprehension of the spaces of life and the living, the exaggeration of the precision prevents the expression of possible for tomorrow.
Reversing our gaze, reporting on the singularity of the ecological transition now seems fundamental to rethink, reproject, redraw, represent our presence on earth. In this perspective, the Atlas as a methodological tool, of assembly of knowledge by the assembly of various materials like a manual of the glance, constitutes the essence of the research.

Towards a hypothesis and research questions

As presented in the state of the art, the notion of habitability raises questions at the present time. The first observation is its parametric rigidity. Inherited from astronomers and geographers, it indeed influences architects-urbanists in a conception of space leading to its own destruction. The paradoxes emerging from habitability considered as a set of parameters necessary for space to ensure living conditions for humans are key in the construction of the research.
To what extent does the socio-ecological transition impose a redefinition of the notion of habitability and, consequently, a modification of cartographic culture?
A transformation of the way we look at things, triggered by contemporary issues, seems to be fundamental to move from a parametric to a systemic vision.

The second observation is that this notion was built on an anthropocentric vision of space and its possible metamorphoses. Closely linked to expansionist values, the socio-ecological transition refutes this impartial conception of space in favor of the human being.
How, and by what operations, can cartography translate the stakes of the socio-ecological transition? Such as the habitability of the territory for tomorrow?
Revealing the invisible, cartography allows the imprint of our practices and uses of spaces to emerge.

The parametric rigidity and the anthropocentric vision each testify to the aspiration to a certain

world. Revealing a utopia, inhabitability justifies recourse to the collective imagination to abstract an ideal of inhabitation, to represent a world in which we project ourselves.
How does territorial habitability present an opportunity to explore the scenarios and imaginaries of the socio-ecological transition?
Habitability thus presents itself as a research tool for questioning the territory and understanding contemporary issues, of which the socio-ecological transition is a part. But this is not without reconsidering the term and it is in this framework that the hypothesis of the present research is built. Based on a systemic understanding of the territory and its components, environmental ethics reopens the multiple definition of the living, thus considering the human and the non-human. Faced with this inclusive vision, considering all forms of life equally, the preoccupation with habitability tends towards the emergence of the notion of cohabitation, the coexistence in which our presence is inscribed and consequently, our habitat as well.

To what extent, and through what representational operations, can we read the territory from the perspective of co-inhabitability?

To answer this question, the reconsideration of territorial representations and projections is fundamental. Starting with the opening of the gaze to all forms of descriptions capable of informing on the multiple and varied components of the territory, of the space or even of its subjects. The map will henceforth be understood in its multiple potential, as a multiple object (Beconyte, 2011; Muehlenhaus, 2013) and thus called cartography, referring to any means of description informing habitability. From iconography to scientific maps, to tales and legends, territorial representations accompany societies in their practices and uses of the world. As a real tool for the architect-urbanist, cartography can reverse the gaze and bring out possibilities by opening a new understanding and projection of space. Considered in this way, cartography will be the object of production of the research towards an Atlas of the transition. A work with a strong didactic potential, the Atlas will present the narrative and the visualization of the new look stated by the socio-ecological transition while revealing the possibilities of an habitability for tomorrow, an inclusive habitability. The latter then asserts itself as both a final object and a methodological research tool. Assembling various territorial knowledge, this collection will be composed during the thesis to propose a new reading and an original visualization of the territory. Between narratives and illustrations, the research will consider the hypothesis of considering the Atlas as a manifesto of the new look. It seems important to note, in the context of this hypothesis, the following wish.

Study case

Towards an Atlas of Transition will be dedicated to the exploration of the territory of Lake Geneva. Fascinating by its great mythical landscape, Lake Geneva is the object of multiple representations between words and images, passed on by various authors throughout history until today. This territory seems relevant for the exploration of the Atlas as a methodological tool for the assembly of situated knowledge (Warburg, 1921) as it refers to a library of references and sources of inspiration in its means of description. Subjected to various pressures, demographic as well as climatic, this territory also raises the problem of the relevance of representations in the face of contemporaneity.

It is in this context that a series of works have been published (Heinzmann, 1993; Diener, 2006; Fondation Braillard Architectes, 2021). Embodying a series of efforts, these achievements question similar topics as the ones addressed by the research. Thus, a real register of references on discourses and visions, of transition as well as of habitability, will constitute the foundation of the explorations conducted.

