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Livable Cities: A Conference on Issues Affecting Life in Cities

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INTRODUCTION

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What makes a city livable? Transport, housing, health. Open space, mobility and the environment. Matters of culture, entrepreneurship, crime and safety. Affordability and access to education. Depending on whose 'livability index' you look at, it may include design quality, sustainability and the digital infrastructures of the smart city. Other criteria applied may encompass food access, job opportunities or walkability. Inclusivity and the politics of participation also come into play. Discrimination in all its forms impacts livability and social and political equity.

The past two decades have seen an exponential rise of livability measures. Reflecting increased urbanity globally, they risk making the notion of the city ever more contested. The two cities that host this event are cases in point. The Mercer Livability Ranking takes New York as the datum by which all other cities globally are graded – as better or worse. London, by contrast, measures itself: the London Assembly scoring everything from air quality to indices of deprivation. When we consider the livability of cities then, it is clear we are dealing with a plethora of issues – both isolated and, inevitably, interconnected.

Responding to this scenario, the papers in this publication tackle these issues above from various angles. They examine how we live in cities, and how every issue we encounter morphs with considerations of others, whether housing, architecture, urban planning, health, IT, crime and safety, city management, economics or the environment.

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TRANSIT-ORIENTED DEVELOPMENTS TOWARDS A LIVABLE CITY

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INTRODUCTION

The transit-oriented development (TOD) model has been adopted by many communities to improve their urban form. By reducing reliance on cars, TOD decreases air pollution and environmental harm. This creates more opportunities and efficient use of space for all citizens, regardless of income level. These factors contribute to the overall livability and attractiveness of cities. TOD encourages the use of public transit and encourages residents to live nearby, leading to a compact and walkable city. This provides greater access to services, amenities, and employment opportunities, making cities more vibrant. This paper explores the ways in which TOD can improve the livability of cities. The aim of this study was to identify and analyze various components of TOD and livability through a qualitative approach, including meta-analysis, comparative analysis of TOD principles and livability, and literature review of TOD, sustainability, and livability. Additionally, this paper seeks to understand how TOD can be implemented to make cities more livable.[1]

The comparative analysis of Livability and Transit-Oriented Development (TOD) sought to evaluate their respective efficacies in fostering sustainable transportation systems. Livability places emphasis on walkability, bike-ability, and transit utilization, while TOD focuses on establishing vibrant urban hubs around transit stations, thereby promoting public transportation use. Both paradigms share the overarching goal of cultivating more sustainable cities. The Livability index serves as a comprehensive metric gauging the suitability of a locale for habitation. It incorporates various factors such as safety, healthcare, education, transportation, and other amenities, providing a multifaceted evaluation of the overall quality of life within a given geographic context.

Conversely, the Transit-Oriented Development index quantitatively assesses how well a city's development aligns with the imperative of promoting public transportation. It considers factors such as the density and distribution of transit stops, service quality, and the availability of amenities near transit nodes. These components collectively contribute to a nuanced analysis of a city's commitment to fostering sustainable urban mobility.

The close interrelation between the Livability and Transit-Oriented Development indices is evident, as cities with robust public transportation systems tend to be more livable. Furthermore, such cities often boast additional amenities, including shops and restaurants, near transit stops, enhancing their appeal to potential residents. The presence of efficient public transportation is indicative of a city's livability, streamlining access to essential services. Additionally, the attractiveness of cities with good public transportation is underscored by the convenience of amenities near transit stops, rendering them more walkable and desirable places of residence.

METHODS

To address the knowledge gaps in the literature, this paper conducted a comparative-analysis to examine various aspects of the TOD model and livability. The analysis was performed to identify the similarities and differences of TOD principles and livability elements. in addition, literature review on TOD, sustainability, and livability was conducted. High-quality data sources were analyzed, and findings were integrated to gain a more comprehensive and systematic understanding of their determinants. The comparison of TOD and livability helped in better understanding how they overlap and contrast. By incorporating TOD and livability benefits into urban and transportation policies, urban planners and decision-makers can formulate more effective urban and transport policies. As a result, gaps in the existing literature were identified, and opportunities for future research providing valuable insight for urban planners and decision-makers.

In the review, various literature related to livability theories, TOD in both international and local contexts, and the connection between the TOD model and livability was examined. The review considered published research that highlights urban planners and designers' role in creating an approach that integrates transportation and land use with livability. Additionally, published work on the history, current state, and future development of TOD was considered. Figure 1 illustrates the theoretical approach.

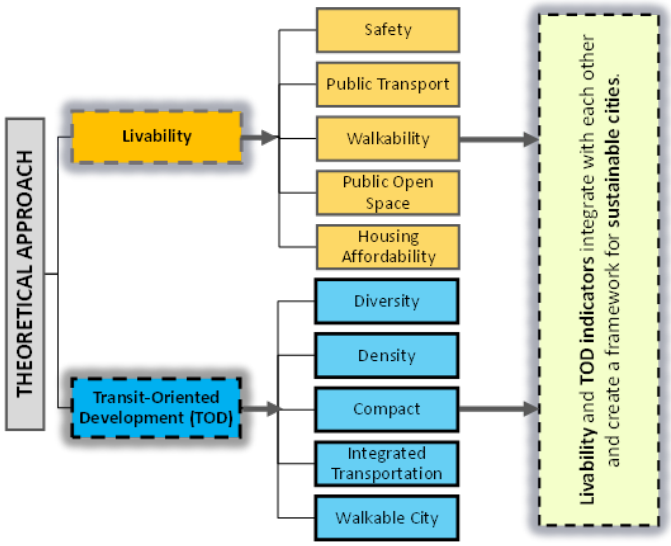

Figure 1. Representation of the theoretical framework of the research

TOD Model

TOD is a tool to enhance the city's urban fabric and increase the usage of public transport. TOD aims to promote urban development near the transit nodes, integrate the land use and transport system, and improve compact urban development. In 1990, Peter Calthorp developed the TOD phrase, which was widely used in The Next American Metropolis book[2]. Calthrop's defined TOD as "a mixed-use development close to a central public transportation stop, which is approximately 10-15 minutes' walk or cycle ride away. In TOD, the densest areas are typically located within a radius of 1⁄4 to 1⁄2 miles (400 to 800 meters) around the central transit stop, as this scale is considered optimal for pedestrians, solving the last mile issue.[3]

TOD is a planning strategy that emphasizes the integration of land use and transportation to create compact, mixed-use communities centered around public transportation hubs. The primary goal of

TOD is to encourage people to use public transportation, reducing reliance on private vehicles and promoting sustainability.[4] Figure 2 illustrates the TOD model.

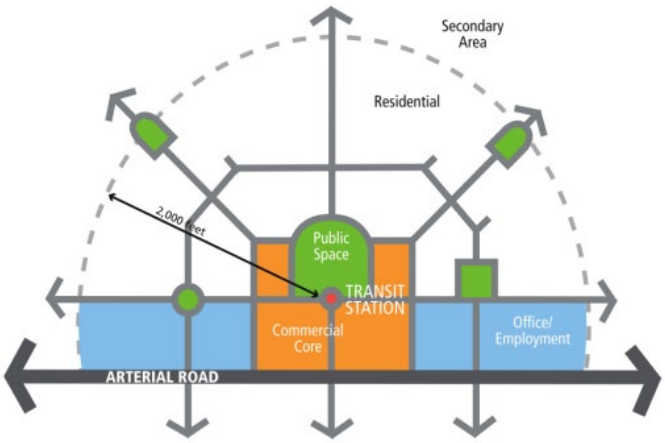

Figure 2. TOD Model.[5]

Scale of TOD

The scale of TOD ranges from regional/city level, corridor level, station area level, and site level. Each level has its own unique challenges and opportunities, from planning to development. Regional TOD focuses on developing larger, interconnected networks that support sustainable transportation. Corridor TOD involves the redevelopment of a single corridor while station area TOD typically focuses on the development of a single station. Site-level TOD encompasses the development of individual sites within a station area. Regional TOD is the development of a region adjacent to a transit station. This includes TOD at residential and commercial uses, as well as public spaces. Station area TOD involves the development of an entire station area, typically within a two-mile radius of a transit station. This includes public spaces, pedestrian amenities, and public transportation. Corridor-level TOD is the development of a corridor along a transit line. This includes the development of transit-oriented housing, commercial uses, public spaces, and other amenities to facilitate the efficient movement of people and goods in the corridor.[6]

It is imperative to understand how TOD can be implemented at each level and integrated into the existing urban fabric. TOD can also provide an opportunity to create a more livable and sustainable environment. By understanding how to implement TOD at each level, it can be used to create a more livable and sustainable environment that can be integrated into the existing urban fabric. Therefore, it is important to recognize the importance of TOD implementation across all scales—from the local level to the regional level—to create a more livable and sustainable environment. Overall, it is essential to take into account the importance of TOD implementation across all scales in order to create a more livable and sustainable environment.[7]

Type of TOD

New TOD

New TOD focuses on mixed-use developments where residential, commercial, and retail spaces are combined. This approach encourages the creation of vibrant, pedestrian-friendly neighborhoods that are connected to public transportation and other amenities.

High-density TOD

High-density TOD focuses on new high-quality public transportation services provided in high-density and diverse areas. It provides a walkable environment close to public transportation. This creates a more vibrant and healthy community with better access to services, amenities, and job opportunities. Additionally, it can reduce traffic congestion, as people rely less on cars for transportation.

Low-density TOD

In low-density TOD, new public transportation services are centered around suburban style neighborhoods. This type of development can be beneficial for both the environment and the economy by reducing greenhouse gas emissions and creating more jobs. It can also help to improve public health through increased physical activity and improved access to healthy foods.[8] Figure 3 illustrates the different types of TOD.

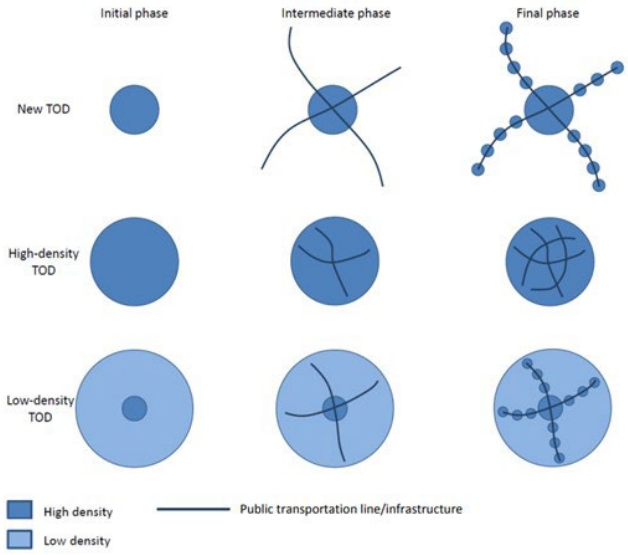

Figure 3. Type of TOD

TYPE OF TOD NODE

Single-node TOD

This TOD node is composed of a single neighbourhood centered around heavy rail stations, which can be situated in either urban or suburban areas (figure 4). The development occurs in a circular pattern, with the train station serving as its center point. The distance of this circular development varies depending on the location, with a radius of 0.5 km to allow for pedestrian access and 2-3 km in where bicycle access is more prevalent.[9]

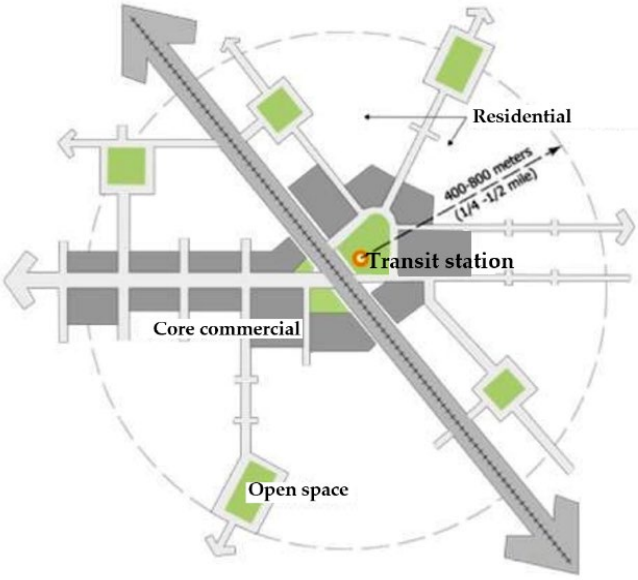

Figure 4. Single-node TOD.[10]

Multi-node TOD

In this type of TOD, the nodes are spread out across a regional area around heavy rail stations, similar to the single-node TOD (figure 5). There are two types of nodes: circular and semicircular. There is a typical "beads in a string" pattern to the placement of TOD nodes. Urban regions are realigned around rail transport instead of cars under this type of TOD.[11]

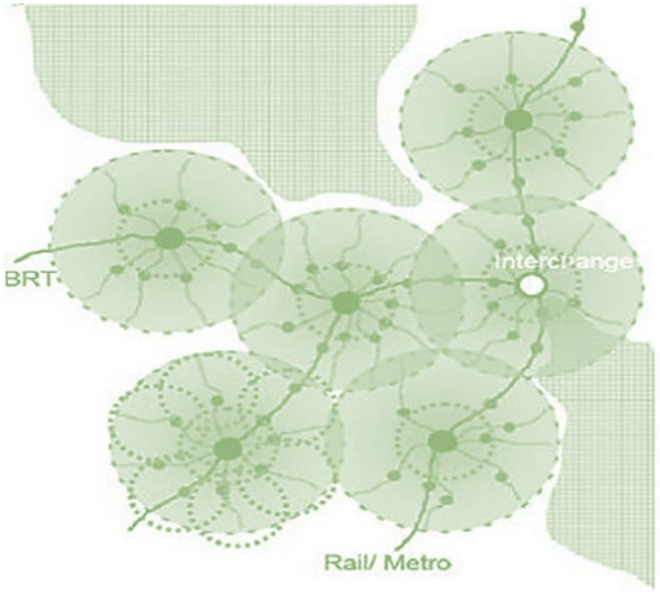

Figure 5. Multi-node TOD

Corridor TOD

The type typically occurs in urban areas and is based around light rail or Bus Rapid Transit (BRT) stops. As a result of the proximity of the nodes (such as tram stops), the development pattern is linear or ribbon-like along the transit line. A TOD corridor can be applied to existing urban areas as well as urban expansion plans. Figure 6 illustrates the corridor TOD.

Additionally, the hub should be located within a 400-meter walk of residents, or within a 10-minute walk from their homes. Its central location emphasizes the importance of transit in the community and in the entire region. An urban transportation development includes both commercial and residential components, as well as non-automotive mobility options, such as walking and biking. From a transit station, a TOD area could be as close as 0.5 miles or as far away as 1 mile.[12]

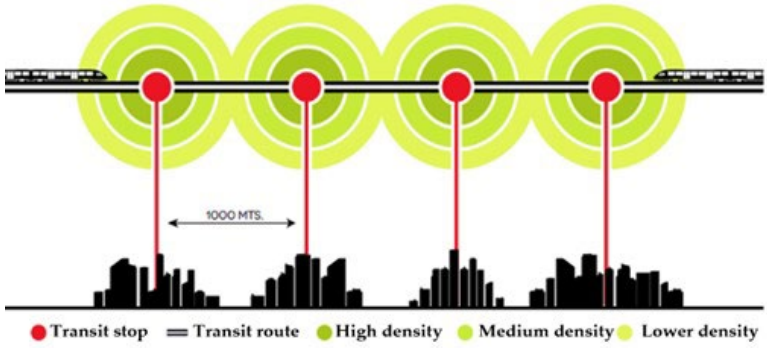

Figure 6. Corridor TOD

TOD and Livability

TOD and livability are two concepts that play a significant role in urban planning and design. While both aim to create sustainable and vibrant communities, they differ in their approach and focus. This document will compare TOD and livability, highlighting their key features, advantages, and potential challenges. While livability refers to the quality of life in a community, including factors such as access to amenities, public spaces, affordability, and social equity. It focuses on creating neighborhoods that are attractive, safe, and inclusive.[13]

The key Features of TOD are: (a) Proximity to Transit: TOD are located within walking distance of transit stations, making it convenient for residents to access public transportation; (b) Mixed-Use Development: TOD combine residential, commercial, and recreational spaces in close proximity. This encourages a diverse range of activities and fosters a sense of community; and (c) Pedestrian-Friendly Design: TOD prioritize pedestrians by ensuring well-designed sidewalks, crosswalks, and bicycle lanes. This promotes active transportation and reduces reliance on cars.[14]

The key Features of livability are: (a) Access to Amenities: Livable communities provide easy access to essential amenities like grocery stores, healthcare facilities, parks, and recreational spaces; (b) Safety and Security: Livable communities prioritize safety measures such as well-lit streets, adequate infrastructure, and community policing to create a secure environment; and (c) Social Equity: Livability emphasizes the provision of affordable housing and equitable access to amenities and services for people of all income levels, ages, and abilities.[15] The table below summarizes the differences between TOD and Livability.

	TOD	Livability
1	TOD index is a measure of how well a city's development is focused on encouraging the use of public transportation.	Livability index is a measure of how suitable a place is for living.
2	Consider the number of transits stop, the quality of service, and the availability of amenities near transit stops	Consider factors such as safety, healthcare, education, transportation, and other amenities.
3	Focuses on creating vibrant urban centers around transit hubs to encourage people to use public transportation.	Emphasizes walkability, bike-riding, transit use, and other forms of sustainable transportation to create a more efficient transportation system.
	Both concepts are geared towards creating more sustainable cities.	

Table 1. Comparison between TOD and liveability index

A car-centric city is inconsistent with a livable city aimed at reducing climate change impacts. Integrated streets are an effective alternative to car-centric cities. It is safer and promotes active travel and public transportation. A more vibrant city will be created as a result of improving mobility and air quality (figure 7).

Figure 7. Non-TOD = Toxic city, TOD = Liveable City

Both TOD and livability indicators are closely related through: (a) A city with good public transportation is generally more livable than one without; (b) Public transportation is a good indicator of how livable a city is; (c) Cities with good public transportation are more attractive to potential residents; and (d) More amenities located near transit stops, walkable and desirable places to live.[16]

Benefits of integrating TOD and livability index

The integration of TOD with a livability index brings numerous benefits to communities and cities. By combining these two concepts, urban areas can achieve a more sustainable and equitable future, enhancing the quality of life for residents, which can lead to (a) Reduce traffic congestion and improve air quality; (b) Reduce the cost of transportation; (c) Create more vibrant and livable communities; and (d) Increase access to jobs and services.[17]

CURITIBA IMPLEMNTATION OF TOD PRINCIPLES

Curitiba, the capital of Paraná in Brazil, is renowned for its innovative and efficient public transit system. The city's transportation model, known as the Bus Rapid Transit (BRT) system, was designed by urban planner Jaime Lerner and his team in the early 1970s. The success of Curitiba's public transit system has served as a model for other cities around the world. The introduction of the Bus Rapid Transit (BRT) system, known as the "direct line" bus system, revolutionized public transit. The BRT features dedicated lanes, elevated boarding platforms, and streamlined routes, enhancing efficiency and making public transportation in Curitiba a model for sustainable urban mobility.[18] Figure 8 show Curitiba first structural axis (1970) and the red express bus (1974).

Figure 8. Curitiba First Structural Axis (1970), Red Express Bus (1974), and original walkways ran with bus lanes and separate car lanes on Structural Axes.[19]

Here are some key elements of how Curitiba's planners designed its public transit system: (a) Integrated Planning: The development of Curitiba's transit system was part of a comprehensive urban planning approach. The city's leaders recognized the importance of integrating transportation planning with land use planning and other urban development initiatives; (b) BRT System: The core of Curitiba's public transit system is the BRT, which uses a network of dedicated bus lanes to ensure fast and efficient transit. The BRT system features exclusive lanes, elevated boarding platforms, and pre-paid boarding to minimize delays and speed up the boarding process; (c) Land Use and Zoning: The city implemented zoning regulations that encouraged higher population density along the main transit corridors. This helped create a more transit-oriented development, making it easier for residents to access public transportation; (d) Feeder Routes: Curitiba's BRT system includes feeder routes that bring passengers from outlying areas to the main transit corridors. This reduces the need for private vehicle travel to the city center and enhances the efficiency of the overall transit network; and (e) Urban Design and Public Spaces: The city prioritized pedestrians and public spaces in its urban design. This included creating wide pedestrian walkways, parks, and plazas that contribute to a more livable and sustainable urban environment.[20]

Figure 9. Curitiba conventional bus system and direct line bus system.[21]

Curitiba's planners seamlessly integrated social and environmental considerations into transit system design. They introduced a competitive framework by involving private companies in bus operations, elevating service quality. The city prioritized affordability and accessibility, offering a single, low fare within the Bus Rapid Transit (BRT) system, catering to diverse socioeconomic groups. Community engagement played a crucial role, fostering support for transit initiatives and ensuring the system aligned with residents' needs. This contributed significantly to Curitiba's public transit success. Curitiba's approach to urban planning and public transportation has been influential globally. It has inspired other cities to adopt similar strategies to address traffic congestion, improve sustainability, and enhance overall quality of life.[22]

QATAR VISION TOWARD TOD

As a result of the rapid population growth and strong economic expansion witnessed in the country over the past few years. Qatar recognizes the importance of developing of transportation infrastructure to support its various economic. The implementation of the Doha metro provided an opportunity to adopt an inclusive TOD approach. Urban developers can utilize TOD to encourage the use of Doha's metro and more transit options by integrating land use and transportation.[23] The Doha Metro provides a modern transport network linking the most important destinations in the city of Doha and its suburbs[24]. Most parts of the network are located underground. It is part of the transportation master plan, which is one of the pillars supporting the realization of Qatar National Vision 2030.[25]

Qatar Road Hierarchy

According to Qatar's National Development Framework (QNDF), a well-integrated public transit services will make transportation safer, more efficient, and more convenient. This will reduce the number of cars on the road, helping to reduce traffic congestion and air pollution.[26] Figure 10 illustrates Qatar road hierarchy.

Figure 10. Qatar road hierarchy.[27]

TOD DESIGN GUIDELINES

Cohesive transport system and pedestrian-friendly design

A well-connected network of transportation modes that work together harmoniously involves the integration of public transportation, such as buses, trains, and trams, with private modes like cars, bicycles, and motorcycles. By ensuring easy interconnectivity between these modes, a cohesive transport system offers commuters multiple options to choose from, promoting convenience and reducing traffic congestion.

In addition to establishing a cohesive transport system, it is imperative to priorities pedestrian needs within urban environments. The pedestrian-friendly design considers land uses integration to create walkable neighborhoods. By providing a mix of residential, commercial, and recreational facilities within proximity, people are more likely to choose walking as their preferred mode of transportation.

CONCLUSION

TOD and livability are complementary approaches to urban planning that aim to create sustainable and vibrant communities. While TOD focuses on integrating land use and transportation to reduce private vehicle use, livability emphasizes overall quality of life, social equity, and community well-being. By understanding the key features, advantages, and challenges of both concepts, planners can work towards creating cities that are not only efficient and accessible but also enjoyable and inclusive for all residents.[28]

The research seeks to understand how TOD can be implemented to design more livable cities through (a) Integrating TOD models with livability indicators; (b) Creating an integrated transport system and land use; (c) Creating connected cycling paths; (d) Enhancing mixed land uses with attractive public spaces; and (e) Promoting the identity and sense of place. In conclusion, the integration of TOD and a livability index offers numerous benefits to communities and cities. By combining compact, walkable neighborhoods with quality of life, cities can achieve sustainable and equitable development. Enhanced mobility, improved public health, reduced environmental impact, increased affordability, and vibrant and inclusive communities are just some of the advantages of this integration. As cities strive to create more livable and sustainable environments, the integration of TOD and a livability index becomes an essential strategy for future urban planning.

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NOTES

[1] Albandari Al-Harami and Raffaello Furlan. "Qatar National Museum-Transit Oriented Development: The Masterplan for the Urban Regeneration of a 'Green TOD'." *Journal of Urban Management* 9, no. 1 (2020): 115-136.
[2] Peter Calthorpe. *The Next American Metropolis: Ecology, Community, and the American Dream.* New York: Princeton Architectural Press, 1993.
[3] Khaled Alawadi. 2017. "Rethinking Dubai's urbanism: Generating sustainable form-based urban design strategies for an integrated neighborhood." Cities 60: 353-366.
[4] Fahad E. Al-Thawadi, Yohannes W. Weldu, and Saud G. Al-Ghamdi. Sustainable Urban Transportation Approaches: Life-Cycle Assessment Perspective of Passenger Transport Modes in Qatar. 2020. Transportation Research Procedia, 48: p. 2056-2062
[5] Calthorpe. *The Next American Metropolis*
[6] Quentin Lamour, Adriano M. Morelli, and Karin R. de C. Marins. "Improving walkability in a TOD context: Spatial strategies that enhance walking in the Belém neighbourhood, in São Paulo, Brazil." 2019. 7(2): p. 280-292.
[7] Sara M. Ibrahim, Hany M. Ayad, Eslam A. Turki, and Dina M. Saadallah. "Measuring Transit-Oriented Development (TOD) levels: Prioritize potential areas for TOD in Alexandria, Egypt using GIS-Spatial Multi-Criteria based model." 2023. 67: p. 241-255.
[8] Jen-Jia Lin, Tzu-Yun Lin, Bhadradri Raghuram Kadali, and Saladi S. V. Subbarao. "Zone-based TOD evaluation considering interdependences among criteria and zones." 2023. 133: p. 108-119.
[9] Sat Pal. "Measuring Transit Oriented Development of Existing Urban Areas around Metro Stations in Faridabad City." 2018. 5(1): p. 115-126.
[10] Calthorpe. *The Next American Metropolis*
[11] Anvar Mukhamedjanov, Tetsuo Kidokoro, Fumihiko Seta, and Yi Yang. "Reshaping the concept of transit-oriented development in response to public space overheating near the transit nodes of Tokyo." 2021. 116: p. 103240.
[12] Liwen Liu, Ming Zhang, and Tao Xu. "A conceptual framework and implementation tool for land use planning for corridor transit-oriented development." 2020. 107: p. 102939.
[13] Raffaello Furlan, Attilio Petruccioli, Mark David Major, Sara Zaina, Samar Zaina, Mahmoud Al Saeed, and Dina Saleh. "The urban regeneration of west-bay, business district of Doha (State of Qatar): A transit-oriented development enhancing livability." 2019. 8(1): p. 126-144.
[14] Sara Nafi, Raffaello Furlan, Michael Grosvald, Rashid Al-Matwi, and Khalida Lifam Marthya. "Transit-Oriented Development in Doha: The Case of the Al Sadd Neighborhood and Hamad Hospital Metro Station." 2021. 5(4).
[15] Chong-Wen Chen. "Can smart cities bring happiness to promote sustainable development? Contexts and clues of subjective well-being and urban livability." 2023. 13: p. 100108.
[16] Barbara T. H. Yen, Cheng-Min Feng, and Tsai-Chen Lee. "Transit-oriented development strategy in Taiwan: An application of land value capture." 2023. 9: p. 100094.
[17] Shishir Mathur and Aaron Gatdula. "Review of planning, land use, and zoning barriers to the construction of Transit-oriented developments in the United States." 2023. 12: p. 100988.
[18] Olga Mara Prestes, Clóvis Ultramari, and Fernando Domingues Caetano. "Public transport innovation and transfer of BRT ideas: Curitiba, Brazil as a reference model." 2022. 10(1): p. 700-709.
[19] Prestes, et al. *"Public transport innovation and transfer of BRT ideas".*
[20] Fábio Duarte and Fernando Rojas. "Intermodal Connectivity to BRT: A Comparative Analysis of Bogotá and Curitiba." 2012. 15(2): p. 1-18.
[21] Prestes, et al. *"Public transport innovation and transfer of BRT ideas".*
[22] Iran J. C. Lopes, Daniela Biondi, Ana P. D. Corte, Allan R. N. Reis, and Thiago G. S. Oliveira. "A methodological framework to create an urban greenway network promoting avian connectivity: A case study of Curitiba City." 2023. 87: p. 128050.
[23] Florian Wiedmann, Velina Mirincheva, and Ashraf M. Salama. 2013. "Urban Reconfiguration and Revitalisation: Public Mega Projects in Doha's Historic Centre." Open House International 38 (4): 27-36.
[24] Djamel Boussaa, Deema Alattar, and Sara Nafi. "The search for identity in a global world: The case of Doha in Qatar." 2021. 14(3): p. 295-311.
[25] Heba O. Tannous, Raffaello Furlan, Mark David Major. Souq Waqif Neighborhood as a Transit-Oriented Development. 2020. 146(4).
[26] The Ministry of Municipality, Environment. "Qatar National Development Framework 2032." 2016 [cited 2022 August]; Available from: https://www.mme.gov.qa/QatarMasterPlan/English/QNDF.aspx?panel=qndf.

[27] Environment. "Qatar National Development Framework 2032."
[28] Hongwei Dong. "Evaluating the impacts of transit-oriented developments (TODs) on household transportation expenditures in California." 2021. 90: p. 102946.

BIBLIOGRAPHY

Al-Harami, Albandari, and Raffaello Furlan. "Qatar National Museum-Transit Oriented Development: The Masterplan for the Urban Regeneration of a 'Green Tod'." Journal of Urban Management 9, no. 1 (2020/03/01/ 2020): 115-36. https://doi.org/https://doi.org/10.1016/j.jum.2019.09.003.

Al-Thawadi, Fatima E., Yemane W. Weldu, and Sami G. Al-Ghamdi. "Sustainable Urban Transportation Approaches: Life-Cycle Assessment Perspective of Passenger Transport Modes in Qatar." Transportation Research Procedia 48 (2020/01/01/ 2020): 2056-62. https://doi.org/https://doi.org/10.1016/j.trpro.2020.08.265.

Alawadi, Khaled. "Rethinking Dubai's Urbanism: Generating Sustainable Form-Based Urban Design Strategies for an Integrated Neighborhood." Cities 60 (2017/02/01/ 2017): 353-66. https://doi.org/https://doi.org/10.1016/j.cities.2016.10.012.

Alawadi, Khaled, Asim Khanal, Azhar Doudin, and Rahma Abdelghani. "Revisiting Transit-Oriented Development: Alleys as Critical Walking Infrastructure." Transport Policy 100 (2021/01/01/ 2021): 187-202. https://doi.org/https://doi.org/10.1016/j.tranpol.2020.11.007.

Amerio, Michele. "Doha Metro Project: 3ti Lesson Learned." Transportation Research Procedia 45 (2020/01/01/ 2020): 866-73. https://doi.org/https://doi.org/10.1016/j.trpro.2020.02.082.

Boussaa, Djamel, Deema Alattar, and Sara Nafi. "The Search for Identity in a Global World: The Case of Doha in Qatar." Journal of Urban Regeneration & Renewal 14, no. 3 (// 2021): 295-311.

Calthorpe, P. The Next American Metropolis: Ecology, Community, and the American Dream. New York: Princeton Architectural Press. Edited by 10003. Vol. 1, Canada: Princeton Architectural Press, 1993.

Chen, Chong-Wen. "Can Smart Cities Bring Happiness to Promote Sustainable Development? Contexts and Clues of Subjective Well-Being and Urban Livability." Developments in the Built Environment 13 (2023/03/01/ 2023): 100108. https://doi.org/https://doi.org/10.1016/j.dibe.2022.100108.

Dong, Hongwei. "Evaluating the Impacts of Transit-Oriented Developments (Tods) on Household Transportation Expenditures in California." Journal of Transport Geography 90 (2021/01/01/ 2021): 102946. https://doi.org/https://doi.org/10.1016/j.jtrangeo.2020.102946.

Duarte, Fábio, and Fernando Rojas. "Intermodal Connectivity to Brt: A Comparative Analysis of Bogotá and Curitiba." Journal of Public Transportation 15, no. 2 (2012/04/01/ 2012): 1-18. https://doi.org/https://doi.org/10.5038/2375-0901.15.2.1.

Furlan, Raffaello, Attilio Petruccioli, Mark David Major, Sara Zaina, Samar Zaina, Mahmoud Al Saeed, and Dina Saleh. "The Urban Regeneration of West-Bay, Business District of Doha (State of Qatar): A Transit-Oriented Development Enhancing Livability." Journal of Urban Management 8, no. 1 (2019/04/01/ 2019): 126-44. https://doi.org/https://doi.org/10.1016/j.jum.2018.10.001.

Heba O. Tannous, Raffaello Furlan, Mark David Major. "Souq Waqif Neighborhood as a Transit-Oriented Development." Journal of Urban Planning and Development 146, no. 4 (2020).

Ibrahim, Sara M., Hany M. Ayad, Eslam A. Turki, and Dina M. Saadallah. "Measuring Transit-Oriented Development (Tod) Levels: Prioritize Potential Areas for Tod in Alexandria, Egypt Using Gis-Spatial Multi-Criteria Based Model." Alexandria Engineering Journal 67 (2023/03/15/ 2023): 241-55. https://doi.org/https://doi.org/10.1016/j.aej.2022.12.053.

Lamour, Quentin, Adriano M. Morelli, and Karin R. de C. Marins. "Improving Walkability in a Tod Context: Spatial Strategies That Enhance Walking in the Belém Neighbourhood, in São Paulo, Brazil." Case Studies on Transport Policy 7, no. 2 (2019/06/01/ 2019): 280-92. https://doi.org/https://doi.org/10.1016/j.cstp.2019.03.005.

Lin, Jen-Jia, Tzu-Yun Lin, Bhadradri Raghuram Kadali, and Saladi S. V. Subbarao. "Zone-Based Tod Evaluation Considering Interdependences among Criteria and Zones." Transport Policy 133 (2023/03/01/ 2023): 108-19. https://doi.org/https://doi.org/10.1016/j.tranpol.2023.01.011.

Liu, Liwen, Ming Zhang, and Tao Xu. "A Conceptual Framework and Implementation Tool for Land Use Planning for Corridor Transit Oriented Development." Cities 107 (2020/12/01/ 2020): 102939. https://doi.org/https://doi.org/10.1016/j.cities.2020.102939.

