From urban research to planning and design

Strengthening cooperation between academia and practice

edited by ILARIA GEDDES and NADIA CHARALAMBOUS

UNIVERSITÀ

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Preface

Interdisciplinarity and Cross-Sectoral Collaboration in Urban Research, Planning and Design

Ilaria Geddes, Nadia Charalambous[1]

Contemporary cities stand at the crossroads of unprecedented challenges and opportunities. Rapid climate change, environmental degradation, mobility inefficiencies, resource inequities, and rising social inequalities pose complex and urgent problems for urban centres worldwide. Yet, within this complexity lies the potential for innovation, collective action, and sustainable transformation. Urban research, planning, and design are uniquely positioned to address these challenges, offering solutions that mitigate environmental burdens, promote social equity, and enhance the quality of life for urban residents.

The joint KAEBUP – 3rd CyNUM Regional Conference, hosted by the University of Cyprus from 6th to 8th December 2023, acted as an opportunity to bring together academics and practitioners from both the private and public sectors to exchange knowledge and explore ways for strengthening collaboration to tackle urban challenges collectively. This cooperative effort was reflected in the shared organization of the conference mobilizing the international research project Knowledge Alliance for Evidence-Based Urban Practices (KAEBUP) and the local scientific group Cyprus Network of Urban Morphology (CyNUM). The interaction between the two meant that the conference offered a breadth of perspectives, building upon the strong theoretical foundations of urban morphology to explore how scientific evidence can be integrated into education that is relevant for the profession and in successful practices which must deliver sustainable urban environments.

The conference featured twelve keynote speakers, who delivered plenary lectures or acted as discussants in round tables, and whom we deeply thank for their participation: Ed Parham (Space Syntax Limited), Mark David Major (Abu Dhabi University), Oya Atalay Franck (European Association of Architectural Education), Ruth Schagemann (Architects Council of Europe), Giuseppe Strappa (ISUF Italy), Achilleas Kalopedis (ALA Planning Partnership), Howayda Al-Harithy (American University of Beirut), Lora Nicolaou (Frederick University), Marco Maretto (University of Parma), Laurent Antonczak (RMIT Vietnam), Vitor Oliveira (University of Porto), and Wafa Al-Ghatam (University of Bahrain).

The sessions were grouped into seven thematic areas:

1. Theory and concepts of evidence-based design: the history of Evidence-Based Design (EBD) and how it has been adapted to urban design and planning; conceptual models of EBD; issues in the interpretation and the translation of research findings for practice.
2. Emerging research methodologies for application in urban planning and design: recent tools and methods created within academia or practice for application in design and planning processes.

1. Society and Urban Form (SURF) Research Lab, Department of Architecture, University of Cyprus.

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3. The role of urban morphology in evidence-based design and planning: 'traditional' morphological approaches (historico-geographical, process-typology, space syntax) and their role in Evidence-Based Design and Planning (EBDP); evaluations and discussions of their uptake, effectiveness, and success in professional practice.
4. Evidence-based design and planning in the Eastern Mediterranean and the Middle East (EMME) region: the extent of the application of EBDP in different design and planning contexts in the region; progress in engaging industry and public sector agencies in the uptake of EBDP in the region.
5. Case studies of research methods applied in professional practice: examples of specific applications of research methods and tools used in real projects to produce design and planning outputs; successful examples as well as challenging projects to reflect on; case studies from any geographical areas and the EMME region, in particular.
6. The evidence from participation in design: the role of the public, NGOs and civil society in planning and design, creating knowledge from participation for the purposes of sustainable and inclusive planning and design, the value of different types of knowledge (from experience, practice, know-how, etc.) in EBD.
7. In memory of Professor Robert Saliba: The urban form of Beirut: the historic formation and transformation of Beirut; tradition and modernity in the urban form and architecture of Beirut; city-planning for post-war reconstruction, and contemporary urban design in Beirut and the Arab World.

The proceedings of this conference reflect the shared ambition of academics and practitioners to strengthen cooperation to tackle pressing urban issues. Evidence-Based Design and Planning (EBDP) served as the central focus of this collaboration, providing rigorous analytical frameworks that complement traditional intuition-led design processes. By integrating robust data gathering, advanced methodologies, and interdisciplinary perspectives, EBDP equips urban professionals with the tools necessary to evaluate and implement effective, sustainable solutions for the built environment.

This conference emerged from a recognition that, despite the growing need for evidence-based practices, significant challenges persist to the flow of knowledge between academic research and professional practice, and vice versa. While higher education institutions across Europe and beyond are increasingly incorporating EBDP into their curricula, there remain barriers and challenges to its integration into daily professional work. Similarly, while a few pioneering firms have successfully embedded evidence-based methods into their operations, stronger links between academia, businesses, and public agencies are essential to scale these successes.

The themes explored in this conference span the theoretical foundations of EBDP, emerging methodologies, and practical applications across diverse urban contexts, with a particular focus on the Eastern Mediterranean and Middle East (EMME) region, including contributions to these proceedings from Cyprus, Abu Dhabi, Bahrain, Egypt an Iran. From historical urban morphology, the integration of new technologies and urban regeneration strategies, to participatory design processes that amplify the voices of civil society, and critical insights into planning practice, these proceedings illustrate the potential of EBDP to create innovative, inclusive, and sustainable urban environments.

By bringing together academics and practitioners from around the world, the conference fostered a platform for mutual learning and collaboration. It emphasized the value of blending research-driven insights with practical expertise and know-how to address shared challenges such as urban densification, mobility, climate resilience, and heritage preservation. The case studies, conceptual explorations, and methodological advancements presented

here demonstrate how EBDP can bridge the gap between theory and practice, transforming abstract knowledge into actionable strategies.

Together, the papers in this collection, exemplify the dynamic relationship between research and practice in urban planning and design. The contributors address both theoretical frameworks and practical methodologies, advancing evidence-based approaches to urban challenges. The range of topics – from space syntax theory to the historical and morphological study of urban settlements and participatory design – demonstrates the breadth of issues and contexts in which urban planning and design intersect with research. The topics addressed reflect contemporary challenges and advancements in urban theory and practice, with a particular focus on the integration of new technologies, historical context, and urban regeneration strategies, examining the role of urban form and policy in shaping public space, human experiences, and the socio-cultural fabric of cities.

Each paper demonstrates a commitment to evidence-based approaches that rely on rigorous data collection, analysis, and interdisciplinary collaboration: their strong theoretical foundations combined with practical methodologies and sensitive contextualisation underscore the importance of critical thinking and interdisciplinarity in addressing contemporary urban challenges, from sustainability and resilience to social equity and historical preservation.

In sum, the papers in these proceedings contribute to the ongoing dialogue between academia and practice, emphasizing the importance of evidence-based methodologies, interdisciplinary collaboration, and the integration of historical and contextual knowledge in urban planning. The insights and frameworks presented here are valuable for addressing the pressing urban challenges of today and for fostering more sustainable, resilient, and inclusive urban environments in the future.

As editors of these proceedings, we extend our gratitude to the contributors for their diverse perspectives, to the organizing committee and Easy Conferences for their dedication to delivering a successful conference and to the scientific committee for devoting their time to the review process. We hope this volume inspires continued collaboration and innovation, driving forward the pursuit of urban environments that are resilient, equitable, and human-centered.

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Leveraging Cross-Sector Expertise for Transformative Urban Education and Practice

The KAEBUP Project

Nadia Charalambous, Ilaria Geddes[1]

1. The Knowledge Alliance for Evidence-Based Urban Practices (KAEBUP)

The Knowledge Alliance for Evidence-Based Urban Practices (KAEBUP) set out to develop an international educational and training model that enables participants to engage directly with professional environments. Its central aim was to demonstrate how research can serve as the foundation for innovative professional practices, and to explore what businesses in the fields of planning, architecture, and urban design require from academia. Across Europe, forward-looking enterprises are increasingly integrating research outputs into their core practice to address urgent urban challenges such as sustainability, mobility, public health, and social cohesion. These evidence-based approaches are becoming essential tools for designers and public authorities striving to achieve more effective and sustainable urban outcomes.

KAEBUP brought together higher education institutions (HEIs), non-governmental organizations (NGOs), and enterprises from various European cities. All partners shared a strong commitment to evidence-based design and a mutual interest in strengthening the interface between academia and business. This collaboration was instrumental in addressing current societal and educational needs, while also contributing to the development of future-oriented educational systems. The project sought to equip students with the skills required to thrive in professional contexts and to inspire academic staff to innovate in both teaching and research through closer ties with practice.

KAEBUP's objectives were pursued through three interrelated 'pathways to evidence-based urban practice':

1. Innovating learning and teaching by promoting knowledge exchange and transversal skills development through real-life urban projects.
2. Understanding and developing business models that support evidence-based urban practices.
3. Co-creating urban knowledge via multiple modes of collaboration and mutual learning involving students, academic staff, and professionals.

Throughout its implementation, KAEBUP fostered entrepreneurial mindsets among students and academic staff, while enhancing businesses' access to research knowledge and improving communication between the academic and professional spheres. The Alliance produced tangible and transferable results, especially in relation to curricu-

1. Society and Urban Form (SURF) Research Lab, Department of Architecture, University of Cyprus.

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lum innovation and the promotion of transversal skills critical to contemporary urban practice.

KAEBUP's activities addressed its ambitions through a series of interconnected initiatives that combined education, research, entrepreneurship, and dissemination. These included three international training workshops and student internships, which innovated learning and teaching by engaging participants directly with professional practices and real-world urban challenges. A comprehensive literature review, alongside interviews with professionals and two dedicated professional development sessions, mapped the potential of research-informed practice and explored the business models underpinning successful evidence-based urban practices. Three Business Model Workshops fostered entrepreneurial thinking among students and staff in architecture and urban design, culminating in a portfolio of tailored business models. Collaborative Learning Activities through the Research to Practice Platform (R2P) supported blended learning and enabled the co-creation of a critical mass of knowledge through open educational resources.

In addition, the project developed an online, open-access module on "Social Entrepreneurship and Evidence-Based Design for Sustainable Urban Development", which introduced a learning progression that integrated key stages of entrepreneurial thinking with evidence-based approaches to urban issues. Finally, a wide range of dissemination activities – including webinars, round table discussions, capacity-building events, conference presentations, research publications, and the organization of academic and professional conferences – played a vital role in initiating communities of practice and promoting the exchange of knowledge and best practices across diverse sectors and national contexts.

2. Innovating learning and teaching in urban planning and design

At the heart of KAEBUP was the ambition to reimagine and enrich the way urban planning and design are taught and learned. Through the integration of practice-based learning, entrepreneurial thinking, and collaborative pedagogy, the project developed and tested a new pedagogic model that bridges academic knowledge with the realities of professional urban practice.

A New Pedagogic Model

The pedagogic model developed by KAEBUP is grounded in co-creation, interdisciplinarity, and knowledge exchange between academia and practice. It moves beyond traditional classroom-based instruction to promote situated, collaborative learning, where students, educators, and practitioners come together to tackle real-world urban challenges. Central to this model (figure 1) is the belief that students should not only acquire knowledge but actively participate in its production – through research, experimentation, and reflection. This model emphasizes flexibility, responsiveness to context, and an iterative learning process that mirrors the complexity of contemporary urban practice.

Transversal Skills

KAEBUP placed a strong emphasis on transversal skills – those competencies that are transferable across disciplines and professional settings. These include critical thinking, collaboration, communication, adaptability, and problem-solving. By engaging with real-life projects and working in interdisciplinary teams, students were exposed to diverse perspectives and learned to navigate complex social, environmental, and institutional settings. These skills were further reinforced through mentorship by professionals and researchers, who modeled reflective and adaptive approaches to urban challenges.

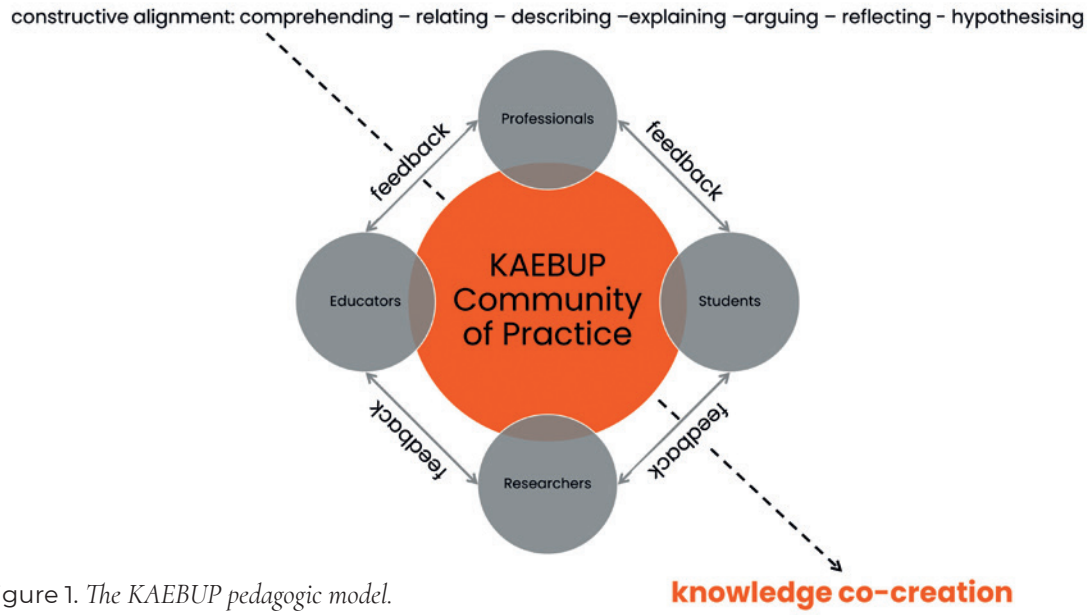

Figure 1. *The KAEBUP pedagogic model.*

Real-Life Urban Projects

One of the key innovations of KAEBUP's approach was the direct engagement of students with real-life urban projects in different cities. These projects served as living laboratories, where students could apply theoretical knowledge to concrete problems, test out research methodologies, and interact with stakeholders. The learning was experiential, hands-on, and deeply contextual. Students worked on issues ranging from urban regeneration and mobility planning to ecological infrastructure and inclusive public spaces. This engagement enhanced their ability to navigate real-world constraints while also encouraging them to propose innovative, research-informed solutions.

Entrepreneurship

KAEBUP also aimed to nurture an entrepreneurial mindset among students and staff. Rather than viewing entrepreneurship solely in commercial terms, the project promoted a broader understanding that includes social innovation, value creation, and proactive engagement with urban challenges. Through the Business Model Workshops, the online module on Social Entrepreneurship and Evidence-Based Design, and direct interaction with practicing professionals, participants were encouraged to envision new roles for themselves – not only as future employees but as initiators of change, founders of practices, or leaders of community-based initiatives. This orientation was designed to empower participants to shape their professional paths and contribute to more sustainable and inclusive urban futures.

3. Business Models for Evidence-Based Urban Practices

3.1. *Market Opportunities for Evidence-Based Urban Practices*

The report on market opportunities for evidence-based urban practices was developed to deepen our understanding of how research is – or could be – adopted in the professional fields of architecture, urban design, and planning. It served not only as a foundation for the subsequent development of business models within KAEBUP, but also as a resource to guide the design of future workshops, learning modules, and strategic collaborations between aca-

demia and practice. At its core, the report explores what drives the uptake of evidence-based design (EBD) in professional settings, and where the barriers, gaps, and possibilities for innovation lie.

Drawing on a combination of literature review, survey data, and in-depth interviews with project partners, the report reveals that the integration of research into design practice depends on two key enablers: skills and strategic orientation. On the one hand, the presence of specific research skills – ranging from data analysis and evaluation to participatory methods and critical reflection – is essential. On the other, the successful adoption of EBD requires a more deliberate and forward-looking business strategy, where research becomes not an add-on but a central driver of value, innovation, and competitiveness.

Despite growing interest, the report highlights several persistent challenges. Many practitioners expressed concern over the additional time, costs, and resources required to engage with research, often noting that clients are hesitant to pay for services perceived as ancillary to design. This signals the need for operational models that can embed research more seamlessly into existing workflows. At the same time, there is a broader issue of knowledge management: much of the expertise within design firms remains tacit, experiential, and siloed within project teams. Without systematic processes for knowledge transfer and codification, it becomes difficult to build on previous learning or scale research-informed practices across an organization.

To address these challenges, the report introduces concepts such as *lean management* and *agile methodologies* as particularly relevant to the design disciplines. Borrowed from manufacturing and software development, these approaches provide tools to streamline operations, reduce waste, and iterate on ideas through structured experimentation. When adapted to design contexts, they can support firms in making research more actionable and sustainable – both economically and organisationally. For instance, lean principles can help clarify value to clients, eliminate inefficiencies, and encourage meaningful knowledge sharing, while agile practices can promote adaptability, team collaboration, and better stakeholder engagement throughout a project lifecycle.

Beyond these methodological insights, the report also surfaces deeper structural considerations. The extent to which a practice adopts EBD often correlates with its size, specialization, client base, and access to external funding. Firms that already operate in complex, multi-stakeholder environments – or that are committed to innovation – are more likely to invest in systematic research. For smaller or less resourced offices, however, the perceived risk and effort remain high. In this context, the role of higher education institutions becomes particularly important: not only to train future practitioners in relevant research methods, but to provide accessible knowledge, tools, and partnerships that help bridge the gap between theory and application.

Among the outputs of the report is a series of *definition cards* – clear, concise explanations of core concepts and practices related to EBD – which can serve as tools for teaching, collaboration, and dissemination. These, along with visual frameworks such as PEST and SWOT analyses, offer firms a way to self-assess their readiness to adopt evidence-based approaches and identify strategic opportunities for innovation.

Ultimately, the report positions evidence-based urban practice as more than a technical enhancement – it is a strategic imperative. In an increasingly complex urban landscape shaped by environmental, social, and economic pressures, the capacity to ground decisions in rigorous, contextualised knowledge is emerging as a key differentiator. For practices willing to engage with research proactively, EBD offers not only new forms of value creation, but a route to resilience, relevance, and long-term impact.

3.2. *Portfolio of Business Models for Evidence-Based Urban Practices*

Alongside the market opportunities report, KAEBUP developed a comprehensive Portfolio of Business Models for Evidence-Based Urban Practices (EBUPs), complemented by a litera-

ture review on research start-ups, entrepreneurial frameworks, and social innovation in the built environment. Together, these resources offer both theoretical grounding and practical guidance for supporting the emergence and sustainability of evidence-based practices across architecture, planning, and urban design. They also provide insights that can inform the reform of higher education curricula, particularly in regard to entrepreneurship, research integration, and industry collaboration.

The portfolio was created through a comparative investigation of architectural and urban design firms and organisations operating across Europe and Cyprus. Despite notable differences in size, mission, and service focus, these EBUPs exhibited significant similarities in the structure of their teams, their relationship with clients, and the role of research within their workflows. Some firms primarily provided consultancy services, others were focused on small- and medium-scale design projects, while a few dealt with more complex, large-scale developments. Additionally, NGOs within the sample adopted a more hybrid approach, engaging in both design practice and research-led public initiatives.

Across the board, these organisations shared a strong emphasis on client satisfaction, high-quality project delivery, and the importance of professional reputation – factors that were seen as critical for securing future work and sustaining business growth. Salaries emerged as the primary operational cost across firms, underscoring the need for effective resource planning in service-based industries.

A major insight from the research was the extent to which research activities vary depending on internal factors, such as a firm's value proposition and project scale, and external conditions, such as regulatory frameworks and access to funding. In smaller firms, research was often informal and closely tied to practical needs such as permit acquisition, site analysis, or material selection. In larger firms and NGOs, however, research was more systematically embedded within their value proposition – sometimes as part of their competitive edge or strategic differentiation.

Several practices highlighted the potential of external funding and academic partnerships in supporting more structured research activities. In some cases, such collaborations allowed for the integration of simulations, post-occupancy evaluations, and participatory methods into ongoing design processes – transforming research from an add-on into an intrinsic element of service delivery. However, the report also noted the persistent challenges faced by firms: limited time, resources, and often a lack of client willingness to pay for research-intensive approaches.

From this comparative analysis, a series of insights were drawn that can inform both sustainable business model development and curriculum innovation in architecture and urban design education. These include the need to: integrate research into the value proposition of a firm, enabling clearer communication of added value to clients; identify diverse revenue streams by reframing architectural services as products (e.g., site assessments, evaluation reports, pre- and post-design analyses); implement knowledge management strategies to make tacit, project-based knowledge more transferable across teams and contexts; teach students a broad spectrum of research methods relevant to design practice, from legal and environmental analysis to simulation tools; promote academic-industry-government collaboration through research projects, empowering students and professionals to contribute to policy change and institutional reform.

Some firms already demonstrated creative approaches to revenue diversification – for example, one practice made use of part of its office space for short-term rentals to supplement income. Others invested in research and development hours, recognizing that such investments would position them more competitively in the long term.

The report also underlined the necessity of framing research not as a burden but as a value-generating process that improves design quality, operational efficiency, and long-term

resilience. By equipping graduates with both entrepreneurial thinking and an understanding of how research adds value to practice, higher education institutions can play a transformative role in shaping a new generation of socially engaged and market-savvy professionals.

Ultimately, this portfolio – alongside its accompanying literature review – serves not only as a practical tool for businesses but as a pedagogical and strategic resource. It supports the scaling, replication, and upskilling of innovative design practices across Europe and contributes to the broader mission of embedding evidence-based approaches in both the professional and educational landscapes.

4. Co-creating Urban Knowledge Through Real-Life Case Studies

One of KAEBUP's most significant contributions lies in its capacity to foster the co-creation of urban knowledge through an integrated model of teaching, learning, and research. At the core of this approach was the active involvement of students, interns, academic staff, and professional practitioners in real-life case studies, forming temporary but highly productive knowledge alliances around pressing urban issues. These activities did not merely simulate professional scenarios – they directly engaged with real urban challenges and professional projects, thus offering a situated, practice-oriented environment for knowledge production.

Across different contexts and project scales, KAEBUP facilitated the exploration of a wide range of research questions, developed collaboratively by learners and professionals. This resulted in a substantial volume of original findings and analytical outcomes, extending from spatial diagnostics to post-occupancy evaluations. Notably, the process led to the creation of a transferable and methodologically grounded tool: the Sustainability Toolkit for the Assessment of Master Plans (STAMP). STAMP is a structured evaluative instrument designed to assess master plan proposals against defined sustainability goals. It is one of KAEBUP's most significant methodological innovations, emerging from the iterative and collaborative engagement between academia and practice.

The diversity and depth of the findings reflect both the richness of the co-creation process, and the complexity of the contexts addressed. In the case of the Ministry of Municipal and Rural Affairs (MoMRA) in Riyadh, for instance, research explored how the building design impacts site accessibility, urban integration, and climate responsiveness at the block level – critical issues in a city facing rapid urbanisation and environmental stress. In the case of the masterplan for Verengaria, the site of former British military barracks in Limassol, Cyprus, the STAMP tool was tested in both academic and professional settings, offering quantitative evidence that allowed consultants to assess the performance of different planning iterations against their sustainability objectives.

In the case of Solar da Avenida, in Porto, Portugal, students conducted a post-occupancy evaluation of a heritage building renovation, analysing its performance in light of local tourism pressures, conservation guidelines, and regulatory frameworks. Their findings not only validated the design team's approach but also demonstrated the potential of research-informed evaluations to support replicable strategies in heritage-sensitive urban contexts.

In the neighborhood of Martinovka in Zagreb, Croatia, collaborative activities revealed a critical gap between planning intentions and the lived experience of the local community. Through community engagement and transdisciplinary research, learners uncovered narratives and spatial practices that had been overlooked in formal planning processes. This case exemplifies the power of co-creation to uncover situated knowledge, enabling planning practices to become more responsive to social realities and everyday needs.

While the quality of outputs varied – unsurprisingly given the diversity in students' levels, institutional settings, and constraints such as time or remote participation – an internal review

process, involving the project's Quality Assurance Committee and feedback from academic and professional mentors, ensured that the most robust and relevant outcomes were identified and included in the portfolio of project research findings. These represent not only meaningful academic exercises but also valuable contributions to practice, particularly in their capacity to generate knowledge that was not previously available to the designers of the case studies.

Importantly, although these activities often took place retrospectively, after the main phases of the design or planning process had been completed, the knowledge produced remains relevant and applicable. Many of the professionals involved continue to work on related projects or within the same geographical contexts, meaning that the tools, insights, and reflections generated through KAEBUP will likely influence future planning and design adaptations. Moreover, the process demonstrated how educational and research collaborations can retroactively strengthen professional practice, offering analytical clarity and validation that may shape subsequent decision-making.

This experience of co-creation also underscores the transferability and adaptability of the research tools and methods developed through KAEBUP. Their application across diverse geographical contexts, project types, and institutional settings revealed their potential not only to enrich education and research but to directly support practitioners in refining design outcomes, aligning with client expectations, and navigating regulatory frameworks. The learning gained through these collaborative engagements illustrates how academia and practice, when meaningfully intertwined, can produce forms of knowledge that are contextual, actionable, and future-oriented.

In sum, KAEBUP's co-creation model did more than provide a framework for experiential learning – it actively produced urban knowledge of professional value. Through real-life case studies, students and researchers became contributors to the urban knowledge ecosystem, supporting a more reflective, informed, and collaborative form of design and planning. This legacy of co-created knowledge not only serves present stakeholders but has established a foundation for ongoing dialogue, tool development, and curriculum innovation within and beyond the lifespan of the project.

5. Concluding Thoughts: Reflections and Future Directions

The KAEBUP project has illustrated the powerful role that European collaboration can play in advancing research-led, practice-oriented, and entrepreneurship-driven models of education in architecture, urban planning, and design. By bringing together higher education institutions, professional practitioners, NGOs, and enterprises from across Europe, the project established a dynamic framework for knowledge exchange, pedagogical innovation, and real-world experimentation that produced tangible results at multiple levels.

At the core of KAEBUP's achievements was its ability to foster the co-creation of urban knowledge through real-life case studies. These collaborative engagements between students, academic staff, and practitioners generated a significant body of research and insight, including the development of new analytical tools such as the STAMP toolkit. The collaborative model proved especially effective in revealing contextual knowledge that had previously been unavailable to the designers or stakeholders of the projects under study, validating the importance of embedding research and education in practice. The results of these activities were not only relevant at the time but are also expected to inform future planning and design work within the same contexts, attesting to their lasting value.

European cooperation was central to the success of the project. The diversity of expertise across the partner institutions enabled the exchange of knowledge that would have been inaccessible within national or disciplinary silos. Institutions specializing in different methods and

pedagogical traditions were able to learn from each other and co-develop new curricular content and approaches. This was evident in the design and implementation of international training workshops, professional development sessions, and the development of blended learning activities. These efforts were instrumental in building a shared educational infrastructure supported by open educational resources, remote collaboration tools, and cross-institutional peer learning.

Moreover, the mobility of students and staff across countries offered direct exposure to new urban contexts, cultures, and design challenges, encouraging reflexivity and global citizenship. Participants developed transversal competencies such as digital and media literacy, intercultural communication, and adaptive problem-solving by working in unfamiliar settings and through interdisciplinary collaboration. The project also enabled institutions to leverage their previous experiences in EU-funded initiatives, while feeding KAEBUP's outputs back into national and European-level research, education, and innovation ecosystems.

Another core contribution of the project was the advancement of entrepreneurial thinking in urban disciplines. By conducting an in-depth exploration of market opportunities for evidence-based urban practices, and developing a portfolio of sustainable business models, KAEBUP helped define how research can be embedded into the operational and strategic dimensions of professional practice. It showed how firms can incorporate research not simply as an auxiliary function but as a value proposition that enhances service quality, client relationships, and long-term competitiveness. This also proved beneficial for academic staff and students, many of whom gained a clearer understanding of how research and entrepreneurship can coexist and reinforce one another in the professional world.

Among the successes of the project was the creation of a robust network of academic and professional actors committed to evidence-based design, the production of high-quality and openly accessible educational tools, and the facilitation of meaningful learning experiences that bridged theory and practice. These outcomes not only fulfilled the goals of the project but also positioned KAEBUP as a model for future knowledge alliances.

Nevertheless, the project also revealed areas for improvement. The diversity in participants' academic levels and access to resources led to a range of output quality, particularly in student-led research activities. While this variability is to some extent inherent in experiential learning environments, it underscores the importance of providing clearer scaffolding, consistent feedback mechanisms, and more structured support, especially in transnational and interdisciplinary settings. In addition, while the partnerships formed were productive and mutually beneficial, ensuring their sustainability beyond the project's lifespan remains a challenge. More robust institutional anchoring and long-term strategies for collaboration would strengthen the durability of these networks.

Looking into the future, the outputs and methods developed by KAEBUP offer fertile ground for further development. The Research to Practice (R2P) platform, the STAMP toolkit, and the online module on social entrepreneurship all have the potential to become permanent educational assets. The integration of these tools and methods into bachelor's and master's programmes could help formalise the innovations piloted during the project. Moreover, the involvement of KAEBUP's findings in new initiatives such as the TWIN2EXPAND project, funded by Horizon Europe, suggests that the project's legacy will continue to evolve and influence research and education in evidence-based urban practice.

Ultimately, KAEBUP has shown that when higher education institutions, professional enterprises, and public organisations work together across borders, they can co-create new knowledge and capabilities that address the complex challenges of urbanisation in a globalised world. The project not only fostered a new generation of urban thinkers and practitioners but also contributed to building a shared European space for innovation in architectural and urban education – one grounded in research, collaboration, and a commitment to social and environmental relevance.

That Which Endures: A Myriad of City Building, A Half-Century of Space Syntax

A Keynote Address to the KAEBUP Final Event/3rd CyNUM Regional Conference

Mark David Major[1]

Abstract: We have been building sustainable, resilient cities for a long time. We know what they look like because they are all around us. We require more critical thought for – and less passion about – our cities today, using evidence-based design and planning. In this regard, fifty years of research and practical applications demonstrate that space syntax theory and methods work because the basis of its representations is us, i.e., people. It is one means of providing evidence-based design and planning tools to objectively measure and discuss the dual nature of our cities as physical and social things. Today, tools like Artificial Intelligence (AI) offer new ways to derive design solutions for settlements. However, they remain a helpful supplement, requiring human intervention and critical thinking to develop sustainable and resilient city solutions. We must guard against muddling those solutions because AI tools are not evidence-based or science.

Keywords: Artificial Intelligence, Resilience, Space Syntax, Sustainability, Urbanism.

Introduction

For evidence-based design and planning in human settlements, we must remain studious, rigorous, and attentive to where we have been in the past, where we are today, and where we are going in the future. It is frequently a mistake to allow tunnel vision – concentrating entirely on achieving a particular aim, usually profit and publicity, and not noticing or considering anything else, especially people and their needs – about some short-term concern or a narrow local perspective to obscure the strengths already present in the universal forms underlying human settlements for thousands of years worldwide. Sometimes, when we do so, it causes us to lose sight of what is valuable in favor of what is profitable or, at the very least, perceived as less costly in the short term. Settlements are not about profit or cost. These things are a notable feature of the capitalistic societies dominating the global economy since the end of World War II, especially after the collapse of most communist governments in the 1990s. Our settlements are about people. We are the ones who live, work, and play in them. In the 20th century, we often lost sight of this fundamental quality of cities and towns. In many ways, we are still trying to recover from the failed urban fallacies of Modernism. Governments and town planners have favored low-density built forms and technological solutions, especially suburban sprawl and the automobile, originally intended to supplement the city's quality of life and social mobility. Instead, they have dramatically transformed the city into a concrete landscape, isolating people in manicured enclaves and destroying the

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civic life of the public square. The explicit and implicit goal has been planning to move vehicles and goods at tremendous speed in a globalized world. Things occupied the center of city design and planning, displacing the subject that should be at its heart, i.e., people.

This paper will briefly take a step back from the latest fashionable debates in architecture, urban design, and town planning in an increasingly fractionalized political world seemingly desperate for solutions. We will take account of 'where we are' after more than ten thousand years of building settlements. The now-obsolete origins of the Ancient Greek root (*murti*) of the word 'myriad' in the title of this paper means '10,000' (Source: Oxford English Dictionary). We will then take stock of 'where we are' today after a half-century of evidence-based research and design and planning solutions based on space syntax theory and methodology. Space syntax is a worldwide research program of academics and practitioners investigating the role of built space as a product of (and influence on) society. Different people mark differently the beginning point of space syntax. However, the author points to the 1973 publication of Hillier and Leaman's "The man-environment paradigm and its paradoxes" in *Architectural Design* as its starting point, since this article lays out the problem definition and aim of space syntax to challenge and change the prevailing paradigm at the time – Modernism as indoctrinated via CIAM – about the built environment, i.e., how we think and see our architecture and cities. Finally, the paper will turn back to the latest fashionable debate about Artificial Intelligence (AI) to discuss 'where we are going' in the future. AI is the theory and development of computer systems using intelligent machines or software that can perform tasks usually requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages (Source: Oxford English Dictionary/Wikipedia). The paper conducts a simple exploratory exercise to test the underlying assumptions of generative AI software. The goal is to begin to understand AI's possibilities and limitations for designing future settlements. It is not intended to be an exhaustive exercise but merely to learn how we might begin with this startlingly innovative technology in the search for answers and, perhaps, new questions.

The argument of the paper is a simple one. We have been building settlements for more than ten thousand years. There are many cities older than two millennia, some more than five, in the world today. These are sustainable, resilient cities because they are proven to endure, adapt, and evolve over time. In the past half-century, space syntax has developed an extensive research profile, helping us to understand why such cities endure via the construction of the social logic of space (Hillier & Hanson, 1984). Space syntax theory has evolved concepts to help us deal with the 'myriad of complexities' in cities by anchoring our questions – and evolving evidence-based design and planning solutions – in the physical construction of built space. In this sense, the word 'myriad' is used in its more contemporary setting, i.e., a countless or considerable number of people or things (Source: Oxford English Dictionary). Finally, we argue that AI is still only a tool, like any other, to help us design and plan our cities in the future. However, so far, AI lacks the capacity for critical thinking that architects, urban designers, and town planners bring to the city's problems today, even if we sometimes deploy those faculties to address the surface symptoms of a problem instead of using them to adequately understand its substance in depth.

2. We Know How to Build Sustainable, Resilient Settlements

Based on the oldest dated archaeological remains in the world today, Göbekli Tepe ('Potbelly Hill' in Turkish) in modern-day Anatolia of Turkey, we have been building settlements for at least eleven and a half thousand years (Figure 1, left). Almost simultaneously, the agricultural revolution led to the origins of widespread urbanization in the Fertile Crescent, most

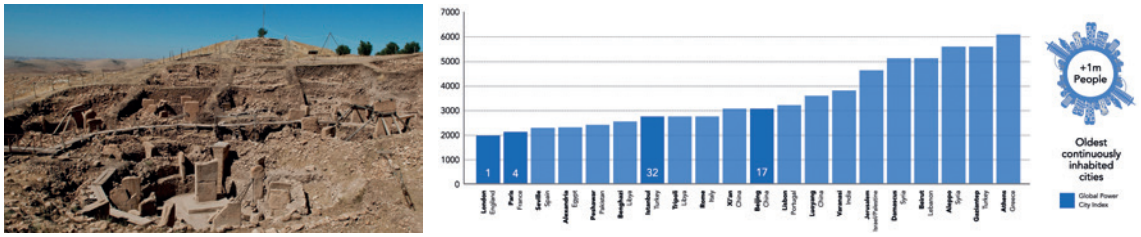

Figure 1. *Archaeological remains of Göbekli Tepe date to circa 9,500 BCE (Pre-Pottery Neolithic Period) in Anatolia, Turkey (left; Source: Wikipedia), and (right) a bar chart from youngest to oldest of the twenty oldest continuously inhabited cities of the world with a population of more than 1 million people today including those listed (highlighted in dark blue) in the Global Power City Index (Source: author updated after Major & Al-Nabet, 2018 and Major* et al.*, 2023).*

notably in the Sumerian city of Ur in ancient Mesopotamia (modern-day Iraq), which is popularly regarded as the world's first city, later abandoned in early 5th century BC perhaps due to drought and the altered ecology of the area (Carter, 1983). Whether it was the first city or not is open to debate. There are still settlements today dating their origins to the 1st Millennium BC or earlier, though not necessarily continuously inhabited, such as Sidon in Lebanon, Jericho in Palestine (destroyed and abandoned several times), and Aleppo in Syria. Major and Al-Nabet (2018) compiled a list of the twenty oldest continuously inhabited cities with a population of more than 1 million people today, later updated by Major *et al.* (2023) (Figure 1, right). The list is not definitive but informative while remaining open to debate. Half of the list are cities in the Middle East North Africa (MENA) region, ranging from Mauritania and Morocco in North Africa to Pakistan in Central Asia. Again, the definition of the MENA region often varies based on whom you ask. The rest of the list are cities in Europe (6) and India/China (4). Of these twenty cities, only four (Beijing, Istanbul, Paris, and London) appear in the 2021 Global Power City Index (GPCI). The GPCI evaluates and rates major international cities according to their magnetic attraction of people, capital, and enterprises worldwide (IUS, 2021).

By definition, these are sustainable, resilient cities (Major & Al-Nabet, 2018). Sustainable means to continue for an extended period or without interruption (Source: Oxford English Dictionary). Resilient refers to change, adaptation, and transformation in response to stress based on Davoudi's (2021) definition of evolutionary resilience. We know what sustainable, resilient cities look like. They are all around us. Most of us like to visit some of these cities as tourists – if we can or do not already live there – such as London in England, Paris in France, Istanbul in Turkey, Jerusalem in Israel/Palestine, Damascus in Syria, and arguably the oldest, Athens in Greece (Figure 2). Yet, researchers often ignore many of these cities when researching sustainability and resilience in cities, especially those of the MENA region. It is unclear why this is the case, though short-term concerns and skewed localized perspectives seem to be the culprit. However, these cities have much to teach us.

Let us take an example from Cairo, Egypt. It would be #21 on Major and Al-Nabet's (2018) list of the oldest continuously inhabited cities in the world due to its brief abandonment in the late first century BCE and the subsequent founding of a settlement that would become modern Cairo in the 1st century CE. Today, when first visiting Cairo, a visitor might be initially shocked by the city's public streets, if they are compared to the modern transportation planning standards of the Western world based on strict enforcement of road sections and signalization. There is little or no striping of lanes. Striping that does exist has faded to faint impressions. There are few traffic lights. Many pedestrians and all kinds of vehicles use the road, i.e., cars, trucks, motorcycles, motor scooters, tuk-tuks, bicycles, and donkeys with carts. These vehicles crowd the streets, sometimes within centimeters of each other, squeezing the concept of a driving lane to its breaking point. Traffic crashes are a common sight. The author of this paper witnessed three crashes in only five days on the

Figure 2. *The sustainable, resilient cities around us today include (youngest to oldest from left to right) London, England (Source: Janno Nivergall/Pixabay); Paris, France (Source: Pixabay); Istanbul, Turkey (Image: Author); Jerusalem, Israel/Palestine (Source: Author); Damascus, Syria (Source: Bernard Gagnon/Wikipedia); and Athens, Greece (Source: George E. Koronaios/Wikipedia).*

streets of Cairo. Initially, crossing the street is also intimidating for a pedestrian new to Cairo. However, after becoming accustomed to the situation, it becomes clearer that something else is happening on the streets of Cairo. The traffic almost always moves but slowly, i.e., around 20 kilometers per hour or less. It is easy for a pedestrian to cross the street by selecting your moment. You never see drivers holding up and using their cell phones while driving in Cairo. Doing so would be a disaster because the public road system demands the driver's attention in Cairo. Streets do not forgive stupidity. Traffic crashes usually fall into a 'minor fender bender' category, i.e., there might be a small amount of damage to the vehicle but not involving the people or animals. Cairo streets are a living organism of shared space writ large (Figure 3, left). Shared space is an urban design approach minimizing the segregation between modes of road users. People regulate themselves. It is how other cities used to be in the early twentieth century before modern transportation planning sidelined pedestrians to sidewalks in road sections to move vehicles quickly through city streets. There is plenty of evidence for this, such as a 1910 photograph of State Street in Chicago, Illinois, in the United States, where pedestrians, horses and carriages, streetcars, and automobiles all share the street (Figure 3, right).

Such a viewpoint contrasts starkly with the consensus about Egyptian traffic in popular media and elsewhere. Let us look at an example based on a 2021 article, "19 Killed in Truck-microbus Collison Outside Cairo", in the online Arabic newspaper *Asharq Al Awsat*. It is published in London by the Saudi Research and Media Group. Please note that we are not specifically 'calling out' – draw critical attention to someone's unacceptable actions or behavior – the Saudi Research and Media Group, *Asharq Al Awsat*, or anyone else with this review. The author came across the article while searching for photographs of Cairo traffic, which led to delving deeper into the article's statements in a search for the truth. The article originally stated (later revised and edited out) that "Egypt ranked 30th worst in the world for congestion, according to TomTom, the Dutch vehicle navigation systems maker" (*Asharq Al Awsat*, 2021). Of course, a navigation systems maker for vehicles has an economic interest in promoting the idea of traffic congestion anywhere in the world, i.e., they want to sell navigation systems. As they say, this statement should be 'taken with a grain of salt', i.e., skepticism. The fact that *Asharq Al Awsat* later edited out this statement from the article indicates that it is unreliable. The article goes on to state, "Traffic accidents kill thousands every year in Egypt, which has a poor transportation safety record. Crashes are mostly caused by speeding, bad roads or poor enforcement of traffic laws" and concludes, "Egypt's official statistics agency says around 10,000 road accidents took place in 2019, the most recent year for which statistics are available, leaving over 3,480 dead. In 2018, there were 8,480 car accidents, causing over 3,080 deaths" (*Asharq Al Awsat*, 2021). The article paints a grim picture. A World Health Organization (WHO) (2012) report paints a similarly gloomy picture about road safety in

Figure 3. *The living organism of shared space (left) today in Cairo, Egypt (Source: Author licensed by Alamy) and (right) in a 1910 view of State Street in Chicago, Illinois, USA (Source: Library of Congress).*

Egypt. There is evidence this WHO report is based on 2003 data, but the sourcing is unclear. It might warrant action to alter the circumstances. But is it accurate?

If we sample the data about traffic fatalities available in Egypt, primarily from the Egyptian Central Agency for Public Mobilization and Statistics, and the United States of America (USA), from the U.S. Highway Traffic Safety Administration, over twenty years, then a different picture of the situation emerges (Figure 4). In 2003, there was a 66% greater chance of a traffic fatality in the USA than in Egypt. In 2011, it was more than a 53% chance. The rate rose to about 83% more in the USA than in Egypt in 2020, then skyrocketed to more than twice as likely in 2021 before falling slightly below 2020 levels two years later (+81%). Over twenty years, on average, this indicates there is a more than 64% greater chance of a traffic fatality on American streets compared to Egypt. We must allow for a difference in the reporting standards of the sources. Nonetheless, the overall picture is that American roads are more dangerous than Egypt's over the last two decades. However, MENA countries continue to import Western, mainly American, transportation planning principles when there is evidence that they are much more dangerous for people.

The reason that false narratives emerge about things such as dangerous Egyptian roads is simple. It is human nature. We need to delve deeper into the problem to test out our assumptions. We do not apply critical thought to that circumstance, defaulting to our intuition, especially in the popular media with its maxim 'if it bleeds, it leads', attributed to the American newspaper publisher and businessman William Randolph Hearst in the late 1890s. It is the myriad of complexities about our cities that make it possible. Our cities have a dual

Country	Year	Population[1] (millions)	Fatalities[2]	Per Capita	% Difference
Egypt	2022	111.0	7,762	1/14300	
USA	2022	338.3	42,795	1/7905	**+81%**
Egypt	2021	109.3	6,164[2]	1/17732	
USA	2021	331.9	42,915	1/7734	**+124%**
Egypt	2020	107.5	7,101[4]	1/15139	
Egypt	2020	107.5	6,722[3]	1/15992	
USA	2020	329.5	38,824	1/8487	**~ +83%**
Egypt	2011	80.4[3]	7,101[5]	1/11332	
Egypt	2011	89.2	~12000[5]	1/7433	**?**
USA	2011	311.6	32,367	1/9627	**+53%**
Egypt	2003	80.4[3]	7,101[5]	1/11332	
USA	2003	290.1	42,643	1/6803	**+66%**
Mean (Egypt)	**2003-2022**	**98.6**	**7,498**	**1/13150**	
Mean (USA)	**2003-2022**	**320.8**	**39,909**	**1/8038**	**+64%**

[1] World Bank
[2] U.S. National Highway Traffic Safety Administration for USA figures.
[3] Al-Monitor citing Egypt's Central Agency for Public Mobilization and Statistics.
[4] Reuters citing Egypt's Central Agency for Public Mobilization and Statistics.
[5] World Health Organization (WHO) citing Egypt's Central Agency for Public Mobilization and Statistics and Ministry of Public Health. The WHO Report also claims 'around 12,000 Egyptians lose their lives as a result of a road traffic accident," though the report is unclear about the sourcing for this claim. The WHO total population for Egypt of 80.4 is equivalent to the population in 2003.

Figure 4. *Sampling of traffic fatality data in Egypt and the United States, 2003-2023, based on various sources, including the per capita, percentage likelihood of dying in a vehicular crash, and mean for each country over 20 years (Source: Author).*

nature related to their form and function. Architects have argued about form and function for over a century, i.e., form follows function per Louis Sullivan, less is more per Mies van der Rohe, or less is a bore per Robert Venturi. It would be more practical to think that form and function are a symbiosis instead of engaging in 'chicken-and-egg' arguments – a metaphor describing situations where it is not clear which of two events should be considered the cause and which should be considered the effect (Source: Wikipedia) – about the built environment, and especially about our cities. The city is both a physical and social thing, constantly in flux and stabilized, ordered and chaotic, familiar and strange, and easy to use but difficult to discuss (Major *et al.*, 2023). Once we come to grips with the dual nature of our cities, it becomes much easier to understand, research, and discuss them. This is where space syntax can help by providing us with the tools and concepts to implement evidence-based design and planning for the future of our settlements.

3. The Many Dualities of Space Syntax

The physical and the social, form and function, exist in a state of simultaneity, i.e., the fact of something happening or being done at the same time as something else (Source: Oxford English Dictionary). Often, it is because the built environment is a physical manifestation of mediating between different scales of experience. Hillier (2003) argues that "the city constructs, in effect, a series of probabilistic interfaces between scales of movement", a concept which he attributes to John Peponis in *Space is the Machine* (Hillier, 1996). We could argue that in its totality, the built environment constructs a series of probabilistic interfaces between different scales of encounter and avoidance through seeing, moving, and occupying in the second and third dimensions of space (Major *et al.*, 2023). We can see this in the first-floor balconies overlooking the public space on the streets of Havana, Cuba, or in the interior of many buildings, such as Zaha M. Hadid Architects' (2009) MAXXI National Museum of 21st Century Art in Rome, Italy or Frank Lloyd Wright's (1959) Guggenheim Museum in New York in the United States.

Since 1973, space syntax researchers have built a massive body of research at all scales of the built environment, from the home and housing to complex buildings, and from the public square to the metropolitan and regional scale of urban agglomerations. Space syntax has been so successful that researchers have begun to look back to chart the impact and evolution of its theoretical concepts and intellectual contributors using various metrics (Krenz *et al.*, 2023; Mohamed & van der Laag, 2023). The reason is that space syntax works. In hindsight, it is also apparent why. The basic representations of space syntax underlying its topological measurements of built space are based on us. The representations of a grid element (akin to a point in space such as the standing area for the typical human being, e.g., 0.28 m^2) for visibility graph analysis (VGA), the axial line or lines of movement because people tend to walk in a straight line, mainly used in urban analysis, and the convex space where everyone can see and be seen in human occupation for the configurational analysis of space are generic to human nature (Figure 5) (Hillier & Hanson, 1984; Hillier, 1996; Major, 2018; Tannous *et al.*, 2021; van Nes & Yamu, 2021). At the urban scale, it has led to robust representations of spatial structure at different scales based on through-movement (i.e., choice) and to-movement (i.e., integration) in many cities worldwide. For example, we can see representations with the mathematical measurement of global choice in the spatial network for the major road network in Doha, Qatar, or evidence of emergent neighborhoods in the localized spatial structure at integration, 800 m in Athens, Greece (Figure 6).

In the last half-century, space syntax theoreticians have collectively developed a conceptual framework to discuss the dual nature of cities as an interface between different scales of the built environment. They are based on a set of dualities, which often but not necessarily

Figure 5. *The basics of representation of space used in space syntax research: (left) a point in space using grid elements, such as the average standing area of a human being (0.28m²), (center) a line of movement, and (right) the convex space for human occupation of space where everyone can see and be seen by everyone else (Source: Tannous* et al., *2021).*

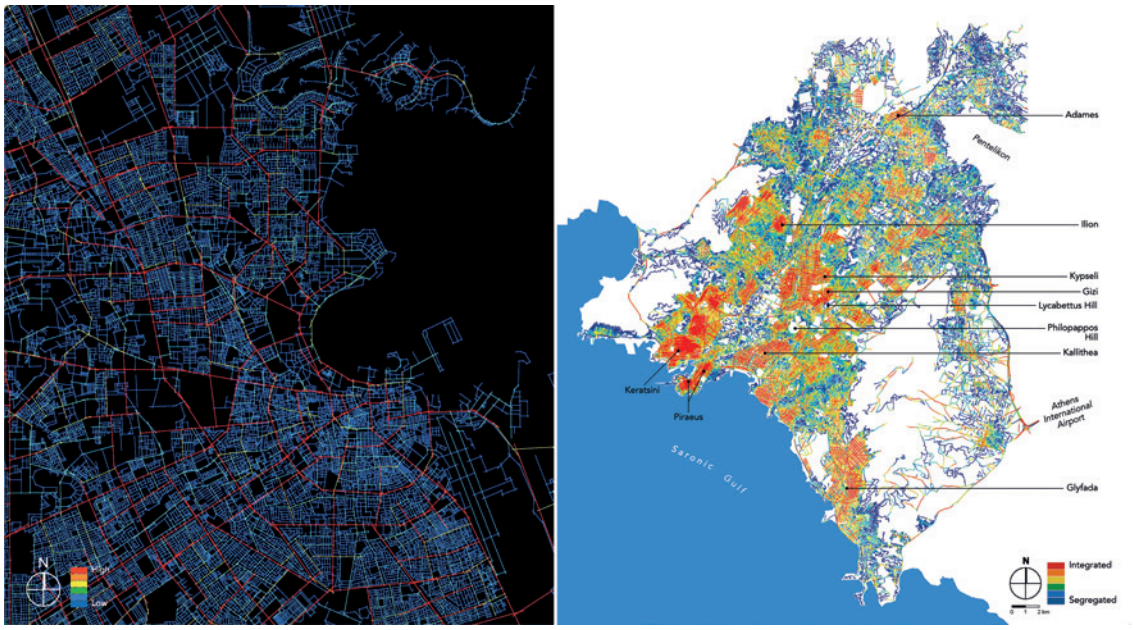

Figure 6. *Pattern of global choice (or 'through-movement') in Metropolitan Doha, Qatar, in 2020 (left; Source: QUCG-CENG-22/23-472) and (right) integration, 800 m radius in the Greater Athens, Greece in 2018 (Source: Street network segment model ©Space Syntax Ltd. and analyzed by Major* et al., *2023).*

always form opposites. It includes concepts such as transpatial (across space) and spatial (located in space); choice (through-movement) and betweenness (to-movement); global and local, integrated and segregated; shallow and deep; rings or ringy and trees or tree-like; mechanical and organic solidarities adapted from Durkheim (1893); intelligibility and synergy; linearity or axiality and centrality or compactness (Major, 2018 after Hillier, 1996); order and structure (Hanson, 1989); and, genotypes (general types) and phenotypes (phenomena types) derived from Leroi-Gourhan's (1964) universal tendencies and ethnic specifications (Hillier & Hanson, 1984).

Hillier's (1996) law of spatial emergence, i.e., local changes have predictable global outcomes, is of particular importance. It now seems evident to state this must be true. Otherwise, why would anyone ever bother hiring an architect or urban designer for any project unless it was to implement local design changes to manage such global outcomes better? Tied to emergence is Hillier's (1996) law of spatial convergence: emergent patterns converge on universal types, i.e., the ortho-radial grid (Figure 7, left). It is why space syntax enables us to understand different cities in different geographical, social, and cultural contexts. Space syntax helps us to see what is universal in all settlements ('allocentric') so we can better

comprehend what is specific to each ('egocentric') (Carvalho & Penn, 2004). Building on the research of Conroy (2001) and Conroy Dalton (2001), Major *et al.* (2023) later supplemented Hillier's (1996) laws, arguing for laws of spatial conservation (people will conserve their spatial strategies without intervention) and optimization (people will optimize their space use if allowed) as the conceptual basis for progressive and regressive strands of town planning (Figure 7, right). These theoretical concepts of space syntax define the role of the architect, urban designer, and town planner across the different scales of the built environment profession, from the single home to the entire metropolis and their interfaces in between. More importantly for evidence-based design and planning, space syntax researchers have developed models of how architects, urban designers, and town planners can intervene in urban environments to understand better the global outcomes of their local changes. Major (2018) and Major *et al.* (2023) laid out these spatio-formal processes with predictable design outcomes for streets and blocks in settlements, including the extension, expansion, subdivision, deformation, marginal separation by linear integration, and discrete separation by linear segregation (Figure 8). These concepts and models of space syntax derive from evidence-based research, leading to their implementation in evidence-based design and planning since the 1980s, beginning with the Foster & Partners' (1989) unrealized Kings Cross project in London (Hillier, 1993; Major, 2018).

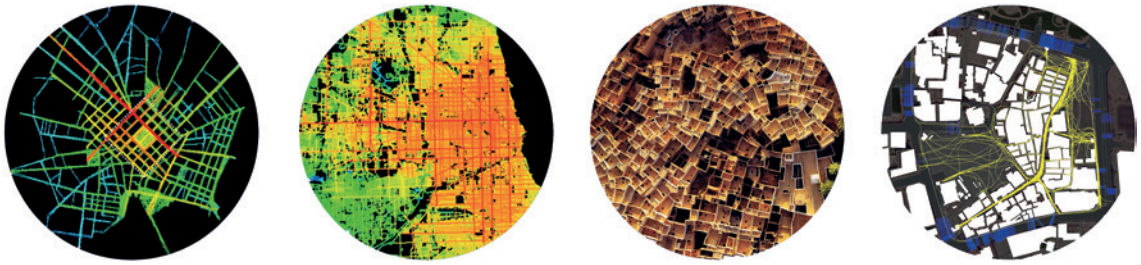

Figure 7. *Emergence and convergence in the pattern of global integration in the urban grid for (far left) all-line axial analysis of New Haven, Connecticut, USA, in 1864 (Source: Major, 2018, 136), and (left) ortho-radial grid of Chicago, Illinois, USA in 2002 (Source: Major, 2018, 183). Conservation and optimization in (right) an aerial view of Ghadames, Libya in 2013 (Source: Steinmetz, 2013) and (far right) unprogrammed street crossings (in blue) in Souq Waqif in Doha, Qatar in 2020 (Source: Major* et al.*, 2021, 10).*

Figure 8. *Spatio-formal processes with predictable design outcomes: (left to right) extension, expansion, block subdivision, deformation, marginal separation by linear integration, and discrete separation by linear segregation (Source: Major, 2018; Major* et al.*, 2023).*

4. Fearing and Worshiping in Artificial Intelligence

Over the previous year, after the public launch of ChatGPT in late 2022, there has been a great deal of angst and optimism about the future of AI across various fields in popular media outlets like the *New York Times*, and the *Washington Post* among others. AI poses the risk of extinction, screams one headline while another heralds the start of the AI gold rush (Rosse, 2023; Verma, 2023). One can find almost any argument about AI that might fit a range of biases, from fear to worship. The potential benefits and pitfalls for architecture, ur-

ban design, and town planning have not escaped notice with the launch of several generative AI tools such as DaVinci, Wonder AI, AutoDesk Forma (formerly SpaceMaker), PromeAI, Imagine, Adobe Firefly, and Architechtures. They all offer some form of AI-assisted design and planning. Many academics and practitioners are trying to understand what this innovative technology might mean for them and their professions. The reaction in higher education covers a similar spectrum, ranging from educators embracing the possibilities of AI to outright fear about it, often centered around student cheating. Like most things, the truth falls somewhere between these two extremes.

To this end, we conducted a simple exercise to explore if there might be any inherent biases built into the programming underlying the technology for the built environment using two generative AI programs: DaVinci and Wonder AI. DaVinci is a state-of-the-art AI Photo Generator app. Using the latest artificial intelligence technology, it can create unique artworks, photos, and images based solely on your descriptions (Source: DaVinci). Wonder AI is a new AI system that can create realistic images and art from a description in natural language. Wonder can create original, realistic images and art from a text description. It can combine concepts, attributes, and styles (Source: Wonder AI). The aim was to test the most straightforward text description for generating these images using keywords commonly associated with the built environment across a varied scale – from a dwelling to a planetwide city – and compare the outputs using three distinctive styles for each. The keywords utilized while maintaining a strict sequence for image generation throughout the exercise were:

> city > metropolis > megalopolis > ecumenopolis > town > village > neighborhood > building > house > dwelling

Ecumenopolis is a word invented by Greek architect C.A. Doxiadis to describe the hypothetical concept of a planetwide city (Doxiadis, 1975). We had to place the adjective 'future' in front of these keywords as the image results without the qualifier – in this case, a word limiting another word's meaning –was easily identifiable based on historical or cultural precedents. For example, Hobbiton from *The Lord of the Rings* movies when only using the word 'village'. For Wonder AI, the three styles selected for the exercise were: Cinematic, meaning of, relating to, suggestive of, or suitable for motion pictures or the filming of motion pictures; No Style, simply meaning the lack of a particular manner or technique by which something is done, created, or performed (Source: Merriam-Webster Dictionary); Steampunk, which is a type of science fiction set in a time when machines used steam for power, often in the 19th century (Source: Oxford English Dictionary). For DaVinci, the selected three styles were: Futurism, meaning extremely modern and unusual in appearance, as if belonging to a future time; Cyberpunk, which is a science fiction genre that focuses on a blurring of distinctions between humans and machines in bleak dystopias with lawless subcultures; and again, Steampunk (Source: Oxford English Dictionary). Since the last is the only standard style in both, it serves as a *de facto* benchmark for comparison. Crucially, Wonder AI does not allow reviewing the default text description after generating the image, at least as far as we could figure out. DaVinci does. As we shall see, this is a significant difference. We are interested in a few simple questions for this exercise, such as how many people are included in the image, whether there are many cars or any other distinguishing factors of the built environment. Wonder AI produces two images per text description. DaVinci produces three. Overall, it means we generated 300 images for this exercise and selected the one image that is most representative of each text description per program. Several hundred more images were generated during initial testing to define the keyword text description parameters and their sequencing precisely and finalize the selection of the styles for this exercise.

The primary takeaway from the Wonder AI output is the almost complete lack of people in the images (Figure 9). In this sense, the future seems full of things but devoid of people. Only 3 of the 30 representative images (outlined in red in Figure 9), or 10%, include people for cinematic metropolis and steampunk town and village. Four images explicitly show automobiles, and two implicitly do so based on light trails (long exposure photography highlighting the movement of light such as car headlights or taillights) on the city streets, e.g., cinematic neighborhood and megalopolis. This means that 20% of the images include automobiles at twice the rate for people depicted, even though today there are approximately (~) 7.9 billion people and ~1.47 billion vehicles worldwide, i.e., 5.4 people for every vehicle (Sources: World Bank/Hedges & Company). More vehicles will likely be seen in an urban setting, so whether this means anything is unclear. Collectively, nine images include rivers (30%), but only 3 or 10% have boats. The only other distinguishing factor is that 3 of the 30 representative images (again, 10%) are explicitly night-time views beyond the architectural stylistic differences. By far, the most featured architectural style is some variation of Modernism for cinematic and no style except for village, town, and neighborhood. The cinematic village features architecture with Asian rooflines. The cinematic town and neighborhood images feature single-family housing. Still, the town includes driveways to these homes, whereas the neighborhood does not, perhaps implying that the social sense of a neighborhood does not include garages and driveways. All the steampunk images possess a distinctive 19th-century industrially-inspired architectural style. There is a reason for this, which we will discuss shortly.

DaVinci produced some more interesting results (Figure 10). More people appear in the DaVinci images, especially for cyberpunk (70%). Overall, 53.3% (16 of 30) include people in all three styles. 33.3% (10 of 30) include automobiles, but 30% are due to cyberpunk style (9).

Figure 9. *The generative image results of Wonder AI in November 2023 testing the generic description of "Future (Insert here, see the top row above the images)" in the style of Cinematic, No Style, and Steampunk with only three images (outlined in red) including people (Source: Wonder AI/Author).*

Figure 10. *The generative image results of the DaVinci AI in November 2023 testing the generic description of "Future (Insert here, see the top row above the images)" in the style of Futurism, Cyberpunk, and Steampunk (Source: DaVinci/Author).*

The rate of showing people versus cars is better than Wonder AI. Overall, only three images show a river or waterway, and only one has a boat. According to DaVinci AI, water is not a significant feature of the future. All the Futurism images feature more organic shapes as a characteristic of parametric design. Steampunk again features its 19th-century industrially-inspired architectural style. It is almost impossible to distinguish an architectural style associated with cyberpunk since all are night-time images. Cyberpunk's characteristics are primarily pink and blue lights with lots of signage featuring mostly Asian-inspired text except for one (future village) where the word "FUTURE" predominates.

Reviewing the default text description after generating the DaVinci images clarifies that the program has altered our generic text descriptions, i.e., future city, future neighborhood, future dwelling, etc. The default text description for Futurism now reads "future (insert here), futuristic, new age, highly detailed, digital painting, concept art, masterpiece ArtStation.com". For cyberpunk, it now reads: "future (insert here), *Blade Runner* (our emphasis), cyberpunk, neon lights, highly detailed, digital painting, ArtStation.com". Finally, for steampunk, it reads: "future (insert here), steampunk, industrial, arcane, octane beautifully detailed render, extremely hyper-detailed, intricate, epic composition, epic cinematic lighting, trending on ArtStation.com, *art by Greg Rutkowski* (our emphasis), crispy quality". By implication, it seems likely that the same thing occurred using Wonder AI due to our use of a benchmark group, i.e., steampunk, and their stylistic similarities. It implies that we have engaged via the AI program in pseudo-plagiarism, specifically of the 1982 film *Blade Runner* for the cyberpunk images, the artist Greg Rutkowski for steampunk ones, and, in a more derivative form, any image generated using another website like ArtStation.com as a resource. At the very least, it is good that the DaVinci AI allows you to review the default text description after image generation to trace the source of the plagiarism. Wonder AI seems to hide this from the user. Many people are unhappy about how generative AI uses online resources for learning without attribution or licensing (Heikkilä, 2022).

What else did we learn from this simple exercise? It was hardly definitive but informative. First, the future is urban. It is unsurprising since ~56% of the world's population – 4.4 billion inhabitants – live in cities today (Source: World Bank). The future is also empty, primarily vehicular, and literally bright. The latter is because the default style filter takes over, representing a 'style over substance' process. For example, it is always daytime for utopian visions, such as Futurism. It is almost always night-time for a dystopian vision of the future, such as cyberpunk. In night-time images, especially cyberpunk ones, light pollution appears to be a severe consequence of the built environment in the future. Generally, apartments are considered dystopian, and free-standing or single-family houses are utopian, even within other structures for these AI-generated images (see DaVinci's steampunk building and dwelling outputs), which seems to contradict the first point. This is not a repeatable scientific process but a heuristic, trial-and-error one. Several attempts were made to replicate remarkably similar images using more detailed text descriptions. They failed.

Nonetheless, it is clear: the more specific the text description, the better. However, even then, the DaVinci AI is always complemented with additional descriptive text. Presumably, so is Wonder AI. It is the role of the architect, urban designer, and town planner to translate the abstract to the concrete in real-world solutions (Hillier, 1996; Evans, 1997). All these AI-generated images are two-dimensional representations. For an architect to take an AI-generated building and translate it into a real-world solution, it would involve shaping it into a three-dimensional form, i.e., making suppositions about what is hidden in the image. In doing so, the architect translates the abstract idea into a concrete, constructible form. Only then do they own the product as a creator. This indicates that AI cannot replace built environmental professionals. AI remains only a tool for sparking ideas in the creator to develop enduring solutions for architecture and cities.

Conclusion

We have been building sustainable, resilient cities for a long time. We know what they look like. We require more critical thought and less passion about our cities. Space syntax works because the basis of its representations is us, providing the evidence-based design and planning tools and concepts to objectively measure and discuss the dual nature of cities. Today, AI is only an emerging helpful tool. It may evolve into something else in the future. However, it still requires human intervention and critical thinking to create solutions for the real world that are sustainable and resilient. We must guard against AI muddling those solutions because they must still be evidence-based design and planning with a rigorous scientific approach in order to endure.

Acknowledgments

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Evolution of Urban Village in Bahrain

A Study on Historical Events and Morphological Constraints

Wafa Al-Ghatam[1]

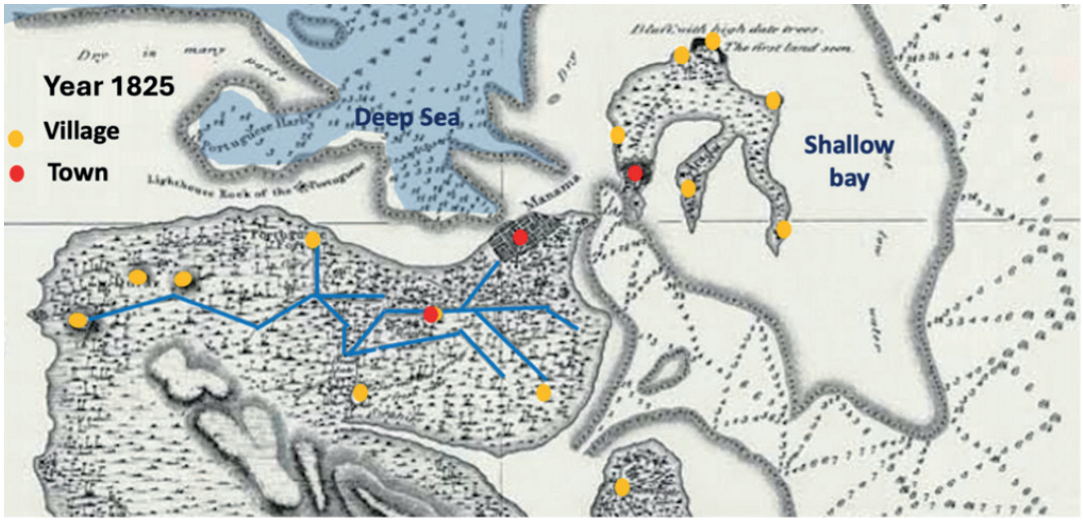
Abstract: This paper aims to review the evolution of villages in Bahrain and the context they evolved in before and after being absorbed into urban centres. The paper attempts to pinpoint how the cumulative processes of urban growth and urban intervention have influenced the city's spatial structure and the development of villages in Bahrain. It sets the historical scene for the formation of Bahraini's old settlements of villages and cities. It starts by discussing the urban development of Bahrain before examining the physical manifestation of Manama and Muharraq and their villages. The paper traces realisation and evolution through literature and historical records. It is divided into two parts, the first of which starts with a review of previous studies that have examined urban development in Bahrain. The second part focuses on the villages' development and their main morphologic features. In addition, it briefly presents the current situation of urban villages in Bahrain. The paper's aim is twofold: to contextualise the research both in terms of its historical background and to reveal the different actors involved in the role of urban form in the social life of the urban villages of Manama and Muharraq.
Keywords: Urban Village, Urban Evolution, Island Development, Urban Form.