The method brought about by the Atlas will focus on an integrative reading of the territory, and of its representations, in a transcalar way. Indeed, the regionalization of the place of observation is a choice, as a specific gesture, to demonstrate that the relevant scale varies from one condition to another. Moreover, this decision is part of the continuity of a systemic understanding of the territory and its habitability, necessary to answer the stakes of the socio-ecological transition adapting to the adequate scales of the encountered narratives and expressions.

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3. Research method

The Atlas, methodological tool

Final object and methodological tool (Daston, 2012), the Atlas is understood as a collection assembling various materials of knowledge (Warburg, 1921), from expressions to stories, according to a purpose (Tiberghien, 2017). And whose consultation reveals its didactic power. For indeed, even if the socio-ecological transition is now claimed by the European directives, the exploration of a habitability for tomorrow, especially through a vision and an understanding of the new territory, remains weak. Therefore, my research argues that the paradigm of tomorrow's habitability, currently little studied, must impose itself in the contemporary debate on the transition of living spaces. The research intends to use the Atlas to show possibilities (Desimini, 2016), as a support of collective education (Bird Rose, 2019) allowed by its simple consultation.

The hypothesis of co-habitability, stated above and questioning a given condition, is at the heart of the research enigma (Lemieux, 2012), thus serving as a research tool to interrogate the territory to best understand the socio-ecological transition. To achieve this, the Atlas as a methodological tool is composed of four Episodes. From reading to analysis, from representations to data collection, the study of the relationships between living spaces and the living are the object of exploration.
Each of them leads to different productions, using different methodologies and tools. The Episodes will be progressively assembled to compose the Atlas. Focusing on the living spaces in the Lemanic territory, the latter will explore and empirically test the theoretical hypotheses of the research, from which a critical reflection will follow. Based on a series of Episodes, forming the Atlas, it is possible that discoveries concerning the relations between living spaces and living people will appear during the research. Leading to the conception of the investigation of the territory as a critical gesture (Lemieux, 2012), a way of exploring, constructing, and questioning the territorial habitability.

Four Episodes of research

Arrangement - Collection - Expression - Reflection are presented successively below. Progressively carried out, this will not be without overlaps and back and forth. Complementary, an iterative process is foreseen to allow the Episodes to enrich themselves as the research progresses.

4. Conclusion

The originality of the work will be defended by the choices of putting in relation and assembling the Atlas. Guided by the research hypothesis, an inclusive vision of the territory will seek to explore the possibilities of a habitability for tomorrow. Superimposing diverse knowledge according to a strong hypothesis, the potentials of cartography will be approached through the search for new means of expression and representation to account for the unprecedented situation embodied by the socio-ecological transition.

The work of this research will be the subject of participation in seminars and/or the writing of scientific articles. Despite the chosen territory, of local influence, the strategy and method of research could be applied to an international reflection. Addressing contemporary themes and exploring cartographic practice, the attempts at assembling and representing proposed in this thesis will be relevant to other cases of study. Therefore, from a methodological point of view, the approach used could be used to analyze other case studies.
Indeed, the objective is to respond to the need to trigger a change of perspective on the territory, among other things by exploring new tools of description. Thus, contributing to the understanding,

theoretically and empirically, of the current conditions of habitability and potential co-habitability of cities and territories.

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SOUND DESIGN ANTHROPOLOGY AND "ECOSOUND"

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ABSTRACT:

"Acoustic ontology" characterizes the relationship we have with the world of sound, our world of sound being in the forefront, and that of the human tribe, the human community, being in the background. The word "ecosound", a neologism composed of the contraction of two terms "ecology" and "sound", refers to this paradigm. Since Schafer and his insights on the question of ecology, sound embraces the acoustic environment, through its notion of "amenity" (tuning), as an entire dimension in its own right and within which rethinking structurally the society can/must be done in relation to such acoustic reality. This acoustic reality constitutes a form of socio-economic engagement, with respect to health, norms and standards, and the environment, three areas of focus in design research. The role of sound design and its actors is therefore to monitor this question of a new "sound order", which we have defined as "ecosonic" and within which, our daily life is organized in different living spaces, in accordance with existing norms and standards and structural frameworks, as well as others yet to be established.