Lopes, Iran J. C., Daniela Biondi, Ana P. D. Corte, Allan R. N. Reis, and Thiago G. S. Oliveira. "A Methodological Framework to Create an Urban Greenway Network Promoting Avian Connectivity: A Case Study of Curitiba City." Urban Forestry & Urban Greening 87 (2023/09/01/ 2023): 128050. https://doi.org/https://doi.org/10.1016/j.ufug.2023.128050.

Mathur, Shishir, and Aaron Gatdula. "Review of Planning, Land Use, and Zoning Barriers to the Construction of Transit-Oriented Developments in the United States." Case Studies on Transport Policy 12 (2023/06/01/ 2023): 100988. https://doi.org/https://doi.org/10.1016/j.cstp.2023.100988.

Mukhamedjanov, Anvar, Tetsuo Kidokoro, Fumihiko Seta, and Yi Yang. "Reshaping the Concept of Transit-Oriented Development in Response to Public Space Overheating near the Transit Nodes of Tokyo." Cities 116 (2021/09/01/ 2021): 103240. https://doi.org/https://doi.org/10.1016/j.cities.2021.103240.

Nafi, Sara, Raffaello Furlan, Michael Grosvald, Rashid Al-Matwi, and Khalida Lifam Marthya. "Transit-Oriented Development in Doha: The Case of the Al Sadd Neighborhood and Hamad Hospital Metro Station." Designs 5, no. 4 (2021): 61. https://www.mdpi.com/2411-9660/5/4/61.

Pal, Sat. "Measuring Transit Oriented Development of Existing Urban Areas around Metro Stationsin Faridabad City." International journal of built environment and sustainabilityy 5, , no. 1 (30 January 2018 2018): 115-26. https://doi.org/10.11113/ijbes.v5.n1.251.

Prestes, Olga Mara, Clóvis Ultramari, and Fernando Domingues Caetano. "Public Transport Innovation and Transfer of Brt Ideas: Curitiba, Brazil as a Reference Model." Case Studies on Transport Policy 10, no. 1 (2022/03/01/ 2022): 700-09. https://doi.org/https://doi.org/10.1016/j.cstp.2022.01.031.

"Qatar National Development Framework 2032." 2016, accessed August, 2022, https://www.mme.gov.qa/QatarMasterPlan/English/QNDF.aspx?panel=qndf.

Wiedmann, Florian, Velina Mirincheva, and Ashraf M. Salama. "Urban Reconfiguration and Revitalisation: Public Mega Projects in Doha's Historic Centre." Open House International 38, no. 4 (2013): 27-36. https://doi.org/10.1108/OHI-04-2013-B0004.

Yen, Barbara T. H., Cheng-Min Feng, and Tsai-Chen Lee. "Transit-Oriented Development Strategy in Taiwan: An Application of Land Value Capture." Asian Transport Studies 9 (2023/01/01/ 2023): 100094. https://doi.org/https://doi.org/10.1016/j.eastsj.2022.100094.

LIVABILITY IN THE NEIGHBORHOODS OF A LIVABLE CITY. THE CASE OF NEW YORK CITY

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INTRODUCTION

The strive for creating livable cities is often substantiated by livability indexes. These indexes rank cities based on how well they score on parameters that are considered to be inextricably linked to a livable city, such as safety, education, health care, recreation, and so on. However, these indexes represent a general impression of a city as a whole and are often created with strong economic motivations.

This paper starts from the belief that the livability of a city does not only depend on its economic prospective on the metropolitan scale. Simultaneous to having good living standards on the larger scale, the city needs to be a sum of livable neighborhoods.

The paper uses New York City as a test case. New York is generally considered to answer to the preconditions that make a city livable. In addition to this livability on the metropolitan scale, this paper provides insights on the parameters of livability on the scale of neighborhoods. To achieve this goal, the paper conducts a comparative analysis between two neighborhoods that consist of contrasting living conditions. First, several parameters that are used in livability indexes are compared for these two neighborhoods (e.g., health care, employment, public transportation, education, and safety), followed by a more detailed local analysis of both neighborhoods' social, spatial, and economic conditions (e.g., ethnic and cultural diversity, their inclusion of minority groups, and their resilience to shocks and stresses).

The paper concludes with insights about livability that results from opportunities and characteristics on the local scale of different neighborhoods, highlighting the importance of going beyond a generalized index and the metropolitan scale to measure livability.

WHAT MAKES A CITY LIVABLE?

Livability indexes

Livability is a broad term, entailing a lot of complexity. More than once, the notion of the livable city has been generalized in an overarching measurable system: an index. In these indexes (or indices), cities are ranked based on preset parameters that define the quality of their (living) conditions. These indexes assess larger-scale, often objectifiable, conditions of the city, such as public transportation, access to jobs, education, housing, safety, and hygiene. Examples are the Mercer Quality of living city ranking,[1] the Global Finance's World's Best Cities to Live,[2] and Monocle's Quality of Life Survey.[3] Each of these studies and rankings consider a city's livability to be measurable and comparable to

other cities. They assess and calculate parameters and measurable components on the scale of the city, quantifying to which extent a city provides opportunities to its society to have a most objectively optimal life. However, the target audience of these rankings are not the cities' inhabitants; instead, these indexes focus largely on economics. Mercer states that their Quality of Living ranking aims "to help multinational companies decide where to open offices or plants, and how much to pay employees".[4] Their focus lies on the quality of life for employees and their families that are sent abroad to a foreign branch of their company. Meaning that these indexes do not function as input on how to increase livability for the cities in question.

Quality of life versus Quality of living

Livability indexes investigate quantifiable criteria, mostly entailing global-scale concerns, viewed from a top-down perspective, and focusing on the metropolitan scale. Mercer emphasizes that, in their ranking, quality of life does not equal quality of living. They state that their ranking is based on the quality of living, which "embodies objective aspects of daily living that most people agree on as being important for having good living standards, such as personal safety and security, health, transport infrastructure, availability of consumer goods, and adequate housing, schooling, and recreation opportunities".[5] Whereas quality of living can be measured by these overarching criteria, quality of life is a more complex given to study; this is perceived as more subjective and less measurable. In this paper, the notion of quality of living is compared to the notion of quality of life on the scale of the neighborhood. By looking into smaller-scale spatial, social, and economic characteristics, insights are drawn regarding the infill of life in a city that is generally considered to be livable. Two neighborhoods in the City of New York are used as case study.

NEIGHBORHOOD LIVABILITY

Introduction

To come to an understanding of neighborhoods' livability, the question 'what makes a city livable?' needs to be finetuned. Therefore, this chapter extends the question 'what makes a city livable?' to 'what makes a city livable on the scale of the neighborhood, including site-specific and user-oriented conditions?'. An important aspect in this extended question is the consideration of understated socio-economic opportunities such as small- and medium-sized businesses, a personal sense of belonging of the user, co-creation, and how these elements are related to the built and spatial environment.

This paper is part of an ongoing research about the relation between space and socio-economic processes on New York's post-industrial waterfront.[6] Building on the findings of this long-term research project, this paper compares two areas in Brooklyn, New York, to gain insights on their notion of livability on the neighborhood scale (Figure. 01). The first neighborhood is Williamsburg, located in the north of Brooklyn, across the East River from Manhattan. The second neighborhood is Coney Island Creek, located in the far south of Brooklyn.

Figure 1. Map of New York City with the location of Williamsburg (blue) and Coney Island Creek (orange). Source: Basic map from CadMapper, edited by author. Aerial images from Google Maps

Neighborhood livability by indexes

By the definition of livability indexes, the preconditions for livability in these two neighborhoods are presumed equal. Indexes cover a city as a whole, and both neighborhoods are located within the jurisdictional boundaries of the same city; New York. However, these two post-industrial waterfronts have known complex transformation processes, dealing with pressures such as industrial decline, displacement, gentrification, climate change, and so on. Both neighborhoods have known a significantly different response to these pressures, turning them into two contrasting areas in terms of living conditions. To showcase this difference, several parameters that are used in multiple livability indexes are compared between Williamsburg and Coney Island Creek with available data (Figure. 02).[7]

A first difference can be found in terms of health and access to healthcare; Coney Island residents had three times more chance of dying from Covid-19 than the inhabitants of Williamsburg. In terms of employments, because of the area's remote location, there are nearly four times less jobs available within 30 minutes from Coney Island than from Williamsburg. In addition, access to public transportation is significantly lower for Coney Island residents. Regarding access to education, 78% of the families in Williamsburg own a computer, while only 66% own one in Coney Island. The combination of this access to facilities, family income, parents' education and income, results in a higher chance of graduating high school as a student in Williamsburg. In terms of public safety there are also noticeable differences between the two neighborhoods. One advantage of living in Coney Island is the lower presence of vehicular traffic, resulting in less traffic injuries than in Williamsburg. However, there is almost double the chance to be assaulted with resulting hospitalization in Coney Island.[8]

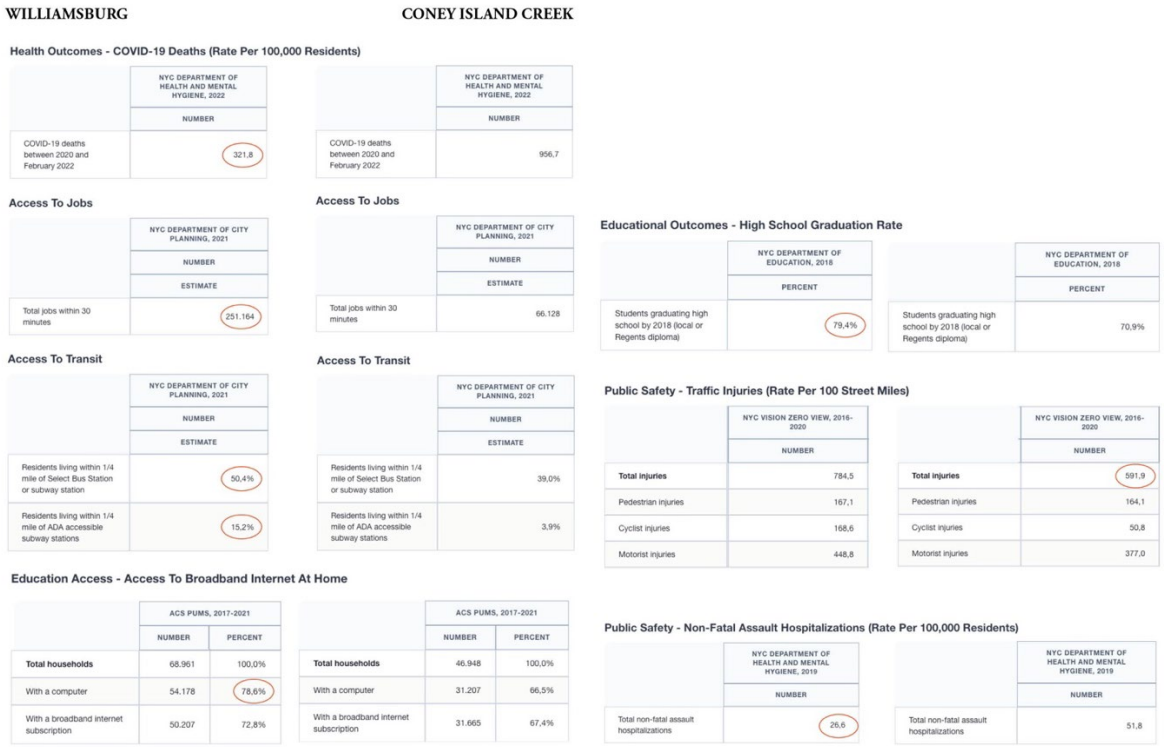

Figure 2. Data on livability parameters in Williamsburg (left column) versus Coney Island (right column). Source: NYC Equitable Development Data Explorer (accessed on May 3rd, 2023)

Neighborhood livability by bottom-up analysis (2 cases)

By the data alone, it is already clear that Williamsburg has known a much larger amount of redevelopment and gentrification than the Coney Island Creek area. Stimulated by its proximity to Manhattan, Williamsburg has known significant investments over the past 10 to 15 years by both private and public sectors, transforming the area rapidly. After the Williamsburg and Greenpoint rezoning plan of 2005,[9] the north Williamsburg waterfront has been drastically redeveloped with mostly high-rise residential towers and waterfront promenades. In only one decade (2007-2017), Williamsburg's population exploded with a 41% increase, while the population growth in New York was only 6%.[10] More recently, the south waterfront of Williamsburg has also been completely redeveloped for high-end residential, commercial, and recreational facilities. These highly profitable real-estate projects, developed by private project developers, are constructed in a tabula rasa manner, after full demolition of the existing built environment. Consequently, Williamsburg knows recent high forms of displacement of initial stakeholders and significant gentrification of its waterfront because of a new, higher income target audience. Theoretically, Williamsburg answers to nearly all parameters that indexes use to define a livable city; it has availability of housing, access to public transportation, culture, education, hygiene, and healthcare.

However, when looking at a neighborhood more locally, livability becomes a complex interplay of spatial, social, economic, and even environmental factors. Zooming in on the area around Coney Island Creek can illustrate this.

Within New York City's systematic and repetitive urban layout of a gridiron, waterfront neighborhoods often form a spatial exception. When the grid is intersected by a coastline, unique spatial conditions arise that can consequently trigger social, economic, and environmental conditions that deviate from the inland. The neighborhood of Coney Island Creek is such an area that has formed

itself around a meandering inlet of water (see Figure. 01, aerial photo of Coney Island Creek). Instead of continuous streets, the interrupted grid turns both W22nd and W23rd streets into dead ends (see Figure. 03). These dead-end streets are surrounded by small, mainly car-related businesses. The combination of good accessibility and yet a high level of privatization within these streets is appealing for small businesses in this sector. On the other hand, W21st, W24th, and W25th streets completely disappear because of permanent privatization, which is reflected in space and in use. The footprint of the buildings that are located on these lots are no longer answering to strong property delineations or the outline of their rectangular building block. Some buildings gain an angled wall that follows the coastline (Figure. 03, A), while others are constructed with an offset from the property line (Figure. 03, B), and some buildings exceed their original block, occupying former streets (Figure. 03, C). This highlights a first example of locally increased tolerance for irregular properties and built constructions in the extremity of the grid. Simultaneously, unique conditions of public and private relationships occur (Figure. 04). The more inland building blocks obediently follow the property lines by facades or fences, clearly distinguishing between private property and public space (Figure. 04, B). While the building blocks directly adjacent to the water of the creek have much more complicated public-private relationships. For instance, by extending their workspace onto the sidewalk, small businesses on W22nd and W23rd streets privatize the public space by use (Fig.04, A). On many occasions, the dead-end streets are used for parking, storage, workspace, or for permanent extensions of a building or its facilities onto the sidewalk. The local businesses are tolerated to expand their territory outside of their private property limits, generating larger productive space for these small businesses that have limited financial means.

In terms of social activities, the area around Coney Island Creek highlights a significant shared use of public space by local inhabitants. The extremities of the dead-end streets, next to the water, are used for fishing or other forms of (ephemeral) recreation. Residual spaces between buildings' deviant geometries – e.g. between W23rd and W24th street - are intensively used for gatherings, community gardens and neighborhood events.

While the median household income in Coney Island ($40,430) is 38% under the average for New York City ($64,850), and the local poverty rate is 28.9%,[11] the area offers unique qualities for bottom-up social and economic initiatives to take place. The combination of the area's remoter location and the spatial deviations in the extremity of the grid creates unique scenarios for small businesses and in terms of living conditions for residents. The area's affordable property prices and the high tolerance for alternative infill of space in the dead-end streets allows for low-revenue businesses and low-income families to find their space in the city of New York.

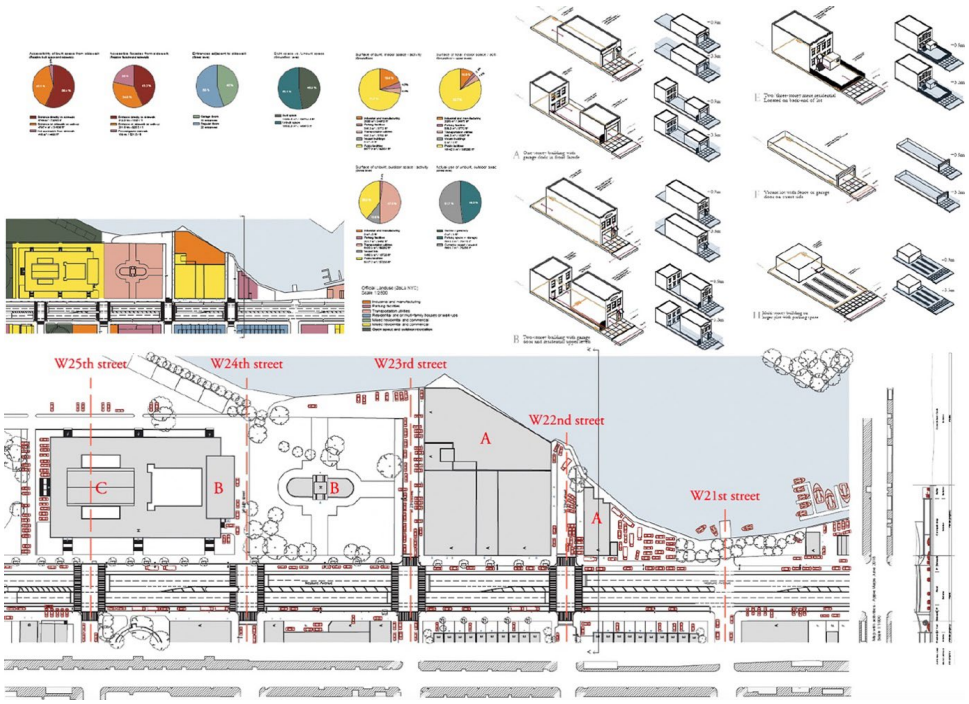

Figure 3. Mapping of activities, built space, typologies, zoning and land use, and use of space at the juxtaposition of water and land in Coney Island, New York - Source: Author, 2021

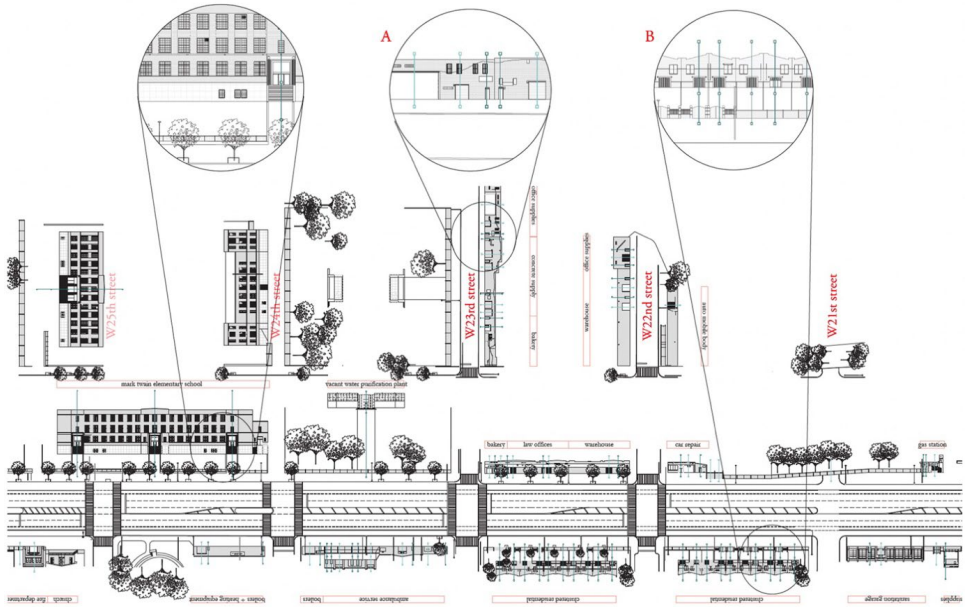

Figure 4. Mapping of facades and the transition of private to public at the juxtaposition of water and land in Coney Island, New York - Source: Author, 2021

In contrast, the unique waterfront conditions that are visible in Coney Island are completely erased in the redevelopments of Williamsburg. By a full redesign, the Williamsburg waterfront gains more of an inland character, with carefully orchestrated and controlled accessibility and programmed use of space. The greater freedom of use that is seen in Coney Island is completely eradicated in Williamsburg to avoid unforeseen scenarios. As a result, Williamsburg becomes a more static built environment, that is less likely to undergo change or transformation again in the foreseeable future. In

contrast, the Coney Island Creek area is constantly adapting to the changing social and economic needs of the moment and of its surroundings.
Because of the combination of a remote location, the grid that is interrupted by the water, the bottom-up transformation and the high tolerance for alternative land uses to establish, the Coney Island Creek area does not only offer the opportunity for small businesses to establish, but it also becomes a representation of urges, needs, and businesses that are unwelcome in the 'Williamsburgs' and the neighborhoods that are generally considered to be more livable.

CONCLUSION

The metropolitan-scale redevelopment of the Williamsburg waterfront results in an urban fabric that is clean, attractive, and popular, but also predictable, homogeneous, and unfriendly to change. Concerning such methods of urban redevelopment, Sennett, for instance, pleads to not exclusively invest in high-end projects with large profits. About the static urban form that is dominant in Williamsburg, he states that "[t]he additive grid as a monoculture embodies danger [...] Plans made of additive parts, meant to repeat on an ever-expanding scale, are peculiarly subject to ills of a social and economic sort, because once one block begins to degrade, there's no reason other blocks, exactly similar in form, will not succumb".[12] The static character of Williamsburg favorizes one activity over another, creating a clear social and economic hierarchy and operation. The design predefines the use of space for decades to come. Although the redevelopment is state-of-the-art and very popular, its danger lies in emerging changes, such as climate change, immigration waves, pandemics, or large societal or economic changes. A static design that is topical today, risks to become obsolete in a changed economic or environmental climate.
The local-scale transformation that is ongoing in Coney Island is, in contrast, more messy, unpredictable, aesthetically less appealing, and less safe, less obvious in terms of livability. However, it is also tolerant to change, and provides opportunities for minority groups and small businesses. The ambiguous character of Coney Island adapts itself to current needs, stakeholders, and emerging changes on the local scale, making this area all the more crucial for inclusive and resilient city development. The actual understated, but all the more pressing socio-economic needs manifest themselves in these margins of the city, where they are tolerated.
Over history, it has been the combination of well-designed, profitable areas and intricate and ambiguous leftover spaces that has made New York tolerant, innovative, and inviting. Many minority groups have appropriated areas like Coney Island Creek to claim their place in the city, or to express themselves. A city that wants to be livable, should be livable for all, and therefore inclusive for all. This requires adding a layer to the notion of livability that does not merely consider economy and financial growth, but answers to the (ever-changing) needs of minority groups and small- and medium-sized businesses, deals with affordability of commercial and residential land, senses of ownerships and belonging, social mixture, mixes of land-uses and activities, and tolerance for change, growth, and decline.
Border neighborhoods, like Coney Island Creek, that challenge the uniformity of a grid plan and standard city life become a representation of the actual pressing social and economic needs and lacks of the metropolis. Because these neighborhoods – especially in comparison to the inner city – are tolerant for more marginal situations to take place, they represent what and who is missing, or has less potential in the city. Their transformational and hybrid character makes them highly valuable sources of information regarding the actual needs of the city at the current time, especially on the smaller scales. Be it the need for housing for immigrants during the 1930s,[13] the inclusion and acceptance of the LGBTQ+ community and artists in the 1970s,[14] or the need for affordable and accessible working space for small businesses that are being outpriced by large chain stores in the 21st century,[15] the

border areas host - and therefore unveil - these lacks. That is why, from the perspective of architects, designers, or politicians alike; learning from neighborhoods that transform bottom-up can drastically increase our understanding of the city and contribute to the idea of all-encompassing and all-inclusive livability.

“What is missing in modern urbanism is a sense of the rupturing power of time. Not to look backward nostalgically, but forward. The city understood as a process. Imagery changing through use, and urban imagery formed by anticipation, which is friendly to disorder and surprise.”[16]

NOTES

[1] Mercer Livability Index, available at https://mobilityexchange.mercer.com/Insights/quality-of-living-rankings
[2] Global Finance's World's Best Cities to Live, available at https://www.gfmag.com/global-data/non-economic-data/best-cities-to-live
[3] Monocle's Quality of Life Survey, available at https://monocle.com/search/quality-of-life-survey/
[4] Mercer Exchange. “Quality of living city ranking”. Accessed May 10, 2023, https://mobilityexchange.mercer.com/Insights/quality-of-living-rankings
[5] Slagin Parakatil. “Measuring Expatriate Quality of Living”. Website Mercer. Accessed May 11, 2023, https://mobilityexchange.mercer.com/insights/article/measuring-expatriate-quality-of-living
[6] This ongoing research project was initiated in 2014 and investigates nine vulnerable post-industrial waterfront neighborhoods in the city of New York. The study focuses on these neighborhoods’ ongoing transformation under the pressure of larger-scale processes such as climate change and industrial decline. More specifically, the research investigates the evolution of smaller social and economic opportunities and how space can function as a host or a platform for these processes to manifest. This paper uses elements of two of the nine neighborhoods of the main research to elaborate on the notion of livability; Gitte Schreurs. *Insights on the reconfiguration of vulnerable industrial waterfronts facing shocks and stresses. Coney Island Creek, New York City, USA.* Ghent: KU Leuven, 2022.
[7] The data for Coney Island are from the Coney Island and Brighton Beach area, which approximately covers Brooklyn Community District 13. The data for Williamsburg are from the Williamsburg and Greenpoint area, which approximately covers Brooklyn Community District 1.
The waterfront area of Williamsburg that is analyzed further in the paper has the highest level of gentrification in Brooklyn CD 1, meaning that the difference between Coney Island and Williamsburg is most likely more extreme than the data suggest.
[8] NYCgov. “NYC Equitable Development Data Explorer”. Accessed on May 3, 2023, https://www.nyc.gov/site/planning/data-maps/edde/edde-overview.page
[9] NYCgov (under M. Bloomberg). “Greenpoint-Williamsburg Rezoning EIS, Executive Summary”. Accessed on May 12, 2023, https://www.nyc.gov/assets/planning/download/pdf/plans/greenpoint-williamsburg/feis_exec_sum.pdf
[10] Michael Hendrix. “A Neighborhood Grows in Brooklyn”. City Journal (2020). Accessed on July 17, 2023, https://www.city-journal.org/article/a-neighborhood-grows-in-brooklyn
[11] NYU Furman Center. “State of the City 2019”. Accessed on April 23, 2023, https://furmancenter.org/stateofthecity/state-of-the-city-2019.
[12] Richard Sennett. *Building and dwelling: ethics for the city.* London: Penguin Books, 2018.
[13] Nancy Foner, “Then and Now or Then to Now: Immigration to New York in Contemporary and Historical Perspective”. Journal of American Ethnic History 25, no 3 (2006): 33-47.
[14] Armstrong, Elizabeth, Crage, Suzanna, “Movements and Memory: The Making of the Stonewall Myth". American Sociological Review 71, no 5 (2006): 724-751.
[15] Adam Friedman, Joan Byron, Jenifer Becker. *Making Room for Housing and Jobs.* New York: Pratt Center, 2015.
[16] Pablo Sendra, Richard Sennett. *Designing Disorder: Experiments and Disruptions in the City.* London: Verso Books, 2022.

BIBLIOGRAPHY

Atelier Workroom Brussels (AWB). *A good city has industry.* Brussels, Belgium, 2016.
Bronstein, Zelda. ‘Industry and the Smart City’ in *Dissent Magazine*. 2009
Bullard, Robert D. *Dumping in Dixie: Race, class, and environmental quality*. Westview Press, 2008.
Curran, Winifried, Hamilton, Tina (eds) *Just green enough: urban development and environmental gentrification*. Abingdon, Oxon ; New York, NY: Routledge, 2018.
Dagen Bloom, Nicholas, Gordon Lasner, Matthew (eds). *Affordable Housing in New York: The People, Places, and Policies That Transformed a City,* Oxford: Princeton University Press, 2016.

Day, John W., Hall, Charles. *America's most sustainable cities and regions: surviving the 21st century megatrends.* New York, NY: Springer New York : Imprint: Copernicus, 2016.

Friedman, Adam, Byron, Joan, Becker, Jenifer. *Making Room for Housing and Jobs.* New York: Pratt Center, 2015

Hall, Suzanne M. *City, street and citizen: the measure of the ordinary*. London: Routledge, 2012.

Mohai, Paul, Pellow, Davind, Roberts, J. Timmons. 'Environmental Justice', *Annual Review of Environment and Resources*, 34(1), pp. 405–430, 2009.

Scheerlinck, Kris. *Depth Configurations. Proximity, Permeability and Territorial Boundaries in Urban Projects.* Belgium, 2010.

Scheerlinck, Kris, Schreurs, Gitte. 'Streetscape essentials', in *Taking Action: Transforming Athens' Urban Landscapes*. Berlin: JOVIS, 2016.

Schreurs, Gitte. *Insights on the reconfiguration of vulnerable industrial waterfronts facing shocks and stresses. Coney Island Creek, New York City, USA.* Ghent: KU Leuven, 2022.

Sennett, Richard. *Building and dwelling: ethics for the city.* London: Penguin Books, 2018.

Sendra, Pablo, Sennett, Richard. *Designing Disorder: Experiments and Disruptions in the City.* London: Verso Books, 2022.

OOPS… WE'VE BEEN DOING IT AGAIN: IGNORING SOCIAL PROBLEMS IN BRITAIN

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INTRODUCTION

Insecurity is an example of urban impediment, and violence will make a city unlivable indeed. British citizens became up even closer and more personal with "gangs" when the August 2011 English riots broke out. In the aftermath of six days of rioting, burning, looting, and violence against the person[1] in the most crime-ridden and deprived areas of the country mostly,[2] then Prime Minister David Cameron declared "an all-out war on gangs and their culture."[3] The Conservative-Liberal Democrat coalition government as a matter of fact considered that "gangs" epitomized what ruined British society, and blamed them for the wave of violence. In other words, the coalition unequivocally construed the disturbances as mindless delinquency rather than as a protest movement from below against some sort of "capitalist revolution from above."[4] However, many a researcher posits that "gangs" arise out of the hardest hit by dire conditions like socio-economic exclusion, and reports on previous riots established a nexus between marginalization and rioting, warning violence would repeat should the authorities turn a blind eye to the socio-economic impulse.[5] Governments such as Thatcher's likewise ignored the deep-seated structural problems and responded with repressive measures in 1981, thereby triggering subsequent disturbances against inequalities and the authorities in 1985 for instance.[6]

Thus, presumably, exclusion as well as inadequate government policies sustain violence and blight the city. Why then would Cameron repeat the same old mistake, obviously refusing to take the social dimension of the "gang" phenomenon under consideration? What if the government in fact depended on these linked and impeding factors, namely exclusion and violence, which are embodied in "gangs?" To put it more clearly, what if, in a context of political corruption scandals and protests against austerity measures, scapegoating "gangs" aimed to distract citizens away from neoliberal capitalism-generated issues? What if "gangs" enabled the coalition to justify and freely implement their Big Society project, which implied devolving political power and social responsibility to local communities, and combined free-market economics and a paternalistic understanding of governance? The thrust of my argument shall be to question whether the coalition's stance may not have been ideology-driven as opposed to genuinely security-driven after all. Wasn't the government's purpose possibly to protect their interests, be it to the detriment of democracy, and ultimately of livable cities? Firstly, I shall demonstrate that the British government clearly benefited from popular sophisms which are entrenched in British society in order to instrumentalize "gangs," and beyond them an entire social class. Secondly, I shall ponder whether the nation's enemy did not turn out to be the

government, as they apparently repressed a section of the community, arguably to concomitantly deceiving and ideological ends.

INSTRUMENTALISING 'GANGS' THROUGH UN-DEBUNKED MYTHS

A series of myths provided the coalition with justifications putatively fitting their stance: "gangs" should be fought as they corrupt British society.

The Gangland Britain thesis

First, "gangs" mushroom in Britain. To some researchers "the central myth is that the gang exists" as they allege violence collectives are produced by the gang industry – that is liberal commentators, politicians or academics who deal with the "gang" issue and who, sometimes involuntarily, give the impression the nation is under the influence of US-style "gangs" – and by fame-seeking "gangs" themselves.[7] Still, the government posited that "gangs" orchestrated the riots, when one of the misrepresentations about "gangs" is that they are organized.[8] It emerged the police manipulated the figures – twenty-eight percent of the people arrested were initially announced to be "gang" members, then the rate was once more revised downwards, to thirteen percent, this time for the whole country. This logically forced Cameron to downplay the role of "gangs" in the unrest,[9] all the more so as the figures corresponded to individuals who had been caught red-handed hence were usually known to the police, and as regional police services relied on different definitions of "gang,"[10] when there is an official one. "A gang is defined as a group of at least three people using (a) characteristic(s) enabling its identification as a group, and engaging in gang-related violence or getting involved in the illegal drug market."[11] The use of quotation marks in the article aims to underline the fact that indeed, the term is not always used adequately.

The dangerous class

Second fallacy, "gang" members are lower class (Black) youths. The term is an American construct with negative racial and social connotations. The British black community has been stigmatized, pathologized, essentialized, and criminalized on cultural and moral grounds for decades. Dysfunctional family structure, immorality, and gangsta culture feature among the many characteristics associated with Black families, whose culture is supposedly defective, un-British, and even criminogenic. "Culture" became a euphemism for "race," and more specifically for "Blacks," long ago.[12] The official statistics contradicted Cameron's claim that "gangs" were to be held responsible for the riots since forty percent of white rioters and thirty-nine percent of black rioters were arrested.[13] Now, one has to point out "black" tends to refer to a wider group than the black community, as articulated by historian and broadcaster David Starkey: black culture contaminated young working-class Whites, commonly and derogatorily referred to as "Chavs."[14]

Povertyism – the popular, political, and media hostility towards people who experience poverty, is deeply embedded in the wider society with Victorian views about the "deserving" and "undeserving" categories. This is reflected in British legislation on poverty, as it generally presupposes that there is a nexus between "rights" and "responsibilities" – assistance may be available providing that more or less objective conditions are met. The refusal of the UK to assimilate the International Covenant of Economic, Social and Cultural Rights into national law has exacerbated ordinary social attitudes that denigrate the presumed dangerous class further – that is twenty-one percent of the population at the time[15] – and erode support for anti-poverty policies amongst the public.[16] The irony is that culturally speaking, the rioters incarnated the neoliberal ideology since one may posit they both were produced by it, and appropriated it, as exemplified by the lootings.