1. Part One: Bahrain Main Islands Urban Developent

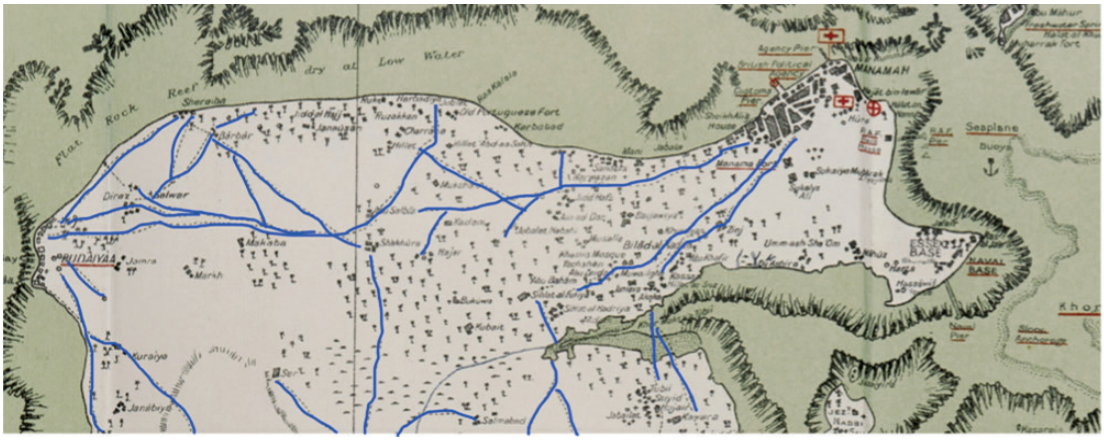
The Kingdom of Bahrain is an archipelago comprising 33 islands located in the Arabian Gulf between the Kingdom of Saudi Arabia and Qatar. The two main islands are Bahrain and Muharraq. Bahrain[2] has a distinctive coastal strip, where villages have existed on the north, east, and west sides of Bahrain's biggest island and around Muharraq's island coastline. The northern coast is fully encircled by shallow water made up of coral reefs, as demonstrated in Figure 1, which prevents access for boats along the coast. This was a critical element of the ancient pattern of settlement in Bahrain. Since antiquity, the inhabitants of the islands have always been able to identify the few rare channels that naturally cut into these coral reefs and sometimes even to enlarge them to allow boat traffic to pass and create moorage areas as close as possible to the coastline (UNESCO, 2005). Figure 1 presents one of the earliest pieces of cartographic evidence of cities and villages in Bahrain from 1825. Notably, this is more of a simple pictographic representation than an actual map; yet, it clearly highlights the location of the villages and cities with their names and the connections and roads between them – gardens, forts, and coral reefs, as well as the depth of the shoreline. The roads (blue lines) and the locations of the villages (yellow and red dots) on Bahrain island were retraced for maps in 1934 and the 1970s, as demonstrated in Figures 1 and 4 for Muharraq island. The historical maps provide proof of the existence of a linear network on Bahrain island that has

1. University of Bahrain.
2. Bahrain was proclaimed a Kingdom in 2002.

DOI: 10.36158/97912566918214



a. Bahrain map Year 1825



b. Bahrain Year 1937

c. Bahrain map Year 1956

Figure 1. *Evolution of Bahrain's Road Network from Historical Maps. Figures 1a to 1c trace the roads and settlements on Bahrain Island from 1825 to 1956, examining the interconnectedness between cities and villages facilitated by road networks. They reveal a consistent linear network connecting villages to Manama, indicating a pre-urban superstructure centred on the port city. This suggests the presence of a market centre in Manama, facilitating trade and connecting villages through cost-efficient routes.*

existed since the 19th century. They indicate a pre-urban network superstructure with historical traces between settlements and main towns. Sometimes these routes connect to villages directly, while others require more steps and roads to reach them. Historically, Bahrain was a market centre within the world trade network, a point of transhipments of Eastern goods and a hub of intensive agricultural villages from the first millennium BC. During the medieval and late Islamic periods, villages appeared in two clusters, one along the north coast and another along the west coast (Larsen, 1983). Bahrain occupies a strategic position in the Arabian Gulf. The major expansion of its settlements occurred during the height of an organised maritime trade network centred on Hormuz between the 13th and 16th centuries.

In the late Islamic period, the Portuguese arrived in Bahrain. A distinct period of land abandonment in the southern region began, marking the onset of a long period of settlement retreat that only reversed during the past century (Larsen, 1983). Historical records indicate continuous settlement along the north coast of Bahrain island, where the most copious artesian springs are located. Population and the concomitant areas of agricultural land use on the island spread outward from this artesian centre and, for reasons that remain obscure, exhibited periodic retreat. These centrally located clusters of villages were supplied by artesian water via qanat systems, as demonstrated in Figure 2. These qanats transported water directly to the agricultural areas, where they emptied into bifurcating canal networks. Belgrave (1968) claimed that the various qanat systems visible on the western coastal plain were introduced to Bahrain during the Sasanian period (600 AD).

1.1. *Bahrain Island*

1.1.1. How Water Shaped Urbanization and Routes in Bahrain

Bahrain began to adopt the characteristics of a modern market economy in the 14th century, when Manama was mentioned for the first time as a market centre of an extensive settlement (Rentz and Mulligan, 1960: 941-944). Manama demonstrated a street network system of a coastal port connecting a semi-circular array of villages on Bahrain island with the market (Larsen, 1983: 94-95). The farmers in preindustrial times marketed their harvest in Manama and there was a network of trails converging on the urban centre of Bilad Al Q-adeem Souq (or Al-Khamis Souq). Considering the lack of motorised shipping in the past allows one to better approximate the near-constant transportation costs. In theory, this study's historical overview identified the presence of a market centre for Bahrain in Manama due to cost minimisation strategies, linking the villages with a central market.

The northern coast of Bahrain island is fully encircled by shallow water made up of coral reefs, as demonstrated by one of the earliest pieces of cartographic evidence of cities and villages in Bahrain from 1825 shown in Figure 1a, which prevents access for large boats along the coast. This was a critical element of the ancient pattern of settlement in Bahrain. Since antiquity, the island's inhabitants have always been able to identify the few rare channels that naturally cut into these coral reefs and sometimes even enlarge them to allow boat traffic to pass and create moorage areas as close as possible to the coastline (UNESCO, 2005). Notably, Figure 1a is more of a simple pictographic representation than an actual map; yet it clearly highlights the location of the villages and cities with their names and the connections and roads between them; gardens, forts, and coral reefs; and the depth of the shoreline.

In addition, the roads and the locations of the villages and cities on Bahrain island on the map of 1825 in Figure 1a were retraced for maps in 1937 and then 1956, as demonstrated in Figures 1b and 1c. The historical maps provide proof of the existence of a linear network on Bahrain island that has existed since the 19th century. They indicate a pre-urban network superstructure with historical traces between villages and Manama as a port city and main

market of Bahrain. In theory, this study's historical overview identified the presence of a market centre for Bahrain in Manama due to cost minimisation strategies, linking the villages with a central market. This could be worthy of future research studying Bahrain human settlements past and present. Sometimes these routes attach to villages directly, while others require more steps and roads to reach.

The mouth of a shallow bay and the cultivatable soils found in the surrounding coastal area of Bahrain, along with the artesian water, have been presented as the main natural factors in the location of villages and agricultural activities. In a geoarchaeological study, Curtis Larson (1983)[3] identified the variables in how historical land use and population density were largely a function of available water sources and distance from main market centres. Figure 2 presents aerial photographs taken in 1956 that show the earlier expanded irrigation and cultivation associated with the location of villages on the coastline of Bahrain (Larsen, 1983: 20). The close approximation to the modern village patterns suggests a comparable preindustrial village pattern. Figure 6 presents a record of the number of villages on the main island with respect to their distance from Manama; as anticipated, the greatest number of villages can be found within 5 kilometres of the city – a reflection of population distribution.

This indicates that Manama's layout evolved alongside the development of irrigation systems, land division, and tenancy arrangements as depicted in a 1937 map. Two main irrigation methods existed: the falaj, utilizing underground channels, and water lifting from wells using goat skins. The absence of topographical barriers facilitated parallel water channels, shaping the city's future street network (Larsen, 1983). These channels also delineated agricultural plots, evolving into pathways connecting the city to palm groves and remote villages. Manama served as a market hub where farmers from distant villages traded their produce, contributing to its growth as a converging point for road networks (Larsen, 1983: 119).

Reflecting on the placement of Manama city on the farthest north-eastern tip of Bahrain Island, numerous theories exist regarding its establishment. However, what remains evident is that this location, nestled between the significant islands of Muharraq and Bahrain, provided the only viable anchorage for large boats, alongside agricultural resources supporting various settlements' sustenance needs. The availability of low-salinity water likely played a pivotal role in the city's growth, distinguishing it from neighbouring urban centres. Additionally, its strategic importance cannot be understated, as it overlooks two crucial sea borders: one facilitating commerce from the Shatt Al-Arab region and the eastern Arabian Peninsula, and the other facing Muharraq island. These maritime gateways, with their potential for harbour construction, further cemented the city's prominence by accommodating fishing and trade vessels.

1.1.2. Reclaiming Land for Urban Growth: Manama's Expansion

The sea, from then on, became the primary source of people's livelihood and a potential area of expansion, offering – in contrast to desert areas – the advantage of being close to existing urban centres (Belgrave, 1968). The naturally high sandbanks surrounding Bahrain's northern and western coasts made reclaiming land from the sea economically feasible. Land reclamation dates as far back as the 1930s on the island of Muharraq, when the city was thriving and land was becoming scarce on the small island. The sea dried out over two to three years when garbage was deposited to become land.

Over the course of the last eight decades, Bahrain has embarked on a monumental endeavour of land reclamation, augmenting its territorial expanse by thousands of hectares

3. A geoarchaeological study in 1983 on the life and land use of Bahrain Islands.

Figure 2. *Modern and abandoned irrigation systems: the position of springs, wells, canals, and garden areas, as mapped by the Italian consulate in 1971 from a map drawn in 1956 (Source: Larsen, 1983: 91).*

enveloping its islands and urban hubs. This transformative process, driven by various factors, has led to a significant disconnection from the sea. Coastal villages and towns have been relocated several kilometres from the original shoreline. Furthermore, beyond the physical transformation of the coastline, land reclamation has fundamentally altered its functional role, relegating the sea to a distant vista mainly observable from private lands.

Figure 3 provides a comprehensive visual representation of the dynamic transformation of Bahrain's land boundary spanning the last four decades. It vividly contrasts the territorial delineations observed in 1964 with the remarkable expansions resulting from significant land reclamation endeavours in 2002 and 2007. The progression of these expansions can be delineated into distinct phases: an initial gradual initiation in the 1930s, followed by a period of exponential growth post-1964 and during the 1990s to 2002, characterized by the strategic creation of artificial islands. However, in juxtaposition with the established urban fabric, the emergent zones frequently exhibited a low-density configuration, characterized by isolated public edifices set amidst verdant surroundings. This development paradigm, indicative of an economically inefficient utilization, was particularly notable during the 1960s. Moreover, by the year 2007, the landscape of Bahrain had undergone further extensive development, marked notably by the proliferation of major highways and bridges, particularly in the bustling urban centres of Manama and Muharraq.

1.1.3. Charting Change: Expanding Roads Networks, Infrastructure and Housing

In 1912, Manama Port was built in front of Manama Souq on the northern side, along with warehouses for goods; however, this soon became outdated and inadequate for the needs of the growing country. It was then that Salman Port was built in southwest Manama, which entered began its operation in 1967. In the early 1930s, Bahrain's airport started operating in the middle of Muharraq Island. In 1936, the Sheikh Hamad Causeway, which connected Manama and Muharraq, was opened. The transformation of social and economic life in Bahrain started at the beginning of the 20th century, followed by the discovery of oil in the early

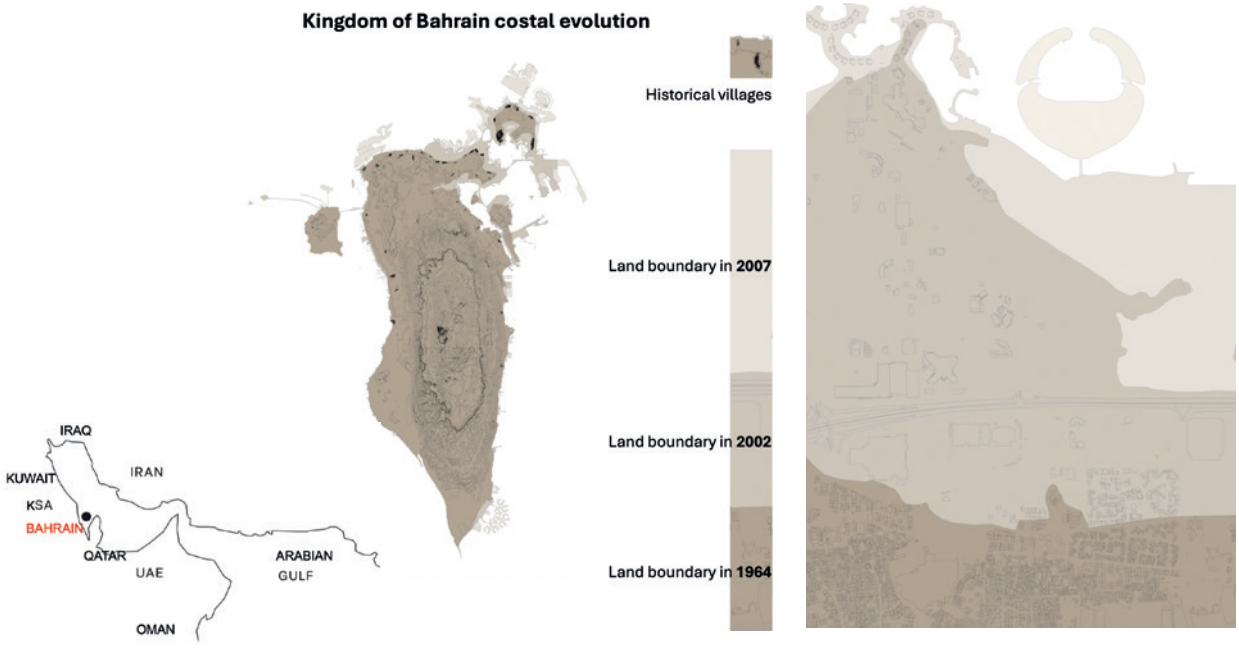


Figure 3. *Evolution of Bahrain's Land Boundary: 1964, 2002, and 2007. The map illustrates Bahrain's land boundary in 1964, juxtaposed with significant land reclamation boundaries in 2002 and 2007. Additionally, historical city and village centres are delineated in black, providing context to the spatial evolution (Source: Bahrain Authority of Culture, 2007).*

1930s. The population density between 1941 and 1971 indicates that the rural areas gradually declined due to immigration towards the towns and new urban areas (Al-Nabi, 2012: 27).

As the expatriate workforce, largely employed in government sectors such as healthcare, defence, law enforcement, the oil industry, and education, expanded, public housing initiatives grew in tandem. In the 1960s, urban policy incorporated public housing as part of its framework, leading to the development of apartment complexes (Al-Nabi, 2012). The State took on a central role as the primary provider of social amenities and housing, underlining a welfare policy aimed at fostering social justice and improving living standards. Across Bahrain, numerous programs were launched to address the housing needs of both expatriates and locals. However, despite these efforts, the historic core, renowned as a bustling commercial and service centre, gradually transitioned into an enclave dominated by low-income rental housing.

Widening roads in the old city and the development of the network linking the cities with the other settlements took place as early as the arrival of the first car in 1914. At the city level, a shift in road pattern from the irregular form to straight arteries and a grid layout was an evident sign of this influence. By 1961, road development was pursued on a minor scale in and around Manama and was primarily meant for the passage of non-motorised vehicles and pedestrians. Major road networks were then constructed in the early 1960s, including the Sheikh Salman Highway, to connect the airport in Muharraq to Manama and the outlying settlements of Awali in the southeast, mainly for Bahrain Petroleum Company (BAPCO) workers. Similarly, the road between Manama and Budaiya in the west was constructed, along with the road that connects Muharraq with Hidd to the south of the airport. Bahrain has experienced significant social and economic changes due to several concurrent developments (Al-Nabi, 2012). Highways have been constructed by pushing back the coastline and extending Bahrain in belt-like forms. Ring roads, following the oval form of the old core, were built in response to the traffic congestion that arose in the city centre where most public services, banks and commercial activities were located.

Until the early 1980s, palm trees continued to dominate the landscape of Bahrain despite the collapse of agriculture. The decline in the date trade in the 1930s led to the sale of agri-

cultural land at low prices, with parcels often sold to wealthy merchants, increasing private property ownership (Rumahi, 1976: 52). The rise of the monetary economy further shifted land use, with date groves transformed into private gardens and housing. At the same time, the pearl fishery in Bahrain had started to decline with the rise of cultured pearls in Japan during the 1920s, and this trend continued even after the first oil discovery in 1932.

By 1990, as demonstrated in Chart 1 and Figure 4, the shift in land use from degrading agriculture to urbanisation had become irreversible. Chart 1 demonstrates a notable shift in the size of agricultural land concerning urban intervention between 1930 and 2007. After 1969, the agricultural green area began to diminish, while urban development in towns surged rapidly. By 1968, a demographic map indicated that 96% of population centres were distributed across the islands, with the remaining 25% of the population dispersed among 89 small villages (Al-Nabi, 2012).

Figure 4 depicts Bahrain's growth and major urban development endeavours spanning from 1939 to 2007. Initially, between 1939 and 1950, the majority of the green built area was devoted to agriculture. However, after 1971, there was a gradual shift from agricultural to residential and commercial land use, with a significant surge in urban construction during the 1990s. Thus, most interstitial spaces and vacant land in Bahrain and its satellite municipalities may owe their existence to this shift in land use. A simple comparison between the earliest and latest maps reveals an inversion of the landscape, from palm trees surrounding buildings to buildings surrounding palm trees. However, such an inversion was just a transitory stage towards the complete urbanisation of the northern region, in which the dying farms turned into a potential land pocket for growth.

Between 1989 and 2001, significant cooperation occurred with the United Nations Human Settlements Programme (UN-HABITAT) to study the preparation of land-use master plans for many parts of Bahrain. The collaboration took place between foreign consultants, the Bahrain Economic Development Board (EDB), and Skidmore, Owings, and Merrill (SOM). Despite the recommendations of the National Land Use Plan 2001 (Ministry of Housing, 1988) to protect the remaining fertile land and relocate urban development to the south, the small settlements within the green band gradually continued to expand at the expense of farms. In 2006, the National Planning Development Strategies 2030 in Bahrain embarked on preparing a comprehensive national master plan that would address and integrate economic, social, physical, and environmental developments. However, as planning in Bahrain is market-led, many of these master plans and bylaws are continually changing in line with market demand (Al-Ansari, 2009).

Between 2001 and 2007, real estate became the principal driving force for urban development; most current developments privatise the coastline, making it inaccessible to the pub-

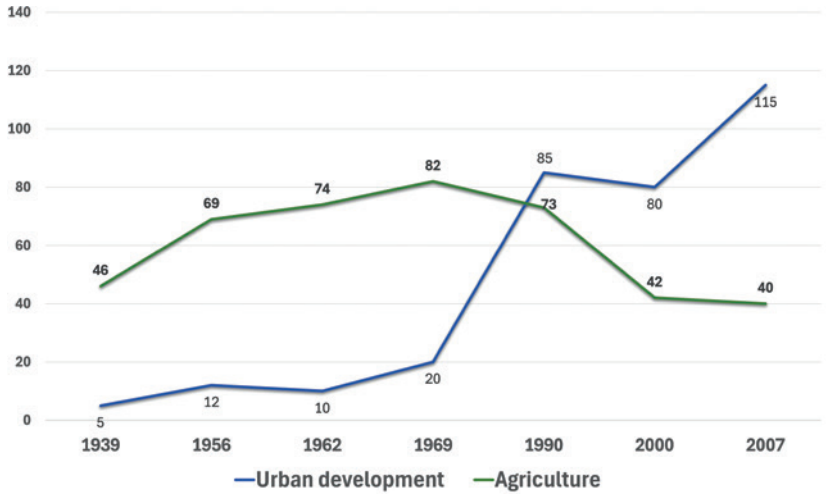


Chart 1. *Urban intervention and development area size in Bahrain between 1939 and 2007: After 1969, the agricultural green area started to shrink and the new urban development of towns rapidly increased. In 1968, the topographic map reveals that there were 96 centres of population within the islands with the remaining 25% of the population scattered over 89 small villages (Source: Al-Nabi, 2012: 28).*

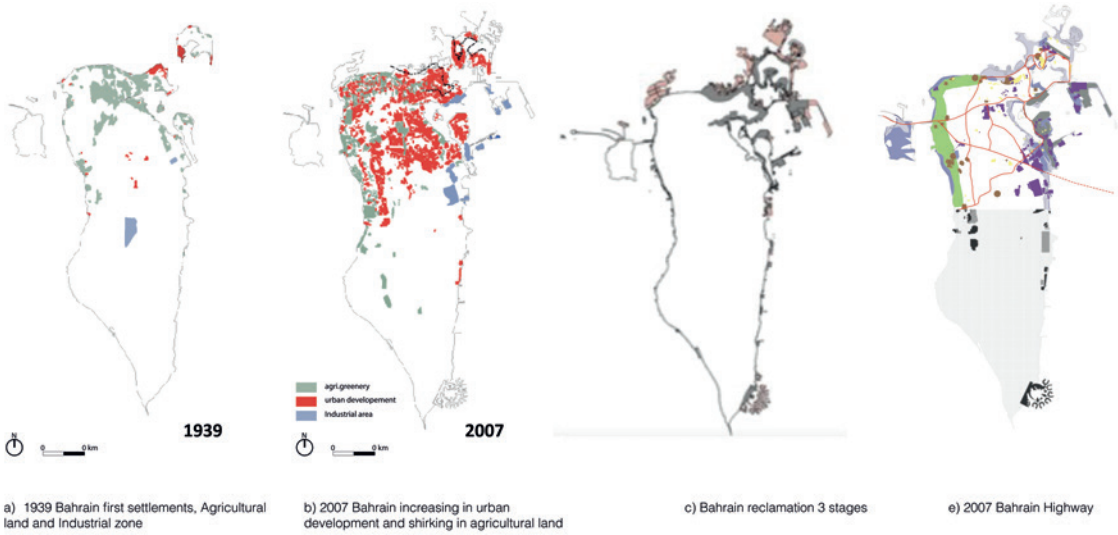


Figure 4. *Bahrain's Urban Development 1939-2007: Bahrain's evolution and significant urban development initiatives from 1939 to 2007. Initially, between 1939 and 1950, the predominant land use was agricultural. However, after 1971, there was a transition towards residential and commercial development, with a notable increase in urban construction during the 1990s (Source: Thematic maps ETH, Gugger Bahrain Lessons, 2010).*

lic. This situation has reached its climax, with only 8% of the total coastline areas of Bahrain now being public (Loughland & Zainal, 2009). This privatisation of the coastline also made it more difficult for local fishermen to access the sea. Although its contribution to the national gross domestic product is marginal, this had a significant sociocultural impact. In just half a decade, society moved from living at the rhythm of the sea to one that is nearly completely detached from it (Al-Ansari, 2009; Banchini & Al-Sayeh, 2010).

The relatively rapid complexity of planning involved with these megaprojects, new towns, and gated communities marked a departure from cities' former incremental slow urban growth and their relation to their direct social and economic-driven urban system. This in turn marked a new era for mid-20th century planning approaches. Al-Sayeh claimed that with this superficial idea of modernisation, there was little need to deal with or integrate with the rest of the urban fabric (Al-Sayeh, 2016).

1.2. *Muharraq Island*

The second main island in Bahrain is Muharraq, which is smaller than Bahrain island. Figure 5 presents maps of Muharraq in 1812 and the 1930s. The 1812 map depicts Muharraq island with the shape of a crescent containing two towns, namely Muharraq and Hid, with two small islands containing Arad village in the middle and Bu Maher Island south of Muharraq town, in addition to four villages in the north coastal line of the island (Busaiteen, Dair, Semaheej, and Galali). The 1930 map depicts Muharraq island made up of three tips: the southwestern tip represents a small peninsula of Muharraq town; the Hidd town tip to the southeast, which is similar to 1812; and Arad Island merging with Muharraq to form the third tip in the south-central part of the island. Muharraq town is separated from the Arad peninsula by a shallow bay that is mostly dry during low tide. Bu Maher island merges on the south side of Muharraq town and occupies some coral reefs and a fort. On the island's north side remain three villages, namely Dair, Semaheej, and Galali. Muharraq's old town has a defined position on the peninsula and is surrounded by the sea from three sides. The only free side allowing Muharraq town to extend was the north, occupied by the main cemetery, Busaiteen village, and the former British military base and residence in the 1930s. The city does not have many open sides except for some limited small parts, such as the north-eastern corner and the coastal side up to Busaiteen

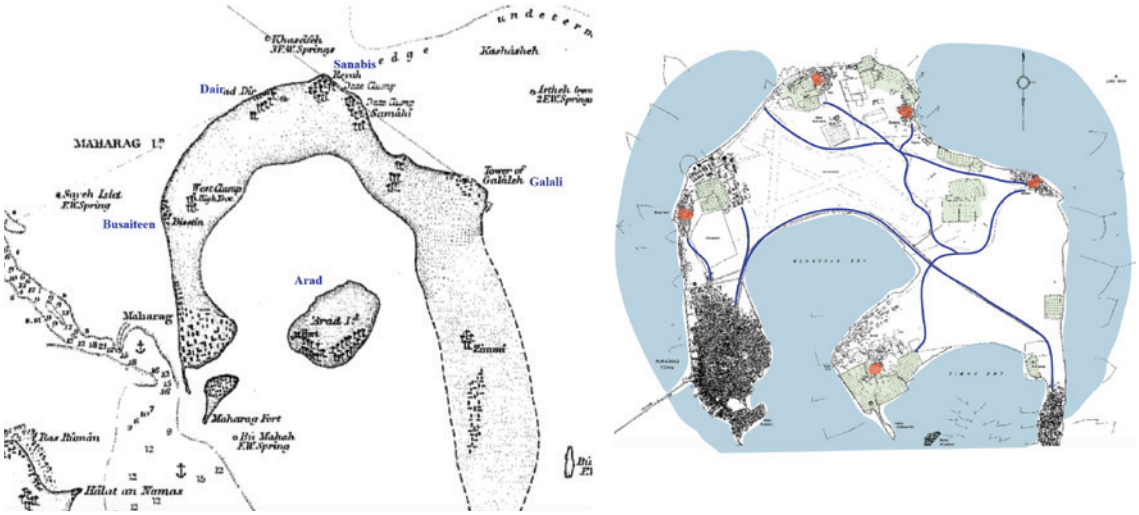


Figure 5. *Muharraq in 1817 (left side) and the 1930s (right side): The 1817 map depicts Muharraq island with significant villages (blue font); Arad village is on a separate small island to Muharraq island (source: Jarman, 1996). The 1930s map reveals that Arad Island has merged with Muharraq's larger island (Source: Bahrain, Idart Al Misahah [in English survey department; later transferred to Ministry of Housing, urban development department]).*

village. The city's position might justify its growth deficiency compared with Manama. When examining historical maps of Muharraq, one is struck by the fluidity of the coastline (Yarwood, 1988: 76). A large area of the reef is exposed at high tide, which may have sometimes made the coastline slightly ambiguous. These shallows provided the basis for the gradual process of land reclamation, which allowed the town to grow.

In Muharraq, the Souq is a long thin shape along the former west coast – that is, facing Manama – as demonstrated in Figure 6. This arose on the coastline for three reasons: "[A]nother suitable land was taken up; it was a major route linking the outlying areas to the Manama ferry boats (by passing the alleys of the town) and ships could unload there. The attenuated form arose because it was easier to extend along the coast before expanding by reclamation into the sea" (Yarwood, 1988: 78). Some caution is required in identifying the most important routes in Muharraq. The modern pattern is deceptive because several new links have been added over the last 40 years, which obscure the significance of the historical pattern (Yarwood, 1988). As Figure 5 indicates, Sh[4]. Hamad Road and Sh. Isa Road were widened between 1983 and 1985 along their entire length. Before this, smaller schemes were also undertaken, and it initially ended by the northern courtyard of Sh. Hamad house.

This was partly demolished around 1960, and the road was extended to meet up with Sh. Isa Road. The original layout gave importance to Sh. Muhammed Road as a north-south link, but after the road extension schemes, Sh. Isa Road became far more critical as such a link. Sh. Isa and Sh. Muhammed roads were crucial links between the villages to the north (which contained the summer palaces of the rulers). Sh. Hamad Road and Sh. Abdullah Road linked the central palaces to the coast, and hence the ferries to Manama. There is also a ring road, mainly along the former beaches (Al-Khalifa Road / Sh. Abdullah / Bu Maher Road / Road 1123) but also Wali – Al-Ahd road, which was a route from Dair and Semaheej villages to the Souq and then to the Manama ferry along with the northern limit of the built-up areas, as it was in the 1920s (Yarwood, 1988: 79-80).

Furthermore, Muharraq town differed from Manama town in its identity, entity, structure, development, and history. Muharraq represented the national capital of Bahrain. It was the capital of fishing in the period of Bahrain's prosperity, as it had central markets and shipbuilding slipways. After the two cities were connected, consequences included the diminishing of many city

4. The initial 'Sh.' indicates Sheikh, a title of a ruler/leader of tribe in Arabic.

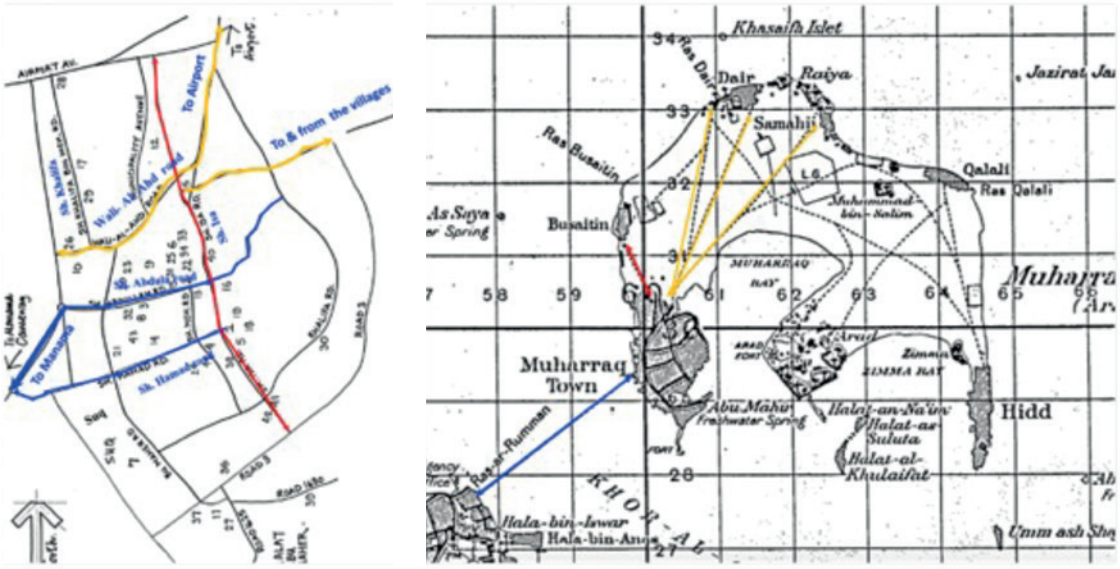


Figure 6. *Muharraq's main routes and links since the 1930s or earlier (Source: Yarwood, 1988; modified by the author).*

functions, which in many cases led to their extinction. If this connection affected the morphology of the city, then its timing in the urban and economic growth period (which relates to the economies of oil and trading) contributed to making Muharraq just a residential suburb near Manama.

1.2.1. Concentration and Diffusion of the Urban Centres in Bahrain in the 1970s

A human geography study in 1975 observed a large number of settlements concentrated around Manama and Muharraq within a 5-km circular radius (Figure 7). These two towns together formed 58.5% of the population of Bahrain (1971) and had more than 63.2% of the total housing units on the islands. By count, all settlements within the 5-km radius accounted for 70.2% of the whole Bahraini population. By extending the circle to a radius of 8 km, this figure reached 81.7% of the total population. The study raised the question of whether this concentration is an elementary characteristic of settlement in Bahrain. The suggested methodology for answering this question used Peter Haggett's formula of locational analysis in human geography (1965) by measuring the degree of concentration and diffusion between the urban centres of Bahrain.

Figure 7 presents the 1970's urban centres in Bahrain in the map used for the human geography study. Haggett divided his location analysis into two main parts. First, models of locational structures were organised around identifying five distinct regional geometric structures: movement – interaction among points; networks – lines of linkages among points; nodes – the convergence of lines of linkage; hierarchies – differentially sized nodes; and surface – spaces separating hierarchical nodes. The second part was a locational analysis with mathematical procedures (Haggett, 1965). The mathematical formula of this concentration and diffusion was as follows: $Rn = 2D \sqrt{N/A}$, where D is the average distance between urban centres, A indicates the area of the urban centres, and N is the number of urban centres. For Bahrain, the concentration degree varied between 0 to 2.15, where zero indicates highly concentrated centres of distribution, 2.15 means a highly ordered distribution, and 1 indicates a disordered concentration distribution between urban centres. By measuring each urban centre within the three main inhabited islands in Bahrain of Manama, Sitrah, and Muharraq as key administrative units, the study obtained the following findings: for Bahrain island, which includes Manama, the degree of the urban centre's concentration-diffusion Rn reached 0.733, demonstrating an inclination toward concentration. Simultaneously, it was characterised by some randomness in the distribution. The convergence distribution distance demonstrated in the area surrounding Manama

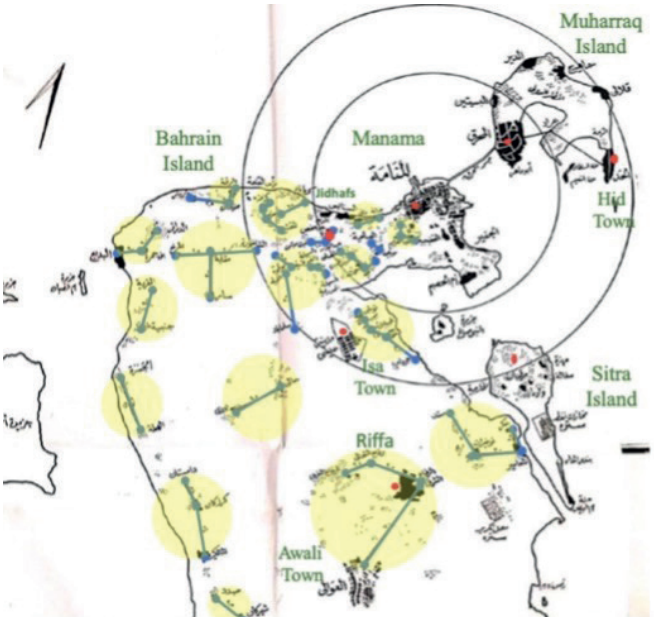


Figure 7. *Map of Bahrain in 1971: The figure reveals that the large concentration of villages and town centres around Manama and Muharraq are within the 5-8-km diameters. The red dots indicate the seven towns in Bahrain (population > 5,000) while the rest are villages. Sitra and Jidhafs were originally a number of small villages next to each other that merged. The yellow circles indicate the closest distance between the villages. Isa town was the first public housing project, and Awali town was the first privately planned town for the Bahrain Petroleum Company (Source: ALECSO, 1975: 304).*

was between one quarter to one half a kilometre. On the western side of Bahrain, the figure was between 1 to 2.5 kilometres, while in the south it increased to 3 to 6 km. These differences in distances between various localities might confirm the feature of relative randomness in distribution between the centres on the largest island. On Muharraq Island, the Rn measure reached 2.01, which indicates close to orderliness in approximately seven centres. They were all located at semi-equal distances that ranged between 1.5 and 2.5 km, while simultaneously all centres lay around the perimeter of the island. For Sitra island, the Rn was 1.64, indicating a mixture of regularity and randomness in distribution and distances. By measuring the distances between eight village centres, the study found that the average distance of the nearest neighbour was half a kilometre for five of them, while it was 1.5 km for the other three.

2. Part Two: The Urban Village

The first part of the paper underscores the pivotal roles of agriculture, fishing, and pearling in shaping Bahrain's economy since 1937. It also examines the interconnectedness between cities and villages facilitated by road networks. The decline of agriculture in the 1930s prompted the conversion of palm groves into private gardens and housing, while the pearl industry suffered from the rise of cultured pearls in Japan during the 1920s. Additionally, urban development initiatives such as land reclamation, road construction, and public housing expansion were implemented to accommodate labor migration. These transformations signify Bahrain's transition from a pearl-driven economy to a modern hub of commerce and culture, illustrating how remote villages became absorbed into urban centers. The second part of the paper is divided into two sections, which present the features of the village layouts: The first section is based on a geographical study conducted in the 1970s; followed by a study by Al-Nabi on the urban development of the surrounding villages before 1950 and after 1970. Then, it explores the recent physical features of the village arrangement and the most current social data available.

2.1. *Village Morphology Study from the 1970s*

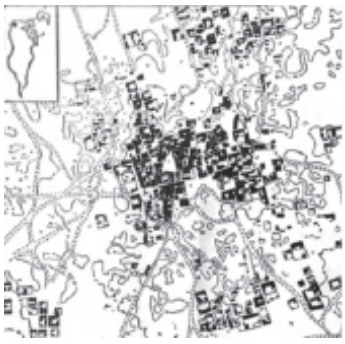
As mentioned earlier, the position of water resources for irrigation and the shallow shoreline are the main natural factors for the emergence of villages in Bahrain (ALECSO, 1975; Larsen,

1983). In Bahrain, villages mainly serve the fishing and agriculture industries. Agricultural villages are characterised by their small size, which does not exceed 0.2 km^2. Their houses are mainly courtyard houses, often with small and narrow rooms. A small narrow alleyway separates the houses and they comprise of a compact system of blocks surrounded by palm groves and agricultural land, as demonstrated in Figure 8b. These palm groves act as soft barriers between the villages and their surrounding context and allow for more control of the village's waterfront (Al-Ansari, 2009).

The second type, fishing villages, is marked by relative detachment from agricultural territories, with houses characterised by wide courtyards with several rooms. A wide street exists between the houses along with a dispersed system of blocks nearby the shoreline. Most villages in Bahrain are a combination of the two types, to serve both agriculture and fishing activities, since most are positioned on cultivated land with a water source as well as near the coast, as demonstrated in Figure 8c. Two main orientations of streets in the villages have been noted, one extending towards the two different sides of a shoreline or field areas located at the periphery of the village, by crossing the centre of the village, as demonstrated in Figure 9a, and another street extending from the shoreline at the edge of the village, crossing it in the centre, and then extending towards the main road that connects to other villages or the main city, as seen in Figure 9b.

The new road network had a significant effect on village layout extensions, mostly on the distance between the new main roads and the location of the village, as observed by the geogra-

a. Arad village as a peninsula surrounded with the sea from three sides

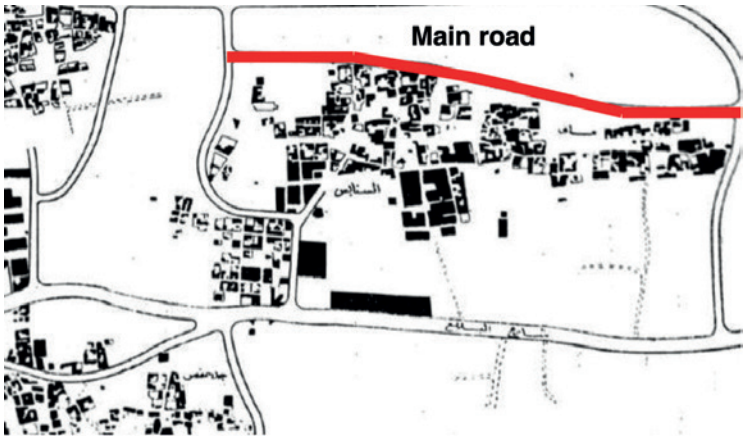


b. A compact arrangement

c. A dispersed arrangement

Figure 8. *Bahrain village morphology in the 1970s study: the village examples in (a) an agricultural village, this map indicates Arad village in Muharraq to illustrate the features of agricultural villages (Source: Survey and Land Registration Bureau, Bahrain). b. A village with a concentrated or compact arrangement of buildings (c) are more discrete or have dispersed arrangements of buildings, while the houses are larger than those of other villages, with a wide street extending along the shoreline (Source: ALECSO, 1975: 306, redrawn by the author).*

a. Mahuz village in 1956 extended a street to connect with the main road a few km away



b. Sanabis village 1970's extended a line with the main road that passes by in the periphery

Figure 9. *Two types of village extension depending on the distance between the village and the new main road. a. The village extends linearly towards the new main road (Source: Survey and Land Registration Bureau, Bahrain). b. The village extends linearly in line with the main road, which crosses the village in the centre (Source: ALECSO, 1975: 306, redrawn by the author).*

phy study in 1975 (ALECSO, 1975). For instance, some new main roads crossed the village into their centres. Later, new buildings from the village extended linearly around the road. Subsequently, the village took on a more rectangular shape. A number of village streets are connected with this main road, as demonstrated in Figure 9a. On the other hand, some villages were relatively far from the new roads, and they were later extended with new buildings towards the new road but connected by one or two roads from the village, as demonstrated in Figure 9b. In addition, with the decline in agriculture, the surrounding properties of the agricultural fields, which are away from the main streets, became relatively cheap. These affordable properties allowed for the vast expansion of the village to occur (ALECSO, 1975: 315). The ongoing extension of villages raises expectations that more newcomers from the cities or surrounding areas may be attracted to settle due to the cheap price of renting and reasonable properties.

2.2. *The Urban Village Today*

In 2012, the Information Affairs Authority published a book titled *The History of Land Use and Development in Bahrain*, which was written by Al-Nabi. It was documentary account of 30 years of work by Al-Nabi as a chief town planner for the Kingdom of Bahrain, from 1971 to 2011. Al-Nabi declared that village planning was not a priority in the Bahraini plan-

ning department before the 1960s. Essentially, the villages were covered by Master Plan 1988 mainly because of the availability of some government-owned land adjacent to those villages (Al-Nabi, 2012). Most of the constructions from the Master Plan were used for public buildings and services, such as public housing, schools, and health centres, as seen in Figure 10. The book indicates that the land uses and functions of the villages' areas differ significantly between commercial use, residential use, and mixed use, as proposed in 1988.

Figure 11 depicts the transformation of village landscapes in Bahrain from the 1950s to the current urban layout. Initially situated near shallow shores and surrounded by agricultural fields, villages evolved due to shifts in the economy. With the decline of the date trade in the 1930s, agricultural land was sold at discounted rates, leading to increased private property ownership and the conversion of former date groves into private gardens and residential areas. State-led land reclamation efforts further altered the coastline, prompting the strategic relocation of coastal villages several kilometres away from their original shorelines. This multifaceted reclamation process unfolded in distinct phases: commencing with a gradual initiation in the 1930s, accelerating into rapid expansion post-1964, and culminating in the meticulous development of mixed-use buildings and artificial islands from the 1990s through 2007.

In 2008, the northern area municipality launched a proposal to demolish several urban villages and replace them with a new urban development plan, including new street net-

Reclamation location and proposal project northern side Naim village for a central market

Aerial Photograph of Naim, in 1966

Detail plan of south Naim village urban planning proposal

Figure 10. *Villages neighbouring the old city, such as Naim in Manama. Orange indicates a residential area, yellow indicates a school, green indicates public parks, blue indicates hotels, pink indicates commercial areas and offices, grey indicates a post office, and purple indicates shopping areas (Source: Al-Nabi, 2012: 55, 78).*

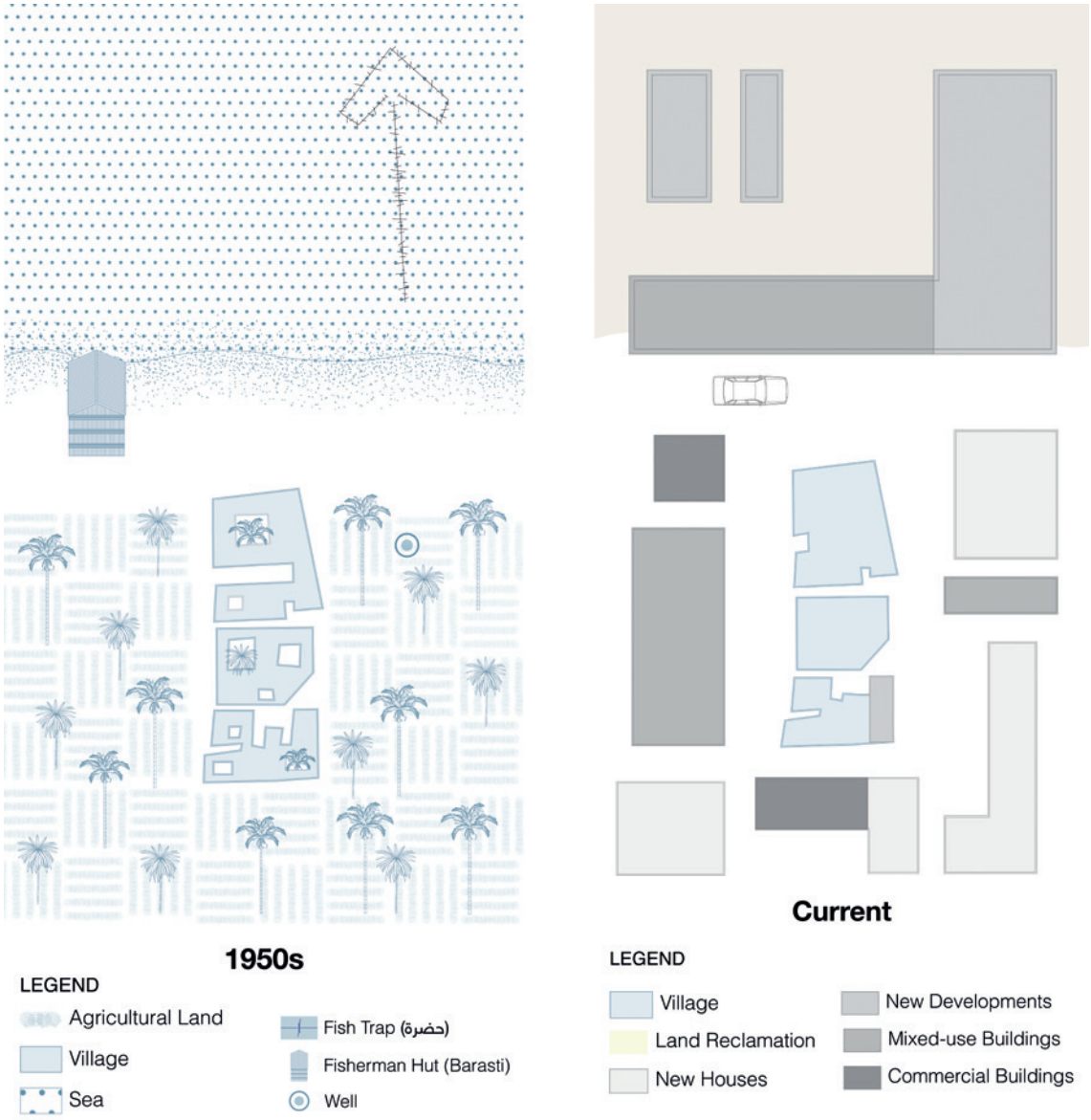


Figure 11. *The Evolution of villages in Bahrain: Transitioning from coastal idylls to urban hubs: Originally, villages in Bahrain were near the shallow shores, surrounded by agricultural fields. The decline of the date trade in the 1930s led to the sale of agricultural land at low prices, mainly to wealthy merchants, increasing private property ownership. The rise of a monetary economy transformed date groves into private gardens and housing. The relocation of coastal villages several kilometres away from their original shorelines was initiated due to state-led land reclamation efforts, which aimed to fundamentally change the function of the coastline, considering the sea as Bahrain's state-owned property. This reclamation process unfolded in phases: a gradual start in the 1930s, followed by rapid expansion after 1964, and culminating in the strategic development of mixed-use buildings and artificial islands from the 1990s to 2007.*

works, new types of housing, and various commercial services, such as supermarkets, as demonstrated in Figure 12. This was considered the solution to upgrading villages, especially with their narrow streets, which created difficulties for traffic and restricted contemporary life, without consideration of any social aspects. However, the community refused these proposals.

Summary

This paper has presented historical evidence about the nature of urban growth and urban development in Manama and Muharraq in Bahrain. The cited 1975 study revealed a key ele-

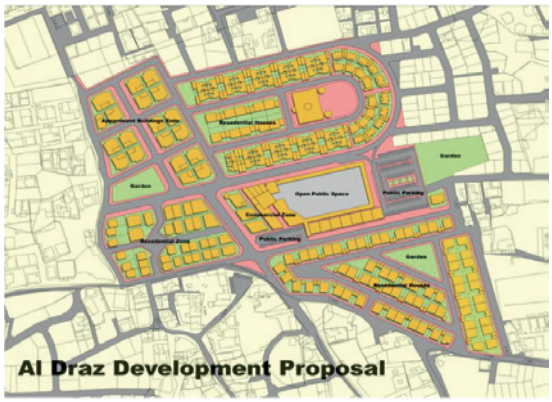
ment related to the distance between the city and villages, indicating significant differences in distance between the settlements in Manama compared with Muharraq Island. Manama's old centre emerged closer to the villages on Bahrain island, possibly due to its function as one of the main markets and a port for world trade networks. Furthermore, the study found that some suburban villages, such as Bilad Al-Qadeem, became important internal markets that mediated between the Manama Souq and the remote villages in the west of Bahrain (see Figure 10). As Larson (1985) claimed, the arrangement of villages and the evolution of their hierarchy are clearly affected by natural factors. There is a correspondence between the number of springs and the number of villages, which downplays the role of the market centre as the dominant variable in the arrangement of villages. This suggests that Bahrain's trading centre may have developed from pre-existing concentrations of semi-differentiated villages near artesian springs (Larsen, 1983: 20). The 1970s geographical study wondered how remote villages would respond to the upcoming rapid urbanisation process: 'Have they evolved into nothing more than simple settlements "implanted" in a context they have no economic or cultural connection to? Or might they expand and grow to form a new town centre?' (ALECSO, 1975: 320). This question has not been adequately addressed to date.

Furthermore, it has been suggested that the two cities have a significant difference. First, the nature of the spatial arrangement of Manama as a whole varies compared with that of Muharraq. There is a sharp division on Muharraq island due to the large void in the middle created by Bahrain International Airport, which almost splits the island into three zones: north, southeast, and northwest. This might affect the degree of buildings' compactness as a whole. By contrast, Manama had wide agricultural fields and palm groves as its backyard. Furthermore, the geometric grid of the old cities differed in length and shape. Second, Manama functions as a commercial centre for Bahrain, while Muharraq is dominated by residential use. Third, the reclamation process surrounding Muharraq and Manama has occurred in all directions along the natural coastlines. However, the urban development for filling these reclamation properties has differed in function between residential, commercial, and mixed uses. These functions impact the shaping of the density and block sizes of the new developments that surround the villages.

Notably, not all villages have a similar morphology of space arrangements, specifically in relation to the building or block size and the degree of their compactness to dispersed distribution. These morphological differences seem to be related to the village's function between fishing activities or/and farming activities, where village composition and distance to the surrounding natural seating of the shoreline and the density of the agricultural land play a role in their spatial arrangement. It was found in the 1970s that there are two forms of villages in Bahrain – one circular in shape and another linear or rectangular in shape. Usually, the linear village layout informally extends along the shoreline and serves as a fishing village; those located away from the coastline tend to be circular in shape and surrounded by palm groves and agricultural fields; and some combine fishing and farming as they are based on both.

The study also demonstrated how the villages extended in relation to the new street networks, which depends on whether the main street crosses the village or crosses near the village. Moreover, the connectivity of the village with new street networks is not always the same. Some villages are surrounded by main roads with links, while others have no such connections. In addition, the urban interventions and urban planning development of land uses of the area surrounding the villages differ significantly between commercial, residential, and mixed use. Therefore, these physical characteristics and backgrounds of the village and their context are essential in making these villages understandable within the urban context of Bahrain. Next, the study attempts to provide a configurational account of Manama and Muharraq by analysing space syntactically. It investigates the spatial characteristics of how the villages' spaces are embedded within the broader urban context.

Al Diraz village on the west coast of Bahrain



Al Diraz village development proposal 2008

Karzakan village on the west coast of Bahrain

Karzakan village development proposal 2008

Figure 12. *An urban planning development proposal for several villages on the northern sides of Bahrain: the northern municipality proposed demolishing urban villages to make way for a new urban development plan, including new streets, housing, and commercial services like supermarkets and parking (Source: Northern area Municipality, 2008).*

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“Stadtatlas” as Methodical Tool in the Urban Planning Process

Martin Ebert[1]

Abstract: In the 13th century the dukes of Mecklenburg granted German town privileges to about 40 towns. These towns were planted in the interior of the country and create the backbone of the spatial structure in the region up until present day. These small urban communities share common traits such as geometry, market-square and the structure of the urban institutions. The morphological structure and the urban tissue of these towns is very distinct. These urban settlements are subject to an interdisciplinary research by historians, archaeologists, architects and urban historians. As part of the project Research on the Urban Heritage of Medieval Mecklenburg RUHMM a “Stadtatlas” is used as a tool to communicate research results to both the scientific community, stakeholders and the interested public. The “Stadtatlas” is structured as method of mapping and presenting informations from historical records, archaeological research, architecture and morphological analysis. By nature the “Stadtatlas” is a result of an interdisciplinary approach on the research on the urban heritage of these towns. The first volume of the Stadtatlas is about to be published in summer 2023. The contribution will show how the “Stadtatlas” as methodical tool is used to create narratives for contemporary urban planning. Based on the example of Woldegk and Malchin the contribution presents the result of processes where interdisciplinary research has generated motives and solutions for the urban renewal of these towns. The contribution intends to document positive effects of EBD creating lasting results for a sustainable future in small urban communities.
Keywords: Historic Towns Atlas, Narrative-based Urban Development, Medieval Town, Mecklenburg.

Introduction

This contribution intends to illustrate how historical and morphological research can contribute to developing narratives that improve sustainable urban renewal projects. Based on the work of the Research on the Urban Heritage of Medieval Mecklenburg (RUHMM), a historic towns atlas project is about to be realized. The effort includes scientific publications (a town atlas) and public outreach efforts such as public talks and publications. Finally, the contribution illustrates a case in the small Mecklenburg town of Woldegk, where a project based on historic narratives and morphological research is about to be realized.

1. Towns Atlas as a Tool of Historical Research

The depiction of urban settlements on maps has been conducted since the time of the Mesopotamian civilisation. Renaissance artists, such as Wenceslaus Hollar and Merian, primarily

1. NMBU.

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produced maps for documentary or military purposes. However, the subject of comparative historical research based on maps gained relevance at the end of the 19th century. While the history of the towns atlas as a tool of historic research is published in detail by Ehbrecht (2013), and Clarke and Simms (2017), the following introduction shall provide a short summary for the purpose of this contribution.

The idea that the geometry of the urban form could be linked to cultural phenomena already took hold in the 19th century. The cultural historian Wilhelm H. Riehl thought that the town plan of Augsburg would "express the spirit of its people in material form" (quoted after Simms, 2010: 2). In the shadow of growing awareness of the fading medieval culture in middle Europe at the time, the Strasbourg schoolteacher Johannes Fritz collected a number of German town plans and published them in 1894 (Fritz, 1894).

In the face of industrialisation and the formation of national states, the desire to shape ethnic and cultural identity introduced a golden age for the systematic collection of historical and geographical data. Although based on historical research and cadastral maps, this effort was driven by the expectation of uncovering "keys to the region's urban identity" (Conzen, 2008), leading to an over-interpretation of findings for the purpose of the contemporary narratives of the 19th and early 20th centuries.

The creation of simplified standard-patterns for street geometry and other morphological shapes, such as planned towns and organically grown structures, was used to construct a historical narrative influenced by the national ideologies of the age. By linking historical data and morphological form to ethnic origin, urban morphology became a tool in the attempt to legitimize concepts of the cultural superiority of certain ethnicities, especially while describing the *Ostexpansion* of the 13th and 14th centuries.

Despite its ideological shortcomings, the period of historical research up until WWII produced a great number of valuable encyclopedias, such as *Mecklenburgisches Urkundenbuch* (1863-1913) (Verein für Mecklenburgische Geschichte und Altertumskunde, 1863), Schlie's *Kunst und Geschichtsdenkmäler Mecklenburgs* (1896-1901) (Schlie, 1898), Krüger's *Kunst und Geschichtsdenkmäler Mecklenburg-Strelitz* (1921-1934) (Krüger, 1921) and Erich Keyser's *Deutsches Städtebuch* (1939-) (Keyser, 1939). Regarding the work on towns atlases, the publication of Paul J. Meier's *Niedersächsischer Städteatlas* in 1922 (Meier, 1922) marked a milestone. Meier recognised the need to supplement the maps with explanatory texts, such as summaries of the town's history and significant urban institutions for the development of the urban structure, such as monasteries or hospices.

While urban historians worked on the standardisation of comprehensive methods in the middle of the 20th century, creating the idea of a "Städtebuch" (Ehbrecht, 2013), the initial concept of capturing the cultural essence, the genus loci, of a town by studying and interpreting its town-plan, became discredited. The ethnocentric debates over whether the rectangular town plans that began to appear in planted settlements east of the Elbe somewhat after 1200 should be linked to the continuous settlement efforts of German-speaking people delivered the narrative to justify German occupation in Eastern Europe during WWII. Keysers active role in the ethnic classification effort on humans at the Institute for Racial Studies of the Danzig did no good to the purpose of historical studies in this field.

After WWII, the International Commission for the History of Towns (ICHT) initiated the publication of historical town-atlases. However, their effort mainly focused on a phenomenological plotting of cartographic data based on the Urkataster of the 19th century.

Based on proposals by Heinz Stoob (Simms, 2010), an associate of Keyser, the ICHT agreed in 1968 on a methodical frame for the now pan-European town-atlas project (Opll, 2011). According to Conzen, Stoob's recommendations were based in large part on a structure Meier had used for his 1922-atlas (Conzen, 2008). This framework serves as the basis for

an ever-growing number of contemporary Stadtatlas-projects in 20 countries, publishing atlases for 581 towns as of September 2020 (Simms & Opll, 1998).

2. The RUHMM-Project

In the 13th century, the dukes of Mecklenburg and Brandenburg granted a variation of German city laws to 43 towns in the area today known as Mecklenburg. These towns were primarily established in the interior of the country and formed the backbone of the region's spatial structure up to the present day. These small urban communities share common morphological traits such as their position in the landscape, the layouts of streets and markets and the position of urban institutions such as churches, hospices, wells, and mills. The morphological structure and urban tissue of these towns have remained very distinct to this day.

Historical research from the early 20th century exclusively links the early history of these towns to the settlement activities of German-speaking settlers introduced to the area by the feudal lords (Hoffmann, 1930). However, later research suggests that, although the granting of town privileges was unknown in the Slavic period leading up to the 13th century, the existence of urban settlements was not unknown to the area even before German-speaking settlers were introduced to the area. The role of the then-indigenous Slavic people has since being re-evaluated, as Jegorov already proposed in 1915 (Jegorov, 1930) and later research shows (Biermann, 2013). Regardless of their cultural origin, the town-plans of these 43 towns are to be seen in themselves as a factual historical source. The fact that the towns were devastated by urban fires in the middle ages and especially during the early 18th century has led historians to believe that the morphological structure of plots, streets, and urban institutions had to be discredited as a source of information about the earliest period of town formation. But in fact, only a small number of towns were laid out from scratch after large urban fires in the 18th century in their entirety (Boizenburg, Dömitz). Archaeological reports from Malchin (Jänicke, 2015) and Woldegk (Jänicke, 2019) show that both street layout and plot structure found in the Urkataster maps of the 19th century have to be seen as a window into the morphology and geometry of the earliest period of town formation in significant parts of these two towns.

The selected urban settlements in Mecklenburg are subject of interdisciplinary research by historians, archaeologists, and architects as part of the Research on the Urban Heritage of Medieval Mecklenburg (RUHMM). The goal of the project is the compilation of all data and documents relevant to the genesis of the urban form in these towns, focusing on the period between the earliest period of settlement and the Reformation in 1552.

The gathering of data from different research milieus such as urban history, archaeology, cultural heritage, and morphology has posed a persistent methodological challenge for the project. Historical records, observations, archaeological reports, and statistical and cartographic data need to be presented systematically to allow for comparative analysis. In 2021, Ebert proposed a systematic method for gathering relevant data in a matrix structure (Ebert, 2021), similar to Keyser's systematic tabulations in *Deutsches Städtebuch* (Keyser, 1939). The method was presented at a seminar in March 2022 and later redefined based on critical feedback. The now-adjusted structure serves as the basis for the first volume of the *Mecklenburgischer Städteatlas*, which focuses on the town of Malchin. Malchin, founded in the early 13th century and granted town privileges in 1236 will have its town-atlas published by the RUHMM-project in 2024.

Figure 1. *Map of planted towns in Mecklenburg (Source: illustration by the author).*

Figure 2. *Urkataster-map of Malchin (Source: illustration by the author based on Urkataster-map from 1867, revised in 1929 and 1940, provided by Landkreis Mecklenburgische Seenplatte).*

3. A Short History of Planted Towns Through the Mirror of Cadastral Maps

The town of Malchin received its privileges on April 7th, 1236, from Nikolaus, duke of Mecklenburg-Werle (1210-1277). During his reign, seven urban settlements were granted town

privileges, earning him the title of "town founder". Although the settlement received its privileges from the dukes of Werle, it was likely established at a time when the area was still ruled by the dukes of Pomerania. The oldest archaeological finds of corduroy roads north of the market square date to the second decade of the 13th century. The significant discovery of these corduroy roads indicated that the rectangular road structure of Malchin predates the town's privileges by at least 25 years. Even the width of the streets in the 13th century resembles the geometry depicted in the Urkataster-maps, as the streets consisted of two parallel corduroy roads, aligning the front of the buildings with their documented position in 19th-century maps.

The burghers of Malchin gained increasing independence over time, as documented in the written documents of the 14th century. In 1367, the burghers destroyed the bailiff's house and negotiated an agreement with the dukes of Werle, freeing them from any obligation to host any ducal institutions inside the town walls.

The war of 1618-1648 devastated Mecklenburg significantly. The town of Malchin was looted 24 times between 1637 and 1639 (Brockmann, 1902: 47f). The following economic downturn and the decline of urban life were accompanied by devastating fires in 1663 and 1692, as well as a bombardment in 1761. At that time, the burghers of Malchin, once powerful enough to destroy the bailiff's house without major repercussions from the duke, had to see the town sink to the status of a small agrarian-urban community with slightly over 2000 inhabitants in 1805. Many buildings in the 18th century were stables and straw-covered houses, which were prohibited by council decree in 1757. In pre-1945 published photos, plastered half-timbered houses dating to the 18th and 19th centuries dominate the urban scenery (Böttcher & Böttcher, 1998). Only a few structures from the medieval period, such as the parochial church, the town-wall with two of its outer gates, and a small number of medieval brick structures, remain. Malchin suffered its largest loss of urban structure when the 2nd Belorussian Army laid fire to its buildings on April 30th and May 1st, 1945, destroying about 75% of the structures inside the medieval walls.

The reconstruction of destroyed towns in Europe remains a growing field of research. As of today, research primarily focuses on prevailing trends in urban reconstruction (Paul, 1985) and case studies of large cities, such as Munich (Enss, 2016), Warsaw (Popiołek-Roßkamp, 2021), and Vienna (Knauer, 2023). Only minor research has been conducted on the small towns of Mecklenburg, such as Neu Brandenburg (Wiesemann, 1993) and Anklam (Nutz, 1998).

Malchin was declared a "Wiederaufbaustadt, Kategorie III", meaning that resources would be prioritised for the rebuilding of the town. However, this classification also limited the

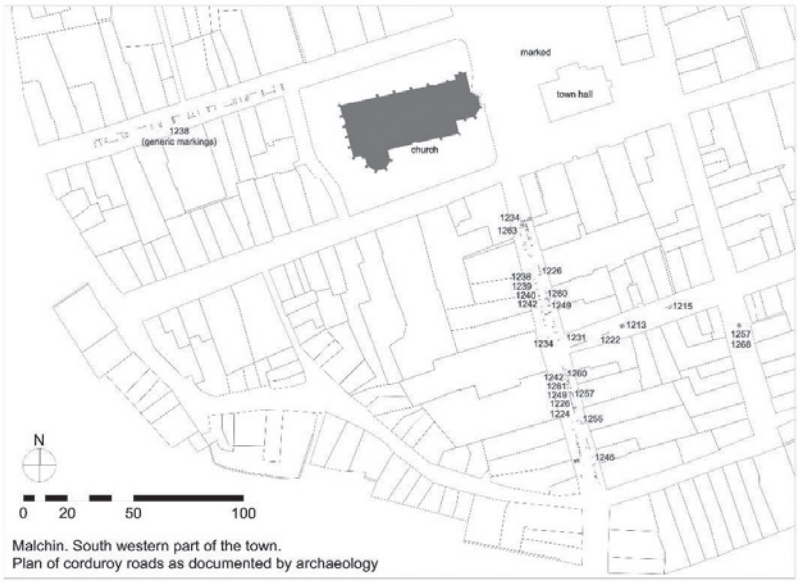

Figure 3. *Plan of corduroy roads in the south-western part of Malchin with dendro-dating documenting the continuity of the street geometry from the early 13th century until today (Source: illustration by the author based on archaeological reports kept by the LAKD MV).*

rights of private plot-owners, empowering authorities to seize large areas within the town. The rebuilding was conducted with industrial methods, mainly in the 1960s and 1970s. To enable industrial building technology, the historical plot structure and small-town volumes were abandoned. Since the town had been declared a "Wiederaufbaustadt", legal constraints were lifted from the authorities to dispose of the plots in the center of town. While some housing quarters were not rebuilt and would serve as parking lots, the remaining streets lost their geometry and spatial characteristics by having modern 4- and 5-story buildings retracted from the street.

The urban ideals of the post-war era followed the then-dominating view of "overcoming" the medieval past by modern housing, guided by the principles of the CIAM-ideology (Mumford, 2009).

4. From "Growth at Any Price" to Narrative-Based Urban Development

Initiated by the political changes in East-Germany, the development of small urban communities such as Malchin has been very dynamic since the early 1990s. Rapid de-industrialisation and the westward-migration of the well-educated workforce (Hannemann, 2003), resulted in a significant population decline in the small towns of Mecklenburg. In addition to the general population decline of 29% from 1990 to 2020, the historical centers of these small towns suffered additional population loss due to planning authorities regulating large areas outside the historic centers for suburban housing.

In effect, urban structures within the medieval town limits fell further into decay. Despite efforts by authorities to improve the urban infrastructure by renewing water and waste management and enhancing public roads and pedestrian walkways, a large number of historical buildings, mostly dating to the 18th and 19th centuries were subsequently demolished due to public safety concerns.

As the population decline came to a halt by 2010, it became clear that the historic urban centers of Mecklenburg faced massive structural challenges in preserving and rebuilding the urban culture inside the town walls. During the economic rise following the crisis of 2008, a great number of construction projects were initiated, especially in the towns close to the tourism centers by the Baltic Sea. While many of the projects involved leisure homes and holiday residences, a number of urban renewal projects were initiated, for example, the rebuilding of the quarter north of the marketplace in Malchin (2002-2014) or the Eastern marketfront in Woldegk (2004-2019), while plans to rebuild the North Quarter in Malchin had to be abandoned in 2019 due to a lack of interest.