In anthropological terms, the architectural paradigm of harmonizing the living space and the environment is also in the ecological dynamics of the human project of "living together" where the living environment leads to finding the appropriate tools to produce and (to) reproduce, even limit the perimeter of our activities. The containment of sound is our destiny.

KEYWORDS: *Anthropocene, anthropology, ecosound, environment, sound design*

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INTRODUCTION

For the researcher, sound design is necessarily part of a multidisciplinary approach. This approach encompasses both design and sound and both terms are understood in their broadest sense. On the one hand, design itself integrates various activities that are linked to production: to produce is to "design" and to conceive is to "project" for specific-use purposes.
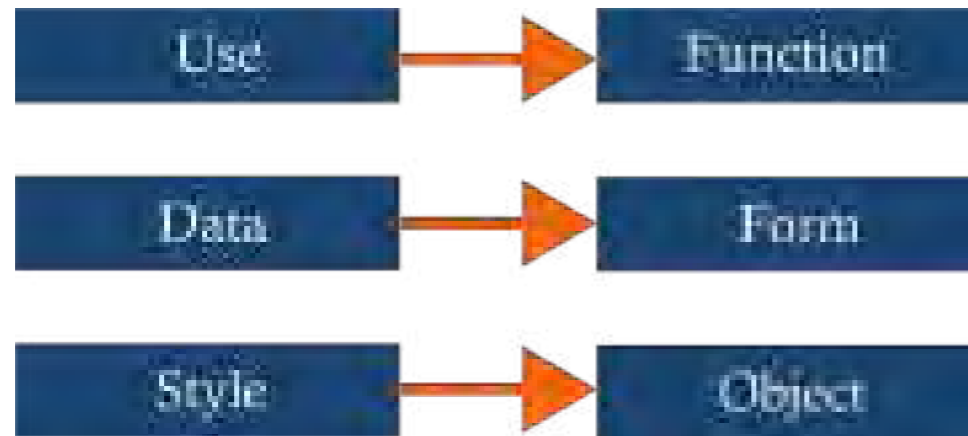
This is obviously a functional element which, in the first instance, answers the question "what is it for?" At a second stage, however, the term gradually evolved to include ergonomic and aesthetic criteria. For its part, sound, a physical phenomenon – an electromagnetic vibration - is a natural and omnipresent component of the universe within which human hearing unfolds.

When considering the anthropology of sound design, it is necessary to understand the study and the identification of all social activities integrating an intentional or unintentional sound dimension. This intentional or unintentional sound dimension can be direct or indirect, and on a principal or secondary basis. This sound dimension has a specific use, whatever it may be. Its purpose is precisely "to affect listening", human listening or animal listening or even other "targets", since sound can be used in other fields, such as extra-auditory medicine, physics and astrophysics.
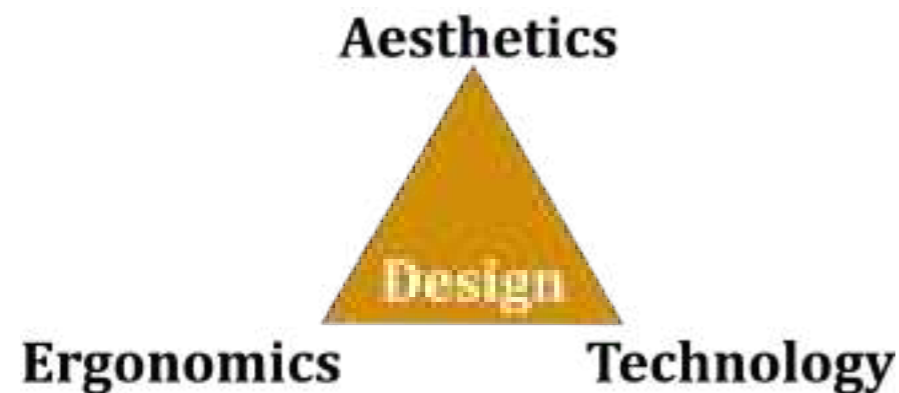
ANTHROPOLOGICAL CONTEXT

Within societal space, hearing holds a special place amongst our five senses. Sound existed before light, and most of the great religious stories translate this physical sequence, first the sound then the light (the photons). Sound is the first sense developed in humans; the fetus hears sound as early as the third month in the womb. Besides the fact that sound places man in a particular context, and even beyond the human condition, the experience by Pavlov (1899) has shown everyone that a dog can be trained to anticipate food by the sound of a bell.