The wanton criminal interpretation

Third misbelief, individuals join "gangs" because they're inherently criminals. Cameron was deeply influenced by American gang buster William Bratton, his advisor, who argued that "gangs" are "domestic terrorists" that should be brutally suppressed since they are no victims of exclusion.[17] Needless to say that undoubtedly, some members are hardened criminals. Yet, as mentioned previously, sociologists for instance explain "gangs" are generated by the redistribution of a progressively privatized space which excludes them from resources.[18] Such collectives have a social function, helping their members in their transition into adulthood and with issues generated by deprivation.[19] Also, "gangs" are not sustained political organizations since they do not put forward articulated demands but to some measure, they succeed in making the issues of people cast away to the very margins of society visible, whether consciously or not.[20] Now, on the one hand, "gangs" agreed on a truce and stopped their postcode war for four days so as to unite against the police, and by extension the government, whom they blamed for their circumstance, thereby interestingly rejecting two components of neoliberalism – individualism and competition.[21] One the other hand, one may aver that these August riots were, as always, triggered by what was regarded as an attack from the state against a member of a minority community, as it were, the killing of a young black man by the police.[22]

Thus, the coalition exploited a series of myths so as to be in a position to instrumentalize a long-scapegoated group of individuals, the urban underclass, through "gangs," on cultural and moral grounds. Mainstream society was well acquainted with such "suitable enemies," [23] and supposedly, in an era when electors' fears define government policy,[24] ready to take to the government's narrative as to the nature of their concerns. Evidence would suggest that the actual threat people should beware of may have been incarnated by the government.

SUSTAINING UNLIVABLE CITIES

Declaring war on "gangs," the government promised citizens safe, hence livable cities. However, one reasonably may suggest that this goal could not be achieved.

Drawing on a failed experience

The government presumably manipulated the British into believing they were indeed determined to protect them. However, as I hinted at before, the coalition identified the wrong causes to violence, sheer delinquency, when studies and reports provided a different analysis. Furthermore, and as a consequence, Cameron's policy agenda was clearly modelled on the gang suppression programme carried out in the United States – a programme which, in spite of substantial funds, had proved unsuccessful, because the focus had not been on the eradication of poverty.[25] The fact that the British government overlooked thriving American initiatives introduced on their territory may raise suspicions. They could have applied the acclaimed Kennedy method, otherwise known as "Operation Ceasefire," launched in Manchester in 2002,[26] or Slutkin's public health approach to "gangs," referred to as "Cure Violence," launched by Strathclyde Police in 2005.[27]

Tough on crime

The coalition, through instrumentalization, managed insecurity by repressing not only criminals, but a whole section of the community. To sum up their (sometimes somewhat illegal) action, which seemed to have the opposite goal to that intended, that is annihilating "gangs," one shall mention the harsh and disproportionate sentences handed down to create strong disincentives. More specifically, penal sanctions and the removal of social benefits were associated. The authorities in fact invested substantial resources in raids, the viewing of thousands of hours of security footage, and in calls for

witnesses in order to recover stolen goods and make arrests long after the events, when crimes cannot be punished retroactively.[28] In addition, the legislative framework governing "gangs" was reinforced, for instance through the introduction of gang-mapping database administered by the London Metropolitan Police. The police sometimes used social media so as to be in a position to monitor potential suspects, at the risk of breaching the Police Investigatory Powers Act. A high proportion of young Blacks (seventy-eight percent in 2013[29]) featured on the Gangs Matrix, thereby contributing to their stigmatization, as Amnesty International lamented. Other agencies such as schools or housing associations, were given access to the database, which meant the population was being watched.[30] What's more, Cameron set about tackling the issue of "troubled families," who lack morals and evade responsibility, for instance offering parenting classes, since he ascertained the link between rioting and educational deficit.[31]

Social insecurity

The coalition therefore further stigmatized the urban precariat and their culture, labelled them as deviants, criminalized social problems, and did not enable the inclusion of the marginalized into society.[32] A policy of "social insecurity" intrinsic to neoliberal democracy replaced the Welfare State with a Punitive State, which, on the one hand, showed itself liberal and permissive towards the middle and upper classes and firms, on the other hand, paternalistic and punishing towards the poorest.[33] The state has a criminogenic function – labelling, criminalizing, and punishing the deviants in the interest of the ruling class, while it may violate the law with impunity.[34] One shall not forget the powerful corporate media have the ideological duty to support them, and they certainly embraced the gang-based narrative emanating from Whitehall.[35] The concept of "Thug State" may be pertinently used to describe the coalition in the aftermath of the riots, as, while clearly motivated by the interests of the elite, they claimed to be democratic but perpetrated what can be considered to be criminal acts against a category of citizens, and allowed such acts to be perpetrated against them. Furthermore, the coalition resorted to arrests, prison, surveillance, informers, and armed forces to dominate, discipline, and punish a non-elite population consisting of disorderly poor and minority community members, all selected to be repressed, and whose fundamental rights and opportunities were denied. Additionally, they built a maximum security society to deter civil unrests certainly generated by a lack of investment in education and social protection. Last but not least, corruption, deficiency of responsibility, and activities which, albeit legal, exploit individuals and betray their trust, characterized the action of a coalition who dominated the social and cultural spheres, and who could act with the blessing of a more intolerant public.[36]

Ideological motives

Livable cities may mean violence / "gang"-free cities, cities where no socio-economic exclusion can be observed. Yet, inadequate anti-gang programmes as well as illiberal repression at various levels against the poorest were bound to incite violence through urban revolts or "gang" membership, and to increase the rates of poverty. One may posit that what can be referred to as the coalition's ideological tool, "gangs," should be sustained. Poverty, which makes "gangs," should thrive likewise. In point of fact, the coalition apparently depended on those elements to justify and impose their ideology, Big Society, the alleged antidote to "broken society,"[37] and, to some extent, for harsh neoliberalism to work smoothly. Poverty is a political choice, as the available funds were used to reduce the taxes of the wealthy while large-scale cuts were made in public expenditure programmes.[38] The coalition purposely attacked the victims of the "disease," to quote Cameron referring to "gangs,"[39] rather than the "disease" itself, that is "gangs and gang culture," as initially announced. Therefore, the government, seemingly, were merely eager to protect their own interests, thereby embodying the

genuine enemy within. They deceived the population all the way through to harmful and ideological ends, distracting them, terrorizing them with the support of the mass media, evading their responsibility, and carrying through counterproductive plans so as to legitimize their capitalist ideology further and keep neoliberalism vigorous, hence unlivable cities.

CONCLUSION

In essence, an urban parallel society, a two-tier system plagued by violence and exclusion in other words, was presumably to survive for the sake of ideology-driven authorities. It appears the coalition played their citizens by abusing an instrument of choice – "gangs." Evidence show they lied to British citizens: about the nature of the threat they were faced with, "gangs," when the state and their neoliberal capitalism ideology blighted society; about the individuals who should be repressed, the poor, when allowing for exceptions, they were victims of the state; and about their intention, tackling the "gang" problem, when they had every reason to let them multiply. "Gangs," as well as rioters, epitomised an ideological force rather than an explanation to the disturbances,[40] and by extension to unlivable cities. As averred by neoliberal theorists, crises should be used to impose unpopular policies while people look the other way.[41] "Gangs" appeared to be ideal scapegoats as they embodied a series of race and class-related myths deep rooted in British society on the one hand, and an imported US myth on the other hand. The mass media possessed the required expertise in the matter to back up the Whitehall narrative and they successfully helped repress "gangs," while a growing intolerant public quite easily bought the package.[42] Hence, the concepts of State crime, Thug State, and State terrorism may be invoked. An enemy from the inside, a "gang," can hide another indeed.

Identifying the winners and punishing the losers, a prerequisite of neoliberalism, entailed the evacuation of some degree of democracy in the aftermath of the August 2011 riots, and the sustainability of unlivable cities. "The injustice machine accelerated in the cause of law and order and the safeguarding of people's rights and civic entitlements were considered an almost obscene concern."[43] Preceding Murray-inspired authorities read downright criminality into riots as well, among whom Margaret Thatcher,[44] in spite of evidence from reports citing poverty, discrimination, and unequal opportunities among the origins of the 1981 riots.[45] Scarman then recommended urgent action so as to avoid subsequent riots but he remained unheard, and disorders occurred quickly as repression was the order of the day. Today, experts such as Andrew Neilson, the director of campaigns at the British charity Howard League for Penal Reform, likewise warn that, the conditions which induced previous revolts being similar today, rioting may well be brewing.[46] Angered young men will endeavour to try and negotiate their position within mainstream society, empowering themselves, and acting as legitimate citizens taking part in the democratic process, however controversially, in order to make cities livable.

NOTES

[1] The Guardian-LSE, *Reading the Riots: Investigating England's Summer of disorder* (London: Guardian Books, 2011).
[2] *An Overview of Recorded Crimes and Arrests Resulting from Disorder Events in August 2011* (London: Home Office, 2011), 3.
[3] James Tapsfield et al., "PM Vows War on Gangs After Riots," The Independent, August 15, 2011, https://www.independent.co.uk/news/uk/crime/pm-vows-war-on-gangs-after-riots-2338009.html.
[4] Loïc Wacquant, *Bourdieu, Foucault and the Penal State in the Neoliberal Era* (Duke: Duke U.P., 2009), 127.
[5] Gareth Morell et al., *The August Riots in England: Understanding the Involvement of Young People* (London: NatCen, 2011).
[6] Monia O'Brien Castro, "Pandemonium Britain: Interactions Between Formal and Informal Places of Governance in the 1980s," Journal of Urban History 41, no. 4 (2015), doi: 10.1177/0096144215579352.
[7] Simon Hallsworth and Tara Young, "Gang Talk and Gang Talkers: A Critique," Crime, Media, Culture 4, no. 2 (2008), doi: 10.1177/1741659008092327.
[8] James C. Howell, "Menacing or Mimicking? Realities of Youth Gangs," Juvenile and Family Court Journal 58, no. 2 (2007), 40, doi: 10.1111/j.1755-6988.2007.tb00137.x.
[9] The Guardian-LSE, *Reading the Riots: Investigating England's Summer of disorder,* 21.
[10] *An Overview of Recorded Crimes and Arrests Resulting from Disorder Events in August 2011*, 34.
[11] "Serious Crime Act, c.9, 2015", The National Archives, accessed October 4, 2022, https://www.legislation.gov.uk/ukpga/2015/9/contents.
[12] Monia O'Brien Castro, "L'atavisme des Noirs comme pierre angulaire d'un discours raciste et propagandiste à l'encontre des "gangs" britanniques contemporains," in *Minorités et société,* ed. Michel Prum et Florence Binard (Paris : L'Harmattan, 2020).
[13] *An Overview of Recorded Crimes and Arrests Resulting from Disorder Events in August 2011*, 29.
[14] David Starkey, "UK Riots: It's Not About Criminality and Cuts, It's About Culture… And This is Only the Beginning," The Telegraph, August, 19, 2011, https://www.telegraph.co.uk/news/uknews/law-and-order/8711621/UK-riots-Its-not-about-criminality-and-cuts-its-about-culture...-and-this-is-only-the-beginning.html.
[15] "Overall UK Poverty Rates," Joseph Rowntree Foundation, January 26, 2023, accessed November 2, 2022, https://www.jrf.org.uk/data/overall-uk-poverty-rates.
[16] "Is Poverty in the UK a Denial of People's Human Rights?," Joseph Rowntree Foundation, January 17, 2008, accessed September 17, 2022, https://www.jrf.org.uk/report/poverty-uk-denial-peoples-human-rights.
[17] Terry McCarthy, "The Gang Buster," Time Magazine, January 14, 2004, http://content.time.com/time/magazine/article/0,9171,574913,00.html.
[18] John Hagedorn, *A World of Gangs* (University of Minneapolis Press, 2008).
[19] Robert K. Merton, "Social Structure and Anomie," American Sociological Review 3, no. 5 (1938), doi: 10.2307/2084686.
[20] John Drury et al., *Re-Reading the 2011 English Riots: ESRC "Beyond Contagion" Interim Report* (University of Sussex, 2019), 6; *After the Riots: The Final Report* (London: The Riots Communities and Victims Panel, 2012), 6.
[21] The Guardian-LSE, *Reading the Riots: Investigating England's Summer of disorder,* 22.
[22] "Framing the Death of Mark Duggan," Institute of Race Relations, April 17, 2014, accessed September 12, 2022, https://irr.org.uk/article/framing-the-death-of-mark-duggan/.
[23] Nils Christie, "Suitable Enemy," in *Abolitionism: Toward A Non-Repressive Approach to Crime*, ed. Herman Bianchi and Rene Von Swaaningen (Amsterdam: Free University Press, 1986).
[24] Ulrich Beck, *Risk Society: Towards a New Modernity* (London and New York: Sage, 1992), 49.
[25] Simon Hallsworth and David Brotherton, *Urban Disorder and Gangs: A Critique and A Warning* (London: Runnymede, 2011), 14.
[26] John Pitts, "Critical Realism and Gang Violence," in *What is to be Done About Crime and Punishment? Towards a 'Public Criminology,'* ed. Roger Matthews (London: Palgrave Macmillan, 2016), 77.
[27] Scottish Violent Reduction Unit, accessed September 25, 2022, https://www.svru.co.uk.
[28] LSE Public Policy Group, *The 2011 London Riots* (London: British Politics and Policy, 2011), Chris Gilson.
[29] Mayor of London, *Review of the Metropolitan Police Service Gangs Violence Matrix – Second Annual Review* (London: Office for Policing and Crime, 2022), 10.

[30] "Met Police Using 'Racially Discriminatory' Gangs Matrix Database, Trapped In The Matrix: Secrecy, Stigma, and Bias In The Met's Gangs Database," Amnesty International, May 9, 2018, accessed July 6, 2023, https://www.amnesty.org.uk/press-releases/met-police-using-racially-discriminatory-gangs-matrix-database.
[31] Department for Communities and Local Government, *Government Response to the Riots, Community and Victims Panel's Final Report* (London, 2013), 16.
[32] LSE Public Policy Group, *The 2011 London Riots,* Chris Gilson.
[33] Loïc Wacquant, *Punishing the Poor: The Neoliberal Government of Social Insecurity* (Duke U.P., 2009), 312.
[34] Ian R. Taylor, *The New Criminology for a Social Theory of Deviance* (London: Routledge, 1973).
[35] Kenneth Thompson, *Moral Panics* (Hove: Psychology Press, 1998), 7.
[36] Stephen Richards and Michael Avey, "Controlling State Crime in the United States of America: What Can We Do About the Thug State?," *Varieties of State Crime and Its Control,* ed. Jeffrey Ian Ross (Boulder: Lynne Rienner Publishers, 2000), 31-33.
[37] "David Cameron on UK riots: 'We must mend our broken society'" video, The Guardian, August 11, 2008, https://www.theguardian.com/uk/video/2011/aug/11/david-cameron-uk-riots-broken-society-video.
[38] "Statement on Visit to the United Kingdom", Philip Alston, November 16, 2018, accessed November 3, 2022, https://www.ohchr.org/Documents/Issues/Poverty/EOM_GB_16Nov2018.pdf, 21-22.
[39] James Tapsfield et al., "PM Vows War on Gangs After Riots".
[40] Simon Hallsworth and David Brotherton, *Urban Disorder and Gangs: A Critique and A Warning,* 16.
[41] Naomi Klein, *The Shock Doctrine: The Rise of Disaster Capitalism* (London: Penguin, 2008).
[42] Daniel Briggs, *The English Riots of 2011*: *A Summer of Discontent* (Sherfield: Waterside Press, 2012), 10.
[43] Gus John, "Oh Dear! That Criminal Minority Again! – Handsworth, Brixton, Tottenham," Race Today 16, no. 6 (1986).
[44] Steven R. Reed, "Prime Minister Thatcher denounces rioting," UPI, April 13, 1981, https://www.upi.com/Archives/1981/04/13/Prime-Minister-Thatcher-denounces-rioting/6509950048693/.
[45] Lord Scarman, *The Brixton Disorders 10-12 April 1981: Report of an Enquiry* (London: Penguin, 1982).
[46] Niamh McIntyre et al., "Conditions that led to 2011 riots still exist today, experts warn," The Guardian, July 30, 2021, https://www.theguardian.com/uk-news/2021/jul/30/conditions-2011-uk-riots-still-exist-today-experts-warn.

BIBLIOGRAPHY

After the Riots: The Final Report. London: The Riots Communities and Victims Panel, 2012.

Amnesty International. "Met Police Using 'Racially Discriminatory' Gangs Matrix Database, Trapped In The Matrix: Secrecy, Stigma, and Bias In The Met's Gangs Database." Accessed July 6, 2023. https://www.amnesty.org.uk/press-releases/met-police-using-racially-discriminatory-gangs-matrix-database.

An Overview of Recorded Crimes and Arrests Resulting from Disorder Events in August 2011. London: Home Office, 2011.

Alston, Philip. "Statement on Visit to the United Kingdom." Accessed November 3, 2022. https://www.ohchr.org/Documents/Issues/Poverty/EOM_GB_16Nov2018.pdf.

Beck, Ulrich. *Risk Society: Towards a New Modernity.* London and New York: Sage, 1992.

Briggs, Daniel. *The English Riots of 2011*: *A Summer of Discontent.* Sherfield: Waterside Press, 2012.

Christie, Nils. "Suitable Enemy." In *Abolitionism: Toward A Non-Repressive Approach to Crime*, edited by Herman Bianchi, and Rene Von Swaaningen, 42-54. Amsterdam: Free University Press, 1986.

"David Cameron on UK riots: 'We must mend our broken society'" video. The Guardian, August 11, 2008. https://www.theguardian.com/uk/video/2011/aug/11/david-cameron-uk-riots-broken-society-video.

Department for Communities and Local Government. *Government Response to the Riots, Community and Victims Panel's Final Report.* London, 2013.

Drury, John, et al. *Re-Reading the 2011 English Riots: ESRC "Beyond Contagion" Interim Report.* University of Sussex, 2019.

Hagedorn, John. *A World of Gangs.* University of Minneapolis Press, 2008.

Hallsworth, Simon, and Young, Tara. "Gang Talk and Gang Talkers: A Critique." Crime, Media, Culture 4, no. 2 (2008). 175-195. doi: 10.1177/1741659008092327.

Hallsworth, Simon, and Brotherton, David. *Urban Disorder and Gangs: A Critique and A Warning.* London: Runnymede, 2011.

Howell, James C. “Menacing or Mimicking? Realities of Youth Gangs.” Juvenile and Family Court Journal 58, no. 2 (2007). 39-50. doi: 10.1111/j.1755-6988.2007.tb00137.x.

Institute of Race Relations. “Framing the Death of Mark Duggan.” Accessed September 12, 2022. https://irr.org.uk/article/framing-the-death-of-mark-duggan/.

John, Gus. “Oh Dear! That Criminal Minority Again! – Handsworth, Brixton, Tottenham.” Race Today 16, no. 6 (1986).

Joseph Rowntree Foundation. “Is Poverty in the UK a Denial of People’s Human Rights?” Accessed September 17, 2022. https://www.jrf.org.uk/report/poverty-uk-denial-peoples-human-rights.

Joseph Rowntree Foundation. “Overall UK Poverty Rates.” Accessed November 2, 2022. https://www.jrf.org.uk/data/overall-uk-poverty-rates.

Klein, Naomi. *The Shock Doctrine: The Rise of Disaster Capitalism.* London: Penguin, 2008.

Lord Scarman. *The Brixton Disorders 10-12 April 1981: Report of an Enquiry.* London: Penguin, 1982.

LSE Public Policy Group. *The 2011 London Riots.* London: British Politics and Policy, 2011.

Mayor of London. *Review of the Metropolitan Police Service Gangs Violence Matrix – Second Annual Review.* London: Office for Policing and Crime, 2022).

McCarthy, Terry. “The Gang Buster.” Time Magazine, January 14, 2004. http://content.time.com/time/magazine/article/0,9171,574913,00.html.

McIntyre, Niamh. et al. “Conditions that led to 2011 riots still exist today, experts warn.” The Guardian, July 30, 2021. https://www.theguardian.com/uk-news/2021/jul/30/conditions-2011-uk-riots-still-exist-today-experts-warn.

Morell, Gareth, et al. *The August Riots in England: Understanding the Involvement of Young People.* London: NatCen, 2011.

Merton, Robert K. “Social Structure and Anomie.” American Sociological Review 3, no. 5 (1938): 672-682, doi: 10.2307/2084686.

O’Brien Castro, Monia. “Pandemonium Britain: Interactions Between Formal and Informal Places of Governance in the 1980s.” Journal of Urban History 41, no. 4 (2015). 607-624. doi: 10.1177/0096144215579352.

O’Brien Castro, Monia. “L’atavisme des Noirs comme pierre angulaire d’un discours raciste et propagandiste à l’encontre des “gangs” britanniques contemporains.” In *Minorités et société,* edited by Michel Prum, and Florence Binard, 73-100. Paris : L’Harmattan, 2020.

Pitts, John. “Critical Realism and Gang Violence.” In *What is to be Done About Crime and Punishment? Towards a ‘Public Criminology’,* edited by Roger Matthews, 57-88. London: Palgrave Macmillan, 2016.

Reed, Steven R. “Prime Minister Thatcher denounces rioting.” UPI, April 13, 1981. https://www.upi.com/Archives/1981/04/13/Prime-Minister-Thatcher-denounces-rioting/6509950048693/.

Richards, Stephen, and Avey, Michael. “Controlling State Crime in the United States of America: What Can We Do About the Thug State?” In *Varieties of State Crime and Its Control,* edited by Jeffrey Ian Ross, 31-57. Boulder: Lynne Rienner Publishers, 2000.

Scottish Violent Reduction Unit. Accessed September 25, 2022. https://www.svru.co.uk.

Starkey, David. “UK Riots: It’s Not About Criminality and Cuts, It’s About Culture… And This is Only the Beginning.” The Telegraph, August, 19, 2011. https://www.telegraph.co.uk/news/uknews/law-and-order/8711621/UK-riots-Its-not-about-criminality-and-cuts-its-about-culture...-and-this-is-only-the-beginning.html.

Tapsfield, James, et al. “PM Vows War on Gangs After Riots.” The Independent, August 15, 2011. https://www.independent.co.uk/news/uk/crime/pm-vows-war-on-gangs-after-riots-2338009.html.

Taylor, Ian, R. *The New Criminology for a Social Theory of Deviance.* London: Routledge, 1973.

The Guardian-LSE. *Reading the Riots: Investigating England’s Summer of disorder.* London: Guardian Books, 2011.

The National Archives. “Serious Crime Act, c.9, 2015.” Accessed October 4, 2022. https://www.legislation.gov.uk/ukpga/2015/9/contents.

Thompson, Kenneth. *Moral Panics.* Hove: Psychology Press, 1998.

Wacquant, Loïc. *Bourdieu, Foucault and the Penal State in the Neoliberal Era.* Duke: Duke U.P., 2009.

Wacquant, Loïc. *Punishing the Poor: The Neoliberal Government of Social Insecurity.* Duke: Duke U.P., 2009.

MUSEUM OF OUR CITY: HOW MUSEUM DESIGN MAKES OUR EVERYDAY LIFE BETTER

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INTRODUCTION

It has long been understood that a museum is a building in which objects of historical, scientific, artistic, or cultural interest are stored and exhibited. However, the museum has developed beyond its collections. The role of a museum has shifted from an institutional-like space into a civic space. The museum has become a place where human interaction, social discourse, and engagement are established. Museums are civic society institutions that support both informal learning, akin to a "school for living," and citizenship.[1] The focus of this paper is the national museum. It is commonly understood that national museums are established to celebrate national pride and identity.[2] Each country naturally takes pride in its nationhood and is keen to project this to its citizens and the world. One way to present the story of the country is to communicate it via museums, so a national museum seems to be an appropriate means.[3] In Europe, especially the Netherlands, nationalism through national museums has been a force of progress and political development. In contrast, the return of nationalism in contemporary Europe is a sign of conservatism fighting against the new political institutions.[4]

In Thailand, a hundred years ago, royalty put significant effort into the country's development, and a museum was considered to be a tool for making the nation as civilized as those in the West. The establishment of a national museum in Thailand during the 1900s, specifically the National Museum Bangkok, was also considered to be part of nationalism. It represented an attempt to construct Thailand as a modern "civilized" state equating to Western civilization at that time. Despite resistance within the empire, and with assistance from Western curators and case studies on national museums in Europe and America, the National Museum Bangkok was formed. In contrast to other museums in Thailand, the museums are "national" in the sense that almost all the objects come from royal collections, state-owned historical and cultural artifacts, or made or found in Thailand. There are also some mutual, transnational heritage objects on display. To this day, national museums in Thailand continue to help people understand the past, cherish culture, and celebrate national identity.

This paper starts with the idea that culture improves the quality of life, and national museums embrace culture as an intrinsic quality. National museums not only play an important role in unfolding unique stories of diverse cultures but also strengthen the shared story that unites members of society. People make sense of their lives by learning and telling stories about who they are, where they come from, and where they are going. By providing the means to preserve memory, sustain culture, and create identity, national museums help equip people to understand each other and themselves.[5]

HOW TO LIVE BETTER THROUGH CULTURE: A DAY OUT IN THE CITY

A museum is a place that cultivates cultural well-being, potentially contributing to livability. According to the New Zealand Ministry for Culture and Heritage 2003, the Local Government Act 2002 defines "cultural well-being" as the expectations that members of society will encompass shared beliefs, values, customs, behaviors, and identity reflected through language, stories, experiences, visual and performing arts ceremonies, and heritage.[6] Consequently, cultural well-being has become the main objective of designing a museum and curating an exhibition. National museums in Thailand play an important role by providing a connection between culture, the state, and citizenship—especially in the contemporary context—where collective identity is represented by having a culture. In the same way, national museums recognize cultural diversity. In addition to cultural well-being, museums must be at one with the third place. According to the idea of the third place, it is where "*community is most alive, and people are most themselves.*"[7] Museums can respond to developing individuality and the need for sociability.

Museums exist to collect, preserve, interpret, and display objects of artistic, cultural, or scientific significance for the education of the public. However, in recent years, people have tended to consider a museum visit in the social and recreational context. A museum visit is considered a social outing where people attend in groups—mostly family and friends.[8] Museum audience segmentation, especially in the psychographic context, including lifestyles, opinions, and attitudes, is becoming more common as museums increasingly take leisure trends into account.

Although educational trips, such as organized school visits to museums, remain a traditional form of learning outside of school, it is noteworthy that more than half of museum visitors come with family groups, partners, or friends to enjoy the day out together.[9] In the UK, research suggests most visitors prefer to travel no more than one hour to a museum and visit other attractions nearby.[10] These day-trippers choose to visit attractions within the broader spectrum, including other cultural attractions in addition to the museum, as part of their trip. Nowadays, national museums can be considered part of a wider leisure trend. In Thailand, most national museums are located near major tourist attractions, while some heritage sites can be found in the old town area. On the other hand, archaeological sites may be situated far away from tourist attractions but along the route to other places of interest. These attractions depend on local residents, day-trippers, schools, and visitors staying with friends and relatives. A trip to a local history museum or city art museum can be an entertaining and enlightening way to spend the day. To city leaders, a thriving museum community is viewed as a measure of the economic health of a city and a means to increase the cultural sophistication of its residents.

MUSEUM OF OUR CITY: EXAMPLES OF NATIONAL MUSEUMS IN THAILAND

In Thailand, there are 46 national museums located in different regions (Figure 1). The core idea of a national museum established by the Office of National Museums under the Ministry of Culture is to be a place of historical knowledge where the past can be understood and national identity cherished.[11] Thailand's first national museum was established in 1860 as a royal collection, subsequently becoming a public museum in 1926 and known as the National Museum Bangkok. From 1960 onwards, the Office of National Museums established 46 national museums, which were either newly constructed or occupied existing historical buildings. This paper elucidates four selected examples of how national museums in Thailand, maintained and funded by the national government, can contribute to the idea of livable cities. Not only are the wisdom and pride of the nation cultivated through museum visits, but the examples also show how national museums create neighborhood bonds, support both formal schooling and family learning and inspire individuals while providing a place for leisure and an oasis for city dwellers.

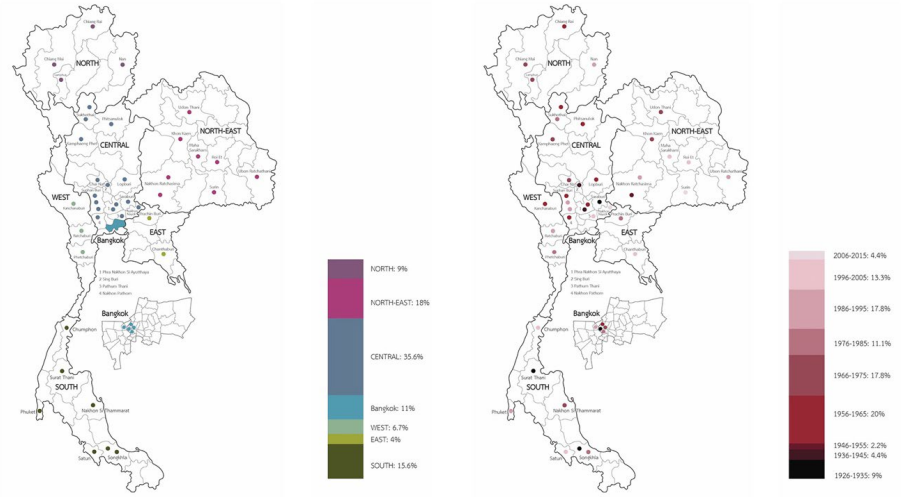

Figure 1. Location map of 46 national museums in Thailand mapped by region (left) and year built (right).

The National Museum Bangkok (Central Region)

The National Museum Bangkok was Thailand's first national museum, established in 1926. The museum is on Rattanakosin Island, a place rich in history and culture. The museum is surrounded by the National Theater, Grand Palace, Royal Plaza, temples, amulet market, and other museums (Figure 2). Before being a national museum, it was the palace of the vice king and later the royal museum.[12] Since the museum inhabits the existing historical shell, visitors can experience the grandiosity of the place together with the collections. The National Museum Bangkok holds significant royal treasures, from puppets, amulets, buddha images, thrones, to chariots of the royal cremation.

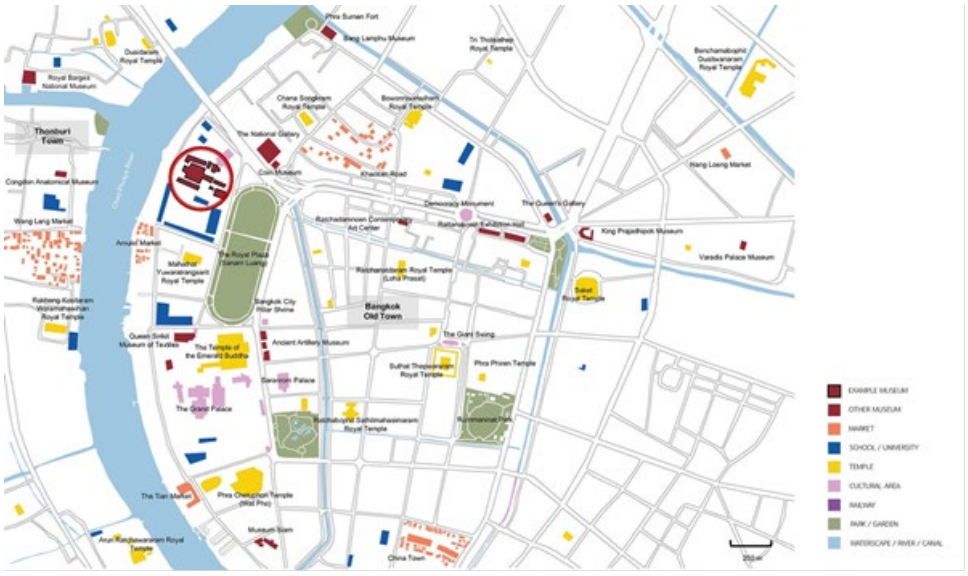

Figure 2. Cultural neighborhood map of National Museum Bangkok.

Two major renovations took place in 1967, involving the addition of new buildings and from 2012 to 2018 for new exhibition displays. With the most recent renovation, the National Museum Bangkok has upgraded its supporting facilities in all aspects to become a renovation model for other national museums. The renovation has not only enhanced the quality of exhibition content, display system,

interior space, lighting design, and supporting facilities but various activities have also been added for civic engagement (Figure 3). The new and renovated supporting facilities include an auditorium, workshop space, museum shop and café, special exhibition hall, and the reopening of historical pavilions.

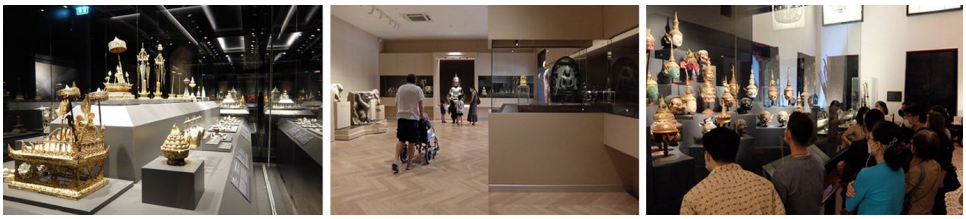

Figure 3. National Museum Bangkok after the recent renovation.

This makeover has changed the perception of how Thai people engage with national museums. It has transformed the dull, storage-like space into a vibrant atmosphere for celebrating and learning about national pride. The National Museum Bangkok is part of the Bangkok Old Town's cultural neighborhood (Figure 4). It has now become one of the must-visit places in the old town area.

Figure 4. A family day out in a Bangkok cultural neighborhood.