Interviews with local authorities show that to incentivise investments, local authorities are increasingly willing to discard regulations introduced in the 1990 as guidelines for the urban renewal of small towns in Mecklenburg-Vorpommern[2]. In the small town of Tribsees, for example, local authorities undertake a program to acquire plots from the owners of small houses or deserted sites, merge them into larger plots, and sell them to potential investors. This approach has led to the erection of a large number of projects driven by property speculation rather than being rooted in the medieval plot structure or volumes resembling the typical small town culture of the area. Examples of such developments this can be seen especially in larger towns such as Rostock (Hansequartier), Neubrandenburg (Marien-Quarre and Marktplatz-Center), and Friedland (Stadt-Center). Especially the replacement of urban structures with mall-like centers featuring internal

2. Interview with Stefanie Timm, chief of administration in Recknitz-Trebeltal, 13th of September 2022, conducted by the author.

street systems poses a significant threat to the urban character of the medieval town centers of Mecklenburg.

The danger in replacing the small-scale urban structures is to irreversible loss of these medieval heritage in these towns. Despite the low economic dynamics in the area, the projects have faced little to no local criticism. However, large-scale developments threaten the uniqueness of the small medieval town centers depriving them of the sources of local identity and opportunities for sustainable tourism.

Therefore, the RUHMM-project has set as one of its goals to introduce historical narratives into modern urban projects. By informing about the genesis of the small towns in Mecklenburg and popularizing historic continuities, the project aims to influence future planning processes in the medieval town centers of the area.

5. The Heiligen Geist Quarter in Woldegk as a Case of Narrative-Based Urban Development

The small town of Woldegk in eastern Mecklenburg was destroyed by Russian troops in the days after its capture in April 1945. Subsequent reconstruction efforts took place during the 1970s and 1980s with large-scale buildings made of prefabricated concrete slabs (Stadt Woldegk, 2014). During the population decline between 1990 and 2010, a great number of apartments fell empty.

The site of the former Holy Spirit Hospice, first mentioned in 1358 (MUB 8503), is situated on the north-western periphery of the town, positioned on the corner of the block, only a few meters from the former Brandenburg town gate. Followint the removal of the chapel belonging to the Holy Spirit Hospice by the council of Woldegk in 1796, it was replaced by two town houses in late baroque style. After the destruction of Woldegk in 1945, two four-story buildings were erected at the site in 1969, constructed using prefabricated concrete slabs with industrial building methods. These buildings were retracted from the sidewalks of the neighbouring streets by 10 meters to avoid the need to clear the ground from the remains of the cellars of the perished houses. After 1990, these two buildings also increasingly became vacant. Consequently, one of them was removed in 2021; while the second building, containing 32 apartments, is planned to be removed in 2024.

In the autumn of 2021, an architectural and urban-design competition was launched to develop the site on which the old Holy Spirit Hospice once stood. The historic hospice consisted of a chapel, removed in 1796, and at least an Almshouse as can be seen on the 1927-copy of the town-plan dated to 1580[3]. The memory of the former site of Holy Spirit Hospice had been dwindling to a degree that the town of Woldegk refrained from mentioning it in the announcement of the competition (Stadt Woldegk, 2021). Accordingly, six of the seven competitors failed to recognise the design potential of the historical link. Some of the design-proposals incorporated the medieval plot-structure on the site and featured designed structured volumes, while others focused on designing large scale buildings to fulfil the technical requirements of the developer.

The seventh design proposal, designed by Neue Heimat AS (Norway) and Milatz/Schmidt Architekten (Neubrandenburg), actively integrated consideration of the communal functions of the medieval Holy Spirit Hospice, connecting them with the communal functions required in the building program. The jury awarded this narrative approach with the 2nd prize (1st prize was not rewarded) and ultimately commissioned the project. The winning project related its approach to historic narratives by:

3. Landeshauptarchiv Schwerin; Reg. Nr. 12.12-2.

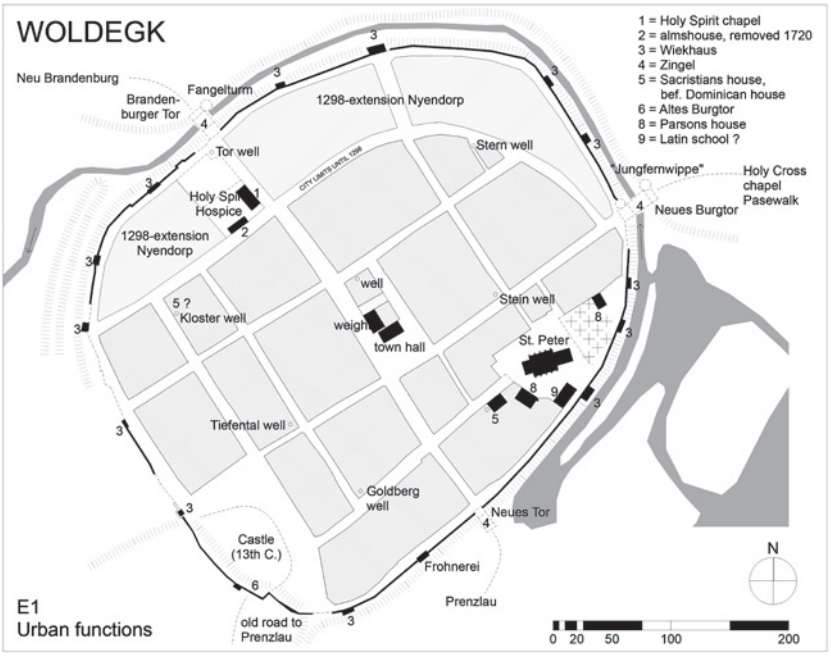

Figure 4. *Holy Spirit hospice in urban fabric of Medieval Woldegk (Source: illustration by the author based on digital data provided by Landesamt für innere Verwaltung MV).*

- Placing a community hall on the spot where the old chapel once stood, referring to the functional narrative of "community service".
- Recreating urban street- and block structure by placing volumes along the sidewalks.
- Adjusting volumes and building height in accordance with the historic plot geometry.

The knowledge of the history of the site and the opportunity to relate the urban renewal of the site to its history have given the project an advantage. Since the design competition was consluded in May 2022, the RUHMM project has mounted an outreach program to build the narrative and create public awareness for the design of the project. Two lectures held in January and May 2023 reached a numerous audience and were widely reported.

6. Historic Towns Atlas as a Methodical Tool in the Urban Planning Process

The case of the Heiligen Geist site in Woldegk illustrated how knowledge of historical narratives can help mediate modern design processes and promote local identity. A tool like the towns atlas as defined by the ICHT can help to both gather historic and cadastral data for the small towns of Mecklenburg. The RUHMM-project has therefore decided to implement the formal requirements of the European Historical Towns Atlas project at the same time as it proceeds with its original method presented in 2021. The necessity of supplying cartographic presentations with a detailed summary of the existing knowledge gathered by historians, archaeologists, and cultural heritage experts over time lies in the challenge of supporting both scientific research and public outreach.

Modern planning processes, whether mediated by public urban developers or private entities, require narratives rooted in urban heritage to develop small towns sustainably. These narratives help build identity, create opportunities for local businesses and promote tourism in the area. The combination of the traditional cartographic towns atlas and matrix-based historical research gives the RUHMM-project "Mecklenburgischer Städteatlas" an edge by providing both scientific methods, an interdisciplinary approach, and public outreach, making it a valuable tool in the future planning practice of the medieval towns of Mecklenburg.

The first volume of "Mecklenburgischer Stadtatlas" is scheduled for publication in 2024, putting the theory behind this tool for urban development to the test. The RUHMM-project

Figure 5. *Heiligengeist-Quartier. Winning entry of the design competition 2022, marking the street corner where the small tower of the Holy Spirit Chapel once was situated (Source: Neue Heimat AS, Norway, and Milatz-Schmidt Architekten, Germany).*

will monitor the effects of using the towns atlas to determine if it provides the anticipated results for a sustainable future in small urban communities in Mecklenburg.

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Description and Prescription in the Historical Centre of Rimini (Italy)

Martina Crapolicchio[1]

Abstract: A prescriptive act (such as a rule) cannot exist without a descriptive act (of restitution of form) that constitutes its founding relationship. Urban morphology, within a geographical and historical tradition, focuses on the rigorous and systematic description and explanation of the urban landscape (Oliveira, 2021), while urban codes are primarily in support of an urban vision (Dutton, 2000) from a prescriptive sphere-oriented perspective in the regulatory sphere. The relationship between description and prescription is the subject of a long debate in urban morphology. One of the central questions is how to derive prescriptions for regenerating the urban environment based on descriptions of the existing and its historical development. The debate today tends to focus on the need to make the descriptions provided by urban morphology more objective and scientific, with the expectation that an objective and scientific description should not, in principle, already be normative (Kropf, 2021). The city has long been the subject of studies involving different disciplines, and some works are based on the concept of the science of the city (Batty, 2013; Mehaffy, 2014). It is impossible to determine how cities will or should be built in the future, yet it is possible to outline the contours of urban rules and how their effects have influenced the city's shape. This research places current issues on urban coding in the context of studying the physical city (form) using the historic centre of Rimini (Italy) as a case study. The study offers an analysis of the evolution of the urban form of the historic centre of Rimini and its urban rules, reasoning on a broader discourse concerning the reform of urban codes. Through a morphological analysis based on traditional assumptions, this study uses design as a bridge between the study of urban form and the prefiguration of urban codes in the context of Italy's historical centres. The proposed result is a draft of urban rules that accommodate the flexibility of past and future urban transformations.

Keywords: Urban Form, Urban Codes, Urban Design, Historical Centre, Italy.

1. Rules and Physical Qualities

As argued by Ben-Joseph (2005), designers, planners and those who wish to work on the built environment cannot easily escape the obligation to create and maintain places where rules do not oust physical qualities. This thinking underlies the concept of quality of place and at the same time the flexible performance of urban rules in a formal action perspective. In this sense, codes could be used in a generative way, to specify generic urban elements and relationships, such as the type of building, the way buildings relate to the hierarchies of pathways, and so on, in order to create a number of variations around the formal theme. In a generative code, the codified elements and relationships are controlled,

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but the final overall form is derived from the identification of the emergent form. An *emergent form* or structure possesses constitutive characteristics or overall qualities that are not explicitly specified (nor necessarily provided for) in their mode of creation (e.g. rules of construction, aggregation, location, etc.) (Marshall, 2011). The concept of *emergent urban structure* refers to a configuration or pattern of settlement that develops spontaneously, without rigid planning or predefined design; it is composed on the basis of individual actions, user decisions and spontaneous adaptation processes and may appear to be orderly and well-organised, but is the result of stratification due to human actions and time. Historic centres fall into the category of emergent structures because they have developed over centuries: streets, buildings and public spaces have gradually configured themselves, responding to users' needs and social interactions. Studies on these concepts have been developed mainly by Christopher Alexander (1977; 2008) and Michael Mehaffy (2008; 2020) and declined into theories that build on these assumptions in the studies of Michael Batty (2005; 2018) on generative algorithms and the science of the city, and Bill Hillier (1996) on connection sets of spatial interactions. These approaches support the use of generative codes in place of master plans and can help consolidate a new way of doing cities (Plater-Zyberk, 2008). The theses of Alexander and the other academics, together with the theories on permanence and permutations developed in the Italian morphological sphere by Muratori (1959) and Caniggia (& Maffei, 1979), compose a framework in which urban form could be assumed as the main generator of codes and vice versa. In addition to the concept of *emergent structure*, from these methods it follows that the configuration of elements at one scale contributes to the design of integrated components at the next scale, creating an interlocking urban vision. For example, the combination of buildings and public spaces creates a certain type of street; or the combination of walls, doors and windows creates a façade. In fact, in traditional urban fabrics, based on the importance of the street as a route and matrix of settlements, there is an interconnected relationship between buildings, streets and public spaces (Marshall, 2011). In other words, elements tend to be composed of smaller sub-elements, which in turn contribute to larger elements or a larger whole (Alexander, 1977). The interaction between scales could help solve a problem highlighted by Christopher Alexander (1966) in his essay, *A City is Not a Tree*. This is a criticism of the overly simplistic hierarchical organisation of the urban environment, which does not allow for a rich complexity of overlapping elements, and of the apparent difficulty of urban planners in conceiving and achieving such complex overlapping arrangements on the ground (Alexander, 1966).

On the basis of these theories, the Rimini case study is developed, conducted with the aim of triggering urban regeneration mechanisms within the historic fabric, starting from its formal analysis and arriving at the definition of new guidelines. To achieve this objective, this article is divided into three fundamental parts. In the first section, 'Five forms (description)', the urban form of Rimini's historic centre is analysed, highlighting the main elements that structure the area. This part recognises urban structures enclosed in morphological clusters, i.e. parts of the urban fabric that present the same characteristics in terms of formal aggregation or building type. The second part recognises in each cluster the opportunity to hypothesise, on the basis of the formal analyses, a meta-design intervention, here called a device (from the definitions of 'dispositif' and 'device' by Foucault, Deleuze and Agamben). As a result of this process of analysis, in the third part, this contribution produces a synoptic matrix that proposes an a priori vision of the urban code, outlining a direction for the urban development of the historic centre (a portion of urban territory that in Italy tends to play a testimonial role, sometimes regardless of its real value).

2. Five Forms (description)

In order to accurately describe the consistency of the urban fabric of Rimini, it is essential to be equipped with the tools and techniques required to realise the complexity of the urban landscape. Recognising that the visible appearance of the urban environment is the outcome of processes that differ greatly in their logic and origins, and that these intersect and overwrite each other, leaving traces, albeit minimal, without a solution of continuity, defines the territory as a palimpsest that is gradually reshaped (Corboz, 1983). The sum of these processes represents an urban scenario in which transformations are difficult to reverse and whose sum constitutes the territorial fixed capital, which is the principle and the constraint for regeneration operations.

To set operational aims on consolidated urban fabrics, it is necessary to clearly define a certain number of elements that make up the urban structures of the historic centre. First of all, the presence of the structuring elements, i.e. the components of the urban environment that are almost unchanged and constitute the identity of the historic centre; these elements can be identified with the street pattern (as an overlay of Roman, mediaeval and later wall systems) and with the hydrography and natural elements (as in the case of Rimini, the Marecchia canal port). Secondly, there are settlement systems, i.e. urban agglomerations interdependent on structural elements, but also responding to internal rules (such as the old Roman insulae, now closed blocks; or open blocks, or linear or terraced agglomerations). Homogeneous morphologies are part of the settlement systems, defining a collage of areas characterised by certain densities, layout structures, and prevalence of building types. Homogeneous morphologies constitute certain taxonomies of urban forms, they are therefore groupings of aggregations of building and architectural typologies that present similar characters, inscribed within a morphological category such as closed blocks or urban fabric with typologies arranged in a line. The coexistence of such characters and the stratification of the processes of remodelling of urban materials constitute the hereditary and identity elements that the city shows today (Figure 1).

The description of the city's form structure is not a conclusion of the urban analysis, but an attribute that opens multiple design opportunities based on the understanding of the complexity of formal stratifications (Albrecht & Galli, 2021). Therefore, this kind of analysis allows to define a taxonomy of the built environment through the recognition of different forms of aggregation on the basis of typological units (Caniggia & Maffei, 2017). In the historic centre of Rimini, five homogeneous morphologies have been identified that contribute to defining its urban identity. These include a compact fabric characterised by blocks with stratifications, an urban fabric with special buildings, a fringe fabric with discontinuities of elevations, a fabric with buildings aligned along streets, and a fabric in which there are architectural units extraneous to the urban environment. These different morphologies contribute to creating a complex and varied picture of Rimini's historic centre (Figure 2). The different clusters were identified according to the types and aggregations defined by Caniggia and Maffei (2017) relative to basic buildings. The identified morphologies are:

a. The compact urban fabric, composed mainly of closed blocks, owes its configuration to the Roman-style street system.
b. Clusters with special buildings generate polarities due to their historical, architectural, political and religious significance.
c. Margin fabrics are configured by their variation with respect to the topography or anthropic elements.
d. The outlying villages, generated by the extension of the Roman road structure, present different forms and typologies compared to the central core.
e. Historical fabric with extraneous typologies out of scale, that generate blind facades.

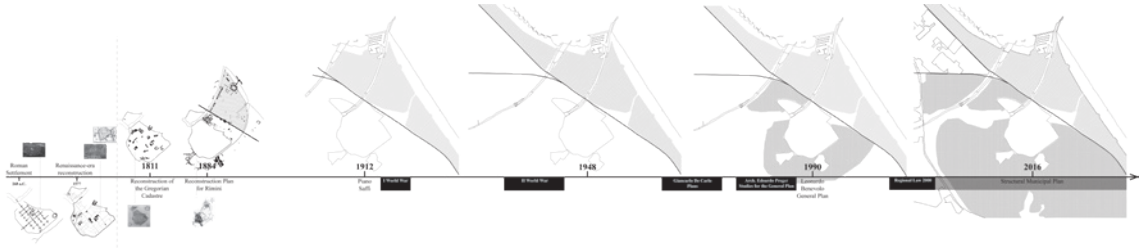


Figure 1. *Transitional morphology of Rimini's settlement (Source: author 2023).*

Figure 2. *Morphological clusters in the historical centre of Rimini (Source: author 2023).*

To understand these characteristics, each morphological cluster has been studied through the extraction of a tissue sample on which a morphological analysis and a meta-project (the *device*) has been conducted. Each *device* is useful not only to suggest prefigurations of the urban environment that conform to the identity of the places, but to generalise the reasoning from the sample to the remaining urban fabric with the same morphological characteristics.

The study of morphological clusters was conducted by analysing the formal transition of the sample urban fabrics, identifying repetitive characters and variations at each stage. The table (Figure 3) shows how the evolution over time brings out the typical characters of each sample and allows them to be compared. For example, it can be seen that in sample A, i.e. the one referring to the compact block fabric, it emerges that the curtain configuration of the blocks is sometimes betrayed by a porous character. In the second sample (B, fabric with the presence of special buildings) it emerges that the balance of the curtain is totally disregarded over time. In the sample of margin tissue (C), one notices the reconfiguration of the sample according to the margin communicating aspects of fragmentation and disintegration. Then, in sample D (fabric with buildings in line) the relationship between urbanisation and the street appears clear, and consequently the relationship between façades, building heights and building types. Finally, in sample E (urban fabric with extraneous buildings in relation to the surrounding buildings) the variations due to urbanisation phases are evident, but the discontinuities created by these typologies are not noticeable. In fact, one of the possible characteristics of extraneous buildings in relation to the surrounding fabric is that they conform to the aggregative principles of the fabric in which they are inserted (since they sometimes replace other units) but present architectural and typological characters that are clearly different from the surrounding fabric.

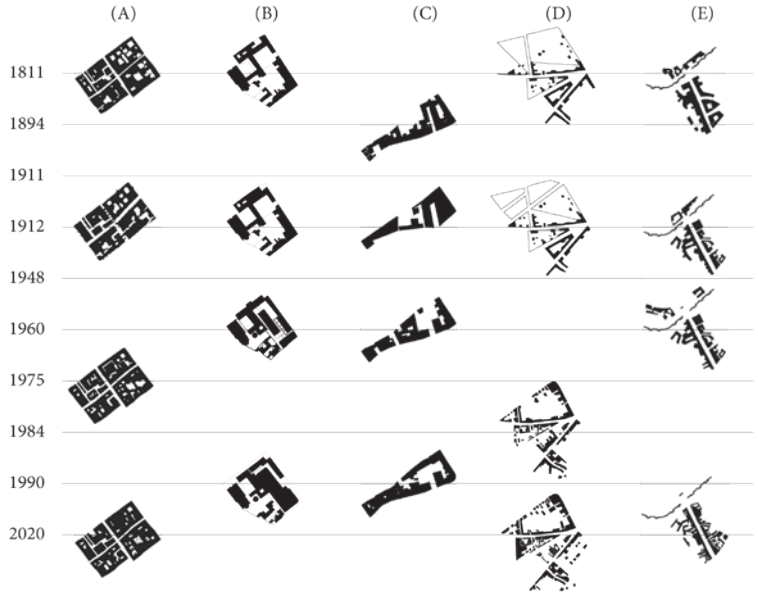


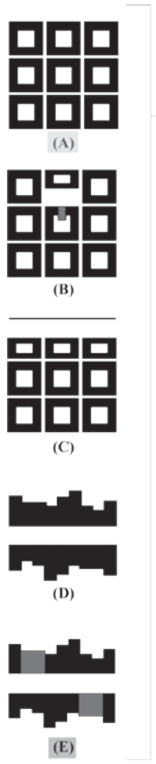
Figure 3. *Formal urban transition of the study samples of the five morphological clusters in Rimini (Source: author 2023).*

3. From Form to Urban Design

As demonstrated for sample E, the analysis of morphological transition is not sufficient to intercept all the characteristics of historic urban fabrics. For this reason, each sample was studied according to a typological abacus, in order to better define the qualities present in the urban fabric at several scales. Therefore, in order to favour a global view of all clusters, a summary table of the analysis conducted was drawn up. The table (Figure 4) is divided into two main parts, the first three columns summarise the main characteristics and relationships of the forms analysed, while the last two columns show the areas in which to act and some strategies, in the form of objectives, to favour urban regeneration processes according to the data analysed. The table descends in scale from top to bottom, from settlement to urban fabrics (schematised graphically), from streets to buildings, to architectural components. For each scale, the characteristics of the elements and the relationships they form intrinsically and extrinsically are summarised. Qualitative specifications indicate the areas in which intervention is possible: from internal courtyards to individual roof elements. Finally, the quantitative specifications identify the objectives to be achieved in order to regenerate the consolidated urban fabric by preserving the identity of places and acting at different scales.

This operation favoured design experimentation on each sample of a *device*. For the compact urban fabric with blocks (A), experimentation focused on light and temporary interventions of urban acupuncture to preserve inherited identity. For sample B (urban fabric with special buildings), the approach involved morphological reshaping of the fabric through specific competitions and design based on the polarity of existing monuments. The marginal fabric (C) lends itself to the use of parasitic architecture and the utilization of residual spaces. The fabric with buildings in line (D) was tested with the device of dynamic growth, where a building can grow in height relative to its taller neighbour. Lastly, for the fabric that features extraneous buildings compared to its surroundings (E), mechanisms related to the use of air rights were experimented with. In order to show the reasoning conducted to set the design strategy, the work done on two urban fabric samples (A, E) is shown here.

(A) In morphological terms, the theme of the block project emerges when global visions exist, not when individual interventions on the scale of the individual building are imagined. Nevertheless, the urban project can become unitary if each intervention (contiguous or not) is related to the others. An operational concept closely linked to the local character of project interventions is that of urban acupuncture. These are small injections that trigger mechanisms of well-being that



Field of observation	*Characteristics of elements*	*Intrinsic and extrinsic relationships*	*Qualitative specifications (interventions)*	***Quantitative specifications (objectives)***
Settlement (Rimini)	Mixed urban areas with a mixture of typologies	Position and relationship with the natural and anthropic territory	Urban landscape	**Urban regeneration of compact fabrics while preserving local identity**
Urban fabric (cluster)	Compact fabric with blocks (A) Fabric with the presence of special buildings (B) Margin fabric (C) Townhouse Fabric (D) Fabric with presence of extraneous buildings (E)	Porosity (A) Influence of the poles (B) Discontinuity and fragmentation (C) Continuity with the eaves line (D) Extraneous typologies and blind fronts (E)	Internal courtyards, facades and roofs (A) Exceptionality in the urban fabric (B) Private and collective space (C) Relationship with the road (D)	**Increase in building capacity in terms of surfaces and volumes** **Greater use of collective spaces**
Streets and collective space	Driveways (A, C, D, E) Pedestrian routes (A, B) Public squares (A) Cycle routes (E) Parking (A, B) Courts (A, B, C)	Ratio between squares and driveways (A, B, C) Ratio between the different degrees of transit (D, E) Ratio between inside/outside of thr block(A, B, C)	Path hierarchy distribution (A, B, C, D, E)	**Accesses** **Openings** **Facades and height of buildings**
Building typologies	Courtyard buildings (A,B,C,D) Special buildings (A, B) Ordinary building (A, B, C, D, E) Buildings arranged in line (D, E)	Position of lots in relation to the road hierarchy (A, B, C, D, E) Setbacks (B) Property boundaries (A, B, C, D, E)	Maintaining Architectural Principles (B) Maintenance of morphotypological and identity characters (A, B, C, D)	**Surface reports** **Dimensions of the building** **Height of buildings** **Distances**
Building Components	Roof typology (B, D, E) Elevations and facades (A, C, D, E) Structural components Porches, balconies, overhangs (C, D, E)	Relationship between openings (doors and windows) (A, C, D, E) Eaves lines (D) Railings (D)	Materials (A, B, C, D, E) Ornaments and decorations (A, B, E) Green roof (A, E) Superelevations (D, E)	**Dimensions of surface and volume additions** **Roof slopes** **Maximum overhangs and overhangs**

Figure 4. *Qualities and Quantities summarised after the analysis of the sample in Rimini (Source: author 2023).*

affect the entire city organism. The 'injections' are interventions at various scales that socially, economically and urban revitalise the portions of the city concerned. Using such a strategy of intervention in an historic centre, such as Rimini's, and in conditions of compact, isolated fabrics, means considering acting on the residual spaces of fabrics with a strong identity. In prescriptive terms, admitting small interventions (even temporary) within courtyards, or on solar slabs, or even admitting the redevelopment of fronts on the edges of urban blocks, could improve the perception of space in the historic centre. In this sense, the urban acupuncture project/device contributes to creating a direct communication with the rest of the city and will naturally integrate if one has the tools to include it. The possible trigger for such a transformation may come from the drafting of a typological abacus of possible interventions, i.e. the type of structures and the extent of intervention affecting the consolidated tissues (Figure 4).

(E) Air rights also refer to the right of ownership that surrounding buildings have over the airspace above their properties. There are a number of ways in which these rights can be transferred, such as: the addition of a new completion volume above the roof; the use of air and ground rights; the use of air rights of the street belonging to the public sphere; the transfer of GFA (Gross Floor Area) to other buildings; the partial transfer of GFA; and the transfer of GFA from the ground floor. The design exploration of buildings outside the surrounding urban fabric, which have blind façades, has led to a number of possible configurations, based on the case histories present mainly in the study sample. This resulted in two types of devices relating to the expansion of private spaces and two concerning the addition of volume for the creation of collective spaces. In the first case, volume addition refers to the inclusion of a private space between existing buildings with the total or partial transfer of air rights. This allows the creation of new interior spaces, e.g. to extend a residence, create a workspace, an accessory space or an outdoor space. As with private spaces, the addition of volumes or surfaces for the creation of collective spaces includes the total

or partial use of the space between two buildings. In this case, however, the intervention involves several parties who collaborate so that the increase in space is available to the community as a meeting place, common area or space accessible to citizenship (Figure 4).

4. A Matrix that Generates a Code (prescription)

What emerges from the synthesis of the analysis of Rimini's urban fabrics is that every consideration regarding urban regeneration comes from a morphological perspective. Therefore, the analysis of fabrics, their aggregations, and typological cells forms the basis of any prescriptive or codifying reasoning. The *devices*, on the other hand, represent a test suggesting design actions to achieve regeneration objectives. These considerations lay the foundation for the construction of a synoptic matrix that serves as a preparatory consideration for writing a code, starting from the relationship between formal analysis and operational devices. The following table (Figure 5) represents the five morphological clusters, the morphological requirements of intervention zones (IF), the possible actions on urban fabrics deduced from device simulations (ALLOWED), the entities responsible for regeneration actions (PROMOTERS), the benefits for the involved entities (ADVANTAGES), and finally, the measures and quantities of operations allowed in each cluster (LIMITS/QUANTITIES). Although the table shows the work carried out on each sample, two examples are given here in full (A, E).

(A) *Compact Fabric arranged in blocks*: If there are conditions of compact building fabric with closed blocks and stratifications, it is allowed to rethink urban space to make the fabric more porous through temporary interventions in the void system (courtyards and inner facades), interventions on roofs and terraces. These interventions aim to promote porosity of the blocks and urban acupuncture interventions to improve spatial quality. The promoters of these operations are the property owners, with specific agreements with the municipality for the use of courtyards and terraces. If there are environmental improvement projects that benefit the community (not only residents of the intervention unit), the municipality could grant incentives on environmental taxes, in addition to allowing increased surface area. The measures and limits of these interventions fall within private land occupancy under private concession and the increase in surface area according to building typology.

(E) *Extraneous Typologies to the Surrounding Urban Fabric*: If there are compact urban fabrics that feature extraneous typologies (out of scale and with blind facades), it is allowed to increase volume by adding volumes and surfaces through air rights transfers. The increase in surface area and volume is permitted through agreements between adjacent plot owners. Once agreements are reached, it is allowed to fully or partially occupy the footprint of the lower plot with structures that catalyse good urban quality. Allowed operations include: adding the maximum volume between buildings (private spaces), adding a percentage of the maximum volume (private spaces), adding volume to connect two buildings (collective spaces), and adding the maximum volume for multiple buildings (collective spaces).

This reading mode, applied to all five generalised sample areas according to their morphological-typological fabric, defines a series of relationships between spaces, entities, and possible guidelines for the development of Rimini's historic centre. The flexibility of interventions is guaranteed by allowing a certain number of variations within these fixed systems. The use of typological-morphological analysis allows for the deduction of parts, components, and their arrangement, thus establishing which variations and modifications are possible in a fixed system such as Rimini's historic centre.

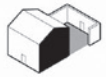
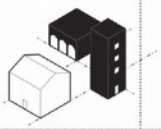
URBAN FABRIC (cluster)	IF (morphological characters)	IS ALLOWED (operations permitted)	PROMOTERS	ADVANTAGES	DEVICE	LIMITS QUANTITIES
	There are conditions of compact building fabric with closed blocks and stratifications	Rethinking the urban space to make the fabric more porous through: • temporary interventions on the system of voids (courtyards and courtyards); • interventions on the internal facades; • interventions on roofs and flat roofs.	Private owners	• Remediation • Incentives on environmental taxes • Increase of surfaces	Urban Acupuncture 	• Occupation of private land by the public on private concession • Surface increase in accordance with the building typology.
	Types of special buildings that have polar characteristics with respect to the surrounding urban fabric	• Remodel the urban fabric while maintaining the layout of the special building; • Recognize the morphogenetic archetypes of the tissues affected by polarity; • Parametrically modulate the interventions between the identified morphogenetic archetypes.	Public administration	Increase in surfaces and volumes as a percentage of the urban fabric under analysis.	Morphological replasmation of tissues 	• Occupation of private land by the public on private concession • Surface increase in accordance with the building typology.
	Margin tissue conditions are present with proximity to topographical and/or anthropic borders	Recover cubage through: • the increase in surfaces and volumes served by walkways or paths; • the temporary occupation of private open spaces (courts and courtyards if any) by the public administration to create public spaces or gardens.	Private owners Investors Public administration	Increase of surfaces and volumes	Parasite architecture 	• Occupation of private land by the public under concession • The overhangs must respect a maximum overhang comparable to the addition of balconies on the street facade • The "parasitic architectures" must occupy no more than 20% of the façade on which they are built.
	There are compact urban fabrics with typologies arranged in line (row houses)	• Increase the building capacity of surfaces and volumes by addition while preserving the characteristics of the original typology • The elevation of buildings is enabled through a dynamic index which is governed by the height of the tallest adjacent building	Private owners Investors	• For urban quality, the preservation of local identity • For investors, increase in area/ volume	Dynamic growth 	Height raising with dynamic index: • h= h near +1 • traditional standard maximum height • 5 floors Adding volume to the facade: • Maximum projection: 1 m • Coverage of the existing facade: max 20%. • No addition of ground floor towards the public road. Roof: • Compensation gauge (partial or total • Residential destination • Addition of dormer window • Partial removal max 20%
	There are compact urban fabrics that have extraneous typologies (out of scale and that have blind facades)	Increase the cubic capacity by adding volumes and surfaces through the transfer of air rights.	Private owners Investors	Increase of surfaces and volumes	Air Rights 	• Occupy all or part of the outline of the lowest lot with structures that are catalysts of good urban qualities. • adding maximum volume between buildings (private spaces); • added as a percentage of the maximum volume (private spaces); • addition of volume to connect two buildings (collective spaces); • addition of the maximum volume for more than one building (collective spaces).

Figure 5. *Synoptic Matrix (Source: author 2023).*

5. Towards Formal Urban Codes

The selection of the analysis samples was conducted starting from the urban forms of Rimini which, due to their intrinsic strength, possess the potential to remain active with new dynamics. *A posteriori* from the analysis conducted, at least two orders of observation can be emphasised: the first linked to the morphological analysis, the second to the *devices*. Firstly, the study on Rimini highlighted that the entire historic centre is composed of compact fabric and that most of this is aggregated in closed blocks. This does not mean that the historic centre can be considered indiscriminately, but that there are a series of spatial organisations and morpho-typological subcategories that can be distinguished. That is to say that each cluster analysed is a specific declination of the compact fabric and that at least three out of five samples (A, B, C) are particular block aggregations that, however, present identity characteristics that go beyond the mere 'block' classification. This denotes that when analysing the urban fabric there are general classifications (compact urban fabric) and evidence at the local level (deformations or replacements) that can contribute at different scales to define the relationships between urban organisms. In the second instance, the classification into clusters implemented for urban fabrics has allowed the conception of *devices* that are more or less incisive with respect to urban design. In fact, it is possible to catalogue devices according to the degree of urban transformation they could generate. This distinction is not accidental, but comes from the recognition of the identity of the places. Where the *cardus* and *decumanus* meet is the most fertile place in which to graft buildings of power and representation, so the fabric that develops in the centre of the historic core presents well-rooted morpho-typological characters and recognisable architectural principles. This approach indicates the presence of two regeneration times: a slower and more concentrated one within the historic core and a faster and more incisive one in the outer boroughs.

The approach developed in this research has a high potential for generalisation to other contexts. Since the proposed matrix summarises the morphological transition, formal abacus, dimensional criteria and suggested transformation *devices*, closely based on and related to the morphological analysis of the study sample, it is possible to reformulate these paradigms for other historic centres. The main advantage of this process is that all the recommendations are site-specific and thus able to foster and promote local identity. More generally, the approach presented is suitable for any established urban fabric, as the main requirement is to have a pre-existing built environment with a recognisable image to inform the form-based transitional analysis abacus. In this sense, the approach presented so far can guide not only the transformations of the most representative and symbolic part of the city, such as the historic core, but also the regeneration of more ordinary or peripheral areas, recognising their different urban role. For these reasons, the future prospects of this study are to develop interdisciplinary research linking urban design with public law and parametric design (Oxman, 2017). The field of public law can help develop specific regulatory tools, supporting urban codes that deal with dynamic and non-absolute criteria based on morphological typologies, while the parametric design approach would offer effective digital tools to visualise and simulate the multiple morphological outcomes of dynamic regulation of urban growth. Another possible integration is the use of spatial analysis and tools such as Space Syntax (Hillier, 1996). This tool addresses a number of issues relevant to the formation of land-use strategy and location considerations: promotion of economic growth, revitalisation of core areas, increasing social sustainability and improving cycling and pedestrian access. The tool offers an evidence-based approach to decision-making (Brown & Corry, 2011), informing the accessibility and walkability of an urban area and helping to test strategic interventions and project proposals.

Although urban codes are not only concerned with physical form, but also regulate land use and other planning issues, they can help create variety associated with both aesthetic ideals and the mediation between individual and collective interests. Codes are not necessarily con-

servators of the established order, but can help offer alternatives to conventional visions, from the combination of planners and other figures who may work to draft them. In conclusion, the generative vision of the urban environment offers a proactive influence on urban form.

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Tackling Uncertainties of Design Projects

Mazyar Abaee, Nahal Khorrami[1]

Abstract: Urban planning and design projects face several uncertainties; in Iran, these uncertainties are intensified due to continuous changes in the planning and design context. Design context uncertainties are diverse, such as administrative, legal, informational, and even physical. The number of uncertainties increases when the scale of the projects increases. This article reviews the design challenges of a large-scale project in Tehran, Iran and proposes a design framework, derived from practical design experience, to tackle these challenges. Four hundred hectares of land suffer from several environmental and ownership issues. The land adjacent to a watercourse has been used for sand and gravel exploitation for decades. The area beside the watercourse has been excavated over time, and the land level has dropped nearly ninety meters below the watercourse bed. The municipality has treated the subject in various ways, from neglecting the issue to forcing the project designers to follow specific processes. Moreover, the project is the place of several conflicts between landowners. This paper discusses the weaknesses of typical urban design process frameworks to respond to design problems. A new urban design framework is proposed. The Incremental process of Urban Design (IPUD) is proposed to tackle the problem. Borrowed from the idea of Disjointed Incrementalism by Lindblom and inspired from the morphological transformation of urban form, it is claimed that the idea of incremental physical change can respond to the diversity of contextual uncertainties in urban design projects. The IUPD tackles the changing circumstances of large-scale projects starting from small-scale pilot projects accompanied by a vague preliminary idea whose development can serve as the design vision. The plan can grow from these pilot projects and connection rules with an incremental approach and provide varying feedback and growing understandings of context to develop next-step sub-projects and transform the preliminary idea into a more concrete design vision.
Keywords: Urban Design Process, Urban Morphology, Design Uncertainties, Incremental Urban Design Process, Incrementalism.

Introduction

The urban design process is assumed to guarantee the urban design product, the designed plan. The evidence of this guarantee can be sought in the result of its implementation. As the scale of the project increases, the realisation time lag also increases. Lang (2005) introduces projects whose implementation process has been prolonged for nearly twenty years. Clark Quay in Singapore (seventeen years), Barbican in London (twenty years), and Raleigh Park in Sydney (eighteen years) can be named as a few examples. Lang mentions changes in and "uncertainties" of the context (as a general term) as the causes of most of these time lags. Changes in the context, rights, stakeholder groups, and data sometimes leads to what Talen (1996) calls the "new plan syndrome".

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Implementing large-scale design projects as a whole suffers from problems resulting in the uncertainty of context and rigidity of urban plans. The plan for La Defence in Paris started in 1920 and changed several times during the World Wars, and what we see on earth today is a result of what Giscard d'Estaing suggested in 1971 (Lang, 2005). Institutional barriers (changes and inertia) puts pressure on the realisation of projects (Bahrainy & Azizkhani, 2012). The need for detailed data for design doubles the uncertainty, mainly in countries with a weak mechanism for accessibility to data (Alnsour & Meaton, 2009; Liu *et al.*, 2010). In developed countries, this happens when the aim is to use a contemporary concept or method, like sustainability, in the design process (William & Dair, 2007).

In the history of urban design and planning, there are straightforward critiques of Master Plan design, whose rigorous approach fails in the dynamic context of urban environments. Alternatives have been suggested as design processes, such as by Alexander (1979), Duany & Plater-Zyberg (2002), and Garcia & Lydon (2015). However, these methods must address large-scale projects facing various uncertain conditions.

This article reviews the design process for an urban site in Tehran, Iran, to clarify the complexity of the uncertainties that a megaproject faces and to search for a practical solution to tackle the uncertainties of it.

1. Assessing the Organisational Plan of the Kan Creek and its Southern Lands[2], Tehran, Iran.

The study area is located in District 18, southwest of Tehran. These lands are considered to be the concrete western and southern edges of the city (Figure 1). The area of this case study is about 408 hectares covered by sand and gravel mines adjacent to a creek named Kan. Kan Creek is one of the seven creeks which flow down from the Alborz Mountains north of the City. The study area can be divided into four parts: the Kan Creek, the sand and gravel mining companies administrative buildings, the agricultural and horticultural lands and a vast pit resulting from removal of sand and gravel. Currently, 8.5% of the land area is allocated to the river and adjacent lands, 22.2% to administrative areas, 42.7% to sand and gravel mines removal pit, and 26.6% to agricultural and orchard lands (Figure 2).

The study area is adjacent to Kan Creek, in the southernmost part of the urban tissue through which the canal passes. Therefore, water runs through this area under heavily polluted conditions and enters the agricultural fields. The end of the urban fabric on the one side, and the proximity to natural areas and agricultural fields on the other provides the opportunity to take advantage of both artificial and natural environmental conditions in the development plan.

In the southern lands of Kan Creek, the extraction of sand and gravel from mines located in the study area over the past fifty years has created massive pits with an area of approximately 100 hectares and a depth of up to 90 meters (Figure 3). These sand and gravel mines and the resulting pits from the extraction have caused a north-south rupture in the urban fabric of District 18, and have created social and environmental damage that significantly affects the living quality of the area. The pits are also in full view of travellers who enter Tehran through the international airport (also located in the southwest).

Despite the location of the study area at the entrance of the city gate and its proximity to Kan Creek, which plays a significant role in the natural structure of the City, the revival of this urban environment has become a social, environmental, and physical necessity. By cre-

2. Here used as a translation for the Persian word "arazi" or "zamin" which can mean "earth" and "plots" at the same time. It is used for extra-large vacant, industrial or agriculture areas.

Figure 1. *Location of the Study area in Tehran, Iran. Author's elaboration (Abaee, 2018).*

Figure 2. *Distribution of natural landforms and sinkholes in the study area. Author's elaboration (Abaee, 2018).*

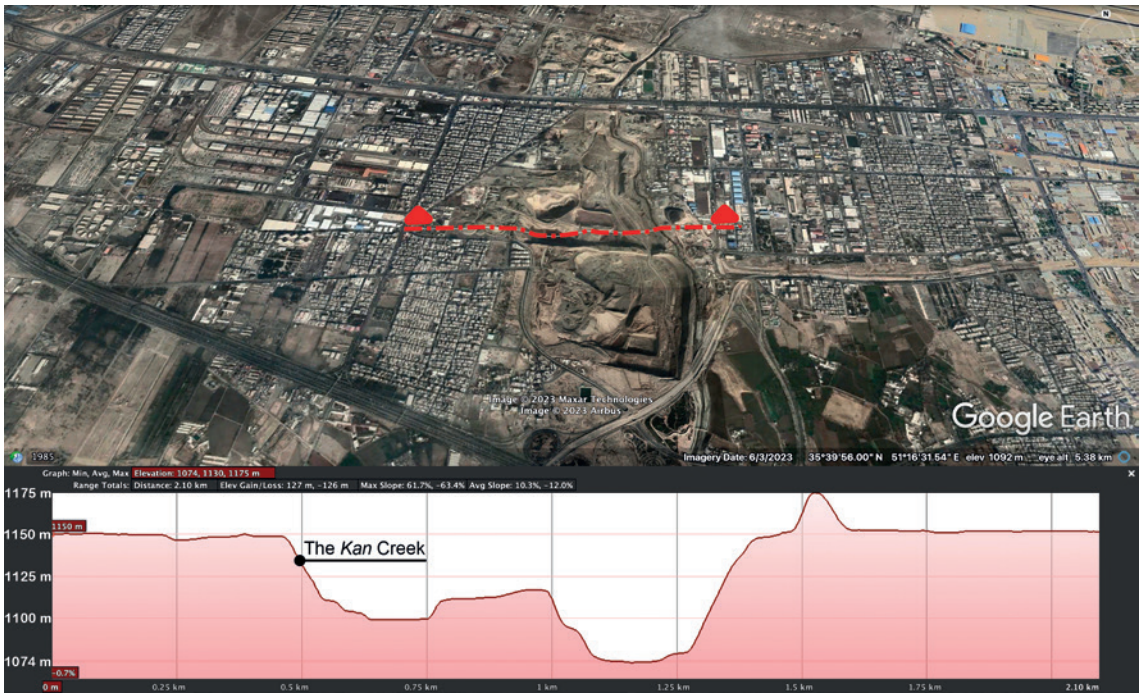

Figure 3. *Topographic section of the excavated pits within the study area (Google Earth Pro, 2023).*

ating a sustainable environment, the cohesion of the urban fabric had to be ensured and human damage to the environment should be avoided; at the same time, some of the shortages in services and tourism needed to be met, and a suitable and worthy view had to be provided at the entrance to Tehran. The existence of large properties with considerable areas and the willingness of owners to participate in urban management is an important factor towards achieving the objectives of the organisational plan.

2. Proposed Organisational Plan of the Kan Creek and its Southern Lands

The Kan Creek and its southern lands project can be explained in three stages.

The first stage involves the definition of the project and the formation of a participatory institution. In the late 2000s, one of the owners of sand and gravel factories in the study area decided to develop a project for their land north of the Fath expressway and a portion of the Creek's southern lands. The project aimed to prepare the land for constructing a residential complex. Upon the owner's request to the Gozineh Company as a consultancy, the consultant prepares a feasibility report that criticises the profitability of the residential construction project for the northern area of the Fath expressway. Instead, the consultant suggests that the owner partner with other landowners of the southern lands of Kan Creek and develop an initial plan for a mixed-use complex on that land. By doing so, not only will the owner benefit from the profits generated by these lands, but the value of residential properties in the northern area will also increase, leading to a more booming construction sector in the northern region. Based on this, a participatory institution, consisting of all the landowners, was formed to realise an organisational plan with a mixed-use function on a total area of 408 hectares in the southern lands of the Kan Creek, located below the Fath expressway. The cooperative company formed by the landowners was named "TAKA" (tose-ye arazi-ye kan-e Iranian), which translates to "Iranian Kan Creek's Land Development Cooperative".

The second stage involves preparing an integrated plan and its implementation challenges. After the contract was signed, the land project was developed within four years, forming a cultural and mixed-use centre. The aforementioned project was communicated to the implementing authorities through the approval of the Article 5 Commission (an administrative commission for jurying due diligence, changes in the city's detailed plan and planning large-scale projects) and was considered necessary for implementation. During the approval process of this project, the comprehensive and detailed Master Plan of Tehran was also approved, which envisioned cultural activities with an emphasis on green spaces and open areas for the southern lands of Kan Creek under the S222 Zone. Based on this, the project was considered to have inconsistencies with higher-level documents of Tehran. On the other hand, it faced implementation challenges related to its internal conditions and specifications. Due to the requirement for integrated construction based on owner partnership, the project demanded significant financial resources and an extensive implementation period, making execution impractical.

The third stage involves entering the decentralised and gradual progress phase, in which the concept, besides the upcoming issues, tries to respond to the practical failure of the previous step. Based on this, the participatory institution of the owners, "TAKA", and their consultants decided to reconsider the aforementioned project within the framework of the approved zoning and the feasibility requirements, relying on a reassessment based on the commission's decision. This proposal was accepted, suggesting that the project should be realised not through a unified development but through the diverse ownerships existing on the land. In this regard, each owner can develop a project within the limits of their allocated share from the approved land use plan. Therefore, the project is divided from a unified development into smaller-scale projects, allowing for an accelerated implementation process.

3. Integrated Project of the Kan Creek and its Southern Lands

Before preparing the organisational plan for Kan Creek and its southern lands, mine owners faced difficulties and were forced to halt their activities in the sand and gravel mines. Some of these problems included: i) the Department of Environment (DoE) demanded the suspension of mining activities to mitigate their negative impact on the surrounding environment; ii) the mines had reached their maximum extraction depth limit.

The initial approach to tackle the issue of halting mining activities and those of related factories was to fill the excavated pits with construction debris in exchange for a fee per truckload of debris. However, this method reduced the revenue generated from these mines and turned the location into a landfill for years, creating an unsightly view within residential areas. Furthermore, this inappropriate scenery was formed at one of the main entry points to Tehran. In 2005, after recognising the negative consequences of the approach mentioned above, the consulting engineers of the Gozineh Company introduced an alternative approach. This approach aimed to transform these mines into a mixed-use, tourism, recreational, and green space complex. By considering the characteristics of the location, it aimed to reduce the gap between residential areas and create a suitable entrance for Tehran. The claim was that by aligning stakeholders' interests, a win-win scenario could be achieved through this approach.

One aspect of the integrated plan has been to envision the role of the project area as a gateway due to the location of the lands in the southwest entrance of Tehran. This gateway is located near one of Tehran's main structure linear zones and tourist routes. Additionally, it serves as the primary entry point for the majority of travellers arriving from the international airport in Tehran. Therefore, among the proposed uses of the comprehensive plan, greater importance is placed on providing public service related to accommodation, hospitality, and large-scale open spaces for population settlement during times of crisis, compared to public services related to passenger transportation and cargo. However, it is essential to consider the significance of the entrance landscape and its visual appeal to the City of Tehran. Therefore, the project consultants have considered transforming this centre into a regional or even national tourism transportation hub to strengthen the spatial organisation of the overall city network.

Furthermore, in the detailed plan of District 18, a unique position has been designed for the project area in the region's development pattern and spatial organisation. This plan expects the studied project to not only reduce the gap between the eastern and western fabric of the area but also positively impact elevating the position of District 18 in the metroplitan city of Tehran. It aims to achieve this by creating a touristic and recreational environment with an appropriate landscape, serving as one of the main entrances to Tehran, and establishing regional activities within it.

Within the project's scope, the designated area comprising quarries, platforms, upper levels of sand and gravel mines, the Kan Creek, and adjacent lands in District 18 of Tehran forms a sustainable complex encompassing the natural, built, social, and urban environment. The project aims to harmonise economic objectives with other goals while ensuring environmental, artificial, social, and urban sustainability.

The defined visions for the project are classified into three categories: residential areas, industrial zones, and agricultural lands, based on their characteristics and functions (Figure 4 and Figure 5). The claim is that these visions, through environmental refinement and adaption to project conditions, responding to environmental requirements, harmonise the features of this ecological urban complex. Accordingly, the standards of the residential areas will be aligned with the environmental approaches, promoting eco-friendly practices. The industrial zones will undergo environmental refinement and transformation into factories

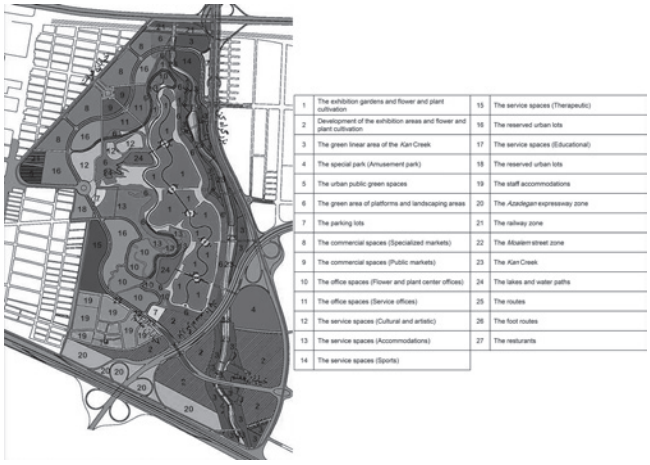

Figure 4. *Site plan of the integrated proposed design. Author's elaboration (Abaee, 2018).*

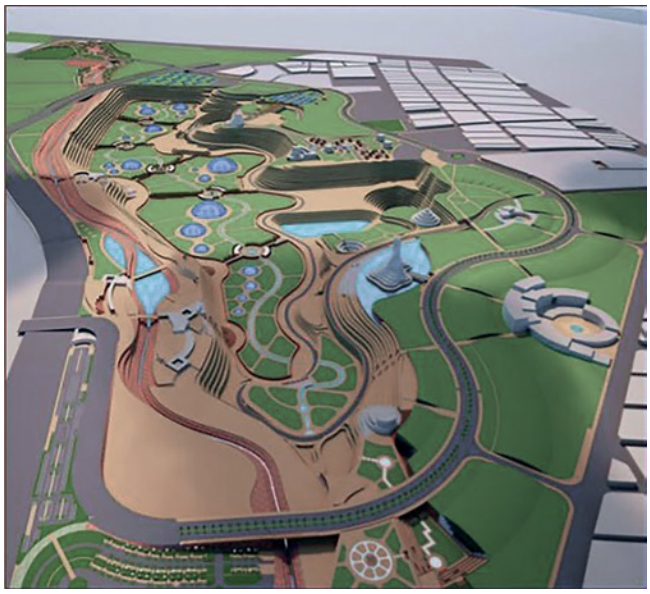

Figure 5. *Three-dimensional visualization of the proposed design, viewed from north to south. Author's elaboration (Abaee, 2018).*

that align with the green objectives of the project, both in terms of operational and construction technologies. The agricultural lands will also undergo improvement and preservation of green spaces, with proposals that ensure added value and economic justification following the planning and design approaches of the project area.

Based on the physical characteristics of the project site and in line with the proposed objectives, missions, and strategies in the planning studies, the project area has been divided into five different sections:

i. The Kan Creek and its surrounding lands: This area has been proposed to be transformed into a linear park along the Kan Creek.
ii. The sand and gravel mines: These areas have been allocated to productive and exhibition gardens for flowers and plants in the proposed plan.
iii. The platforms of sand and gravel mines and their upstream lands: The proposed plan for these lands includes commercial, administrative, and service-oriented uses, which not only meet the environmental needs of the area but also accommodate seven main activities within them. These uses operate at regional, sub-regional, and neighbourhood scales, encompassing markets, service offices, residential and hotel accommodations; headquarters for the exhibition gardens for flowers and plants, cultural and artistic centres, tourism, sports, and specialised medical facilities.
iv. The agricultural land and orchards: This land in the proposed plan is allocated to the development of productive flower and plant gardens in line with the anticipated activities in the sand and gravel mines.

v. The residential areas: This area currently has residential land uses, and its environmental quality is low, as indicated in the detailed plan with code R112, which allows residential buildings up to three stories. The plan for organising the land adjacent to Kan Creek assigns residential land uses with the R112 code to these lands. These areas can meet part of the housing needs of the special plan's employees. To ensure coordination and harmonisation of the physical environment of this complex with the objectives of the special plan, implementing quality control methods in construction within this area is necessary.

4. Gradual Project of the Kan Creek and its Southern Lands

The gradual approach to the design of the Kan Creek and its southern lands, based on the obstacles to the realisation of the integrated plan, has been presented and is currently being implemented. However, the integrated plan has been temporarily halted in the initial stages of its implementation process. The main factors contributing to the non-realisation of the project are related to ownership issues, the high volume of construction, and the challenge of attracting investments. Therefore, the project area has been divided into four different sections:

i. The Kan Creek zone: This zone extends from north to south and is defined under zone G of the comprehensive plan for the surroundings of the river.
ii. The large valley zone: This zone encompasses multiple land depressions and is characterised by a specific type of activity based on the geomorphological changes of the land.
iii. The urban zone: This zone is located adjacent to the western administrative buildings on the land.
iv. The urban-natural zone. This is a transitional zone between the urban fabric and the immense valley zones. It is an intermediate between these zones, acting as a buffer or threshold area.

Based on these four zones and ownership lines, efforts have been made to enable each owner to develop projects within their own property boundaries without needing land consolidation, while still obtaining the necessary permits for construction and operation. This type of project classification has brought the physical structure of the western region closer to the surrounding residential areas.

5. Discussion: Seeking an Alternative Process? Borrowing from Lindblom and Urban Morphology

In 2014, the Gozineh Consulting Co. asked the author for technical supervision. They proposed their alternative plan with the incremental process and expressed their pure, innocent practical approach to the proposed process. They wondered if there are any theoretical roots for such an approach. With an urban design background and a pragmatistic point of view, the author relied on the Theorising concept of John Friend (Needham, 2004), seeking a theoretical base for the proposed process. Having a pragmatistic point of view and attitude to urban morphology, the author found common approaches of gradual changes in Lindblom's ideas on disjointed incrementalism, morphological understandings of urban transformation and the incremental approach of the proposed process. Therefore, the author suggested the following steps for an incremental process

and asked to redesign the incremental plan according to these steps (which are presented in Figure 6).

i. Start with a basic sketch plan or just a draft.
ii. In an uncertain context, the first step is to start from something unavoidable. in this project, the land most ready for development were the northern areas due to the enthusiasm of the owner, clear ownership documents, and the highest land stability after the effects of the land erosion resulting from the pit.
iii. Clarifying the vision of the whole plan during the first step of the development.
iv. Seeking more certainty in the context by trying to understand clear boundaries of ownership, expanding the stability of the pit walls and expanding the executable zones, and encouraging further investments.
v. Defining the next steps of design.

Despite this procedural detail, the cohesion of the final form was a problem. To achieve cohesion a basic type is used as a repeating cell in the project. The plan got redesigned based on different variation of the chosen type. It claimed that this type could be a genetic code in the development. Different possible connection rules between the types are generated to handle any connections between development units. Finally, it argued that this process might reorder the traditional linear steps of urban design. In this project, design and implementation are connected. Therefore, designers and contractors face the study, analysis, design and implementation phases together. This process is named the "Incremental Process of Urban Design" (IPUD) to reduce the uncertainties discussed above. When the parameters of the project are less precise, the proposed incremental design process begins early on, with the project's study phase, with an eye on small domains for implementation. As the project progresses and the parameters and limitations become more apparent, the study, data analysis, and design phases are integrated with implementation.

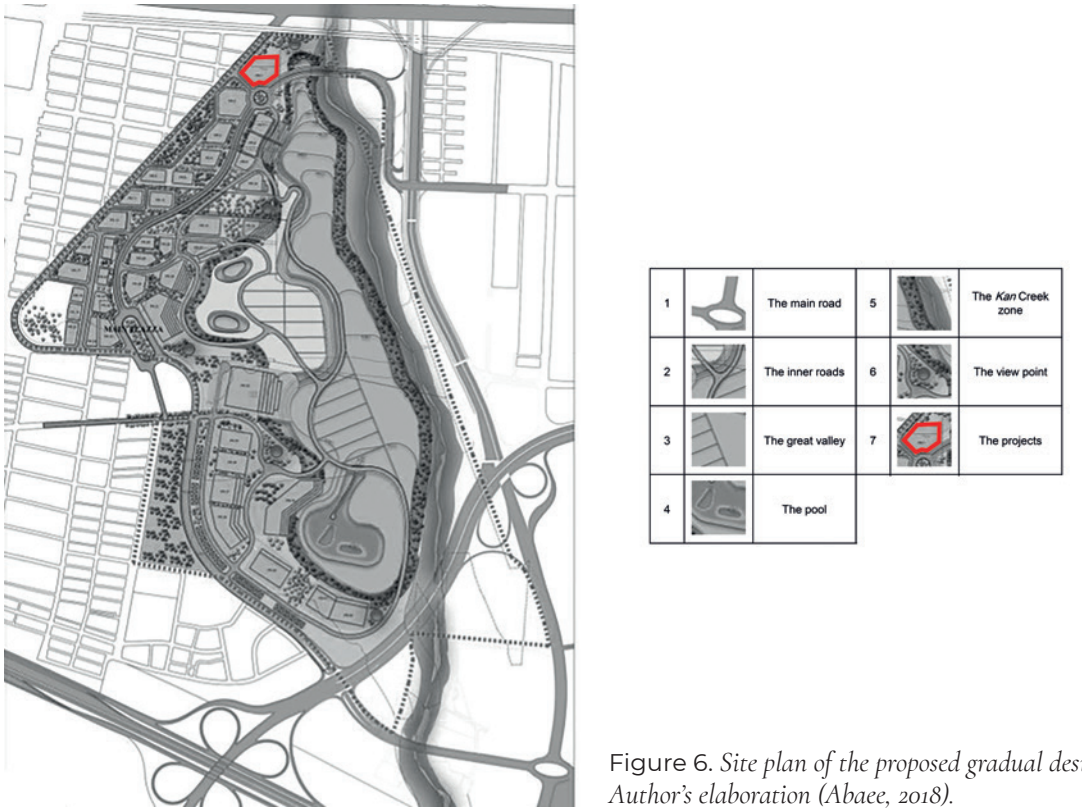

Figure 6. *Site plan of the proposed gradual design. Author's elaboration (Abaee, 2018).*

Conclusion

The implemented idea encourages an extensive study of design processes, large-scale project realisation, studies in project implementations, project management and the role of urban morphology in urban design. The idea of this process begins with an actual project, which may be one of many with the same problem (extensive contextual uncertainties). It is unlikely that the incremental ideas can change the design process as a whole, but they can most certainly contribute to the design of large-scale projects.

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The Values of Identity in Contemporary Architecture in Saudi Arabia

Alberto Riccioni, Claudia M. Sacristán Pérez, Silvia Cimini, Matteo Molinari, Amedeo Schiattarella[1]

Abstract: In the framework of an international increasing experimentation on sustainable buildings that overlaps the fast development of Saudi society in terms of "race to the construction of an international metropolis", depicted by large investments in architectural elements to be seen as symbols of the culture renewal and openness to the world, one of the most necessary objectives to be focused on and, probably, Saudi contemporary architecture most important challenge is figured in the research of an image coherent with the own local expression to become, at the same time, demonstration of innovation and experimental investigation on the language and technologies to be used. This research of a language as an expression of contemporary architecture should be rooted on the understanding and reinterpretation of the local identity based on a detailed knowledge of history, customs, environment and construction forms to allow the definition of the principles that we can call "core" of local architecture. These invariants, timeless tangible and intangible attributes which can be found within the historic urban fabric of a city, should be at the basis of the formulation of a new contemporary language that is faithful expression of a culture in evolution but linked to its roots in order to respect the sense of belonging and the coherence with their own traditional culture, with all the different facets grown up from the foundation of the city, through a renewed formal expression. Following a methodology based on the development of a conceptual approach capable of providing operational knowledge to be integrated into the contemporary architectural design process, new directions to combine principles of traditional sustainable architecture with technological innovation have been experimented on landmark buildings: Ministry of Municipal and Rural Affairs and Housing, Diriyah Art Futures (Riyadh-Diriyah, Najd region) and Culture Square (Jeddah, Hejaz region), whose design aims to demonstrate that the study of characters and vernacular landscapes in terms of composition, performance, technology and materials in particular extreme climatic and environmental situations can be part of a unique strategy to raise awareness among the Saudi population in reference to the sustainability and respect of each cultural identity.

Keywords: Cultural Identity, Saudi Contemporary Architecture, Najd Architecture, Hijazi Architecture, Historic Urban Fabric, Evidence-based Design.

Introduction

In the framework of an internationally increasing experimentation on sustainable buildings that overlaps with the rapid development of Saudi society in terms of a "race to the construction of an international metropolis", large investments in architectural elements are

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seen as symbols of a renewal of culture and openness to the world, one of the most necessary objectives to focus on. Nowadays, contemporary Saudi architecture's most important challenge is the search for an image coherent with local expression displaying, at the same time, innovation and experimental investigation on the language and technologies to be used.

In the Arabian Peninsula, climatic and environmental influences are strongly linked to social and cultural traditions, and this relationship is intrinsic to local identity. The frequent invitations of the country's leadership institutions to international firms to develop creative prototypes expressing identity through architecture show a clear desire to lead the past into significant elements of the present, translating the contrast between the country's modernity and tradition into an architectural language. This is an opportunity to bring global attention to the development of an architectural style, which, by creating a strong link with the tradition and cultural identity of the Saudi Arabian people, will lean towards the future, highlighting innovation within its own nation and representing Saudi heritage to the world.

1. Aim and Methodology

1.1. *Aim: Research for a Language of Expression for Saudi Contemporary Architecture*

This research for a language as an expression of contemporary architecture needs to be rooted in the understanding and reinterpretation of local identity in terms of society, culture and environment, based on a detailed knowledge of history, customs and built forms of specific areas, to allow the definition of a group of extrapolated principles that we can call the "core" of local architecture.

This develops into a threefold aim:

1. Conceptual: Establishing a useful framework of keywords and principles to define a clear direction for this evolution.
2. Methodological: Developing an architectural method which evolves from the roots of Saudi tradition and highlights its intrinsic and intangible characteristics, helping designers to explore the transition from historic to contemporary and to suggest different options of progression in new future-focused styles.
3. Formal: Enabling designers to formulate a new 'language' for contemporary architecture based in Saudi specificity, expressing the character of each region, yet allowing for variations and creativity, but with a lexicon able to connect with the traditional language of architecture, as a natural evolution.

1.2. *Method: Extrapolation of Tangible/Intangible Characters that Form the Core Principles, towards a Contemporary Language*

Invariant, timeless, tangible and intangible attributes found within the historic urban fabrics, are the basis for the formulation of a new contemporary language: faithful expression of an evolving culture, deeply linked to its roots, sense of belonging and coherence with its tradition.

> By identifying the process of making that led to shaping the characteristics of built environments in the Najd region, it has enabled the development of understanding beyond the physical appearance and discovering the processes that generated the urban and architectural forms and defined their visual shapes. This understanding can serve to increase the awareness of and appreciation for local architectural identity as a process, not merely as a final product (Alnaim, 2020: 11).

If physical elements are essential in defining an architectural style, simply repeating them cannot achieve effective results. Instead, the key to success is understanding the characterization of these physical elements to reach the original spirit and enucleate the core concepts underpinning the architectural form, deeply associated with socio-cultural meaning, the natural environment and local building materials and techniques. By understanding and identifying the production and reproduction of the Saudi Core Principles, we can understand the "hidden order" that guides the configuration of its architecture.

Each region of the Arabian Peninsula has its own geographical peculiarities and historical/social evolution that led to a different outcome of built form, with its own recognizable features, patterns and colours. Nevertheless, there are some underlying aspects of the architecture that trespass regional borders and can be recognized as "Saudi".

This research, beginning with the study of geographical and climatic-environmental features, social institutions, and religious principles and evolving into a method for reading building structures that have appeared in the past as 'spontaneous consciousness' (Caniggia & Maffei, 2017), in a progression of scalar sizes ranging from buildings and clusters of buildings to urban organisms and the territory, has allowed to reconstruct the conceptual thread linking the apparatus of responsive behaviour to the formulation of the built environment.

The result of this investigation is the definition of a series of architectural characteristics that must be verified to express the traditional, embedded process of building. These characters can be summarized as a comprehensive approach to urbanism and architecture, responsive to the site in terms of architecture, functionality and inherited culture generated by strong social co-creation. Originally based on human values and the human scale, and simultaneously functioning as a catalyst for social life, this set of features shapes a complex pattern through the aggregation of simple elements, with double formal readings and functioning standards ruled by an environmental control strategy, by phenomenon observation and collective knowledge.

2. Invariant Characters / Core Principles of Saudi Architecture and Their Application on Case Studies

2.1. *Invariant Characters of Najdi Architecture*

Located in the very centre of the Arabian Peninsula, the Najdi region (with Riyadh as its capital City) is surrounded by thousands of kilometres of inhospitable desert, therefore Najdi architecture is based on a careful use of local resources in extreme competition with nature. Urban settlements have fundamental principles of coexistence with the environment, and architecture is developed as a structural artwork designed to respond to the extreme climatic conditions of the central Saudi region desert, taking advantage of the unique microclimate generated in the oasis.

Each formal feature of Najdi architecture is responding, primarily, to an environmental input and to a social necessity of improving the living conditions of the inhabitants. The environmental and social responsibility is the implicit principle of the physical appearance and technological development of Najdi architecture.

Massiveness

Najdi architecture achieves a continuous wall illusion through compact forms and material mass emerging from the earth (such as earth bricks and stone) that resist compression. Thick walls provide thermal insulation, while narrow openings ensure privacy and limit solar ra-

diation. The agglomeration of simple volumes generates complex dynamic structures while maintaining a domestic-scale management.

Porosity and Permeability

Architectural processes generate urban spaces by orchestrating building volumes around voids (courtyards), employing varied forms and subsequent expansions. Clusters of buildings shape the urban fabric, carving pathways and underlining social hierarchies. Public to private transitions are guided by physical cues such as doors and bridges, fostering a maze-like feeling. Design features like bottlenecks, zigzag routes, colonnades, and setbacks foster shaded public areas. Buildings lead to courtyards animated by recesses, porches and sculpted levels, displaying a distinct section on each floor. Through human-scaled outdoor areas, seamless indoor-outdoor continuity, and vertical-horizontal interplay, courtyards emerge as rich urban spaces.