Such reflective behavior can be applied in humans, where sensory, perceptual and cognitive organization takes place. The sphere of influence of sound is thus closely linked to the attractiveness of the hearing principle, which is exercised differently in different societies depending on the culture. We thus notice, in almost all civilizations in human history, similar practices of sound use. More particularly, with regard to large societies, such practices may be sacred, such as prayers sung during religious services; military practices, such as combat training or demonstrations of encouragement - army marches and/or the sound of weapons; socio-political, such as ceremonies, parties or hunting or economic, sound arrangements that influence our purchasing decisions. The (sound) service status associated with the design therefore relates to common objectives – with audible alarms, to provide acoustic support for instructions, to give signals for training or precision or to provide atmosphere or emotion, etc.

If sound can determine our behavior, it can also influence our listening skills in key sectors of societal organization. While depending on a particular case, it is always a question of capitalizing "attention" by means of sound with a strong identity, listening is often evaluated by opposition - loud/weak (intensity), high/low (frequency), short/long (duration) or more generally as "texture" (timbre) or dynamics (envelope). These basic properties form "listening criteria" for the common use of sound within any culture. 1 The open-mindedness of human sciences to the "sociology of sound" was initiated by Jonathan Sterne in his concept known as the "new sound modernity" (Sterne, 2003). Sounds in the human body, whether or not they are perceived, occupy a primary place in the medical field for example. In particular, sound can serve as evidence of its profound nature

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1   Sound oscillates between two antagonistic poles, noise on one side, music on the other. When a sound is perceived negatively, it can be improved, just as music can represent noise for those who cannot bear it.

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and of the subject's disorders. While all sound is made to be heard, the ordinary sound experience or "everyday soundtrack" is now a permanent object of multidisciplinary study in all areas of human life.
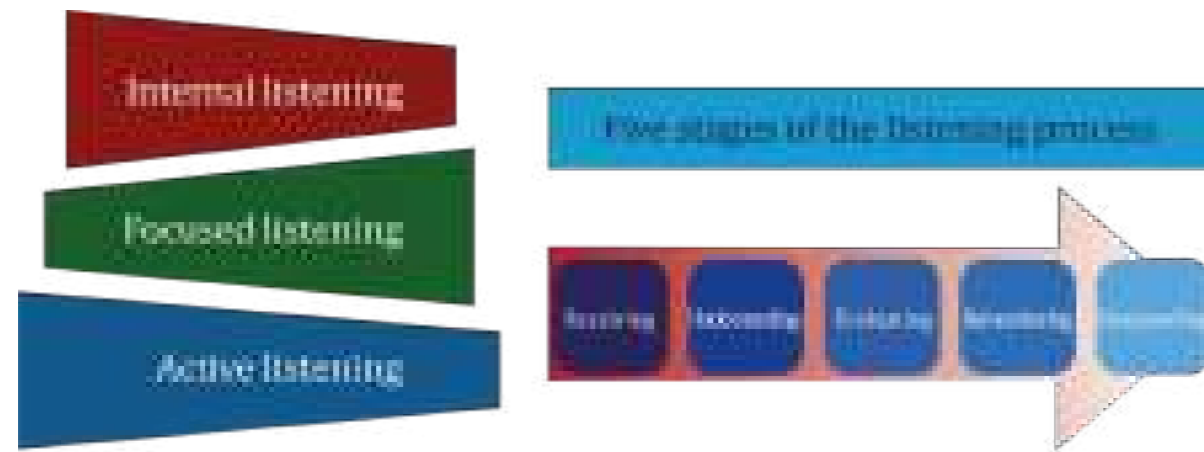
According to the current meaning, natural sounds, like the elements, are various noises linked to forces in action in a given place2 - and are different from artificial sounds, or sounds produced by man - movements, activities, communication, machines3. But listening is also "designing" the sounds we hear and make. The case of the creation of sounds, if it corresponds to an "artificialization" of sound, is only pertinent here if the sound artifact produced is made for "utilitarian purposes". If music has already been created for other purposes but is re-invested or re-instrumentalized, it remains the object of sound design, and this in order to respond to a functionality which is extrinsic to it4. We must therefore consider the societal issues according to our sound exposure in occupied spaces. Even beyond the "schizophonic5" (Shafer, 1977) aspect of prosthetic listening (with headphones) and which leads to immersion and a form of isolation with an asocial tendency, "schizophony" can then relate to the extreme acoustic confusion that arises in the inopportune use of sound on the scale of human relations, all orders combined.