The Nan National Museum (Northern Region)

The Nan National Museum is in the Nan Old Town area, established in 1985. Nan's culture is a mixture of Thai, Laos, and Myanmar influences. More than ten temples surround the museum, including the Phumin Royal Temple, which is renowned for its mural painting. Due to this, many locals and Thai and foreign tourists often gather around the neighborhood and museum (Figure 5).

The museum building previously served as the governor's residence and later a town hall before being converted into a national museum. The majority of the collections in Nan National Museum are related to religious, everyday life objects and artifacts of the northern region (Figure 6). The most prominent artifact is the Black Elephant Tusk, a sacred object of the city. The famous tusk is placed in the main hall on the second floor of the museum, where different activities take place. It acts as a magnet for visitors who come to worship, learn, and take photographs with the tusk. The ground floor of the museum building connects to the plaza that hosts various civic activities. The plaza acts as a public space for tourists, a leisure space for locals, and a cultural ground for city dwellers. Nan Tourist Center is located opposite the museum, and there are several cultural activities, such as the national park route, a route to visit remaining noble houses and local museums, and an old town cycling route. In this regard, the Nan National Museum is a part of the cultural neighborhood.

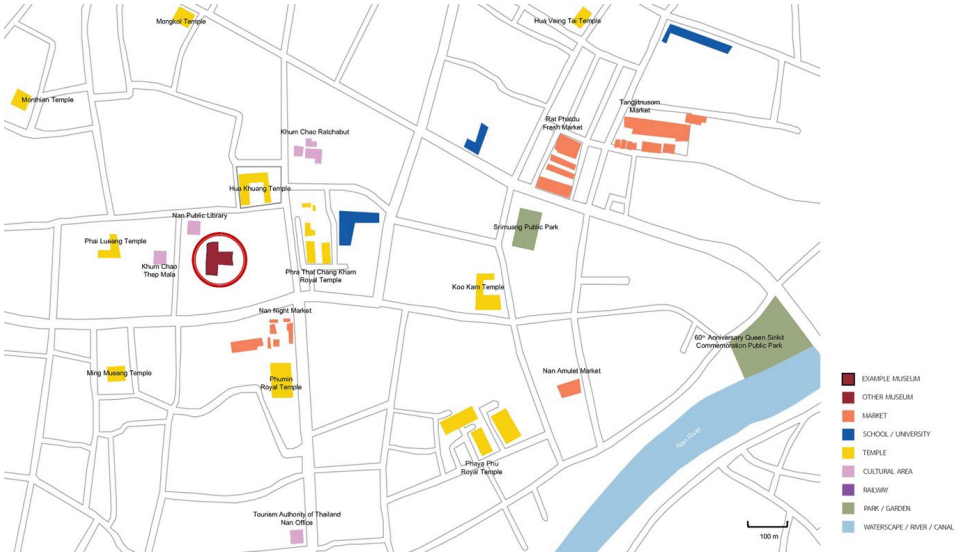

Figure 5. Cultural neighborhood map of Nan National Museum.

Figure 6. Nan National Museum.

The Ban Kao National Museum (Western Region)

The Ban Kao National Museum is in the southern part of Kanchanaburi Province. Kanchanaburi has been a strategic location for warfare from the Dvaravati era until World War II. It has a distinctive topography of high mountains in the north and lowlands with a river basin in the south. For this reason, Kanchanaburi is a historical town with diverse cultures and traces of tragedy. The inception of Ban Kao National Museum traces back to the discovery of stone tools in the Ban Kao area along the River Kwai Basin by a Dutch archaeologist who was a prisoner of war during World War II. He noticed odd-shaped rocks during the construction of the Death Railway, later identified as prehistoric stone tools. His discovery led to other archaeological excavations near the River Kwai Basin. Ban Kao National Museum was established in 1965 after many historical artifacts had been found around archaeological sites (Figure 7).

While the majority of national museums present treasures and religious artifacts as a form of national identity, Ban Kao National Museum honors historical knowledge. The exhibition contents cover prehistoric knowledge, evolution, and the way of life of stone-age people in Thailand. The brand-new building finished in 2021 is inspired by the character of the excavation holes, while at the same time, acts as a landmark of the area (Figure 8).

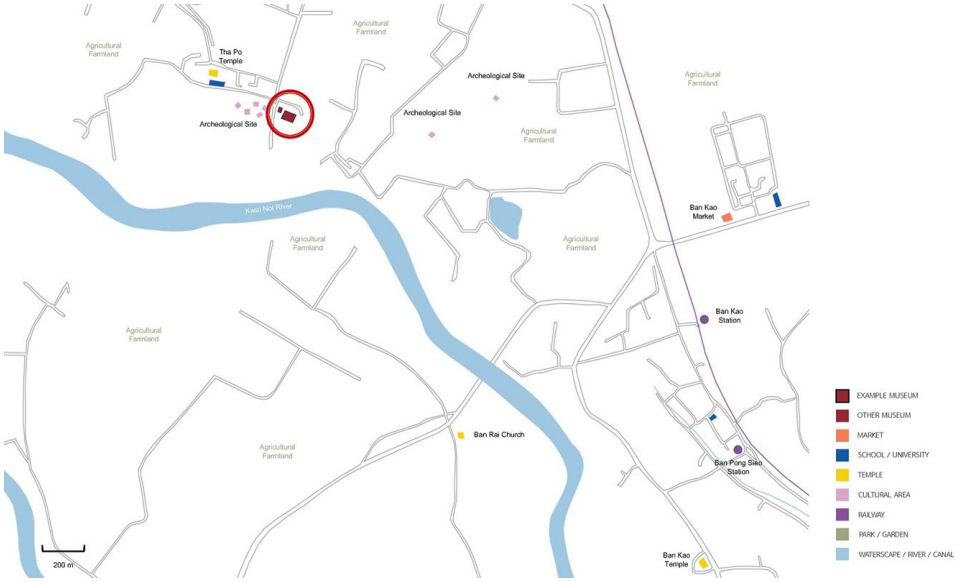

Figure 7. Historical neighborhood map of Ban Kao National Museum.

Figure 8. Ban Kao National Museum.

Nowadays, Ban Kao National Museum serves not only museum visitors but also local children. Students from Ban Kao area can learn about their roots and transfer their inherited knowledge to others. There are new supporting facilities such as a multi-purpose hall, canteen, viewpoint, assembly point, and interactive exhibitions. Kanchanaburi's diverse cultural neighborhood includes a cemetery in remembrance of wars, the railway as a monument to tragedy, along with museums and wartime architecture as memorials of past events. This unique cultural combination makes Kanchanaburi a popular travel destination.

The Songkhla National Museum (Southern Region)

The Songkhla National Museum is a historical site. The building is a mix of Chinese and Western architectural styles. The building used to serve as the governor's residence, town hall, and courthouse. After being registered as a historical building in 1973, it was converted into a national museum in 1982. The building complex has front and back courtyards, which are used as green spaces, and an inner courtyard for organizing various activities. The museum boundary is demarcated with a curved Chinese-style wall. The building has been planned as a group of four houses connected by a corridor and a grand staircase. Decorative elements such as a folding door and partition carved with dragon patterns and the roof rafters in a floral pattern represent the strong influence of Chinese culture in Songkhla, dating back more than one hundred years. The exhibition contents of Songkhla National Museum encompass the history of Songkhla from the Songkhla Peninsula, the prehistoric to the early history of Songkhla, foreign relations, arts and cultures, and the way of life of people in the lower southern region.

Songkhla is well-known for its unique Chinese and Thai cultural influence and a place where different

religions and cultures pleasantly unite. People visit Songkhla for food, art, architecture, and nature (Figure 9). In 2022, the Creative Economy Agency (CEA) organized the "Songkhla Old Town Creative District" event to encourage Songkhla citizens to preserve and revive their cultural inheritance and economy. People perceive the museum building as a landmark because of its distinct architecture. This makes the museum an attractive cultural destination for visitors and tourists.

Figure 9. Cultural neighborhood map of Songkhla National Museum.

From the four examples, it can be clearly seen that visitors of all ages are able to spend quality time both inside and outside the national museums. They can enjoy learning when attending as a school group, appreciate the collections with family and friends, spend leisure time on their own, take photographs to maintain their impressions or join in the special activities organized by the national museums. These new engagements can soften the boundary between the national museum institution and its visitors. In terms of the bigger picture, national museums can become part of the cultural neighborhood where people are part of the museum, and the museum is part of people's everyday lives.

CONCLUSION: HOW MUSEUM DESIGN MAKES OUR EVERYDAY LIFE BETTER

Museums are, above all, storehouses of knowledge. As for public perception, museums are not as public as libraries. However, in terms of the public dimension, museums should strive to be accessible, fostering personal associations, creating a sense of ownership and identity, ensuring safety, building trustworthiness, providing rewarding experiences, offering substantive content, promoting reciprocity, and presenting multiple perspectives.[13] Since the museum concept was established in 1926, Thailand has experienced changes in every aspect of life, including shifts in living patterns from rural to urban and employment from agricultural to industrial as well as a wave of immigration. The fear of rapid urbanization is seen as potentially threatening people's lives with overcrowding and congestion, social segregation, and inequality. Changes in education and the opportunity to learn are imbued with the impact of social media on young and old city dwellers. National museums face the dilemma of how to remain relevant to today's society.

Presented with the challenge of developing museum support facilities, learning activities, and public programs, the Office of National Museum Thailand has redefined its position and attempted to create a social connection by expanding the boundaries of national museum spaces to become part of people's everyday lives. Since 2010, several national museums in Thailand have undergone

renovations. Museum support facilities must have the necessary design quality for the museum to adopt the role of civic space. The spatial design of both the interior and architecture should be able to provide museum visitors with facilities to support before/in between/after exhibitions, civic engagement, education and learning, and public activities. National museums are re-examining the role they play in encouraging civic engagement and building better communities (Figure 10).

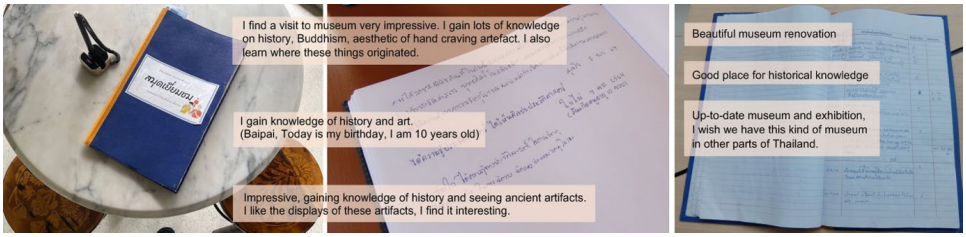

Figure 10. Examples of visitor books of national museums in Thailand.

Furthermore, when national museums aim for civic engagement, they develop in twofold. Firstly, through a program-based relationship, and secondly, through audience development. The program-based relationship introduces diverse voices into exhibition and program development. Audience development helps museums to cultivate prospective segments, identify underserved groups, focus resources, and undertake targeted programming. In the aftermath of COVID-19 and three years of social distancing, National museums in Thailand have become less formal and more public-friendly. Taking part in the leisure trend, national museums have developed public entertainment to engage with city dwellers. As can be seen, by the four examples in this study, national museums, as well as other cultural attractions, are expected to play a role in how city dwellers choose to spend their free time.

ACKNOWLEDGMENT

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NOTES

[1] Brad King, “Museums and Their Exhibitions,” in *Manual of Museum Exhibitions*, 3rd ed., ed. Maria Piacente (Maryland: Rowman & Littlefield, 2022), 10.
[2] Davide Banis, “The Role of National Museums in a Time of Nationalism,” Forbes, February 19, 2019, https://www.forbes.com/sites/davidebanis/2019/02/19/the-role-of-national-museums-in-a-time-of-nationalism/
[3] Nuntamon Kutalad, “The Role of National Museums in the Making of Nations,” Dmu, October 20, 2014, https://www.academia.edu/8863110/The_role_of_national_museums_in_the_making_of_nations
[4] Davide Banis, “The Role of National Museums in a Time of Nationalism.” Forbes, February 19, 2019, https://www.forbes.com/sites/davidebanis/2019/02/19/the-role-of-national-museums-in-a-time-of-nationalism/
[5] Christopher T. Gates, “The Civic Landscape,” in *Mastering Civic Engagement: A Challenge to Museums* (Washington DC: American Association of Museums, 2002), 27–28.
[6] Kylie Message, *New Museums and the Making of Culture* (Oxford and New York: Berg. 2006), 176.
[7] Ray Oldenburg, *The Great Good Place: Cafés, Coffee Shops, Bookstores, Bars, Hair Salons, and Other Hangouts at the Heart of Community* (New York: Marlowe & Company, 1999), 20.
[8] Graham Black, *The Engaging Museum: Developing Museums for Visitor Involvement* (Oxford and New York: Routledge, 2005), 30.
[9] Graham Black, *The Engaging Museum: Developing Museums for Visitor Involvement* (Oxford and New York: Routledge, 2005), 17.
[10] Graham Black, *The Engaging Museum: Developing Museums for Visitor Involvement* (Oxford and New York: Routledge, 2005), 14.
[11] The Office of National Museums, *Manual for Local Museums,* Thai Text (Bangkok: The Office of National Museums, 2007), 7.
[12] “History of the National Museum in Thailand,” in *Thai Junior Encyclopedia Book Number 40 / National Museum / History of the National Museum in Thailand*, Thai Text, Thai Junior Encyclopedia Foundation, accessed July 1, 2023, https://www.saranukromthai.or.th/sub/book/book.php?book=40&chap=1&page=t40-1-infodetail14.html
[13] Ellen Hirzy, “Mastering Civic Engagement: A Report from the American Association of Museums,” in *Mastering Civic Engagement: A Challenge to Museums* (Washington DC: American Association of Museums, 2002), 15.

BIBLIOGRAPHY

Banis, Davide. “The Role of National Museums in a Time of Nationalism.” Forbes, February 19, 2019, https://www.forbes.com/sites/davidebanis/2019/02/19/the-role-of-national-museums-in-a-time-of-nationalism/

Black, Graham. *The Engaging Museum: Developing Museums for Visitor Involvement*. Oxford and New York: Routledge, 2005.

Gates, Christopher T. “The Civic Landscape.” In *Mastering Civic Engagement: A Challenge to Museums*, 23–28. Washington DC: American Association of Museums, 2002.

George Washington University | Office of Student Life | Division for Student Affairs. “Cultural Wellbeing.” Accessed May 20, 2023. https://studentlife.gwu.edu/cultural-well-being

Hirzy, Ellen. “Mastering Civic Engagement: A Report from the American Association of Museums.” In *Mastering Civic Engagement: A Challenge to Museums*, 9–20. Washington DC: American Association of Museums, 2002.

Karnchanaporn, Nuttinee, and Chanida Lumthaweepaisal. *Research on Existing Supporting Facilities in Local Museums to Develop Possible Models Responding to Social and Cultural Changes in Contemporary Thai Society.* Bangkok: King Mongkut’s University of Technology Thonburi, 2021.

Karnchanaporn, Nuttinee, Chanida Lumthaweepaisal, and Nichamon Dejprasert. *Research on Education and Learning Supporting Facilities for Developing Future Learning Spaces and Education Programs in Museum: Case Study of National Museums in Thailand*. Bangkok: King Mongkut’s University of Technology Thonburi, 2023.

King, Brad. “Museums and Their Exhibitions.” In *Manual of Museum Exhibitions*, 3rd ed., edited by Maria Piacente, 7–15. Maryland: Rowman & Littlefield, 2022.

Kutalad, Nuntamon. “The Role of National Museums in the Making of Nations.” Dmu, October 20, 2014, https://www.academia.edu/8863110/The_role_of_national_museums_in_the_making_of_nations

Message, Kylie. *New Museums and the Making of Culture*. Oxford and New York: Berg. 2006.

Oldenburg, Ray. *The Great Good Place: Cafés, Coffee Shops, Bookstores, Bars, Hair Salons, and Other Hangouts at the Heart of Community.* New York: Marlowe & Company, 1999.

Sim, David. *Soft City: Building Density for Everyday Life*. Washington DC: Island Press, 2019.

Thai Junior Encyclopedia Foundation. “History of the National Museum in Thailand.” In *Thai Junior Encyclopedia Book Number 40 / National Museum / History of the National Museum in Thailand*, Thai Text. Accessed July 1, 2023. https://www.saranukromthai.or.th/sub/book/book.php?book=40&chap=1&page=t40-1-infodetail14.html

The Office of National Museums. *Manual for Local Museums,* Thai Text. Bangkok: The Office of National Museums, 2007.

WHATEVER HAPPENED TO SUB-URBANISM: PRODUCTIVE LANDSCAPE PRESERVATION IN CHINA

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INTRODUCTION

The recent interest in the countryside revitalization in China, both from a design and a political perspective, epitomized by the 2018 Venice Biennale's Chinese pavilion on the one hand, the 2021 Rural Revitalization Promotion Law, moved planners and designers' focus away from the urbanization phenomenon to the desertification of the countryside. However, the urban exodus hasn't halted, and the urban population crossed the symbolic threshold of fifty percent in 2015, continuing its upward trajectory. Fuelled by what Lefebvre refers to as "the second circuit of capital,"[1] i.e., real estate speculation, public authorities persist in transforming rural land into urban areas, resulting in perpetual urban expansion, following outdated urban models from the early 20th century. Navigating between the Arcadian vision of the countryside and the dystopian urban condition, our research delves into the forefront of urbanization to tackle issues of agricultural land loss, preservation of cultural landscapes, and housing creation. Located in South Zhejiang, the Wenzhou landscape is marked by its productive transition from agriculture to small-scale industries, and its urban fringes exemplify this mutation. In the transitional margins of the grand urban project, agriculture and industries coexist with the city's layout to come: new highways overlap with villages, large-scale demolition with partial preservation, Homo Faber and Homo Ludens.

In this middle landscape,[2] this coexistence of cultural, environmental, and economic milieus is jeopardized by the endless urbanization and the blind spot that constitutes the urban edge for both the political and planning actors. In these conditions, traditional planning and architectural tools are limited to grasping the complexity of the environment. Our approach build on Sébastien Marot's concept of "Sub-Urbanism," "an approach to design where the hierarchy established by modern urbanism between programme and site ('from the inside outwards,' from programme to site, from the city to the territory) is overturned, such that the site becomes the regulatory idea of the project and almost the subject in which the programme has to be deciphered."[3] Rooted in Landscape planning and inspired by Land-art practices such as Robert Smithson's exploration of New Jersey, this position capitalizes on existing conditions to imagine revitalization alternatives neither following the towers fields of Le Corbusier nor the ideal image of a preserved countryside. Learning from the existing infrastructural overlapping and the disurbanists' speculations, our proposal questions the traditional juxtaposition of the city and the countryside to explore overlapping scenarios.

Our design aims to answer the need for population growth in urban fringes, driven by rural-urban migration and economic development, while providing the existing population ways to preserve and improve their previous means of production: small-scale industries and agriculture.

In the first part, our paper will dig into the current productive landscape, characterized by ruralization processes on one hand and urbanization on the other; in the second part, we will outline scenarios to preserve and develop this transitional territory.

RURALIZATION UNVEILED: MAPPING PERSISTENCE AND CHANGES

The theory of ruralization, as envisioned by Jamie Gillen,[4] intricately weaves together socio-spatial dynamics that defy conventional urban-rural dichotomies, finding resonance within the tapestry of Wenzhou's urban transformation. Gillen's framework encompasses three interwoven geographies—each distinct yet interrelated—offering an insightful exploration of the nuanced interplay between rural and urban elements, their transformations, and their narratives. This exploration reframes the rural from a static "other" into a dynamic force that intricately shapes contemporary landscapes and livelihoods.

At the core of Gillen's theory lies the concept of "in situ ruralization," revealing the ongoing (re)production of spaces and practices traditionally associated with rural life. Stereotypical rural landscapes, from quaint villages to small-holder agricultural realms, persist and evolve amid shifting urbanization dynamics. This process challenges traditional notions of urban progress versus rural stasis, portraying ruralization as an active process shaped by historical legacies and adaptive strategies that continuously reshape spaces within the broader urbanizing landscape.

Gillen's "extended ruralization" delves into the intricacies of livelihood strategies that transcend geographical confines. This concept disrupts traditional boundaries between rural and urban, acknowledging how peasant livelihoods extend into spaces conventionally labeled as urban. The fusion of rural practices within urbanizing regions prompts a reevaluation of urban and rural dynamics. It uncovers the persistence of "rural" elements within the urban fabric, resulting in hybrid spaces where subjectivities, land uses, and livelihoods intermingle, often challenging conventional urbanization narratives. The notion of "rural returns" presents a dual perspective, differentiating urban and rural prospects and identities among new urban migrants while reflecting cyclical returns to rural spaces after urban exposure. This movement reshapes the urban-rural relationship, highlighting the emergence of rural imaginaries and ideals. Gillen's theory underscores the dynamic nature of ruralization, going beyond simplistic categorizations to reveal the multifaceted nature of these geographies and the fluid interplay between them.

In the context of Wenzhou's urban transformation, the fusion of Gillen's theories with the "Wenzhou Model"[5] offers a unique lens to intertwine rural household industries within the trajectory of urban demolition. This fusion births a transformative self-construction and house cooperation network that transcends conventional urban boundaries, leveraging entrepreneurial culture, adaptable regulations, and social networks. This network envisions communal spaces within urban pockets housing rural household industries, fostering vibrant artisanal production and trade networks. The synergy between Gillen's theories and Wenzhou's dynamic landscape challenges traditional urban and rural definitions. The envisioned network dismantles the confines of urban demolition by creating spaces where rural and urban intertwine harmoniously, nurturing creativity, resilience, and sustainability. In this fusion, authenticity, innovation, and sustainability converge to weave a narrative that transcends dichotomies and celebrates the transformative power of rural and urban interplay. Thus, the convergence of Gillen's theories with Wenzhou's urban dynamics unfolds a blueprint for rural household industry networks. It's a fusion that defies isolation, weaving a narrative where rural practices and urban aspirations intertwine to shape a future where the "many" converge over the confines of "the other." This reimagined landscape crafts a dynamic continuum where the rural and urban coexist, embracing the complexities of their interplay and steering the course of contemporary society.

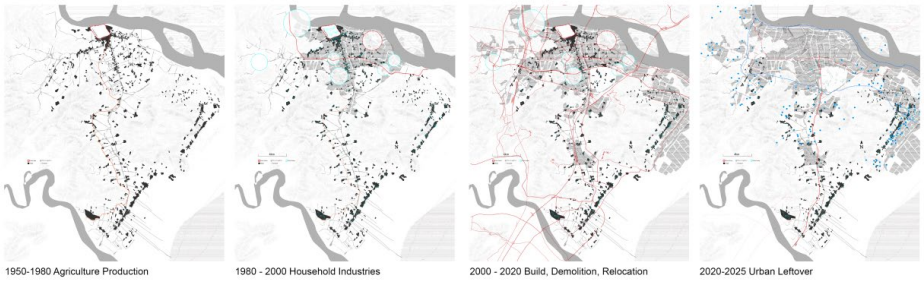

Figure 1. Wenzhou Urbanization Process 1950-2025 (Drawn by Zhao Ruzhen)

Ruralization Through Time: Shifting Boundaries and Dynamic Narratives

The evolution of ruralization in Wenzhou territory spans from the post-war period to now, with an acceleration during the Reform and Opening up and in the last twenty years. Between 1950 and 1980, the settlement pattern followed an agricultural model where production was adapted to the geographical condition, shaping villages' boundaries. This era was characterized by an organic connection between human settlements and their natural environment, where the very location determined spatial parameters. Fast forward to 2010-2020, and a new epoch emerges. The demolition policy and expansive reach of developers ushered in a phase where conflicting forces reshaped village boundaries. Migrants, villagers, and family factory workers were uprooted, seeking refuge in the outskirts or resettlement houses. Urban transportation infrastructure, a powerful agent of change, redefined the very contours of villages. In this era, tradition yielded to emergent realities, and the momentum of urban plans and infrastructure overshadowed the traditional articulation between geography and settlement. Amidst these dynamic shifts, a tapestry of continuity and change unfolds—a testament to the resilience of communities and the evolving thread of heritage. The boundaries that once mirrored geography now intertwine with the tides of progress, forging a landscape in flux. The chronicles of ruralization, an odyssey through time, narrate the collision of tradition and progress, etching a path towards an ever-changing horizon.

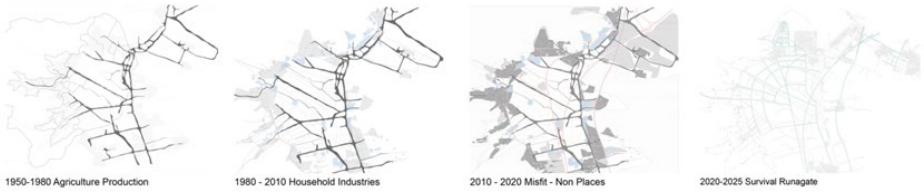

Figure 2. Wenzhou Ruralization Process 1950-2025 (Drawn by Zhao Ruzhen)

NAVIGATING COMPLEX INTERSECTIONS:
INDUSTRY STRIPS, URBAN ROADS, AND VIADUCTS

The intricate dance between industry strips, urban planned roads, and viaducts reveals a nuanced relationship shaped by spatial conditions, economic dynamics, and the ever-evolving fabric of urban landscapes. Within this dynamic interplay, three distinct conditions emerge, each offering a unique perspective on the convergence of industry, mobility, and community. These conditions prompt consideration of continuity as a catalyst for redefining rural industry strips in the face of impending demolition stages.

Condition 1: Coffee Strip Conundrum

The coffee strip near the street, curated by overseas emigrants, is confronted by the expansion of the road. This spatial transformation necessitates a crucial decision for these businesses to move their shops to adjacent villages or adapt to a new spatial reality. This condition underscores the challenge of preserving vibrant business clusters while accommodating urban expansion. The continuity between the existing coffee strip and potential village locations opens the dialogue for reimagining the concept of industry strips, connecting communities across different spatial dimensions.

Condition 2: Viaduct Ventures: Factory Spaces Beneath

The utilization of space under viaducts as factory and distribution centers underscores the adaptive nature of urban spaces. The spatial constraints and possibilities are redefined as viaducts expand to accommodate changing needs. The emergence of transitional edges within villages, driven by the multifaceted demands of informal uses, offers a unique opportunity for innovation. The continuity between the under-viaduct factories and their transitional edge counterparts hints at the potential for cross-pollination, fostering symbiotic relationships between industrial activity and community dynamics.

Condition 3: Fragmented Villages and Industrial Circulation

The fragmentation of old villages by roads or transportation corridors presents a complex challenge to the continuity of community life. However, amidst this fragmentation, an intriguing possibility emerges—the synergy between industry clusters and villages forming a new circulation. The continuity between fragmented village elements and the interconnected industry clusters forms a foundation for a new narrative. This narrative envisions rural industry strips as nodes that engage in different demolition stages, bridging the gaps between urban expansion and cultural heritage preservation.

Spatial Reimagining: Navigating Uncertain Terrain:

The scenario prompts a reconsideration of spatial design and planning. Integrating relocation materials transfer, escape routes for the floating population, resettlement locations, encroachment spaces, resting areas, and tourism aspects into a coherent framework necessitates a meticulous approach. By fostering spatial coherence that respects the unique needs of each condition while envisioning a holistic fabric, stakeholders can redefine industry strips as spaces of continuity, adaptability, and vibrancy.

During the ruralization process, villages stand as witnesses to the ebb and flow of time, each with its unique demolish conditions, forming an ensemble of distinct time zones. These time zones interplay with the occupation of industries, creating a symphony of change, resilience, and adaptation. As we traverse the landscapes of Wangzhai, Bo Ao, Zili, and Shefang villages, a narrative emerges of preservation and reinvention, atavism of pre-modern life, and the emergence of urban habitus.

Figure 3. Overlapping Conditions in the Wenrui Plain (Drawn by Zhao Ruzhen)

Wangzhai Village: Embracing Heritage Through Learning

In embracing industrialization and transformation, Wangzhai exemplifies the village as a canvas for reinvention. The echoes of the past find resonance in its transition to a current extension project for the Wenzhou-Kean University campus — a place where the old housing waits for its academic future uses. The dormitories that rise amidst the demolished agricultural land create a tranquil haven where the spirit of learning commingles with the whispers of tradition. Wangzhai Village morphs into an innovative space, a testimony to the resilience of architecture, culture, and education.

Bo Ao Village: A Gastronomic Gateway to Culture

Bo Ao Village, nestled near the south of the existing campus, charts a path of transformation that resonates with culinary exploration and cultural immersion. The remnants of a flower market and a stone factory echo through its streets, laying the foundation for a gastronomic journey. As the village becomes a food street, it intertwines heritage with culinary exploration. A haven for migrants and students alike, Bo Ao Village reinvents itself as a gastronomic gateway—a testament to the fusion of sustenance and culture.

Zili Village: Spaces of Community and Transition:

Beneath the arch of viaducts, Zili Village unveils a narrative of community and transition. As the industrial hum resonates, the village cultural hall and bulletin board become a gathering hub while the basketball court beckons with echoes of camaraderie. Zili Village dances between spaces of industrial ingenuity, migrant resilience, and communal bonding. The solid walls bridge open markets and closed storage rooms, embodying a harmonious interplay of function and transformation.

Shefang Village: The Resilient Heart of Recycling

Resilience and adaptation find a home in the heart of Shefang Village, where demolitions leave voids. Backyards transform into recycling areas, where the echoes of demolition are repurposed for renewal. As bricks find solace beneath viaducts, Shefang Village becomes a living testament to the art of

recycling and reinvention. Amidst the shifting landscapes, the village retains its heart, resonating with the spirit of renewal and resourcefulness.

Weaving a Tapestry of Continuity

These vignettes outline potential scenarios for future transformation. Villages stand as witnesses to the passage of time, adapting, reinventing, and preserving harmony. As industrial strips, viaducts, and urban roads reshape landscapes, these villages provide models for adaptation, resilience, and the enduring pursuit of community. Continuity emerges as the common thread amid the flux—a guiding light that navigates these diverse landscapes, fostering a harmonious future where tradition and progress coexist.

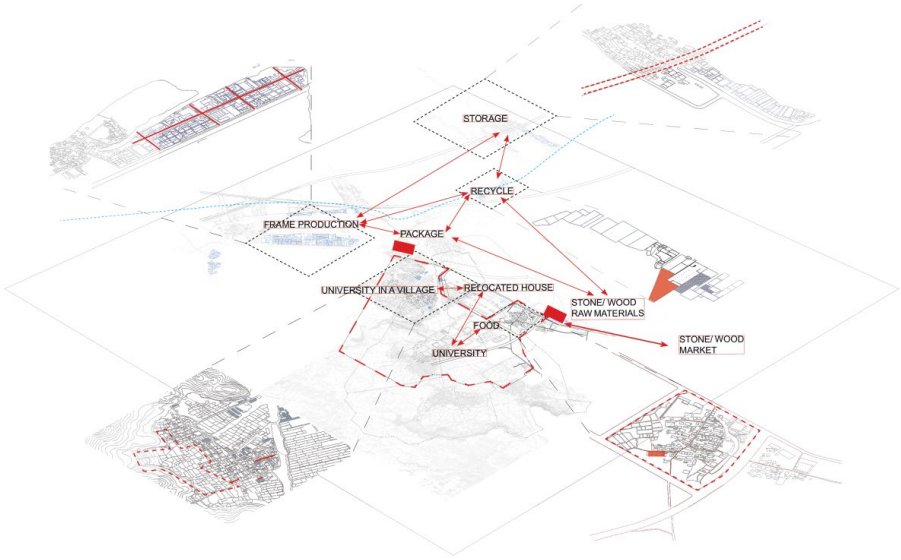

Figure 4. Redefinition of the connections (Drawn by Zhao Ruzhen)

Informal Modification

The "Wenzhou Model" thrived in a relaxed institutional environment, encouraging private enterprises to flourish. This environment, characterized by the government's tolerance and support, allowed the model to overcome inherent challenges and emerge successfully. This principle resonates with the concept of informal modification within rural household industries. The ability to adapt, occupy, expand, and creatively repurpose spaces reflects the agility of the "Wenzhou Model." As the urban demolish process unfolds, these principles can be harnessed to create cooperative spaces where different households converge, expand, and reshape the urban landscape according to their evolving needs.

The depiction portrays various house plan modifications, artfully designed to optimize cooperative systems. This typology showcases an array of inventive strategies, each embodying unique forms of resilience—from replacement and relocation to expansion, occupation, misfit, and abandonment. Anchored in a bay system meticulously constructed through columns and walls, these adaptations breathe new life into conventional structures. – as illustrated in Figure 5.

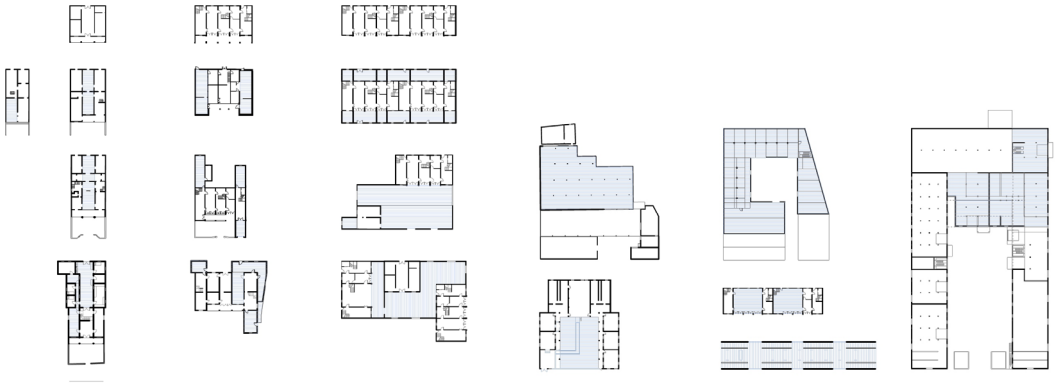

Figure 5. Informal Public/Private Occupation Typology (Drawn by Zhao Ruzhen)

Within this framework, the original functions of spaces transform, giving rise to innovative communal areas. Linear yards morph into vibrant cooperative hubs, serving as communal spaces for cooking and dining within individual houses. Courtyards and agricultural lands are thoughtfully occupied, extending the bounds of traditional domains. Houses are ingeniously repurposed to create interconnected yards, while upper and lower floors are opened up to accommodate machinery for efficiently loading goods. Venturing deeper, voids within structures are created, a nuanced interplay where a single house houses diverse factories and distinct living components, harmoniously coexisting. Even the once-secluded backyards find purpose, nurturing pigeon coops adjacent to recycling hanging brackets.