Social Factors

Saudi cities function as cohesive organisms, embodying an interconnected fabric as a living entity providing protection from the hostile desert. Quranic principles shape social self-regulation, guiding remote desert settlements. Urban density arises from the need for social and environmental safeguarding. The homogeneous urban appearance is punctuated by primary mosques and palaces, formed through straightforward aggregation.

Continuity of Space

Urban settlements appear as uniform clusters of volumes, organized within a tree-shape irregular urban pattern. Like the stratification of masonry construction, the building fabric is formed by serial additions of elements and structures determining a visual continuity in

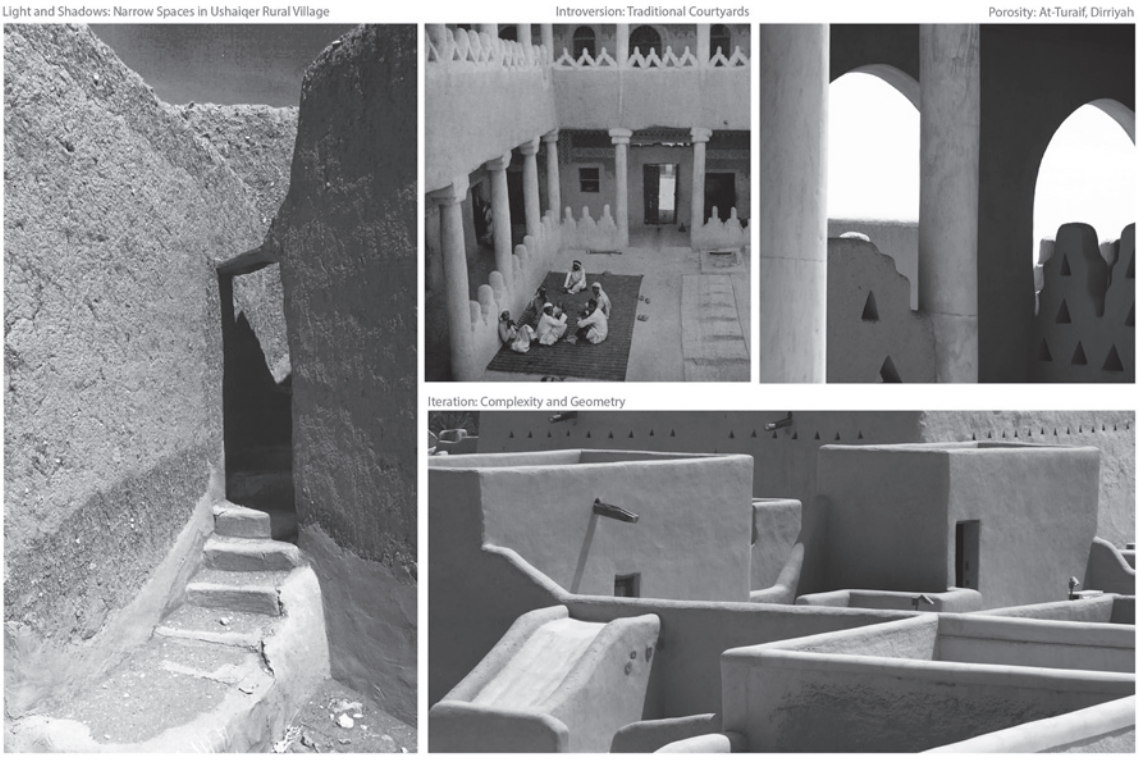

Figure 1. *Najdi Core characters.*

public and private areas. In all aggregations the fabric experiences moments of discontinuity such as knots or poles, generating unexpected visual and physical interconnections. People flow smoothly from private to public spaces naturally, guided by the widening and/or tightening of streets.

Environmental Mimeticism

Buildings harmonize with their surroundings using local materials and colours. Sourced from the site, materials integrate the structure with the earth. Resource constraints require energy efficiency. Built on natural slopes with minimal disturbance, the cities blend into the desert landscape, reducing visibility. Native knowledge and materials like mud offer insulation, durability and sustainable design, supporting living conditions, vegetation, water control and airflow.

Introversion

Buildings ensure privacy, merging buffers with indoor spaces. Volume distribution and internal design revolve around courtyards: the breathing core of each building, preserving intimacy and combating aridity. Courtyards mimic oasis dynamics, inviting cool night air and expelling heat during the day, offering protected outdoor spaces for daily activities.

Iteration

Buildings' intricacies spring from simple quasi-modular volumes, using scale and sequence to elevate architectural qualities. Material treatments create geometric patterns as sole decorative elements on plain facades. Like Arab music's repetitive themes, Najdi structures prefer serial compositions, downplaying node hierarchies.

Light and Shadow

The interplay of deep light and shadow defines the buildings' volumes and pathways. Narrow streets in mud-walled structures cast profound shadows, contrasted by sunlight on adjacent facades. Patterns in mud plastering and limestone contribute to this effect. Bridges, arcades, and parapets protect against glare and heat, enabling activities in shaded spaces.

2.1.1. Case study: Digital Art Center

Positioned on a hill's slope, once part of the historical city, signifying the limit of the agricultural landscape of palm groves of Wadi Hanifah and included in the UNESCO buffer zone of At-Turaif, in the old city of Diriyah, the project of the Diriyah Digital Art Center aims to create a focal point for the development of digital art within the community of Saudi Arabia as part of the redefinition of the Diriyah territory.

As an art incubator of 12.000 square meters, it is intended to be a laboratory able to train artists performing their activities and arrange, assist and support operators (artists, critics, technicians...), facilitating their interactions and experience exchanges, while acting as a show case for their production.

The architectural configuration dislocates volumes and generates a new urban fragment by creating a path network of small outdoor squares intertwined within the buildings. Each individual architectural component is dictated by the natural configuration of the existing site, with boundaries defined differently on the city-facing side and the side facing the

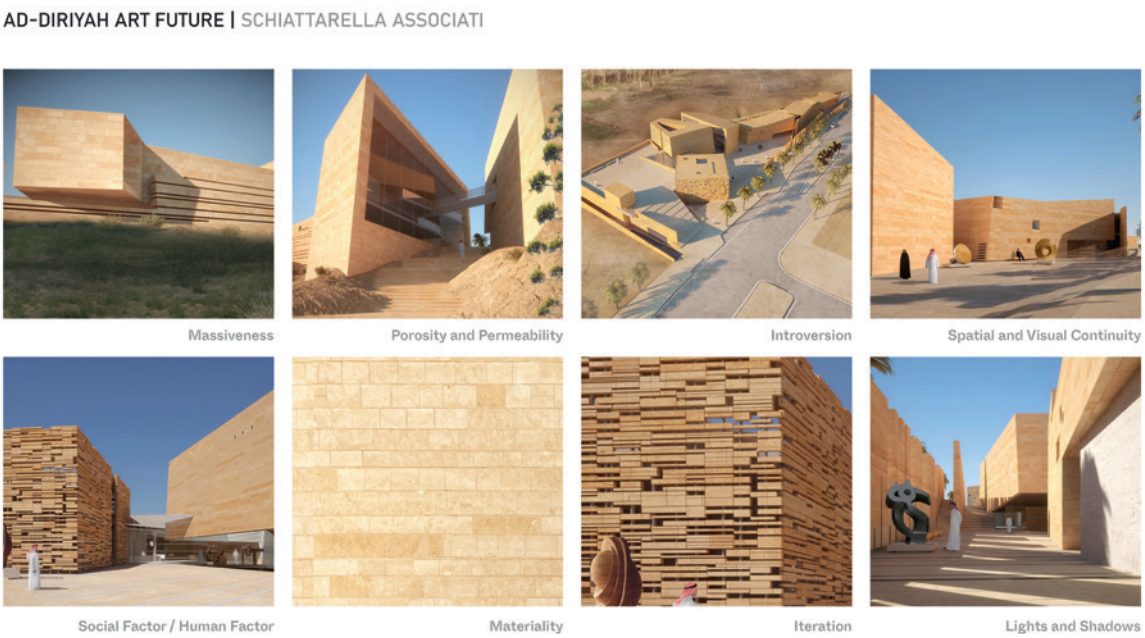

Figure 2. *Diriyah Art Futures case study: main characters.*

natural wadi and the rising terrain. The narrow and elongated shape of the plot allows the articulated morphology of these elements along the slope and reconnects them in a shared underground level.

Two main squares, placed at different levels along the slope of the main road giving access to the plot, offer functional distribution and separated accesses with different privacy levels: the lower square is intended to receive workers and residents (artists, students, teachers, administration staff...) and the upper square constitutes a public meeting place giving access to the exhibition gallery, retail area, educational spaces, conference room and restaurant.

A limit is placed on the east side, along the wadi, in the same position where the historical urban settlement ended (the ancient boundary of the city walls is clear, even if almost completely demolished). On this margin the sense of a border between the old urban settlement and the agricultural territory is reproposed, similar to the defensive wall but through a different approach.

On the other side, to the west, the limit is more permeable, inspiring continuity with the past through a sense of fragmentation and an interrupted relationship, by using a sequence of partial rammed earth walls that allude to the remains of an urban elevation, which dissolves while providing shade to the open areas.

Internally, small courtyards and crossing views distribute the light from narrow skylights protected with brise-soleil, mitigating the brightness of direct sunlight with discontinued shadows, and highlighting the colors of the mud plaster and Riyadh yellow stone walls that characterizes the internal environment, linking it to the traditional patterns and colors.

The elements' aggregation respects the natural vocation of the surroundings and creates visual and physical connections, not only through the massive volumes of the complex, but also between the city and the land of the wadi, through the open areas integrated in the project.

2.1.2. Case study: Ministry of Municipal and Rural Affairs New Headquarters

Located in a central and crucial position of Riyadh, immersed in a beautiful palm grove and just beside the existing MoMRA building in Olaya, the new headquarters of over 60,000

square meters shall provide both new workspaces and common facilities, improving the capacity of the Ministry of Municipal and Rural Affairs and the quality of its office environment. The new building is meant to be a flagship building for the Municipality, for its excellence in energy performance, water consumption and environmental quality for workers, aiming to be certified with LEED Gold.

The intent is also to open the quarter to the city: a conference centre and an expo area for the municipality's work to be shared with the public, while preserving the existing palm grove and converting it into a public park; the project includes in its functional program a pedestrian square and a commercial building for future private investors.

The idea leading the project is to realize a small fragment of a traditional Saudi town, with its complexity, as an urban fabric made of small volumes framed into each other, in-between passageways, narrow roads, small squares, courtyards. Buildings are mostly closed and inward looking with few external breaches; spaces between buildings are narrow and complex. Courtyards filter sunlight and aim at air cooling through shading systems, fountains, and vegetation.

Design intents to make voids as primary elements of an urban space configuration which, like a sculpture, will articulate the set of volumes that make up the building, both in plan and section. A ribbon of paths constitutes the main feature of the space, giving birth to a set of narrow spaces, where the wind is channelled, while neat volumes shape the light and shadows in the courtyards.

Materials and patterns are inspired by Najdi tradition, alternating solid yellow Riyadh stone with brise-soleil elements that open the façade to the views of the beautiful palm grove surrounding the building.

In the interior, the crossing views help to create spaces continuously penetrated, generating an intriguing complexity. The main lobby is conceived as an urban space, as the inner part of the public square, the paving and other finishings are the same as the exterior ones, ensuring continuity, to make it appearing as paths that enter the building from this "inner square" depart in the same way as streets penetrating the urban fabric.

The contemporary language of interior patterns and textures is inspired by the linearity of the geometric forms found in the decorated wooden doors and the vibrant shadows cast on the walls by palm leaves, applied to a variety of contemporary materials.

The landscape strategy is strictly linked to the desert environment, where the "garden" takes on a special importance and symbolic meaning. The design aims at reproducing the

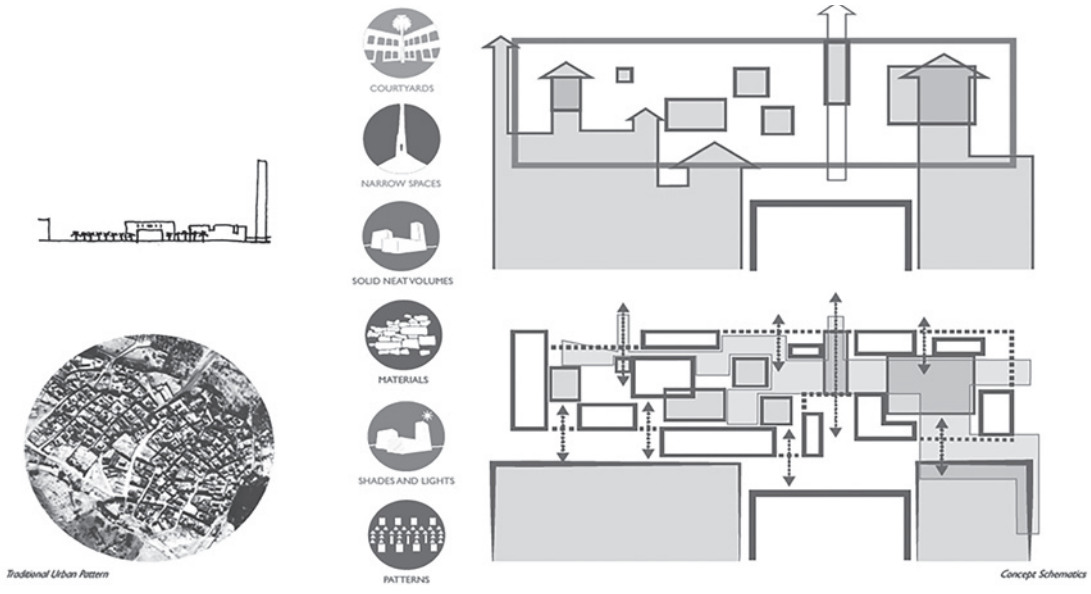

Figure 3. *MoMRA case study: concept scheme.*

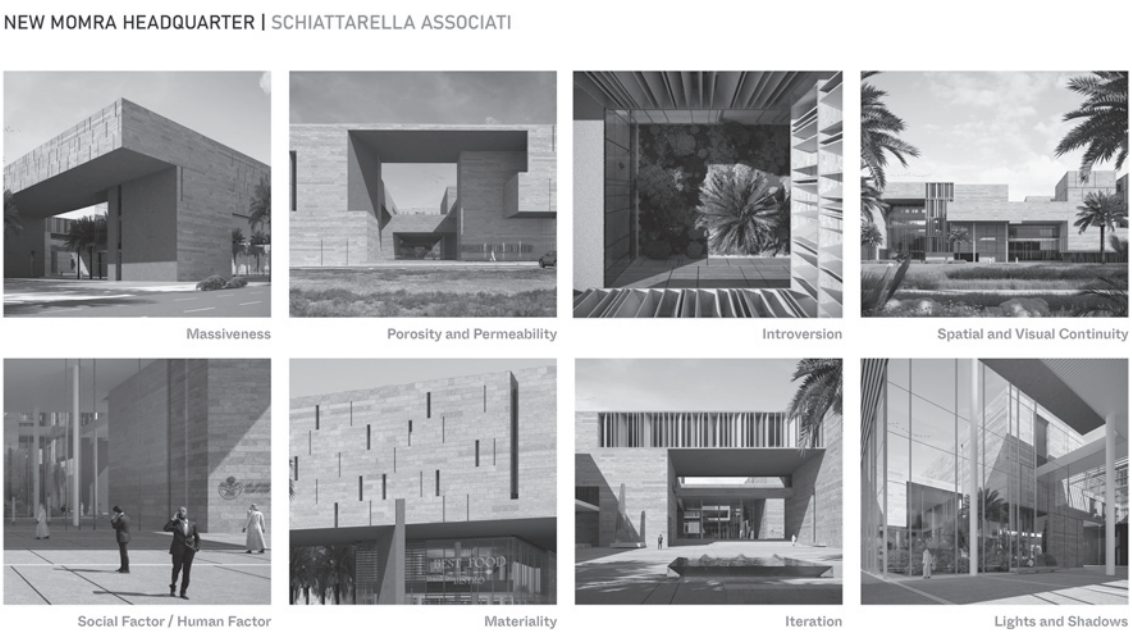

Figure 4. *MoMRA case study: main characters.*

oasis environment, almost always determined by a complex system of strategies that foresees water consumption reduction, microclimate regulation and protection from sandstorms.

To cope with the climatic condition of the Saudi region securing indoor comfort without wasting unnecessary energy, the passive behaviour of the building has been analysed from the very beginning of the design process. By controlling the shape of the building, it is possible to control solar gains and avoid the overheating of external facades, enhancing its performance and maintaining high-quality psycho-perceptive comfort standards as well as channeling prevailing winds to cool the facades by inducing a convection effect and combining natural and mechanical ventilation for the air cooling of the building.

Courtyards are used as in-between spaces that filter sunlight and aim at air cooling through shading systems, fountains and vegetation for evapotranspiration and convection effects. Exterior massive walls, small openings and compact volumes enhance thermal inertia and reduce heat gains.

2.2. *Core Dualities of Hijazi Architecture*

Differing from the principles of Najd area, Hijazi society, with Jeddah as the main example, thrives on contrast. Jeddah's history mirrors its mercantile nature, marked by fluctuations and adeptness at finding equilibrium amidst diverse forces. As a consequence, the definition of its character is identified mostly through dualities rather than singular concepts, as certain attitudes or operational principles that are intrinsic to Hijazi society can be glimpsed not only through individual conditions, but also in the tension that exists between them. As a mediator and gateway for internal areas such as Makkah, Jeddah's evolution from a fishing village to a Red Sea trade hub illustrates its essential role, which finds relevance in its own dependence on wider contexts, evident both in times of prosperity and decline.

Porosity/Filtration

Porosity characterizes the coral stone foundation of Jeddah. Homes exhibit this through room distribution and cage-like systems for airflow. Open spaces exemplify continuity and

sea breeze circulation, seen in the historical tall houses' disrupting paths. Jeddah, reliant on trade, maintained an open yet controlled connection to the world. Filtration maintains human encounters, preserving privacy and virtue through the dialectic of "haram" and "halal". Thresholds, often doors or Mashrabiyya, symbolize this filtration.

Order/Spontaneity

In the Al-Balad district (the historical city center), architectural contrasts are evident through juxtaposing formal and informal elements. Urban order arises not from rigid geometry, but from its natural landscape and mercantile logic. City planning references the mountain-sea terrain and an efficient street layout while spontaneous aggregations in various districts conceal a subtle, adaptable order, reflecting a desire for communal change over time, grounded in respect and coexistence.

Flow/Anchorage

The city's vitality comes from the flow of inhabitants, pilgrims and goods. Other than typical vehicular traffic, this energy is evident in public areas. Iconic spaces include souqs aligned with movement and trade. Contrasting these are Barahat, enclosed areas for communal activity. Neighborhoods, dynamic crowds, varying scales and enchanting musharabiyya alternate with serene corners shaded by tamarind trees, where artisans rest amid everyday architecture.

Permanence/Transience

Maritime commerce embodies dynamic cultural exchanges and encounters. The urban structure is fluid, continually dismantled and rebuilt, adapting through time with grafts for functional efficiency. Even if accelerated under the pressure of information, the city's life maintains an immutable core from its inception, combining the natural morphology and the inhabitants' consciousness interwoven in the city's layers, elements which should persist in any future project for the preservation of architectural identity.

Locality/Eclecticism

A deep connection to the landscape has historically inspired Hijazi architecture, which embraces the world's cultural influences while retaining its coherence. A syncretic, adaptive architecture arises, though in recent years we have seen caution replaced by superficial novelty, leading to an eclectic array of self-referential and alien styles, disregarding function and architectural identity.

Verticality/Horizontality

Caravans along Incense routes introduced the tower-house style to Hejaz and Asir from Hadramaut peasant societies. The design's success resulted from modifications like floor specialization. Ideal for merchant families, tower-houses protected goods and allowed integration with bazaars in easily manageable units which created cluster aggregations well aligned to tribal divisions. Architecturally, this model preserves individuality, which matches the mechanics of modular iteration, but accepts clustering in rows along pathways or around open spaces, historically used for agricultural functions. Recent

times have seen unchecked high-rise development, compromising the urban fabric and open spaces.

Spirituality/Worldliness

Jeddah's merchants prioritize pragmatic profit, leading to a straightforward life philosophy. The tower-house type, iterative compositions, and its modular aggregation reflect this ethos. This individualistic society, united by Islam's spirituality, harmoniously integrates minarets with merchants' homes. Today, Jeddah grapples with its dual role: a spiritual link between Makkah and the Sea, and a commercial maritime capital, giving form to a modern urban landscape.

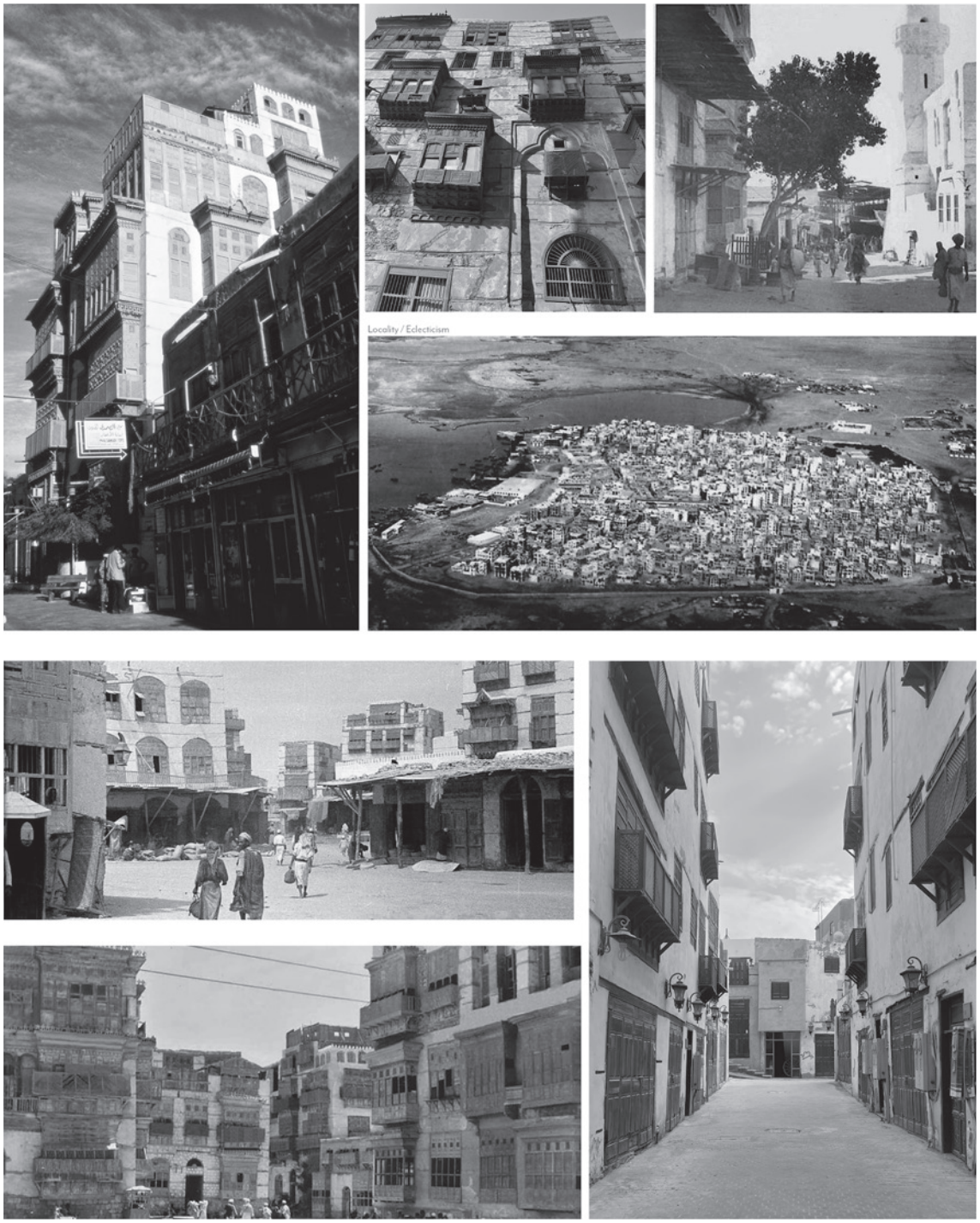

Figure 5. *Hejazi Dualities Roots.*

2.2.1. Case study: Culture Square

Located on the Al Arbaeen Lagoon near Al Balad, with the historical building of Beit Amir al-Bahr in the center of the area, this intervention is one of the main projects in the regeneration strategy of historic Jeddah. The significant role it played in the redesign of the city's future is confirmed by the project's centrality in transforming Jeddah, based on its undeniable natural vocation, into the most important cultural node of Saudi Arabia. Culture Square, with a built surface of 10.000 square meters, consists of two cultural complexes: the first will house a permanent museum of digital art and the second the permanent venue of the Red Sea Film Festival, a recently born international film event that aims to become the most important film festival in the entire Middle East.

The project is shaped through the reinterpretation, with a contemporary approach, of the Hijazi architectural features that can be found in the Al-Balad neighborhood, the old city. It is built in a human scale, which turns out to be compact yet permeable, articulated through the complex composition of simple and elementary volumes in an urban system where nothing is homologated but internal hierarchies are generated nonetheless.

The dialogue between solids and voids creates a rich landscape, dominated by the stark contrast between the vivid brightness of the surfaces exposed to the sun and the deep shadows of the courtyards. The town seems to move as a single organism, accessible from all directions both physically and visually with porous buildings, full of fractures and cavities to be permeable to the wind. Similarly, the complex enhances the connection between the city and the sea, provided via its Masterplan provision of a linear urban park profiling the coastline and extending it gradually through a soft inclined public park in an ascent to panoramic views of the historic center and the intricately designed coastline.

An arcade on the northern side of the complex serves as a threshold and demarcates the boundary between the internal and external realms. It forms a scenic plane facing the cityscape and embracing the historic building of Beit al-Bahr, whose presence prompts the conception of strategies to highlight its prominence, enabling a seamless integration with neighboring structures.

A public square delineated by the recesses of the principal structures and by the arrangement of palm trees is enriched by a slender water channel originating from a fountain in

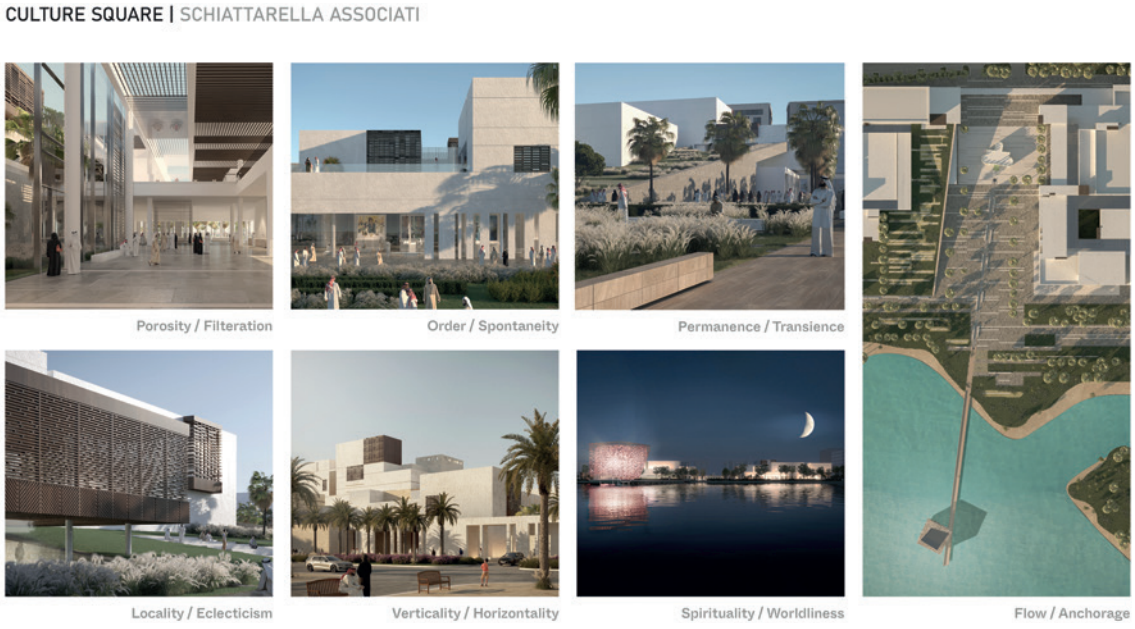

Figure 6. *Culture Square case study: main characters.*

front of the historical building, which meanders toward the sea, culminating in a waterside pavilion that functions as a distinctive urban landmark.

The outcome is a grand urban expanse extending toward the sea, framed by the two flanking structures, progressing perpendicularly along the coastline, which will house the digital museum and the performing arts center featuring an auditorium, cinemas and exhibition spaces.

The compact nature of the architectural form is marked by intricate volumetric patterns, incorporating abrupt fractures and recesses that confer porosity and permeability through voids and solids, while casting profound shadows and mitigating the weight of the massive walls through dynamic interplays of light upon white plastered surfaces. These ensure urban continuity, embellished by the ornate wooden textures of the Masharrabiya, offering both aesthetic variety and shielding from prying eyes and the intense zenithal sun.

Conclusions

Saudi traditional architecture and urban settlements emerge from a history of vernacular building systems, firmly rooted in the historical knowledge of surviving a desert environment. The approach to the genius loci, or local identity, is a prerequisite for any quality architectural or planning intervention and should be as site-specific as possible, considering that social values are key factors to responding and surviving in one of the most challenging environments. Not understanding the deep cultural roots of this architecture and the challenges people were faced with, would lead to formalistic and soulless architecture.

However, a deep dive into the three usual levels of urban form, buildings, and individual architectural elements can help break down the complexity of Saudi Arabia's built environment through understanding the varied factors that shaped each level. A systematic cross-referencing between different levels, from functional to physical embodiment, from social norms to environmental needs, is the way to proceed further in order to generate a visual code for contemporary architecture. A deep observation of these multiple factors offers an accurate view of a wide cultural background behind simple architectural gestures, which are more than an elaborate systemic built environment, and where all of those meet.

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The Role of Urban Archaeology in a Multidisciplinary Approach to Urban Heritage

Philip H.W.B. Hansen, Martin Ebert, Rainer Atzbach[1]

Abstract: Mecklenburg's 13th century was characterized by a sudden rise of approximately 40 towns with the first half of the 13th century. Resulting from a combination of the conversion and conquest of the Slavic tribes in the 12th and 13th centuries, German speaking settlers were introduced to found villages and towns within Mecklenburg. While the development of these towns has been considered through historical and archaeological work done by other authors, the aim of this contribution is to examine an interdisciplinary approach connecting historical sources, urban morphology and urban archaeology. This approach aims to determine the major factors influencing the urban development of towns of Mecklenburg in the 13th century. For this contribution, the town of Friedland will be used as a case study. Friedland has a rich catalogue of archaeological findings while at the same time the urban history is well established. Meanwhile major details of the earliest phase of urban in the mid-13th century settlement remain still unclear. Using the oldest cadastral maps, the town was divided into morphological regions that will be further studied through the archaeological and historical sources. The addition of these sources have allowed for a comprehensive understanding of Friedland's urban development from Slavic settlement to Medieval town. The analyses and results of this case study will help form the first of many towns to be studied under the banner of the Research on Urban Heritage of Medieval Mecklenburg (RUHMM). The overall goal of the PhD project this case study is part of is to demonstrate how an interdisciplinary approach can be used to place the development of towns like Friedland in the larger context of urbanization in the Baltic region. As these towns were under both internal and external influences, the matrix would be a perfect basis for the future development of the urban heritage within Mecklenburg and the surrounding areas.

Keywords: Archaeology, Urban Morphology, Medieval, Mecklenburg.

1. Urban Archaeology and the Development of Towns

This paper examines how the discipline of urban archaeology can be combined with that of urban morphology, in a new approach to study urban heritage and expand our knowledge on the development of towns.

Urban archaeology has long been used to study the development of towns (Fracchia, 2020). While the very definition of a 'town' has been disputed among archaeologists for decades, and while it is unlikely that a consensus will be reached, this paper will make use of the factors discussed by Peter Carelli (2001, 99-105). The factors discussed by Carelli range from town and market rights, heterogenous population, and a reliance on trade to support

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the town. While some of these factors like the market rights are not archaeologically visible, other factors like the town rights can be viewed as archaeologically visible from town seals, and population density can be discerned from the density of plots and foundations. While these factors are used by Carelli to discuss the identity of the populace, they are also used here to demonstrate when a settlement can be considered urban.

This paper will use the town of Friedland as a case study, focusing on its development between 1244 and 1600. Urban morphology is defined by Vitor Oliveira as "the science that studies the physical form of cities, as well as the main agents and processes shaping it overtime" (Oliveira, 2016b: 1). However, urban morphology has not yet been combined with archaeological methods and sources.

The paper will compare the methods used in urban archaeology to these two approaches, in order to enable the discussion of the individual merits of each discipline and how they may work together in a multidisciplinary approach. Part of the methodological presentation will include the author's own proposal for an optimal approach and combination of these methods. This will lead to a short presentation of the known history of Friedland, and subsequently to an analysis of Friedland, using the archaeological evidence to expand upon what would otherwise be a 'standard' urban morphological study of Friedland. Finally, this paper aims to demonstrate how urban archaeology can challenge and support the discipline of urban morphology in answering questions about the development of towns.

2. Why Friedland?

This paper will use the medieval town of Friedland as a case study, as part of a PhD project at the Norwegian University of Life Sciences (NMBU). The focus is on the Urban Morphology of the towns in Mecklenburg (Germany), which were founded during the medieval period. Approximately 40 towns were established during the 11th and 12th centuries (Figure 1) (Ebert, 2021) either by Slavic Lords recently converted to Christianity or by German lords, who brought German-speaking settlers to the area over a century. The founding of the towns took place following the conquest, conversion, and settlement of the original Slavic people of the area (V. Schmidt, 1995). Overall, Mecklenburg was a region under great transformation during the 11th and 12th centuries, which makes it a region of great interest for this paper.

Despite the abundance of towns founded in Mecklenburg during the medieval period, not all were found to be suitable for the study. Towns like Rostock, Wismar, and Stralsund are all Hanseatic Towns with widespread connections, and they were excluded in favour of other towns more representative of a medium-sized town under local lordship during the medieval period. As for the rest of the towns, one major challenge was finding towns that fit the paper's criteria, namely that the town had to provide enough sources gained by excavation that were available from the Landesarchäologie Mecklenburg-Vorpommeren from the medieval period to enable a discussion about its development over time. For the purposes of this PhD, the three towns chosen are Friedland, Güstrow and Parchim.

3. Methodology

3.1. *Urban Morphological Methodology*

The cornerstone of a morphological analysis lies in the town-plan analysis, the goal of which is "revealing structural and historically determined spatial qualities of cityscapes" (Conzen, 2018: 141). Cadastral maps represent a simple way to get an overview of these regions and

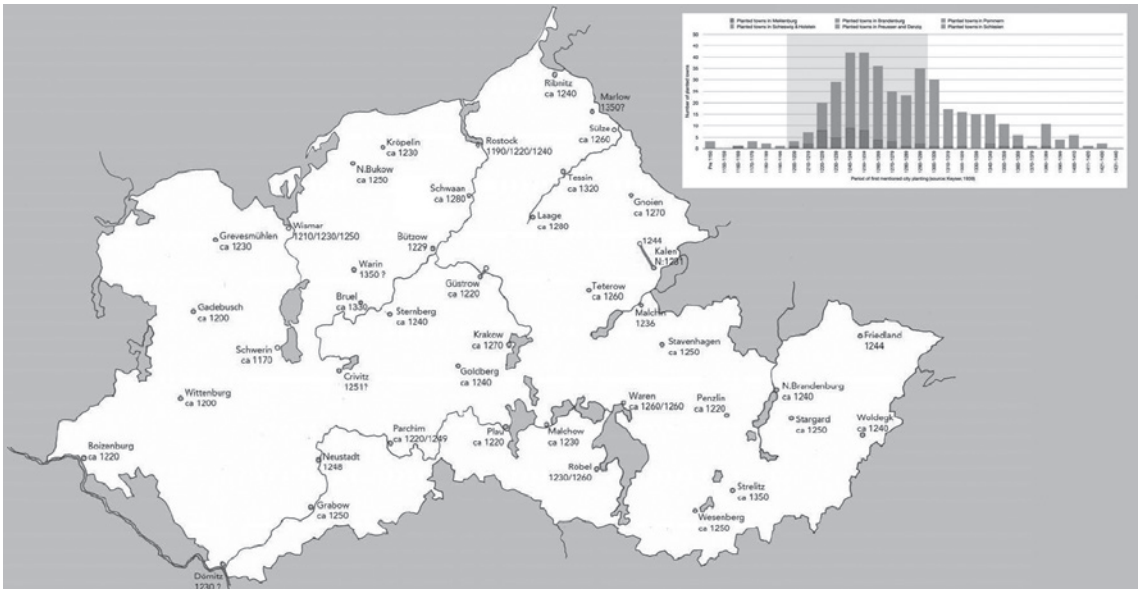

Figure 1. *Map of Mecklenburg displaying the towns founded during the 13th century, with a graph showing the highest concentration of city founding (Ebert, 2021).*

what the towns would have looked like. These maps allow for the study of towns over time, as cadastral maps show the layout of the town at the moment of the survey (Simms, 2015). Not only does this allow for tracing the evolution of plot sizes and housing developments in towns, it also enables the tracing of areas of use within towns, whether the area was considered commercial or private (Simms, 2015). From these maps, it is possible to perform a town-plan analysis. Part of the earliest form of town-plan analysis came from Conzen's work on Alnwick in the 1960's (Conzen, 1960). While Conzen and other urban morphologists have not been able to give "an explicit statement on the methodology of plan analysis" (Lilley, 2000: 9), it has been generally accepted that this method can be used to study the development of historic towns where the plots and block structures can be grouped into historical periods, i.e. medieval, renaissance, industrial periods (Lilley, 2000). Archaeologists have disputed the use of these maps as a form of continuity in medieval towns, with evidence of such continuity being sporadic even within the same towns (Lilley, 2000; Simms, 2015).

Despite its shortcomings, the approach of using cadastral maps for morphological analysis in the manner Conzen did is still regarded as a standard within urban morphology. Despite his lack of a clear methodological approach in his original work, Conzen did expand upon his methodology in a 2004 paper, which he has summarized in 2018 (Conzen, 2018). Conzen listed seven axioms in his chapter, which are as follows: "Townscapes are historically stratified [...] The period specificity of urban forms [...] secular sociopolitical conditioning [...] systemic townscape composition [...] hierarchical nesting of form complexes [...] systematically differentiated persistence of forms [...] morphogenetic priority of forms" (Conzen, 2018: 127-128). Essentially the axioms boil down to accepting that the towns consist of areas that are visually distinct enough to be grouped by their characteristics, areas of the town can be characterized into their systematic components, and that these groupings can be encompassed in a so-called morphological region.

As mentioned in the previous sections, the analysis of Friedland will start with a morphological analysis. Since such an analysis has not been carried out in Friedland before, one will be attempted here using the sources available. The goal is to demonstrate how the addition of urban archaeology benefits an urban morphological study; the focus of this section will be on available archaeological data, with the urban morphological analysis working as the starting point.

3.2. *Archaeological Methodologies*

The author of this paper draws from his own experience on Nordic archaeology to assess the relevant archaeological methods and shortcomings. Nordic archaeology has been moving towards a more interconnected focus (i.e. between towns and between towns and regions), the goal of which is to seek out networks, e.g. commercial, transport and social networks, that are visible and/or can be assessed, both within and outside the town (Raja, 2020). Part of this work can be said to be an expansion on earlier archaeological work within towns, where the focus has been on the identification of social groups, mainly through the material culture that they leave behind (Jervis, 2014). In Denmark, the *Projekt Middelalderbyen* sought to analyze and discuss the emergence of several medieval towns combining historical, geological, archaeological, and geological analysis. The results of these analyses were presented in terms of periods of development for the towns that were in the project (Krongaard & Poulsen 2016: 28-31).

As opposed to some of the larger Nordic excavations, like the Bryggen excavations in Bergen, most of the towns in Mecklenburg have not received similar levels of continual excavations. From 1949 to 1990, Mecklenburg was part of the GDR, which resulted in sometimes underfunded and rushed excavations, and no archaeological excavations at all in most cases[2]. Outside of towns like Stralsund and Rostock, this has resulted in few larger publications of the town's archaeological development over time (Radohs, 2023).

3.3. *Methods of the Paper*

As the goal is to demonstrate the viability of a multidisciplinary approach, i.e. urban archaeology combined with an urban morphological study, the methodological approach consists of three aspects:

1. Contextualizing Friedland in terms of its placement and connections.
2. Division of the town into smaller regions similar to the morphological regions.
3. Interpretation of written sources and archaeological data.

Since Friedland has not been studied from an urban morphological perspective, it is appropriate to start with this type of analysis. In essence, the urban morphological perspective takes a much wider approach to studying the urban landscape than urban archaeology does.

The contextualization of the town is relevant in terms of why a town would be placed in a chosen location, including how this location connects it to other towns and regions. As Carelli states, one of the factors that can help characterize a town as urban is a dependency on external food production (Carelli, 2001). This dependency breeds a necessity for trade, highlighting the importance of a town's placement. Something that also needs to be considered, especially when discussing the shape of the town, is the geological makeup of the area. Soft soil is not an appropriate foundation for heavier buildings like fortification walls and multistoried houses. Looking at medieval towns in continental Europe, a soft soil foundation would place natural restrictions on the construction of medieval walls. Geological maps and height maps can therefore assist in explaining the placement of the town.

The second aspect of the analysis is the division of the town into smaller regions, similar to the morphological regions. A central part of an urban morphological study is to produce morphological regions based on the characteristics that can be observed throughout the

2. Personal comment from Dr. Michael Schirren.

town. However, this assumes a direct continuity of a town's major elements, such as the width of the plots, size of buildings, and the construction of these buildings from the Middle Ages until its mapping in the 19th century, an assumption which may be problematic. For the analysis of Friedland in this paper, three numbering systems were employed: One for the blocks that include private buildings; one for the blocks containing public buildings, e.g. churches, hospitals and mills; and one for the street system, thereby treating this as its own independent system. The numbered blocks were based on the cadastral map from the 19th century provided by the Rostock Landrat. This division of private blocks, public blocks and streets facilitates the discussion of archaeological excavations within and among these blocks and streets.

While buildings are an important aspect of a morphological study, buildings that were constructed after the thirty years war, like the school close to the church, are not included in the analysis, The buildings in this case are loosely dated based on available data from the written sources, so while certain buildings are not mentioned until the 14th century, it has to be assumed that the building existed prior to this. One instance of this is the church of St. Mary that, while not mentioned before 1328 in the Mecklenburgische Urkundenbücher, must have been there beforehand[3].

The final step of the analysis is the interpretation of archaeological and written sources. Unfortunately, very few excavations have been undertaken within the blocks themselves. However, the ones that are available can be georeferenced and placed on a map of Friedland to give an idea of settlement development, while archaeological finds and principles of stratigraphy can show connectivity between excavations. Looking at written sources, these are studied to gain an idea of the development of the town and, where applicable, gain an overview of named buildings, like churches and mills.

4. History of Friedland

In 1994, historian Horst Wernicke published an article on Friedland, theorizing that Friedland's Slavic origin lay around St. Nicolai church (Wernicke, 1994). After the Slavic period, the area was settled by German-speaking settlers in 1244. The two founders were Johan and Otto, both Margraves of Brandenburg, with market rights being given in 1282 by Albrecht, Margrave of Brandenburg[4]. The town was founded to fortify the border between Brandenburgian Stargard and the Duchy of Pommern, and, as with the previous Slavic settlement, was placed on the plateau due to the access and sanitation options that the Datze River provided (Figure 2) (Wernicke, 1994).

During the foundation of Friedland in 1244, the sources available in the Mecklenburgische Urkundenbücher mention that Friedland was given an area of 200 Hufen, with 50 of these Hufen being given for pasture and the remaining 150 being given for farmland (Erstling, 1994). It is also mentioned that permission for the construction of a mill was given to Johann of Grevendorp, with a two year tax exemption (Erstling, 1994). Most notably in the founding document, the town of Friedland is given the town charter of Stendal placing them under Magdeburg town ordinances and privileges chartered to a town (F. Erstling, 1994). Following this initial founding and the gifting of market rights, Friedland had its customs returned along with those from the town of Neubrandenburg[5]. The document makes no

3. G.C.F. Lisch (1872), *Mecklenburgisches Urkundenbuch*, vol. 7 (1322-1328), Schwerin: Verein Für Mecklenburgische Geschichte und Alterthumskunde, 4906.

4. G.C.F. Lisch (1865), *Mecklenburgisches Urkundenbuch*, vol. 3 (1281-1296), Schwerin: Verein Für Mecklenburgische Geschichte und Alterthumskunde, 1617.

5. G.C.F. Lisch (1869), *Mecklenburgisches Urkundenbuch*, vol. 5 (1301-1312), Schwerin: Verein Für Mecklenburgische Geschichte und Alterthumskunde, 3025.

Figure 2. *A map of the territories in 1250 AD. Note Friedland's placement as part of the Stargard area. Illustration by Martin Ebert, data from* Mecklenburgisches Urkundenbuch.

mention of who had the rights before this, but it is noteworthy that, despite Neubrandenburg only being founded four years after Friedland, Friedland still had a measure of control over Neubrandenburg. However, the extent of this control is not immediately clear in the *Mecklenburgische Urkundenbücher*.

Apart from the mention of the mill being constructed as part of the town foundation, neither the founding document nor any later sources make mention of the construction of other public institutions, like the two churches and the hospital (Figure 3). However, St. Mary is mentioned as part of a gift given by the Bishop of Havelberg, who donated 5 ½ Hufen to St. Mary church with the aim of establishing a vicarage, presumably separate from the one established by the Kaland Brotherhood, which was gifted areas inside the town in 1308 by Heinrich of Mecklenburg[6]. The St. Nicolas church is not mentioned in any of the documents available in the MUB, but it is safe to assume that the churches were constructed after 1244, especially in the case of St. Mary.

The fortification of Friedland was accomplished by the construction of three medieval gates and a brick wall. The common assumption for Friedland's original fortification was a rampart that surrounded the town, but this was replaced by a brick wall in 1304 (Dehio, 2000). Part of this construction included "drei Tore und 29 Wieckhäuser [fortified houses on top of the town wall]" (Dehio, 2000: 138) with the three gates being the Anklamer (Steintor), Neubrandenburger (Burgtor), and the Treptower. Of the three gates, only Anklamer and Neubrandenburger have been preserved in their original state. The Treptower Gate was stuck by lightning in 1803, but torn down later (Mayer, 1896: 92). However, the Treptower gate has since been torn down.

6. G.C.F. Lisch, *Mecklenburgisches Urkundenbuch*, vol. 5 (1301-1312), 3243; G.C.F. Lisch, *Mecklenburgisches Urkundenbuch*, vol. 7 (1322-1328), 4906.

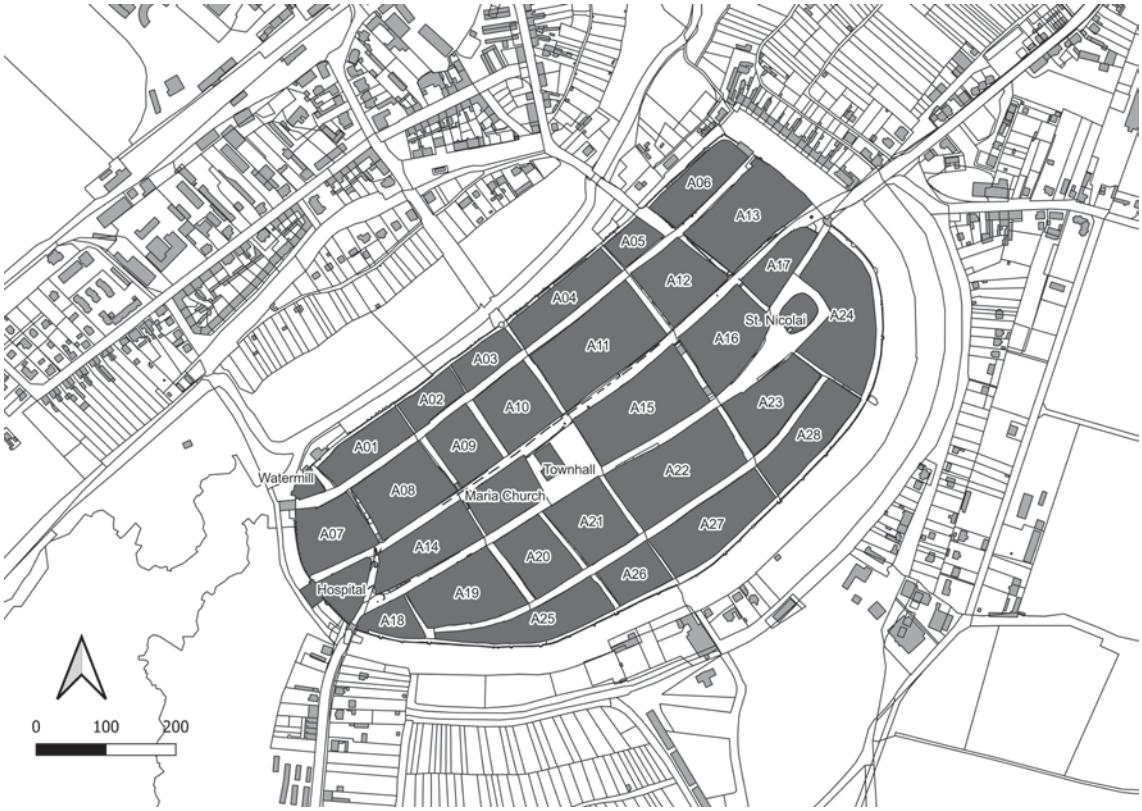

Figure 3. *A map of the Friedland with the blocks base on the cadastral map from 1901, produced by Martin Ebert. St Mary church is located at the center of the town and St. Nicolai is located to the northeast.*

5. Analysis of Friedland

As mentioned in the methodology, an urban morphological analysis seeks to understand the elements that make up a town (Oliveira, 2016a). Following this approach, the analysis of Friedland will seek to go from the wide view of the town to a narrower view. As opposed to other urban morphological studies, this one will, as stated before, largely ignore the buildings in the town unless the building can be said to have belonged to a medieval core, as is the case with the St. Mary Church and the St. Nicolai Church. To get the best possible results, the analysis will start with a wider topographic perspective and zoom in to the narrower perspective of the individual blocks.

Starting with the topographic analysis, elevation maps gathered from Mecklenburgs Geoportal show that the town of Friedland is placed on a plateau in the Datze Riverbed. Geologically speaking as the plateau is moraine in nature, "die insbesondere bei ihrer Betrachtung aus einer talhangnahen Position den Eindruck von inselartigen Hochflächenplateaus vermitteln können" (Erstling, 2001). The placement of Friedland on this plateau served multiple functions, with the Datze River providing a natural form of defense for the town, as well as necessary sanitation (Wernicke, 1994). Friedland is also a convenient meeting point between the towns of Treptow, Anklam, and Neubrandenburg. Friedland covers an area of 360.000 m^2, making it the largest of the urban settlements founded in the 13th century.

According to the standard process of urban growth, the town of Friedland tells a story of two phases of development. The area surrounding St. Nicolas church appears, on the cadastral maps, to have a non-geometric construction in opposition to the rest of the streets in Friedland that form a cartesian grid with SW/NE running streets. Typically, this type of opposition is viewed morphologically as the contrast between an area that grew unregulated and an area that was planned from the beginning. Other research, like the one carried out by Baeriswyl in his research on Zäringer towns in Switzerland, would suggest that the area of St.

Nicolas church could have been the site of an earlier, larger construction (Baeriswyl, 2004). This area was pointed to by Horst Wernicke in 1994 as the origin of the town, being the possible area of the Slavic town (Wernicke, 1994). His theory suggested that from this area the rest of the town was constructed, forming the trellis road system that is seen today. However, from an archaeological point of view, the evidence for a Slavic settlement is focused around the St. Mary church and the areas to the north of here (V. Schmidt, 1994).

Moving on from the urban morphological perspective, the archaeological perspective paints a slightly different picture of Friedland's development. Archaeological excavations are limited in their scope to areas that are in need of reparation or to new constructions. One of the largest excavations undertaken in Friedland is the excavation of Riemannstrasse, which is also Friedland's arterial road. Results from this excavation included the foundation of a large building towards the Neubrandenburg gate, foundations of medieval, late medieval, and modern buildings, as well as remains of the wooden road that ran through medieval Friedland, dated to between 1234 and 1256 AD (Fenske, 2007a, 2007b).

For the areas of the town that were excavated, the orientation of the road has not changed much. However, one of the other excavations near the watermill revealed the site of a Slavic ringfort (B. Schmidt, 2010). This, along with excavated Slavic finds from around the market square, indicate that the Slavic presence was centered around the areas that would later become the watermill and St. Mary's church, following Friedland's founding (B. Schmidt, 2010). Sadly, despite the relatively high amount of excavations carried out in Friedland, little work has been done around the St. Nicolas church. Therefore, despite the evidence that points at the Slavic settlement being more centrally placed within the town, from an archaeological standpoint, there is not enough evidence to completely ignore the possibility of an earlier settlement being somewhere in the region of the St. Nicolas church. However, one excavation in Friedland, Fundplatz (Excavation Site, shortened to FPL) 57, makes reference to another excavation, FPL 158, and discusses the medieval layers in the northern area of the town, which is just below the subsoil. While the FPL 158 excavation cannot be located beyond a single mention in the Denkmal GIS system, it is the closest archaeological excavation that gives an idea of the medieval layers in the region of St. Nicolas. Future archaeological work would be helpful for a better identification of where the Slavic center of the town is found, as it is known from historical sources that there was a Slavic population already present at Friedland's founding, demonstrated by the founding document stating that the current Slavic population should be governed by a bailiff that was yet to be elected to the town[7].

Previous urban morphological analysis of medieval English towns has also been able to reveal patterns in the plot widths of these towns (Lilley, Lloyd, Trick & Graham, 2005). Similar work has been completed for the towns of Malchin (Ebert, 2021). These results revealed groupings in the plot sizes, referred to in English literature as perches. Similar work was done for the town of Friedland, where the peaks in terms of plot widths lie between 27-30 Magdeburgian feet and in another case around 38-39 Magdeburgian feet (Table 1). This corresponds roughly to a width of between 7-10 meters for the lower grouping and 11-13 meters in the higher grouping. Based on foundations found during the Riemannstrasse excavations, the plots were measured to 9 meters. The excavations from FPL 150, one of the few undertaken within a block, give a width of approximately 12 meters. Thus, it is possible to discuss a form of consistency of plot sizes (Figure 4). Future excavations would help provide more datapoints for this type of research, while larger excavations could possibly help advance the discussion of the plot depths, which would provide further proof of consistencies within the plots systems of medieval towns, as well as their periods of development.

7. G.C.F. Lisch (1863), *Mecklenburgisches Urkundenbuch*, vol. 1 (786-1250), Schwerin: Verein Für Mecklenburgische Geschichte und Alterthumskunde, 559.

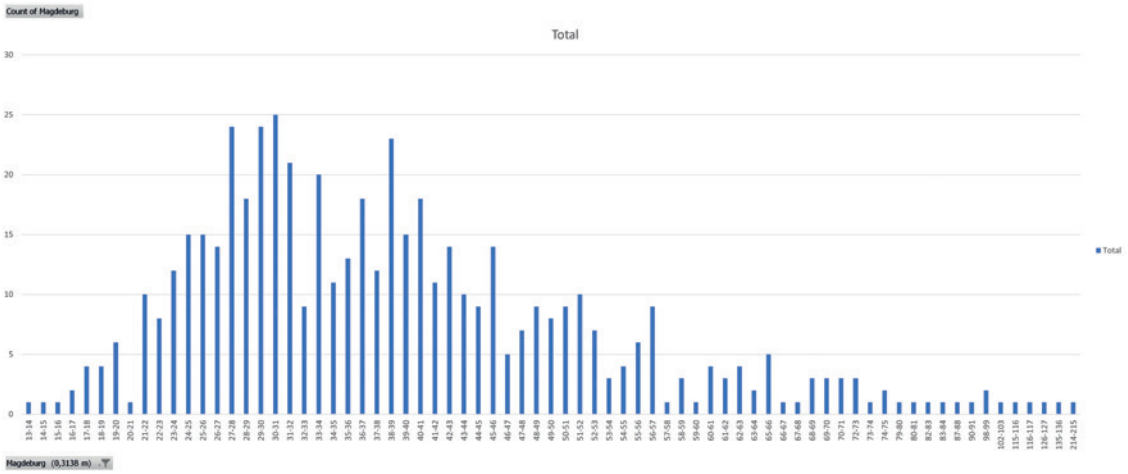

Table 1. *Graph showing the count of plot sizes grouped into 2 feet sections. Note the groupings around the 27-30 Magdeburgian feet and 38-39 Magdeburgian feet.*

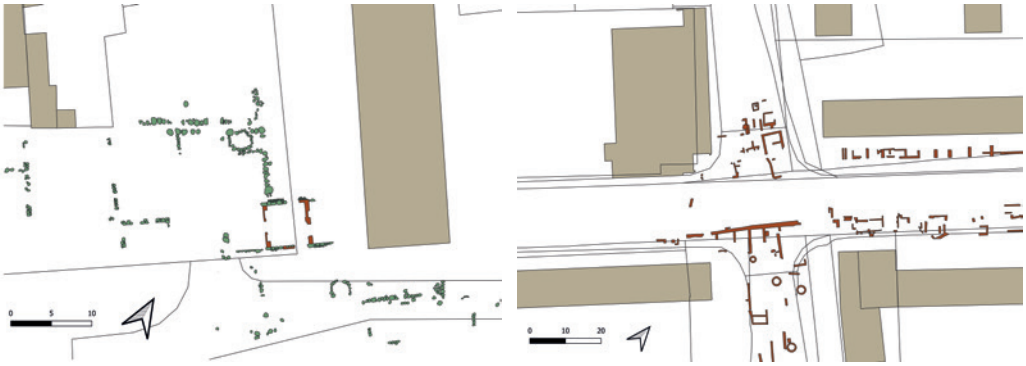

Figure 4. *Two excavations, FPL 150 (left) and FPL 144 (right) both showing properties from the medieval period (marked in green) and late medieval (marked in orange).*

Conclusions

With all the data collected, the characteristics of Friedland's development become clearer. Friedland is a border town at the edge of the Stargard territory adjacent to Pomerania. Wernicke's article on Friedland proposes that a Slavic settlement was situated around the St. Nicolas church in Friedland. While the excavations that have been undertaken in Friedland to this point have revealed signs of a Slavic presence in Friedland, especially in the area close to the watermill, the only excavations that give an indication of a Slavic presence are those around the area of the town market. The strongest evidence apart from archaeological findings of a Slavic presence prior to the founding of Friedland is the mention of a Slavic population that was under the control of a special court and the bailiff. Ringforts like the one found in Friedland are not uncommon when compared to other towns within the Mecklenburg area, with the town wall of Parchim bisecting one such construction while Bützow, the seat of a Bishop, has two such ringforts constructed in the town's periphery.

Following the founding of Friedland in 1244 on the natural plateau in the Datze River, the natural defenses provided by the riverbed to the south, man made channel to the north, made to supply the mill, as well as the walls that were built to surround the city made the town a perfect border fortification. As the town developed, certain aspects of the town changed, most notably the width of the streets, as is the case with most medieval cities. One aspect that further excavations will uncover is the standard widths of the plots of the origi-

nal medieval and late medieval buildings, particularly the depth of the plots as the available data showed a strong continuity in terms of standardized plot sizes.

Future work with Friedland would benefit greatly from larger excavations with greater focus on activity within the blocks of the town. Sadly, despite the town's founding naming several important people involved with the founding of the town they do not reappear in the written sources following their original mention, making it impossible to know what influence they had on the formation of the town. In the span of the town's medieval development, there are also mentions of several brotherhoods, as well as various guilds that all could potentially have influenced Friedland's development. The ideal result would be something similar to that produced by Armand Baeriswyl in his study of the Zähringer towns of Switzerland and Southern Germany (Baeriswyl, 2004).

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Identity Impelled Urban Transformations

A Reflection on the Cultural Identity of 'Displaced' Populations

Lora Nicolaou, Delis Papadopoulos, Demetris Economides[1]

Abstract: Comprehensively designed housing during the last half of the 20th century often failed in several ways. Poor construction, lack of management and maintenance, tenure policies/ownership, urban models all contributed to the absence of self-sustainable renewal mechanisms necessary for the long-term retention of their value as residential environments. Some models of housing seem to have been more responsive to transformational change and regeneration strategies. A positive personalisation of space, in terms of utilisation and its role as cultural product, fails to turn estates into responsive high value contemporary mix tenure environments. The paper begins to investigate the possibility for the transformational change of comprehensively design housing, in a way it can reflect the cultural identity of populations with a coherent cultural background – common in the of displaced populations. The mapping of the 'before' and 'after' context, cross referenced to anthropological research associated with the experience of displaced populations (refugees) is a very useful empirical research methodology. The research draws understanding from two very different cases of refugee displacement, in terms of geography and chronology; the experience of refugee populations arriving in Greece from Asia Minor in 1922 and their 'placement' into the poorly serviced infrastructure of the city of Athens, and the relocation, of Greek Cypriot refugees from the north to the south of the island in the years after 1974, in housing estates modelled on European social housing at the time. Selected reference to the experiences drawn from the Angel Town Estate refurbishment (Housing Action Trust) programme in London in the late 1990s attempts to clarify some of the transformational mechanisms observed in the two former cases. The potential value of the interpretation, the place-identity of both the motherland and the new homes, the experiential discontinuities between the past and the present of displaced populations, can inform the 'design' of regeneration strategies of decaying refugee housing in Cyprus. This understanding gained from this recording of 'cultural imprints', begins to inform guidelines for the comprehensively designed transformational change in a way that does not only avail new lifestyles but emotive and cultural aspirations for personalisation and distinctiveness of place identity.

Keywords: Displaced Populations, Local Identity, Collective Memory Mapping, Self Built Housing, Appropriation.

1. Frederick University. Nicosia March 2024. The empirical research material this paper refers to derives from the Diploma Thesis of Christina Sarra submitted in 2021 at Frederic University – School of Engineering, Department of Architecture, titled *The role of the identity of Cypriot refugees in the space of the present: the case of the settlement of Anthoupolis* (*ο ρόλος της ταυτότητας των κύπριων προσφυγών στον χώρο του παρόντος: η περίπτωση του συνοικισμού της Ανθουπολης*) tutored by the authors.

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Introduction

In recent decades, the phenomenon of globalization and transnational ideas have played a decisive role in architectural design. A common architectural language often overwhelms traces of 'local identity' and the original structural and physiognomic characteristics of place. Where the theoretical debate around issues of identity is vibrant, there are fewer references to briefing and design tools and/or implementation mechanisms which investigate locally biased responsive environments. Comprehensively designed modernist housing models built during the last half of 20th century, denying the integration to their locality and often failing to retain their value (social, economic, cultural) in several ways, due to poor construction, insufficient management, tenure policies/ownership, spatial configurations etc, have contributed to the absence of self-sustainable renewal mechanisms. Some models seem to have been more responsive to transformational change than others with positive personalisation of their architecture playing a key role in its future value and/or built in mechanisms for a perpetual self-sustainable renewal.

The paper draws from the empirical research of a diploma thesis at Frederick University (Sarra, 2021) which attempted to design and test mechanisms for the transformational change of a comprehensively designed refugee housing estate built in Nicosia in the 1970's. The thesis argues for an alternative to an institutionally driven top-down regeneration programme, opting for the design of a bottom up mechanism which can transfer responsibilities of the long-term care, maintenance and renewal of the environment to the 'individual'. Retaining a sense of collectiveness and enhancing local identity as tools for managing local relationships are seen as a key added value for low-income communities often associated with refugee housing.

In investigating issues of identity as a central preoccupation, the thesis draws from two very different cases of refugee displacement, in terms of geography and chronology (Sarra, 2021); the neighbourhood of Nea Ionia in Athens associated with the displacement of large populations from Asia Minor after the defeat of the Greek army in 1922, and a group of Greek Cypriot refugees relocated from the north to the south of the island in the years after the Turkish invasion of 1974. Both peoples were characterised by a strong coherent cultural background and a common understanding of place associated both with their original homes – cast in stone in the memories of refugees because of their abrupt uprooting – as well as the instantly contracted new homes in a comprehensively built environment.

Common identity is explored here as a design tool understood as remaining relevant in the making of the modern city as a sociocultural construct, and in the relationship between local identity and collectiveness, which is perhaps more relevant in a multicultural context. The key question is how far urban renewal mechanisms carry within them notions of commonality, shared value, shared determination and aesthetic understanding of place, all relevant for a high value transformational change.

1. How Useful is the Term 'Local Identity' in Constructing Design Narratives?

There is a very long debate around the concept of local identity within the realm of historic preservation and commonly accepted conservation mechanisms. Heritage conservation offers little to the debate on the relevance of local and cultural identity towards the design of new places. It "approaches the meaning or value of architecture in static terms" with a justifiable indifference to the contemporary status of its context (Tran, 2011). Jeniffer Tran continuous to suggest that "such timeless depictions of the built environment tend to view architectural identity as a physically defined construct; they often privilege and rely on the designer's concepts

to define a building; and articulate architectural history as a continuous narrative outlining the historical improvement of built form across time" (Tran, 2011). Architecture attempts to contextualize design, often deploying relatively simple notions of identity, images or practices which reflect realities long gone, internationalization, multiculturalism, and climate change – a token gesture more than a new way of approaching locally relevant design. This cannot sustain and service contemporary practice, which continues to regard notions of identity in contemporary architectural design as valuable. Considering the continuous and often substantial transformational change to the building fabric and the way it is perceived, as well as cultural and historical fluidity, the timeless notion of architecturally defined identity becomes more difficult to accept. Such a construct would "discount significant socio-cultural, perceptual and contextual aspects of architecture, and project idealized impressions of the built environment" (Tran, 2011). Furthermore, the new sustainability agenda calling for compactness, deployment of new technologies and the parallel but independent explorations of post-modern trends in architecture as an independent cultural product render borrowing aspects of the physicality of place as pointers toward designing a new identity attainable.

Identity is an aspect of Architectural design which implies strong reflections onto the physicality of place. The idea of meaning as an intrinsic component of culture which expresses actuality as well as intent, simplification and/or purpose, appears more as a tactile tool in narrating aspects of identity in design: "ideas of meaning open up a dynamic notion of the built environment which allow architectural identity to be understood as an unstable construct that forms and alters according to historically specific socio-cultural, perceptual, and contextual conditions across time" (Tran, 2011).

Notions of derived identity can be traced back to sociological research in the early 1900s. In the late 19th century, French philosopher Henri Bergson analysed in depth the way memory is defined in detail: the components of human perception comprising of images and movements. Our perception is our action and movements as they are formed through images, while the "actuality of our perception thus lies in its activity, in the movements which prolong it". (Bergson, 1911). In his argument, he focuses on the difference between perception and memory. Memory is an act that lacks energy in the present, done in the past and completed there. On the contrary, perception is not limited to representation. It is active and experiential. "The reality of things is no longer constructed but touched, penetrated, lived" (Bergson, 1911). More specifically, for Bergson, perception gives us information about the general picture of matter and allows us to separate the real from the ideal, while additionally emphasizing that perception and memory are two concepts directly connected as the latter introduces to the present moments with duration from the past.