SOUND USES

Among the issues raised in the project, in accordance with "listening requirements" contributing to presenting sound as a conveyer of audible meaning, the "transversality" specific to sound design meets the different criteria of sound according to its field of application - places of worship, ceremonies of all kinds, mobility, care, sound signage, and services. These fields, which are therefore associated with targeted practical utilities, give rise to "directed listening" situations, replacing the use of sound in the social space. This use of sound can be observed in production (artefacts) by sound

2   These natural, stochastic sounds are defined otherwise as Wind, Water and Birds (WWB).

3   This distinction, which can be kept as a convenient working hypothesis, poses a problem since it radically separates man from nature.

4   It is thus necessary to separate what can be separated and consider that the anthropology of sound design is interested more precisely in sounds created for this purpose (if not already used for something else): sounds "in the service of", for such "use", "sounds "as a message", sounds "in or for a specific environment".

5   Schafer writes: "by coining this term "schizophony" in the new soundscape, I wanted to underline the pathological character of the phenomenon. Close to schizophrenia, I used it with the same sense of aberration and cut off from reality».

professionals or sound practitioners with diversified professional profiles - engineers, acousticians, urban planners, sociologists, advertisers, therapists, musicians, designers and consumers.

In a "listening / meaning" transmission scheme, recorded sound is captured and is therefore available for manipulation and use outside of its own production. This aspect of being "captured" makes it intemporal and it is therefore accessible as potential audible capital to be exploited by the user, both "ready to use" and "in the service of" the user. On the anthropological level, this mediatization of sound has largely contributed to the emancipation of sound and to those of generalized practices of sound consumption that have become "commonplace". The consumption of sound can be a matter of listening to individual music, commercial broadcasting, sound signage, audible alarms, equipment or various objects.

On a broader societal level, even if these practices already existed, they were not even considered as professional design practices, such practices resulting from more general industrial or other design/manufacturing projects, such as crafts. The evolution of these practices is directly linked to those of reproduction / broadcasting technologies which are constantly renewing themselves through use and listening behavior (Savonardo, 2010).

FROM SOUNDSCAPE TO ECOSOUND

Sound places humans in a listening context within a given environment, which has been defined as "the soundscape". Murray Schafer, in his work "Tuning the World", was interested in "the study of the relationship of human beings with their acoustic environment" when he had founded with others from the end of the sixties, the World Soundscape Project's publications. The study of a specific "soundscape" highlights the "image" of the soundscape shaped by the perception of the listener. "Image" analysis is based on cognitive units such as foreground, background, outline, rhythm, space, density, volume, and silence. From these units were derived analytical concepts such as the "keynote", "signal", "sound imprint", "object and sound symbol".
Continuing the research in "ecological acoustics" ("sound ecology") undertaken by Murray Schafer in the 1970s, the expression "soundscape" thus indicates how the environment is understood by