These adaptations unveil the essence of everyday urbanism—a seamless blend of the informal and spontaneous. This flexible approach to space transforms households into epicenters of cooperation, forging a vibrant synergy that encapsulates the spirit of rural-urban integration. As these adaptations merge form and function, they mirror the dynamism of ruralization in action, revealing the transformative potential embedded within the intricate interplay of architecture and community-driven evolution.

Resistance Type

The synergistic between the process of demolition and the occupation of industry intertwine seamlessly in the flexible patterns of activity that now animate what was once a house but has transformed into an expansive void. This metamorphosis is artfully realized through the employment of two ingenious spatial strategies. The first strategy revolves around the occupation of space facilitated by adaptive reusing of demolished part of factory backyard—an embodiment of Michel de Certeau's spatial "tactics."[6] The recycling and conversion of previously destroyed sites into places where metal can be reused embodies everyday spatial practices that transcend fixed locations, evoking what he coined as the "art of the weak." This art form, deeply woven into the fabric of power dynamics, redefines spatial utilization within the void, enabling a dynamic and fluid interplay between industry and urban form. – as photographed in Figure 6.

Figure 6. New Type-Adaptive Reuse of demolished land (Photographed by Zhao Ruzhen)

The design application of this approach revolves around harnessing the potential of voids and repurposing them to foster innovative spatial solutions. In the context of demolition and household factory dismantlement, the emergence of voids within the urban landscape creates a unique opportunity for adaptive reuse. The factory's intervention exemplifies how these voids can be strategically occupied and transformed into functional spaces that cater to various needs.

One key application is the conversion of open spaces left behind after building destruction. Rather than allowing these spaces to remain dormant, they are repurposed as bustling food markets, attracting vendors and residents alike or cafe for overseas Chinese to meet. This adaptive use revitalizes these voids, generates economic activity, and fosters social interactions. Similarly, the transformation of a former school into a clothing and furniture factory underscores the adaptability of spaces over time. As factories move away and rented houses are abandoned, these voids within the urban fabric offer opportunities for creative reimagining. By strategically integrating roof structures into courtyards, previously disjointed spaces become interconnected, offering a continuum of functional areas. These spaces can serve as workshops for assembling house components, responding to the community's evolving needs. – as illustrated in Figure 6.

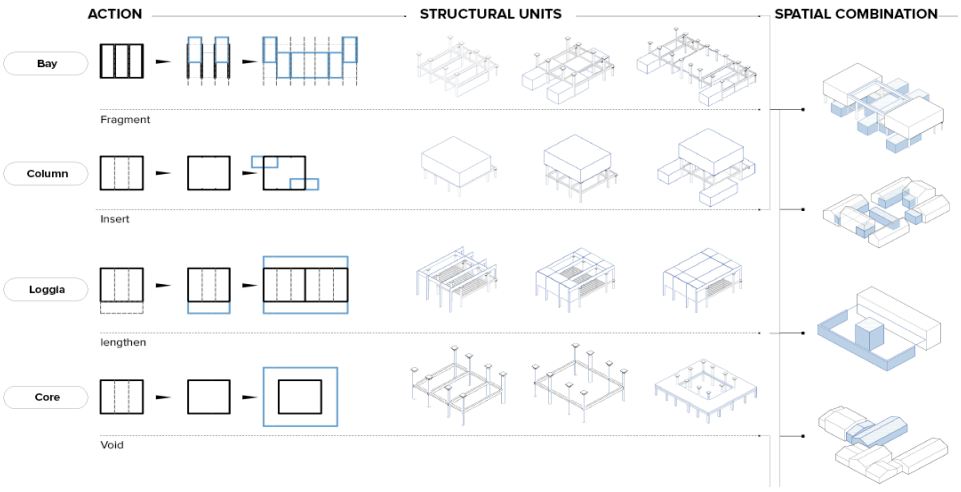

Figure 6. Occupation Transformation (Drawn by Zhao Ruzhen)

The application of this approach extends beyond physical space. It emphasizes the importance of identifying opportunities within urban transformation processes, where voids and disruptions can be leveraged to foster innovation and collaboration. This approach showcases how unplanned areas can become catalysts for adaptive reuse, social engagement, and economic growth by redefining spaces and their functionalities. Applying these principles empowers communities to actively shape their environments, creating a dynamic interplay between demolition, occupation, and repurposing that enriches the urban and rural fabric.

The principles of the rural self-built housing concept and the ideas conveyed by McTaggart's "Spontaneous Settlement"[7] deeply reflect the structure and spatial organization. This concept of housing, characterized by residents constructing their homes without the intermediary of contractors or architects, presents a housing dilemma that addresses people's fundamental right to life and the appreciation of spatial value. This approach embraces the spontaneous utilization of public spaces and the "overflow" of private spaces, fostering shared interests across various scales. Drawing parallels to Herbert Kramel's Zöllig Project,[8] which offers valuable insights into rural contexts in Wenzhou, the principles are modified to align with the specific rural dynamics. This adaptation is distinctly reflected in the flexible modification of roof structures. The design process is rooted in the intricate details of the roof frame, or the "node." This node acts as a focal point, guiding the construction of various roof frames that cater to the practical spans required by wood factory workshops. Vertically arranging the roof truss within the available spatial framework follows the site's feasibility and layout, emphasizing the essence of the factory workshop design—the creation of a roof that determines the structural significance of the span. – as illustrated in Figure 7.

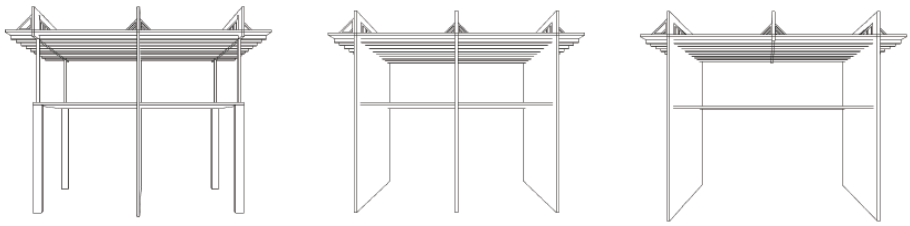

Figure 7. Framework (Drawn by Zhao Ruzhen)

The rural self-built housing concept and "Spontaneous Settlement" principles advocate for a hands-on approach to housing construction that resonates with the local community's needs and values. The reference to Kramel's project underscores the adaptability of these principles within the Wenzhou rural context, specifically in the context of structural design. The emphasis on the node as a starting point demonstrates how the structural intricacies align with the philosophy of spontaneous settlement, as both strive to create functional spaces that respond organically to the environment and user needs.

An intriguing paradox arises: the void, often perceived as a backdrop, takes center stage while architecture assumes a subsidiary role. This philosophy resonates with the geographic boundaries of Wenzhou, where continuous islands metamorphose into strips, forming both planned and unplanned territories. Resources within these strips undergo repricing, while the untouched voids are perceived as valuable public resources. The unplanned layers within the overlapping system can be segmented

into three distinct sets: the reevaluation of natural resources, the establishment of resource management institutes, and the emergence of a land leasing market. These elements collectively establish the infrastructure that lays the foundation for future transformations—a conceptual framework that reshapes development patterns, settlement dynamics, production processes, and population density. This approach redefines the relationship between architecture, space, and the potential latent within the void, ushering in a novel urban planning and development era.

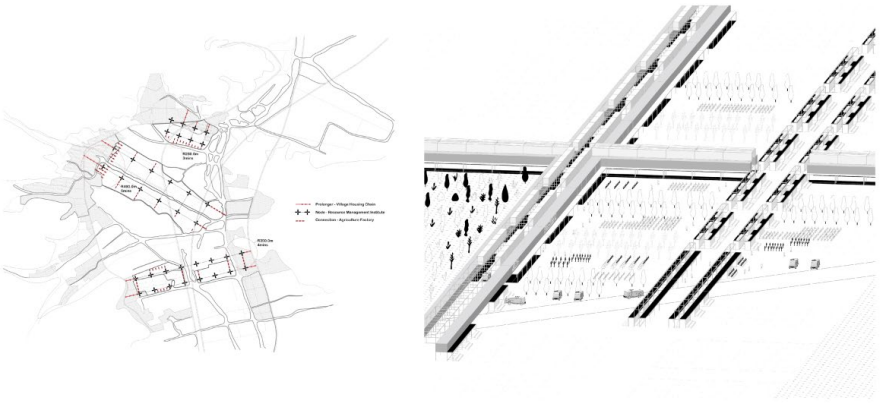

Figure 8. The Unplanned Layer

CONCLUSION

In conclusion, integrating Jamie Gillen's ruralization theory and the "Wenzhou Model," we explore the fusion of rural household industries within urban demolish. Michel de Certeau's tactics and the "Strategy of the Void I" underscore the potential of surrendered, unplanned spaces. McTaggart's "Spontaneous Settlement" and Herbert Kramel's Zöllig Project highlight self-built housing's adaptability. The findings emphasize the vitality of recognizing ruralization's fluidity, the efficacy of integrating rural industries into urban demolish, the strategic use of informal tactics, and the power of surrendered unplanned space. These implications contribute to a holistic transformation of rural and urban landscapes, bridging divides and shaping a resilient future.

NOTES

[1] Henri Lefebvre, *The Urban Revolution*, trans. Robert Bononno (Minneapolis: University of Minnesota Press, 2003), 159.
[2] Peter G. Rowe, *Making a middle landscape* (Cambridge MA: the MIT Pres, 1991)
[3] Sébastien Marot,. "Sub-Urbanism / Super-Urbanism: From Central Park to La Villette." *AA Files*, 53 (2006): 20–37. http://www.jstor.org/stable/29544815. And *Sub-urbanism and the Art of Memory*. (London: Architectural Association, 2022)
[4] Jamie Gillen, Tim Bunnell, and Jonathan Rigg. "Geographies of Ruralization." *Dialogues in Human Geography* 12-2 (2022), 186–203. https://doi.org/10.1177/20438206221075818.
[5] Kristen Parris, "Local Initiative and National Reform: The Wenzhou Model of Development." *The China Quarterly*, 134 (1993): 242–63. http://www.jstor.org/stable/654301
[6] Michel de.Certeau, *The Practice of Everyday Life*. Trans.Steven Rendall, (Berkeley: University of California Press, 1984), 29.
[7] W. Donald McTaggart, "Geographic Perspective on Spontaneous Shelter", in Carl V. Patton ed. *Spontaneous Shelter* (Philadelphia:Temple University Press, 1988)
[8] Chen. Zhao,"Herbert Kramel and My Academic Confidence of Tectonic Culture." *Architectural journal* 654 (2023): 25–31.

BIBLIOGRAPHY

Chase, John, Margaret Crawford, and John Kaliski. *Everyday urbanism.* New York: Monacelli, 2009.
Chen, Ningning, and Lily Kong. "Rural Revitalization in China: Towards Inclusive Geographies of Ruralization." *Dialogues in Human Geography* 12 - 2 (2022): 213–17. https://doi.org/10.1177/20438206221102933.
de.Certeau, Michel, *The Practice of Everyday Life*. Translated by Steven Rendall. Berkeley: University of California Press, 1984.
Gillen, Jamie, Tim Bunnell, and Jonathan Rigg. "Geographies of Ruralization." *Dialogues in Human Geography* 12-2 (2022), 186–203. https://doi.org/10.1177/20438206221075818.
Lefebvre, Henri, *The Urban Revolution*. Translated by Robert Bononno. Minneapolis: University of Minnesota Press, 2003.
Lin, Sainan." New Wenzhou: Migration, Metropolitan Spatial Development and Modernity in a Third-tier Chinese Model City ", Doctoral Dissertations, University of Massachusetts Amherst, 2015. https://scholarworks.umass.edu/dissertations_2/522
Marot,. Sébastien, "Sub-Urbanism / Super-Urbanism: From Central Park to La Villette." *AA Files*, 53 (2006): 20–37. http://www.jstor.org/stable/29544815.
Marot,. Sébastien *Sub-urbanism and the Art of Memory*. London: Architectural Association, 2022.
McTaggart, W. Donald, "Geographic Perspective on Spontaneous Shelter", in Carl V. Patton ed. *Spontaneous Shelter*. Philadelphia:Temple University Press, 1988.
Parris, Kristen, "Local Initiative and National Reform: The Wenzhou Model of Development." *The China Quarterly*, 134 (1993): 242–63. http://www.jstor.org/stable/654301
Parsons, Laurie, and Sabina Lawreniuk. "Geographies of Ruralisation or Ruralities? The Death and Life of a Category." *Dialogues in Human Geography* 12- 2, (2022): 204–7. https://doi.org/10.1177/20438206221102937.
Rowe, Peter G., *Making a middle landscape*. Cambridge MA: the MIT Pres, 1991.
Thwaites, Kevin, Alice Mathers, and Ian Simkins. *Socially restorative urbanism: The theory, process and practice of experiemics*. London: Routledge, 2013.
Zhao, Chen."Herbert Kramel and My Academic Confidence of Tectonic Culture", *Architectural journal* 654 (2023): 25–31.
Lin, Sainan." New Wenzhou: Migration, Metropolitan Spatial Development and Modernity in a Third-tier Chinese Model City ", Doctoral Dissertations, University of Massachusetts Amherst, 2015.

ASSESSING THE EFFECTIVENESS AND REGULATORY COMPLIANCE OF A MUNICIPAL INCLUSIONARY HOUSING PROGRAM

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INTRODUCTION

This paper contributes to the growing knowledge base on incentive zoning (IZ) and inclusionary housing programs (IHPs) in high-cost American cities and to preliminary understandings of their effectiveness. IHPs encourage or require the provision of affordable housing units in new market-rate housing developments of a set unit size, often in exchange for development incentives such as density bonuses. Unlike housing produced by public housing authorities or nonprofit organizations, inclusionary housing units typically are not publicly funded. City agencies may manage their waiting lists, but the costs of building and maintaining the affordable units are paid by the developer and the building owner. Exploring the effectiveness of these programs, and in particular their legal compliance, is of growing import as the private market expands and the public sector contracts their roles in the production of affordable housing.

Affordable Housing: Growing Need, Shrinking Funding, and New Challenges

Federal funding for most affordable housing programs has decreased annually since the mid-2000s; however, the need for them has only grown.[1] The National Low Income Housing Coalition makes this brutally clear: "In only 5% of all U.S. counties...can a full-time minimum-wage worker afford a one-bedroom rental home at fair market rent."[2] Waitlists for public housing—once the federal solution to housing America's lower paid workers—can run over a decade long, and voucher waitlists can be even longer.[3] A lottery for affordable housing in a new mixed income building in San Francisco yielded 6,580 applications; in New York, a similar lottery yielded 969 applications for every unit.[4] Moreover, rapid increases in urban land values—in some counties, over 40% in five years—make acquiring land for affordable housing development difficult and may also further concentrate poverty.[5]

Inclusionary Zoning and Inclusionary Housing Programs

734 municipalities in thirty-one states had Inclusionary Zoning (IZ) and Inclusionary Housing Programs (IHPs) in 2019.[6] IZ capitalizes on growth in the private residential market to produce affordable housing. It therefore leverages some of the factors which in recent years have made building 100% affordable housing difficult. Because there are no federal requirements for IHPs, programmatic characteristics differ widely. Common elements include:

- Determined affordable set asides, the percentages of housing units in market-rate housing developments which are designated as affordable
- Set residential unit numbers which trigger the zoning, known as unit thresholds
- Income groups targeted for the affordable units, falling somewhere between below 50% of the Area Median Income (AMI) and 120% AMI
- Affordability terms for the allocated units which may expire or exist in perpetuity
- Exemptions for certain projects, often redevelopment projects
- Incentives such as density bonuses to encourage developers to build larger unit sizes (three bedrooms, for example), or to set aside a higher percentage of affordable units
- In-lieu fees which allow developers to "buy out" of the program through payments to an Affordable Housing Trust

Existing research has examined the impacts of IZ on affordable housing production and assessed how regulatory differences among ordinances influence program outcomes.[7] Aspects of IZ, such as the number of housing units which trigger affordability requirements, differ by municipality and have been debated by scholars and practitioners. However, there appears to be general agreement that, "jurisdictions with voluntary programs that rely on 'carrots' with no 'sticks', mandatory programs with weak compliance alternatives, or mandatory programs that impose onerous conditions with few, if any, financial or regulatory offsets typically fail to achieve the purported goals of the program."[8] Similarly, IZ has had inconsistent impacts on the spatial distribution of affordable housing, as each program is reliant on the nuances of local land use policies and neighborhood demographics like homeownership rates.[9] Despite differences in language and outcomes, researchers agree that IHPs are "important part[s] of a larger housing strategy."[10]

The literature appears focused on unit production instead of the experiences of tenants in inclusionary units. This is surprising, given that disparate treatment of IHP tenants could constitute a violation of the Fair Housing Act.[11] Despite a lack of research on IZ tenants and program compliance, the experiences of participants in other affordable housing programs have been studied through both qualitative and quantitative means.[12] Some of these studies have looked at longer term impacts of affordable housing on tenants, such as educational attainment, while other research has assessed shorter-term results, such as tenant satisfaction with their neighborhoods and dwelling units. Mohit et al. articulates these criteria as "objective attributes of residential environments."[13]

CASE STUDY: INCLUSIONARY ZONING IN A MEDIUM-SIZED NEW ENGLAND CITY (USA)

One IHP in New England (USA) has been selected as a case to understand the experiences of affordable renters in IHPs, and the program's compliance with zoning. The researcher is a former tenant in the IHP under study and has experienced first-hand some of the program's benefits and burdens. First adopted in 1998 and adjusted twice since then, the IZ under study requires that 20% of the floor area of new residential construction be set aside for units affordable to residents making between 50% and 80% of the Area Median Income (AMI). IZ applies to both rental and homeownership developments in all of the city's neighborhoods. Renovations and new buildings under ten units are exempt. The IHP under study does not allow housing developers to opt out of building affordable units onsite by paying an in-lieu fee. Adherence to IZ is also mandatory, although projects which trigger the zoning are eligible for relaxed dimensional requirements. The IHP's income limits by unit size appear in Figure 1.

	HUD 50% of Median	HUD 60% of Median	HUD 80% of Median	City 80% of Median
1 person	$ 51,950	$ 62,340	$ 82,950	$ 83,610
2 persons	$ 59,400	$ 71,280	$ 94,800	$ 95,550
3 persons	$ 66,800	$ 80,160	$ 106,650	$ 107,500
4 persons	$ 74,200	$ 89,040	$ 118,450	$ 119,440
5 persons	$ 80,150	$ 96,180	$ 127,950	$ 129,000
6 persons	$ 86,100	$ 103,320	$ 137,450	$ 138,550
7 persons	$ 92,050	$ 110,460	$ 146,900	$ 148,110
8 persons	$ 97,950	$ 117,540	$ 156,400	$ 157,660
	⟵ Inclusionary Housing Rental Program** ⟶			

Figure 1. 2023 income limits to qualify for an IHP unit without a housing voucher[14]

Research Questions

Using Mohit et al.'s criteria, I test the adherence of the Inclusionary Housing Program under study to the stated goals of its zoning by assessing compliance with 11.203.3 of the city's Zoning Code. 11.203.3 establishes nine Standards for Providing Affordable Dwelling Units Created through Inclusionary Housing (hereafter, "Standards"). These guidelines regulate against disparate experiences between market-rate and affordable tenants in residential properties within the IHP. I pose the following research question: *has the Inclusionary Housing Program achieved the goal set by Section 11.200 of the Zoning Ordinance to "promote the public health, safety, and welfare...by increasing the production of affordable housing."*[15]

In order to answer this question, I pose a secondary research question which is tested through fieldwork: *has the Inclusionary Housing Program met the Standards for Providing Affordable Dwelling Units Created through Inclusionary Housing in Section 11.203.3?*

Three out of the nine Standards for Providing Affordable Dwelling Units were selected for testing on the case. Each Standard, as it is stipulated in the Zoning Code, appears in Table 1.

Methodology

The three Standards under study appear in Table 1. Alongside each Standard are notes on the methods and data utilized to test compliance. These Standards were selected because they regulate "objective attributes of residential environments"[16] and allow comparisons to be made between the experiences and living environments of market rate and affordable tenants of the same buildings. Two buildings which participate in the IHP were chosen as study sites for their differences after considering some of the factors the literature highlighted as challenging unit production or the fulfillment of program requirements: location, market value, and economic climate. These are The Vista, a building located in the center of the city completed in the 2000s, and The Hearth, a newer complex of buildings located in a former industrial district on the city's periphery. Building names are pseudonyms intended to protect the identity of respondents.

Standard	Methodology
Affordable Dwelling Units shall be similar in size, layout, construction materials, fixtures, amenities, and interior and exterior finishes to comparable non-Affordable Dwelling Units in the project.	Photographs Floorplans Interviews
Affordable Dwelling Units shall have similar access to common areas, facilities, and services as that enjoyed by comparable non-Affordable Dwelling Units in the project including but not limited to outdoor spaces, amenity spaces, storage, parking, bicycle parking facilities, and resident services.	Interviews Photographs
Affordable Dwelling Units shall be dispersed throughout the project rather than concentrated on particular floors, within sections of a building, or within particular buildings in a project with multiple buildings.	Blueprints Deeds Interviews

Table 1. Three Standards for Providing Affordable Dwelling Units to be assessed by this study.

Semi-structured interviews were held over Zoom with participants from five stakeholder groups:

- 3 Inclusionary Housing tenants
- 1 market-rate tenant
- 1 planner at the local Community Development Department (CDD)
- 1 real estate developer
- 1 City Councilor
- 1 mediator at a local CDC

Findings

Important terms which appear in the reporting of results include "resident(s) in the IHP," "IHP resident(s)," "IHP tenant(s)," "tenant(s) in IHP," "affordable renter(s)," or "affordable tenant(s)." These terms are used interchangeably to describe residents who rent units designated as affordable under IZ within the IHP.

Has the Inclusionary Housing Program achieved the goal set by Section 11.200 of the Zoning Ordinance to "promote the public health, safety, and welfare...by increasing the production of affordable housing?"

Affordable housing produced through IZ is affordable in perpetuity. Since 1998, 1,102 affordable units have been added to the IHP. This increased the program's share of affordable housing citywide to 14%.[17] The percentage of IHP units by number of bedrooms is found in Figure 2.

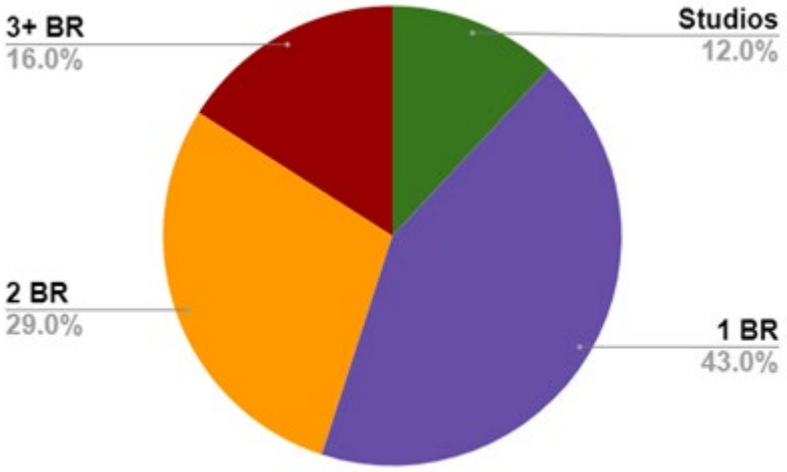

Figure 2. IHP units by number of bedrooms.

Chart created by author with data from Community Development Department[18]

56% of all IHP tenants in the IHP are Section 8 voucher holders.[19] The IHP is considered an essential option for voucher holders due to the difficulty of leasing apartments on the open market. Leasing officers would often not respond to phone inquiries, and other apartments either exceeded the housing authority's payment standards or failed inspection. The IHP may also reflect greater diversity than the city as a while. For example, 27% of IHP residents reported their race as Black as compared to 10.8% of all residents citywide; however, 44% of IHP participants failed to report a racial identification.[20]

For IHP renters, moving increased their safety and well-being. In their old buildings, they dealt with broken windows, fighting neighbors, and cramped conditions, such as a 300 ft^2 micro unit. Some renters' landlords had sold their buildings and the new owners had either raised their rents beyond what they could afford or decided to clear the building out for gut renovations. Tenants also had children in the public school system; renting an IHP unit enabled their children to remain in the same district. These findings indicate that the Inclusionary Housing Program has achieved the goal set by Section 11.200 of the Zoning Ordinance to "promote the public health, safety, and welfare...by increasing the production of affordable housing."[21]

However, IHP tenants also expressed feeling uneasy around property managers and some administrators of the affordable housing pool. Although both market-rate and IHP renters complained about inattentive and at times combative property managers, IHP tenants wondered if they were being treated differently because they were paying affordable rates. Beyond sharing complaints that managers "just sit around and eat pizza all day," only IHP tenants described receiving monthly emails about missing rent even though they paid on time, or hearing their children, some of only a few in the entire building, being yelled at for leaving their bicycles near a building entrance. Property managers would not fix an IHP tenant's bent blinds, but "they also won't let me put up curtains because 'we don't know how it will look from outside to other residents." These encounters made IHP renters wonder, "is it just us?"

IHP renters also described an uncomfortable climate in the IHP office due to personnel inconsistencies. Some case managers were patient and responsive, while others were cantankerous and infantilizing. One tenant described a tense meeting he had at the IHP to discuss a rent increase:

She [my wife] called me crying, this Alex [IHP administrator, name changed] is being so mean to me, our rent went up so much, we can't even…[sigh]. So, I put on my nicest, sweetest face, and within the

first 5 minutes I felt my blood pressure going up and going up. It was their tone, 'You know, Mx. Jones [name changed], as I told your *wife*...' The most sarcastic tone of voice, when I'm asking you questions about things I don't understand, and when I ask you, you repeat the same thing…meanwhile, her boss was so nice. You could tell she veered me away from Alex, 'like, we *know*'."

Moreover, administrative delays, such as late rent recertifications, made residents fearful that their leases would not be renewed. Tenants emphasized that they were in a more precarious situation than market-rate renters because they had fewer housing options. Therefore, "they [IHP administrators] shouldn't be disrespectful with housing; it's so stressful that you're going to lose your housing," one IHP tenant exclaimed. Another tenant questioned a refrain they had heard often from case managers at the local housing authority. "They say, 'you are lucky to have your housing, but as a housing advocate, I fought for these programs…it isn't like they just gave it to me." While IHP residents were grateful for their housing, their concerns about disparate treatment and expressions of dependency-related helplessness suggest that a determination of if the program promotes "public health, safety and welfare" is not clear-cut.

Has the Inclusionary Housing Program met the Standards for Providing Affordable Dwelling Units Created through Inclusionary Housing in Section 11.203.3?

Research Question 2a, testing 11.203.3b: "Affordable units shall be similar size, layout, construction materials, fixtures, amenities, and interior and exterior finishes to comparable non-Affordable Dwelling Units in the project."[22]

Building	**Finishes**	**Appliances**	**Floorplans**	**Sound**	**Baths**	**Windows**	**Flooring**	**Storage**
Hearth	Different	Different	Similar	Same	Same	Same	Different	Same
Vista	Same	Same	Similar	Same	Same	Same	Same	Same

Table 2. Comparison of in-unit amenities and finishes in IHP and market-rate housing units.

Market rate and IHP apartments in The Vista were identical. However, differences were observed between IHP and market-rate units in The Hearth. IHP units had carpeting, whereas market-rate units had wood floors. Kitchen finishings and appliances appeared to be more modern in market-rate units, including newer countertops, ovens and refrigerators. These differences can be found in Figure 4. Because Section 11.203.3 does not stipulate what "similar" means, it is not possible to determine if The Hearth complies with or violates its zoning.

Figure 3. The Hearth: An IHP unit (left) and a market-rate unit (right). Photographs taken by tenants.

Research Question 2b, testing 11.203.3c: "Affordable Dwelling Units shall have similar access to common areas, facilities, and services as that enjoyed by comparable non-Affordable Dwelling Units in the project including but not limited to outdoor spaces, amenity spaces, storage, parking, bicycle parking facilities, and resident services."[23]

Building	Gym	Workspace	Bike Room	Parking	Storage	Swimming Pool	Movie Room	Pool Table	Dog Park
Hearth	Same	Same	Same	Same	Same	N/A	N/A	N/A	N/A
Vista	Same	Same	Same	Same	Same	Same	Same	Same	Same

Table 3. Comparison of building amenity access by market-rate and IHP tenants.

All residents had equal access to building amenities such as gyms, workspaces, and bike parking. Therefore, both buildings comply with 11.203.3c as writ. However, some IHP tenants didn't "feel comfortable" using their building's amenities because they felt "like they stood out like a sore thumb…the people who use them are just so different from who I am." This tenant reported that they often saw a neighbor who parked two luxury cars in the parking garage teleworking in their building's lounge. Common areas like pool tables and rentable party lounges also appealed more to single, young professionals than seniors or families with children, and neither The Hearth nor The Vista had play areas for children. Common areas were instead populated by sharp-edged tables and fire pits. A former city planner explained that getting residential developers to pursue family-inclusive design was "an uphill battle" because there were no requirements, even as the City Council updated the IZ Ordinance to incentivize the construction of more family-sized units.

Additionally, storage rentals are not discounted for IHP tenants. This felt particularly frustrating to renters who were seniors or who had children. In the same building, one market-rate tenant rented three storage units for his camping supplies, while a family of six living in an affordable two-bedroom apartment did not rent any.

Research Question 2c, testing 11.203.3d: "Affordable Dwelling Units shall be dispersed throughout the project rather than concentrated on particular floors, within sections of a building, or within particular buildings in a project with multiple buildings."[24]

Both The Hearth and The Vista may comply with 11.203.3d of the Zoning Ordinance because IHP units are not clustered in one building, wing, or floor. However, the top floors of both developments have fewer affordable units. This would be a cause for concern, but 11.203.3d. does not include a definition of "distributed." There is no ratio or formula which developers are required to follow when siting affordable units. Therefore, it is unclear if either building complies with or violates this subsection.

CONCLUSION

This study adds to a surprisingly limited knowledge base on an increasingly popular policy tool. As the first study to test the regulatory compliance of inclusionary housing projects with inclusionary zoning, and perhaps the first study to assess tenant experiences in an IHP, the findings are useful to practitioners and scholars alike. The researcher has refined criteria for comparative analyses of mixed-income units, such as square footage and in-unit amenities. For the case, the researcher compared residents' experiences, living spaces, and amenities in market-rate and affordable units within the same buildings. She also combined document collection with semi-structured interviews to assess the physical aspects of IHP units, as well as the less tangible, but perhaps more significant elements of the tenant experience, such as treatment by property management. While assessments of overall housing production are important, qualitative studies which examine regulatory compliance and highlight tenant experiences in mixed-income residential buildings may be of even greater import.

NOTES

[1]. Alex S. Schwartz, *Housing Policy in the United States* (Milton Park: Routledge, 2014).
[2]. National Low Income Housing Coalition, *Out of Reach 2020: The High Cost of Housing* (2020): 4, https://reports.nlihc.org/sites/default/files/oor/OOR_2020.pdf.
[3]. Rachel Bratt. "Public Housing Authorities: Determining an Appropriate Role in a National Preservation Strategy," Housing Policy Debate 2, no. 2 (1991): 535-556, doi: 10.1080/10511482.1991.9521063.
[4]. Emily Badger, "These 95 Apartments Promised Affordable Rent in San Francisco. Then, 6,580 People Applied," The New York Times, May 12, 2018, https://www.nytimes.com/2018/05/12/upshot/these-95-apartments-promised-affordable-rent-in-san-francisco-then-6580-people-applied.html.
[5]. Alexander Hermann, Increasing Land Prices Make Housing Less Affordable, Joint Center for Housing Studies of Harvard University, July 22, 2019, https://www.jchs.harvard.edu/blog/increasing-land-prices-make-housing-less-affordable; Shomon Shamsuddin and Hannah Cross, "Balancing Act: The Effects of Race and Poverty on LIHTC Development in Boston," Housing Studies 35, no. 7 (2020): 1269-1284, https://doi.org/10.1080/02673037.2019.1657072.
[6]. Ruoniu Wang And Sowmya Balachandran, "Inclusionary Housing In The United States: Dynamics Of Local Policy And Outcomes In Diverse Markets," Housing Policy 38, No. 6 (2023): 1068-1087, https://doi.org/10.1080/02673037.2021.1929863.
[7]. Dawkins, Casey, Jae Sik Jeon and Gerrit-Jan Knaap, "Creating and Preserving Affordable Homeownership Opportunities: Does Inclusionary Zoning Make Sense?" Journal of Planning Education and Research 37, no. 4 (December 2017): 444-456; Mukhija, Vinit, Regus, Lara, Slovin, Sara, and Ashok Das, "Can Inclusionary Zoning Be an Effective and Efficient Housing Policy? Evidence from Los Angeles and Orange Counties," Journal of Urban Affairs, 32, no. 2 (2010): pp. 229-252.
[8] Robert J. Wiener And Stephen E. Barton, "The Underpinnings Of Inclusionary Housing In California: Current Practice And Emerging Market And Legal Challenges," Journal Of Housing And The Built Environment 29 (2014): 408.
[9]. Constantine E. Kontokosta, "Do Inclusionary Zoning Policies Equitably Disperse Affordable Housing? A Comparative Spatial Analysis," Journal of Housing and the Built Environment 30, no. 4 (November 2015): 569-590.
[10]. Mukhija et al., "Can Inclusionary Zoning," 248.
[11]. Conor Arpey, "The Multifaceted Manifestations of the Poor Door: Examining Forms of Separation in Inclusionary Housing," American University Business Law Review 6, no. 3 (2017): 627-645.
[12]. Martine August, "Revitalisation Gone Wrong: Mixed-Income Public Housing Redevelopment in Toronto's Don Mount Court," Urban Studies 53, no. 16 (2016): 3405–3422; Mark L. Joseph, "Early Resident Experiences at a New Mixed-Income Development in Chicago," Journal of Urban Affairs 30, no. 3 (2008): 229-257; Mohammad Abdul Mohit, Mansor Ibrahim, and Yong Razidah Rashid, "Assessment of Residential Satisfaction in Newly Designed Public Low-Cost Housing in Kuala Lumpur, Malaysia," Habitat International 34 (January 2010): 18–27; Lawrence J. Vale, "Public Housing Redevelopment: Seven Kinds of Success," in *New Directions in Urban Public Housing*, eds. David Varady, Wolfgang F. E. Preiser, and Francis P. Russell (London: Routledge, 1998), 142-178.
[13]. Mohit et al., "Assessment of Residential Satisfaction," 20.
[14]. "Housing Program Income Limits," Cambridge Community Development Department, accessed August 10, 2023, www.cambridgema.gov/hudincomeguidelines.pdf.
[15]. Cambridge [MA] City Council, Section 11.200, Incentive Zoning and Inclusionary Housing, Cambridge Zoning Ordinance (2020), https://library.municode.com/ma/cambridge/ordinances/zoning_ordinance.
[16]. Mohit et al., "Assessment of Residential Satisfaction," 20.
[17]. Cambridge Community Development Department, *Inclusionary Housing Report* (2018): 4, https://www.cambridgema.gov/CDD/housing/~/media/152E5933A1404BEBB5619622FFF411F9.ashx.
[18]. Cambridge Community Development Department, *Inclusionary Housing Report*, 4.
[19]. Cambridge Community Development Department, *Inclusionary Housing Report*, 19.
[20]. Community Development Department, *Neighborhood Statistical Profile 2019*, CDD, 2019, https://www.cambridgema.gov/-/media/Files/CDD/FactsandMaps/profiles/demo_profile_neighborhood_2019.pdf; Cambridge Community Development Department, *Inclusionary Housing Report*, 21.
[21]. Cambridge [MA] City Council, Section 11.200.
[22]. Cambridge [MA] City Council, Section 11.200.
[23]. Cambridge [MA] City Council, Section 11.200.