With the introduction of sociology to the field of social sciences in the 20th century, a new concept was introduced, that of *collective memory*. French sociologist Maurice Halbwachs, in his work *Collective Memory* states that memory is attributed to a society or group, making it collective. It is emphasized that to remember, one needs others, while individual and collective memory are interconnected without being identified. For him, *space and time* are basic tools for identifying and recalling memories and recollections (Halbwachs, 1992). Collective memory differs substantially from society to society and the configuration of place is a product of different conjunctures and events that took place in each location. People seem to think that every place should have its own unique identity so that it stands out from the rest which was possible pre 19th century, with limited transportation and necessary use of local materials, techniques, and customs in order to build buildings. Despite subsequent industrialisation and internationalisation, basic identification tools and the ability to recall memories is space and time directly associated with the notion of place identity.

In the 1980s, Watson and Bently, while exploring issues of identity from the perspective of the place maker, developed the idea that the identity of place is immediately intertwined

with the identity of its people, which indirectly affects the way people perceive themselves and how they think other people perceive themselves. They deploy 20th century sociological research notions of 'collective memory' to ground an academic construct in its potential reflections for design. They suggest that collective memory differs substantially from society to society as a notion, and impacts the formation of place as a product of different circumstances and events that took part in each location constructing thus a unique place identity which is defined as "the set of meanings associated with any cultural landscape which any person or group of people draws on in the construction of their own personal or social identities" (Watson & Benltey, 1980). While buildings/roads/spaces/activities are losing their distinctiveness, meaning associated with place is still impactful both locally and often also internationally. They go further to suggest that place identity is not necessarily associated with space itself but can be a result of symbolism in collective memories of groups, making reference to the Mostar Herzegovina Bridge in Bosnia – a place associated with both a positive memory (young love) and a negative memory (civil war), independent of architectural elements which have been severely transformed during post war reconstruction. Interestingly, place identity as an expression of collective meaning is not necessarily positive or loved and cherished but simply passed on through generations.

Avoiding the complexities of the term identity, the notion of collective memory as a tool for mapping and demonstrating the commonality of values (even in relatively simple terms) as the relationship between spatial configurations and cultural contracts seems to be a more plausible tool for design and briefing. Collectiveness, derived from the rules of social interaction as a sense of ownership and belonging as well as a common memory of the norm, can be easily traced through the physicality of place, assuming spatial transformations are directly connected to social events that unfold in a place and vice versa.

2. Mapping of *Common Memories* and *Social Constructs* Associated with Design

In architectural and planning practice, the design brief often derives from the investigation of a spatial pathology, user needs research, or evaluations of users' aspirations for a better future. The investigations of the cultural identity of place or communities (often very different from the ones which established a place) are difficult to conduct and lie outside project briefs. Public consultation is a well-established investigatory tool which is often used to legitimize or evaluate ideas more than construct them through the articulation of tactile data associated with place personalization parameters. Furthermore, particularly large scale regeneration programs deploy top-down design and delivery mechanisms focusing on the delivery of physical change and very rarely its facilitation (i.e. allowing bottom up initiatives and decision making).

The Anthoupolis estate, one of the case studies reviewed here, experienced numerous very expensive public space improvement programs, attempting to activate a regenerative process of an already privatized stock of buildings and amenities, and all of them failed spectacularly. Renewal programs always include an aspect of tactical urbanism deploying assumptions of what the key drivers of change are and how they can trigger substantial urban renewal activity. As such, mechanisms are often based on trial and error activities, borrow experiences from other places and inevitably cannot be fully understood in terms of their social context and the structural ability of a place to regenerate itself (comparative case study evaluation). Even successful regeneration examples (physical and social) do seem to be derivative in nature to the collective sociality associated with the pathology of the original place and the aspiration for the future, rather than searching for a new identity based on

collective memories or a shift away from the institutional narrative accompanying collective top down renewal programs.

A typical example of a successful urban renewal program referred to by Watson and Bentley is the settlement of Angell Town in London (Watson & Bentley, 2008). The estate was built in the early 19th century and was intended for middle-income tenants and was secluded from the social and commercial amenity base of its surroundings. The estate quickly gained a reputation for its neglected and degraded environment, thus stigmatizing local society as problematic. In the 90's, the estate became eligible for renewal funding which the community in collaboration with designers capitalized on. A long consultation program aimed to redefine the place's identity by changing its spatial data based on three important suggestions (a) the connection of the area to its surroundings and Brixton centre (b) the re-engineering of urban morphology which restructures the original modernist layout with a new urbanism streets and square plan, thus altering the previous image of the estate. (c) New architecture was chosen as an expression of the new socio-economic status of the remaining residents and their distinct desire to erase traces of the past. A borrowed place identity associated more with the lead architect's portfolio prevailed in the absence of a positive collective memory or a common past – as well as associations with activism or the demand of a new future. Space acts as a container of aspirations which determines the way in which its users self-identify as a group, not necessarily reflecting existing social constructs or collective memories. Such constructs are often associated with common beliefs but derive from cultural bias and individual actions.

The issue of mapping collective memory – in the first instance – is reviewed through the experiences of two groups of displaced populations associated with two different events in the eastern Mediterranean – coming from Smyrna in Asia Minor in Turkey, and Larnaca Labithou in Cyprus, in the 1920s and 1970s respectively. Both places were associated with homogenous populations with long, culturally consistent traditions and distinct morphologically identifiable places of origin. Similarly, upon arrival at their new locations, the construction of the new place was consistent and instantaneously comprehensive in order to receive them.

The refugee settlement of Nea Ionia in Athens is associated with the Asia Minor disastrous defeat of the Greek army in 1922. Events that followed led to the exchange of populations at the scale of some 1.5 million people relocating to Greece over the span of a few months. Most of them moved to the Athens area, a city with a population of 3 million inhab-

Figure 1. *Angle town: a 'borrowed' new place identity.*

itants at the time. As expected, such an upheaval overwhelmed the city, its people and the infrastructure of the young Greece democracy (which was only established in the 1830s.) The rehousing policy suggested two initial categories of procurement methods. The first instance was the design and construction of compact, high-density, low-rise refugee settlements. The second mechanism was associated with the allocation of funds for self-built housing which took place often on illegally occupied lands in the outskirts of Athens (later legalized) or on designated lands often remote and outside the main infrastructure network. Very small plots and a basic street network form the basis of an almost makeshift morphology of new settlements, which included Nea Ionia. The names of the new neighbourhoods began with the adjective "new" (New Chalkidona, New Smyrni, New Ionia) an expression of the nostalgia for the past and the rich history of the ancestral lands, as well as to express the promise of incarnation of the lost homeland and its cultural wealth in a new place. The archetypal refugee house consisted of a one-story structure made of mud bricks with a tar paper roof, intended to accommodate two families. By adding a similarly constructed additional floor, a second type of house was created that had the capacity to house four families. The decision to establish carpet and textile factories – on an adjacent industrial zone – in Nea Ionia also reflected the wealth of trades refugees carried with them. Over the course of a few years, Nea Ionia had reached 24,000 inhabitants, with 90% of the population consisting of refugees.

This neighbourhood, despite its refugee character and shabby infrastructure quickly became very well known for its distinctiveness and for what it had to offer to the city of Athens. The economic contribution of the thriving local industries, the exotic stories of travels to faraway places, the new economy and its trade, its narrow streets full of life and activity, its sociality associated with music, food, and lifestyle all became emblems of the new yet coherent cultural identity of a place which captured the imagination and interest of the wider local population. A plethora of urban narratives formally and informally recorded the refugee identity of the Asia Minor in mainstream history and culture of Greece. This is expressed less in space, but more through the character and the lifestyles of the refugees, the gastronomy, and also the stories and especially the songs the new population brought with them.

Nea Ionia's refugee character began to fade in the following decades, spatially, socially, and economically. The wealth generated by the business success of the newcomers, and the economic immigration in the 1950-60s, inevitably generated a mix of populations and social restructurings. A particular planning regulation introduced in Greece in the 1970s dramatically changed the nature of all urban areas in Greece. The regulation set up a framework through which landowners could exchange land with partial ownership for a much higher density building with favourable tax terms. The two story shanty town was very quickly transformed into a 6 story continuous building line, flattening neighbourhoods into the rest of the Athenian plan, with the exception of a few conservation areas. By the late 1970-80s a total transformation of Nea Ionia (physical, economic, social) had occurred, with only the narrow frontage of buildings and the very fine scale of morphological patterns implied the presence of a very different past. While small business associated with food and entertainment – taverns, night clubs, music venues continued to operate, they were soon swallowed by the boundary less Athenian urban fabric.

Despite the complete change of the human geography of Nea Ionia as a product of the collective memories of the populations of Smyrna in Asia Minor, it retains its strong and disreputable identity to date. Apart from actually teaching the young generations of historic events and refugee identity, physical reminders survive in the names of streets and places, as well as through aspects such as gastronomy, crafts, literature and oral urban narratives around the commemoration of a collective identity. These continue to retain a strong identity of place and most importantly an extensive repertoire of music specific to the place and time of displacement (laika) continue to support a very strong identity of place. This retention of

Figure 2. *Nea Ionia – a strong identity despite the total redevelopment of the building fabric.*

a very strong identity over time with clear historic relevance, signals a de-territorialization of identities and life in a stateless condition. References to the new and the old generate a timeless connection through the creation of emulations/simulations of reality allowing happenings in the city: enhancing real memory over historical memory alongside the parallelism of everyday life in the present and the past in a place.

Larnaca Lapithou (today's Kozankoi) is a village that experienced dramatic demographic changes after the Turkish Invasion in Cyprus in 1974, when the Greek Cypriot population was replaced by an equally rural Turkish Cypriot community which continues to inhabit the village today, carrying through a strong cultural identity directly associated with a preserved village setting (Dicomitis, 2012). The displaced Greece Cypriots inhabitants on the other hand were relocated to an outer suburb of the capital city of Nicosia, in the comprehensively designed and built social housing estate in Anthoupoli. The estate opened for habitation in 1977 with 5000 occupying 975 homes. The neighborhood was constructed according to a modernist architectural ideal, similar to social housing in the UK at the time, designed by British architects. A looped perimeter road branches into a set of cul-de-sacs forming distinct neighborhoods of either terraced two story narrow frontage houses or 4 story blocks of flats. Ample open space (almost 60% of the plan) is associated with a central amenity core (mainly shops), a local school, extensive parking areas and an extensive network of pedestrian routes with more undefined and left over lands. On the other hand, very little private open space was allocated to units distributed almost evenly to back and front small courts. As a pattern, it absolutely reversed the space allocation of a traditional village like the one associated with the group of refugee populations. Very little public space simply facilitated movement except for a small public square and the church yard. Ample private open space was gathered at the front of the house in an entry forecourt used for socializing, interfacing with the outside and accommodating most of the house based activities of an agricultural society – in essence an outdoor workshops/living space almost around the year.

Initial observation indicated a distinctly high level of appropriation of the impoverished open space by the residents, as a functional open space for communal and private activities. This distinctive transformational change observed after 40 years of habitation of the estate seems to reflect directly the functional nature of the traditional village house semi-private courtyard. The fit out of public space was with gardens (flowers and vegetables), external cooking (wood ovens and barbeque equipment) for private and communal use, areas for

drying clothes, shading devices – plants and makeshift structures (also associated with the traditional house courtyards). This lack of essential functional space was confirmed during interviews. The expansion of interior spaces (i.e. enclosed balconies) was used for core activities such as sleeping, working living spaces etc. (Sarra, 2021). Informal discussions also highlighted interventions aimed also at the personalization of institutional uniformity, particularly of the residential terraces. The need for differentiation was reflected in the choice of materials, styles, and to some extent of interventions in relation to neighboring properties.

Interestingly and in contrast to the need for personalization, suggestions for a potential integration of the estate to the surrounding much more affluent housing of Nicosia (similarly to the Angel Town case) as a tool for ameliorating the ghetto status of the estate was outright rejected. A high level of comprehensiveness in the environment was seen more as a reflection of the social nature of relationships in the estate (as refugees) which was perceived as positive. A socially cohesive group of original tenants and their descendants extended their courtesy and support to newcomers (often from the same low-income economic background) in need of mutual support in the new environment. Surprisingly, the pride in a collaborative culture (very much transferred from the rural background of original residents) runs across generations, original and new residents, with younger people recognizing the value of membership in a collective.

This strong, distinctive identity of refugee and rural communities was very much reflected in the interior fit out of houses and flats as much as the need for more space. Not only through memorabilia in the decor but in ways of organizing the spaces, the management of the flexibility of interchangeable rooms, the relationship of sleep to living spaces as well as the way workspaces integrated into living functions, were all clear traces of surviving traditions passing through generations of collective memories.

The leniency of authorities in tolerating illegal extensions in public and private spaces created a new tapestry of building typologies. It was recognized by all that while extensions were necessary and useful and a tool for the personalization of space, they were aesthetically inconsistent and damaged the monetary value of properties. A strong identity based on collective memories and sociality was generating haphazard spatial transformations deriving from social data and vice versa.

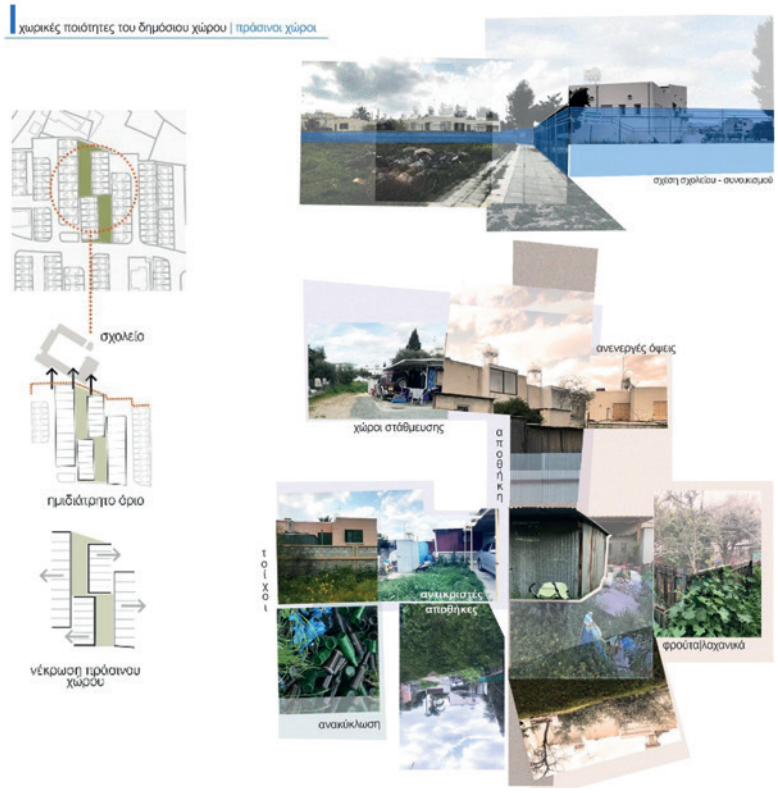

Figure 3. *Appropriation and personalization of 'unclaimed' left over space in Anthoupolis (Source: Sarra, 2021 modified extracts).*

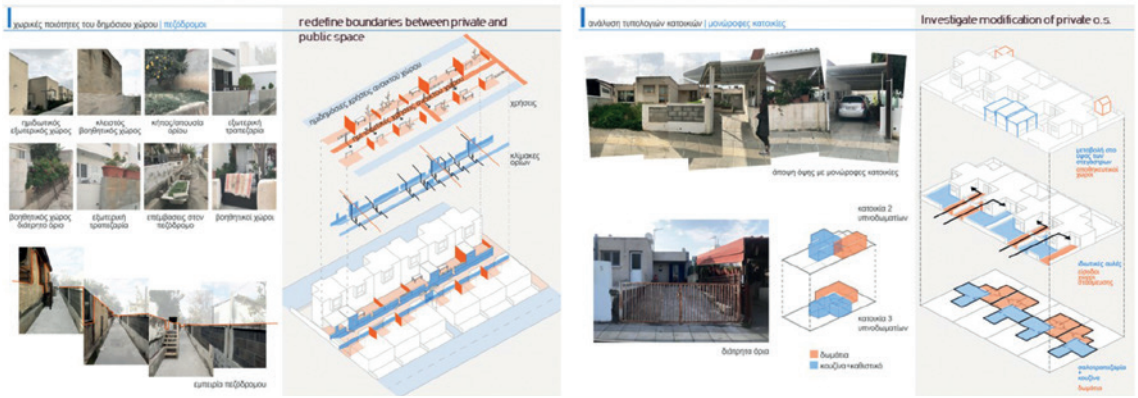

Figure 4. *Mapping the characteristics of outdoor private space utilization (Source: Sarra, 2021 modified extracts).*

It becomes clear from the review of all cases that collective memories of place survive through generations and are not always reflected through space (i.e. Nea Ionia in Athens) which is often outside the control of individuals and collectives alike. It is also clear that not many community groups can explore the physical expression of their collectiveness on the transformational change of their environments. In Angel town and Nea Ionia, because of specific circumstances, communities settled to models of postmodern housing typologies typical in each location. Instead, collective identities were reflected through other cultural products or expressions of political activism, while there is an inevitable danger of losing the area's sociocultural identity over time. In the case of Anthoupolis, the physical traces of a lost lifestyle were only possible because of unchecked illegal interventions on the original comprehensively designed environment.

A key question remains how far the continuous renewal process of the urban fabric can retain transferals of sociocultural contracts, strongly present within communities, not necessarily as valuable/differentiated place identity for others, but as a tool of social cohesion associated with healthy, sustainable, and thriving neighborhoods.

3. Bottom-up Renewal: A Trustee Collective of Urban Narratives

Larnaca Labithou is a case study that gave the opportunity to review the potential of renewal mechanisms derived from social meanings associated with lifestyle as a sense of collectiveness and connected to some extent to a common background, but mostly linked to membership of the same economic class.

It became obvious from early surveys and previously failed schemes focusing on the upgrade of the public common space that similar refurbishment proposed by a top-down regeneration program will not create the preconditions to enhance the environmental condition of the estate. Residents felt that emphasis on the condition of the open space was not an appropriate conversation at this point in time. Pressing matters to the renewal of privately owned homes in order to accommodate expanded families and new lifestyles were seen as the key for unlocking a healthy, prosperous long-term future for the neighborhood. A controlled level of personalization was also seen as a condition which could keep the sense of a rural tight-knit community but could constrain the institutional sense of place perpetuated by a typical public sector led building renewal program. The term village was commonly used in informal conversation instead of suburban neighborhood or estate.

A bottom-up implementation of an urban code attempts to investigate the possibility of a long term continuous building fabric renewal program associated with individual unit refurbishments within a coded set of options. The investigations indicated in images 5 and

6 explore the various possibilities for expansion at ground and upper floors, including the two sets of private open space at the front and back of each unit which could be feasible without compromising neighbouring properties of climatic design parameters (Sarra, 2021). These options reflect existing illegal extensions, deriving from observations of daily activity, mappings of implicit /explicit need questionnaires and spatial references associated with urban narratives.

Key assumptions driving design prescriptions were the clear need for the establishment of permanent extensions to very small units by increasing their building volume, the need for supportive spaces– storages/parking – and the need for shaded open spaces at both ground and upper levels. Flexibility in the interchangeability of functions according to seasons and/or family circumstance, the management of a sense of privacy, the compactness of the residential unit and the active utilization of private outdoor space as an extension of the house's activities were some of the qualitative specifications. All of them very much culturally echo the traditional Cypriot village house, which despite socio-economic changes persists through generations because of its flexibility for activity and cohabitation of different generations, as well as its sensibility toward climatic design.

Extensions are seen as generative elements of new typologies with the combination of solid volumes and flexible shells to simulate the semi-private covered space of the traditional Cypriot house. Implicit and explicit needs called for the extension of private built and open space with well-defined boundaries, the transformation of public space into semi-public with informal and ad hoc investment by residents to appropriate it in a high value manner.

A morphological design code associated with the house extensions was tested against the level of personalisation and diversity it generated with new architectural elements interfering across the flat continuous facade of the terraces. A key objective was to 'regulate' the elements of choice, improve the quality and modernise the image but at the same time preserve a valued sense of comprehensiveness/expression of collectiveness still strong within the community (Figure 8).

The code focuses on the renewal of the housing stock with no references to an urban layout which could have been characterized by contemporary urban planning/design ideas as problematic. The lack of accessibility from and to the outside, the fragmentation into neighborhoods, and the retention of introversion were seen as positive conditions by the community connected to the self-perpetuated sense of social referencing and inclusiveness across old tenancies and newcomers.

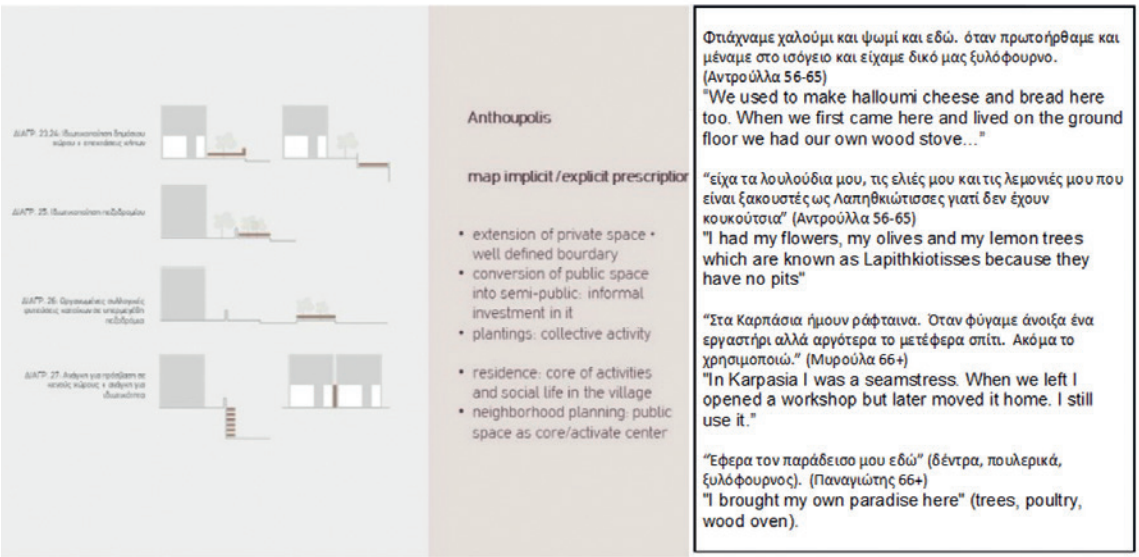

Figure 5. *A renewal urban code: investigation of unit expansions (Source: Sarra, 2021 modified extracts).*

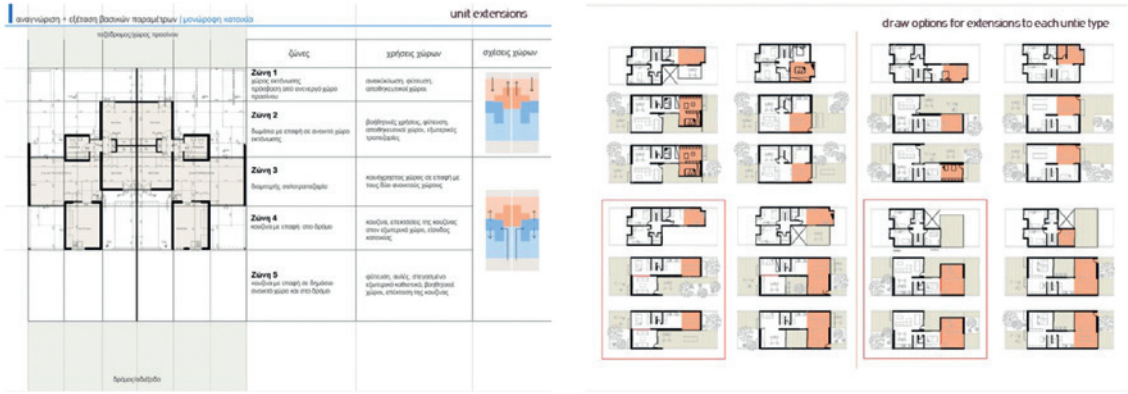

Figure 6. *A renewal urban code: the investigation of house typologies compact extensions (Source: Sarra, 2021 modified extracts).*

Figure 7. *New and old typology of open space extensions (Source: Sarra, 2021 modified extracts).*

Figure 8. *Manage comprehensiveness of renewal of image and architectural quality (Source: Sarra, 2021 modified extracts).*

The potential delivery of a long-term gradual change led by individual owners holds several challenges. Although it simulates the gradual renewal process of a typical suburbia neighbourhood, it is particular in that the change needs to take place in a coded and collective way. A mechanism for collectively applying as a community for the planning permit of the code collectivises the mechanism of approvals. The common and identical structural systems of units also implies the possibility for a similarly joint building regulations approval with works even tendered. This could lead to a community-led coded renewal programme implemented by individuals, and gradual home refurbishments over time.

It is also necessary to review collective and individual funds (still available to originally displaced refugee families).Funds associated with on-going maintenance grants or bespoke projects associated with the estate could be channeled toward a community-led allocation of mixed funding towards a bottom up but substantial regeneration plan.

A bottom-up piecemeal housing renewal does not only provide a framework for the gradual intensification and upgrade of living spaces, but shifts the long-term responsibility of the constructive maintenance of institutional environments from the public sector to the community and the individual in a way that could support and renew aspects of collective memory, a condition interwoven with the notion of local identity as a positive spatial indicator.

Concluding Note

Nowadays, due to globalization, the issue of identity exploration is emerging as a means of self-determination, in a world where identities are becoming increasingly denationalized.

The analysis of concepts of identity, movement and parallelisms in the first chapter, highlights local identity as a set of concepts which refers to the collective self-identification of a community. Notions of meaning carried through collective memories assisted – consciously or unconsciously – to transfer traditions, habits, activities to the new place where they settled.

The potential value of the interpretation of place-identity and the experiential discontinuities between the past and the present of displaced populations, can inform the design of regeneration strategies not only for decaying refugee housing but for institutional housing in general. The understanding gained from this recording of cultural imprints, begins to inform guidelines for relatively unconventional, comprehensively designed, transformational change in a way that does not only avail new lifestyles but emotive and cultural aspirations towards personalisation and distinctiveness of place identity.

What would be unconventional in urban renewal mechanisms would be the shift from a top-down to a bottom up approach for large scale interventions, allowing personal renewal of homes by preserving institutional integrity and the essence of estates not only as spatial entities but as social constructs with a strong sense of collectiveness, often deeply valued by local populations (sense of belonging, social support mechanisms, community engagement in common affairs etc.).

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Towards an AI-Based Time Machine

Mapping the Morphogenesis and Metamorphosis of Urban Fabrics and Blocks: Nanjing 1929

Marco Trisciuoglio, Didem Turk[1]

Abstract: The aim of the paper is to describe an experiment of remote sensing – remote in time rather than remote in space – about the Southern part of Nanjing (China), as portrayed by a 1929 aerial photography. This image is conserved at the Library of Congress Geography and Map Division, Washington D.C. (20540-4650 USA), and is entitled «Nanking, China». The image was taken by the United States Aircraft Squadrons in September 1929, during a survey campaign of the Republic of China to describe its main cities, including the new Capital city. The aerial photography, comprising six boards, shows the urban morphology of Nanjing, which is largely lost today, due to the great transformations that have taken place in the almost last 100 years of urban history. The remote sensing experiment has been driven within the framework of research aimed at understanding urban fabrics and their morphogenesis, involving the investigation and mapping of the origins of urban blocks and their constitutional elements. The project recognizes the urban block as a dynamic structure. The dynamic structure of urban blocks caused adjustments in the formation of an urban block, in some cases showing the metamorphosis of urban fabrics both in social and physical contexts. By mapping the change in urban blocks, the study aims to understand the temporal transition. To map changes in urban blocks, cases are selected in a different context. In the case of Nanjing, historical photography was selected as the main source to understand this change, facilitated by the possibility to compare it with contemporary satellite views. Accessibility of information from historical images is limited. To conduct quantitative and geometrical analysis on settlement characteristics, it is essential to acquire relevant spatial information by automatic geographical feature detection and extraction. The project uses satellite image processing technology to automatically digitize and extract information from historical images, addressing the challenge of vectorizing limited-quality historical maps. The main goal is to reconstruct past spatial characteristics to trace and understand urban patterns. The defined steps included annotating the building footprint using GIS and creating GeoJSON data and masks to serve as input for training the AI model. The preliminary results consisted of the automatic detection of building footprints. This will be used as input to conduct further analysis with parametric design.

Keywords: Urban Morphology, Artificial Intelligence, Remote Sensing, Historical Maps.

1. Background

Urban morphology enables the examination of transformations in settlements, spanning from their initial development to their contemporary formations, across different peri-

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ods, locations and contexts. The field of urban morphology has evolved and expanded from various perspectives, providing a transformative and evolutionary framework for research. According to Wang *et al.* (2022), mapping urban morphology has played a crucial role in comprehending cities. In recent years there has been a shift in the perception of cities and mapping methods, particularly in terms of their complex form, leading to the new approach that considers cities as data (Rhee *et al.*, 2019).

In a concurrent manner, recent years have witnessed the accelerated adaptation of systematic and more quantitative approaches in urban morphology, aligned with the primary theories in the field. Quantitative morphological analysis commonly involves converting urban elements into numerical indices (Chen *et al.*, 2021). Extensive research has been dedicated to quantifying urban form and its characteristics, establishing quantitative relationships among spatial variables, and defining indicators of urban form (Fleishmann, 2020; Marshall, 2005; Yu, 2014). Furthermore, the tools used for examining morphological patterns vary across different levels of analysis (D'Acci & Batty, 2019).

In light of the dynamic nature of urban form, there is a focus on understanding how changes in urban form can be traced over time. An essential aspect of comprehending and interpreting changes in urban form lies in analyzing the historical evolution of cities. In this context, historical maps play a critical role as invaluable tools for understanding such transformations. However, extracting precise information from historical maps through vectorization poses significant challenges. These challenges include limited geographical information and the absence of metadata unless it can be sourced from archival data (Ekim *et al.*, 2021).

Access to historical maps is often limited, with them typically available only in the form of scanned images, necessitating further processing to enable quantitative and geometrical analysis (Ekim *et al.*, 2021). Among these sources, aerial photography and satellite imagery have become crucial sources for retrieving geographic information. However, vectorizing aerial photography or historical maps can be time-consuming and labour-intensive. Recent advancements have emerged in reducing this labour through the utilization of computers and machines. Rhee *et al.* emphasize the transformation of computers from mere tools to generators of information. According to him, "the possibilities of AI technologies in architectural design are amplified when thoroughly dealing with a data space called a city with complex and innumerable relationships" (Rhee *et al.*, 2019).

The advancement in AI technologies has become invaluable in extracting information from aerial photography, satellite imagery, and other sources. Deep learning models, in particular, can be used in object detection, segmentation, and classification (Wang *et al.*, 2022; Moosavi, 2016). The effectiveness of the model's application depends on good quality input, such as image quality, the level of desired information, completeness and comprehensiveness of the dataset, among others.

This study employs a deep learning model (U-Net) to analyze and read urban forms in Nanjing, China. The study takes historical maps as input for the model to extract relevant information from aerial photographs captured in 1929, which, to our knowledge, is considered the most representative historical image available for the area. Due to rapid urbanization in Nanjing, it has become exceedingly challenging to trace the historical typology of the city. Therefore, the study's objective is to understand and analyze the changes in urban form by examining the information extracted from aerial photography taken in 1929 by United States Aircraft Squadrons.

Applying an AI model to extract urban form involves several essential steps. In the context of this study, these steps were carried out with the assistance of students participating in the Design Studio "Urban morphology, architectural typology, contemporary settlement patterns", held in Spring-Fall 2023 at the Southeast University of Nanjing (School of Architecture), led by Bao Li and Marco Trisciuoglio. The specific topic of the studio was "Urban

Re-generation in Diaoyutai (钓鱼台) Traditional District, Nanjing". The process encompassed the utilization of GIS (Geographic Information System) and a deep learning model to read and compare urban form in Nanjing.

2. Case Study Area

Nanjing, China, has been chosen as the case study area to investigate the transformation of its urban form, primarily due to the substantial changes that have occurred over time, making it nearly impossible to discern historical patterns.

The aerial photography used in this study was provided by aircraft and preserved in the Library of Congress Geography and Map Division, Washington, D.C. 20540-4650 USA, dating back to 1929. The photography covers a vast area within the city of Nanjing. For this work, a specific zone, known as Qinhuai District (named after the water canal that crosses it) or Old Town, has been selected as the focus of the experiment. This selected area exhibits diverse urban forms, particularly in terms of urban blocks (see Figure 1). As described by Shane (2020), changes in social and economic aspects significantly impact the modification or complete transformation of urban form, often observed within the urban blocks.

Nanjing, particularly the Qinhuai District, exhibits a combination of historical patterns and new formations of urban blocks that have recently dominated the area. The city image from 1929 provides a glimpse into the morphological structure of the city, with the block primarily consisting of courtyard houses and narrow surrounding streets. Architectural features during that period were characterized by low-rise courtyard houses. However, a significant transformation becomes evident when comparing the contemporary satellite image taken from Google Earth to the historical one (see Figure 1d).

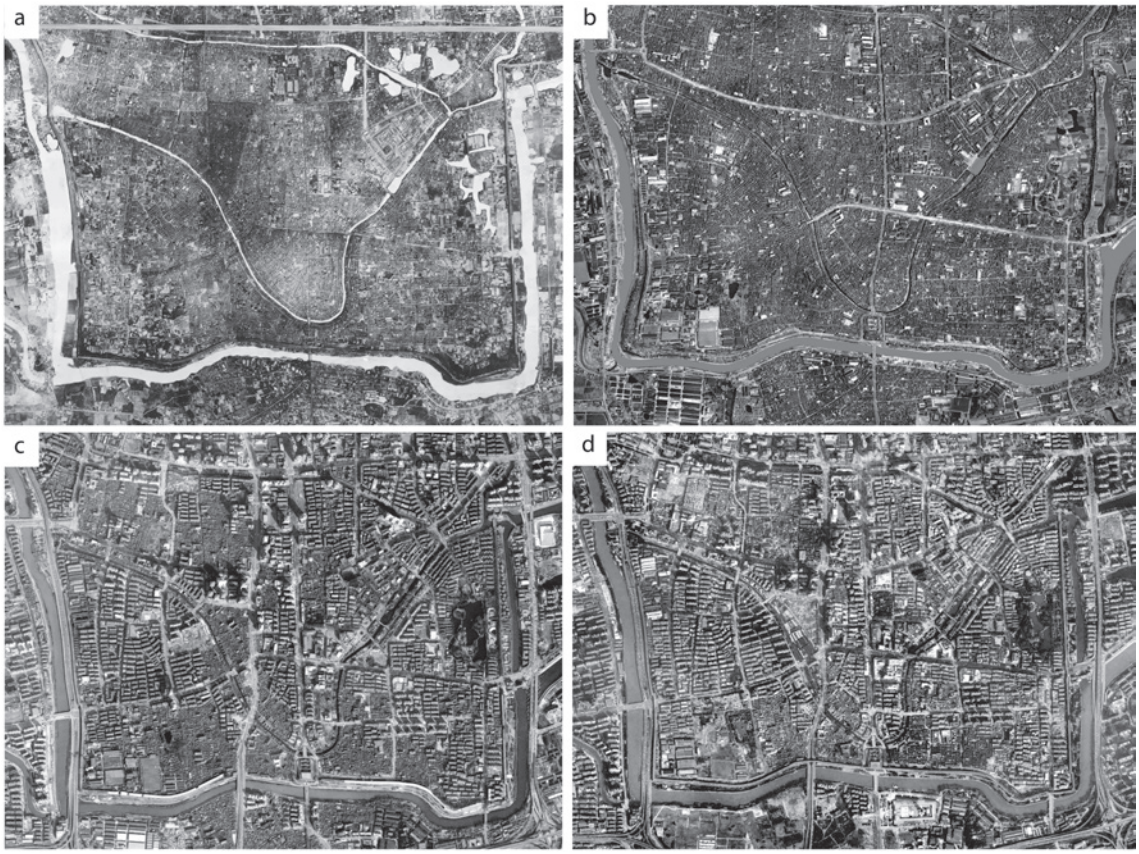

Figure 1. *a. Aerial photography of Old Town 1929. b. Aerial photography of Old Town 1976. c. Aerial photography of Old Town 2005. d. Aerial photography of Old Town age 2017.*

In 1929, the role of the Qinhuai River, the city walls and the great North-South Road, leading to the South Gate of the City (Zhonghuamen) was still prominent. However, by 1976, the dense urban fabric of courtyard houses underwent the first erosion due to the establishment of small/medium factories and service infrastructures. Following the economic reform from the 1990s, the same urban sector underwent heavy redevelopment, as evidenced by the 2005 satellite photo which showed a significant replacement of the original fabric of the Ming and Qing era with the construction of stick buildings, ranging from five to eight floors, characterized by a clear functional imprint. Additionally, a second north-south artery, Zhongshan Lu, was opened, disregarding the pre-existing settlement forms. Subsequent satellite representations from 2017 onward depict the progress of a redevelopment process that seeked to reorganize urban spaces, the housing system and activities, although not always successfully.

3. The Methodology and Application Process

In this project, urban form elements are used as examples to train a model that can automatically extract information from satellite imagery. Wang *et al.* (2022) highlight the natural connection between mapping urban morphology and remote sensing (RS), emphasizing how knowledge about cities can be obtained through this approach. Earth Observation (EO) technology advancements have significantly enhanced our capacity to observe cities from an aerial perspective. Analyzing tangible physical characteristics captured in imagery data using remote sensing techniques makes it possible to identify and study various aspects of the urbanization process at different scales and levels (Wang *et al.*, 2022). Regarding morphological analysis, crucial elements discernible from remote sensing data include the primary building typology, the arrangement of courtyards, and the street network. It is important to note that the quality and scale of the images play a vital role in effectively extracting such information.

As part of the master studio project, a workshop was conducted, encompassing two primary steps: teaching and experimenting. The initial phase involves introducing the notion and concept of urban form and urban block elements to the students. They were familiarized with various typologies observed in the area, which enabled them to utilize this knowledge in a subsequent extraction process. In this case, the understanding and digitization of urban form elements became a critical role as the initial step of the project.

The experiment's second step involved demonstrating the AI model's working mechanism. AI models require information to process and learn from, referred to as supervised training. Ekim states that "supervised classification approaches require reference data to be used in the training stage, which is also called ground truth masking, for the corresponding input images" (Ekim, 2021: 5). With the advancements in data science methods, particularly machine learning and deep learning applications, predictions (such as automatically detecting urban form) are increasingly derived from images by leveraging their inherent features (Wang *et al.*, 2022).

In the context of this project, specific information is provided to the model in a particular format, enabling the model to learn and recognize similar patterns when encountered. This learning process is known as training, wherein the model is exposed to a certain amount of data. Once trained, the model can be tested on unseen data with similar structures. In this case, the data presented in the model comprises aerial photography from 1929. A part of the Old Town area is selected on the map for training purposes.

Clarifying the data structure assumes great importance in this project. To enable the model to learn from aerial imagery, it is necessary to provide the model with both the image

and a corresponding mask. The mask is created using provided labels that contain the specific information to be detected. In order to generate these labels, a manual process is followed in the QGIS environment, with the assistance of the students involved in the project (see Figure 2 for digitized building footprints).

The selected area is divided into 16 sections, with each student assigned a specific section to label the buildings using QGIS software. A step-by-step introduction is made to the students to ensure a comprehensive understanding of the process of vectorizing, which involves labelling and annotating the building footprints.

Following the labelling process, the creation of the mask is carried out using Python scripts along with the images and polygon in GeoJSON data format, where geographic information is stored with polygons. "This process is called reprojection and assists in matching the coordinate system of the image and the mask vector so that each pixel in the image matches with its corresponding point in the mask or vice versa" (Ekim *et al.*, 2022: 5).

Once the images and corresponding masks are prepared, they are introduced to the model for training and learning based on the dataset. The masks are defined with binary classification, meaning only two classes are introduced: buildings and unlabeled areas (see Figure 3). This binary classification allows the model to differentiate between the presence and absence of buildings in the images during the training process.

Training the model requires substantial computing resources, making it challenging to train the model using a single large image due to memory limitations. To address this issue, the commonly adopted approach is to use smaller patches of images of 256x256 pixels for training purposes. The data[2] (total amount of patches) is divided into three main sections: training, validating and testing.

In the case of the map image in this project, due to its resolution, the map is divided into smaller patches of 128x128 px (see Figure 3). A total of 64 patches are created, each with its corresponding mask. The validation dataset comprises 20% of the images, while the remaining images are used for the training dataset. The test dataset is provided separately for evaluating the trained model's performance.

To effectively train the model, a large amount of data is required. One method to increase the dataset size is through augmentation techniques. These techniques artificially expand the dataset by applying basic image processing techniques such as flipping, cropping, adding noise, adjusting brightness, blurring, etc. By augmenting one image with different variations, such as rotating to the different angles or above mentioned techniques, a single image is transformed into eight images (see Figure 4). In this project, augmentation techniques are applied, resulting in a total of 459 images created from the original 51 images in the training dataset.

The U-net deep learning model is employed for the training process. "UNet, evolved from the traditional convolutional neural network, was first designed and applied in 2015 to process biomedical images. As a general convolutional neural network focuses its task on image classification" (Zhang, 2019). Due to its effectiveness in capturing detailed spatial information and accurately delineating object boundaries, the model can be easily adapted to analyze satellite imagery. Its architecture allows for extracting meaningful features from the images, enabling the model to identify and classify different urban form elements.

The training process is carried out in a virtual server environment provided by the CRIB platform from the University of Twente, Faculty of Geo-Information Science and Earth Observation. The choice is made because training deep learning models with requires robust and powerful servers to handle the computational load efficiently.

2. The data defined here is structured in two formats: images, which are generated by dividing the map into smaller patches, and masks for these images, created through manual vector labeling of buildings and blocks. Both image and mask formats are used during the training process.

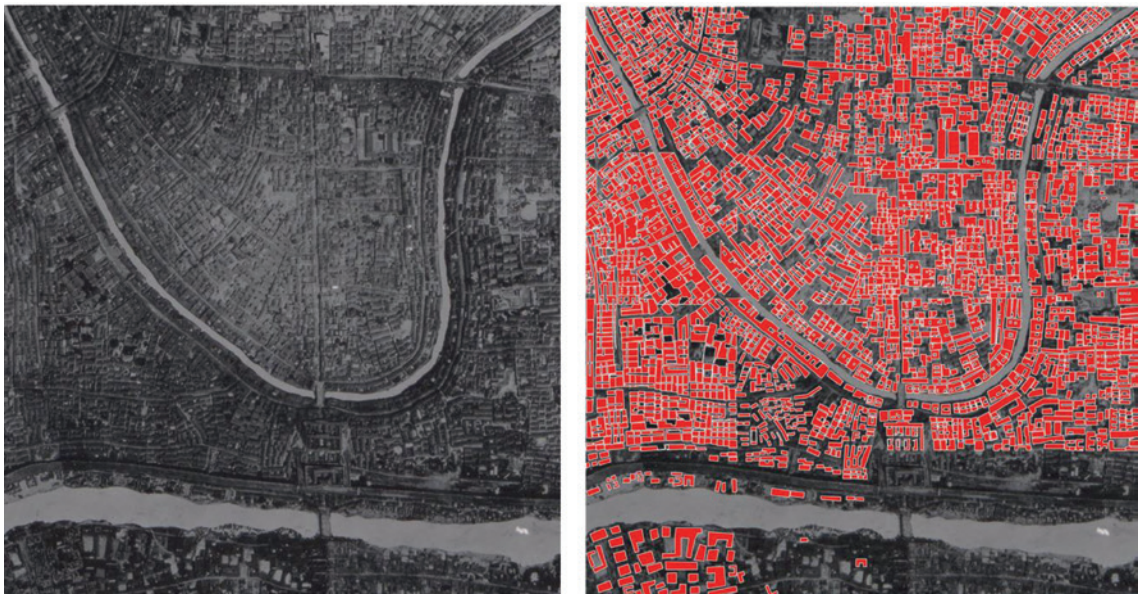

Figure 2. *Building labels drawn by the students.*

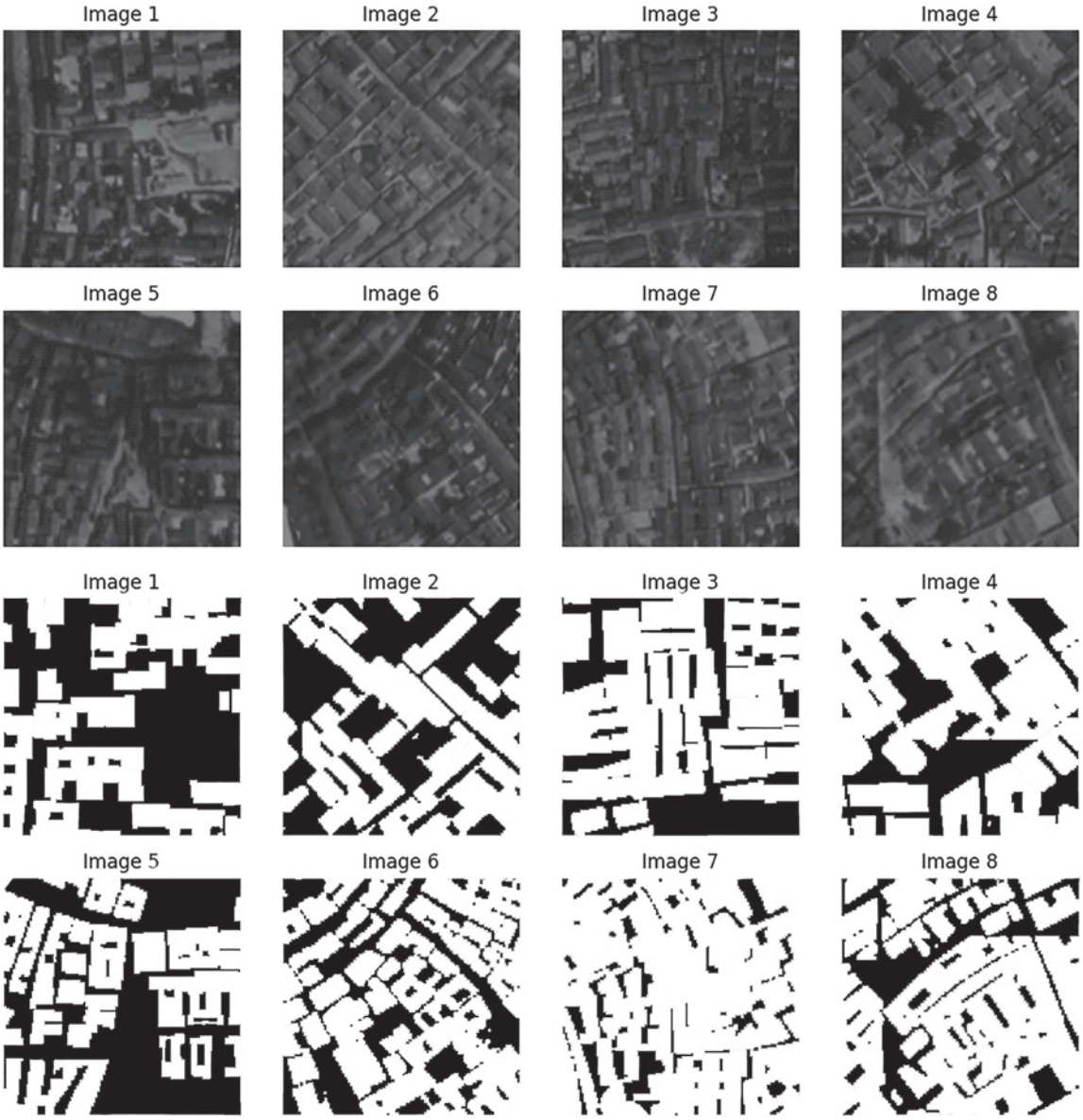

Figure 3. *Creating masks from images based on label: white color – buildings, black color – unlabeled.*

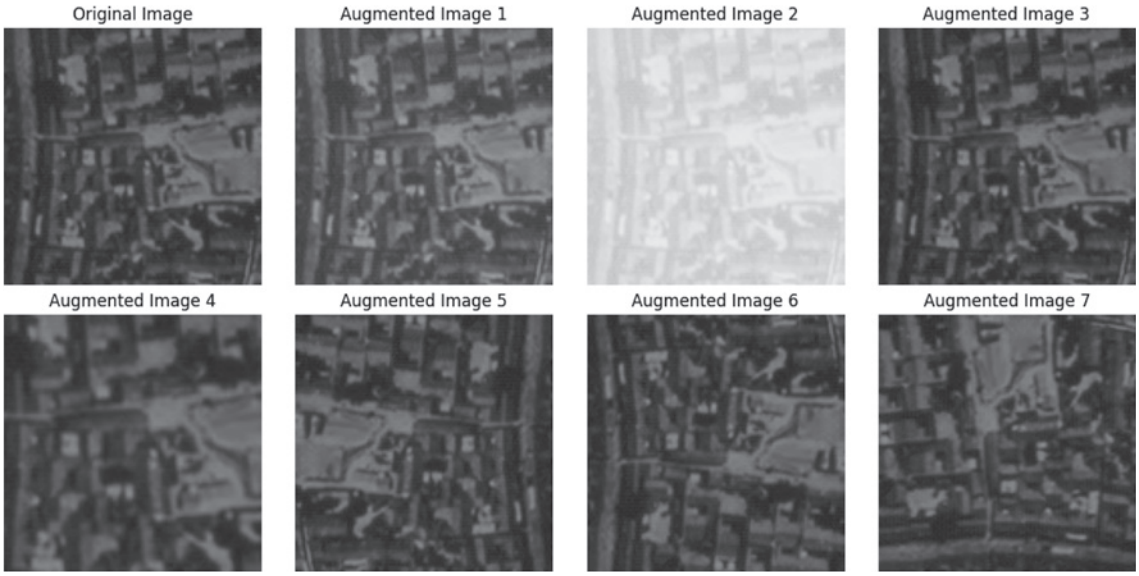

Figure 4. *Augmentation of the images.*

To enhance the performance of the model, pre-trained weights are utilized. This involves incorporating pre-trained Convolutional Neural Networks (CNNs) into the semantic segmentation architecture. By leveraging pre-trained weights obtained from models trained on large-scale datasets like ImageNet, the model benefits from the knowledge and feature extraction capabilities learned during the pretrained training process. This is particularly advantageous for extracting high-level features from the input data, such as aerial imagery, and improving the overall performance and accuracy of the model (Ekim *et al.*, 2021).

4. Results and Step Ahead

The training results are evaluated using graphs and accuracy metrics to assess the model's performance. Although the training results demonstrate slightly lower quality than expected, likely due to resolution limitations, it is observed that the model is capable of detecting building footprints (Figure 5)[3].

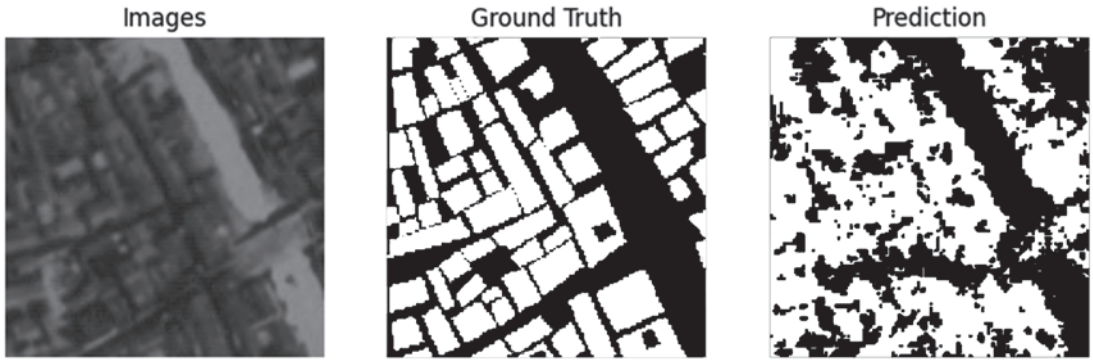

Figure 5. *Training result, ground truth (expected detection), prediction (detection by the model).*

To validate the model's performance, it is tested on a separate set of 24 test data images to predict the building footprints. Post-processing techniques are applied to the test data

3. The image illustrates the utilization of labeled data and the model's predictive results. As previously mentioned, the image, along with its corresponding mask, is used for training the model. Once the model has seen the image and its corresponding mask, it can learn from them. Consequently, when the model encounters the same image or similar versions, it can make predictions and successfully detect buildings.

to refine the results. Firstly, the individual automatically detected test images are merged into a single TIFF file and then detected pixels are converted into shapefiles to process further. Secondly, since the model's predictions are pixel-based, a simplification process is conducted using the QGIS platform to ensure smooth and accurate lines for the detected building footprints. The goal of this post-processing step is to enable the repeated testing of the model on different parts of the dataset, ultimately automating the generation of the entire map.

While the model's performance requires fine-tuning, the preliminary results are promising. The model could predict an area it had never seen (see Figure 6, upper left). We received lower detection quality due to color contrast and low resolution of images (both for training and testing). Nevertheless, it is still possible to observe recognition of form and, in some cases, clear continuity in block structure between training and test images (see Figure 6). Since the model was not trained on river or street elements, there was no detection or confusion between these elements and building footprints. As a result, the river path is visible alongside the detected buildings. The following steps will involve adjusting the training data to achieve better prediction results to read and measure the pattern.

We selected the predicted test area to observe the transition and the changes in block typologies over time. The maps (see Figure 7) illustrate the stages of transformation in the area in four stages, from 1929 to 2017. The process resulted in the loss of the organic block structure and the implementation of the modern block structure.

The change in density can be observed, but it is not possible to measure and compare them with raster images. In addition to the aerial photo of 1929, the cadastral map of Nanjing from 1936 reveals the city's primary structures, which are incredibly rare in the Chinese context. This map was created as part of a process that commenced with the establishment of the Republican government in 1912. It enables us to analyze changes in the area from the 1929 aerial photo to more recent maps from 2005. However, many details,

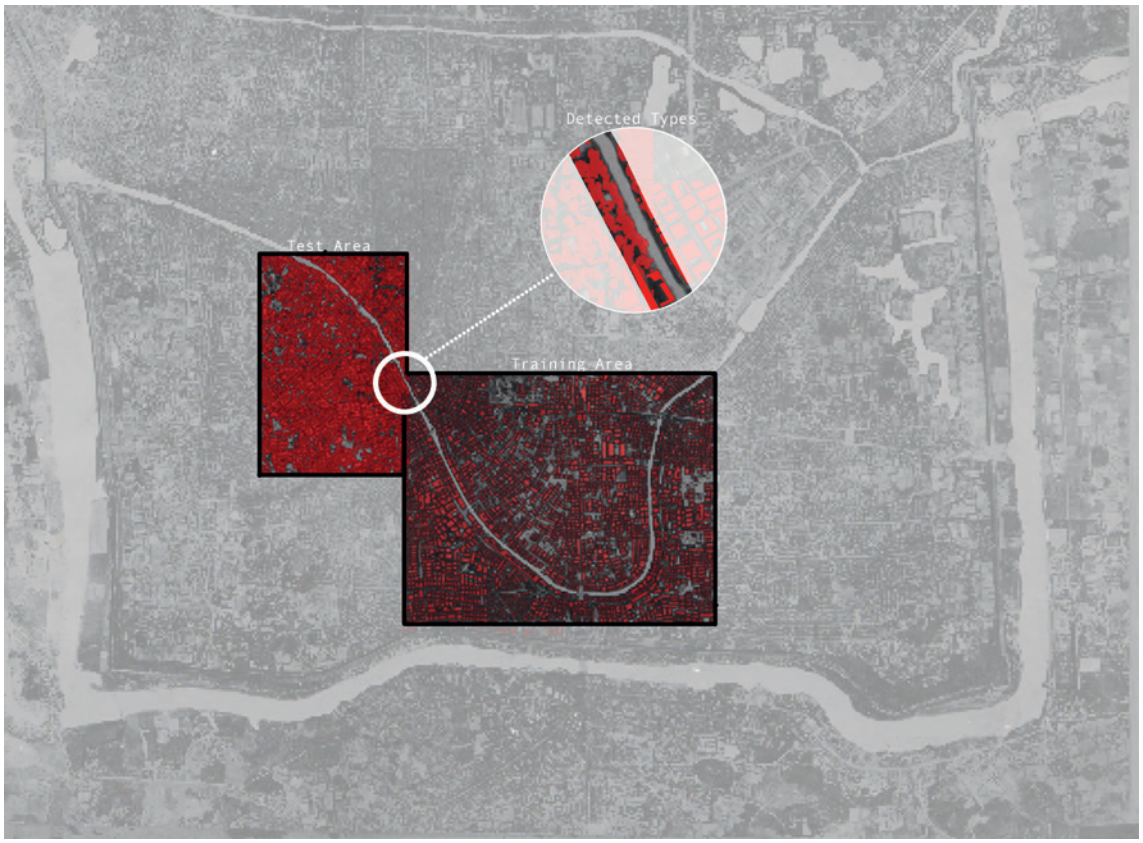

Figure 6. *Training and test area.*

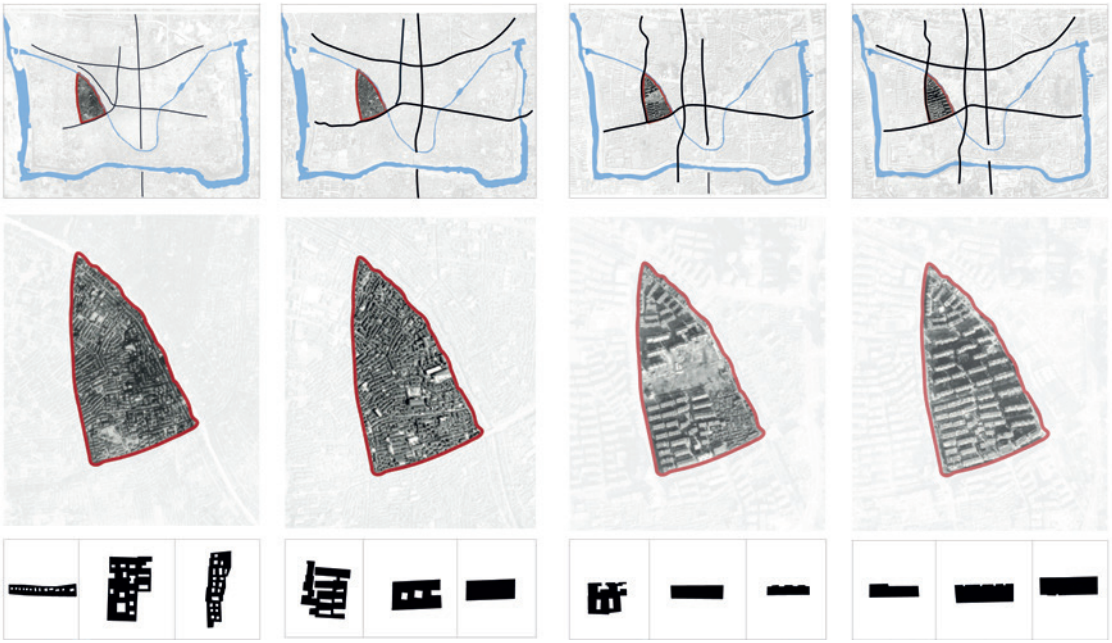

Figure 7. *The morphological transition of the predicted area, from left to right, from the map of 1929, 1976, 2005 and 2007.*

such as plot divisions, land use, and block structures from 1929, remain unavailable. This highlights the importance of applied methods. By detecting building footprints in the area, further metric analysis can be conducted to better understand the organic pattern and its transformation in time.

Conclusion

The research highlights the gap in generating information from historical maps. The research presents an AI approach to extract information from historical maps. The morphological process and transformation of the Old Town in Nanjing are presented. The remote sensing approach is applied to map and read urban forms. The project draws a new perspective on reading the transition of urban form with the application of new technologies.

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Diagrams as Logical Machines
Informing the Design Process Through Permutation

Rossella Gugliotta[1]

Abstract: The morphological school of Italian tradition, developed in the 1960s, is grounded on the investigation of the urban environment and architectural form. It reconstructs the contemporary environment's configuration as a historical process derived from a previous structure through maps and typology. From a broader perspective, the process mentioned is similar to an evolutionary process in which some elements change at different times with a logic that can be different in each part of the globe but can be understood thanks to a logical tool. Despite criticisms of the urban morphology approach and its aim to predict a specific urban environment based on evolutionary recurrences, looking at the city as composed of permutations encourages the possibility of defining new scenarios for the city and the project. This shift in reading the city led to a significant change in the study of urban form, pivoting the tool from maps to diagrams. That is why the diagrammatic logic may directly connect the reading of the urban environment with the design process. Indeed, the iteration with software, especially when it allows to show dynamicity, has expanded the range of outputs. It provides a diagram that is neither entirely mental nor purely iconic, which can be manipulated to produce other diagrams and urban configurations. Maps translated into diagrams can be used as a starting point for computational design thinking activities. The innovation from informing the design process through the permutations extracted from the diagram became the driving force for new projects. Informing the design process through permutation means searching for a way to interpret the process of transformation of the city. For this reason, the paper focuses on the potential of the diagram as a machine built using a logical process that can lead to reading the city logically but focusing on its exceptions without fixing a specific rule of transformation. Moreover, the expected result is to open a debate on methodology that directly links the analysis with the urban design.
Keywords: Urban morphology, Diagram, Methodology, Information, Permutation.

Introduction

Informing the design process necessitates providing evidence as a foundation for the design. According to the Cambridge Dictionary, evidence is a proof, a reason, or something that clarifies whether an assumption is true or false. Decoding the city with evidence is closely linked to data and numerical information about a specific event. However, what is more interesting is connecting the evidence with its logical construction and the qualitative study of the city's shape and its components. In urban design, it is possible to inform the process not only by translating the urban form into numerical data but also by understanding the dynamism of the city's transformation process. The evidential data in the transformation process includes the consistent building typologies that remains the same over the years as

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a benchmark of good practice. On the other hand, discovering their evolution and variation allows architects to explore various dynamic urban structures.

Traditionally, the study of cities has primarily focused on their stable elements, following the lead of renowned international scholars like Aldo Rossi. Within the Italian urban morphology tradition, the concept of permanence was broadly explained by juxtaposing it with the concept of variation as another perspective on the city, but without focusing on interpreting the transformation process. Aymonino in 1977 introduced two variables for understanding the city: invariants and permutations. However, merely identifying laws that help us comprehend how a place changes or why certain elements remain constant does not concretely help us understand the emergent possibilities that each environment can offer. It is precisely because the replication process between one phase and another is imperfect that it opens the possibility of variations and recombinations of elements (Ingold, 2019). This precise point is where the concept of permutation as a way to perceive the city's space comes in, defining new possible approaches to urban design. The contemporary city is no longer seen as a system of permanence but as a realm of continuous and diverse permutations. Each change represents a unique and unrepeatable transitional process.

Nowadays, the need is not just to recognise this process but to find a method to interpret it. The starting point to embrace this concept is the idea of diagrams as a tool capable of elucidating a logical process. It is worth highlighting how this tool can represent the city and its evolution through change and design. In fact, diagrammatic logic can be directly related to understanding the urban environment through design. Using this approach to interpret urban morphology can highlight potential generalisations, not of the phenomenon itself, but of the method employed to comprehend the city. As a result, from the method used to define permutation, it is possible to extract a potential design tool or, at the very least, a different perspective for viewing the city.

1. From Image to Diagram

The morphological school of the Italian tradition focuses on investigating the urban environment and architectural form. It reconstructs the current configuration of the space by tracing its historical process from a previous structure using maps and typology (Marzot, 2022). This mapping process delves into the fixed aspects of the city and examines why its shape has adapted over time without fundamentally altering its nature. The map serves as a static image, akin to a snapshot of a specific place at a particular moment. This way of interpreting the city emphasises the permanences of the urban form. Only by overlapping and comparing different maps of the same place over time is it possible to resemble the evolutionary process of the city. In fact, despite recognising the fixed terms, others undergo significant changes guided by distinct logics that can vary across different parts of the world but still maintain a particular interest in the project. This process of linking together different representations leads maps to resemble diagrams, as both share the property of being images with a solid logical construction that is transferred to the viewer.

Starting from criticisms of the urban morphology approach and its tendency to prefigure specific urban environments by prioritizing permanences, shifting the perspective on permutation through diagrams offers a wide range of possibilities for defining new scenarios. Traditional morphological analysis typically emphasizes interpreting structure as a fundamental aspect while identifying the changing elements as exceptions; however, the diagram places both parts on an equal footing. In this paradigm, permutations are no longer exceptions, and the rules derived from them are logically constructed similarly to those governing permanence. The diagram becomes a tool, and its logical construction is a medium informing the design process.

From assemblage theory, the diagram defines spatiotemporal multiplicities and represents changes by establishing a new reality. Moreover, as it arises from an abstraction process, it continuously generates different readings (Muminovic, 2019). The diagram itself encompasses a multitude of possible and unrealised scenarios. It serves as a graphic assemblage that delineates the relationships between activities and forms based on an organisational principle. Hence, it serves as the most effective tool for grappling with the complexity of reality. Thus, the diagram is not merely a drawing but a depiction of potentiality, presenting not only the abstract representation of a model of how things behave in the world but also a multiverse of configurations (Allen, 1998).

During the 1990s, diagrammatic techniques in architecture underwent significant advancements due to the spread of new software capabilities. One of the main focus during this period was the manipulation of digitalised inputs; these diagrams aimed to represent architectural concepts and ideas more dynamically and interactively. One prominent example is Greg Lynn, who discussed these ideas in his *Animated Form* book. By incorporating dynamic elements and variables into the design process, Lynn aimed to create shapes and forms that emerged due to the modelled and animated variables. The diagrams produced during this era often had a pictorial look, combining verbal concepts and mathematical operations. They were not merely static representations but rather dynamic and interactive visualisations. The challenge for architects and designers was interpreting these diagrams and extracting the information that unexpectedly emerged from the modelling and simulation processes (Gómez, 2010). This perspective has led to the perception of the diagram as the outcome of a design process facilitated by software tools, giving a reductionist value to the diagram, which is seen not a tool but a representation method.

On the other hand, when used generatively, the diagram can actively define a method of reading and visualisation. Beyond its pictorial role as an image, the diagram shifts towards logical diagrammatic construction (Allen, 2009). It is no longer merely a tool used for representation; instead, it can generate mechanisms and establish relationships between the urban fabric and information. In this context, the diagram becomes an operative medium, differentiating itself from the concept of diagrammatic architecture, where architecture takes on the characteristics of the diagram and loses its real essence (Gasperoni, 2022).

Understanding the diagram in an operative sense means attributing to it the ability to unfold concepts, leading to the proliferation of different meanings. It constitutes a method capable of generating, destabilising reality, and promoting discovery. Through the diagram, composing a thought process and a complex argument or synthesising a set of circumstances is possible. It can also be associated with a projective function, with vectors pointing in unknown directions (Gansterer, 2011). In this condition, the diagram leads to the continuous reformulation of a hypothesis (Knoespel, 2002). The diagrams, through their practice, can raise questions about design methods and tools (Garcia, 2010).

The logic behind the diagram, looking at the city as a whole made by permutations, is the medium between the urban form of the city transformation and its design. From this assumption, this article, part of a broader research (Gugliotta, 2023), will retrace the importance of the diagram in the generative approach to design, not by defining its relationship with data but by explaining its construction as a logical tool to investigate the city and generate new projects.

2. The Diagram as Logical Machine

The concept of the diagram as a logical machine capturing and representing complex processes in architecture has been influenced by the works of Deleuze and Guattari. Tradition-

ally used to depict the city and its transformations, the diagram can also serve as a tool for understanding and visualising the urban environment within a design project. When adopting a generative approach, the diagram moves beyond its role as a mere image. It becomes a logical and constructive tool for generating relationships and understanding the urban fabric and information. The output of a diagram made not just to represent but built with a logical framework is a system of rules and relationships.