those who live there. The individual listener in a "soundscape" is part of a dynamic information exchange system, which Barry Truax describes with the term "Acoustic Communication". Also, the soundscape ideology recognizes that when humans enter an environment, they have an immediate effect on sound; the soundscape is man-made and, in this sense, "composed". An interpretation which means that listening is selective, not only to adapt one's ear to the environment, but also as a physico-biological organ reacting to acoustic fluctuations coming from outside. Listening is both organizing the audible and communicating its meaning.
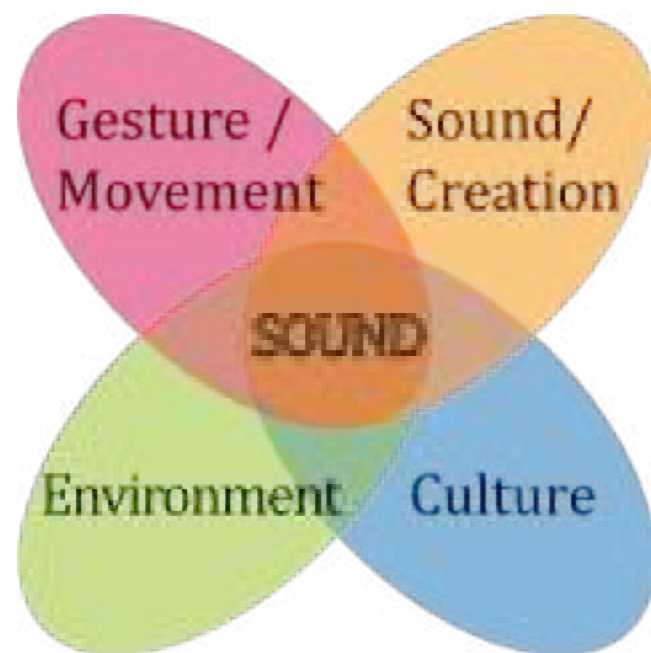
Resulting from the multimedia revolution, the digital instrumentalization of the sound world generates the "in betweenness" which has a direct influence on our auditory behavior, thus "artificialized". Steve Goodman (Goodman, 2012) and others like him, believe that the "hyper-industrialization" of contemporary society, since the advent of sound reproduction and obsessed by productivity on all sides, has generated a sound infection ("earworms", "audio viruses") with effects that are difficult to control, and by extension which affect the relationship of man with the living, the natural environment, as well as of man within societal structures. In the proclaimed era of the Anthropocene and ecological lobbies, haunted by the sacrosanct "organic" labels – such as biodiversity and bioacoustics - the distinction is made between a "hi-fi" perception of natural sound spaces and "lo-fi" artificial sound spaces. If this distinction is to remain relevant, it must integrate technological performances of the third industrial revolution known as digital, a new sound generation of intelligent "hyper-objects" endowed with empathy.

Insofar as these hyper-objects respond interactively to hidden algorithmic principles, often at the expense of their users, it is important to control their "effects" if we do not want to end up with a society where constant audio streams are crossing through constituting a form of noise pollution that will necessarily have to be arbitrated.

ECOSOUND

"Acoustic ontology" characterizes the relationship we have with the world of sound, ours at the forefront and that of the human tribe, the human community in the background. The word "ecosound", a neologism constructed from two terms "ecology" and "sound" refers to this paradigm. It means the harmonization or "ecognosis" (Morton, 2014) of sound with the surrounding environment. Though one should not consider the negative aspect of a "dark ecology", the latter nevertheless constitutes the starting point of any ecological consciousness in reference to the existential trauma that it can induce in a community "space.

Since Schafer and his insights on the question of ecology, sound embraces the acoustic environment through its notion of "amenity" (tuning), as an entire dimension and within which rethinking structurally the society can/must be done in relation to such acoustic reality. This acoustic reality constitutes a form of socio-economic engagement, with respect to health, norms and standards, and the environment, three areas of focus in design research. The role of sound design and its actors is therefore to monitor this question of a new "sound order", which we have defined as "ecosonic" and within which our daily life is organized according to different living spaces, in accordance with existing norms and standards and structural frameworks, as well as others yet to be established.


It is now proven that noise in workspaces, whatever its nature, impairs concentration and reduces work productivity accordingly. Studies made on open workspaces, initially created to promote synergy between employees of the same company, have shown that they significantly and paradoxically reduce the performance of the company by generating a quantity of noise pollution with distracting effects, leading to trade-offs with regard to other advantages of these particular environments (some workspaces must be open). While today there are tools for systematic analysis of the "home interior" for such measurements - sound level meters and sound-reputational surveys being the most common, acoustic engineering is most often limited to physical sound evaluations, rendering the issue of socio-acoustics a secondary factor. Now the task is that an "ecosound", in accordance with ecological requirements complying with the regulations in force, provided that a solution exists in reference to the tolerance of sound in place in various social practices, and which can act as an acoustic regulation of the environment for optimal acoustic quality. The management of ecosound can then take on different aspects - laws, decrees, standards, education, while respecting the diversity of protocols.