[24]. Cambridge [MA] City Council, Section 11.200.

BIBLIOGRAPHY

Arpey, Conor. “The Multifaceted Manifestations of the Poor Door: Examining Forms of Separation in Inclusionary Housing.” *American University Business Law Review* 6, no. 3 (2017): 627-645.

August, Martine. “Revitalisation Gone Wrong: Mixed-Income Public Housing Redevelopment in Toronto’s Don Mount Court,” *Urban Studies* 53, no. 16 (2016): 3405–3422.

Badger, Emily. “These 95 Apartments Promised Affordable Rent in San Francisco. Then, 6,580 People Applied.” The New York Times, May 12, 2018. https://www.nytimes.com/2018/05/12/upshot/these-95-apartments-promised-affordable-rent-in-san-francisco-then-6580-people-applied.html.

Bratt, Rachel. “Public Housing Authorities: Determining an Appropriate Role in a National Preservation Strategy.” *Housing Policy Debate* 2, no. 2 (1991): 535-556.

Cambridge [MA] City Council. Section 11.200, Incentive Zoning and Inclusionary Housing. Cambridge Zoning Ordinance (2020). https://library.municode.com/ma/cambridge/ordinances/zoning_ordinance.

Cambridge Community Development Department, *Inclusionary Housing Report* (2018), https://www.cambridgema.gov/CDD/housing/~/media/152E5933A1404BEBB5619622FFF411F9.ashx.

Community Development Department. *Neighborhood Statistical Profile 2019*. CDD, 2019, https://www.cambridgema.gov/-/media/Files/CDD/FactsandMaps/profiles/demo_profile_neighborhood_2019.pdf.

Dawkins, Casey, Jae Sik Jeon and Gerrit-Jan Knaap. “Creating and Preserving Affordable

Homeownership Opportunities: Does Inclusionary Zoning Make Sense?” *Journal of Planning Education and Research* 37, no. 4 (December 2017): 444-456.

Hermann, Alexander. *Increasing Land Prices Make Housing Less Affordable.* Joint Center for Housing Studies of Harvard University, July 22, 2019. https://www.jchs.harvard.edu/blog/increasing-land-prices-make-housing-less-affordable.

“Housing Program Income Limits.” Cambridge Community Development Department, June 15, 2023. Accessed August 10, 2023, www.cambridgema.gov/hudincomeguidelines.pdf.

Joseph, Mark L. “Early Resident Experiences at a New Mixed-Income Development in Chicago.” *Journal of Urban Affairs* 30: 3 (2008): 229-257.

Kontokosta, Constantine E. “Do Inclusionary Zoning Policies Equitably Disperse Affordable Housing? A Comparative Spatial Analysis.” *Journal of Housing and the Built Environment* 30, no. 4 (November 2015): 569-590.

Mohit, Abdul Mohammad, Mansor Ibrahim, and Yong Razidah Rashid. “Assessment of Residential Satisfaction in Newly Designed Public Low-Cost Housing in Kuala Lumpur, Malaysia.” *Habitat International* 34 (January 2010): 18–27.

Mukhija, Vinit, Lara Regus, Sara Slovin and Ashok Das, “Can Inclusionary Zoning Be an Effective and Efficient Housing Policy? Evidence from Los Angeles and Orange Counties,” *Journal of Urban Affairs* 32, no. 2 (2010): 229-252.

National Low Income Housing Coalition. *Out of Reach 2020: The High Cost of Housing*. National Low Income Housing Coalition, 2020. https://reports.nlihc.org/sites/default/files/oor/OOR_2020.pdf.

Schwartz, Alex S. *Housing Policy in the United States*. Routledge, 2014.

Shamsuddin, Shomon, and Hannah Cross. “Balancing Act: The Effects of Race and Poverty on LIHTC Development in Boston.” *Housing Studies* 35, no. 7 (August 2020): 1269-1284.

Vale, Lawrence J. “Public Housing Redevelopment: Seven Kinds of Success,” in *New Directions in Urban Public Housing*, eds. David Varady, Wolfgang F. E. Preiser, and Francis P. Russell (London: Routledge, 1998), 142-178.

Wang, Ruoniu and Sowmya Balachandran. “Inclusionary Housing in the United States: Dynamics of Local Policy and Outcomes in Diverse Markets.” *Housing Policy* 38, no. 6 (2023): 1068-1087. https://doi.org/10.1080/02673037.2021.1929863.

Wiener, Robert J. And Stephen E. Barton. “The Underpinnings Of Inclusionary Housing In California: Current Practice And Emerging Market And Legal Challenges.” *Journal Of Housing And The Built Environment* 29 (2014): 403-422, 408.

THE PHYSICAL ENVIRONMENT AND ITS INFLUENCE ON CRIME AND FEAR OF CRIME IN THE HETEROGENEOUS CONTEXT OF ‘ ASTIR ’ NEIGHBORHOOD

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INTRODUCTION

In the realm of urban planning, prioritizing safety stands as a main concern. While achieving a completely crime-free environment may be an overwhelming challenge, cities attempt to minimize criminal activities. This is particularly true for cities like Tirana, which are in a continuous change and where criminology and crime rates tend to be higher. However, it is essential to recognize that crime rates vary across different parts of the city due to various factors, including the physical design and social dynamics. Areas with elevated crime levels are commonly referred to as ‘hot *spots* ’ of the city.

In this study, the focus is one such neighbourhood in Tirana called the ‘Astir’ zone. As a new neighbourhood, ‘Astir’ has experienced rapid and mostly informal growth over the past decade. Nevertheless, a lot of transformations are currently reshaping the neighbourhood in terms of infrastructure and the built environment in general.

With the objective to investigate both physical and social aspects of crime prevention within the ‘Astir’ neighbourhood, this study aims to explore how the neighbourhood’s environmental characteristics, such as the street network, building types, and landscape features, impact the actual or perceived safety and fear of crime among its residents. What affects the crime rates to be higher? How can environmental design prevent crime in ‘Astir’?

To answer these questions the research applies mixed-methods approach combining both qualitative and quantitative methods. Through questionnaires, open-ended questions with a randomly selected focus group of 'Astir' residents, and site surveys involving observations, mappings, and photo shooting, was collected a complete dataset for analysis.

All data collected were analysed referring to the theoretical background classified as:

-Physical factors which are: *territoriality, natural surveillance, image, target hardening, access control and activity support, etc*.

-Social character of the neighbourhood including results of: *social cohesion, connectivity, threshold capacity, etc*.

-Environmental features: *road pattern, lighting, maintenance, building height, etc*.

-Crime experience & Perception

Results have revealed the elements that make the neighbourhood a ‘*hot spot*’, referring to crime or whether there are some design strategies to improve the overall neighbourhood security and safety from fear of crime and crime itself in the residential environment.

URBAN ENVIRONMENT & CRIME

Crime Prevention through Environmental Design (CPTED) is a theory aiming to prevent crime on design principles of the built environment. If the built environment is designed and applied accordingly, it directly changes the quality of life of the citizens and there is no place for crime or fear of crime. The pillars of CPTED were originated by Oscar Newman, Jane Jacobs, and C. Ray Jeffery in broad principles which are: *Defensible Space*, *Movement Control* covered by *Territoriality*, *Surveillance*, *Management*, *Maintenance* and *Image*, *Activity Support,* and *Physical Security*.[1] All the above-mentioned principles are the elements of the so-called *Mechanical Prevention of Crime* being part of the physical factors of preventing crime. The restructuring of the physical layouts of communities including streets, grounds outside buildings, corridors, lobbies, etc is what the "defensible space" theory lies. Its purpose is to help people preserve the areas which they feel have an impact on their common lifestyle and security. The theory consists of self-help. Newman states that there are three key concepts that initiate Defensible Space: Territoriality, Natural Surveillance, and Image/Milieu.[2]

Territoriality

Territoriality is the tendency to stake out an area and a willingness to defend that area from intruders. Both humans and non-human animals practice territorial behavior. The purpose of territorial boundaries is to make life more predictable, orderly, and stable.[3] According to Newman, territoriality is considered as 'the capacity of the physical environment to create perceived zones of territorial influences' and it can be created due to different elements such as physical and symbolic barriers which try to keep our the unknowns.[4] The social aspect of territoriality varies across different populations, indicating the influence of culture on territorial behavior.[5]

Natural Surveillance

In order to increase the observability of the area from the inhabitants, Newman came across the concept of natural surveillance which is exactly the ability of residents to surveil their own space with the possibilities that the physical design offers.[6] This concept is similar to that of Jane Jacobs that buildings should be oriented in such a way as to provide natural surveillance by the streets.[7] Newman emphasizes keeping units isolated from strangers, while Jacobs sees strangers as potential sources of surveillance and natural 'police' mechanisms.

Image/Milieu

Newman claims that the appearance of the building creates an image that affects the perception of people about that building either negatively when the image is not very pleasant or positively when it is pleasant to the eye.[8] On the concept of Image/Milieu, Jane Jacobs's contribution is present. She strongly suggests the addition of routine activities that not only increase natural surveillance but also helps in creating the milieu of that particular place directly affecting defensibility.[9]

Crime Preventions Factors

There are several factors that help in crime prevention such as; access control, target hardening, activity support and land use. Access control involves creating barriers to access denying for offenders in order to increase their risk perception for potential targets. It can be reached by informal/natural strategies or formal/organized and mechanical strategies, considered also in target hardening and natural surveillance.[10] Implementing access control elements has demonstrated a decline in crime rates, highlighting its importance in crime prevention. Yet, the most traditional method is target hardening. It aims to increase the offenders' efforts in committing a crime consisting on denying and restricting access.[11]

Evidence has shown that crime is not concentrated in a homogeneous way. Places with mixed land use and transportation nodes such as the city centers have the tendency to be riskier than the residential areas.[12] Even selected areas with high crime rates do not have the same distribution of crime. It differs from place to place according to the land use. Different types of land use affect differently the crime distribution due to the change of location, human activity that takes place, and the built environment.[13] Activity support may increase 'eyes on the street',[14] but with the increase in activity level, there is also an increase in 'permeability' which ensures more escape routes for the crime.

Apart from these factors, road patterns, lighting, maintenance, greenery, and building height impact crime prevention. Good street networks enhance natural surveillance[15] but may compromise access control.[16] Lighting and maintenance signal neighborhood improvement and affect fear of crime.[17] The Greenness of a neighborhood is an important factor for physical activity, diseases, air and noise pollution, mental health, etc.[18] Its presence can facilitate or hinder crime, depending on visibility. [19] Building height is one of the elements determining residential and commercial density. High building density and mixed land use can contribute to higher crime rates. [20] The number of stores is a good determinant of the neighborhood's development density.

Social Factors affecting Crime in a Neighborhood

Safe and healthy neighborhoods have similar characteristics in terms of social aspects. A high range of citizen participation,[21] community discourses and partnership, positive interactions between diverse populations and local culture, and the capacity to work together to reduce crime motives are some of the characteristics of a safe neighborhood. There are four strategies developed from Second Generation CPTED known as the 4 C's in order to reach a safe neighborhood: *social cohesion, connectivity, community culture, and threshold capacity*.[22]

Environmental Psychology in Crime Perception

The environment's psychology and perception are affected by social aspects such as gender, age, economic status, race, or ethnicity. They provide clues for designing environments actively friendly for each group. Despite sociological aspects, physical attributes also impact the psychology and perception of an environment. As Nasar[23] has listed them: *Naturalness* refers to the natural elements. *Upkeep* refers to the perceived maintenance of the area. *Openness* refers to the perceived vista. *Complexity* refers to the amount of information in an environment that brings the aspect of *Order*, showing the degree to which people perceive the environment as coherent, clear, and unified. *Historic Significance* mostly depends on the observer's perception of an environment being historic authentically or just giving the perception of a historic place.

Fear of Crime

Fear of crime can be considered as a catalyst for further consequences which affects other elements such as territoriality, people's habits and perception of safety, approach of the criminals, etc. It is proven that fear of crime increases its rates at night and most people choose not to go out. On the contrary, if they go out, people avoid particular activities that could be dangerous as a measure undertaken due to fear of crime.[24] It is hard to directly find the source of fear because it is not always related to crime but can bring crime as a consequence, breaking down the sense of attachment and responsibility to an area.[25]

Citizen's Characteristics

The level of crime is not only related to the urban layout but also to the members of the community. Education, ownership, income, age, racial makeup, and length of residency are some of the characteristics that affect it.[26] It is found that crime is more present in areas where incivilities are at higher rates.

MATERIAL AND METHODS

The research applies mixed methods aiming to collect more data and analysis. Both qualitative and quantitative methods were used to study and provide opinions, perceptions, behaviors and inputs of the focus group which will be randomly chosen residents of one of Tirana's neighborhoods. We chose to study 'Astir' zone. It is a new neighborhood created on Tirana's edges and it is built without a regulatory plan where a part from the unplanned settlements were demolished and new residential areas are being build.

The study includes also people that choose to pass some time in different activities there but that are not residents. Observations, mappings, open-ended questions, questionnaires and photo shootings were also developed.

The questionnaire was developed between different target groups chosen according to: their age, socio-economic status and ownership status (renters or owners). 120 people were questioned. Questions also aim to understand how physical factors affects the residents physically and their perception of crime. They are classified in 4 groups related to physical factors, environmental features, crime experience and perception and social character of the neighborhood.

ENVIRONMENTAL DESIGN.
ANALYSIS OF URBAN ENVIRONMENT & CRIME: CASE OF 'ASTIR'

The urban expansion after the post-socialist period has made Tirana experience informal growth, especially in its outskirts. Astir neighborhood is considered one of the new urban development neighborhoods of Tirana. Looking back nearly two decades to 1994, the area that is now Astir was primarily covered by agricultural parcels with only a few houses (Figure 2). As the post-socialist era began in 1994, people started migrating to this region near the capital and constructing their own homes. From 1994 to 2005, there was rapid growth, resulting in nearly the entire area being covered with individual houses. Initially a low-income neighborhood, Astir has gradually transitioned to an area primarily inhabited by middle-income families. The neighborhood continues to expand, with increasing density and the demolition of remaining individual houses.

Questionnaire & Observation Results

Among the responders, 70% were residents and 30% were visitors. The resident responders consisted of 57% females and 43% males, with the majority falling into the age range of 18-27 (44%) and 25-40 (24%). Other age groups included 40-65 (14%), 5-18 (11%), and over 65 (7%). In terms of education level, 55% had higher education, 39% had middle education, and 6% had low education. Incomes were predominantly middle (77%), with 11.5% each having high and low incomes. Regarding housing, 63% of residents owned their apartments or houses, while 37% were renters.

As Astir is a newer neighbourhood in Tirana, 56% of the responders had lived there for 0-5 years, 16% for 5-10 years, and a significant 28% for over 10 years.

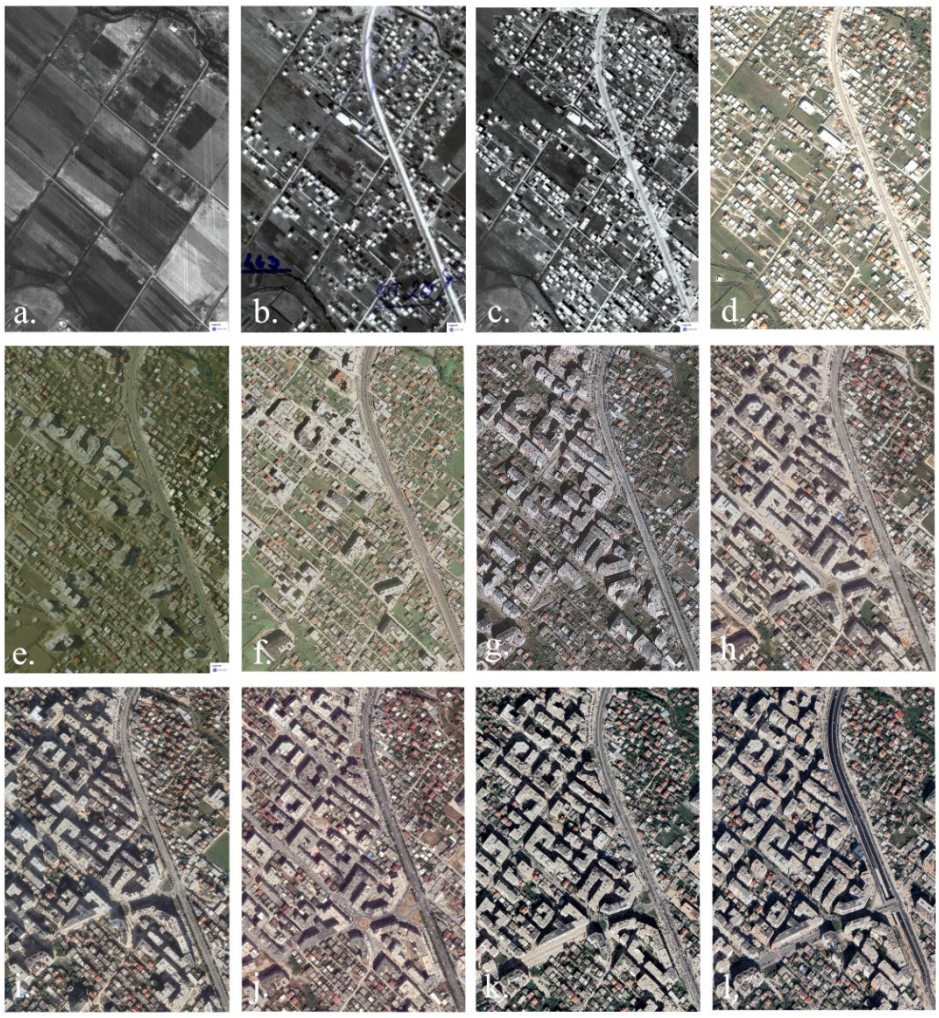

Figure 1. 'Astir' map over the years; a. (1994), b. (1999), c. (2001), d. (2004), e. (2005), f. (2007), g. (2009), h. (2012), i. (2015), j. (2017), k. (2019), l. (2022)

Residents' approaches to physical factors in preventing crime were examined. Symbolic elements, such as leaving shoes at the door or keeping lights and TVs on to indicate occupancy, were commonly used by residents (Figure 2). Concerning child safety, only 26% of respondents were unafraid to let their kids go to school or play with neighbourhood children. Reasons for fear included long distances to activities (29%), the presence of strangers and suspicious individuals (22%), and lack of visual access (18%). The majority (89%) agreed that increased activities improve security, while a small percentage (11%) disagreed. Lighting was cited by 46% of respondents as a factor that makes them feel safer in the neighbourhood, followed by street pavement (26%), façade quality (18%), and tree presence (9%)

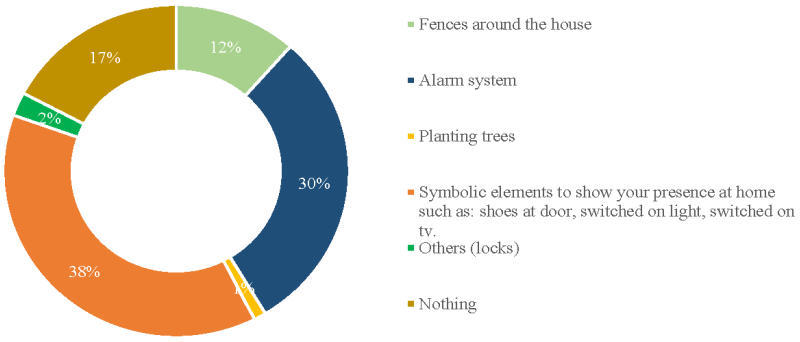

Figure 2. Elements that residents use to keep crime away

Evaluation of public transportation safety during the day and night on a scale of 0 to 5 revealed that 32% considered it safe during the day , while only 7% deemed it unsafe . Conversely, during the night, only 12% considered it safe , while 24% perceived it as entirely unsafe.

Regarding the social character of the neighborhood, residents were asked to rate their relationship with neighbors on a scale from 0 to 5. Results showed that 23.5% felt they knew their neighbors well, while 14.8% reported having no knowledge of their neighbors. In terms of interaction with neighbors, responses varied, with 23.5% indicating no interaction, while others reported some level of interaction ranging from 1 to 5. When asked about the need to protect themselves from neighbors, 34.6% felt no need for protection, while 8.6% expressed a strong need for protection. The frequency of discussing community problems with neighbors ranged from 0 to 5, with 11.1% reporting frequent discussions. The sense of belonging to the community varied, with 17.3% feeling no attachment and 23.5% feeling a strong attachment. When given the opportunity, 60% expressed a willingness to move out of the neighborhood, while 40% would choose to stay.

Crime perception among residents differed during day and night. During the day, 88% considered the neighbourhood safe, while 12% felt it was unsafe due to apartment burglaries, the presence of strangers, and a lack of safety measures. However, at night, 52% perceived the neighbourhood as unsafe due to poor lighting, bars and nightclubs, suspicious individuals involved in drug-related activities, and various crimes. The fear of walking at night was reported by 67% of residents, with poor lighting being the most common reason cited (22%). The presence of suspicious individuals and low maintenance were also considered dangerous elements by residents.

Regarding crime experiences, approximately 45.7% of residents reported being crime witnesses or victims. The most frequently witnessed or experienced crimes were robbery (17.6%), usage or distribution of narcotics (11.4%), physical assault or home invasion (10.4%), and organized crime (6.2%).

Most visitors claimed to visit 'Astir' at least once a week for entertainment purposes (50%), to visit friends and family (44%), or to work (6%). During the day, 73% of visitors perceived the neighborhood as safe, while at night, 93% considered it unsafe. Regarding crime experiences, 87% of visitors reported being crime victims or witnesses, with usage and distribution of narcotics (38%) and robbery (31%) being the most commonly reported crimes.

Neighborhood Image

The neighborhood's identity was analyzed using Kevin Lynch's elements of nodes, districts, edges, paths, and landmarks. 'Astir' exhibited different types of districts based on density, with the most densely populated district known as the '2 rings of Astir'. Major nodes included 'Sheshi Shqiponja',

'Pallati me Shigjeta', and 'Kthesa e Kamzes', which had a significant impact on the entire city of Tirana. Landmarks primarily consisted of bars, building names, and restaurants *(Figure 3*).

Figure 3. Diagram of Kevin Lynch (1960) analysis

Edges were distinguishable, particularly along the border with the rest of the city. The neighbourhood had a very rich network of paths. Facilities such as bars, coffee shops, grocery stores, and restaurants were prevalent, while institutional facilities were limited.

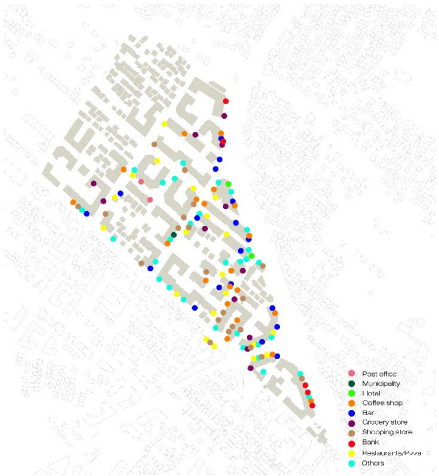

Figure 4. Diagram of facilities in the neighborhood

Mobility observations revealed patterns of public transportation, bicycle lanes, pedestrian movement, and vehicular traffic. Noise pollution, both from traffic and nightlife, affected the neighbourhood, with intersections and nodes being the most affected areas (Figure 5).

Figure 5. Diagram of traffic & nightlife noise pollution

DISCUSSIONS

Environmental criminology has a significant impact on neighborhoods, affecting their image, density, movement, and the lives of people both physically and psychologically. This study compares data from various sources and literature research to highlight the principal factors of environmental criminology in the real context of the "Astir" neighborhood. The focus is on physical and social factors related to crime prevention and perception by continuously referring to the literature research.

In terms of physical factors, residents' interventions to prevent crime and create territoriality were explored. According to Newman[27] territoriality can be created by physical and symbolic barriers, but Brown & Altman[28] have added the element of traces to the concept of Territoriality. Type of a symbolic barrier consisting on a strategy to inform burglars about the presence or absence of residents. Symbolic elements such as leaving shoes at the door, and turning on lights or TV to show presence at home were commonly used by residents which agree with the concept of consider detectability[29] but in a contradiction between the natural surveillance and territoriality concepts of Newman.[30] Asking the residents if the addition of activities gives them more security, almost all of them approve with Jacobs'[31] concept of natural surveillance by answering 'yes'. Residents expressed concerns about leaving their kids alone (Figure 6) due to factors such as the long distance of activities, the presence of strangers and suspicious people, and the lack of visual access to have their kids under surveillance. This shows the lack of natural surveillance in the neighbourhood.

Figure 6. Parents and grandparents accompanying kids at the park

The presence of strangers and suspicious people explains the necessity of the residents to have natural surveillance over their kids and overpopulation is one reason. Browning, et al[32] claims that high commercial and residential density may bring higher crime rates from the deterioration of territoriality, low responsibility level, and low social community. 'Astir' neighborhood is dominated by high buildings of 8 to 10 floors which explains a lot of reasons why residents are afraid to leave kids alone or to perceive the neighborhood as not safe.

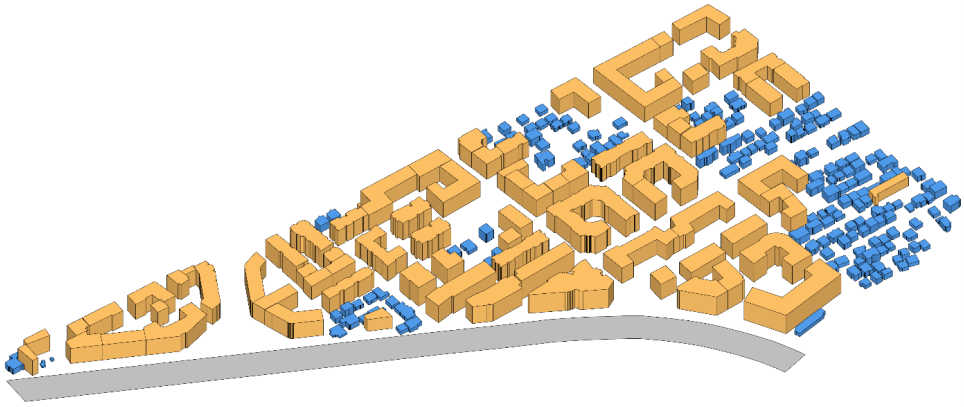

Figure 7. 3D view of 'Astir'

From the authors' analysis of Kevin Lynch elements (*Figure 3*), 'Astir' can be considered as a neighborhood with high permeability due to the high number of major and minor nodes. The presence of distinct edges such as the part of 'Big Ring' makes the presence of strangers a normal phenomenon that leads to higher crime rates. It is proved from observations and mapping of facilities and land use a disbalance between community stabilizers proposed by Saville & Wong[33] has a great impact on crime prevention. It is clearly seen in the absence of educational institutions such as kindergartens, primary schools, and high schools causing the long distances from which the parents are afraid of leaving their kids alone.

According to Ceccato[34] crime rates differ from place to place according to land use, places selling alcohol and bars tend to have more crime than other places. Through the authors' observation and mapping, the number of bars and nightclubs is high consequencing in a high number of places where alcohol and maybe drugs are sold.

Social factors were also examined based on the 4 C's: *social cohesion, connectivity, community culture, and threshold capacity*. While residents reported knowing their neighbors, interaction, and communication about community problems were low. This shows that knowing each other in a neighborhood does not necessarily mean that there is social cohesion. A sense of attachment to the neighborhood was also relatively low, as many residents expressed a willingness to move out if given the opportunity. According to Newman,[35] a low sense of responsibility and attachment comes as a consequence of sharing the space with a high number of people in high buildings that resulted very common in 'Astir' from previous analysis and also from the low presence of open public areas.

CONCLUSION

In conclusion, interventions in both physical and social aspects are needed in order to prevent crime in 'Astir'. Addressing the issues of overpopulation, high density, and the presence of bars and nightclubs is crucial. Providing essential services such as educational facilities, healthcare centers, and police stations within the neighborhood would reduce the need for residents to travel long distances,

thus improving safety. The creation of open public spaces and gardens would enhance the neighborhood's image and promote social cohesion among residents.
Furthermore, attention should be given to improving environmental features such as lighting, street pavements, and landscape maintenance. These enhancements not only contribute to reducing the fear of crime but also create a more appealing and inviting environment. Additionally, incorporating greenery can help reduce noise pollution caused by traffic and nightlife activities, developing a sense of calm and enhancing the overall attractiveness of the neighborhood.

NOTES

[1] Rachel Armitage, Paul Ekblom Rebuilding Crime Prevention Through Environmental Design. Routledge, 2018.
[2] Oscar Newman *Creating defensible space*. Diane Publishing, 1997.
[3] Barbara " Brown, Territoriality." *Handbook of environmental psychology* (1987).
[4] Newman, 1997.
[5] Richard L. Miller, "Territoriality." *The Encyclopedia of Cross-Cultural Psychology* 3 (2013): 1276-1278.
[6] Newman,1997.
[7] Patrick G. Donnelly, "Newman, Oscar: defensible space theory." (2010).
[8] Newman, 1997.
[9] Danielle M. Reynald, and Elffers Henk. "The future of Newman's Defensible Space Theory: Linking Defensible Space and the routine activities of place." *European Journal of Criminology* 6, no. 1 (2009): 25-46.
[10] Paul Michael, Cozens, Greg Saville, and David Hillier. "Crime prevention through environmental design (CPTED): a review and modern bibliography." *Property management* 23, no. 5 (2005): 328-356.
[11] Michael, et al. *"Crime prevention through environmental design".*
[12] Lawrence W. Sherman, Patrick R. Gartin, and Michael E. Buerger. "Hot spots of predatory crime: Routine activities and the criminology of place." *Criminology* 27, no. 1 (1989): 27-56.
[13] Vania Ceccato, "The urban fabric of crime and fear." In *The urban fabric of crime and fear*, pp. 1-33. Dordrecht: Springer Netherlands, 2012.
[14] Jane Jacobs, *The death and life of great American cities*. Vintage, 2016.
[15] Jacobs, *The death and life of great American cities*.
[16] Patricia L. Brantingham, and Paul J. Brantingham. "Nodes, paths and edges: Considerations on the complexity of crime and the physical environment." *Journal of environmental psychology* 13, no. 1 (1993): 3-28.
[17] James Q. Wilson, and George L. Kelling. "Broken windows." *Atlantic monthly* 249, no. 3 (1982): 29-38.
[18] Young-Jae Kim and Eun Jung Kim. "Neighborhood greenery as a predictor of outdoor crimes between low and high income neighborhoods." *International journal of environmental research and public health* 17, no. 5 (2020): 1470.
[19] Frances E. Kuo and William C. Sullivan. "Environment and crime in the inner city: Does vegetation reduce crime?." *Environment and behavior* 33, no. 3 (2001): 343-367.
[20] Christopher R. Browning, Reginald A. Byron, Catherine A. Calder, Lauren J. Krivo, Mei-Po Kwan, Jae-Yong Lee, and Ruth D. Peterson. "Commercial density, residential concentration, and crime: Land use patterns and violence in neighborhood context." *Journal of Research in Crime and Delinquency* 47, no. 3 (2010): 329-357.
[21] Barry Checkoway and Janet Finn. *Young people as community builders*. Ann Arbor, MI: Center for the Study of Youth Policy, School of Social Work, University of Michigan, 1992.
[22] Gregory Saville and Gerry Cleveland. "CPTED and the social city: The future of capacity building." *The CPTED Journal* 2, no. 1 (2006): 50.
[23] Jack L. Nasar, "Assessing perceptions of environments for active living." *American journal of preventive medicine* 34, no. 4 (2008): 357-363.
[24] Reka, Solymosi, David Buil-Gil, Laura Vozmediano, and Inês Sousa Guedes. "Towards a place-based measure of fear of crime: A systematic review of app-based and crowdsourcing approaches." *Environment and Behavior* 53, no. 9 (2021): 1013-1044.
[25] John H. Schweitzer, June Woo Kim, and Juliette R. Mackin. "The impact of the built environment on crime and fear of crime in urban neighborhoods." *Journal of urban technology* 6, no. 3 (1999): 59-73.
[26] Patrick G. Donnelly, "Individual and neighborhood influences on fear of crime." *Sociological Focus* (1989): 69-85.
[27] Newman, 1973
[28] Barbara B. Brown, and Irwin Altman. "Territoriality, defensible space and residential burglary: An environmental analysis." *Journal of environmental psychology* 3, no. 3 (1983): 203-220.
[29] Brown, and Altman. *"Territoriality, defensible space and residential burglary"*, 203-220.
[30] Newman, 1997.
[31] Jacobs, 2016.
[32] Christopher R. Browning, Reginald A. Byron, Catherine A. Calder, Lauren J. Krivo, Mei-Po Kwan, Jae-Yong Lee, and Ruth D. Peterson. "Commercial density, residential concentration, and crime: Land use patterns and violence in neighborhood context." *Journal of Research in Crime and Delinquency* 47, no. 3 (2010): 329-357.
[33] Gregory Saville and Paul Wong. Exceeding the Crime Threshold: The Carrying Capacity of Neighbourhoods. Paper presented at the 53rd Annual Meeting of the American Society of Criminology, Miami, Florida (1994).