This assumption signifies a paradigm shift, moving from the map as a guide towards an already specific project (Palma, 2001), to the map, or the diagram, as a speculator of multiple project possibilities. This consideration arises from using the diagram to generate new realities of the city composed of permutations. The purpose is to escape the taxonomic nature of urban analysis and instead explore the realm of project possibilities where typology and topology engage in dialogue. Urban analysis is already a construct, as it not only derived from surveys but primarily from conjectures and analogies. Furthermore, it is inherently abstract, as it is almost inevitably subjected to a process of abstraction.

In his publication, Gansterer correlates the term "figure and thought" with Astrit Schmidt-Burkhart exploration of "figures of order" from 2004, forming a basis for the investigation and analysis of scientific texts in visual culture, graphemics and diagrammatic representation. The term comes across as establishing various concepts, models, and processes to highlight the role of diagrams as tools of thought capable of stimulating a collateral point of view on the environment analysed. Figures of thought can be placed on different levels of abstraction, with the process often involving multiple iterations of abstraction. Rather than beginning with purely mathematically abstract or verbal abstractions, diagrams incorporate formulations that can be visually depicted to describe a procedure or process, that, in the case of the contemporary city is the process of city transition.

The use or application of these figures of thought thus leads to forms that are comprehensible through drawing (Gansterer, 2011). The diagram as a drawing becomes a medium translated into an operative machine. Consequently, permutations become explicit through reconstructing the logical processes of the diagrams. Developing methods for reconstructing permanences contributes to qualitative features in the design processes of the contemporary city.

3. The Diagram as a Method

Reading the urban form with a diagram is only sufficient if the diagram focuses on permutation. For this reason, the first hypothesis on transforming the maps into a diagram is to build one of the multiple possible representations of a diagram, a matrix. It incorporates all the traditional morphological analysis information previously contained in the map to change the perspective of reading the city. Each component of the classic reading of urban forms, such as scale, time, and each part of the city involved in the process of transformation, has been decomposed and recomposed in the new space of the matrix. All of this is done to reconstruct the rule behind the permutation and understand its variety. The matrix, as it is built, uses generative diagrams and assemblage theory to define itself as a specific tool that addresses the need for a dynamic city. In this way, the tool can give different information simultaneously and display, in the same matrix, multiple points of view on the city.

Through the matrix, considerations arise regarding methods for representing the city and its transitions. Permutations, initially identified in the maps, are now normalised and used as catalysts for project development. For the investigation, it is not essential to observe the specific permutations of individual contingencies but to identify a method that allows for their identification through the decomposition into rules and permutation variables. The

specific contingency becomes a pretext for a methodological analysis. Starting from the relationship between reading the city and designing it (the design is influenced by the method used to read the city), the image of the diagram (Figure 1) becomes a provocative representation of the city in transformation, opening up new possibilities for representation.

The results of the representations aim to underline the variety of analysis possibilities of the transition, defining the logical framework of the method. The diagram highlights the importance of diagrammatic logic, which becomes a tool for revealing hidden urban dynamics. Consequently, it becomes evident that the diagram's objective is not merely the representation of a specific scenario, but rather highlights its character of multiplicity in providing ever-different scenarios informing the design. The diagram is the diagrammatic object that composes the representation, but its diagrammatic logic is exportable and adaptable to new and different images. Beyond the meaning of the image, the purpose of visualisation becomes having a critical point of view, opening up new perspectives on possible representations of the transitioning city.

For this reason, the diagrammatic reconstruction of the map is just one of the possible interpretations that, through the decomposition and exploitation of hypothesis relationships, aims to provide a new point of view on the city. As understood in this way, the diagram does not correspond to a single image but to a logical system. From this methodology, the starting point for the design shifts from the static part of the city to those undergoing change. These changes bring to light the dynamic nature of the of the urban environment, emphasizing its propulsive features.

4. Using the Diagram to Interpret the City as Permutation

Diagrams are essential representations for thinking, problem-solving, and communication in design disciplines, particularly those related to creating physical forms (Do & Gross, 2001). The ability to develop multiple scenarios leads once again to consider the diagram as generative, representing and analysing existing realities and envisioning realities that do not yet exist on paper or in time. It becomes a carrier for non-specific design visions. The diagram, functioning as a map, serves as the genesis of computational design thinking and activates the development of multiple projects in the city from a specific configuration of the urban environment without excluding the architect from the design process in favour of a software-based approach based on a sorting process. Conversely, the information on permuta-

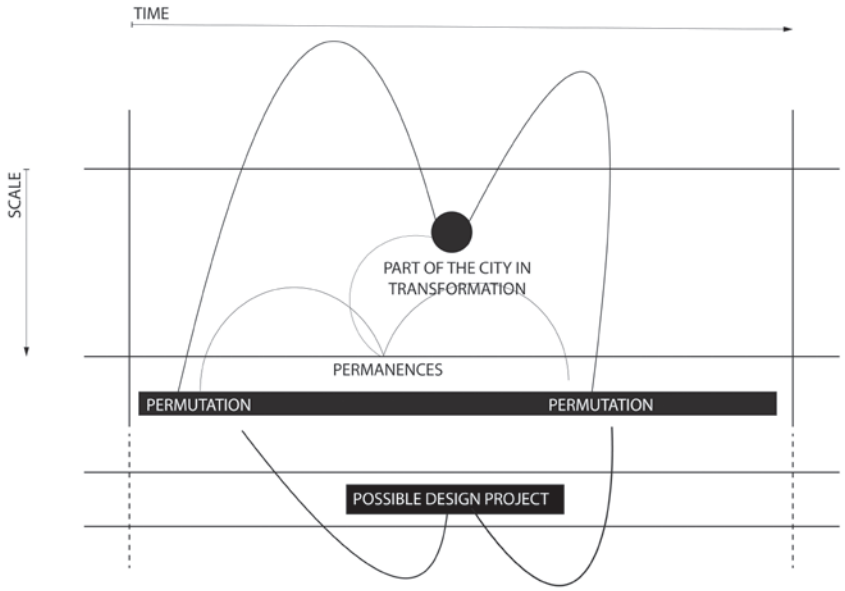

Figure 1. *Informing the design process through a diagram permutation-based. Representation of a possible matrix for the design that contains all the elements of the traditional morphological analysis.*

tion extracted from the diagram becomes the driving force for a new project. The architect is a "researcher-designer", as defined by Lak and Aghmolaei, who designs and evaluates the project according to evidence (2020). Evidence that, in this case, is not based on quantitative analysis, numbers, or indices, but on the logical construction of the analysis.

Indeed, there are contrasting interpretations of the term "diagram" in current discourse. On one hand, some perceive diagrams primarily as tools for systematisation and problem-solving (Lucan, 2015). This understanding considers diagrams as aids facilitating numerous perceptual inferences, making them highly accessible to human understanding. This perspective emphasises the role of diagrams in organising information and simplifying complex concepts. On the other hand, an opposing viewpoint sees diagrams as catalysts for unfolding processes or as maps of movement. According to this perspective, diagrams go beyond static representations and capture dynamic and evolving phenomena. They are seen as instruments that provoke the exploration of various possibilities and reveal hidden relationships or patterns. Rather than providing fixed solutions, these diagrams encourage the generation of new ideas and the discovery of novel perspectives (Gansterer, 2011).

The results of reading the city as a permutation through diagrams as maps of movement lead to the definition of a new paradigm in the urban environment, a brand-new perspective. This approach opens up a methodological discourse beyond the simple relation between causes and effects. This approach allows the architect to have some qualitative data as a set of relationships between parts of the city. The data are not numbers but relations that inform the designer to develop a city vision.

Conclusion

The morphological approach proposes the idea that morphology has the potential to be the driving force behind the urban design process. Many studies have related morphological characteristics translated into numbers with aspects related to building energy, social effects, or urban evolution (Dibble *et al.*, 2019; Fleischmann *et al.*, 2021). Conventional morphological features are defined based on qualitative descriptions or manually selected indicators, which include subjective biases, thereby limiting the generalizability of possible computational approaches (Cai & Biao, 2021). Li and Han (2011) argue that architectural design requires an integrated balance of complex adaptive systems. Generative design emerges as a solution, focusing on translating and simulating design concepts using computational models that facilitate decision-making, the construction of connections, and project optimisation. These computational models rely on extensive data and the extraction of rational rules to generate new design proposals (Do & Gross, 2001). In this context, combining qualitative morphological analysis, which highlights permutations with logical diagrammatic construction, which helps define rules, supports generative design as a strategy to propose new project visions.

From the definition of the method, analysis and design have been treated separated practices; instead, their connections need to be defined. The perspective of the project changes: analysis does not aim to establish what already exists, and design does not express a desire for invention. A mechanism of mutual exchange is established between the two, within which there is recognition of existing patterns that are not taken as prejudged conclusions but are reformulated (Rispoli, 2016). To develop an urban matrix, with the help of the diagram concept, capable of preserving the complexity of dynamism, continuous questioning of analysis during the design process is essential. The role of the diagram in design is placed upstream and not as the outcome of software but as its construction. Generative parametric architecture demonstrates how the diagram has a raison d'être in architecture as a working tool (Brauer & Rogers, 2019).

Furthermore, due to its logic-based construction, the diagram can be exported to inform the design process through software developed from the matrix, conceived as a system of thought. Historically, designers have engaged with mathematics and logic either to build knowledge (informing the design) or without rules (using the tool without understanding its functioning). In between lies the grey area of grey boxing (Witt, 2018), where only partial knowledge is available, yet it still generates potential. To implement this transition from analogue to digital, logical construction in urban analysis is of fundamental importance. The diagram can be useful as cross-disciplinary way of thinking, capable of reading what changes in the city to align with the new emergencies of the contemporary world. The expected output of going deeper into the research is to investigate new diagrams and matrices able to show more than what the maps were showing in the traditional morphological reading, permutation at first, but also the actors involved in the process, economic and societal factors. The perspective on the design product is multiple, from using the diagram as a platform for a bottom-up process to the use of the matrix as the first approach to control computational and parametric software.

This new concept of interpreting the city through diagrams and using a specific matrix built, underscores the significance of permutation in the built environment, ultimately generating a new image of the city that helps design new spaces and urban forms.

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An Evidence-Based Business Model Applied to Urban Practice

The Case of Urban Void Regeneration

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Abstract: Understanding the processes that occur in the city of the 21st century is a complex task that involves different disciplines. A cross-scale interaction results from the urban texture, environmental aspects and social traits leads to a complex network of feedback loops among urban features, local ecosystems, and human health that needs to be understood to enhance design strategies for the urban environment. The paper offers an understanding of how an evidence-based business model can be successfully applied to an urban regeneration project, along with environmental morphology tools. In this sense, urban morphology, microclimatic analysis, and business model approaches are merged to explore how open and underused spaces in the city can be redesigned with a new set of assumptions, which suggests how the traditional design approach can create and deliver new values. The research offers a contribution to evaluating the cross-scale interaction of urban regeneration methods and the implication of an evidence-based business model approach in revitalising urban spaces. This approach is here described and tested to gain a richer perception of environmental aspects, urban patterns, and social interactions. The objective of this research is to explore the first application of a business model approach derived from business knowledge, that can act as a trigger in Environmental Urban Design. Operationally, this contribution focuses on the study of three regenerative solutions for an urban void in the city of Parma (IT).
Keywords: Business Model, Evidence-based Model, Urban Morphology, Urban Regeneration.

Introduction

Urban regeneration (UR) is a process of urban intervention which encompasses the reconstruction of old or underused urban areas and includes a large variety of intervention actions on buildings and adjacent urban spaces. Several definitions of UR can be found in literature, but according to Roberts and Sykes (2000) UR is defined as "a comprehensive integrated vision and action which leads to the resolution of urban problems, and which seeks to bring about lasting change in the economic, social, physical and environmental condition of an area that has been the subject to change" (Roberts & Sykes, 2000). In Couch's research (Couch, 1990), UR is described as an attempt to act on a city (or on a portion of it), and this action overcomes "the aims, aspirations, and achievements of urban renewal, which is seen as a process of essentially physical change; urban development (or redevelopment), with its general mission and less well-defined purpose; and urban revitalization (or rehabilitation), which whilst suggesting the need for action, fails to specify a precise method of approach". In this view, the concept of UR incorporates more than just the act of renewal.

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UR is today a topic of increasing importance, with recognized social, economic, and environmental consequences. Nowadays cities are experiencing many different issues that should be considered as a whole since they are deeply embedded within a complex network of feedback loops, that involve urban features, local ecosystems, human health, and social needs that must be assumed to enhance design strategies for the urban environment. The increasing acknowledgment of the importance of UR has been corroborated by diverse EU policies, legislation, and instruments such as: the Leipzig Charter (European Union, 2007); the Europe 2020 strategy (European Commission, 2010) the Paris Agreement (European Commission, 2015); the 2030 Sustainable Development Goals (United Nations, 2015); and the Pact of Amsterdam (European Union, 2016).

On these premises, innovative approaches in managing UR projects are deeply appreciated by academics, unless it is quite difficult to apply in a real-life case project. Innovation is increasingly seen as a helpful approach to the development of new service contributions, new business models, new processes or new management practices and today can be also applied to architectural practise. Applying a Business Model (BM) method to an urban redevelopment or UR project is a new and only partially investigated approach.

As a standard BM, which illustrates how a company can generate and deliver value to its customers while also generating profits, the idea of an Evidence-Based Business Model (EBBM) here defined and tested on a selected case study, can assist municipalities and architects in defining how they will create and provide public value through UR projects (Letaifa, 2015). Currently, a small amount of research mostly focuses on the smart city business model (Walravens & Ballon, 2013; Walravens, 2015; Díaz-Díaz, Muñoz & Pérez-González, 2017; Timeus, Vinaixa & Pardo-Bosch, 2020) but there is a gap in research on EBBM. The research presents the potentialities and verifies the constraints of EBBM in the case of an UR project, to provide city managers and local architects and urbanists with a smart and valuable procedure.

To conduct this research, this paper is divided into the following sections: i) intersection between Business Model and Urban morphology; ii) Aims and objectives of the research; iii) Urban Void identification in Parma (IT); iv) Business Model Canvas application for a selected urban void; v) Urban Void reuse projects; vi) conclusions.

The research aims to demonstrate, through a specific case study, the advantages of an integrated approach that can be used in urban regeneration projects to support a more comprehensive and holistic design that goes beyond traditional morphological assessment. This is achieved by incorporating Evidence-Based Business Model (EBBM) resources, which are derived from the Business Model Canvas method.

1. Intersection Between Business Model and Urban Morphology

Although urban morphology and business model are distinct disciplines and belong to very different environments of knowledge, some recent examples of the application of BM in smart cities unveil interesting insights into the possibilities and advantages connected to the joint application of the two disciplines to urban renewal and urban regeneration projects.

Urban morphology is the study of urban contexts through the examination of the urban fabric, which is a particular arrangement of local patterns consisting of streets, buildings, and open areas and is thought to be a one-of-a-kind result of the physical city's conscious and unconscious design (Caniggia & Maffei, 1979). Urban morphology is a discipline that was developed in the early 1950s to help understand the issues facing modern cities. However, it is now obvious that to be better equipped to meet the demands of citizens and the

challenges of a changing society, urban morphology should be integrated with other subjects and tools.

A trustworthy body of research (Manson & O Sullivan, 2006; Ortman, Lobo & Smith, 2020) has been developed in recent decades by the examination of the contemporary city, highlighting the role of urban morphology as an interdisciplinary field involving architecture, landscape architecture, architectural history, geography, history, urban planning, and archaeology, which faces significant challenges in depicting complex urban relationships. These days, it requires new analytical tools and a capacity for synthesis among different disciplines, needs, and information. Urban morphology refers to the study of urban form, which focuses on the development and transformation of urban structures in cities and neighbourhoods over time. It examines their spatial patterns at different scales and physical characteristics to inform appropriate urban interventions that promote sustainable urban development.

On the other side, the Business Model (BM) is defined as a conceptual tool that encompasses several interconnected elements. These mechanisms allow organisations to express their business logic, which describes how they conduct their operations and create value. BM helps organisations add value, attract customers willing to pay for this value, and effectively manage the profit generated from this relationship (Zott, Amit & Massa, 2011). BMs are not strategies as such, but rather guidelines that reflect a strategy. They are the primary factors for interpreting, comprehending, and efficiently conveying strategies, both internally within an organisation and externally throughout its business ecosystem. BM should reflect an organisation's strategic choices and operational implications (Wirtz, Pistoia, Ullrich & Göttel, 2016).

To effectively utilise a BM in public policy decisions for UR projects, it is crucial to align the methods and instruments with specific objectives and provide active support to public policy decision-makers and practitioners. For these reasons, recent studies have focused their attention on adapting the concept of the Osterwalder Business Model Canvas (BMC) to address urban needs and articulate their value propositions (Osterwalder & Pigneur, 2005; Carayannis, Sindakis, & Walter, 2015). According to Blank (2013), instead of engaging in complex planning and research or creating intricate business plans, hypotheses and strategies can be summarised in a framework called the Business Model Canvas (BMC).

Several recent studies have examined how business models can promote architectural advancements, including sustainable approaches (Boons & Lüdeke-Freund, 2013), sustainable innovation (Kuk & Janssen, 2011), urban mobility and smart city projects (Giourka *et al.*, 2019). The literature has paid less attention to the application of a BM in sustainable and innovative UR projects.

However, there is still a limited understanding of how to implement an evidence-based urban renovation project (EBUR) according to a BMC method. There is limited understanding of how to create economically feasible and sustainable business models for those involved in the UR project, while also successfully enhancing innovation.

2. Aims and Objectives

With these premises, the main research question is how to effectively utilise the BM to actively support a UR project. Consequently, the study aims to investigate the benefits of integrating a BM workflow into an urban morphology approach to support an urban renewal to be applied to more energy and environmentally oriented aspects. The Erasmus Plus

KAEBUP project (https://www.kaebupr2p.eu) provided the opportunity to apply the Business Model Canvas BMC to a UR project.

The purpose is to provide an initial overview of the benefits of integrating the well-known BM method with urban renovation to assist decision-makers and practitioners, integrating an approach that also emphasizes the practical application of the findings of available current research. By using environmental morphology instruments and methods, along with BMC, we can obtain accurate analyses of how specific urban areas can be revitalized and repurposed. This approach involves optimizing user needs, while also leveraging business requirements. To achieve our objectives, we have selected a significant urban area in the city of Parma as a case study.

The main objectives of the paper are as follows:

- assess how BM can be applied into architectural and urban practice in a real-life case study;
- assess three different scenarios of reuse;
- discuss integration potentialities and constraints applied to the case studies.

3. Urban Void Identification in Parma (IT)

Parma is a city with a population of about 200,000 inhabitants in the north of Italy. Like many other historic cities it has numerous urban voids, which have formed because of sedimentation and modifications to the urban fabric. Today, many urban vacant spaces require interventions for recovery and redevelopment, both for urban and strategic purposes, to meet the modern needs of citizens and tourists (Hwang & Lee, 2019). Several studies have recognized the importance and value of vacant urban spaces, commonly referred to as "urban voids".

Several recent local policies have focused on participatory methods for the redevelopment of public spaces (Geddes, Charalambous & Papallas, 2019).

What is still missing is the incorporation of a business model approach to the topic of urban renovation.

Thus, this research offers some preliminary reflections on the benefits and opportunities of using BM to address an urban voids project in the city of Parma. During the 3rd business model workshop held in Parma and hosted by the Authors as part of the KAEBUP Project, we examined a major urban void in the Oltretorrente Neighbourhood (Figure 1).

Despite the great canopy that covers the triangular open space, the actual square is deeply underused due to a large variety of issues.

The selected case study is Piazzale Rondani (Figure 1). It is a triangular-shaped square, adorned with a dense canopy of trees, and has a total area of 2900 square meters. Located in the northern part of the school district, it is frequented by approximately 2500 students daily. In the vicinity there are numerous school buildings, which is the primary reason for the abundance of parking lots in this area. On the east side, near the Torrente Parma (Parma River), there is a monument called the Barricades monument. Currently, the square is underused, principally because of the high traffic volume in the area, which is caused by the presence of numerous school buildings and students. The ample shade provided by the trees' canopy is highly advantageous during the summer months, as the square is one of the few green and unpaved spaces in this historic district. Nevertheless, no other activities take place in this vacant area, which is the main reason for its underutilization and deterioration.

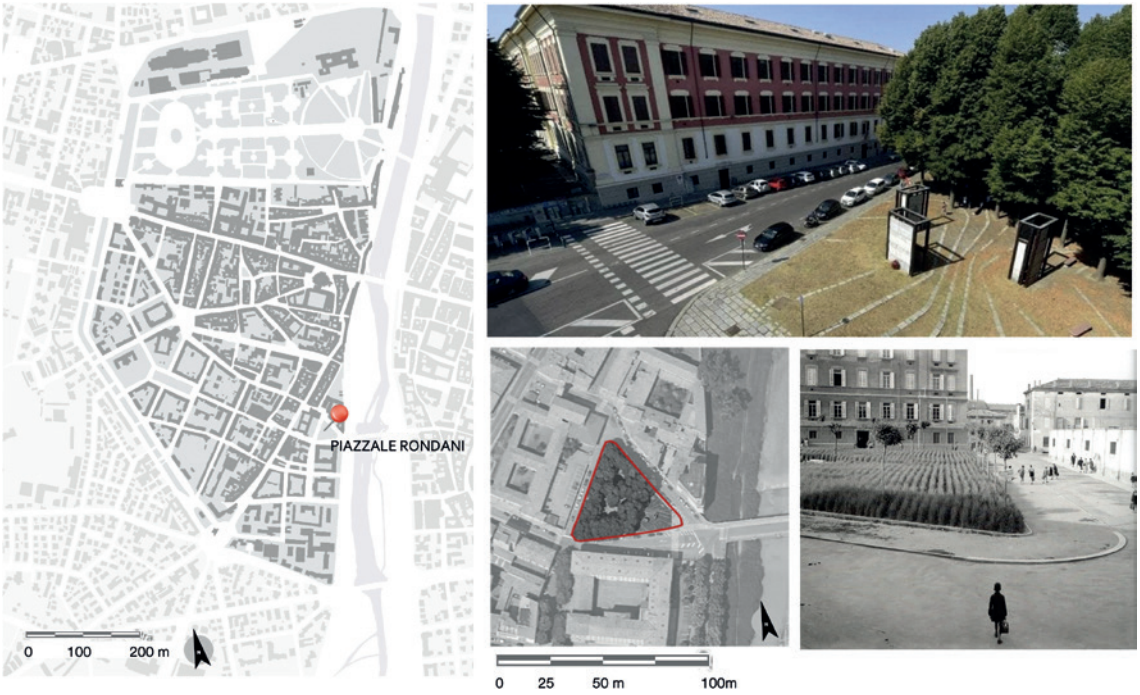


Figure 1. *Parma Oltretorrente Neighborhood and Piazzale Rondani. Actual view and Piazzale Rondani in 1942.*

3.1. *Walk-Through Survey*

The first part of the assessment involves conducting a site inspection to gather valuable data for the UR project. We conducted a site survey to gather information on the morphological characteristics of Piazzale Rondani. This included assessing the presence of specific elements, collecting data on vegetation (such as trees and grass), documenting materials used for finishes, and identifying urban furniture elements, light posts, and other urban features that can help us understand the strengths, weaknesses, opportunities, and threats of Piazzale Rondani. The site inspection allowed us to take pictures, evaluate the actual usage during different times of the day, and ask locals for suggestions on how to reuse the void. The features that were observed regarding the selected void attributes during the walk-through survey are discussed in Figure 2.

Similar research was carried out through a questionnaire survey and semi-structured interviews. The qualitative features of Piazzale Rondani were scored on a 5-point Likert attitude scale. Users who were identified as stakeholders in the study locations participated in some semi-structured surveys to investigate users' perception of the square.

3.2. *Morphological Assessment*

From a morphological point of view, Piazzale Rondani belongs to a fringe belt of the modern fabric of the Oltretorrente district. It is located immediately beyond the pertinent strip of the matrix route made up of the Nino Bixio Road and operates as a connection with the fabric parallel to the Parma River. Its triangular form is derived from these morphological characteristics as well as from the presence of "non-active facades" on the northern front (this is the back of the fabric built along the matrix route).

Morphologically, it is anti-nodal with respect to the Oltretorrente district, but it acquires a potentially nodal value of connection with the historic center thanks to the construction of the Caprazucca bridge. To this end, its radical rethinking is necessary, both with respect to the new role it can assume within the district, and with respect to the wider historical urban fabric. The functional analysis indicates a prevalence of school buildings rather than residential ones. The survey was conducted thanks to the GIS tool, which reinterpreted the investigation on site.

Current view of the urban void						
Weakness	Excessive unused space in front of the monument of the barricades	Square blind side with high wall	Poor and poorly maintained outdoor furniture	Uncomfortable, uneven and unsafe sidewalks	Lack of playground equipment or bike storage/stall	Lack of social /public identity
Strenght	Permeable open space	Noise protection and public space for Graffiti art gallery	Outdoor seating under the shade	Large sidewalks	Large Parking area (for people visiting the city centre)	Large sitting open area
Users' survey potential use	Open green space in the historic urban texture for outood activities and for school students	Graffiti art gallery and youth space	Outdoor safe space for outdoor activities	Sidewalks and bikepath space	Inclusive public park/ playground/ neighborhood ground	Inclusive public park for school district use

Figure 2. *Case study site features.*

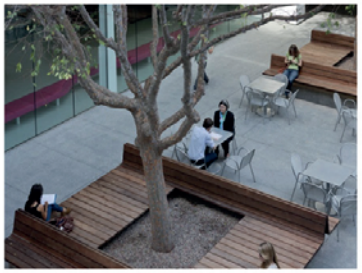
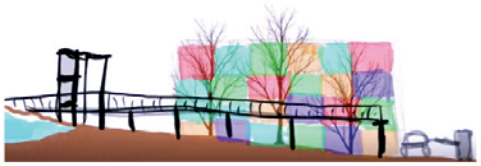
Project name	Theater of the Barricades	Tree Angle food court	REuse REenergize RE member
Main funtion	Open-air theatre 	Open-air food court 	Community garden 
Value proposition	Provide local users (mainly school kids) with a place of memory and a place for teenage users, where they can experience freedom in a safe place, by removing obstacles to comfort	Offer a safe space for students and staff to meet and eat at affordable prices after school; an original and alternative eating and meeting experience for locals, families and tourists during evenings and holidays A renovated public and safe space for the community	A convivial area to help the community safely use the space by providing sustainably powered infrastructure for social gatherings and environmental education
Expected impact	A diffuse sense of ownerships, socio-educational values, greater sense of safety and a new affordable space for teenagers	Parma is known for its high-quality food products and food is part of local identity. The project will reactivate the place in terms of social identity, by recovering an abandoned square for the student in school district.	Continuous integration of an IT structure for Object Self-service in the sustainable energy showroom, continuously innovating the energy production and sustainable design and providing a dynamic leverage of the space
Customers Relationships and Distributions	Intended users are teenagers, as they left the school district can find the in square a safe place where to gather and spend some outdoor time, In the evening theatrical shows can take place	Intended users are teenagers, as they left the school district and family and tourist in the evening/weekends	Intended users are students and residents
Resources & Partners identification	• Key partners: Local teather foundation 30% and Municipality 70% • Revenue: partial use of space for free and rental to theatres, associations, etc.	• Key Partners: Municipality, Food Providers, Food Producers, the Community • Revenue: Selling Products, Renting Spaces	•Key partners: Local energy provider ENEL, Parma football club •Revenue: Energetic Community funds (EU); Sustainable energy showroom including electric parking (ENEL) Renovation funds (Parma)

Figure 3. *Brief Projects description according to BMC. Credits project 1: I. Geddes, D. Panagiotou, L. Lima, V. Eliopoulos; project 2: A. Kalopedis, F.D. De Rosa, M. Tsangaris, M. Tuastad; Project 3: A. Riccioni, R. Shametaj, Ana M. Dias, C. Anthimou, K. Gregoriou.*

4. Business Model Applied to Piazzale Rondani

The main objective of the project is to reactivate an Urban Void in Parma by proposing the integration of a BM approach, based on an understanding of the space's needs and constraints in regard to urban morphology.

Consequently, the standard BM is applied in a simplified way and some alterations are considered to encompass the architectural and urban nature of the project to the Piazzale Rondani Case study, as follows:

1. Value proposition definition.
2. Customers' Relationships and Distributions:
   a. For whom do you create value?
   b. How do you establish and maintain a relationship with your clients/users?
   c. What are the best channels to reach your client/users?
3. Resources & Partner identification:
   a. Who are your key partners?
   b. What do you need to deliver your value proposition?
   c. What resources are needed to deliver your value proposition?
4. Financial aspects and expected impact.

From a practical point of view, the experimental design project is divided as follows: we firstly observe the opportunities and challenges in the case selected in Parma (1); propose an intervention according to Environmental Urban Morphology (2), evaluate the impact on users (3), define our business model (4), present a value proposition (5).

5. Urban Void Reuse Projects

Three different projects are defined with the aim of reactivating the urban void of Piazzale Rondani, considering the evidence-based data, namely the information derived from the surveys and Urban Morphological assessment. To keep things concise, specific projects' descriptions won't be covered in this article; instead, the focus will be on their goals, which result from a combined appraisal of morphological features and factors derived from the BMC's application.

The main features for each UR project are briefly described in Figure 3, following the BMC structure (Value proposition definition, Customers Relationships and Distributions, and Resources and partner identification).

The three projects were developed based on the information gathered during the inspection, through interviews with the users, and by applying a BM approach to the UR project. The projects aim to provide a recovery and reuse scenario based on an urban morphological approach, but also to apply an innovative method that considers, at the same time, functional, economic, user-related, and feasibility aspects of the project itself.

Project one, called "Theatre of the Barricades", aims at reducing actual barriers to ensure overall outdoor comfort conditions and giving local users – mostly schoolchildren – a space for gathering and an outdoor and protected location where teenagers can enjoy independence in a secure environment. The reuse project is modelled to provide the final users with a sense of ownership, socio-educational values, a greater sense of safety, and a new, affordable space for teenagers.

Project two, "Tree Angle Food Court", is derived from the fact that Parma is renowned for its fine culinary products, and that local identity is shaped by cuisine. Through the recovery of an abandoned square for the students in the school district, the project would revitalise the area in terms of social identity, offering a harmless space for students and school

staff to meet and eat at affordable prices after school – an original and alternative eating and meeting experience for locals, families, and tourists during evenings and holidays.

Project three, "Reuse-Reenergize-Remember", is the most diverse reuse project presented here, intended to define a convivial area to help the local community safely use the urban void by providing sustainably powered infrastructure for social gatherings and environmental-oriented education programs.

The three reuse design projects presented in Figure 3 aim to systematise the functional requirements of Piazzale Rondani. The urban square design illustrated here is based on a collaborative morphological interpretation that has previously identified the functional requirements concerning pedestrian paths, economic needs, and local constraints. Besides architectural and urban requirements, all three projects consider the users' requests and foreseen benefits by evaluating the economic feasibility in both present and future scenarios. Through a simplification of the well-known BMC, the projects presented here exemplify a practical and economically sustainable approach to reusing and revitalising abandoned urban spaces. The results of the three projects indicate that the effectiveness of the workflow does not depend on the functions envisioned by the reuse project. The definition of customer relationships, distribution, and identification of resources and partners (as defined in paragraph 5) is facilitated when the project includes an economic activity that allows for an easier assessment of revenue.

Conclusions

The research has highlighted the possibility of integrating traditional methods used in UR projects with a business-oriented approach. Although the projects are not yet realised, this contribution focuses on how the business model, usually applied in the case of business development or business-oriented projects, can be profitably translated into design practice. The established urban renewal approach can take advantage of the methodological workflow used in the business model canvas and be profitable for urban renovation projects by securing the quality of open public spaces, making their usage more profitable, and providing a more coherent treatment according to the user's expectations and economic outcomes. This approach offers several advantages, including a business perspective that considers the value proposition, the expected impact of the project, customer relationships and distribution, as well as resource, partner, and revenue identification. The experience offered by the KABEUP project on the regeneration of urban voids provided an opportunity to test the feasibility of applying a BM to an UR project. As evident from a critical evaluation of the three presented projects, integrating functional, morphological, and business-oriented aspects in an UR project is both promising and beneficial. Some further considerations should be made to thoroughly test the approach of applying the Evidence-Based Business Model to other urban renovation projects.

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The Effectiveness of Planning Tools in Managing Urban Change

Lora Nicolaou, Grigoris Kalnis, Byron Ioannou[1]

Abstract: Transformational change to urban morphologies has historically been driven by local dynamics which, over time, reconfigured the scales of urbanized territories and the nature of buildings and urban plans. Slow and continuous change generated familiarities and retained traces of the past, all part of a coherent morphologically built environment we love and cherish. The unprecedented scale of growth in the 20th century, changes to demographics and social cohesion, and the complexity of economics associated with development, created the need for a web of regulations and controls which characterizes modern planning with often adverse effects on the built environment. More recently global warming and advances in technologies created a new speculative context as the basis of city transformations and growth adding another layer in the complexities of regulatory frameworks. Planning practice has also shifted from 'positive' proactive planning during the post war era to a more 'marketconscious' (and sometimes market led) approach by the end of the 20th century, which found planning practice, 'trouble shooting' more than decisively guiding towards good practice. The same period paradoxically also signaled a renewed interest in 'design' previously labeled as 'aesthetic control' abandoned with the introduction of neoliberal urban policies in Europe in the 1960s and 70s. While operating within the same political context, the European 'South' still lags behind, in terms of sophistication and multiplicity of mechanisms in regulating change. Places like Greece and Cyprus are just beginning to adopt tools such as masterplanning, area plans, regeneration strategies, design codes etc. The paper examines Urban Briefing as an activity which structures and debates time and place-specific research and analysis, to inform a client's design objectives and decisions toward the management of urban change. This in contrast with planning as an activity which is primarily descriptive and part prescriptive in nature. The analysis of good practice examples investigates planning tools, of which 'research-based briefing' is in intrinsic part of, aiming to directly infrom design at different scales. The use of Urban Briefing tools is increasingly important, particularly in the context of the retraction of the public sector's role in shaping the manmade environment.

Keywords: Research-based Briefing, Morphologies, Developer-led Masterplans, Market-conscious Planning, Tactile Briefing Tools.

Introduction

Transformational change to urban morphologies has historically been driven by local dynamics, which, over long periods of time, reconfigured both the scales of urbanized territories as well as the nature of buildings and urban plans. This slow and continuous change

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generated familiarities and retained traces of the past, all part of a coherent morphologically built environment we hold dear.

The unprecedented scale of growth, since the middle of the 20th century, changes to the demographics and social cohesion and the complexity of the economy associated with development, created the need for a web of regulations and controls which characterizes modern planning with not always positive effects on contemporary urbanity. More recently, climate change and advances in technology created a new speculative context as the basis of city transformation and growth, adding another layer to the complexities of regulatory frameworks (Ioannou *et al.*, 2019).

Planning practice has shifted from a self-claimed positive proactive planning during the post-war period to a more market-conscious (and sometimes market led) approach by the end of the 20th century. This means that planning practice, often trouble shoots rather than guiding towards regulated good practice. The same period paradoxically also signaled a renewed interest, by architects and planners, in design previously labeled as aesthetic control, abandoned with the introduction of neoliberal urban policies in Europe in the 1960s and '70s (Sager, 2011). Localism and public opinion very rarely find their way into decision making on the production of the urban environment other than their – not always productive – indirect influences on property markets. Environmental prescriptions associated with planning practice at the design level and scarcity of space available for development, are becoming a complex mosaic of tools assisting various public and private sector agencies to engage with the production of the built environment (Geddes *et al.*, 2020).

While operating within the same political context, the European South is lacking in terms of sophistication and multiplicity of mechanisms in regulating change. Places such as Greece and Cyprus are only now beginning to adopt tools such as masterplanning, area plans, regeneration strategies, design codes etc., and/or awkwardly introduced public participation as a design tool. Process based briefing and design led research tools are still novelties insignificant in local practice.

This paper attempts to examine the notion of *Urban Briefing* as an active planning and urban design tool which produces time and place specific research and analysis toward the management of urban change as well as design prescriptions. Integral to the notion of briefing is the embodiment of the notion of the client's (generic client) views and behaviours, directly or indirectly into decisions associated with the 'design' of environmental change. This stands in contrast to planning as a primarily top-down activity, bound to engineering logistics of systems, descriptive and prescriptive in nature. The references to good practice examples attempt to illustrate how *research-based briefing* is an intrinsic part of design, informing it at different scales (Kalnis, 2016). The importance of the formulation of such urban briefing tools and mechanisms is increasingly important, particularly because of the public sector's leading role in designing the manmade environment, retracting mostly to the production of strategic planning frameworks. Large scale change, comprehensive development and renewal is nowadays led primarily by private and institutional sector interests.

1. Proactive Planning Tools in the Context of Cyprus

Historically the planning system in Cyprus was based on a relatively simplistic but effective zoning system inherited by the British governance (early 20th century) and based on prevailing planning ideas of the time. The free-standing nature of all buildings clearly derives from 1950s ideas of European suburbia garden city models. Haphazard revisions 'littered' with interventions by development politics reflect the unclear relationship between planning and the central government's economic policy. The result is often incomprehensible in its intend-

ed planning regulatory frameworks. A large part of its activity concentrates on prescribing the basic morphological standards (plot ratio, coverage, distance from boundaries etc.) and defining infrastructural and service prerequisites of development. More intensive management, with additional guidance and advice, as well as the management of subsidy systems and the design of environmental improvement projects are associated with conservation (Geddes *et al.*, 2020).

The revision of local plans – a key planning tool – occurring every 5-10 years often reiterates and maps changes driven by development activity, more than opening the way to new thinking on city planning and design reflecting good practice, with the ability to shift trends more than managing them. In parallel, a plethora of ministerial and departmental directives impose short term objectives originating from short term development economics, undermining the efficiency of an already hesitant planning system. A main activity beyond plan making of local planning departments focuses on the control of indecisive planning frameworks (Ioannou *et al.*, 2020).

The production of Local Plans (produced solely by public sector departments) is one of two main proactive tools of development control practice in Cyprus. They focus primarily on the design of infrastructure (roads and utilities), defining/redefining development zones including a plethora of (mainly) restrictions aiming at preventing bad development practices. Local plans and the Dilosi Politikis (the framework which regulates all territories outside the urban plans), remain at the level of strategic prescription, and often the examination of implications in terms of the negative instead of positive impact of a specific direction. At the development practice end, design competitions are mostly associated with the design of buildings and increasingly large-scale architecture often associated with the rapid expansion of the tourism industry, second homes and special infrastructure (schools, casinos, etc.). Masterplans are primarily commissioned by the private or institutional sectors, as a way of securing the capacity and terms of development proposals in the absence of outline planning permission practiced in most of Europe. The Public sector commissions associated with design investigation are less interesting because of the terms of their tendering practice. Government departments are obliged to commission the cheaper tender which often refers to "technical infrastructural design rather than aesthetic choices" associated with each inquiry. (Pissourios & Serghides, 2023).

More recently tools, such as masterplans have become necessary when attempting to secure approval for large-scale developments. Although local authorities are often accused of paying lip-service to associated Environmental Impact Statements, such new developments (Aphrodite Hills, 1990s Minthis Hills 2020s, etc.) clearly mark a significant positive change in the quality of new city expansions, compared with the piecemeal urban additions elsewhere. Such masterplans are primarily developer-led and reflect international practice, including the privileged treatment associated with large scale, inward international investment (Ioannou, *et al.*, 2019). The design often reflects adaptations of architectural models, based on representational imagery (simulating the materiality and selective architectural elements, arched openings, roofs etc.) more than traditional typo-morphological models associated with the locality.

A marked change to practice has begun with the adoption of area plans or masterplans attached to statutory regulation (Nicosia centre, Limassol centre, Karnagio Limassol, Pissouri bay, etc.). Depending on their objectives, plans take different shapes in terms of their level of prescription, their focus or the level of participation in their production, often stopping short of addressing detail design issues or references to decisive delivery mechanisms compared to their European counterparts.

The *void* in planning practices seems to be the *middle ground* between statutory regulation and design competitions, which could inform design intelligence in the form of flexible

briefs and advisory guidance. This does not only inform good practice and design, but advances knowledge on issues through empirical research drawn from local and international best practices. The diagram of Figure 1 sketches the middle ground between strategic planning and design in Europe, where a plethora of design-led briefing activities draw from a variety of prescriptive tools focused on a place, its people, and processes associated with its delivery.

Empirical research activity associated with such tools in Europe is driven by central governments, local authorities, and most importantly a rich and diverse institutional sector decisive in supporting good planning and urban design practices (Reimer *et al.*, 2014).

This lack of briefing at the intermediate scales in Cyprus results perhaps from the undeveloped and young planning system, the lack of interest in environmental issues on behalf of the institutional sector and the lack of capacity within local authorities to proactively 'plan' environmental change. Responsibilities for plan making are concentrated within a centralised planning department inherently susceptible to political pressures for the promotion of economic growth and the support of the central government's economic policy (Pissourios & Serghides, 2023). Local authorities, on the other hand, do not have the responsibility or capacity to proactively drive city design and are unable to respond effectively to the scale of the task (Constantinides, 2019).

2. Informing the *Middle Ground*

Urban Briefing is in no way a standardised practice nor can it be characterised as an 'exact' science. Research tools are tactile and tailored to specific conditions, while research questions can shift faster than their answers. The policy context of empirical research on urban issues in recent years is very much driven by the sustainability agenda and climate change crisis which emerged during the end of the 20th century.

Since the 1980s, the academic community has been deeply involved in the question of how conurbations, particularly large and increasingly growing ones, can plan a more energy aware rapid urbanization (Hall, P. 1993; Sudjic, 1992; MVRDV, 1999). The city's intensification, allowing for walking and cycling as well as the use of effective public transport to

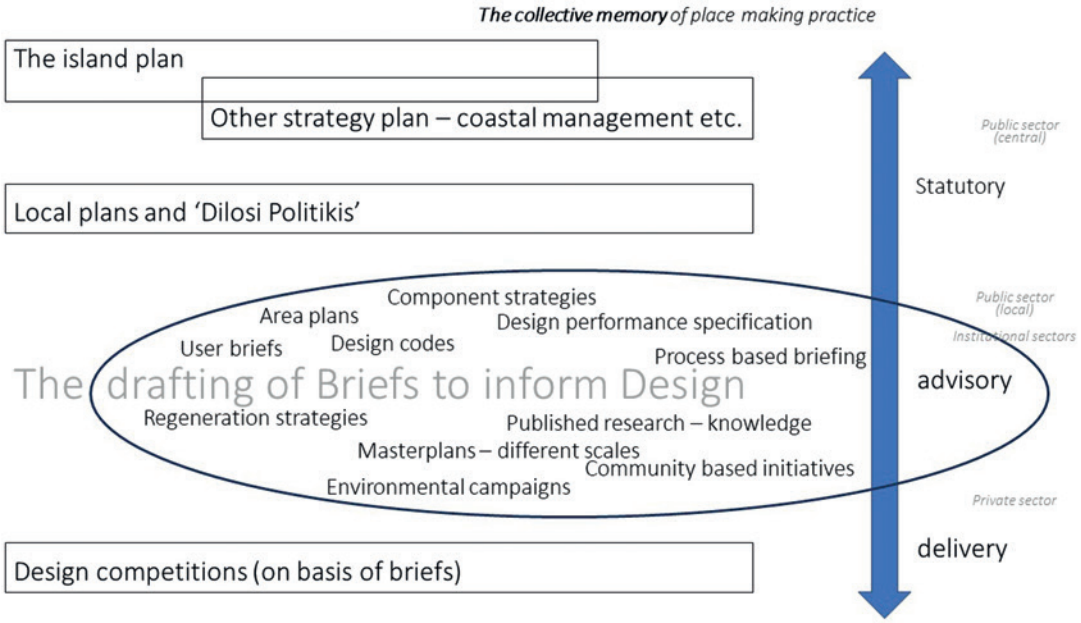

Figure 1. *Role of Urban Briefing in Development Control practice (Source: authors).*

service a large part of its plan became the doctrine of the time. It was recognized early on that the compactness of cities can be advantageous in other ways, such in encouraging social interaction (Elkin *et al*. cited in Jenks *et al*. 1996: 5). While the context of the compact city as a tool to achieve sustainability was very quickly adopted with enthusiasm by both the public and private sectors, they soon understood that the relationship was "neither simple nor straightforward" (Jenks *et al*. 1996: 5). Classic texts such as The Compact City: A Sustainable Urban Form edited by Jenks in 1996 consists mainly of a series of diagnostic exercises and 'well-articulated' questions with arguments that remain 'largely theoretical' (Jenks *et al*., 1996: 341), highlighting a need for further research. Despite that, the support of the private sector in adopting new policies was decisive in 'the re-imagining of the city required by a post-industrial consumerist economy, and in the role of urban design in making cities more competitive in attracting global firms, property investment, regional shoppers and tourists'. (Madanipour, 2006, cited in Punter 2006: 344).

Under this immense pressure, changes to government policies in Western Europe were swift and plethoric. In the UK, the immediate publication of several Planning Policy Guidance notes (PPGs) was decisive in changing planning policy in the 1990s (on Housing, Transport, etc.). Public response to change kicked off another set of policy measures advocating public consultation as a necessary procedure for planning any kind of large-scale change set in policy (PPG1). In the following decade, this led to the branding of the term 'good design', distinct from good planning (ODPM, 2005) as a key focus of planning. This term was a far more constructive and expansive/complex term compared to aesthetic control in the key Planning Circular (DoE, 1980) that had launched the Conservative deregulation of planning and the introduction of neoliberal urban policies' (Punter, 2010: 343).

Since then, Urban Planning and Design have been prolific in the progression of academic discourse, and academic and empirical research regardless of impact on policy practice. In many ways, Urban Design continues its tradition as a *mongrel discipline* (Carmona & Tiesdell, 2007), borrowing information and methodologies from a much wider field of environmental sciences, free of the constraints of architecture, engineering or planning. The nature of Urban design/planning research is multifaceted and adopts inter-disciplinary and often empirical approaches in the investigation of strategic and/or place-specific conditions. The physical design, the consideration of its economic and socio-cultural dimension, the consideration of futures, are inquiries complex in nature attempting to articulate all aspects, including delivery mechanisms, into a single research question. "Urban design is a far from clear area of activity" with perhaps no need for a short, clear or more precise definition (Madanipour, 2007, cited in Carmona & Tiesdell, 2007: 12). The strong links between academic research and empirical research associated with practice appear to make both design led methodologies equally valid with "neither form of research being intellectually superior" (Carmona, 2014: 4).

The table in Figure 2 outlines the context of urban briefing in the UK in the early 21st century, in relation to urban change (Nicolaou, L. 2017). It refers to published policy research prescriptions, which systematically record realities and are directly relevant to specific localities. In parallel, they construct models (morphological/social/economic) and develop methodological approaches, applicable not only to the study but to design prescription in a wider context. The Matrix sets out to review the methodological tools, varying from investigatory design tools (points 1, 2 and 3 – column 4), to more inquiry based qualitative evaluations, (points 4 and 5) and the use of scenario building as a learning and design tool (points 6 and 7). The patterns emerging across the case studies reflect the nature of the topic, established knowledge patterns in the field and the nature of the required output. Most importantly, it becomes obvious that the application of a variety of methodological tools is necessary to construct the answers to the research question. The collective application of tools is what adds value and sophistication to otherwise conventional research methods in planning and Urban Design (Nicolaou, 2017).

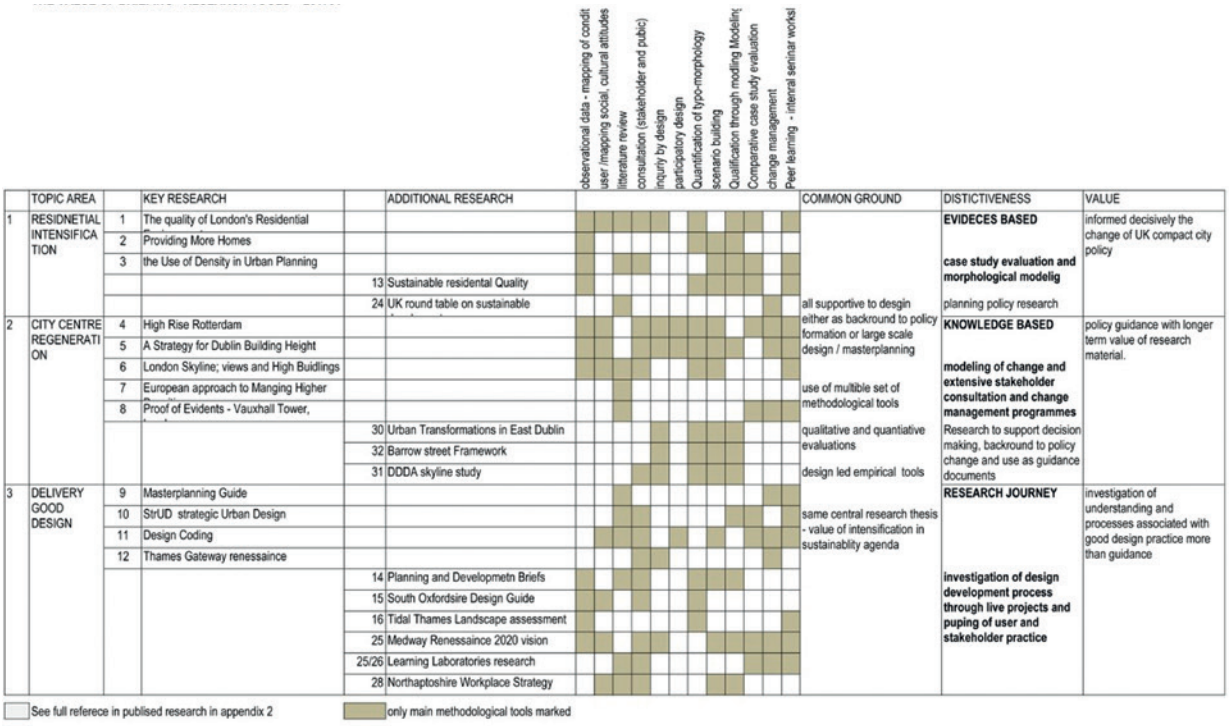

Figure 2. *Research tools matrix (Source: Nicolaou, L., 2017,* The Value of Briefing in managing Urban change, *Doctoral thesis, Oxford: Brookes University, Table 1).*

3. Prescriptions of Urban Character – Methodological Tools

Typo-morphological analysis is still in the center of contemporary planning research based on the investigation of built form in relation to its land use, and the processes which give rise to it. As a method, it establishes an up-front dialogue between building, its originating factors and the quantitative and qualitative attributes of built space. Despite unresolved disparities across different morphological approaches in academic discourse (Li & Zhang, 2022), it is recognized that reading and analysing the physical form of cities can be understood at different levels of resolution and can provide insight on its origins and generating factors. Another key aspect, controversial in its validity as a scientific research method, is the use of precedents (case study evaluations) as tools for understanding and prescribing design and place (Bunschoten, 2014; Bunschoten, *et al.*, 2001). Ongoing debate suggests that the reading of reality through case studies does not constitute theoretical knowledge which is superior to a practical one. The statistically significant aspect of case study evaluation in relation to the detailed evaluation of a single case study, also points to how much case studies can be used as a tool for deriving scientific knowledge or simply assist with the construction of a hypothesis. In defense of the use of precedents in urban planning research, Ben Flyvbjerg concludes that "the case study is a necessary and sufficient method for certain important research tasks in the social sciences and it is a method that holds up well when compared to other methods in the gamut of social science research methodology" (Flyvbjerg, 2006). He continues to suggest that comparative relevance, the credibility of data and the quality of mapping templates are key aspects of the credibility of case study evaluation as a research tool.

The nature of both tools (typo morphological analysis and case study evaluation) is dramatically changing in line with technological advances on the one hand and the shifts in urban planning debates on the other. A new condition which decisively impacts how morphological and reference information is produced and used is the advancement of GIS information systems in surveying and interpreting three-dimensional form. "By 2030 more

than just enablers, digital technologies including 5G, the Internet of Things, edge computing, Artificial Intelligence, robotics and augmented reality will be the core of new products that will enhance the digital transformation of business and ensure a fair and competitive digital economy" (European Commission – March 2021). Despite promising technological tools, there are concerns about the ability of societies to generate vast databases by various agencies mapping relevant data (Mills *et al.*, 2021). Furthermore, commitment toward continuously updating and maintaining databases and systems relying on multiple agents does not seem to support a full digitization of frameworks. Not to mention the dangers entailed of unregulated practices at every level (public and private sectors) of these vast ecosystems (Ma *et al.*, 2013 cited in Mills *et al.*, 2021) with the "devil already hidden in the details" (Cendic & Gosztonyi, 2022).

In parallel, the urgency brought about by climate change on strategies to understand and resolve shifts the focus of European debate on research, associated data collection and guidance from sociocultural and morphological factors to that of a place's environmental performance. The sustainability agency is already well embedded into European Regulation (Reimer *et al.*, 2014) in several different formats with the United Nations SDGs filtering down to all strategic and place specific activities.

One possible danger driven by environmental urgencies and technological advances is the understandable priority given to the investigation of measurable data of performance over qualitative descriptors of an extremely complex and heterogeneous landscape, particularly in large metropolitan scenarios. "The development in urban climate science, based on observational programs coupled with theoretical understanding of near-surface processes, now allows the integration of cities into regional-scale models. Whereas previously, such models treated the urban surface as simply warm, dry, and rough, the newest models incorporate variations in building dimensions and layout that numerically describe the urban landscape" (Mills *et al.*, 2021). Although such sophisticated morphological modeling and urban microscale models are progressing fast with the establishment of regional databases, the focus is mainly on recording the physical and functional attributes of space (nature of construction materials, materiality, morphology of urban landscape, occupational patterns). A key question is how much they will guide urban planning practice toward descriptors associated with larger scale components, climate change risk averse strategies, factors associated with urban resilience and sustainability more than 'place making' in its sociocultural context.

The danger of the digitization of environmental performance and *big data* is the diversion of researchers' and policy makers' attention away from tangible considerations such as sociality, urban character and micro economics as generators of urban character. The view of landscape as a cultural expression needs equally urgent attention as an integrated consideration to the measurable attributes of climatic performance (Averchenkova *et al.*, 2016; Neef *et al.*, 2018).

On the other hand, traditional investigatory tools are concerned with tactile, temporal, often unpredictable urban conditions, the accumulative mapping of which sketches out the specificity of place in time, all central to what we refer to as sense of place (Norberg-Schulz 1960s). Observational data and recording of abstract conditions, not always connected to the patterns and behaviors found in the work of Jan Gehl (Gehl & Svarre, 2013) have decisively influenced city regeneration approaches across Europe during the last few decades. A variety of consultation mechanisms (Arnstein, 1969), observational techniques and various types of 'gaming' (public, stakeholders, etc.) impacted strategic and detailed designs for change. Inquiry by design (Groat & Wang, 2002) tests and verifies views and opinions and investigates intellectual contracts continuously in today's practice. Furthermore, urban design competition platforms such as Europan demonstrate how the making of urban design projects can obtain hybrid characteristics, depending both on the specificity of the actual context and

the dynamics of networks of actors that span all European cities involved (Kalnis, 2016; Europan Europe, 2009; Stratis, 2006, 2009).

The development of 'user briefs' using these methodologies and most importantly the process for producing them through a progression of data collection leads seamlessly to a parallel synthesis of ideas and solutions. It does not only contribute toward the mapping of the less tangible descriptors, but often acts as a change management tool, leading stakeholders and users to not only accepting new space configurations but changing attitudes toward more effective ways of using space. The process of urban briefing involves problem formulation and problem solving at the same time. "The urban brief is an opportunity for all parties to agree on a vision and clear objective for an area, before beginning detailing urban design studies. Precedent and generic design are powerful tools to help access options and dimension the appropriate design response" (Blyth & Worthington, 2001).

Briefing as a process which generates valid and creative solutions encompassing their delivery mechanisms was very popular in UK practice during the 1990s and early 2000s. CABE (Commission for the Architecture and the Built Environment) a public sector quango set up by the Labor government in 1999, established a national scale 'enabling programme', designed to support local authorities with expertise needed in preparing briefs for large regeneration projects. The appointment by CABE of specialist consultants in project teams within local authorities demonstrated a deep understanding of relevant practice precedents. 'Live assistance' to policy maker teams as objective sounding boards for local interests, concerns and evaluations of their mission statements proved to be extremely successful and productive. The process itself captured the dynamics of a 'process based urban brief' successful in absorbing tactile shifts and turns associated with urban design strategies and regeneration projects in the making. The two briefing projects presented in the following section attempt to illustrate some of the attributes of process based urban briefs adept in captivating the sociocultural making of place as well as its physical attributes.

4. The Nature of the 'Process Based Urban Brief'

Briefing as design is a political process, reflecting values through the ethics and morality of the society it refers to. Creating a better human experience of place is inevitably derived from a society's ability to 'be present' – not necessarily through conventional participation programs – but through conveying its needs and convictions in some kind of manner. Simultaneously, the formulation of any design ideas needs to come from the ability of the institutional base of each society to deliver change – whether through building space or not. Björgvinsson, *et al.*, take a step further towards what he calls an *infrastructuring* process and argue about *design after design* as a contemporary form of collective processes instead of *use before actual use*. They argue that a new challenge is presented in designing "beyond the specific project and toward future stakeholders as designers" (Björgvinsson, 2008; Björgvinsson *et al.*, 2012).

The following two briefing projects attempt to illustrate how the tactical mapping of a place and its cultural connotations, through user research (needs, opinions, preferences, and behaviors) directly inform the design and associated policy. The nature of participatory design varies and does not necessarily rely on conventional public participation programming. The consideration of users derives from research on patterns of behavior, recorded requirements for space and place (Patel, 2020; Thomas, 2019; Duffy, 1998; Duffy *et al.*, 1993; Whyte, 1980; Gehl & Svarre, 2013), observational data of space utilization (often associated with case study material in sociology, anthropology and environmental psychology).

Process-based briefing also allows the continuous feedback of stakeholders and users in a dynamic and flexible way (Habraken, 1988; Habraken *et al.*, 1999) and another key attribute

is the ability of the tool to consider the tangibles of built space simultaneously in its detail and strategic implications on their policy context (buildings, outdoor spaces, infrastructure). Being interactive and parallel to the timeframe of the project can often resolve polarized positions, by negotiating issues at each stage of an unfolding formulation of a common view.

The first example is associated with the current and ongoing issue of the appropriateness of tall buildings in European policy. European cities have taken a different stance toward this decisive change to their morphologies according to their physical setting, economy, social-cultural context as well as the nature of their planning systems. Some, like London and Rotterdam, have liberalized their policies, lifting locational restrictions to the placement of taller buildings. Others, such as Frankfurt, Paris and Dublin, were very careful with prescribing appropriate locations that would not have 'interruptions', to their traditional morphologies (Managing Intensification and Change: A Strategy for Dublin Building Height, DEGW for Dublin Corporation 2000 – DEGW was a London based architectural firm specializing in workplace briefing).

The Barrow Street masterplan in Dublin (Barrow Street Masterplan; creating a new business district, for Treasury Holdings, Dublin, DEGW 2004) associated with the regeneration of a decommissioned industrial area, with a robust but distinctive scale, attempted to address the polarization between conservative and liberal views of city height configurations which put projects within the area on hold. Drafts of alternative typo-morphological options, their feasibility and implications on public space and existing infrastructure were debated over a long period in stakeholder workshops, street surveys and working sessions with policy makers. It soon became clear that the notion of *acceptable height* was not driven by rational planning implications or the environmental impact of increased height but the *level of change* the Dublin society was prepared to accept at that point in time. The key to unlocking unresolved differences between stakeholders was the common denominator across views on the level of modification to the city skyline in Barrow Street. Interestingly, results suggested that the scale of growth of the morphological volume of the area by 25% appears to be acceptable by all population groups comfortably (verified by similar earlier research in London). At the other end of the scale, a 40% growth of volume and height was seen as the point beyond which the area's character would fundamentally change by all survey groups (Figure 3). Further modeling investigated the change of perception of density associated with the shape of built space. The same volume arranged in a tall slim building gave the impression of a much denser development than a *short and fat* one, particularly when the volume was articulated with references and alignments to their context (street width, adjacent buildings, etc.) (Figure 3, top).

Such 'evidence based' explorations of the density issue in a specific context at a particular point in time, fulfilled a number of client objectives (Dublin Planning Department) without prescribing a density as was originally expected. The simple experience of the process, the understanding of parameters impacting the perception of appropriate density by the public was enough to confidently assist with development control decisions of the new application. Furthermore, the participatory process including stakeholders in the design, confused and defensive at the outset of the process, arrived at a consensus, understanding the variety of cultural views on space, offering city planners and policy makers a framework for the negotiation of a new plan.

One other interesting evidence-based strategic briefing project was commissioned by Northamptonshire Invest (a public sector organisation responsible for the economic development of the region), which was tasked to help the County with the delivery of and aggressive job growth strategy. The purpose of this study into the nature of the future of *workspaces* and *workplaces* was to inform Northamptonshire decision-makers and key business stakeholders on the shape of the future property portfolio associated with work. It aims at enabling the transformation of Northamptonshire from a place of 'comfortable liveability' to a memorable place in a very competitive regional environment for a new generation of business. The

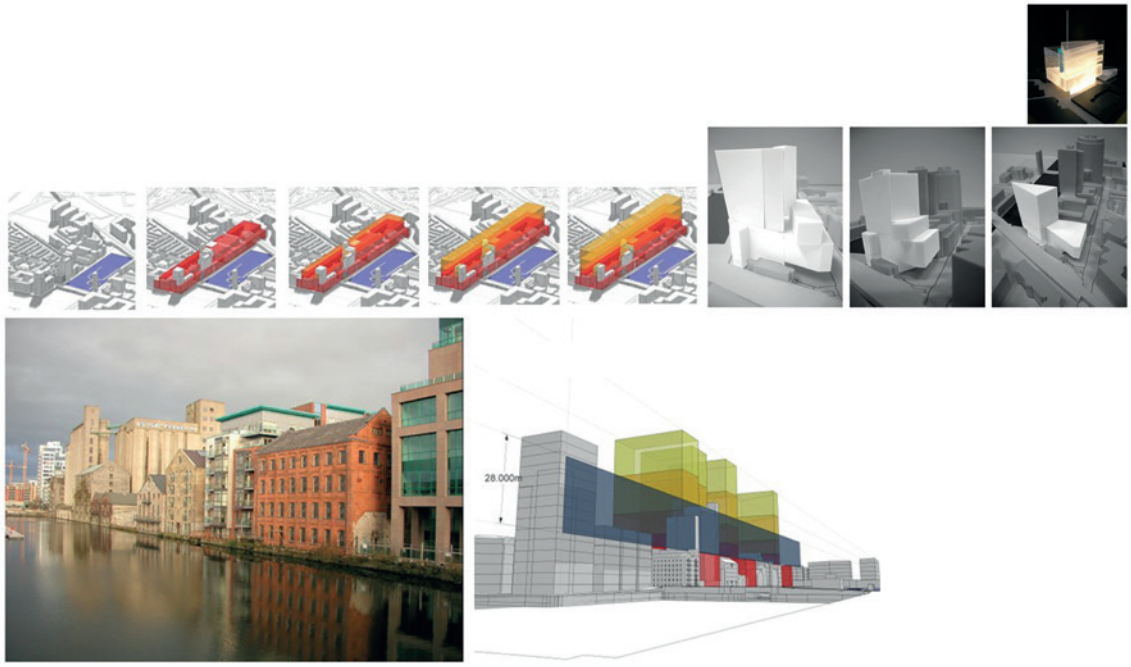

Figure 3. *Different levels of acceptability of change by different social groups on Barrow Street, (planners considered dark yellow as appropriate while the public view favoured the light yellow as a potentially interesting townscape and skyline) Barrow Street Masterplan (Source: DEGW 2005 Treasury Holdings).*

assumptions were that the supply of leading-edge workspaces and high value associated infrastructure could attract new business in its own right (supply led regeneration).

Access to an extensive workplace associated database at DEGW along with local investigations sketched the initial framework of space and business support attributes which could trigger changes in the real-estate demand markets, and the interest of new tenancies for the region. The study, in a unique way, seeks to filter data on regional economics and real estate demand into specifications for a new generation of workspace models and the accommodation lifestyles associated with them. Consequently, work and home spaces would be revised, along with the types of desirable locations in terms of accessibility and qualities, infrastructure frameworks and services associated with each, etc.

A shift in key conceptual thinking, based on an extensive body of users' research, led to the construction of 'workstyles' (work lifestyle-based typo-morphological models) instead of workspace models (space typologies) which are often associated with conventional sector-based descriptors of organisations (banking, tourism, financial sectors, industrial, etc.). The qualification of 'workstyles' adds new descriptors on accommodation models, based on an analysis of organisation purpose, process and culture, rich in information on the type of environment in general for work, living and leisure associated with these new business sectors (Figure 4). These new accommodation models do not correspond to particular sectors but run across them – for example, corporate functions or research can be found across the financial sector, the pharmaceutical industry or manufacturing. Aspects such as the 'culture' of different activities (i.e., visionary, products development/design part of organisations) and not sectors, have very different demands not only in terms of the 'space' they occupy but also the 'place' they want to contact business within.