THE DESIGNER SOCIAL RESPONSIBILITY

"Design" (in the generic sense) can be the influential indicator of the acoustic environment, while man, plagued by doubts about his ecological condition, intends to rethink his future in light of the announced disasters. In anthropological terms, the architectural paradigm of harmonizing the living space and the environment is also in the ecological dynamics of the human project of "living

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together", where the living environment leads to finding the appropriate tools to produce and (to) reproduce, even limit the perimeter of our activities, the containment of sound being our destiny.
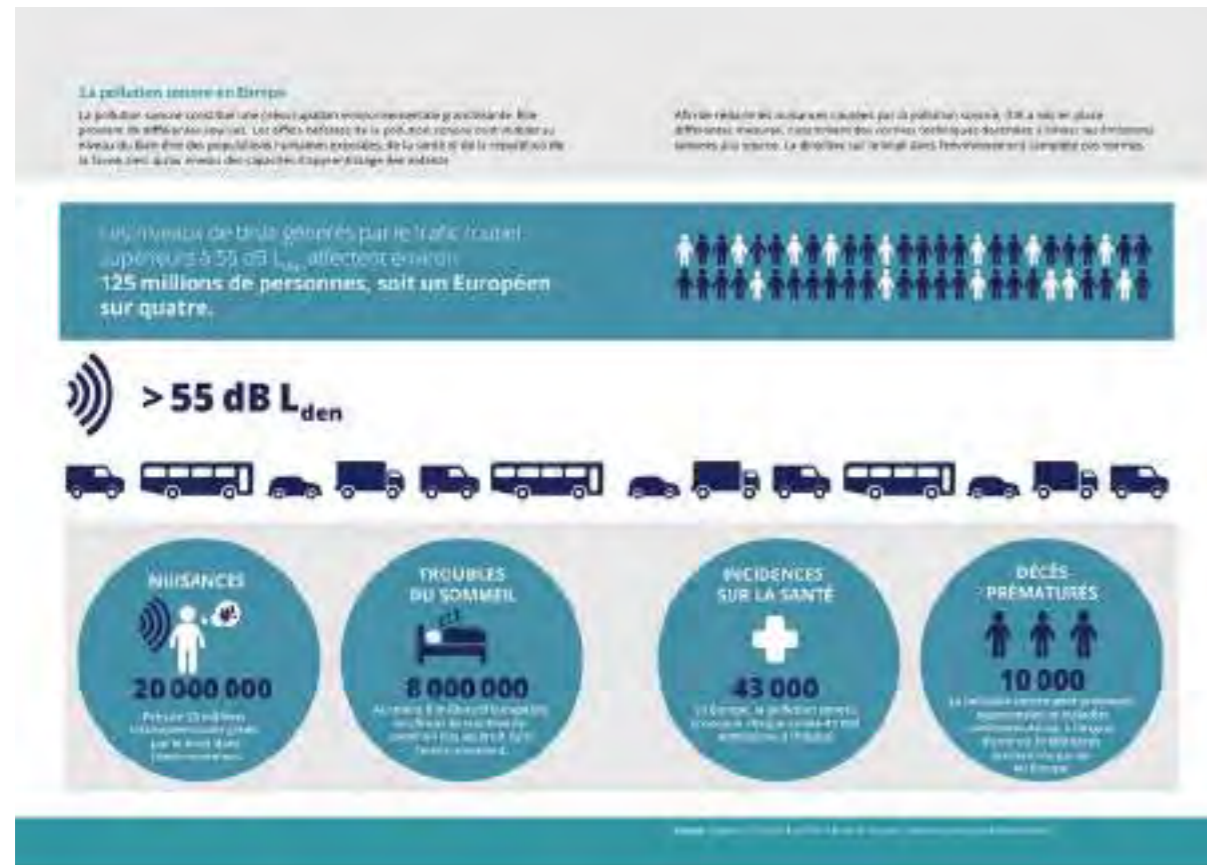
Victor Papanek in his book "Design for the real world" (Papanek, 1971) thus emphasizes the social responsibility of the designer in its various aspects - choice of materials, manufacturing methods, recycling... - which will become the bases of resilience in eco-friendly material. Today, the interaction between the human social system and the ecosystem leads any design project to a "responsible" action. Environment, product and sound service must therefore integrate this anthropological paradigm of sound design - give substance to sound by recomposing daily listening - at the risk of not being understood or accepted by the community and going against the current of uses, in any case, real "sound or not" needs. If there must be an eco-design, then there must be an "ecosound".

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