[34]Vania Ceccato, *The Urban Fabric of Crime and Fear.* Stockholm: Springer, 2012.
[35] Newman, 1997.

BIBLIOGRAPHY

Armitage, Rachel, and Paul Ekblom. *Rebuilding crime prevention through environmental design.* New York: Routledge, 2019.

Brantingham, Patricia L, and Paul J Brantingham. “Nodes, Paths and Edges: Considerations on the Complexity of Crime and the Physical Environment.” *Journal of Environmental Psychology*, 1993: 3-28.

Brown, Barbara B., and Irwin Altman. "Territoriality, defensible space and residential burglary: An environmental analysis." *Journal of environmental psychology* 3, no. 3 (1983): 203-220.

Brown, Barbara. “Territoriality. In D.Stokols & I.Altman (Eds.).” In *Handbook of environmental psychology*, by Barbara Brown, Vol. 1, pp.505-531. New York: NY: Wiley-Interscience, 1987.

Browning, Christopher R., Reginald A. Byron, Catherine A. Calder, Lauren J. Krivo, Mei-Po Kwan, Jae-Yong Lee, and Ruth D. Peterson. "Commercial density, residential concentration, and crime: Land use patterns and violence in neighborhood context." *Journal of Research in Crime and Delinquency* 47, no. 3 (2010): 329-357.

Ceccato, Vania. *The Urban Fabric of Crime and Fear.* Stockholm: Springer, 2012.

Checkoway, Barry, and Janet Finn. *Young People as Community Builders.* Michigan: Center for the Study of Youth Policy, 1992.

Cozens, Paul Michael, Greg Saville, and David Hillier. “Crime prevention through environmental design: a review and modern bibliography.” *Property Management*, 2005: 328-356.

Crowe, Timothy “Crime prevention through environmental design.” *National Crime Prevention Institute*, 2000.

Reynald, Danielle M., and Henk Elffers. "The future of Newman’s defensible space theory." In *Social, Ecological and Environmental Theories of Crime*, pp. 477-498. Routledge, 2017.

Donnelly, Patrick G. "Individual and neighborhood influences on fear of crime." *Sociological Focus* (1989): 69-85.

Donnelly, Patrick G. *Newman, Oscar: Defensible Space Theory.* Thousand Oaks, CA: Sage Publishing, 2010.

Jacobs, Jane. *The Death and LIfe of Great American Cities.* New York: Vintage Books, 1961.

Kim, Young-Jae, and Eun Jung Kim. "Neighborhood greenery as a predictor of outdoor crimes between low and high income neighborhoods." *International journal of environmental research and public health* 17, no. 5 (2020): 1470.

Kuo, Frances E, and William C Sullivan. “Environment and Crime In the Inner City: Does Vegetation Reduce Crime?” *Environment and Behavior, Vol.33*, 2001: 343-367.

Nasar, Jack L. "Assessing perceptions of environments for active living." *American journal of preventive medicine* 34, no. 4 (2008): 357-363.

Lynch, Kevin. *The Image of the City.* London: The MIT Press, 1960.

Miller, Richard L. “Territoriality.” In *The Encyclopedia of Cross-Cultural Psychology*, by Kenneth D. Keith., 1276-1278. Kearney: John Wiley & Sons, Inc., 2013.

Newman, Oscar. “Defensible Space Principles.” In *Creating Defensible Space*, by Oscar Newman, 9-28. Washington, D.C: U.S.Department of Housing and Urban Development Office of Policy Development and Research, 1996.

Saville, Gregory, and Gerry Cleveland. “CPTED and the social city: The future of capacity building.” *The CPTED Journal*, 2006: 43-50.

Schweitzer, John H., June Woo Kim, and Juliette R.Mackin. “The Impact of the Built Environment on Crime and Fear of Crime in Urban Neighborhoods.” *Journal of Urban Technology*, 2010.

Sherman, Lawrence W., Patrick R. Gartin, and Michael E. Buerger. “Hot Spots of Predatory Crime: Routine Activities and the Criminology of Place.” *Criminology*, 1989: 27-56.

Sohn, Dong-Wook. “Residential crimes and neghbourhood built environment: Assessing the effectiveness of crime prevention through environmental design.” *Cities 52*, 2016: 86-93.

Solymosi, Reka, David Buil-Gil, Laura Vozmediano, and Ines Sousa Guedes. “Towards a Place-based Measure of Fear of Crime: A Systematic Review of App-based and Crowdsourcing Approaches.” *Environment and Behaviour*, 2020: 1-32.

Wilson, James Q., and George L. Kelling. "Broken windows." In *The City Reader*, pp. 303-313. Routledge, 2015.

IS COMPETITIVENESS AMONG CITIES A METRIC FOR IMPROVED URBAN QUALITY OR LIVABILITY?

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INTRODUCTION

Today, 54% of all people now live in cities, and by 2050, this figure is expected to rise to 66%.[1] In this urbanizing landscape, city indices have become increasingly prominent, gaining recognition for their pivotal role in understanding and comparing cities. These indices rely on an exhaustive set of parameters that encompass the physical, social, and economic facets of a city. Such ranking tools have become indispensable in assessing and juxtaposing urban quality, livability, sustainability, and financial stability among various cities. These tools are frequently utilised by city administrations, international organisations, and research institutes to rank, benchmark, and enhance the allure of cities. As urbanisation continues to march forward, it brings intricate challenges concerning housing, economy, culture, social integration, and environmental sustainability. This paper delves into the function and impact of competitive city rankings, scrutinising their evaluation criteria and questioning the assumption that specific ratings inherently lead to improved urban quality. It introduces a pioneering concept: an urban quality framework that can potently guide the multifaceted development, social interaction, and spatial organisation within our evolving cities.

RANKING INDICES AND THEIR ROLE IN URBAN DEVELOPMENT

Numerous city indices and rankings focus on diverse facets of urbanization, sustainability, and economic vitality, each tailored to specific objectives. Each index with its own objectives is continuously ranking various cities to showcase the quality-of-life and or livability offering.[2]

City rankings have evolved into a vital repository of empirical data, accentuating comparative advantages and distilling distinctive attributes. Consequently, they are essential in determining goals and crafting strategies for prospective growth and advancement. By promising enhancements to urban quality, they not only aim to uplift the quality of life of its residents but also act as catalysts, guiding the strategic future development of cities.

What attributes are being compared?

It is imperative to understand in this context the terms quality of life, urban quality and or livability that are often used to compare cities and their relevance to the planning policies of a city. Quality of life, a term with over 100 definitions noted in literature, encompasses a broad spectrum of well-being. In addition to material factors like standard of living or livability, it includes non-material elements and is intimately connected to perceptions, feelings, and subjective values. This multi-indicator

construct requires a blend of qualitative and quantitative approaches to define it for individuals, groups, or spaces. The spatial dimension of quality of life presents a complex, multifaceted arena where architects, urban planners, and city administrations can collaborate. Urban quality, akin to the definition of quality of life, does not possess a simple, clear, or universally agreed-upon definition. Rather, it represents a complex concept that can be interpreted in various ways by different disciplines. In the context of this review, urban quality is not utilized to delineate specific physical characteristics. Instead, it serves to encapsulate the intricate, networked relationships and dynamics existing between these physical traits and certain quality-of-life indicators. The understanding of urban quality, therefore, is portrayed as multifaceted and interwoven rather than a straightforward or linear concept.

What are the factors influencing the comparison?

It can be clearly observed that the objectivity of city rankings is profoundly influenced by factors such as the selection of cities and indicators, the quality and comparability of the available data, the geographic extent of cities considered, and the specific calculation methods deployed. The same city may receive varied rankings in different indices, depending on the background data and calculation methods used, which are oftentimes not transparently disclosed. This lack of transparency complicates the comparisons, creating a situation where cities are not being assessed based on equivalent or directly comparable criteria. Instead of a like-for-like comparison, it becomes a contrast of disparate elements, akin to juxtaposing dissimilar categories, as divergent as comparing apples with oranges. Giffinger et al. identifies this as the generalist approach in his review of role of rankings in growing city competitions.[3]

What are the pitfalls of such competitive comparisons?

Ranking systems often frequently fail to consider the complex interconnections and causal relationships that shape urban environments. Too often, the conversation is centered solely on the final standings, neglecting the importance of the processes that led to these results.[4] Moreover, these rankings may risk undermining strategies aimed at long-term development. There is also the issue of reinforcing existing stereotypes, as these evaluations can inadvertently support preconceived notions about certain cities.[5] Furthermore, risk remains that cities which are ranked poorly undermine the potential of these assessments to drive change.

Are these competitiveness rankings universally applicable to all the cities?

Ranking systems often fall short in recognizing the distinct drivers of change between first and second-tier cities, making them less useful for long-term planning and urban development. Second-tier cities, or mid-sized cities, are typically smaller than their global counterparts but remain vital hubs of economic and cultural activity. According to the OECD, the economic significance of these middle regions is often underestimated, and governments should do more to leverage their potential in order to boost national competitiveness.[6]

While indices and rankings strive to bring transparency to urban development processes and enhance decision-making, their efficacy in shaping the future of second-tier cities remains questionable. The prevailing argument is that most ranking methodologies cater primarily to first-tier cities, employing a top-down approach that often leads to competition at the expense of enhancing urban quality. Such an approach also impacts the formation of planning policies and design guidelines, leaving the needs of second-tier cities unaddressed.

The classification of cities into tiers varies depending on the context and the specific criteria used for evaluation.[7] On a global scale, cities are often categorized into tiers based on factors such as

population size, economic importance, cultural influence, infrastructure development, and global connectivity.[8] Cities like New York, London, Tokyo, and Paris are typically considered first-tier cities due to their significant global influence in terms of finance, commerce, culture, and political power.

As an example, in the Swiss context, the criteria for classifying cities into tiers might differ.[9] Switzerland is a relatively small country with a unique political structure, and the size of its cities may not compare to the largest global metropolises. In this context, cities like Zurich and Geneva, with their larger populations, economic significance, international influence, and global connectivity, are often regarded as first-tier cities within the Swiss context. Cities such as Fribourg, Zug, and Bellinzona, while not as large or internationally renowned as Zurich and Geneva, still play important roles within Switzerland. Fribourg is symbol of cultural plurality and is considered a metaphorical bridge uniting the French and German-speaking Switzerland. Zug, known as the "Crypto Valley," is a hub for blockchain and cryptocurrency businesses. Bellinzona, the capital of the canton of Ticino, is famous for its medieval castles. These cities may be considered second-tier in the Swiss context due to their smaller populations and lower global prominence, but they still hold regional significance and contribute to Switzerland's overall economic and cultural landscape. Therefore, it is notable that the classification of cities into tiers is subjective and can vary depending on the criteria and context applied. There is a positive correlation between a city's competitiveness and its level of human capital, social capital, and environmental sustainability which are critical in this context.[10]

Ranking systems, with their emphasis on first-tier cities, are not adequately designed to confront the unique challenges and opportunities inherent to second-tier cities. However, insights garnered from first-tier cities could be tailored to inform the planning and design processes of second-tier cities. Therefore, it is reasonable to recalibrate the indices approach to cover the shortfall for future development of second-tier cities, which share the burden of rapid urbanisation of first-tier cities. Notably, there are a few specialized indices that focus exclusively on second-tier cities (Table 1), assessing their particular strengths and weaknesses, reflecting a growing recognition of their importance in the urban landscape. Similar to the indices for first tier cities, these indices are also designed to evaluate and report existing situation and lack to provide policy insights and interdependencies for the decision makers.

INDICES	YEAR STARTED	UPDATES	KEY CATEGORIES	NO. OF CITIES EVALUATED
The Emerging Cities Outlook	2015	Annually	Economic and Business Environment, Real Estate and Investment, Demographic and Societal Change, Connectivity and Technology	165
The Next Cities Index by Resonance Consultancy	2017	Annually	Place, Product, People, Prosperity, Programming, and Promotion	130
The JLL City Momentum Index (CMI)	2014	Annually	Socio-economic Momentum, Commercial Real Estate Momentum, Innovation Momentum, and Real Estate Investment Momentum	131
The Global Smaller Cities Index by Savills	2014	Annually	Economic Growth, Demographics, Education, Environment, Infrastructure, and Real Estate Market Potential	100

Table 1. Indices Targeting Second Tier Cities

ROLE OF CITY RANKINGS IN URBAN SPATIAL DEVELOPMENT

Despite the shortcomings, city rankings have a notable impact on investors and political decision-makers.[11] Despite the considerable influence city rankings have on urban spatial development, regional science has yet to undertake a thorough examination of this impact. The assessment of urban quality and livability relies heavily on a wide-ranging set of parameters, encompassing spatial, social, and economic aspects. This complex blend of criteria serves as an essential instrument for understanding the nuances of city life, yet its full implications on spatial development remain largely unexplored. Of these criterions, it appears that the spatial organization of cities fundamentally influences a city's efficiency, growth, productivity and sometimes even their specialization.[12] Spatial patterns of urban form can be identified from relations between the physical parts of cities, parks, mobility, greenery, building blocks. Such patterns affect the livability of urban spaces.[13] Urban quality can also be understood and analyzed through the lens of spatial relationships and interdependencies, recognizing that the connections and interactions among the physical elements of a city play a pivotal role in shaping the overall quality of urban life.

In the Fig 1 below, nine of the most widely utilized city indices have been mapped to elucidate the overlaps between various evaluation categories. These indices have assessed anywhere from 100 to over 200 cities globally, with the selection of cities largely guided by the target audience of the ranking. This audience may include businesses, expatriates, real estate and finance sectors, and those interested in livability and sustainability.

The evaluation categories have been distilled into four distinct subsets: i) governance and operations, ii) social and cultural capital, iii) spatial attributes, and iv) economic attributes. Among these subsets, the spatial attributes category stands out as particularly relevant for architects, urban planners, and city administrators. It can be perceived as a collection of spatial characteristics that collectively define the urban quality, offering insights into the intricate interplay of physical components that shape the living experience within the city.

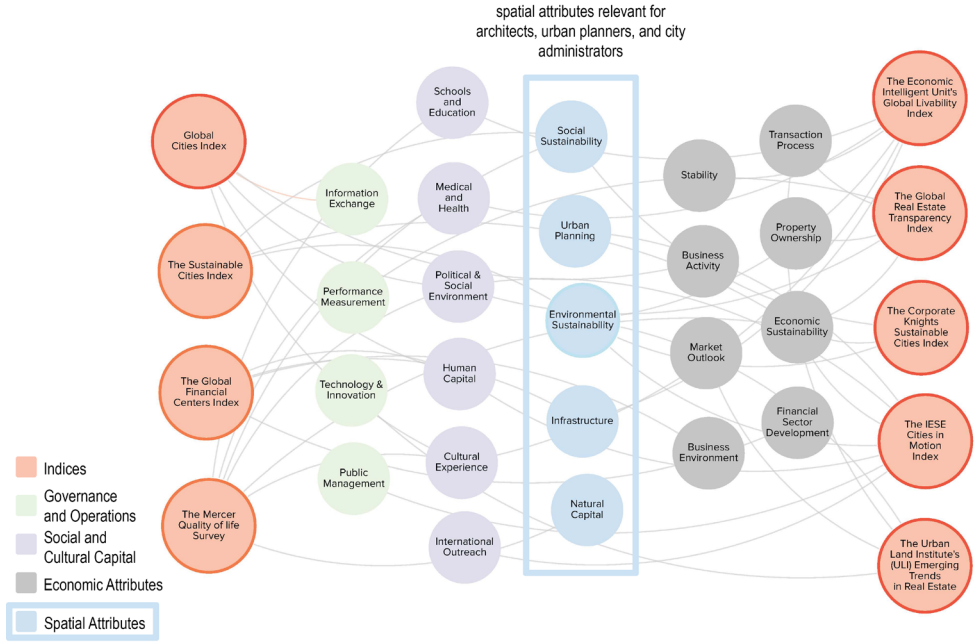

Figure 1. Mapping categories of nine widely used city indices highlighting overlapping categories. (Source: Mayank Kaushal, ETH Zürich)

NEED FOR DEVELOPMENT OF AN URBAN QUALITY FRAMEWORK

Until now, academics have used two basic approaches to examine the quality of urban life: the objective approach, which is typically confined to analyzing and reporting secondary data—usually aggregate data that are mainly available from official government data collections, including the census, at different geographic or spatial scales—and the subjective approach, which uses social survey methods to collect primary data at the disaggregate or individual level, and focuses on peoples' behaviors and assessments, or their qualitative evaluations of different aspects of urban life.[14] These two foundational approaches can also be categorized as top-down and bottom-up methods.

This paper presents the novel approach for the development of an urban quality framework. It puts to use the combination of top-down and bottom-up approach instrumental in informing the contextualised decision-making process of the development of cities. The formulation of the urban quality framework uses the categories of ranking indices as a base to provide policy and design recommendations for urban development of such cities. By combining decision sciences and multiple stakeholder inputs to the applicability of categories from ranking indices, it provides a range of application for various indicators, tests their applicability on different scales - neighbourhood, core-city (political boundary) and agglomeration.[15]

Contrary to the various city indices, which are formulated majorly for the purpose of comparative assessment, the urban quality framework is proposed to calibrate the skeleton of ranking indices to a policy and design instrument for architects, planners, and city administrators. The urban quality framework translates the research findings into a range of application for planning and design processes, where several indicators and their aspects are systematically recorded and interrelated. It is a framework that captures and compares the diversity of urban situations for smaller cities. It cannot define universal or even optimal urban quality, but it can be used to analyse various spatial conditions specific to smaller geographic regions. The framework is intended to occupy an interface between analysis and the case study. It will transfer the environmental, economic and quality-of-life observations into a flexible methodological network and can be used as policy for design processes for urban developments. It characterises urban developments, enables complex indicator analysis and typification of urban conditions in smaller cities, and facilitates recognising and localising shortcomings and potentials for future developments.

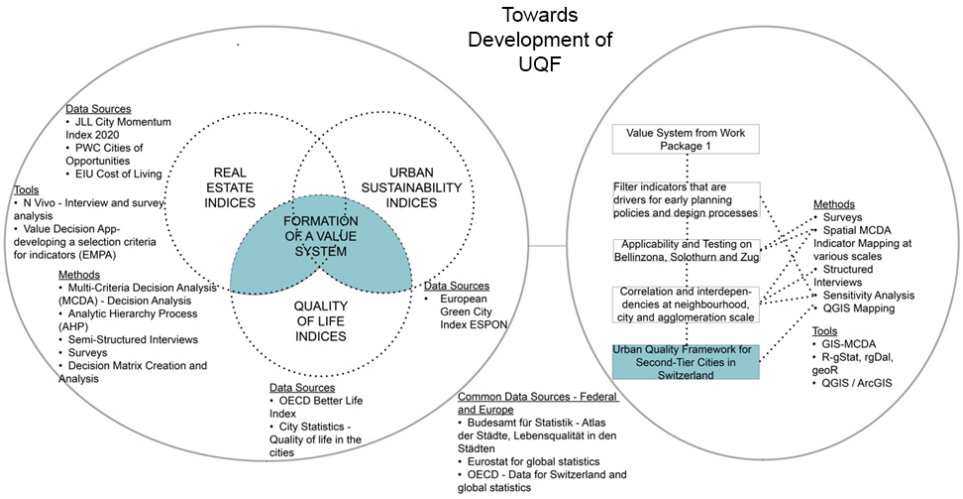

Figure 2. Schematic diagram showing mix-methodology approach, methods, and tools to formulate Urban Quality Framework (Source: Mayank Kaushal, ETH Zürich)

FUTURE OUTLOOK AND RECOMMENDATIONS

The creation of urban quality frameworks for cities stems from the limitations of existing methods, with the goal to harness insights from ranking indices to guide the early planning and design processes. This approach aims to enhance urban quality by offering a more nuanced understanding and strategic application. Specifically, the framework intends to address concerns at various levels by:

Shifting Focus

Moving beyond the current practice of mere evaluation and reporting of empirical data, which often falls short in providing actionable insights for urban development.

Spatial Development and Urban Form as a Function of Urban Quality

The framework leverages urban form as a measurable aspect of spatial development. Although some facets of urban quality may resist quantification, the use of specific indicators enables the assessment and enhancement of a city's progress towards improved urban quality. Approaching this concept from a spatial perspective is based on the understanding that the relationships among a city's physical components can either enhance or impede its overall quality of life. Existing methods and tools have largely been confined to simulating or proposing urban quality solutions in two-dimensional city plans, thus lacking the capacity to envision the impact of spatial variables such as changes in zoning, land use, or design guidelines. By quantifying and visualizing these spatial characteristics, they can be analyzed and modified, allowing for a more nuanced comprehension and focused efforts to elevate urban life.

Parameterized Approach

Implementing a structured method for assessing and testing different categories and indicators. This considers not only the existing state of urban quality but also engages in scenario planning for future possibilities, all within the bounds of legislative frameworks.

The methodology creates scenarios for change in density for a section of Lindenplatz in Zürich, Switzerland, using ArcGIS Urban with the goal to preserve or enhance the urban quality indicators such as urban greenery and open space Lindenplatz, referred to as a "platz," embodies an open space similar in scale to those found in second- and third-tier cities, paralleling the Italian concept of a 'piazza.' It thus serves as a fitting case study for demonstrating this method's applicability and potential adaptability across diverse urban scenarios. The accompanying diagram contrasts the current and proposed development scenarios within a specific urban residential setting. The image on the left illustrates the spatial arrangement around an open area, flanked by residential structures, within the city's existing context. Conversely, the image on the right outlines a visionary strategy for future development. This strategy involves both retrofitting and new construction within the same zone, with the aim of increasing density without sacrificing urban quality.

Figure 3. Scenarios for Enhancing Density without Compromising Urban Quality in Relation to Open Space Development (Source: Mayank Kaushal and Carl Ludovic Peterson for Dense and Green Cities Summer School, ETH Zürich)

By integrating these layers of complexity, the framework seeks to transcend traditional urban analysis, crafting a more comprehensive and flexible model capable of responding to the diverse challenges and opportunities that cities will face in the future. It is conceivable that this framework could evolve into a web-based tool, adaptable to various cities, providing critical insights into numerous urban planning and development scenarios. This could include highlighting the benefits of urban development, such as job creation, improved quality of life, and economic growth, and advocating for policies and investments that support sustainable urban development.[16]

NOTES

[1] Mengyuan Zhu et al., "Two-Period Based Carbon-Economy Equilibrium Strategy for Modular Construction Supply Planning," *Journal of Cleaner Production* 290 (March 2021): 125674, https://doi.org/10.1016/j.jclepro.2020.125674.
[2] Brian Conger, "On Livability, Liveability and the Limited Utility of Quality-of-Life Rankings," *SPP Research Paper*, no. 7–4 (2015).
[3] Rudolf Giffinger, Gudrun Haindlmaier, and Hans Kramar, "The Role of Rankings in Growing City Competition," *Urban Research & Practice* 3, no. 3 (24 November 2010): 299–312, https://doi.org/10.1080/17535069.2010.524420.
[4] Matthias Schönert, "Städteranking und Imagebildung: Die 20 größten Städte in Nachrichten- und Wirtschaftsmagazinen," *BAW Monatsbericht 2/03, S.1-8*, February 2003.
[5] Rudolf Giffinger, Hans Kramar and Gudrn Haindl, "The Role of Rankings in Growing City Competition," Urban Research & Practice 3, no. 3 (2010): 1-14.
[6] Michael Parkinson, Richard Meegan, Jay Keracha, and Richard Evans, Second Tier Cities in Europe: In An Age of Austerity Why Invest Beyond the Capitals? (Liverpool John Moores University: European Institute for Urban Affairs), https://homepages.tuni.fi/markku.sotarauta/verkkokirjasto/Second_tier_cities_policy.pdf.
[7] Rodrigo V. Cardoso, "Localising Urbanisation Trajectories: Comparing the Emergence of Second-Tier Urban Regions in Europe (1890–2011)', *Urban Research & Practice* 11, no. 3 (2018): 223–46, https://doi.org/10.1080/17535069.2017.1328068.
[8] Nataša Urbančíková, 'European Capitals Of Culture: What are their Individualities?', *N T* 13, no. 4 (2018).
[9] Ridrigo V. Cardoso, and Evert J. Meijers. "Secondary yet Metropolitan? The Challenges of Metropolitan Integration for Second-Tier Cities," Planning Theory & Practice, 18, no. 4, (2017): 616-635, DOI: 10.1080/14649357.2017.1371789
[10] Giffinger, Haindlmaier, and Kramar, 'The Role of Rankings in Growing City Competition'.
[11] I. Tosics, Strategic Planning in European Cities. Consultancy for the Institute of Urban Economics, Moscow (Metropolitan Research Institute, Budapest, July 2003).
[12] Roberta Capello and Roberto Camagni, "Beyond Optimal City Size: An Evaluation of Alternative Urban Growth Patterns," *Urban Studies* 37, no. 9 (2000): 1479–96, https://www.jstor.org/stable/43196575.
[13] Nicholas Martino, Cynthia Girling, and Yuhao Lu, "Urban Form and Livability: Socioeconomic and Built Environment Indicators," *Buildings and Cities* 2, no. 1 (2021): 220–43, https://doi.org/10.5334/bc.82.
[14] Robert W. Marans, "Quality of Urban Life Studies: An Overview and Implications for Environment-Behaviour Research," *Procedia - Social and Behavioral Sciences* 35 (2012): 9–22, https://doi.org/10.1016/j.sbspro.2012.02.058.
[15] *Rational Decision Making*, accessed 9 August 2023, https://link.springer.com/book/9783642028502.;
Viktor Goebel and Florian Kohler, Raum Mit Städtischem Charakter 2012 (Swiss Statistics. Federal Statistics Office (FSO), n.d.), https://www.bfs.admin.ch/bfs/de/home/statistiken/querschnittsthemen/raeumliche-analysen.assetdetail.349558.html.
[16] Cardoso, 'Localising Urbanisation Trajectories'.

BIBLIOGRAPHY

Capello, Roberta, and Roberto Camagni. "Beyond Optimal City Size: An Evaluation of Alternative Urban Growth Patterns." *Urban Studies* 37, no. 9 (2000): 1479–96. https://www.jstor.org/stable/43196575.

Cardoso, Rodrigo V. "Localising Urbanisation Trajectories: Comparing the Emergence of Second-Tier Urban Regions in Europe (1890–2011)." *Urban Research & Practice* 11, no. 3 (3 July 2018): 223–46. https://doi.org/10.1080/17535069.2017.1328068.

Conger, Brian. "On Livability, Liveability and the Limited Utility of Quality-of-Life Rankings." SSRN Scholarly Paper. Rochester, NY, 4 June 2015. https://papers.ssrn.com/abstract=2614678.

Dangschat, Jens. "Hamburg Vor Köln Und München, Berlin Deutlich Dahinter, Leipzig Abgeschlagen. Warum Und Für Wen Der, Unsinn von Rankings' Sinn Macht." *ARL-Nachrichten* (2001).

Giffinger, Rudolf, Christian Fertner, Hans Kramar, and E. Meijers. “City-Ranking of European Medium-Sized Cities.” 2007. https://www.semanticscholar.org/paper/City-ranking-of-European-Medium-Sized-Cities-Giffinger-Fertner/fcd2292c028ef31f24d750aef302f6fa14716fc6.

Giffinger, Rudolf, and Gudrun Haindl. “Smart Cities Ranking: An Effective Instrument for the Positioning of Cities?” In *5th International Conference Virtual City and Territory, Barcelona, 2,3 and 4 June 2009*, 703–14. Centre de Política de Sòl i Valoracions, 2009. https://doi.org/10.5821/ctv.7571.

Giffinger, Rudolf, Gudrun Haindlmaier, and Hans Kramar. “The Role of Rankings in Growing City Competition.” *Urban Research & Practice* 3, no. 3 (24 November 2010): 299–312. https://doi.org/10.1080/17535069.2010.524420.

Goebel, Viktor, and Florian Kohler. “Raum Mit Städtischem Charakter 2012.“ Swiss Statistics. Federal Statistics Office (FSO), n.d. https://www.bfs.admin.ch/bfs/de/home/statistiken/querschnittsthemen/raeumliche-analysen.assetdetail.349558.html.

I. Tosics. “Strategic Planning in European Cities. Consultancy for the Institute of Urban Economics, Moscow.” Metropolitan Research Institute, Budapest, July 2003.

Mäding, Heinrich. “And the Winner Is ... Standpunkt: Städte-Rankings.“ *Difu-Berichte*, 2001.

Marans, Robert W. “Quality of Urban Life Studies: An Overview and Implications for Environment-Behaviour Research.” *Procedia - Social and Behavioral Sciences* 35 (2012): 9–22. https://doi.org/10.1016/j.sbspro.2012.02.058.

Martino, Nicholas, Cynthia Girling, and Yuhao Lu. “Urban Form and Livability: Socioeconomic and Built Environment Indicators’ 2, no. 1 (2 March 2021): 220–43. https://doi.org/10.5334/bc.82.

‘Monatsbericht. Städteranking Und Imagebildung. Die 20 Größten Deutschen Städte in Nachrichten- Und Wirtschaftsmagazinen - PDF Kostenfreier Download’. Accessed 7 August 2023. https://docplayer.org/14534273-Monatsbericht-staedteranking-und-imagebildung-die-20-groessten-deutschen-staedte-in-nachrichten-und-wirtschaftsmagazinen.html.

Rational Decision Making. Accessed 9 August 2023. https://link.springer.com/book/9783642028502.

Rosol, Marit, Vincent Béal, and Samuel Mössner. ‘Greenest Cities? The (Post-)Politics of New Urban Environmental Regimes’. *Environment and Planning A: Economy and Space* 49, no. 8 (August 2017): 1710–18. https://doi.org/10.1177/0308518X17714843.

Royuela, Vicente. ‘City Competitiveness and Quality of Life’. In *Encyclopedia of Quality of Life and Well-Being Research*, edited by Alex C. Michalos, 927–31. Dordrecht: Springer Netherlands, 2014. https://doi.org/10.1007/978-94-007-0753-5_384.

Schönert, Matthias. ‘Städteranking und Imagebildung: Die 20 größten Städte in Nachrichten- und Wirtschaftsmagazinen’. *BAW Monatsbericht 2/03, S.1-8*, February 2003.

‘Second Tier Cities in Europe: In An Age of Austerity Why Invest Beyond the Capitals?’ European Institute for Urban Affairs, Liverpool John Moores University, n.d. https://homepages.tuni.fi/markku.sotarauta/verkkokirjasto/Second_tier_cities_policy.pdf.

Urbančíková, Nataša. ‘European Capitals Of Culture: What Are Their Individualities?’ *N t* 13, no. 4 (2018).

Zhu, Mengyuan, Jingqi Dai, Rui Liu, Jiuping Xu, and Aladdin Alwisy. ‘Two-Period Based Carbon-Economy Equilibrium Strategy for Modular Construction Supply Planning’. *Journal of Cleaner Production* 290 (25 March 2021): 125674. https://doi.org/10.1016/j.jclepro.2020.125674.

ARCHITECTURE AND MIGRAINE: AN INCLUSIVE MODEL FOR MIGRAINE-SAFE VISUOSPATIAL ENVIRONMENTS

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INTRODUCTION

As defined for 2000 years, migraine is a complex and variable disease with various symptoms that affect different body parts. It often causes severe headaches, visual disturbances, mood swings, balance disorders, and nausea. Migraine-induced headache is the third most common disease and the sixth-highest specific cause of disability worldwide, determined by genetic and environmental factors.[1] According to the American Migraine Foundation (AMF), the disease affects more than 1 billion people worldwide; it is seen in 1 out of 5 women, 1 in 16 men, and 1 in 11 children.[2]

Migraine has many different sensory triggers among physical, physiological, and psychological conditions. Those, alone or together, are the factors that trigger attacks and headaches in people who are prone to migraine.[3] In addition to situations triggered by visual, auditory, olfactory, and other senses, environmental and biological variables, like sleep deprivation, fatigue, hormonal changes, and sudden decreases in air pressure, have also been identified as migraine stimuli.[4] Along with visually triggered diseases and disorders such as photosensitive epilepsy, fear of light (photophobia), light sensitivity, headache, and accompanying migraine attacks, migraine refers to a much larger community and social burden.[5] Although the causes of migraine allow speculative approaches in diagnosis and treatment, the complex mechanisms of migraine have become more understandable with increasing scientific research, neuroimaging technologies, and new findings in recent years.[6]

Burden of migraine: Migraine and its impact on human life

Every stage of migraine can cause disability in the individual's different domains of private and professional life.[7] Migraine makes seemingly easy tasks much more challenging to complete and takes more time. Individuals with migraine have difficulties that are highly dependent on the individuals' lifestyle and environmental characteristics, as well as the severity and frequency of their symptoms. According to a study conducted in 2019, within the most common themes of the overall impact of migraine disorders, Matilde Leonardi and Alberto Raggi evaluated the effect on home and leisure activities first and the impact on work or school-related activities second.[8] The difficulties mainly arose in work or school-related activities as they require diverse skills for physical and social tasks and maintaining communication and relationship with others. The problems related to work and school are reported to be associated with headache frequency, pain intensity, decreased productivity, and female gender. The authors explain that the burden of headache disorders, especially migraine, is also an economic burden. Much of this economic effect is due to work-related costs resulting from absenteeism and low productivity.