The exploration of this conceptual framework of 'workstyles' directly informs development and real-estate products driven by new trends in demand but also planning policy and creative land use planning which can deliver the kind of places people want to live and work in, in the future. Figure 5 begins to suggest the distribution of 'workstyles' in the form of development types, their infrastructure, and their environment across city locations – from

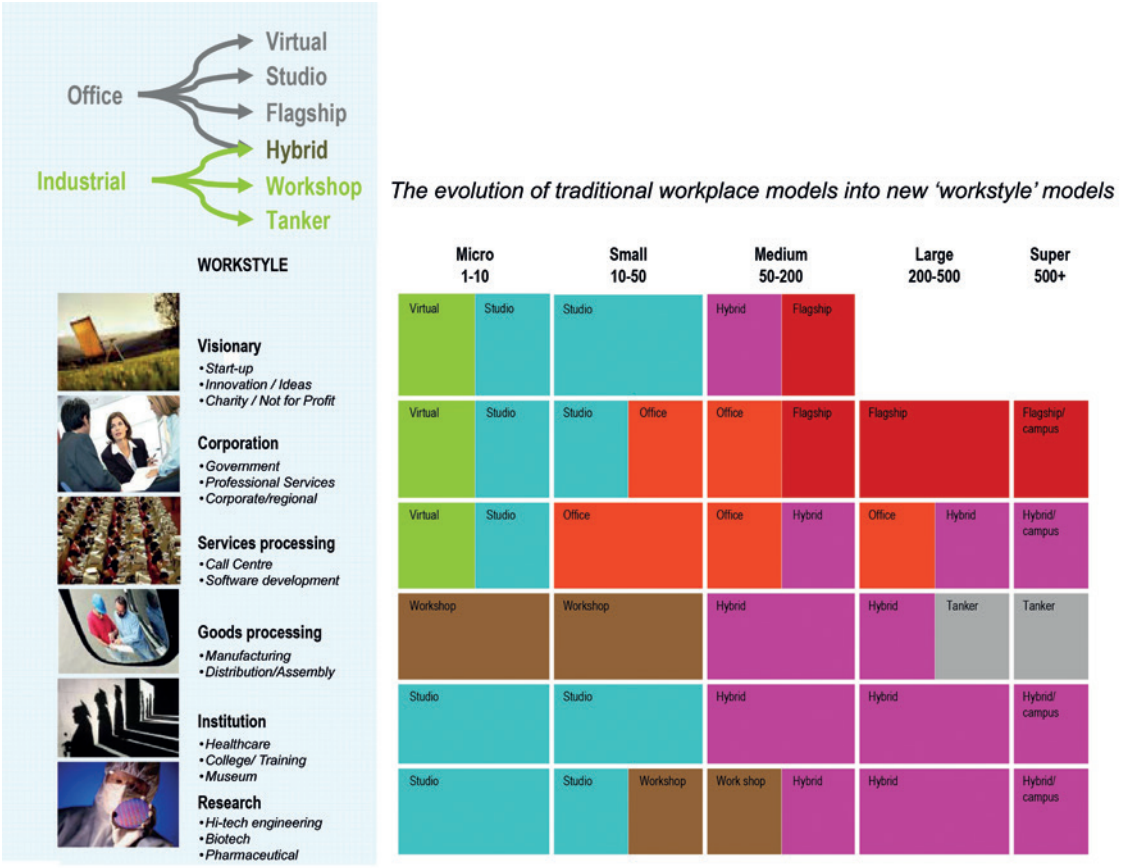

Figure 4. *Northamptonshire 'Workstyle' strategy – Cross referencing of 'workstyles' to sectors' workplace / activity and space types (Source: DEGW 2005).*

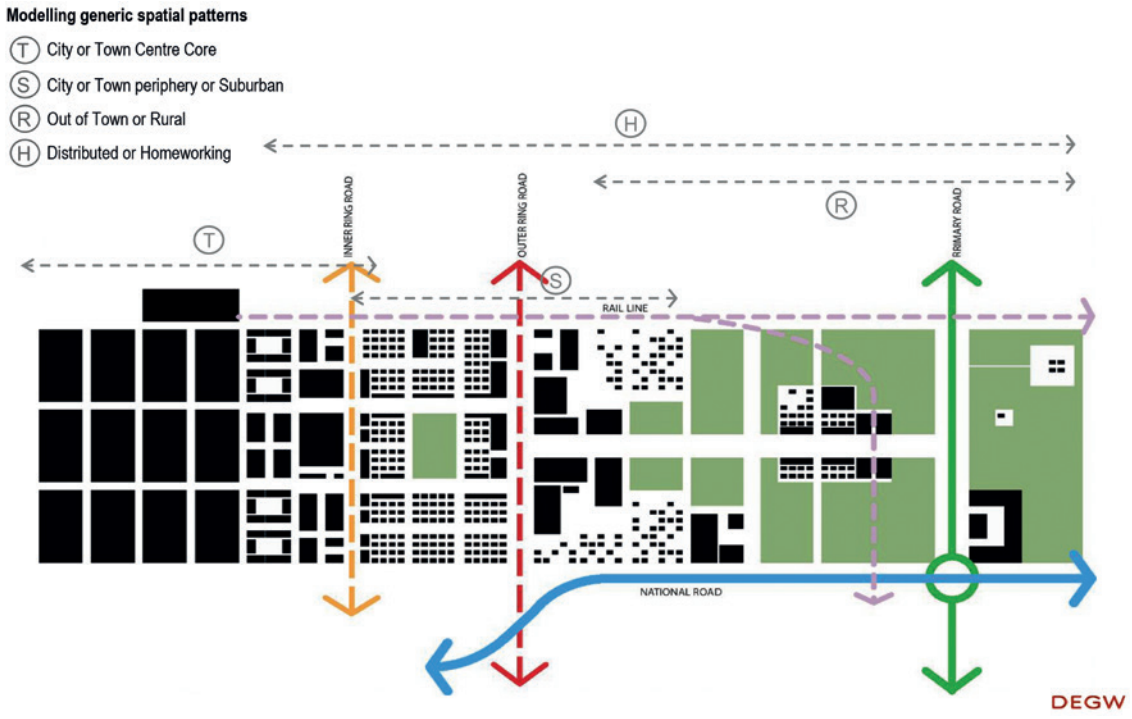

Figura 5. *Northamptonshire, WorkStyles strategy, Land use planning (Source: DEGW 2005).*

urban to suburban and out of town places. This land use framework is based on the nature, culture and economics of 'workplace activity' instead of simplistic sectoral characterisations of demand used by real estate markets.

This 'bottom up' approach led to a high level of *'specificity'* in the interpretation of land use, which informs a detailed understanding of the drivers of change and aspirations for the qualities and attributes of a future environment. The transferral of conventional classifications of use to more tactical characterizations of function and activity informs new space typologies loaded with more detailed environmental specifications on the shell and fit out of space typologies.

Both projects in Dublin and Northamptonshire, were commissioned by 'clients' situated between the formal public and private sector delivery mechanisms. Barrow street was proposed by the dockland's development agency in Dublin, tasked with delivering the regeneration of old industrial harbor areas over a specific period of time and independent from the local planning department and processes. Northamptonshire Invest was also an independent body representing private interests, funded partly by the public sectors and with strong links with local interests. In both cases, the nature of the investigations and urban briefs produced did not only reflect the formative and responsive-to-change nature of the output, but also the ability of the commissioning organizations to work towards delivering change with soft ergonomic frameworks instead of spatial prescriptions.

Concluding Note

Inquiry by design and process-based investigations toward the development of Urban Briefs do not only lead to evidence based design but construct briefs that are flexible to change. Design, as an activity, examines space (explicitly or intuitively) from a number of different perspectives simultaneously. It sketches out the complex nature of multi-faceted characterizations and constructed solutions necessary to determine the building environment of the future – at all scales. Tactile briefing tools can assist with the understanding and measuring the scale of impact, the definition of thresholds of appropriateness in the context of policy regulation, and the testing the temporal compatibility of concepts with stakeholders views necessary for a creative policy formulation.

Key barriers identified earlier in this paper, for the adoption of such fertile tools of the *middle ground* in planning practice in southern Europe need to be studied further, since there are several systemic weaknesses in systems driving environmental change. The centralized plan making processes, the rigidity of a zoning system, the under-developed institutional sector, and the lack of pressure by public interests demanding participation in place making are some of the systemic shortcomings, blocking more inclusive and in many ways sophisticated urban briefing. The lack of capacity at the local authority level for policy making at the local scales retains the perpetuation of the deployment of an inflexible strategic policy, uniform in its prescriptions, in the delivery of urban space. Associated mechanisms for environmental design do not seem to facilitate or explore the contemporary international urban planning debate, or process based briefing practices.

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The Impact of Privatization in Re-Shaping the Coastal Cities Planning

Alexandria City as a Case Study

Engy Farrag[1]

Abstract: Alexandria is one of the most attractive waterfront cities in Egypt, located at the center of the Mediterranean coastline. The Corniche of Alexandria is the main road that runs along the coastline, a vital public space for all citizens. However, recent privatization has led to a loss of public access to several parts of the Corniche, particularly access to beaches, while it has also raised concerns about social inclusion and segregation. The paper highlights the important role of planners and designers in creating more equitable and accessible public spaces. In this light, the study proposes a design intervention for developing the Corniche, through research findings and emerging urban design and planning methodologies. This comes at an important moment after the Covid-19 crisis, to ensure that all Alexandrians can enjoy this vital public space. To achieve the research objectives, this study employs a spatial analysis to map the changes in the Corniche's form over time and assess the impact of privatization on public access and use. Moreover, the research will be guided by a theoretical framework that draws on concepts of social inclusion, segregation, and public space. The study will also explore emerging urban design and planning methodologies and their potential for creating more equitable and accessible public spaces.

Keywords: Privatization, Alexandria, Urban Design, Public Spaces, Social Interaction.

Introduction

In essence, privatization refers to the transfer of ownership and control from the public sector to the private sector (Ntakana & Mbanga, 2020). The privatization of public spaces in coastal cities has become a common practice in many parts of the world. In the case of Alexandria, a vibrant waterfront city located at the center of the Mediterranean coastline, recent privatization has led to a loss of public access to several parts of the Corniche, a vital public space. This paper investigates the impact of privatization on the planning of coastal cities, using Alexandria as a case study.

The paper highlights the important role of planners and designers in creating more equitable and accessible public spaces. Employing a mixed-methods approach, the study uses spatial analysis to map the changes in the Corniche's form over time and assess the impact of privatization on public access and use. This provides insights into its evolution and the impact of privatization on public access and use. The research is guided by a theoretical framework that draws on the concepts of social inclusion, segregation, and public space. The study also explores emerging urban design and planning methodologies and their potential for creating more equitable and accessible public spaces.

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The research findings reveal that the privatization of public spaces has led to a loss of public access and increased segregation in Alexandria. The study proposes a design intervention for developing the Corniche that is informed by the perspectives and needs of different stakeholder groups. The proposed design will be evaluated through feedback from stakeholders and assessed for its potential to address issues of social inclusion and segregation.

Overall, the paper concludes with a discussion of the implications of the research findings for coastal city planning, highlighting the importance of preserving public access to vital public spaces and the role of planners and designers in creating more equitable and accessible urban environments.

1. An Overview of the History of Alexandria's Corniche

Alexandria is the second-largest city in Egypt. It is known as a linear city due to its elongated shape. Alexandria's Corniche is a famous waterfront promenade that runs along the coastline of the Mediterranean Sea. It stretches for about 20 km along the coast and has an average width of 30 meters. The first Corniche in Alexandria was built by Khedive Ismail in the early 1900s, but it was officially opened in 1934 under the reign of Abd al-Fattah Yahya Pasha, who extended it from the quays between Fort *Qaytbay* and Cap *Silsilah* to *Al-Montaza* in the east during Ismail *Sidqi* Pasha's government. The Corniche has a rich historical background that dates to the time of the ancient Greeks, who founded the city of Alexandria in 331 BC. The original Corniche was a narrow road that ran along the shoreline, connecting the city's main port to the royal palace (Katba, 2009).

Over the centuries, the Corniche underwent several transformations. During the historic period, the Corniche was expanded and embellished with gardens, fountains, and public monuments. It was further developed and became a popular destination for recreation and leisure.

The Corniche continued to be an important public space and was further enhanced with the construction of mosques, public baths, and other public amenities. In the modern era, the Corniche has been a symbol of Alexandria's cosmopolitan character and has been celebrated in literature, poetry, and art.

Today, the Corniche remains a vital public space for all citizens of Alexandria, offering stunning views of the Mediterranean Sea, public gardens, cafes, and restaurants. However, recent privatization has led to a loss of public access to several parts of the Corniche, particularly to beaches, and raised concerns about social inclusion and segregation. Efforts are being made to preserve and revitalize the Corniche as a public space that is more equitable and accessible to all Alexandrians.

Figure 1. *a) Alexandria's Corniche, Egypt, 1945. Source: an American specialist radar operator during the war; b) Alexandria's Corniche, Egypt, 1910 (Source: Tulipe Noire on Flickr).*

2. The Impact of Privatization on Public Access, Social Inclusion, Environmental, and Cultural Heritage in Alexandria's Corniche

The privatization of beaches in Alexandria has emerged as a significant concern for the residents of the city. A substantial portion of the Alexandria coastline is now owned by private enterprises, thereby barring citizens from accessing the beach. Notably, even the available beaches necessitate Alexandrians to pay a fee for utilizing them, thereby compounding the issue. The privatization of Alexandria's Corniche has raised several concerns, including:

- Loss of public access: The privatization of parts of the Corniche has resulted in a loss of public access to certain areas, particularly beaches. This has limited the ability of Alexandrians to enjoy this vital public space.
- Increased segregation: The privatization of the Corniche has led to increased segregation, as certain areas have been reserved for private use, making them inaccessible to the public. This has created a sense of exclusion and inequality among different segments of the population.
- Commercialization: Privatization has led to the commercialization of the Corniche, with commercial establishments such as restaurants, cafes, and shops dominating certain areas. This has changed the character of the Corniche as a public space and has made it less accessible to those who cannot afford to patronize these establishments.
- Loss of cultural heritage: The privatization of the Corniche has also led to the loss of cultural heritage, as historic buildings and public monuments have been replaced by commercial establishments.

The investors begin to impose illegal violations such as constructions, parking, and gates that blocked visibility to the sea, as well as several excesses in their allocated areas such as renting and converting the Corniche corridors into a miniature cafeteria. The sea view became completely non-existent along the Corniche, except in small parts that were not rented.

The privatization of beaches has resulted in the construction of walls and private facilities, thereby impeding the residents' access to the sea. This has generated frustration and disappointment among the populace, as the beaches have been historically enjoyed as a public resource. It is noteworthy that the privatization of beaches not only impedes the residents' access to the coast but also damages the environment. Private entities may prioritize their economic interests over environmental concerns, leading to pollution and deterioration of natural habitats.

Figure 2. *Fences and sea view barriers on the corniche (Source: Afte Egypt and the researcher).*

To mitigate this issue, authorities must adopt measures to ensure that the beaches are accessible to the public, while also safeguarding the environment. The government must consider regulating the activities of private enterprises to ensure that they do not harm the environment or curtail the citizens' right to access the beaches.

The photograph (Figure 3) presented illustrates the rapid privatization of the Corniche, resulting in a significant loss of public space. The transformation is evident as certain parts of the Corniche have been converted into private clubs, private playing areas, and a circus, among others, and are now owned by hotels. Furthermore, the emergence of new cafeterias and restaurants has encroached upon pedestrian walkways as well, diminishing the public's access to these areas. Additionally, the construction of private facilities along the corniche has resulted in the loss of public spaces and a detrimental environmental impact. Moreover, the increased use of cars parked in front of the sea to access the privatized areas has led to increased carbon emissions and air pollution.

The original design of the Corniche functioned for entertainment and was completely accessible for pedestrians, with an uninterrupted view of the sea (Hareedy, 2016). The shore has been obstructed by the presence of cafes, restaurants, clubs, parking lots, and some private beaches that belong to hotels. In addition, the seashore itself was either privatized or

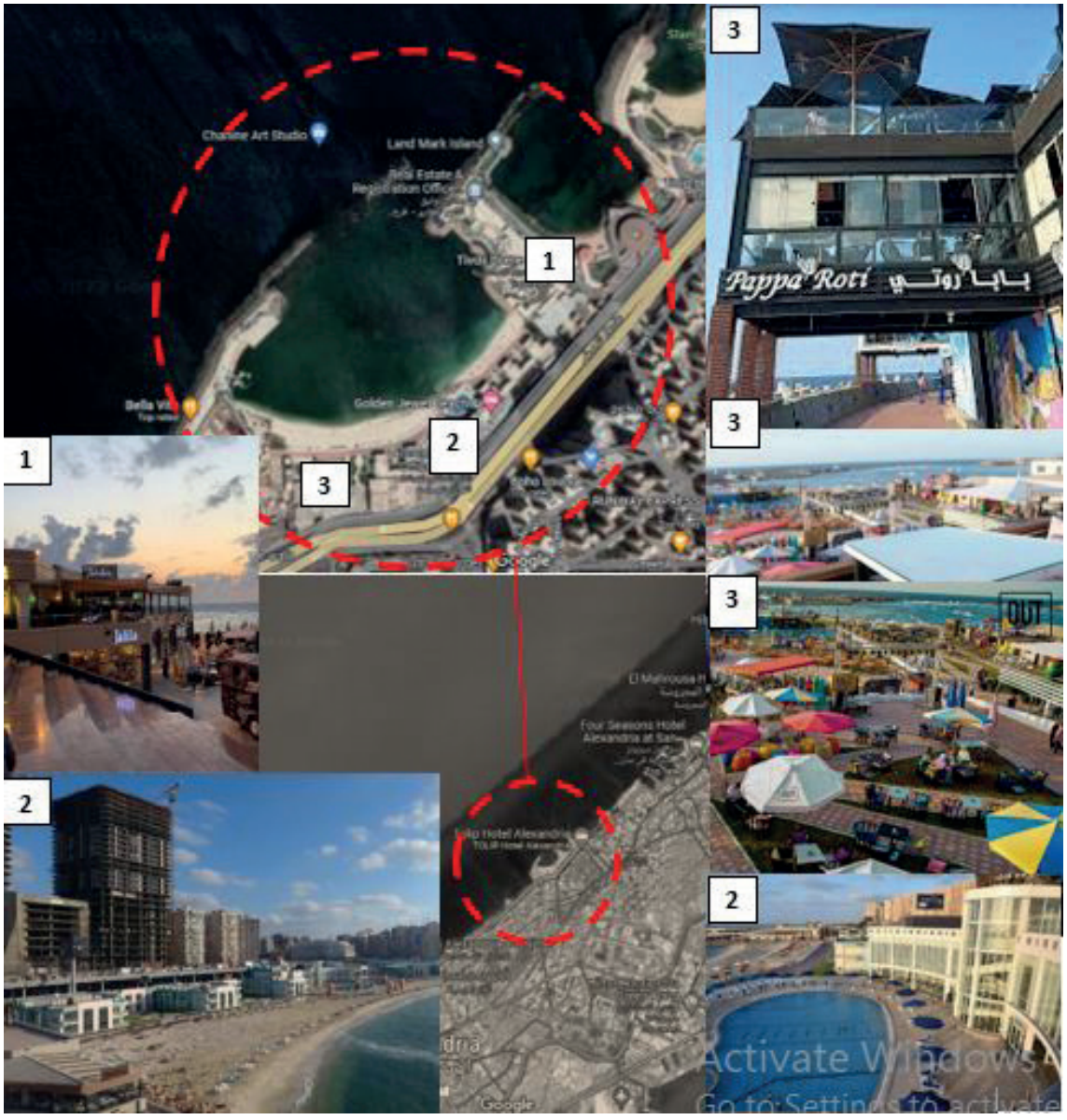

Figure 3. *The current situation destroying the panoramic view of the Corniche (Source: Researcher).*

Figure 4. *a. The original design of Corniche, made as seating for people enjoying the view (Source: Hareedy 2016). b. A protest (Save Alex) of Alexandrians and architects against the disfiguration of Alexandria (Source: Save Alex).*

access to certain portions of it have been restricted through ticketing. Fencing was installed in some rental beaches, and some cafes blocked the view with wooden structures. As a result of these developments, there has been a significant public outrage among individuals such as architects, students, and journalists, which led to the commencement of several campaigns protesting the process.

Overall, the concerns about the privatization of the Corniche relate to the loss of public access, increased segregation, commercialization, and loss of cultural heritage. These concerns highlight the importance of preserving public spaces as accessible and equitable places that promote social inclusion and cultural heritage.

3. Privatization and the Climate Change

According to statistics, Egypt is the third country most impacted by climate change. Alexandria, commonly referred to as the "bride of the Mediterranean", is one of 15 coastal megacities from around the world that are at risk of sea level rise and coastal surges, and is listed among the 20 most vulnerable cities (Ismail, 2018; Kamal *et al.*, 2021). This does not only affect Alexandria but the entire Nile Delta, which encompasses a coastal front along the Mediterranean Sea, home to several major cities, including Alexandria, Rosetta, Damietta, and Port Said. These cities are highly vulnerable, due to their low topography, significant land erosion, and high probability of flooding, in addition to their heightened susceptibility to the impacts of climate change.

Alexandria City has many cultural heritage sites along the Mediterranean coast that are vulnerable to climate change impacts, including coastal erosion and flooding. Alexandria, founded by Alexander the Great in 331 BC, was intended to be one of the foremost cities in the Mediterranean region, with numerous Roman and Islamic archaeological sites scattered throughout the backshore. Many of these sites have been submerged, leading several researchers to conclude that sea levels have risen significantly at various points in history. There remains a risk of a sea level rise that could cause severe coastal erosion and flooding, leading to significant impacts on infrastructure, beaches, and cultural heritage sites (Kamal *et al.*, 2021).

The impact of sea level rise (SLR) extends beyond just population displacement and infrastructure damage and encompasses a diverse range of effects on environmental and socio-economic conditions of Egypt. The city of Alexandria, with its numerous archaeological sites, is particularly vulnerable to SLR, as it poses a threat to historic buildings that are already deteriorating and at risk of submersion, complicating access to these sites (Hemeda, 2021). This has the potential to reduce tourism and negatively impact the socio-economic conditions in the area, as the loss of beaches would lead to a decrease in the number of tourists in coastal regions and contribute to an increase in unemployment. It is estimated that by the middle of the 21st century, about 200,000 jobs will be lost due to this trend.

Recent studies have shown that there is a correlation between sea level rise (SLR) and floods, whereby the former exacerbates the causes of the latter. It is predicted that the sea level will rise more than two meters by the end of the century (Farrag & Khalil, 2022).

In the next 15 to 30 years, the sea level is expected to rise, leading to more frequent tidal flooding and potentially causing widespread disruption. This is due to a number of factors, including the increasing erosion of shorelines, the elevation of high tides during full moons resulting in the tide reaching further inland, the elevation of coastal wave tables leading to flooding in low-lying areas, the increased failure of dikes and flood control facilities, and higher waves than those typically caused by storm surges. The privatization of several coastal parts of Corniche will accelerate sea level rise which highlights the need for urgent intervention from decision makers and planning.

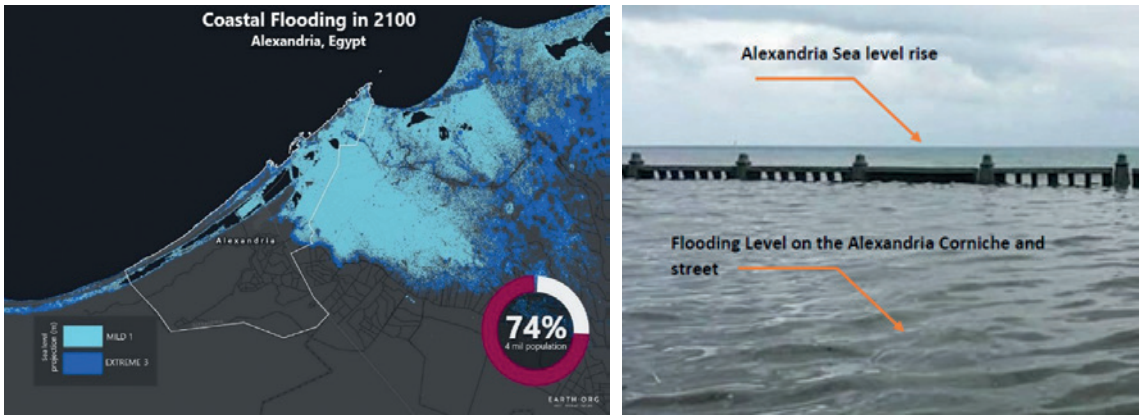

Figure 5. *a. The photo shows two scenarios with the amount of sea level rise in meters (mild = 1 m; extreme = 3 m) in several areas in Alexandria city and total population displacement by 2100 (Source: Earth.Org). b. Photo shows the flooded streets and Corniche in 2015 and how commuting across the flooded streets of Alexandria was impossible (Source: Egyptianstreets.com).*

The Privatization of Alexandria's Corniche has had significant implications for climate change. Private entities, whose economic interests take precedence over environmental considerations, have caused pollution and the degradation of natural habitats. This has led to several consequences for the environment such as an increase in sea level rise, erosion, and carbon emissions, which contribute to climate change.

It also has resulted in the deterioration of the natural coastline, which plays a fundamental role in mitigating the effects of climate change. The natural coastline serves as a protective barrier against rising sea levels and extreme weather events, such as storms and floods. The destruction of the coastline due to privatization has contributed to a heightened vulnerability of coastal areas to the impacts of climate change.

4. "Revitalizing Alexandria's Seashore: Creating a Hub for Social and Physical Community Activities"

The contribution of Alexandrian architect Eng. Abd El-Hamed Ezzat in the redesign of Alexandria's Corniche has been significant in enhancing the quality of life of its residents and visitors. Through the proposed conversion of the seashore into a hub for social and physical community activities, they have demonstrated their ability to create functional spaces while preserving the aesthetic value of the area through a competition which was titled 'Alexandria 2030' for the redevelopment of Alexandria's Corniche to solve the problem facing Alexandria and create more areas of entertainment for the public.

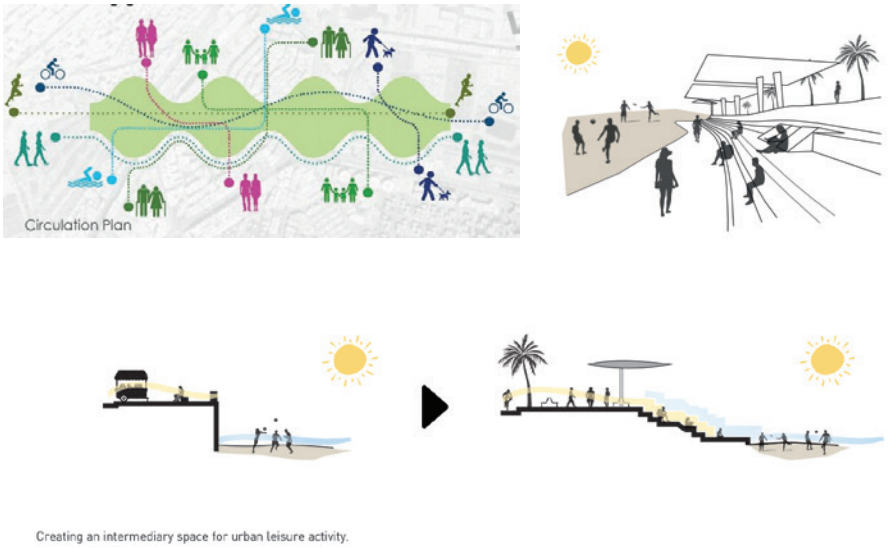

Figure 6. *a. A Circulation plan for various activtives available along the beach. b & c. Accessible areas to the sea for more social vitality (Source: Ezzat, 2019).*

The design concept has been developed with the objective of increasing the interaction between people and beaches. This has been achieved by creating more public spaces and new activities, removing obstacles that obstruct the view, and restoring Alexandria's status as one of the most beautiful cities in the world. The architect has also taken sustainability into consideration by balancing social and human aspects and removing barriers that prevent users from freely seeing and using the beach.

The location of all cafes and restaurants under the pedestrian path is a particularly innovative feature of the design. This not only increases investment without damaging the city's waterfront but also provides a direct relationship between the beach and users. The free flow of pedestrians to and from the sandy beach, along with the extension of the city's waterfront, further enhances the human aspect of the design and increases public areas of interaction.

Architects and planners are trying to restore Alexandria's status as one of the most beautiful cities in the world. Their design prioritizes the human aspect and enhances the city's urban landscape and quality of life. Overall, the design has demonstrated the ability to balance functionality, sustainability, and aesthetics in the redesign of Alexandria's Corniche.

Therefore, it is crucial that authorities take action to regulate the activities of private entities and ensure that environmental and social considerations are prioritized over economic interests. This may involve implementing policies to protect natural habitats, reduce carbon emissions, and reduce SLR impact. Also, such threats can be minimized through; awareness, where the causes of climate change can be controlled, and limitingprivatization, where cities are protected from its negative impact. Through these measures, the negative impact of privatization on climate change can be mitigated, and the adverse consequences of climate change can be minimized.

5. Recommendation and Result

Based on the research findings, it is recommended that planners and designers prioritize the preservation of public access to vital public spaces in coastal cities. The proposed design intervention for the Corniche aims to create a more equitable and accessible public space by considering the needs and perspectives of different stakeholder groups. Some recommendations that should be considered are shown in Table 1.

Table 1. *Recommendations that should be considered for the design of waterfront cities (Source: Researcher).*

Development Aspects	**Development Concept**	**Recommendation and suggestions**
Cultural-Historical	City's Identity	– Strengthening and preserving the identity of the city. – Realizing the city with a high cultural and historical value.
Touristic	Aesthetic Image	– Promoting aesthetic characteristics to attract visitors and tourists. – Making the city a new tourist destination with water tourism in the future.
Economical	Local Economic Development	– Developing the economy of the city to increase local community income. – Increasing economic growth from local to global.
Ecological	Ecological Entertainment	– Encouraging the community to walkand cycle on the seaside. – Creating recreational facilities to be used by the public.
Social	Human-Centered Design	– Arranging a continuous waterfront connected with urban activities. – Providing comfortable public space for community activities. – Easily accessible for people to enjoy the sea view.
Environmental	Climate change mitigation	– Creating a natural experience to maintain and preserve the environment. – Prevent any new development in areas at high risk of flood or erosion. – Replace or elevate buildings in the high-risk flood zone. – Relocate buildings in flood zones to higher ground is a simple response to sea level rise. The area can be converted to a buffer zone with vegetation to increase biodiversity and reduce shoreline erosion. – Natural plants can absorb strong storms and mitigate risk from SLR. – Construct levees or sea walls to protect the city from rising sea levels. Some cities around the world have integrated levees into their urban design and landscape, creating open green spaces for recreation and social activities. Additionally, sea walls can be constructed with glass to provide unobstructed views of the sea and land.
General		– It is crucial that authorities take action to regulate the activities of private entities and ensure that environmental and social considerations are prioritized over economic interests. – The privatization of public spaces contributes to social segregation, diminishes the public nature of these spaces, and creates privileged areas that have detrimental effects on the socio-cultural landscape. To address this issue, the government should enact legislation to prevent encroachment on public spaces like the Corniche and coordinate high-quality private development projects that benefit the local community. – The involvement of urban planners, architects, policymakers, and other decision-makers in the planning, management, and provision of public spaces is crucial, and they should prioritize the human and social aspects of their work.

Finally, Waterfront areas play a crucial role people's lives and are expected to persist over time. The development of urban waterfronts has become a global trend in numerous cities worldwide, extending beyond large urban centers to medium-sized cities and even to small towns. The objective of such development is to enhance the quality of urban spaces by transforming waterfront areas into open public spaces. The development of ambitious waterfront projects in many cities worldwide is an attempt to address environmental preservation challenges while simultaneously improving public spaces. Alexandria has a limited number of recreational public spaces, with one of the most important being the Corniche. More than 70 % of spaces in the Corniche have been privatized and only a length of a few meters is freely accessible after privatizing the entire coast of Alexandria. The creation of additional public spaces can help to reduce the negative impact of privatization, segregation, and inequality. The enhancement of the Corniche requires collaboration between the government and major public and private entities at the national level. A prudent decision in this regard will have far-reaching implications for the city and the Governorate of Alexandria. Therefore, in order to create appealing public spaces, it is imperative to improve the utilization of the Corniche and take into consideration other aspects of the development.

Conclusion

This paper has highlighted the privatization of urban public spaces and its ugly impact on social inclusion and other aspects of urban areas. It has been contended that the sustainable and socially cohesive design of cities is influenced by the actions of local authorities, city planning decision-makers, and the interests they prioritize. As mentioned before the notion of utilizing privatization as a means for economic advancement and financial gain, while disregarding other aspects such as social inclusion, environmental factors and cultural heritage, climate change, and the need for incorporating a comprehensive set of sustainability attributes in the realm of urban planning and development has been deemed unacceptable. The creation of more resilient, livable, and sustainable cities needs a new vision. It is crucial that local authorities and city planning decision makers prioritize sustainability, human-centered planning, and other mentioned aspects in their actions to ensure that cities can meet the needs of current and future generations while maintaining a healthy and thriving environment.

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Neurourbanism and Neuroarchitecture

How can Cognitive Sciences Inform Design?

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Abstract: Research on the relationship between the built environment and human perception, behaviour and experience is by no means new to the fields of architectural and urban studies. Relevant traditional methods used to address these issues include post-occupancy surveys, ethnographic and phenomenological approaches as well as observations of behaviours and movements in spatial settings (e.g. space syntax). However, a fresh perspective into the embodied experience of the built environment has come to complement these attempts. Neuroacrhitecture and neurourbanism are two emerging research fields that take advantage of advancements in neuroscientific knowledge, and cutting-edge technology to gain a deeper understanding of the brain-body-environment relationship. These fields are rapidly gaining traction, and the translation of research findings into evidence-based design parameters is vital for creating spaces that fit our situated emotional and cognitive needs. The paper adopts a theoretical stance inviting the reader to re-imagine how neuroscientific knowledge on the brain-body-environment interaction can be generated and translated in formats that can inform architectural and urban design. The paper offers a brief review of the neural turn in architectural and urban studies, followed by a detailed discussion of the main challenges (and potential remedies) related to the translation of such biological evidence into design research and practice. The paper aims to draw attention to the potential valuable contribution of neuroarchitecture and neurourbanism to evidence-based design practices and the development of urban policies that can positively shape our everyday experience.
Keywords: Neuroarchitecture, Neurourbanism, Evidence-based Design, Neurophenomenology, Environment-behaviour.

1. Background

Since the "design methods movement" in the 60s, design practitioners have started exploring ways to intertwine scientific and research-based knowledge with design practice. Around the same period, the growing dissatisfaction with the lack of knowledge regarding human-environment interaction gave birth to the field of 'Environment-Behaviour' (E-B) studies. According to Amos Rapoport (2008), one of the founders of the field, it began as an attempt to advance relevant scientific knowledge essential for improving the design of the built environment through criteria-based evaluations of outcomes and to develop a body of knowledge for evidence-based design. Starting with Ulrich's (1984) pioneering work, revealing that having a window with a view to nature is beneficial for surgery patients' health, evidence-based practices in healthcare design often focus on how improvements in health are linked to environmental features, such as patient recovery in relation to building layout

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(Hamilton, 2003, 2017; Ulrich *et al.*, 2008). In general, the aim is to fit the particular needs of different users through design, and potentially improve cognitive performances such as learning and memory, productivity and teamwork, or even the quality of life.

Theoretical and empirical work from the field of neuroscience has great potential to expand the E-B field and its objectives. Zeisel (2006: 356) considers the possible contributions of such a neuroscientific lens and recommends that "[i]f a new paradigm is to further the discipline of environment-behaviour studies, it must shed new light on old concepts and introduce new concepts, methods, theories and models". Introducing neuroscientific insights into the design process allows us to move beyond post-occupancy evaluations, shedding light on non-conscious perceptual and affective dimensions of our architectural and urban experience. Even if traditional tools can capture important behavioural patterns, we may now start exploring why an observed behaviour might be occurring (Farling, 2015). This can lead to diverse and innovative ways of implementing new insights on environmental behaviour in evidence-based design: integrating aspects of human and non-human behaviour (Atelier Bow-Wow), quantifying patterns of movement and co-presence (Spacelab), emphasising on the relational agent-environment field of action (RAAAF). This fresh outlook into the embodied and psychological realms of the built environment is also facilitated by the latest technological developments (e.g. biosensors), complementing the traditional methods used in the E-B field (e.g. surveys, interviews, observations, analysis of archival plans). The integration of neuroscience into E-B studies opens up new possibilities for developing data-driven approaches to human experience and behaviour.

Besides neuroscience, knowledge linked to network theory and social physics, guiding most space syntax work (Hillier, 1996, 2005), is also relevant to E-B studies, extending further the traditional disciplinary boundaries of the field (Rapoport, 2008). Evidence-based design approaches in space syntax have focused, for example, on the relationship between spatial configuration and human behaviour in the context of workplace design (Sailer *et al.*, 2008), hospital ward design (Pachilova & Sailer, 2020) as well as in urban design and pedestrian flows (Karimi, 2012). Although space syntax is positivist conceptually, its definition of space is phenomenological according to David Seamon (1994, 2007). It is studied in terms of how it appears to humans in terms of everyday experiences, behaviours and events (Hillier, 2005).

Such phenomenological traditions in architectural and urban studies may complement current efforts for neurophenomenological approaches to cognition. This offers a great opportunity for developing overlapping research agendas, leading to more phenomenologically-driven approaches and experimental setups (e.g. Charalambous *et al.*, 2021; Charalambous & Djebbara, 2023) and, perhaps, to evidence that is more relevant to architecture and urban discourses. Nevertheless, the interdisciplinary dialogue between architectural and urban design, on the one hand, and cognitive sciences, on the other, is not trivial. Neither is the 'marriage' of scientific research and design practice. To understand how cognitive science can inform design the paper discusses two main challenges i.e. the disciplinary knowledge gap and the research-practice gap. The paper sketches out briefly the state and tendencies of current research on neuroarchitecture and neurourbanism. Then it explores in detail the demands related to a) the inherently interdisciplinary nature that requires reciprocal engagement and flexible, creative thinking and b) the translation of biological, physiological and experiential evidence into design practice. The paper discusses potential remedies to overcome such obstacles in an attempt to find pathways for advancing the contribution of neuroarchitecture and neurourbanism in evidence-based design, urban planning and policies that can positively shape our everyday experience.

2. The Neural Turn in Architectural and Urban Studies

The neural turn in E-B studies led to the emergence of research agendas that focus on gathering empirical neuroscientific data and on evaluating intuitive understandings of architects regarding the brain-body-environment interaction (Eberhard, 2007, 2009; Mallgrave, 2011). Recent reviews illustrate well how relevant neuroscientific findings can advance the knowledge regarding the cognitive, emotional and experiential dimensions of the built environment (Bower *et al.*, 2019; Higuera-Trujillo *et al.*, 2021; Karakas & Yildiz, 2020; Rad *et al.*, 2021). Phenomenological accounts have gained momentum with the neural turn (Holl *et al.*, 2006) leading to the exploration of concepts such as mood and atmospheres (Canepa *et al.*, 2019; Griffero, 2016) multisensory integration (Pallasmaa, 2012; Spence, 2020) and attunement (Perez-Gomez, 2016). Furthermore, exploring concepts related to relevant theoretical frameworks such as affordances (Djebbara, 2022; Jelić, 2022; Rietveld & Kiverstein, 2014) contributes to understanding dimensions of architecture that go beyond its visual form. A large body of research in the field demonstrates how architectural and environmental features influencing perception, emotion, cognition and behaviour can have an impact, for example, on way-finding and orientation (Ghamari & Sharifi, 2021), on stress reduction in healthcare environments (e.g. Higuera-Trujillo *et al.*, 2020), on students' cognitive performance (e.g. AL-Ayash *et al.*, 2016) or the everyday experience of special populations such as those living with dementia (Barrett *et al.*, 2019; e.g. Zuanon & Cardoso de Faria, 2018). Such neuroarchitectural explorations offer the possibility to become sufficiently knowledgeable of brain-body-environment interactions, as well as of the diversity of behavioural patterns and needs among different populations.

Similarly, the emergence of neurourbanism (and neurogeography) responds to the increasing need to better understand the interdependencies between urbanisation and mental wellbeing (Adli *et al.*, 2017; Ancora *et al.*, 2022; Buttazzoni *et al.*, 2021; Fett *et al.*, 2019; Reichert *et al.*, 2020). Urban living and urban upbringing are considered risk factors for poor mental health (Lederbogen *et al.*, 2011; Peen *et al.*, 2010). Factors such as living in a harsh and unpredictable environment, social isolation and commuting stress (Pykett *et al.*, 2020) are associated with a higher risk for chronic social stress, which in combination with other social, psychological and genetic factors can have a severe negative impact on mental health. Crowding, noise, pollution and fragmented social networks also contribute to such outcomes (Mavros, J Wälti, *et al.*, 2022; Tost *et al.*, 2015). On the other hand exposure to nature, urban green space, and biodiversity in contrast to urban density, appear to be a key resilience factor for mental health – inducing relaxation restoration, stress reduction and resilience (Lin *et al.*, 2020; e.g. Olszewska-Guizzo *et al.*, 2020; Tost *et al.*, 2019). Furthermore, being able to navigate and orient oneself easily in a city is another key factor affecting urban life (Jeffery, 2019). Neurourbanism can complement ongoing social research on urban stressors and determinants of urban wellbeing. The integration of biological and social perspectives (Pykett *et al.*, 2020) on urban emotions can provide rich evidence for policy-making and the design of healthier city environments for individuals and communities.

3. The Knowledge Gap and Interdisciplinary Reciprocity

Integrating the distinct modes of disciplinary thought associated with cognitive science, on the one hand, and architectural and urban design, on the other, essentially involves the juxtaposition of two very different forms of knowledge. That is factual and tacit knowledge (the form of knowledge gained through experience and reflection). Arguably, this suggests a number of challenges for design researchers of neuroarchitecture and neurourbanism: a) the 'translation',

integration and transferability of accumulated information; b) balancing the tension between scientific claims of universality and the particularities of different 'contexts' shaping situated cognition; and c) establishing effective interdisciplinary reciprocity and reflexivity.

3.1. *Mapping the Evidence*

Empirical studies on the brain-body-environment relationship coming from different disciplines are often heterogeneous and produce highly specialised knowledge with no obvious linkages or 'bridges' between the existing literature (Rapoport, 2008). Connecting the scattered findings remains a difficult task since what is required is relevant 'maps' illustrating how the linkages between these 'islands' are conceptually structured or which areas need further development. An essential component for advancing evidence-based design thinking in neuroarchitecture and neurourbanism is mapping the evidence e.g. meta-analysis reports (Higuera-Trujillo *et al.*, 2021; e.g. Karakas & Yildiz, 2020; Reichert *et al.*, 2020). Innovative interdisciplinary thinking can be also impeded by difficulties in intellectual communication (e.g. conceptual terms used, disciplinary jargon, multiplicity of writing styles and publication journals). Translating scientific findings into terms that are more closely linked to architectural discourse can facilitate transcending disciplinary boundaries and even lead to new design hypotheses (Edelstein, 2008).

However, without a theoretical framework or a critical attitude this may result in over-generalisation, oversimplification, misinterpretation or in literal, prescriptive, universal guidelines that lack contextualisation to the particularities of each design problem (Hamilton, 2003). In other words, it is essential to synthesise the fragmented findings into conceptual frameworks or explanatory theories at a higher level of abstraction, which can facilitate the navigation, transferability and communication of the different findings (Rapoport, 2008). Otherwise, their meaning might not always be clear. Two significant theoretical approaches currently predominant in neuroarchitectural inquiries have great potential in facilitating a genuine interdisciplinary dialogue since they highlight the link between the environment (the physical and the socio-cultural) and cognition (Jelić *et al.*, 2016; Rietveld & Brouwers, 2017; Wang *et al.*, 2022). Enactive-embodied perspectives (the 4EA model) emphasise the embodied, enactive, extended, embedded and affective nature of cognition and perceptual experience (Rowlands, 2010; Varela *et al.*, 1992) and focus on the role of recurrent sensorimotor patterns of perception-action cycles that are shaped and shape our engagement with the built environment. Ecological psychologists (Gibson, 1966; Heft, 2001) argue that it is through direct perception that we can pick up relevant environmental information in the ambient energy arrays (e.g. detecting affordances). These rich accounts of agent-environment dynamics and co-determination highlight the importance of the specific situation, context and environment of the agent.

3.2. *Contextualisation vs. Universality*

Research findings regarding human experience require a great degree of reflection before they can form a credible evidence-based terrain. It is often debatable to what degree and under what conditions empirical results (and their interpretation) on how we perceive, experience and behave in architectural and urban settings can be generalised as universal laws applicable to other situations, populations and cultures. Narrow forms of evidence may be naively considered adequate for providing prescriptive universal neuro-design guidelines. However, we cannot assume that architecture is simply and solely driven by material or hedonistic factors because human beings are inherently bio-culturally complex (Mallgrave, 2015; Ritchie, 2020).

As Pykett (2015) argues, such assumptions may only offer a 'blinkered view' of the specific phenomenon with little consideration of the 'context' and its influence. Even if the context is formally acknowledged, the conceptualisation of what a 'context' is can be vague, narrow or can vary substantially. Especially regarding urban experiences and city life, reducing the concept of context to immediate surroundings can be quite problematic. To be able to inform urban interventions with neuro-evidence we need to be able to consider the dynamics between the intra-personal (e.g. individual brain dynamics) and intersubjective scales e.g. how social production of space shapes human subjectivity. Understanding the brain *in situ* requires more expansive ways of understanding the quality of urban experience and what drives behaviour, decisions and shapes subjectivities (Pykett, 2015)[2]. This suggests a need for neurourbanism and neuroarchitecture that move beyond the reductionistic tendencies, driven instead by phenomenological insights about embodied, enactive, and situated cognition. As Gallagher (2011: 86) claims "A phenomenologically-informed neuroscience can also be a critical neuroscience". Studies in cognitive neuroscience exploring, for example, questions of social cognition, agency and intention formation, phenomena not reducible to physio-biological processes, may reveal aspects of human relations that involve "larger pragmatic and social interactions in the lifeworld". Reflecting on the research methods, findings and contextual particularities of urban life expands the potential of integrating neuron-based knowledge in evidence-based practices for urban policy.

3.3. *Designerly Modes of (Neuro)scientific Inquiry*

The problem of 'disciplinary imperialism' may be another factor impeding the attempt to transcend disciplinary boundaries. This is not a rare phenomenon in academia, especially when the involved disciplines attract funding at different rates. This can result in one-sided research agendas, often led mainly by cognitive scientists. Consequently, designers are not the driving forces of such agendas and "[t]hey are thus not usually seen by governments and sophisticated clients as at the forefront of the field. These problems could be seen to exist at what we might call the policy level" (Lawson, 2013: 34). The prevalence of scientific rigour over the seemingly 'messy' designerly ways of knowing might easily give a mistaken impression that architectural and urban thinking is subservient to (neuro)scientific approaches. However, designers have learned different ways to deal with the ambiguous multifaceted factors and complex interdependencies of "wicked problems" (Rittel & Webber, 1973), which are not amenable to conventional approaches such as linear, incremental problem-solving. Designers tend to "reflectively redesign their design process" to fit the particularities of the situation they come across each time (Sweeting, 2017). Through this process, a single solution or idea can suddenly solve several problems at once. Consequently, a new interdisciplinary research framework needs to be established in order to embrace a greater degree of reflexivity and a more designerly mode of doing (neuro) science, embracing the values inherent in the designerly ways of knowing (Cross, 1982). Glanville (1999, 2014) argues that research is not a set of procedures and rules, but a way of acting; it is essentially a "design act". It is a self-reflective activity. It is about researching research and redesigning designs.

These views support a groundbreaking avenue of applying design research in the science field, rather than vice versa (Sweeting, 2017). During design thinking, designers are often actively engaged in self-reflectivity regarding the embodied experience of future imaginary architectural scenes and urban landscapes (Mallgrave, 2011). Expertise in such a skilful reflec-

2. As Pykett (2015) comments "If the materialism of our urban experience is to be understood geographically and historically, there is a need to address the specificity of that urban experience in terms of the political, economic, social and cultural driving forces that influence our behaviours, shape our subjectivities and direct our attentions in particular ways within particular spaces".

tive practice along with the phenomenological tradition in architectural and urban studies offers a wealth of knowledge that can significantly contribute to renewed attempts to incorporate first-person accounts into empirical neuroscience (Gallagher, 2004). Neurophenomenology, as proposed by Valera (1996), is a disciplined approach to the subjective experience as part of scientific inquiries and appears to be a very promising ground for ecological research inquiries on the experience of the built environment (Jelić, 2015). Restructuring the path(s) of the interdisciplinary dialogue between cognitive sciences and architectural and urban studies can lead towards a more transformative and creative design of neuroscientific research; an ecological and phenomenologically-driven, experimental science of neuroarchitecture.

4. Bridging the Research-Practice Gap

Being familiar with the state-of-the-art of existing literature is essential to use the available evidence in the design process. However, design practitioners often have limited access to academic research and often lack the necessary sophisticated skills to search and critically evaluate the literature[3] (Lawson, 2013). The skills and habits of design practitioners can certainly be enriched through a relevant reform of the existing curriculum of architectural education. However, integrating evidence-based thinking into design practices requires not only reflecting on the role of design practitioners but also on the design process. Cognitively-relevant design heuristics (Emo, 2019) can be used as tools giving the designers more immediately accessible knowledge during the design process, facilitating in turn the emergence of hybrid practices combining tacit knowledge with academic knowledge.

4.1. *Cognitively-Relevant Design Heuristics*

Finding adequate ways to represent the knowledge derived from academic research can greatly facilitate its successful integration in the design process. Different methodological and analytical tools that capture aspects or phenomena related to cognition and perceptual experience can be employed as design heuristics. Design heuristics can be used iteratively as tools that facilitate design thinking (Gray *et al.*, 2016). Introducing knowledge from cognitive sciences in the form of perspective-taking, using narrative tools or storytelling formats, not only places the human perspective at the centre of the design process, but enhances at the same time designers' reflexivity and ability to immerse themselves in the life of future inhabitants, but also facilitates discussions and familiarity with relevant scientific knowledge[4].

A powerful tool for evaluating the strength of available scientific evidence in relation to the particularities of the design problem is a simulation model. Agent-based modelling, for instance, is often used to simulate complex situations and study emergent phenomena. By assigning different cognitively-relevant attributes (e.g. internal states, rules of behaviour) to individual agents we can observe and evaluate aggregated results such as occupant behaviour in certain buildings, or differences in cognitive agents' wayfinding performance associated with different architectural scenarios e.g. various 3D multilevel configurations (Gath-Morad *et al.*, 2020).

Furthermore, spatial analysis tools such as space syntax and isovist analysis have been often used to interlink neuroscience, cognition and environmental psychology with config-

3. A survey of evidence-based practice in architecture and urban planning found that although 80% of responders acknowledge the need for evidence in the design process 68% reported that they never or very rarely reviewed literature (EBD Journal, 2014).

4. According to recent study the use of spatial cognition and architectural strategies cards during design thinking processes improved user-centred perspectives and facilitated the introduction and communication of scientific concepts (Mavros, Conroy Dalton *et al.*, 2022).

urational and visibility features of spatial layouts. Space syntax appears to capture successfully in the same formal model both the physical structure and human behaviour such as movement flows in urban spaces across different cities and cultures (Hillier, 1996). This is most likely due to the types of analyses used, able to pick up on components that are naturally processed during cognition (Hillier, 2012; Penn, 2003). The capacity of these modelling techniques to quantitatively capture properties linked to cognition has been demonstrated in empirical studies focusing on spatial behaviour and experience (Dalton *et al.*, 2012; Emo, 2014; Hölscher *et al.*, 2006; Wiener *et al.*, 2007) as well as brain dynamics (Sakellaridi *et al.*, 2015; Charalambous *et al.*, 2021; Javadi *et al.*, 2017) and has been also explored theoretically (Marcus *et al.*, 2016; Marcus, 2018). Linking behavioural and neural data to quantitative descriptions of spatial properties can perhaps facilitate more immediate access to neuro-based knowledge for design practice.

4.2. *Designerly Modes of Doing Science in Architectural Education*

One way to equip future design practitioners with the set of knowledge and skills to critically read the relevant literature is to reform the curriculum of architectural education (Tvedebrink & Jelić, 2021). This can be done by introducing material that familiarises students with scientific approaches while giving room for them to imagine more designerly modes of doing science[5]. However, currently, there is little emphasis on evidence-based practices as well as on approaches that involve the collection and analyses of data (both qualitative and quantitative) on human behaviour, perception and experience. Becoming familiar with evidence-based design practices can enhance students' skills to acquire, assess and apply research-based knowledge. Pallasmaa (2012) further observes that there has been a disregard for architecture as embodied experience[6] due to the dominance of vision over other senses. He highlights the need to re-emphasise the nature of the experience of architecture as a "multi-sensory sensing of atmospheres, feelings, and moods" (Pallasmaa, 2013: 13). Introducing (neuro) phenomenological design inquiries into architectural education may be a fruitful way of sharing scientific insights and shaping students' design thinking process. Increasing their awareness of the embodied, multimodal and affective dimensions of architectural experience and elevating their sensibility towards user needs and experiences can lead to more inclusive human-centred approaches that embrace a diversity of bodies and user experiences (Chrysikou, 2018). As a result, this can strengthen the students' sense of the multifaceted responsibility regarding not only environmental but social sustainability, which might soon be a crucial part of building assessment (Stender & Walter, 2019).

4.3. *Hybrid Practices*

The practice of architecture and urban design is undoubtedly a multifaceted form of engagement, often intersecting with the world of academia through the use of theoretical frameworks, historical accounts and research findings as well as through teaching and publishing. Recently, the notion of the 'hybrid practitioner'[7] has been proposed to capture this mul-

5. There are several cases of such advanced curriculums in architectural education starting in 2017 with the "Certificate in Neuroscience for Architecture" from the New School of Architecture in San Diego and the "Master of Science Neuroscience Applied to the Architectural Design" by the University of Architecture Iuav in Venice, the "Architecture, Health, and Well-being" at the Department of Architecture, Design, and Media Technology, Aalborg University, Denmark and the "Evidence-based design. Methods and Tools for Evaluating Architectural Design" at ETH.

6. In Pallasmaa's words, "an architectural work is not experienced as a collection of isolated visual pictures, but in its fully embodied, material and spiritual presence" (Pallasmaa, 2012: 44).

7. The threefold role of the hybrid practitioner involves: a) an operative attitude when using academic expertise to inform, develop and innovate practices b) an embodied understanding of the practice of design and empirical understanding of how things are made in their specific spatial and geographical context, which can be used to inform academic research;

tidimensional figure that "simultaneously practices architecture, carries out research, and educates the next generation" (Schreurs *et al.*, 2022: 24). Hybrid practitioners may enrich and even challenge academic epistemology "thanks to their accurate instinct for contemporaneity and their independent and entrepreneurial attitude" (Schreurs *et al.*, 2022: 23).

There are some interesting examples of hybrid practices, influenced in different ways by theories and knowledge from cognitive sciences that explore in diverse ways how individuals' behaviour and movement are shaped in relation to the built environment. For instance, the concept of "architectural behaviorology" forms the basis of an architectural design theory and methodology, guiding the majority of the work of the Tokyo-based atelier Bow-Wow (Tsukamoto & Kaijima, 2010). They design ecosystems of behaviour by synthesising aspects of human behaviour and experience (architectural ethnography) with the behaviour of environmental elements such as light, air etc. and the building's behaviour in its surroundings. Their design practice is about activating behaviours of human and non-human agents to create community livelihoods[8]. Another design practice influenced by cognitive sciences and ecological psychology is Rietveld Architecture-Art-Affordances (RAAAF). Their design projects and published work explore the idea of affordances as a relational field, as a set of possibilities for action for a certain individual that experientially "stands out" among the rest of the landscape of affordances (van Dijk & Rietveld, 2016). On the other hand, London-based practice Spacelab adopts a more quantitatively inclined approach to explore how actions are shaped and how they shape our sense of the environment embracing the idea of data-driven design. Combining data on human behaviour (observational studies), human experience (VR) and spatial configuration (space syntax) enables the practice to evaluate, for example, the performance of a spatial layout and how it integrates or segregates people and thus its potential to facilitate communication and collaboration in workplaces.

Concluding Remarks

Neuroscientific inquiries into the experience of the built environment (including its cognitive, perceptual and affective dimensions) can certainly provide a rich base of evidence for design thinking. Nevertheless, it is essential to acknowledge the many challenges involved. Neuro-based evidence on architectural and urban experiences involves aspects related to both the physical brain and subjective human experience. Incorporating such evidence in the design involves working within a 'third culture' of knowledge, the 'designerly ways of knowing'. Consequently, integrating neuro-based knowledge in design thinking requires transcending boundaries across fundamentally distinct areas of knowledge: a) a body of theoretical knowledge based upon observation, measurements and hypothesis testing focusing on the natural world with a primary concern for 'truth'; b) a body of interpretive knowledge based on criticism, evaluation and discourse focusing on human experience with a concern for 'justice'; and c) a body of practical knowledge based upon sensibility, invention and implementation with a primary concern for 'appropriateness' (Cross, 1982; Archer, 2005).

Implementing neuroscientific evidence in design research and practice requires a creative approach that explicitly acknowledges the complex interdependencies of the design process.

and c) communicating the design knowledge through teaching, lecturing, writing and publishing (Schreurs *et al.*, 2022: 24). Although the notion of the hybrid practitioner has been initially introduced to capture the conjunction of design practice with histories and theories derived from academic work, the term may also encompass the integration of explanatory theories and the interpretation of empirical findings.

8. "Behaviorology brings about an immediate shift in subjectivity, inviting many different elements together and calling into question who or what may be the main protagonist of a space. Through this ecological approach our imagination follows the principles of nature and experiences space from a variety of perspectives. When one is surrounded by and synchronized to the liveable rhythms embedded in different behaviors – there is no experience quite so delightful" (Tsukamoto & Kaijima, 2010: 15).

In contrast to evidence related to technical details, which can be easily implemented later in the design process, evidence regarding the impact of the designed built environment on cognition, perception and the formation of habitual patterns, has a much higher degree of complexity (Lawson, 2013). It cannot be simply implemented in the form of optimisation strategies or prescriptive guidelines because understanding the experiences and needs of the potential occupants lies at the generative core of the design. This form of evidence-based design thinking implies a change in the design process, where evidence informs decisions at different key moments throughout the workflow. In this way, scientific knowledge and objective criteria can be interwoven with reflective practice reinforcing the intuitive and creative processes underlying design dexterity.

A genuine reciprocal interdisciplinary dialogue can generate mutually inventive ways of moving towards the acquisition of new knowledge. Insights gained from phenomenological inquiries into the architectural experience can drive experimental design and the formation of situated embodied hypotheses. Furthermore, the re-conceptualisation of the triad brain-body-environment as a complex dynamic system calls for a reconsideration of the conventional scientific research agenda as well (Gallagher, 2017). Shifting the boundaries of disciplinary thought on cognition, from computational explanations to enactivist accounts, opens up new possibilities for more creative experimental setups that respond more directly to inquiries relevant to architectural design, urban planning and urban policy.

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Building Capacity for Evidence-Based Knowledge Through Participatory Action Research

Community-Engaged Architecture Design Studio

Christina Panayi, Nadia Charalambous[1]

Abstract: In the ever-changing urban landscape, shaped by intricate interactions of social, economic, environmental, and cultural forces, the role of citizens in shaping their cities has become increasingly vital. Urban development today is a consequence of decisions made by individuals, institutions, and governments over time. Recognizing the significance of citizen participation in city planning, authorities and professionals have embraced community engagement to foster a sense of belonging and promote sustainable, inclusive solutions. This evolving urban paradigm calls for new roles for citizens and professionals alike. Urban designers, architects, and planning institutions are being challenged to meet the growing demand for community-engaged design approaches. Consequently, there is a pressing need to educate future graduates in a transdisciplinary framework, equipping them with the skills required to address real-life urban challenges effectively. Despite commendable recent efforts, academia's response to these challenges, particularly in the context of the design studio's relevance to real-world scenarios and engagement of all stakeholders in the design process, remains constrained. Doubts arise regarding the preparedness of students, who are the future professionals expected to navigate the intricate urban landscapes of today. This paper emphasizes the significance of community-engaged design studios by reflecting on a transdisciplinary pedagogic approach. This approach, developed, implemented, and critically assessed at the Department of Architecture, University of Cyprus over the past years, studies the collaborative dynamics between academia, local governments, professionals, and citizens. It fosters synergies within the quadruple helix framework and promotes the co-creation of knowledge. Furthermore, it seeks to accumulate evidence-based knowledge through successive cycles of participatory action research (PAR) and a commitment to continual reflection and enhancement. This pedagogical approach's impact on students' development of transferable soft skills, motivation, and attitudes toward complex societal issues and their future professional roles has been continuously evaluated through qualitative methods. The repetitive nature of these research investigations, connecting findings with teaching methodologies and the co-creation framework, holds the promise of establishing a formidable knowledge foundation. The knowledge accumulated through these research cycles can serve as a catalyst for reevaluating and enriching the current academic curriculum, infusing it with insights gained through these processes. These insights, in turn, can significantly augment the development of students' skills, making them better equipped to tackle the complexities of modern urban contexts. Evidence-based knowledge generat-

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ed through these iterative research investigations may transcend the realm of academia to become a dynamic force that shapes the future of urban development and sustainability.
Keywords: Community Engagement, Architecture Design Studio, Transdisciplinary Pedagogy, Evidence-based Knowledge.

1. Empowering Urban Transformation Through Co-creation: A Community-Engaged Approach in Architecture Design Studios

Citizen participation in urban development processes is gradually acknowledged as a fundamental aspect of contemporary city planning, with far-reaching implications for the quality of life, social cohesion, and sustainable development. Actively involving citizens in the development and transformation of their neighbourhoods and communities fosters a sense of ownership and belonging, which in turn spurs residents to take a proactive interest in the preservation and enhancement of their surroundings. It plays a pivotal role in weaving stronger social bonds and nurturing a shared sense of responsibility, culminating in the creation of safer and more vibrant communities.

Beyond its role in enhancing social cohesion, citizen participation significantly amplifies inclusivity. In the diverse tapestry of urban populations, composed of individuals from varied backgrounds, experiences, and demographics, citizen involvement ensures that a wide spectrum of unique needs and perspectives finds a voice in the decision-making process and that the urban environment is thoughtfully shaped to accommodate the multifaceted requirements of its diverse inhabitants. The collaborative involvement of a wide array of stakeholders – citizens, local authorities, and professionals – aligns with the global aim of making cities and human settlements inclusive, safe, resilient, and sustainable, as outlined in Sustainable Development Goal 11 (SDG) (UN, 2015). The integration of diverse forms of knowledge in real-life contexts and urban decision-making processes is vital for generating innovative solutions to complex challenges, fostering community cohesion, ensuring inclusive and sustainable development, and addressing social inequality (Lund, 2018; Lorne, 2017).

The need for citizens and professionals to assume new roles is increasingly evident, while the capabilities and responsibilities of urban designers, architects, and public planning institutions in meeting the growing demand for community-engaged design approaches are frequently questioned (Charalambous, 2018). Architects and spatial practitioners have long grappled with a legacy of modernist thinking that framed their roles as objective and neutral experts. This perspective often severed the intrinsic connections between architecture and spatial design and their political and social implications, isolating them from the intricate web of interdependencies that bind them to the broader societal fabric (Standring, 2021).

This viewpoint leaves a significant mark on architectural education, emphasizing the acquisition of technical skills necessary to produce professionals ready to fit seamlessly into the neoliberal job market. Notable pedagogical models acknowledge the limitations of this traditional approach and the inherent risks of disentangling spatial disciplines from their socio-political contexts. By neglecting the understanding of the built environment as a dynamic force that shapes and reflects the values, needs, and aspirations of the communities it serves, professionals may miss opportunities to make meaningful and positive contributions to society.

It is imperative to educate future graduates, equipping them with the skills required to enact solutions that align with the objectives of sustainable development in real-life contexts. The incorporation of architectural design studios within a co-creation framework, contextualized in real-world scenarios, has undergone extensive exploration, practical implementation, and critical evaluation. Recent "live" architecture design studios attempt to overcome a conventional emphasis on technical prowess and neutrality and embark on a

transformation towards a more comprehensive understanding of the field's broader societal role (Harriss *et al.*, 2014). Diverse approaches and methodologies have been adopted to facilitate this integration, including community design (Salama, 2013), architecture live projects (Anderson & Priest, 2012; Harris & Widder, 2014), and design-to-build initiatives (Stonorov, 2017). These community-engaged pedagogical endeavours actively involve citizens in the collaborative creation process, leading to a redefinition of spatial practitioners' roles. Moreover, they introduce a paradigm where democracy becomes an integral part of daily existence, offering an inclusive, lived experience (Sara & Jones, 2018).

It is important to acknowledge these significant efforts aimed at redefining the nature of architecture and, by extension, the fundamental tenets of architectural education. This emerging paradigm envisions architecture as a manifestation of "spatial agency" (Awan *et al.*, 2011; Lorne, 2017). Under this framework, architecture transcends its conventional portrayal as a static discipline, instead assuming the role of a dynamic, cooperative, and politically engaged process that actively shapes the built environment. It evolves into a vibrant arena of continuous negotiations, fostering the exchange of knowledge and insights. This progressive viewpoint on architecture advocates for a profound sense of collaboration and inclusiveness within the discipline, ushering in a new era where architectural practice is intrinsically linked to the multifaceted dimensions of human life and society.

This evolution entails an educational paradigm that not only imparts technical skills but also nurtures critical thinking, social consciousness, and an acute awareness of the ethical and political dimensions of architecture and spatial design. Architectural education could be the catalyst for this shift, producing graduates who are not just technically proficient but also advocates of a more socially responsible and ethically attuned built environment. Architecture students thus become active agents in shaping the political and social landscape, engaging with communities, and addressing the multifaceted challenges of our era. This transformation is essential to ensure that the architectural and spatial design professions remain relevant and responsive to the complex and ever-evolving needs of society (Salama, 2016).

A compelling need thus arises to re-evaluate the pedagogical approaches that can effectively tackle these multifaceted challenges. The challenge lies in bridging academia and society, reformulating architectural studio frameworks, and fostering effective interaction between research, pedagogy, and urban context agents. This ongoing opportunity prompts a reevaluation of current educational tools, methods, and policies across all educational levels (Charalambous, 2018).

2. The Co-Creation Design Studio at UCY

2.1. *Fostering Co-creation and Community Engagement*

The above are addressed through a community-engaged architecture design studio (the Co-creation Studio), designed, implemented, and critically assessed at the Department of Architecture, University of Cyprus, over the past years. The Co-creation Studio described in the following sections builds on a transdisciplinary[2] pedagogical approach (Salama, 2016), informed by the theoretical foundation and methodologies of participatory design practices and Urban Living Labs (Menny *et al.*, 2018). It serves as an experimental platform where the conceptualization of architecture as spatial agency is not just discussed, but actively applied and evaluated. The studio format is designed to expose students to real-world complexities,

2. An approach to research that involves the integration of knowledge from diverse disciplines and engagement with stakeholders outside of academia to address complex and multifaceted problems.

fostering collaboration with local communities, stakeholders, public officials, and practicing architects and planners. Through participatory and co-creation workshops and processes students are challenged to step outside the comfort of traditional design studios and dive into the unpredictable and uncertain reality of the urban environment.

This shift encourages the critical production of knowledge, enabling students to be exposed to the concept of the urban commons, with a specific focus on the design and implementation of neighborhood public spaces situated in suburban areas, in order to question their own preconceived notions about their roles and the contextual aspects of their work. By participating in these real-world initiatives, students are provided with valuable opportunities to apply their skills and knowledge in community-driven projects, gaining a deeper understanding of the urban environment's intricate dynamics and their potential roles within it.

What distinguishes the format of this studio in relation to the discussion in the previous section is its' twofold aim: to explore the collaborative dynamics between academia, local governments, professionals, and citizens, to foster synergies and to promote the co-creation of knowledge on the one hand, as well as to amass a growing body of evidence-based knowledge by way of successive cycles of participatory action research (PAR) and a commitment to continual reflection and enhancement.

The first aim has been addressed and discussed in a number of recent articles; this paper focuses on the potential of the design studio's methodology to establish a co-created evidence-based knowledge foundation that provides vital insights on the impact of the proposed pedagogical approach on students' skills, attitudes and development.

2.2. *Co-creating Evidence-Based Knowledge Through Participatory Action Research*

Evidence-based urban planning and design play a crucial role in addressing the intricate challenges of contemporary cities and offering sustainable, well-informed solutions. This approach relies on research and empirical evidence to guide the urban design process, enhancing its effectiveness and responsiveness to the ever-evolving urban landscape (Karimi, 2023).

Similarly, co-created evidence-based knowledge represents a powerful synergy between community engagement and the urban planning and design process. It is the product of a collaborative effort between citizens, professionals, and public authorities to generate insights that inform urban decision-making. The concept of co-creation emphasizes inclusivity and active involvement, acknowledging that urban challenges are best addressed by those who experience them daily. One of the core features of co-created evidence-based knowledge is the democratization of the decision-making process. Citizens are no longer passive recipients of urban policies but actively participate in shaping their urban environments. By participating in data collection, analysis, and interpretation, citizens contribute to a shared knowledge base that goes beyond traditional expert-driven approaches (Vohland *et al.*, 2021).

Co-created evidence is grounded in the belief that those who live and work in a particular urban context possess invaluable contextual knowledge. This knowledge encompasses the nuances of daily life, including transportation patterns, social interactions, environmental conditions, and other factors that affect urban living. When citizens become active contributors to evidence generation, urban planning and design solutions are more likely to address their actual needs, preferences, and concerns. This knowledge reflects the real-life challenges and opportunities that residents encounter, providing a more accurate and holistic understanding of the urban context. It can reveal unique perspectives that might not be apparent through traditional data collection methods, enriching the evidence base with context-specific insights.

In practice, co-created evidence-based knowledge is not without its challenges. The nature of co-creation can be experimental and iterative, making it challenging to quantify the long-term impact of certain initiatives. However, the accumulation of evidence over time can help build a case for the effectiveness and sustainability of co-created solutions. To leverage the full potential of co-created evidence-based knowledge, collaborative platforms such as Urban Living Labs (ULLs) have been established, providing structured environments for co-creation, research, and testing of innovative urban interventions. They offer a controlled setting for experimentation, data collection, and evaluation (Mahmoud *et al.*, 2021).

Following a similar conceptual framework, Co-creation design studios, such as the one detailed in this paper, have a primary objective of fostering the co-creation of knowledge within the context of real-life scenarios. The studio is dedicated to accumulating a substantial body of evidence-based knowledge, offering invaluable insights into the effects of the proposed pedagogical approach on participants. This is achieved through a series of iterative cycles of participatory action research (PAR) and continuous reflection and refinement. Through a systematic process of participatory action research (PAR), students, educators, and other stakeholders collaboratively collect, analyze, and interpret data derived from their experiences within these design studios. This data-driven approach can serve as a rich source of evidence, shedding light on the multifaceted impacts of the pedagogical approach. It can provide a comprehensive understanding of how students' skills evolve, how their attitudes shift, and how their overall development progresses during and after their engagement in co-creation design studios.

The commitment to continuous reflection and enhancement is a cornerstone of the Co-creation design studio; it acknowledges the evolving nature of urban contexts and the dynamic needs of society. Thus, the studio is designed to adapt and refine its approach based on the evidence generated from previous cycles. This iterative process ensures that the pedagogical approach remains responsive, relevant, and effective in addressing contemporary urban challenges.

The studio is designed to assess its impact on the development of students' transferable soft skills, their motivation, their perspectives on complex real-life societal issues, and their evolving understanding of their future professional roles; more specifically, to explore the specific effects of this pedagogical approach, a comprehensive examination is conducted to explore how it shapes the participating students in several critical dimensions:

- Enhancing Professional Skills: The studio's influence on students' confidence and transversal skills, vital for their future roles in architecture and urban planning/design, is a primary focus. This assessment occurs within the context of an ever-changing socioeconomic, political, and environmental landscape, driven by persistent neoliberal policies. The studio's role in equipping students with the necessary competencies to thrive in this complex reality is closely scrutinized.
- Developing Positionality: Students' awareness of their agency and social role within co-creation processes is another pivotal aspect under continuous examination. The studio aims to empower students to recognize the influence they hold and understand the implications of their actions and decisions when participating in collaborative endeavors. Their evolving positionality within these processes is a key component of the evaluation.
- Fostering Critical Thinking: The capacity for reflexivity and critical thinking is cultivated throughout the studio experience. Students are encouraged to question assumptions, analyze outcomes, and engage in reflective practices that underpin their decision-making processes. This aspect is rigorously monitored and assessed.

These evaluations are carried out through the application of qualitative research methods across various phases of the design studio, allowing for an in-depth exploration of the students' experiences, perceptions, and personal and professional growth. By employing a range of qualitative techniques, such as interviews, surveys, and observations, the studio gathers context-specific data that provides valuable information on the multifaceted impacts of the pedagogical approach. The subsequent sections provide a detailed account of the methodology employed and the outcomes of these assessments, highlighting the transformative journey of the participating students as they navigate the complex terrain of the design process.

3. Research Methodology

The proposed framework, rooted in Participatory Action Research, serves as a structural backbone for cultivating collaborative learning partnerships and crafting pedagogical and assessment tools that uphold the principles of 'transformative learning values and ethics' (Pine & Urie, 2017). Educators adopting a stance of 'self-reflective teaching' with a focus on progress and transformation (Tran, 2009) are guided by action research, capable of unveiling inconvenient truths (Kemmis, 2006) while propelled by a commitment to advancement and change (McTaggart, 1997). Its cyclical pattern, encompassing planning, action, observation, and reflection, underscores the demand for adaptability, responsiveness, and the indispensable collection of evidence to inform the path forward.

The methodology, as depicted in Figure 1, unfolds through four distinct phases: the establishment of the co-creation framework, its execution, the concurrent processes of evaluation and assessment, and the crucial phases of reflection and re-design. The implementation phase is characterized by its fluid, nonlinear nature, subject to adjustments, and embraces activities like co-assessment and understanding (co-identification), co-creation (co-development and co-selection), co-design and execution. Evaluation and assessment run in parallel with implementation, encompassing both the co-evaluation of the process itself and an assessment of its influence on students. This assessment entails an exploration of their skill development, motivation, their evolving perspective regarding their future professional roles, and the quality of the resulting design work.

The data collection process encompasses information gathered from multiple sources, including the active participation of educators-researchers, input from students, and insights from other participants, notably citizens (Figure 2). Students actively engage in focus group discussions, scheduled at specific points in the process, to capture their sentiments, thoughts, and informal viewpoints as the process unfolds. They are also tasked with completing targeted questionnaires, usually administered both before and after the instructional phase via Google Forms. These questionnaires incorporate a mix of open-ended inquiries and Likert scale questions, focusing on aspects such as motivation, experiential insights, their roles in the process, self-reflection on design outcomes, skill development, and overall learning outcomes.

In addition to questionnaires, students and other participants are engaged in open-ended interviews, where they are encouraged to share their holistic experiences, impressions of the design results, personal gains, recommendations for future enhancements, as well as other thoughts and ideas. Throughout the entire process, the educator-researcher plays an active role in observing the ongoing activities, capturing students' and participants' spontaneous behaviors, and maintaining a reflective diary. This diary helps in documenting observations and reflections on the work as well as the outputs generated by the students.

The observation and reflection process is structured around four key axes:

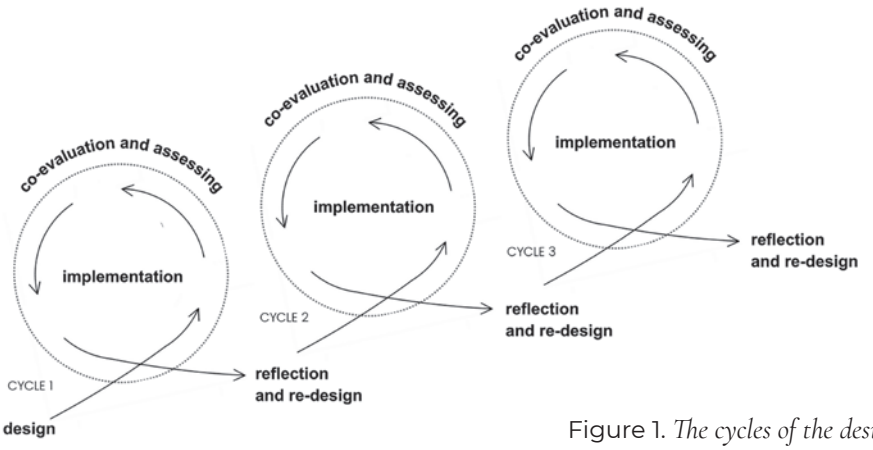

Figure 1. *The cycles of the design studio's methodology.*

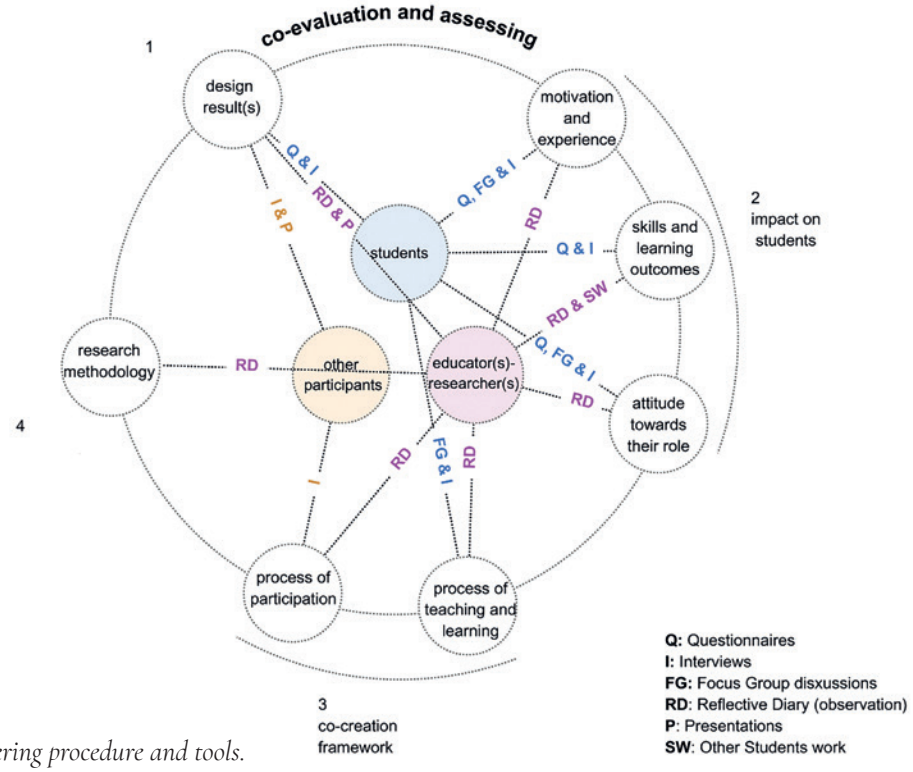

Figure 2. *Data gathering procedure and tools.*

- Assessing the impact of the co-creation process on the final design results.
- Evaluating the effects of the co-creation process on the students.
- Analyzing the co-creation pedagogical framework as a comprehensive process encompassing participation, teaching, and learning.
- Scrutinizing the research methodology employed to ensure its effectiveness and relevance.

This multifaceted approach to data collection and analysis aims at yielding insights into the entire co-creation process, its effects on the various stakeholders involved, and the overall effectiveness of the pedagogical framework. The structure of data gathering is based on the factors/indicators summarized in Table 1. The data collection tools and the overall procedure described earlier exhibit flexibility, allowing them to be tailored to the specific requirements of each semester, learning objective, and studio capacity. Furthermore, the circular reflection process ensures that these tools remain open to adaptation and enhancement as needed from year to year. The qualitative analysis approach serves the purpose of aggregating and examining data gathered from each year. This analysis seeks to identify recurring patterns or

Table 1. *Data gathering structure.*

1. impact on the design result	**2. impact on students**			**3. co-creation framework**		**4. research methodology**
	motivation and experience	skills and learning outcomes	attitude towards their role	participation	teaching & learning	
– responsiveness to the needs identified, – inclusivity according to the users identified, – relationship to the site, – functionality, sustainability, and efficiency. (A Handbook for Live Projects, 2013; Gibbs *et al.*, 2020; NTNU Live Studio: Handbook, 2015)	– excitement and pleasure, – commitment and responsibility, – confidence, – opinions about the usefulness of the process. (Huitt, 2011; Savic & Kashef, 2013)	– development of transferable soft skills (critical thinking, management skills, social skills), – development of subject specific skills and – new knowledge. (A Handbook for Live Projects, 2013; Gibbs *et al.*, 2020; NTNU Live Studio: Handbook, 2015; Savic & Kashef, 2013)	– behavior to/ relationship with other participants, – decision making, – thoughts regarding the profession's and the professional's role.	– inclusivity and participants, balance, – transparency and access, – commitment and interest, – trust and sense of community, – levels of participation. (A Handbook for Live Projects, 2013; Arbter *et al.*, 2007; Delli Priscoli, 2003; Gibbs *et al.*, 2020; Haufe *et al.*, 2017; Leyden *et al.*, 2017; NTNU Live Studio: Handbook, 2015; Sanoff, 1988; Simonsen and Hertzum, 2012; Stratigea, 2016)	– learning experience (learning activities), – challenging and interesting curriculum, – clear and valid assessment methods, – activities that encourage the active role of students. (NTNU Live Studio: Handbook, 2015; The Cyprus Agency of Quality Assurance and Accreditation in Higher Education (CYQAA))	– feasibility of the methodology, – effectiveness of the data gathering tools and structure, – sample size, – ethics, – researcher's role. (Morrow, 2014; Rehm & Gadenne, 2013; Walter, 2009)

trends within the sample concerning the four axes and their respective subcategories. Additionally, it aims to uncover potential connections between the first two axes, which focus on the impact on the design outcome and students, and the third axis dealing with the co-creation framework. After three years of implementation, the analysis extends its scope to verify initial assumptions and to detect any consistent patterns that emerge across different years, within each axis and subcategory.

4. Co-creating Knowledge

Over the course of this three-year research endeavor, several insights have gradually emerged concerning the co-creation framework as a multifaceted process encompassing participation, teaching, and learning. These findings have informed iterative improvements implemented in subsequent years. It is important to note that the outcomes from the 2023 phase are still in progress and have yet to be finalized. Table 2 highlights some of the key findings achieved thus far.

The proposed co-creation framework has demonstrated an impact on both the design outcomes and the students involved. The practice of engaging with a wide array of diverse individuals within each neighborhood has significantly enriched the exploration of inclusive design concepts. This approach has resulted in housing concepts that are closely aligned with the site's specific context. Additionally, a comprehensive understanding of budgetary and construction schedules has fostered the creation of more pragmatic and effective designs. It's important to note that the focus and frequency of co-creative activities, particularly on public space in 2022 and schoolyard intervention in 2023, have influenced the resulting designs based on identified needs and participant recommendations. However, they had a limited effect on housing proposals.

The students' direct involvement in on-site investigations, face-to-face interactions with participants, and other interactive tasks such as video creation, alongside hands-on 1:1 work during design and build workshops, heightened their enthusiasm, sense of responsibility, and dedication to the co-creation process. This engagement has also boosted their confidence in the applicability of the process. Throughout the experience, students have acquired and improved a wide range of transferable soft skills such as effective communication, leadership, and critical thinking. Moreover, they have gained practical design and construction skills while also developing a profound understanding of co-creation processes and the concept of the urban commons. Exposure to real-life settings and meaningful interactions with various participants has better prepared them to navigate the complexities and constraints of real-world scenarios, and encouraged them to view conflicts as opportunities for productive dialogue. These interactions have allowed students to explore their roles in diverse teams, shifting from passive listeners to active discussants, leaders, and negotiators. Key

Table 2. *Some of the most important outcomes (the outcomes of 2023 remain ongoing and have not been concluded).*

2021 (online-COVID 19)	**2022**	**2023**
1. impact on the design result		
(+) – relatively inclusive design concepts. (-) – only the initial ideas and concepts are affected by the needs identified; – limited relation to the site and limited experiential "interpretations" of it. WHY? – long gaps between co-creative activities; – lack of 'on-site' investigations.	(+) – relatively inclusive design concepts; – great responsiveness to the users' needs; – solid connection between the housing units and the public space. HOUSING (-) – only the initial ideas and concepts are affected by the needs identified. WHY? – greater focus on public space during the co-creative process. PUBLIC SPACE (+) – the design is affected by the needs identified and the participants' suggestions; – investigating concepts of functionality, sustainability, accessibility, safety, inclusivity and flexibility. (-) – low efficiency in terms of materials, cost and scale; – low relation to the site (out of scale concepts). WHY? – unclear budget limitations and construction schedule.	(+) – substantial relation to the site. HOUSING (+) – relatively inclusive design concepts. (-) – only the initial ideas and concepts are affected by the needs identified; – lack of connection between the housing units and the school yard intervention. WHY? – greater focus on the public space during the co-creative process; – housing course is perceived as something separate from the school yard intervention. SCHOOL YARD INTERVENTION (+) – the design is highly affected by the needs identified and the participants' suggestions; – considerable responsivity to functionality, sustainability and efficiency; – significant responsivity to cost issues and construction details. (-) – lack of focus on the relationship with the neighbourhood. WHY? – only students and teachers are involved in the co-creative activities; – students in the school yard intervention course limit their site explorations to the school yard.

2. impact on students			
motivation and experience	(+) – a sense of excitement. (-) – limited commitment and responsibility to the process. WHY? – lack of 'on-site' investigations and unexpected encounters; – lack of face-to face interaction with the users.	(+) – engagement with the process; – responsibility and commitment, especially during the design and build workshop; – excitement with hands-on 1:1 work. (-) – concern about completing the design successfully while staying on schedule WHY? – considerable time was spent on co-creation activities; – designing both housing units and a public space is complex and time-consuming.	(+) – engagement with the process; – responsibility and commitment to the process; – excitement with some co-creative activities (video-pitch making,) and hands-on 1:1 work; – perceiving the process as beneficial to all participants and the common good. SCHOOL YARD INTERVENTION (+) – confidence for the usefulness and success of the design.
skills and learning outcomes	-	(+) – communication, cooperation skills; – know-how and practical skills related to design & build; – challenges and limitations of real-life settings; – co-creation and participation.	(+) – communication, leadership, and critical thinking skills; – know-how and practical skills related to design & build; – challenges and limitations of real-life settings; – conflict as an opportunity for fruitful discussion; – co-creation, participation, and urban commons.
attitude towards their role	(-) – passive listeners; – main decision makers. WHY? – lack of interaction with the users; – low involvement of other stakeholders.	(+) – shift from passive listeners to more active members of the team; – exploration of the multiplicity of the roles of a professional. HOUSING (-) – main decision makers. WHY? – greater focus on the public space during the co-creative process. PUBLIC SPACE (+) – decision making is affected by the co-creative process.	(+) – shift from passive listeners to more active members of the team; – understanding notions such as respect, trust and group work; – exploration of the multiplicity of the roles of a professional; – reflection on the importance of commons in Cypriot society and the role of the architect and citizen; – recognition of the social responsibility of architecture. HOUSING (-) – main decision makers. WHY? – greater focus on the public space during the co-creative process. PUBLIC SPACE (+) – decision making is highly affected by the co-creative process.

concepts such as respect, trust, and teamwork have become integral to their professional development.

However, having two parallel courses, while offering students manageable workloads and clearly defined tasks, created a separation between housing proposals and schoolyard interventions, potentially affecting the students' perception of the utility of their non-implementable housing designs. Lastly, a strong emphasis on co-creative activities related to

3. co-creation framework

participation	(+) – unlimited, long term and asynchronous access to information (Google Drive, Facebook). (-) – under-representation and lack of inclusivity; – low commitment to the process and gradually decreasing interest; – low levels of participation; – lack of a sense of community and interaction; – lack of spontaneity. WHY? – lack of real benefit and tangible results; – long gaps between co-creative activities; – exclusively online tools (Microsoft Teams, Miro, Google Forms) and lack of face-to face interaction.	(+) – unlimited, long term and asynchronous access to information (Google Drive, Miro, Facebook, Instagram); – participants balance (age, gender, social status); – ease of access with some hybrid activities and a workshop at the Municipality Hall; – motivation and interest/commitment to the process; – different levels of participation; – dynamic interaction, especially during informal activities (with legos). (-) – long gap between design and implementation of the public space; – limited participation of young couples and people; – limited participation during the summer design and build workshop. WHY? – most of the activities took place at the University and not in the neighbourhood/ Municipality; – unclear construction schedule and budget issues.	(+) – unlimited, long term and asynchronous access to information (Miro, Instagram); – ease of access with almost all the activities at the Highschool; – different levels of participation; – dynamic interaction especially during informal activities (with legos and video making); – some interaction after/ in between the co-creative activities to collect data and complete the tasks; – commitment to the process; – a sense of community building; – spontaneity and excitement. (-) – limited inclusivity in the participants group; – no participation during the summer design and build workshop. WHY? – participants are a select group of students, their teacher, and the school director owing to scheduling constraints; – limited information.
teaching & learning	(-) – lack of dynamic and spontaneous discussions between the students and educators; – limited learning activities. WHY? – lack of face-to-face interaction and communication with body language; – limited knowledge on online tools.	(+) – dynamic discussions between the students, educators and participants; – diverse and rich learning activities. (-) – too exacting and challenging curriculum, difficult to respond to. WHY? – considerable time was spent on co-creation activities; – designing both housing units and a public space is complex and time-consuming.	(+) – dynamic discussions between the students, educators and participants; – diverse and rich learning activities; – challenging and interesting curriculum; – doable tasks. (-) – unclear responsibilities during the two parallel courses; – intensive schedule and limited involvement of professionals and users during the summer workshop. WHY? – difficulty in clarifying responsibilities in mixed groups; – need for role organization during construction; – better organisazion and planning needed.

public spaces and school interventions has led to housing decisions that were less influenced by the co-creative process.

In terms of participation, the integration of online and face-to-face tools and procedures has facilitated unlimited, long-term, and asynchronous access to information, improving accessibility and inclusivity. However, due to scheduling constraints, the 2023 participants were limited and specific. Organizing activities within the participants' premises, such as the municipality and high school, and adopting a more informal format, has encouraged spontaneity, dynamic engagement, excitement, and varying levels of participation, ultimately

fostering a sense of community. The presence of a well-structured, tangible result and practical benefits has enhanced commitment to the process, even in between co-creative sessions. Successful co-creation activities have enriched the learning experiences, while face-to-face interactions have fueled dynamic discussions among students, educators, and participants alike.

5. Co-creating Evidence-Based Knowledge

The establishment of a long-term knowledge base founded on credible evidence necessitates a scientific and factual approach, emphasizing scientific research, empirical evidence, and rigorous analytical methods (Karimi, 2023). It is of paramount importance to scrutinize the research methodologies for each year in order to accumulate robust, comprehensive, and reliable knowledge. This knowledge serves as the foundation for the examination of existing educational practices and the development of evidence-based design approaches that can effectively respond to future challenges in a sustainable and inclusive manner.

While the general research methodology involving design, implementation, co-evaluation and assessment, reflection, and re-design has remained consistent over the past three years, several improvements and recommendations have emerged, warranting further clarification and development. The utilization of diverse data collection tools has played a vital role in determining their efficacy under specific conditions. For instance, students have displayed a greater willingness to engage in focus group discussions and informal interviews compared to completing questionnaires or reflective writing tasks. Focus group discussions have proven valuable for eliciting open and spontaneous responses, offering a wealth of informal insights. Questionnaires should be succinct and straightforward, incorporating a combination of Likert scale and open-ended questions. Additionally, gathering feedback from students during the course(s) itself is crucial, as they may forget or become less willing to engage after the course(s) conclude. When collecting data from other participants, it is imperative to seek input from a diverse and balanced group, in order to ensure a wide array of perspectives and viewpoints.

To ensure the methodology's viability and effectiveness, it is essential to align implementation activities with data collection activities for improved scheduling, and to standardize the process, creating an environment in which participants feel authentic and at ease. For data credibility, ongoing evaluation of evidence strength, quality, and applicability is essential (Peavey *et al.*, 2017). Proper documentation of the process is crucial to ensure long-term access to information such as activity dates, review dates, participant numbers, research year, theme, and more. Establishing an open-access database capable of correlating data across years, axes, and subcategories will facilitate the extraction of long-term findings. The axes and subcategories that govern data collection and analysis should be further enriched and defined to develop a framework guiding the selection and utilization of data collection tools, such as open-ended interviews and questionnaires with Likert scale questions.

A comprehensive framework should encompass data collection by participants, researchers-educators, and other involved parties. Furthermore, it may involve a method for future co-evaluation, examining how built solutions are integrated into urban form and users' daily lives over time. In the process of systematizing these approaches, it is imperative to preserve full extracts from each year's data to prevent the loss of complexity and uniqueness inherent in the data. While establishing a co-evaluation and assessment framework to some extent, flexibility must be retained to accommodate spontaneity and unexpected factors characteristic of the co-creation process.

6. Co-creation Studios: Nurturing Evidence-Based Design for Sustainable Cities

The emerging concept of "architecture as spatial agency" challenges the traditional roles of architects and spatial practitioners. This reconceptualization acknowledges the political, inclusive, and cooperative aspects of producing space, reframing architecture as a dynamic arena for negotiation and mutual knowledge. Within this evolving landscape, professionals and citizens have become more intertwined, and the concept of a neutral expert has been replaced by a collaborative and engaged participant.

Transdisciplinary architecture design studios represent one of the most promising pedagogical approaches that encapsulate this evolving paradigm. These studios have gained momentum, acting as crucibles of innovation and change. They provide students with the opportunity to engage directly with real-world contingencies, facilitating collaboration with communities, local stakeholders, public authorities, architects, and planners. Participatory and co-creation processes, combined with design and build projects, challenge students to step out of the conventional design studio and confront real-world uncertainties. They offer a platform for continuous assessment of the impact of this pedagogical approach on students. This impact encompasses the development of transferable soft skills, increased motivation, a transformation in attitude toward complex societal issues, and an evolution in their perception of their future professional roles, nurturing a generation of professionals capable to embrace the complexities of contemporary urban contexts.

One of the most important aspects of these co-creation studios is their capacity to create an evidence-based knowledge base, continually enriched through successive cycles of participatory action research (PAR) and critical reflection. The ongoing and iterative nature of these research investigations, linking findings with teaching methodologies and the co-creation framework, holds the promise of informing and improving academic curricula. Through the systematic application of participatory action research and a commitment to reflection and refinement, these studios continuously gather evidence on the transformative impact of their pedagogical approach. Designing, implementing, and evaluating a community-engaged and transdisciplinary pedagogical approach for architectural education is critical for the formation of the next generation of architects and urban planners, future policymakers and decision-makers, citizens, and, by extension, the future of cities and urban environments. The co-creation of a shared framework and solid knowledge that can lead to evidence-based urban design allows for expertise, responsiveness, and relevance, generates a greater impact on professionals, civil society, and urban form production, enhances the development of innovative, resource-efficient, and inclusive solutions, and establishes and maintains long-term relationships between academic institutions, governance bodies, and civil society for urban decision making. This can be transformative both for the participants and for the city, developing a sense of ownership and responsibility for their urban living environments. The city can thus be perceived as an agent of change for the University (research and education), while the University can be an agent of change for the city.

The methodology creates a dynamic and adaptable framework that encourages ongoing learning and improvement. It effectively encapsulates the essence of co-creation in a learning environment while emphasizing the significance of assessment and reflection in the pursuit of continuous advancement. The interconnected nature of these phases allows for the seamless integration of evidence-based insights into the learning process.

Nevertheless, it is crucial to acknowledge that such pedagogical approaches embracing situated learning, come with both strengths and limitations. Students are exposed to the complexities of the real world, provided with opportunities to engage with new people, techniques, materials, and a transparent value system. They are encouraged to experiment with "new ways of practicing architecture" (Denicke-Polcher & Khonsari, 2015; Morrow, 2014).

They can also acquire valuable transversal skills, including collaboration, peer learning, communication, negotiation, professionalism, leadership, and critical thinking, through their interactions with various stakeholders (Sara & Jones, 2018). Despite the mainstreaming of concepts like co-creation, community participation, and collaboration in these approaches, several limitations and challenges persist, including among others:

- Changing Student Cohorts: In the context of educational institutions, a new group of students participates each year. This turnover means that the knowledge and experience acquired in one cycle might not be seamlessly passed on to the next group. This dynamic can pose difficulties in building a cumulative body of knowledge and expertise.
- Context Specificity: Each year, these approaches may be applied to different themes and contexts, making it challenging to draw broader generalizations or assess the long-term impact consistently. Context-specific factors play a significant role in determining the effectiveness of the educational approach.
- Student Exposure to the Methodology: The gradual exposure of students to this particular methodology, involving contact with students from various years and the presentation of course materials, can lead to a gradual assimilation of concepts over time. The results of these projects may evolve from year to year based on the level of students' exposure to the methodology.
- Reflective Writing Bias: The use of reflective writing may introduce hindsight bias from the researcher's perspective. Researchers must address concerns related to this bias to ensure the credibility and accuracy of their findings (Rehm & Gadenne, 2013).

In addition to the limitations associated with educational approaches, it is also essential to acknowledge the challenges in building an evidence base that demonstrates the long-term success and feasibility of co-created solutions. Co-creation often involves experimental and innovative methods that may lack established precedents, making it difficult to verify their efficacy (Fanzini *et al.*, 2020). This challenge underscores the need for rigorous evaluation and long-term monitoring of co-created projects to establish a reliable evidence base.

In conclusion, the incorporation of situated learning, co-creation, and community participation in educational approaches offers numerous benefits, but it is equally vital to be mindful of the challenges and constraints that may impact their implementation and long-term impact. A holistic understanding of these limitations is necessary to develop strategies that can enhance the effectiveness of these approaches and provide a more comprehensive educational experience for students.

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Plenary Session: Fostering Synergies

Advancing Collaboration Between Academia and Professional Practice. Friday, 8th December 2023

Keynote Speakers

Oya Atalay Franck (President – EAAE_European Association for Architectural Education), Dubravko Bačić (ACE_Architects Council of Europe), Ruth Schagemann (President – ACE_Architects Council of Europe, online participation)

Invited Contributors

Gregoris Patsalossavis, Michalis Cosmas, Alessandra Swiny, Chrystalla Psathiti, Pantoleon Skayannis, Panayiota Pyla

Session Chairs

Nadia Charalambous, KAEBUP Coordinator
Alkis Dikaios, President Cyprus Architects Association
Christos Christodoulou, Architects Council of Europe

This roundtable session brought together voices from both academia and professional architectural practice to explore how synergies between these domains can be meaningfully strengthened. The discussion was anchored by three central questions, each addressing a key aspect of collaboration and cross-pollination:

1. Sustainable Collaboration Frameworks: In what ways can academia and small-scale architectural practices – particularly those without formal Research and Development (R&D) departments – create sustainable platforms for ongoing communication and collaboration?
2. Curricular Integration of Practice: How can real-world professional insights be systematically integrated into higher education curricula? What channels or methods can support a consistent flow of practical knowledge into academic environments to enrich student learning?
3. Cross-Sectoral Synergies: What strategies can promote collaboration across fields such as architecture, urban planning, engineering, and urban studies? How can such cross-sectoral exchanges of curricula, expertise, and resources be organized to improve educational outcomes and prepare students for the complexity of professional challenges?

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Introduction and Welcome – Nadia Charalambous

The session opened with a warm welcome from Nadia Charalambous, who introduced herself as one of the moderators, alongside Alkis Dikaios, President of the Cyprus Architects Association (CAA), and Christos Christodoulou, a practicing architect in Cyprus with long-standing involvement in both ETEK and the CAA.

Charalambous extended her gratitude to the distinguished guests participating in the roundtable. Among the international contributors were Oya Atalay Franck, President of the European Association for Architectural Education (EAAE); Dubravko Bačić, representing the Architects' Council of Europe (ACE); and Ruth Schagemann, President of ACE, who would be joining the discussion online. The session also welcomed several esteemed local participants from both academia and professional practice. These included Chrystalla Psathiti, a practitioner based in Paphos and academic at Neapolis University; Michalis Cosmas, primarily a practitioner but also engaged in a variety of initiatives; Gregoris Patsalossavis, a practicing architect in Nicosia; Alessandra Swiny, faculty member at the University of Nicosia; and Panayiota Pyla, Professor at the University of Cyprus.

In attendance were students from local institutions as well as participants from the KAEBUP conference. The roundtable marked the concluding event of the KAEBUP project – Knowledge Alliance for Evidence-Based Urban Practices – a three-year EU-funded initiative focused on bridging academia and practice. The project involved partners from four European countries – Croatia, Italy, Portugal, and Cyprus – and was hosted primarily by academic institutions, with the aim of fostering collaborative teaching and training methods involving students, researchers, and professionals alike.

Charalambous outlined the two core aims of the KAEBUP project. The first was to explore and co-develop pedagogical approaches through a combination of online and on-site workshops, intensive training sessions, and collaborative activities. The second aim involved the development of business model workshops, conducted in partnership with business departments, to identify essential transversal skills needed in architectural education. The project also included professional training sessions for faculty and internship opportunities for students in all four participating countries.

Framing the roundtable's relevance within this broader context, Charalambous introduced the session title, *Fostering Synergies*, as an invitation to further explore how collaborations between academia and professional practice could be deepened and sustained.

She then presented the three discussion topics that would guide the session:

1. Sustainable Frameworks for Collaboration – How can small-scale architectural practices, which often lack formal R&D departments, engage in meaningful and ongoing partnerships with academic institutions?
2. Integration of Practice into Curricula – What mechanisms can be introduced to ensure a continuous and productive flow of professional experience into higher education curricula?
3. Cross-Sector Collaboration – How can collaboration across disciplines such as architecture, planning, urban studies, and engineering be structured to enrich learning outcomes and prepare students for the complex realities of the professional world?

Charalambous concluded by inviting the keynote speakers, Oya Atalay Franck and Dubravko Bačić, to share their opening remarks, before opening the floor to contributions from the local participants and the broader audience.

Positioning Statement – Oya Atalay Franck (EAAE)

Oya Atalay Franck began by expressing her gratitude for the invitation, noting the pleasure of participating in the event and her enthusiasm about being in Cyprus for the first time.

She introduced the European Association for Architectural Education (EAAE), an organization with nearly five decades of history and a membership of approximately 150 schools across Europe focused on architecture, planning, and design. The EAAE, she explained, is fundamentally committed to advancing the quality of both architectural education and research – two domains it views as inseparable. The association acts as a platform that connects institutions, individuals, and stakeholders, and it plays an advocacy role, albeit on a smaller scale compared to organizations like the Architects' Council of Europe (ACE). The EAAE's broad community includes schools of architecture, urbanism, landscape architecture, and design.

Drawing on data from the ACE Sector Study 2022, Atalay Franck noted that there are approximately 620,000 architects in Europe. The United Kingdom alone hosts 65 architecture schools, with numbers continuing to rise, while Germany displays similar trends. Italy and Germany count around 150,000 and 120,000 licensed architects respectively. Significantly, one-third of these professionals operate as sole principals, underscoring the critical role of mentorship and hands-on learning in the workplace. She emphasized that architectural education must reflect this diversity of practice – ranging from sole practitioners to partners in firms and salaried employees – rather than idealizing the image of the singular, iconic architect.

Turning to the current challenges facing architectural education and practice, Atalay Franck pointed to the complex, post-Bologna landscape of degree structuring, and the increasing importance of lifelong learning and continued professional development, particularly in light of emerging specializations in the construction and design sectors. She situated these issues within broader global vectors such as internationalization, mobility, and European funding alliances – developed in response to major global issues including war, pandemics, migration, inclusivity, democratic society, sustainability, and artificial intelligence. She stressed that these challenges are shared by both academia and professional practice.

Atalay Franck highlighted the built environment's responsibility for 40% of carbon emissions, and noted that as urban populations grow – projected to reach three-quarters of the global total – cities are becoming ever more central to sustainability debates. She called attention to the EAAE's partnerships with global and European networks, such as ACSA (Association od Collegiate Schools of Architecture USA/Canada), and discussed recent events like the 2021 Biennial Educators Conference focused on "curricula for climate agency, design, and action". The association has continued this work through initiatives such as the EAAE Annual Conference hosted by the Politecnico di Torino on architectural education, where cultural and contextual specificity – local as well as institutional – was emphasized as integral to any pedagogical reform.

Despite pressures of globalization, Atalay Franck argued, local culture and institutional identity remain vital in educational settings. She invited participants to the upcoming EAAE Deans Summit on Transformations in Amsterdam, to be held in April, and referenced a recent Erasmus+ funded study on the "afterlife" of architectural education – i.e., its impact across multiple sectors. This study reaffirmed the value of architectural education in producing generalists, who are exposed to a rich curriculum spanning natural sciences, applied sciences, humanities, and formal sciences. While some schools may emphasize one domain over another, this diversity of training offers students a broad base of potential and critical thought. However, she acknowledged the persistent tension in architectural education: students are often trained to do "everything", which raises the question – *why?* – and

whether a more focused or specialized approach might be beneficial. This tension, she noted, remains unresolved.

The first joint conference between EAAE and ACE, held recently in Brussels, was another significant milestone. Organized in collaboration with ENACA (referring to the European Network of Architects' Competent Authorities network regarding the topics of professional admissions all around Europe), the event addressed themes of upskilling and educational practice. Here too, the emphasis was on forging stronger ties between education, research, and practice, which she identified as essential to tackling major societal issues – particularly climate change. She went on to emphasize how schools are proactively addressing this challenge by adopting resilient design curricula, experimenting with new materials, exploring waste-as-resource strategies, and promoting climate literacy. Nonetheless, there is a shared recognition of the urgency for new knowledge and skills, which continues to serve as a key driver of change.

Turning to the roundtable's three thematic questions, Atalay Franck shared three illustrative case studies:

1. Germany – Neuperlach, Munich «NEBourhoods» – A New European Bauhaus Lighthouse Project. This project, led by TU Munich, is situated in Neuperlach – a post-war urban settlement of 65,000 residents facing significant social and infrastructural challenges. The project involves 24 partners, including local citizens, government bodies, scientists, and artists, working in co-creative teams to renovate buildings and neighborhoods. The initiative stands out for its integration of entrepreneurship, empowering residents to launch new ventures during the physical transformation of their environment. Although not solely about collaborations between academia and small-scale firms, the project actively involves such firms in workshops and development processes, demonstrating how large-scale projects can foster engagement at smaller, localized levels.
2. Denmark – Circular Urban Transformation – «DESIRE» Designing the Irresistable Circular Society. Organized by Danish architecture schools, this second example also includes 24 partners and focuses on developing irresistible circular solutions for urban regeneration. Spread across eight locations in Denmark, Italy, Latvia, the Netherlands, and Slovenia, the project emphasizes social inclusion, symbiotic transformation, and reconnection with nature. Collaboration spans local governments, academic institutions, and other stakeholders, offering a replicable model for cross-sectoral engagement in urban development.
3. European Consortium – Art and AI Integration – «CrAFT – Creating Actionable Futures». The third project is led by ELIA (European League of Institutes of the Arts) and lead by the Norwegian University of Science and Technology. With a focus on AI, smart cities, and citizen empowerment, the project links students, startups, and over 70 European cities – including participation from Cyprus. While the first two projects were primarily school-led, this initiative gives students a prominent, independent voice in shaping urban futures. The centrality of art and creative expression makes it a distinct case of cross-sector collaboration, where practice, academia, and civic participation are fully intertwined.

Reflecting on these examples, Atalay Franck noted the intensifying pressure on architectural education to respond to changing professional demands. In the UK, for example, the registration board has expanded its graduate competency framework from 11 to 39 skills, placing new burdens on schools to adapt curricula accordingly. While core architectural competencies remain constant – designing space and creating place – these are no longer sufficient in isolation. Architecture must now also deliver economic, ecological, social, cultural, and political value.

She concluded by emphasizing the need for a systemic approach to sustainability, requiring holistic thinking and cross-disciplinary collaboration. In a world marked by disruption and flux, the integration of research, teaching, and practice is not merely beneficial – it is essential. "Even if it's about disruption, discontinuity, and radical change", she said, "when we have co-creation, collaboration, and communication, we really reach our goals in a more efficient way".

Positioning Statement – Dubravko Bačić (ACE)

Following Oya Atalay Franck's remarks, Alkis Dikaios thanked her for her insightful contribution and congratulated the European Association for Architectural Education (EAAE) for its work in strengthening education and research. He then invited Dubravko Bačić to share his perspective on bridging the worlds of education and professional practice.

Bačić began by expressing his appreciation for the invitation to participate in the conference. He introduced the Architects' Council of Europe (ACE), describing it as a European network composed of professional associations, chambers, and regulatory bodies from across the continent. As referenced by Atalay Franck, ACE collectively represents approximately 620,000 architects through its 37 member organizations. These include all 27 EU member states, three members with special status (Switzerland and the UK among them), and six observer members representing countries in the process of joining the EU.

Bačić outlined the three core purposes of ACE:

1. Collaboration – Facilitating knowledge exchange between member organizations and learning across national borders. ACE also engages in partnerships with global counterparts, including the EAAE and other transcontinental professional bodies.
2. Advocacy – Representing the interests of architectural professionals at the European level, particularly in relation to legislative and regulatory developments which are first shaped in the EU before being transposed into national law.
3. Promotion of the Profession – Supporting the visibility and societal relevance of architecture through strategic projects and outreach.

ACE's work is structured into four thematic areas:

- Access to the Profession, which includes standards and requirements for registration.
- Practice of the Profession, addressing practical matters such as insurance, team dynamics, and architectural competitions.
- Quality of Architecture, with a focus on defining and assessing architectural excellence.
- EU Research Projects, a newer area that Bačić would return to in connection with the discussion topics.

Bačić emphasized the value of ACE's biannual Sector Study, a Europe-wide survey that gathers consistent, long-term data on the profession through member organization networks. This data forms the backbone of ACE's policy work and is widely used by practitioners and institutions alike.

Drawing on this data, Bačić addressed the first discussion topic: collaboration between academia and small-scale architectural firms. According to the Sector Study, there are roughly 150,000 architectural offices in Europe, the vast majority of which are very small. Specifically, 78% consist of one to two people, and 90-93% have five employees or fewer. As a

result, most of these offices do not have dedicated R&D departments and often struggle with time and resource constraints. Yet, Bačić argued, the capacity for research and innovation remains embedded in architectural education and in the exploratory nature of the design process itself. From Brunelleschi to contemporary practices like Foster + Partners or OMA/AMO, architecture has always been a field where design is closely tied to investigation and experimentation. Recent professional exhibitions, such as those presented at the Venice Biennale, reflect this increasingly research-oriented trend.

Bačić expressed concern that the profession may have lost some of its innovative momentum in recent decades. Historically, architects were often technological innovators – master builders who developed construction methods themselves. Today, architects are more likely to adapt and apply technologies developed elsewhere. Nonetheless, he insisted, the relationship between education, practice, and research has always existed, especially because project-based learning – the pedagogical foundation of most architecture schools – mirrors the iterative, exploratory nature of professional design work. Even without formal research departments, many offices conduct investigative work, particularly in heritage preservation and urban planning, both of which rely heavily on research-based methods in day-to-day practice. In this sense, Bačić offered a diagnostic perspective on the systemic gaps between education and practice, proposing several pathways to better integration:

1. Lifelong Learning and Continuous Professional Development (CPD) – Bačić emphasized the importance of CPD, noting that most CPD programs are developed and delivered by universities. This creates a valuable interface between research and practice, allowing small firms to access emerging knowledge. According to ACE data, European architects engage in an average of 20 hours of CPD per year.
2. Practitioners in Academia – He called for a better balance of practitioners in academic roles, highlighting the importance of having both educators and practicing architects on faculty. However, he acknowledged a major shift: architecture schools have become increasingly absorbed into university structures, where career advancement depends on peer-reviewed publications, conference presentations, and formal research projects. This institutionalization has, in some cases, made it more difficult for academics to stay connected to professional practice. That said, variation across Europe remains significant – what applies in Ireland may not hold true in Bulgaria or Italy.
3. Student Internships – Bačić strongly advocated for internships as a critical point of connection between academia and professional practice. When coordinated effectively, internships benefit both students and firms, with students acting as carriers of new knowledge between the two spheres.
4. Inclusive Conferences and Accessible Research – He called for research-driven conferences to include more small offices and practitioners, ensuring wider dissemination and utility. He noted the proliferation of academic journals and publications, questioning their reach beyond academia. Making research freely available online is essential so that even small firms can access and apply it in practice.

Although ACE is not a research institution, Bačić noted its active role in EU-funded research projects, often in partnership with the EAAE. ACE frequently acts as a dissemination partner, ensuring that the outcomes of conferences, workshops, and publications reach member organizations and practitioners across Europe. This dissemination role is crucial not only at the European level but also at the national level, where schools can collaborate with professional associations to bridge research and practice more effectively.

Bačić reflected on the need for hybrid identities within the profession – those who both teach and practice, alternating between roles as necessary. While dedicated academic re-

search is a specialized pursuit, broader participation in practice-relevant inquiry remains essential.

Acknowledging the complexity of these issues, Bačić emphasized that there are no simple or immediate solutions, but that the pursuit of relevance in research must remain central. As someone who teaches, he observed a growing concern that many research topics have become overly esoteric, disconnected from practice. Still, he maintained that any well-articulated research topic has potential value, and while some may seem obscure at first, they may later find resonance and application in professional settings.

Finally, he referenced international exhibitions such as the Venice Biennale, which have increasingly incorporated research themes and outputs. For instance, Rem Koolhaas's *Fundamentals* exhibition explored foundational aspects of architecture in a research-intensive format. These events, he argued, play a significant role in making research accessible and inspirational to practitioners.

Bačić concluded his remarks by reaffirming his belief that research, education, and practice must remain connected, especially if the profession is to evolve and stay relevant in a rapidly changing world.

Positioning Statement – Ruth Schagemann (ACE)

Following Dubravko Bačić's contribution, Christos Christodoulou welcomed Ruth Schagemann, who joined the session online. Schagemann began by greeting her colleagues, Oya Atalay Franck and Dubravko Bačić, and expressing her pleasure at participating in the roundtable, even from a distance. She emphasized that the topic under discussion – the relationship between research and practice – is of crucial importance in the current moment.

She then highlighted two specific developments at the European level that reflect the relevance and complexity of this connection. First, Schagemann pointed to ongoing discussions surrounding the New European Bauhaus (NEB) and its integration into the Horizon Europe research framework. Horizon Europe is one of the EU's largest funding programs for research and innovation, and there had been significant debate over whether the New European Bauhaus should be recognized as a "sixth mission" within the program. This was not merely a bureaucratic matter, but one that underscored the need to advocate for architecture and urban planning as integral fields within the broader research landscape.

She noted that both the European Association for Architectural Education (EAAE) and the Architects' Council of Europe (ACE) worked closely together to maintain the visibility of the NEB within Horizon Europe. Although the effort to designate NEB as a sixth mission ultimately did not succeed, a compromise was reached: NEB will instead be implemented as a Mission-Enabled Deployment (MED) Facility. This format will allow for the targeted allocation of research funding specifically within architecture and urban planning.

Schagemann stressed that the debate behind this decision was challenging and highly significant. It was not easy to persuade stakeholders that the built environment – architecture and urban planning – should be recognized as a key driver of research and innovation in Europe. The next phase of the initiative will focus on supporting the European Commission in crafting research calls that tightly connect architectural and urban practice with research and development goals.

As her second point, Schagemann introduced the work of Marcos Ros, a Member of the European Parliament (MEP) from Spain, who has served as rapporteur for the New European Bauhaus and has shown strong commitment to advancing this agenda. She explained that, within the European Parliament, each of the 705 MEPs is entitled to propose projects. Annually, more than 1,400 proposals are submitted, and only 30 to 40 are selected for im-

plementation. Ros was successful in having his proposal selected. His project centers on the idea of simulating the New European Bauhaus as a grassroots initiative, and consists of two core components:

1. Creation of a Hub – A digital or physical platform where researchers, architects, urban planners, and universities can collaborate, share ideas, disseminate research findings, and exchange practical experiences.
2. Development of Vouchers for Small Cities – A funding mechanism that enables small-sized cities to apply for vouchers valued between € 30,000 and € 40,000. While modest in scale, these vouchers are designed to support existing local initiatives, facilitating real-world application of NEB principles through architecture, design, and community-based planning.

Schagemann underscored the symbolic and strategic significance of this effort. It demonstrates that the transformation of the built environment – toward more sustainable, inclusive, and high-quality living spaces – requires not only design excellence, but deep integration of research and innovation.

She concluded by highlighting the importance of aligning national-level programs with European initiatives and architectural values. Creating effective alliances between Member States and EU institutions, she argued, is essential if architectural quality and innovation are to be supported across all levels of governance.

Following the keynote presentations, moderator Alkis Dikaios opened the floor to the roundtable's invited educators and practitioners, inviting them to share their perspectives on the connections between education, research, and practice, and how these align with the principles of the New European Bauhaus. He invited Alessandra Swiny and Panayiota Pyla to speak first, representing academic institutions, and noted that Chrystala Psathiti, with one foot in both education and practice, would follow.

Positioning Statement – Alessandra Swiny (University of Nicosia)

Alessandra Swiny began by thanking the moderators. She noted that the University of Nicosia, and private universities in general, have a slightly different role than public institutions, particularly in terms of funding and availability of research.

She emphasized the importance of discussing the relationship with small-scale firms, noting the need for proper infrastructure to enable this dialogue. In her view, this kind of infrastructure is currently missing. She suggested that something enabling better communication of availabilities and needs would be helpful.

As the conversation turned toward the industry, she observed a real lack of connection. Although efforts had been made over the years to encourage this connection, she noted that there were ebbs and flows, often related to economic pressures. In the past, there had been much more collaboration. Swiny pointed out the need for more funding to support classes that would allow practitioners to participate more easily. Without such support, practitioners end up sacrificing their working time to participate. She explained that they are not paid to attend critiques, which can last up to six hours, effectively costing them a whole day.

She reiterated that some form of infrastructure would be very useful, especially in enabling student communication within a mentorship framework. Such a system would allow students to connect with certain architects and offices during their education, potentially

leading to better relationships as they enter practice. She noted that nothing like this currently exists in Cyprus. She asked whether mentorship programs exist internationally, particularly in Europe, and suggested that such a model would be very useful.

Positioning Statement – Panayiota Pyla (University of Cyprus)

Responding to the invitation from Alkis Dikaios to share her insights, Panayiota Pyla began by reflecting on the long-standing nature of the dialogue between academia and practice, noting that various forms of exchange have existed for some time. However, she argued that in order to move this dialogue forward, it is necessary to understand its mechanics and the challenges involved.

As she listened to the previous speakers, Pyla was prompted to focus on two key points. The first was the issue of research and development. While, as mentioned earlier in the session, it is common to say that every small office engages in research, Pyla stressed that this form of research operates with very different mechanics compared to academic research. In design practice, she noted, every line on a drawing may represent a research question, making the process arguably even more intense. However, this form of inquiry is different from the academic model, where a topic is systematically explored and formally published.

To bridge these differences, Pyla suggested the need for analysis and recognition of how the same terms – like "research" – are executed differently in professional practice. Understanding these differences, she argued, is key to identifying new modes of dissemination and making the work done in small offices more visible and communicable within broader research frameworks.

The second point she raised was the issue of economics. While market pressures also exist in academia, they are often more bracketed compared to professional practice, where economic concerns are dominant and unavoidable. She argued that it is crucial to acknowledge and identify these economic tensions and mismatches if new forms of collaboration are to be developed.

As a concrete example, Pyla pointed to recent regulatory changes in Cyprus's housing policy, including new laws that tax larger houses. She described these changes as revolutionary, and noted that they align with discussions that have long been taking place within academia. To her, this represented a clear opportunity to establish a more substantial and meaningful communication between academic knowledge and professional practice.

Response – Dubravko Bačić (ACE)

Dubravko Bačić responded by clarifying that his earlier remarks were not intended to tie research strictly to institutional or political structures. Rather, his aim was to explore how small practices might benefit from research, and to identify similarities between research and the problem-solving or design thinking inherent in every architectural project. He acknowledged that while statistical models describe the structure of offices one way, reality is often more nuanced. In his view, research needs to reach small offices, because practitioners typically have limited time to seek it out themselves. The challenge lies in ensuring that research findings, questions, books, and publications are made accessible and readily available to smaller practices in forms they can use effectively.

Response – Oya Atalay Franck (EAAE)

Oya Atalay Franck followed with a further reflection on the position of small offices. She cautioned against speaking about small firms as if they were passive recipients of knowledge.

These practices, she emphasized, are not disconnected from research – they are formed by individuals like us, or our students, and they know how to conduct research. The issue is not a lack of capacity but a need to maintain and reinforce connections with the knowledge and skills they developed during their education.

She argued that the mindset and culture of research instilled in students during their academic years can and should carry over into their professional lives. If these values are nurtured properly, they become embedded in the DNA of young architects, enabling them to remain active participants in collaborative and research-based projects throughout their careers. Atalay Franck concluded by noting that it is essential to ensure small offices stay connected to calls for projects and opportunities. She stressed that this connection must be mutual – it cannot be a one-way effort. Institutions and practitioners must work together to sustain the flow of communication and collaboration.

Positioning Statement – Chrystala Psathiti (Neapolis University Pafos / Practitioner)

Following the discussion on how to sustain connections between practice and education, Chrystala Psathiti shared her perspective as both an academic and the head of a small-scale architectural practice. She began by emphasizing the importance of clearly defining the skills students are expected to acquire. While a broad European framework exists – comprising eleven key competency areas – it may be too general to be effectively applied. Psathiti noted that there is a lack of clarity regarding how these skills are addressed in different academic institutions, and how they translate into professional settings.

In order to bridge this gap, she argued that more investment and funding are needed to support training initiatives specifically for small-scale architectural offices. Drawing from her own experience, she explained that while she is able to conduct research through her academic role, practice presents different challenges. Time is limited, and practitioners must regularly deal with legislative hurdles, client demands, and budget constraints, all of which make it difficult to pursue research to its full potential.

She suggested that financial support for training programs could offer small practices the flexibility and incentive to engage more actively with research. With dedicated funding, these firms would have the time and resources to invest in training, which in turn could support and improve their work. Psathiti gave the example of current legislation in Cyprus requiring solar studies, which has created a more research-based framework for energy and solar performance evaluations. However, she noted that no similar requirements exist for other aspects of design, such as social or material considerations. This imbalance, she suggested, reflects a missed opportunity for broader research integration in practice, and highlights the potential for legislation to play a more constructive role in promoting research.

She also noted that while many small practices do engage in research-like activities, these efforts are typically unsystematic and often go undocumented. Firms tend to acquire knowledge through day-to-day challenges but do not store or organize this information in a way that can be reused or built upon, as would be done in a formal research context.

Finally, she stressed the need to teach students about knowledge management, particularly how to decode legislation and understand it as a form of research. She described this as a core activity within small-scale practices – one that is already happening but is often overlooked as a learning opportunity. Without systems for recording and reflecting on these experiences, such knowledge is gained passively, rather than actively through structured research processes.

Positioning Statement – Michalis Cosmas (Architect)

Following Chrystala Psathiti's contribution, Christos Christodoulou invited Michalis Cosmas to share his thoughts. Cosmas began by reflecting on the nature of the conversation, noting that the ongoing discussion about the disconnect between education, research, and practice was particularly fascinating. He pointed out that architectural practice, in its current form, is relatively new, especially when compared to its apprenticeship-based origins.

In his view, the platforms for dialogue between research and practice already exist, and it is important to continue investing in and utilizing these platforms – through discussion events such as the roundtable itself – to strengthen communication and collaboration.

He emphasized that architecture is a pluralistic profession, where each practitioner carries their own set of individual polemics. As such, he expressed skepticism about attempts to codify the profession through universal points, directives, or legislation. Instead, he argued that meaningful collaboration can only occur among individuals who share common interests.

In the Cypriot context, he identified the challenge as one of matching the interests of research groups with those of practitioners. Rather than identifying as a "practitioner", Cosmas described himself and others in the profession as producers of space, each operating through a personal filter of priorities, skills, and knowledge. Successful collaboration, he suggested, depends on aligning these differing interests, which could then lead to productive outcomes.

Response – Dubravko Bačić (ACE)

In response, Dubravko Bačić posed a question to Cosmas, asking whether, in a small professional and academic environment like Cyprus, where everyone tends to know each other, there is any evidence of shared interests emerging across the sectors.

Reply – Michalis Cosmas

Cosmas responded by noting that such alignment of interests is not a primary focus in Cyprus. He explained that Cyprus's academic architectural environment is relatively young. Although architecture schools have existed for over a decade, university-hosted architectural discussions are a much more recent development. He pointed out that most local practitioners have studied abroad, resulting in a community that speaks different architectural languages. In his two decades of experience in Cyprus, there have been only a handful of moments where a shared architectural conversation truly emerged.

Cosmas noted that architectural professionals in Cyprus tend to discuss a wide range of topics, and if something interesting arises, it may be extrapolated into further dialogue or exploration. Otherwise, individuals continue along their own paths. Whether or not something collaborative emerges depends on whether shared interests with researchers exist. If they do, he noted, there is potential for something valuable to come out of the interaction. If not, practitioners will continue learning and growing through their own work. He concluded by expressing appreciation for Bačić's earlier remark about research having the capacity to feed itself.

Response – Oya Atalay Franck (EAAE)

Oya Atalay Franck contributed a perspective from Switzerland, noting that in that context, the professional title of "architect" is not protected, meaning that anyone can claim the title and open a practice. She explained that in Swiss schools, most design studios are taught by

part-time practitioners, with very few full-time academic staff. This creates an intense overlap between practice and education, where conversations similar to those discussed by Cosmas occur naturally and frequently – sometimes as often as two days a week. Atalay Franck highlighted the value of this mixed culture within schools, as it allows participants to identify what is relevant or shared, and to recognize that it is also acceptable to have topics that are not mutually followed. However, she also acknowledged that there are moments when it is unfortunate that things do not come together. In her view, architecture schools have a responsibility to foster and support such conversations and collaborations.

Positioning Statement – Gregoris Patsalosavvis (Architect, Nicosia)

When invited by Alkis Dikaios to contribute, Gregoris Patsalosavvis reflected on the conversation with a note of concern and urgency. He remarked that while the presentations from the European guests had been interesting and informative, many of the initiatives and developments discussed do not reach local practitioners in Cyprus.

"There are a lot of things going on at the European level", he said, "which we don't know about. They don't reach us. We don't know about the research". He emphasized the need to create mechanisms to ensure that local professionals are exposed to what is happening in Europe. "I think we are neglected. Somebody has to wake us up – we are sleeping".

Patsalosavvis agreed with earlier speakers on the importance of education and the development of skills for students, noting, "Education is very important, I agree with what you all said on all these topics". He reflected personally on his early experiences in architectural education: "I remember reading for the first time, and learning to draw. I was a bit scared because I had to wear appropriate trousers and fix my shoes and all these things". Though the profession has changed, he believes architectural education today lacks broad knowledge. "The topics are very interesting", he said, "but the schools and the programmes lack broad knowledge".

Response – Ruth Schagemann (ACE)

Ruth Schagemann responded by underscoring the need for practitioners to be more integrated into the development of funding calls and research programs, particularly those oriented toward real-world projects. She stressed the importance of practice-based research – research that emerges from and supports the existing built environment.

This, she argued, would allow research ideas to translate into actual projects or components of real projects, closing the gap between theory and application.

Comment – Audience Member

A participant from the audience added to the discussion by emphasizing that the relationship between the market and academia should begin early in a student's education, ideally during undergraduate (bachelor's) studies. Students should engage with practice from the start, working alongside practitioners to see how the field functions in real-world contexts. The speaker noted that architectural education is more than a career choice: "They do not merely study this. They choose a way of life… it's something you live". The speaker also proposed that small firms be required, through competition regulations, to include at least two students in international design competitions. This, they suggested, would allow students to become actively involved in professional environments and experience competitions – which inherently involve research-oriented processes – as a platform for connecting education and practice.

Response – Christos Christodoulou (Moderator)

Christodoulou responded to the idea, suggesting that such involvement could be formalized within the academic year and even regulated. He acknowledged that while architectural academia often aspires toward idealistic goals, in practice, real-world constraints must be taken into account. Referencing Oya Atalay Franck's earlier observation that most design studios in Switzerland are taught by practitioners, he asked how many similar cases exist in Cyprus. "We should consider this also", he said. "In Cyprus, how many studios do we have where only practitioners teach?". For Christodoulou, the issue went beyond relationships: "It's much wider than that; it's a question of culture".

Response – Alessandra Swiny (University of Nicosia)

Alessandra Swiny then pointed out a key mechanism that had not yet been addressed in the discussion: curriculum design, particularly in the context of the second and third discussion topics. She praised the Erasmus and Erasmus+ programmes, crediting them with transforming interdisciplinary communication and collaboration across Europe. "It's just completely exploded the relationships in Europe", she said, contrasting this with the situation in the United States, where the same level of institutional connectivity does not exist if one is not working within academia. Swiny suggested that a similar framework could be developed for professional practices, not just universities. This could create a European network for practices, enabling collaboration beyond academia and into the professional realm.

Response – Oya Atalay Franck (EAAE)

Oya Atalay Franck returned to the discussion to address the real pressures faced by small offices, typically composed of one to five people. She acknowledged that every hour spent on research is an hour not paid. Small firms face constant pressure from clients, deadlines, and daily operational issues, which push research priorities aside.

She questioned why no funding mechanisms currently exist to support these efforts: "Who has to pay for it? Do we need to free public money for it?". She also raised the issue of institutional responsibility, asking why chambers or schools are not in a position to provide such funding – whether to pay for extra hours or to compensate practitioners for their time.

Atalay Franck noted that while the lack of support is a longstanding issue, many project outputs and research reports are available as open access resources. "It's in your hand", she said. "You have all the reports and it's an invitation to make use of the results in your own practice".

She concluded by highlighting the broader systemic problem of limited investment in research outside of large industries. "It's a question of shifting this kind of knowledge into your daily life", she said. "How could we get [small firms] into the fold, to stitch everything together?".

Audience Discussion: Key Themes and Reflections

During the open floor session, participants raised a number of important reflections that expanded the discussion beyond the invited speakers. A central concern that emerged was the structural limitations of architectural education. One audience member emphasized that architectural programs are expected to deliver an overwhelming volume of content, spanning both practical and theoretical domains. The result, they argued, is a curriculum over-

loaded with expectations, leaving little time to focus on essential research skills. Students are often sent into practice without proficiency in technical drawing, software, or construction knowledge, while simultaneously lacking training in research methods and critical inquiry. This, the speaker suggested, stems from a mistaken belief that five years of architectural education should produce fully formed professionals. They proposed that universities should instead focus on cultivating curiosity and the ability to ask foundational questions – skills more in line with academic training – while professional development should continue through structured training after graduation, as is the case in other disciplines.

Another recurring theme was the potential of architectural competitions as a bridging mechanism between academia and practice. One contributor proposed that students, educators, and practitioners could collaborate through competitions, which naturally combine research, design, and real-world constraints. They suggested that requirements be introduced – particularly for international competitions – that compel small offices to include students on their teams. This would expose students to live projects and enhance their understanding of the profession, while also making competitions more inclusive and pedagogically valuable.

The role of practitioners in academia was also highlighted as an essential pathway for knowledge transfer. One audience member pointed out that teaching in universities provides practitioners with a means of staying up to date in a rapidly evolving field. If small offices feel disconnected from current research, they argued, participating in academic studios allows them to remain engaged and bring valuable insight back into their own practices. This point was reinforced by another speaker, who noted that architecture is an industry characterized by fast-paced innovation – especially in sustainability and zero-emission technologies. Without parallel involvement in practice, academic teaching risks becoming detached from the real challenges facing the built environment. In some countries, such as Italy, regulations prevent academics from practicing, which was seen as a serious limitation. In contrast, in Norway, where this dual role is encouraged, professors are expected to remain professionally active precisely because of these rapid developments.

Several participants stressed the importance of building structured relationships between academia and practice. Consultancy was raised as one possible form of collaboration. Given the limited time and resources available to small offices, it was suggested that they could benefit from engaging with existing academic research, rather than initiating their own. Universities, in this view, could serve as sources of applied knowledge, offering insights and expertise to support practice. Communication challenges were another major concern. Nadia Charalambous acknowledged the difficulty of conveying research findings beyond academic settings. Research is often complex, and simplifying it in ways that make it useful or impactful for practitioners and policymakers is not easy. Nevertheless, she stressed the importance of investing in this process – what she described as building a "chain of knowledge" – linking stakeholders and improving awareness across sectors.

The discussion also turned to the structure of professional training following graduation. Gregoris Patsalosavvis raised the issue of post-educational development, noting that the current model in Cyprus – where a graduate works for a year before being signed off by an employer – is insufficient. Drawing on his own experience completing the RIBA Part 3 in the UK, he argued for a more formalized and structured training system overseen by a professional body such as ETEK, and developed in partnership with universities. Christos Christodoulou added that what matters is not the duration of post-graduate practice, but whether it is structured. A 12-month structured experience, he said, could be more valuable than three years without clear objectives or evaluation criteria.

This led to a broader debate about the purpose of architectural education. Christodoulou questioned whether universities are meant to produce professionals ready to enter practice immediately, or "architectural thinkers" equipped to grow and adapt over time. He argued

that some skills can be learned after graduation, and cautioned against reducing education to technical training. This point was echoed by another participant, who argued that the profession often expects academia to deliver graduates fully prepared for office work, which is both unrealistic and counterproductive. Instead, practice must take on part of the responsibility for continued training.

Finally, the conversation returned to the potential of universities to act as initiators of research in collaboration with small-scale practices. One guest praised the openness and curiosity of the students at the host university, noting how important it is for both students and faculty to gain real-world experience. Alkis Dikaios suggested that universities could play a more active role by offering funding to small practices to carry out specific research projects. If funding were made available, he argued, small firms would welcome the opportunity, as it would allow them to expand their teams, engage with research, and ultimately improve the quality of their work. In this way, universities could become catalysts for applied research and innovation, aligning with the principles of initiatives such as the New European Bauhaus.

Concluding Reflections

As the roundtable drew to a close, Nadia Charalambous invited final reflections from the three keynote speakers – Oya Atalay Franck, Dubravko Bačić, and Ruth Schagemann – to offer their thoughts on the rich and wide-ranging discussion.

Oya Atalay Franck began by expressing her wish that such a conversation could take place in the Chamber of Architects, with practitioners, students, and colleagues sitting side by side. She emphasized the need to go beyond internal academic discourse and ensure that such dialogues are shared more broadly. She acknowledged the diversity of cultures within schools and professional practices across Europe. Even though European directives outline common skill sets and curricular frameworks, the ways in which these are taught and interpreted vary significantly between institutions. A school, she noted, provides not only mindset, method, and craft, but also a sensibility toward the quality of the built environment. Rather than aiming to define a fixed set of skills that make a good architect, she argued that education should focus on giving students an inner compass – a sense of curiosity, criticality, and self-confidence to ask not just *what is right or wrong*, but *how can it be done better*.

Atalay Franck stressed the importance of collaboration and negotiation, acknowledging that architecture has become too complex to navigate alone. She shared that her institution is considering curriculum reform to support part-time teaching and learning, allowing students to work while studying – an economic necessity for many. While this was once resisted in favor of full-time academic immersion, changing conditions demand more flexible models of education. She concluded by reaffirming the importance of maintaining quality while exploring new systems, and expressed appreciation for the discussion: "This was very exciting for me – I learned a lot".

Dubravko Bačić echoed the view that not everything can be learned in school, and pointed out that different schools have different cultures, traditions, and contexts, which must be respected. Education, he argued, must strike a balance between foundational knowledge and the capacity to adapt and grow, a balance that is necessarily dynamic and always in flux – hence why education is always under reform. He shared a personal anecdote from a recent visit to Christos Christodoulou's office, where he saw three young architects working on a competition. On their desk was a book by Charles Baudelaire, something he found surprising and moving. He reflected on how architectural culture, once built around bookstores and reading, is evolving in a time when such habits are in decline. Yet moments like this

affirm the continued intellectual engagement of younger generations, even amid broader societal changes.

Ruth Schagemann offered three succinct reflections. First, she emphasized that research and practice must work together, particularly given the urgent challenges facing the built environment. This collaboration must be interdisciplinary, involving connections across architecture, urban planning, and beyond. Architecture, she stressed, is not just a professional field but a relevant topic for research and innovation, and it should be recognized as such in funding and policy priorities. Second, she called for a sharper focus on identifying the key problems we face today – social, environmental, spatial – and working collectively to develop targeted solutions. Third, she underscored her strong belief in collaborative innovation between universities and practices. Only through this alliance, she argued, can we begin to develop meaningful responses to pressing issues such as urban inequality, sustainability, and the transformation of our living environments. "I think we are finding solutions", she concluded, "and we need to continue doing so – together".

In closing, Nadia Charalambous thanked the speakers and participants, and reaffirmed the intention to disseminate the outcomes of the discussion. "I hope that it doesn't stay in the room", she said, acknowledging the value of the exchange. She offered thanks to Christos Christodoulou and Alkis Dikaios for moderating the session, and to all who contributed to the conversation.

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