Efforts to improve the quality of life for all are instrumental in mitigating migraine's personal, social, and economic burden. By responding to the causes of migraine in terms of reduced equality, restricted abilities, and productivity, the present study proposes to incorporate the unrecognized relationship between migraine and the built environment through the knowledge of neurology and environmental psychology with architectural design methods and tools. Architecture is a field of practice and research that specifically and extensively deals with the visual perception of spatial relationships. Therefore, through disciplinary know-how, the entrance of architecture into the equation is indispensable in leading research with easily implementable solutions. The first step to unfolding the problem is searching for migraine's intricate mechanisms in the visuospatial field of perception.

MECHANISMS OF MIGRAINE AND VISUOSPATIAL FIELD OF PERCEPTION

The study defines the migraine triggers as "visuospatial factors," as part of the human perception where visual and spatial features of the built environment are joined, and which, alone or together, are both creating, inducing, stimulating migraine and other visually induced discomforting conditions. An inquiry into migraine's visuospatial factors requires a deeper look into the mechanisms of migraine and its relationship with human perception. Arnold J. Wilkins' book *Visual Stress*,[9] in which the mathematics of different elements and disturbing images that create visual stress are explained, is the most comprehensive study describing the relationship between migraine and visual perception. The author attributes the experience of visual disturbance to strong physiological arousal caused by certain visual stimuli and the effects of overstimulation of the brain's visual cortex. Visual stress occurs because unnatural and disturbing images cause an increase in neural activity and metabolic demand, requiring less efficient processing and more oxygenation.[10]

The neural mechanism of the visual cortex processes some images efficiently and others inefficiently. Wilkins states that natural images are processed efficiently and comfortably by the visual system, and the least disturbing images correspond to the characteristic features of the natural visual environment.[11] Many aspects of spatial coding in the visual system are matched with the 1/f spatial structure of the visual environment. Because images with different structures do not fully match the visual mechanisms, so they produce unnaturally strong neural responses and trigger individuals susceptible to migraine or epilepsy.[12] In other words, the mind processes uncertain visual stimuli that it cannot predict with less efficiency, thus causing a stronger neural response and discomfort. Peter R. Boyce and Arnold J. Wilkins state that most studies show a positive relationship between visual disturbance and neural activation of the visual cortex and, therefore, oxygenation, including studies on individuals with migraine with fear of light.[13] Cortical hyperexcitability is thought to occur in migraine and epilepsy, and other neurological disorders where seizures are relatively common, such as autism.[14] Complexity in the visual field creates a computational charge leading to excessive neural activity, and high metabolic demand for oxygenation, eventually causing visual discomfort. High contrasts, frequency in repetitive patterns, and distribution of light and shadow provoke hyper neuronal activity.[15]

The migraine literature needs three dimensional studies on spatial relations. Though neurologists, psychologists, and ophthalmologists deeply dissect the adverse effects of migraine on human health and comfort, their arguments primarily rely on 2D-image experiments. Future work can complete those experiments' deficiencies with the 3D experimental research methods and findings produced in the architecture sciences. Although without any focus on migraine, numerous 3D research has been executed in architecture and building science concerning energy efficiency, lighting comfort, and performance. In these studies, comfort is defined as the minimum required performance, therefore failing to have an inclusive account for people with migraine.

The study claims that it is possible to detect visual factors that can trigger migraine in the spatial organizations of the built environments, therefore, to assess the level of inclusiveness for people with migraine through the computational complexity of visual stimuli in their spatial relations. Since the mechanisms of visual stress and visually induced migraine are similar,[16] investigating the elements and parameters that cause overstimulation of the brain's visual cortex helps establish a framework to include these factors as design considerations.

MIGRAINE AS A SPATIAL CONSIDERATION

Some environmental factors are decisive in designing built environments and measuring spatial comfort and livability. There are prominent studies that are concerned with the spatial comfort and livability criteria; in its greater complexity,[17] comfortable interior designs,[18] and for production of guidelines for accessible spaces.[19] In 1983, Wolfgang F. E. Preiser explored the relationship between human behavior and the built environment and evaluates them based on the topics of habitability, thermal comfort (air conditioning and ventilation), noise control-acoustics, lighting systems (access to natural light), and access to nature (planting). The author defines them as aesthetic and performative components.[20]

Since individuals with migraine are more sensitive to certain qualities of light, sound, odor, or otherwise,[21] they have varying threshold tolerances and respond to the built environments differently. These qualities can effectively form migraine attacks and pain, singularly or cumulatively. In 1995, Oliver Sacks defines migraine caused by such stimuli as "conditional migraine." Therefore, the same physical environment that is habitable and comfortable for healthy individuals may affect people with migraine differently.

Researchers working with the methods of environmental psychology and architecture long studied user experience and the effects of environments on people. However, these studies need to address the architectural design and be occupied with the experience of space from migraineurs' perspective. An extensive set of experimental studies in the literature on migraine and visual stress are conducted from a neurological and psychological perspective. These primarily focus on light, glare, patterns, and color chromaticity. For example, some patterns are known to create visual stress with their dazzling and vibrating effect (pattern glare) and stimulate migraine, even some can lead to epileptic seizures.[22] When we look at the effect of light as another stimulus, it is seen that some situations provoke migraine by creating fear of light and visual stress.[23] These experiments are limited to two dimensions. Spatial conditions such as depth, level differences, movement, and other dynamic factors in the production and experience of space still need to be included in the migraine literature.

According to a study conducted in the USA, nearly 90 percent of daily activity is spent indoors; and, more than half of this time is spent in working environments such as offices and classrooms.[24] Artificial light sources, technological tools, and digital screens bring high visual stress to these working and educational environments. It is known that these factors can trigger visually sensitive migraine and epilepsy.[25] Visually intense environments like shopping malls and supermarkets also trigger vestibular symptoms in vestibular migraine patients.[26] The more exposure time, the greater the possibility of occurrence and impact.[27]

Although the existing scientific literature on migraine is conducted mainly for academy-based researchers, through architecture mediating in between, it becomes possible to augment the impact of migraine research on first design practitioners and secondly to the policymakers and the public to act on the issue. Possible solutions for the mitigation of migraine require an interdisciplinary mindset and approach. Neurology and psychology dominate the studies, yet there are studies conducted, including researchers from engineering and lighting sciences. When the problem is extended towards understanding the mechanisms of triggers within the three-dimensional space, i.e., perceived visuality

of the built environment, existing literature fails to deal with the uncertainty and complexity inherent to the 3D visual field. This gap demands approaching migraine from an architectural point of view. (Figure 1) The agency of architecture is especially crucial when migraineurs are exposed to these spatial triggers for more than half their day in buildings, primarily for work and education. In these environments, they have minimum control over the design and arrangement of architectural elements and spatial relations.

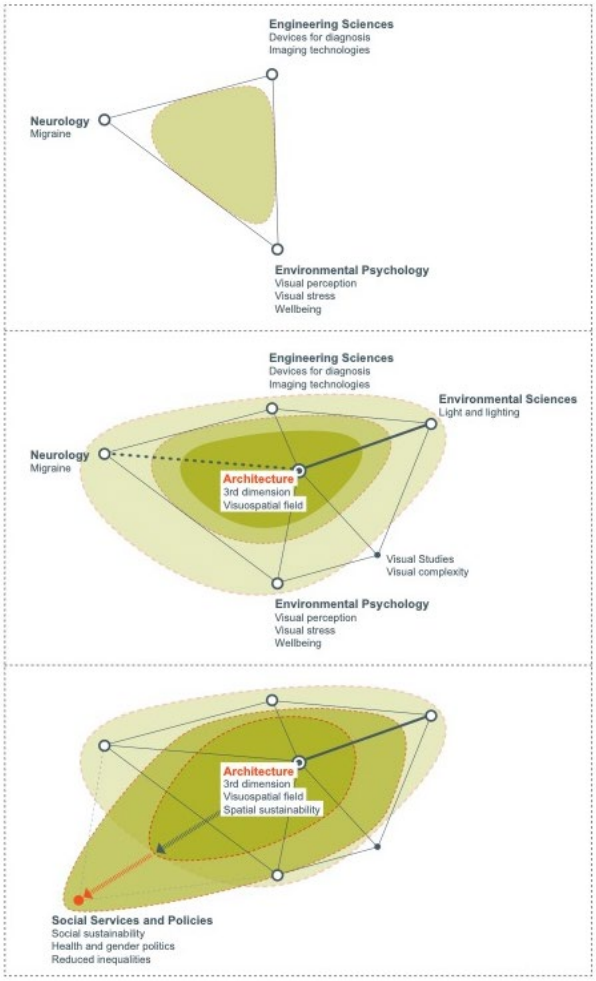

Figure 1. The formation of the proposed interdisciplinary research area extended through the agency of architecture.

VISUOSPATIAL FACTORS INDUCING MIGRAINE AND THE AGENCY OF ARCHITECTURE

This part of the paper presents a framework developed to translate the existing knowledge on built environments as an architectural design concern. The migraine issue has yet to be approached directly from an architectural point of view. How architectural design decisions affect individuals with migraine pain and triggers of attacks has yet to be investigated. The findings also show that no study deals with these elements in their multiple holisms, likely due to the high level of complexity of the visual-spatial field that is quite challenging to control the parameters for experimental studies. This gap interrupts the practical use of the knowledge produced so far. It constitutes the motivation of this study and determines the area it aims to contribute. As the first comprehensive study on the

relationship between migraine and architecture, this paper underlines the massive social burden of migraine by unfolding its visuospatial triggers from a design perspective.
Within the physical characteristics of built environments, the elements and parameters included in this study are defined as the visuospatial triggers of migraine. (Figure 2) Together with the direct triggers of migraine, factors that have the potential to induce migraine by creating visual stress are also included in this study. They are grouped under the headings (1) lighting structure, (2) surface properties, (3) formation of space, and (4) movement. In the literature on lighting structure, light and lighting, visual comfort, and energy efficiency have a relatively large set of empirical information. In addition, surfaces have also been studied under various sub-titles concerning visual comfort and energy efficiency.[28] It is observed from the existing studies that the spatial factors: formation of space and movement, were not covered in the experimental studies, neither in migraine nor visual comfort research, which the author determines as a significant deficiency in the literature.

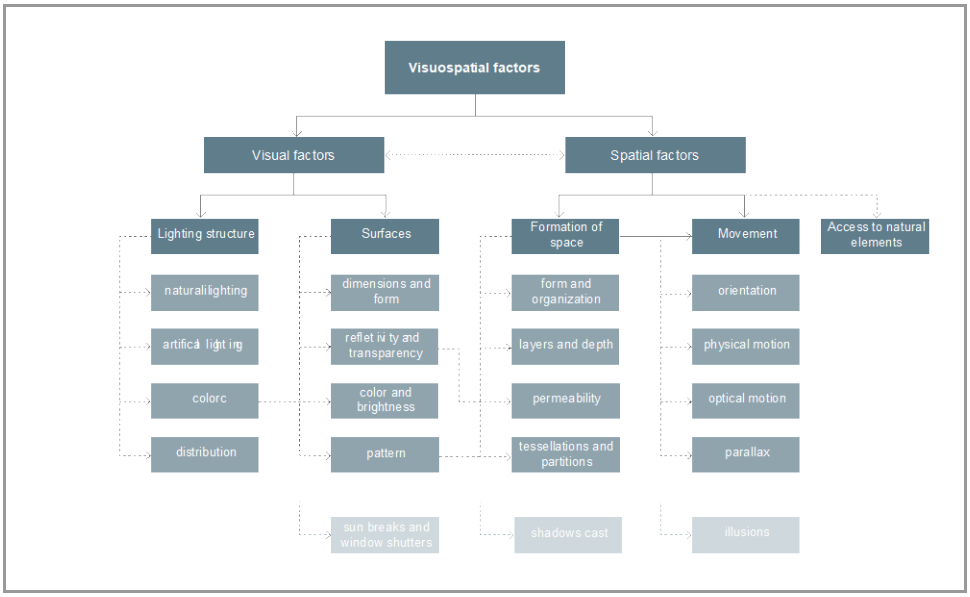

Figure 2. The proposed framework for migraine-safe visuospatial built environments.

TOWARDS MIGRAINE-SAFE ARCHITECTURES: POSSIBLE IMPLICATIONS OF THE STUDY

This project's contribution and widespread impact can be understood when the frequency and severity of the situations in which this large population living with migraine and its accompanying diseases become debilitated, and their productivity is reduced and restricted. Control over built environments will help people with migraine and include them more in social and work-education life. The paper addressed possible implications and related them with the UN's SDGs for the significance and the urgency in finding ways to solve the problem.
The general public has not yet been unable to build a clear understanding of migraine and migraine burden on individual, societal, and governmental levels. This study exposes architecture's agency and influence in making the hard-to-understand scientific knowledge public and developing possible solutions for reducing and regulating migraine triggers. Solving the problem altogether is unrealistic with the current knowledge, though some attempts can be made for effective mitigation. The proposed framework provides architects with accurate predictions for projects at the design stage by leading the way for inclusive environments that consider the well-being of people with migraine.

All people should have access to equal opportunity and comfort conditions to achieve natural equality, including people living with migraine. National and international associations work to raise awareness of migraine, facilitating the follow-up and accessibility of current information, educating healthcare personnel and patients, and supporting research. These include but are not limited to the International Headache Society, the American Headache Society, the American Migraine Foundation, the Migraine Trust, the Association of Migraine Disorders, Headache and Pain Studies Association.

The study creates a groundwork to demand action for the formation and future application of social policies and regulations for the built environments. The implications of the study extend in multiple directions. Explicitly and implicitly, and in various ways, the study contributes to the United Nations' 2030 Agenda for Sustainable Development.[29] The contributed Sustainable Development Goals (SDGs) of the UN are "good health and well-being," "gender equality," "reduced inequalities," and "sustainable cities and communities." By extending its limits, the possible implications and impact of the study are manifold yet can be classified under five interrelated trajectories:

Livable cities and sustainable environment: The paper exposes the wide variety of the burden of migraine and the negative experiences that migraineurs face. Visualizing the actuality and seriousness of the problem and looking for solutions at physical and social levels, the study is intended to guide the research and practice in design fields and policy making. The proposed framework can be a valuable guide for creating new designs to improve built environments in a way that will produce migraine-safe spaces. It can also work as a model to assess and transform the existing spaces in use into inclusive and livable environments. In addition to the considerations on architectural space, the paper presents a groundwork for further study of migraine-safe environments on the perception and experience of urban and city levels.

Health and well-being: The study supports the creation of healthy physical environments to ensure the physical, social, and psychological well-being of individuals with migraine. It aims to increase life quality and migraineurs' active and healthy participation in life as SDG3 aims to "ensure healthy lives and promote well-being all at all ages."

Reduced inequalities: The proposed inclusive framework for migraine-safe visuospatial environments respond to the SDG10 as it advocates for awareness to "reduce inequalities" and "empower and promote the social, economic, and political inclusion of" individuals living with migraine and other visually induced discomforting conditions and disabilities. It also demands equal opportunity and inclusive policies and practices regarding the discrimination created through them.

Employment and work life: An implication of this study is to initiate inclusive and specific policies for individuals with migraine in employment and working life, increasing participation and productivity of groups requiring special policies in the labor force and employment. By reducing inequalities for disadvantaged individuals with a natural equality approach, it is advocated that everyone can reach equal opportunities and comfort conditions, including but not limited to the work environments of offices, coworking, and education spaces.

Empowerment of women in business and academic life: Although affecting both sexes, being female is a risk factor for the chronicity of migraine.[30] Migraine has a more significant effect on females, especially during the reproductive years, due to "female sex hormones, which can have profound effects on the frequency, severity, and type of migraine".[31] The incidence of migraine in women is three times higher than in men, and the risk of attacks during menstrual periods increases the overall burden cumulatively for women. Considering the frequency and severity of situations where females' productivity decreases in their work and education life because they become debilitated, this situation puts women at a disadvantageous position in business and education life compared to men. In this respect, the impact of the study extends towards empowering women in

business and education life, ensuring their access to equal rights and opportunities, and active participation in all levels of education.

CONCLUSION

This study corresponded to the theme of the conference “livable cities” as it has introduced an encounter by intersecting architectural design and health research from a unique perspective to develop methodologies for creating inclusive environments for people with migraine. By responding to the burden of migraine, this paper aimed to detect the visuospatial factors affecting individuals with migraine and questioned why migraine should be a design consideration. Further research is needed to holistically cover non-visual environmental sensory triggers, including auditory and olfactory. It brought a critical perspective to the field by approaching architectural design research and practice, reconsidering the inadequate vocalized migraineurs' side. With this new perspective, the study formed a new area for research and practice by establishing a bridge between migraine studies and architectural design.

NOTES

[1] Amrit Sudershan, et al., “The complexities of migraine: A debate among migraine researchers: A review.” *Clinical Neurology and Neurosurgery* 214: 107136 (2022).
Doğa Vurallı et al, “Cognitive dysfunction and migraine.” *The Journal of Headache and Pain* 19, 109 (2018).
[2] American Migraine Foundation, https://americanmigrainefoundation.org/migraine-101/.
[3] Paul R. Martin, “Triggers of Primary Headaches: Issues and Pathways Forward.” *Headache* 60 (2020): 2495–2507.
Geneviève Demarquay et al., “Revised guidelines of the French Headache Society for the diagnosis and management of migraine in adults. Part 1: Diagnosis and assessment.” *Rev Neurol (Paris)* 177 (2021): 725–733.
[4] Oliver Sacks, *Migraine*. Picador. 1970/1995.
[5] Daniel P. Hayne and Paul R. Martin, “Relating Photophobia, Visual Aura, and Visual Triggers of Headache and Migraine.” *Headache: The Journal of Head and Face Pain* 59 (2019): 430–442.
Arnold. J. Wilkins et al., “Tinted spectacles and visually sensitive migraine.” *Cephalalgia* 22 (2002): 711–719.
Arnold. J. Wilkins et al., “Photophobia in migraine: A symptom cluster?” *Cephalalgia* 41 (2021): 1240–1248.
[6] Sacks, *Migraine*.
Sudershan, et al., “The complexities of migraine.”
[7] Arife Ç. Atalar et al., “Living with Burden of Migraine: The Analysis of "My Migraine Voice" Survey Results in Turkey.” *Noro Psikiyatri Arşivi* 58(2), (2019): 115–120.
[8] Matilde Leonardi and Alberto Raggi, “A narrative review on the burden of migraine: when the burden is the impact on people’s life.” *The Journal of Headache and Pain* 20:41 (2019).
[9] Arnold J. Wilkins. *Visual Stress.* Oxford University Press: Oxford, UK, 1995
[10] Peter R. Boyce and Arnold J. Wilkins, “Visual discomfort indoors.” *Lighting Res. Technol.* 50 (2018): 98–114.
[11] Arnold J. Wilkins, “A physiological basis for visual discomfort: Application in lighting design.” *Lighting Research & Technology* 48 (2016): 44–54.
Arnold J. Wilkins, “Visual stress: origins and treatment.” *CNS* 6, (2021): 74–86.
[12] Igor Juricevic et al. “Visual discomfort and natural image statistics.” *Perception* 39(7) (2010): 884–899.
[13] Boyce and Wilkins, “Visual discomfort indoors.”
[14] Arnold J. Wilkins, *Visual Stress.* Oxford University Press: Oxford, UK, 1995.
[15] Wilkins, *Visual Stress.*
[16] Hayne, and Martin, “Relating Photophobia.”
[17] Wolfgang F. E. Preiser, “The habitability framework: a conceptual approach towards linking human behaviour and physical environment.” Design Studies 4(2) (1983): 84–91.
Ardeshir Mahdavi, “Steps to a General Theory of Habitability.” *Human Ecology Review* 5(1), (1998): 23–30.
[18] Philomena Bluyssen, *The Indoor Environment Handbook: How to Make Buildings Healthy and Comfortable* (1st ed.). Routledge, 2009.
[19] Wolfgang F. E. Preiser and Koridon H. Smith. *Universal Design Handbook*. Second Edition. New York: McGraw Hill, 2010.
[20] Preiser, “The habitability framework.”
[21] Deborah. I. Friedman and Timothy De Ver Dye. “Migraine and the Environment.” *Headache: The Journal of Head and Face Pain* 49 (2009): 941–952.
[22] Wilkins, *Visual Stress.*
James M. Gilchrist and Peter M. Allen. “Lexical decisions in adults with low and high susceptibility to pattern-related visual stress: a preliminary investigation.” *Frontiers in psychology* 6, 449 (2015).
Deacon E. Harle et al., “Visual Stimuli Are Common Triggers of Migraine and Are Associated with Pattern Glare.” *Headache: The Journal of Head and Face Pain* 46 (2006): 1431–1440.
Alex J. Shepherd et al., “Headache.” *Headache: The Journal of Head and Face Pain* 53 (2013): 1087–1103.
Shu Imaizumi et al., “Illusory visual motion stimulus elicits postural sway in migraine patients.” *Frontiers in psychology* 6, 542 (2015).
[23] Wilkins, “A physiological basis.”
Wilkins, “Fear of light.”
Harle et al., “Visual Stimuli.”
[24] Tristan Roberts, “We Spend 90% of Our Time Indoors. Says Who?.” *Building Green*, December 15, 2016.
[25] Wilkins, *Visual Stress.* Wilkins, “Visual stress.” Boyce and Wilkins, “Visual discomfort indoors.”
[26] Doğa Vurallı et al., “Visual and postural motion-evoked dizziness symptoms are predominant in vestibular migraine patients.” *Pain Medicine* 19(1) (2018): 178–183.

[27] Hayne, and Martin, “Relating Photophobia.”
[28] Alireza Hashemloo et al., “GlareShade: a visual comfort-based approach to occupant-centric shading systems.” *Journal of Building Performance Simulation* 9 (2016): 351–365.
Mojtaba Parsaee et al., “Human-centric lighting performance of shading panels in architecture: A benchmarking study with lab scale physical models under real skies.” *Solar Energy* 204 (2020): 354–368.
Alen Mahić et al., “A pilot daylighting field study: Testing the usefulness of laboratory-derived luminance-based metrics for building design and control.” *Building and Environment* 113, (2017): 78–91.
Laura Belli et al., “Lighting in educational environments: An example of a complete analysis of the effects of daylight and electric light on occupants.” Building and Environment. 68, (2013): 50–65.
Peter R. Boyce, “Lighting research for interiors: the beginning of the end or the end of the beginning.” *Lighting Res. Technology,* 36(4) (2004): 283–294.
Peter R. Boyce, “The Present and Future of Lighting Research.” SDAR* *Journal of Sustainable Design & Applied Research,* 6(1), Article 2 (2018): 5–14.
Kevin W. Houser et al., “Human-centric lighting: Myth, magic or metaphor?” *Lighting Research and Technology* 53 (2021): 97–118.
[29] United Nations, “Sustainable Development Goals.” Accessed February 14, 2023. https://sdgs.un.org/goals.
[30] Doğa Vurallı and Hayrunnisa Bolay. “Türkiye'de Kronik Migren Özellikleri ve Hastaya Yaklaşım.” *Turkiye Klinikleri J Neurol-Special Topics* 10(4) (2017): 347–52.
[31] Anne MacGregor, *Migraine in Women* (2nd ed.). CRC Press, 2003.

BIBLIOGRAPHY

American Migraine Foundation, https://americanmigrainefoundation.org/migraine-101/.
Atalar, Arife Ç., Manal Bozkurt, Zeynep Çalışkan, Pamela Vo, Mustafa Ertaş, Betül Baykan. “Living with Burden of Migraine: The Analysis of "My Migraine Voice" Survey Results in Turkey.” *Noro Psikiyatri Arşivi* 58(2), (2019): 115–120. https://doi.org/10.29399/npa.24780.
Bellia, Laura, Alessia Pedace, Giuseppe Barbato. “Lighting in educational environments: An example of a complete analysis of the effects of daylight and electric light on occupants.” Building and Environment. 68, (2013): 50–65. https://doi.org/10.1016/j.buildenv.2013.04.005.
Bluyssen, Philomena. *The Indoor Environment Handbook: How to Make Buildings Healthy and Comfortable (*1st ed.). Routledge, 2009. https://doi.org/10.4324/9781849774611.
Boyce, Peter R. “Lighting research for interiors: the beginning of the end or the end of the beginning.” *Lighting Res. Technology,* 36(4) (2004): 283–294. https://doi.org/10.1191/11477153504li118oa.
Boyce, Peter R. “The Present and Future of Lighting Research.” SDAR* *Journal of Sustainable Design & Applied Research,* 6(1), Article 2 (2018): 5–14. https://doi.org/10.21427/D7853J.
Boyce, Peter R., and Arnold J. Wilkins “Visual discomfort indoors.” *Lighting Res. Technol.* 50 (2018): 98–114.
Demarquay, Geneviève, Xavier Moisset, Michel Lantéri-Minet, Solène de Gaalon, Anne Donnet, Pierric Giraud, Ev Guégan-Massardier, Christian Lucas, Jérôme Mawet, Caroline Roos, Dominique Valade, and Anne Ducros. “Revised guidelines of the French Headache Society for the diagnosis and management of migraine in adults. Part 1: Diagnosis and assessment.” *Rev Neurol (Paris)* 177 (2021): 725–733. doi: 10.1016/j.neurol.2021.07.001.
Friedman, Deborah. I., and Timothy De Ver Dye. “Migraine and the Environment.” *Headache: The Journal of Head and Face Pain* 49 (2009): 941–952. https://doi.org/10.1111/j.1526-4610.2009.01443.x.
Gilchrist, James M., and Peter M. Allen. “Lexical decisions in adults with low and high susceptibility to pattern-related visual stress: a preliminary investigation.” *Frontiers in psychology* 6, 449 (2015). https://doi.org/10.3389/fpsyg.2015.00449.
Harle, Deacon E., Alex J. Shepherd,and Bruce J. W. Evans. “Visual Stimuli Are Common Triggers of Migraine and Are Associated with Pattern Glare.” *Headache: The Journal of Head and Face Pain* 46 (2006): 1431–1440. https://doi.org/10.1111/j.1526-4610.2006.00585.x.
Hashemloo, Alireza, Mehlika Inanici, and Christopher Meek. “GlareShade: a visual comfort-based approach to occupant-centric shading systems.” *Journal of Building Performance Simulation* 9 (2016): 351–365. https://doi.org/10.1080/19401493.2015.1058421.
Hayne, Daniel P., and Martin, Paul R. “Relating Photophobia, Visual Aura, and Visual Triggers of Headache and Migraine.” *Headache: The Journal of Head and Face Pain* 59 (2019): 430–442.

https://doi.org/10.1111/head.13486.
Houser, Kevin W., Peter R. Boyce, Jamie M. Zeitzer, and Michael Herf. “Human-centric lighting: Myth, magic or metaphor?” *Lighting Research and Technology* 53 (2021): 97–118. doi: 10.1177/1477153520958448.
Imaizumi, Shu, Motoyasu Honma, Haruo Hibino, Shinichi Koyama, S. “Illusory visual motion stimulus elicits postural sway in migraine patients.” *Frontiers in psychology* 6, 542 (2015). https://doi.org/10.3389/fpsyg.2015.00542.
Juricevic, Igor, Leah Land, Arnold Wilkins, and Michael A. Webster. “Visual discomfort and natural image statistics.” *Perception* 39(7) (2010): 884–899. https://doi.org/10.1068/p6656.
Leonardi, Matilde, and Alberto Raggi. “A narrative review on the burden of migraine: when the burden is the impact on people’s life.” *The Journal of Headache and Pain* 20:41 (2019). https://doi.org/10.1186/s10194-019-0993-0.
MacGregor, Anne. *Migraine in Women* (2nd ed.). CRC Press, 2003. https://doi.org/10.3109/9780203427187.
Mahdavi, Ardeshir. “Steps to a General Theory of Habitability.” *Human Ecology Review* 5(1), (1998): 23–30. Accessed December 20, 2023. https://www.jstor.org/stable/24707103.
Mahić, Alen, Kiara Galicinao, and Kevin van den Wymelenberg. “A pilot daylighting field study: Testing the usefulness of laboratory-derived luminance-based metrics for building design and control.” *Building and Environment* 113, (2017): 78–91. https://doi.org/10.1016/j.buildenv.2016.11.024
Martin, Paul R. “Triggers of Primary Headaches: Issues and Pathways Forward.” *Headache* 60 (2020): 2495–2507. https://doi.org/10.1111/head.13901.
Parsaee, Mojtaba, Claude M. H. Demers, Jean-François Lalonde, André Potvin, Mehlika Inanici, and Marc Hébert. “Human-centric lighting performance of shading panels in architecture: A benchmarking study with lab scale physical models under real skies.” *Solar Energy* 204 (2020): 354–368. https://doi.org/10.1016/j.solener.2020.04.088.
Preiser, Wolfgang F. E. “The habitability framework: a conceptual approach towards linking human behaviour and physical environment.” Design Studies 4(2) (1983): 84–91. https://doi.org/10.1016/0142-694X(83)90038-8.
Preiser, Wolfgang F. E. and Koridon H. Smith. *Universal Design Handbook*. Second Edition. New York: McGraw Hill, 2010.
Roberts, Tristan. “We Spend 90% of Our Time Indoors. Says Who?.” *Building Green*, December 15, 2016. Accessed December 20, 2023. https://www.buildinggreen.com/blog/we-spend-90-our-time-indoors-says-who.
Sacks, Oliver. *Migraine*. Picador. 1970/1995.
Shepherd, Alex J., Trevor J. Hine, and Heidi M. Beaumont. “Headache.” *Headache: The Journal of Head and Face Pain* 53 (2013): 1087–1103. https://doi.org/10.1111/head.12062.
Sudershan, Amrit, Kanak Mahajan, Kuljeet Singh, Manoj K Dhar, and Parvinder Kumar. “The complexities of migraine: A debate among migraine researchers: A review.” *Clinical Neurology and Neurosurgery* 214: 107136 (2022). https://doi.org/10.1016/j.clineuro.2022.107136.
United Nations. “Sustainable Development Goals.” Accessed February 14, 2023. https://sdgs.un.org/goals.
Vurallı, Doğa, and Hayrunnisa Bolay. “Türkiye'de Kronik Migren Özellikleri ve Hastaya Yaklaşım.” *Turkiye Klinikleri J Neurol-Special Topics* 10(4) (2017): 347–52.
Vurallı, Doğa, Cenk Ayata, and Hayrunnisa Bolay. “Cognitive dysfunction and migraine.” *The Journal of Headache and Pain* 19, 109 (2018). https://doi.org/10.1186/s10194-018-0933-4.
Vurallı, Doğa, Funuzar Yildirim, Didem T. Akcali, Mustafa N. Ilhan, Nebil Goksu, and Hayrunnisa Bolay. “Visual and postural motion-evoked dizziness symptoms are predominant in vestibular migraine patients.” *Pain Medicine* 19(1) (2018): 178–183. https://doi.org/10.1093/pm/pnx182.
Wilkins, Arnold. J. “A physiological basis for visual discomfort: Application in lighting design.” *Lighting Research & Technology* 48 (2016): 44–54.
Wilkins, Arnold. J. “Fear of light: On the cause and remediation of photophobia.” *Lighting Research & Technology* 53 (2021): 395–404.
Wilkins, Arnold. J. “Visual stress: origins and treatment.” *CNS* 6, (2021): 74–86.
Wilkins, Arnold. J. “Visually-induced seizures.” *Progress in Neurobiology* 15 (1980): 85–117.
Wilkins, Arnold. J. *Visual Stress.* Oxford University Press: Oxford, UK, 1995.
Wilkins, Arnold. J., Ragini Patel, Peyman Adjamian, and Bruce Evans. “Tinted spectacles and visually sensitive migraine.” *Cephalalgia* 22 (2002): 711–719. https://doi.org/10.1046/j.1468-2982.2002.0036.
Wilkins, Arnold. J., Sarah M. Haigh, Omar A. Mahroo, and Gordon T. Plant. “Photophobia in migraine: A symptom cluster?” *Cephalalgia* 41 (2021): 1240–1248. https://doi.org/10.1177/03331024211014633

AUDIO-VISUAL STORYTELLING AS A FOUNDATION OF SITE ASSESSMENT IN JOHANNESBURG

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INTRODUCTION

What methods do spatial practitioners need to operate in an African city characterized by extreme socio-spatial complexity, fluid contingency, and emergent insurgency? This paper presents *Urban Scripting*, an urban design approach that uses audio-visual storytelling to assess sites. Its reading format combines Nguni oral tradition (local expertise) with audio-visual and spatial methods and positions the urban designer as a spatial and content producer. The mix strategically inserts social narrative and hybrid storytelling as an engagement technique. *Social narrative* is an evolving discourse unit employed to write spatial imagination. This interactive storytelling finds those often overlooked by conventional tools, specifically voices in and from 'the twilight zone' – the urban entrepreneurs who seize and adapt to the space between roadway and building, usually in breach of city by-laws.

Tested in Johannesburg, *Urban Scripting* casework builds an anthology of the best-on-ground evidence needed to turn space into place. The method uses the frame to reassess the city's architecture and urbanism by creating a documentary genre that exposes layers and details needed to enhance the understanding of everyday users. The documentary texts inform city-making practices and model appropriate policies to support subaltern communities instead of restricting them. This paper explains how the frame performs as an inclusive tool within a specific set of urban processes, and its application [enframing] calibrates a spatial narrative through empathy with the potential to improve marginalized lives in African cities in motion.

Background

South Africa still employs Euro-American spatial theories, methods, and norms. As a result, urban configurations reflect an imperial imposition misaligned with Nguni expressions. This imbalance creates knowledge gaps and produces rigid city spaces that, rather than enabling, usually hinder socio-economic and cultural development, forcing many into the 'informal' economic sector to work in its 'twilight zone' of on-the-ground operations that straddle an area hitherto undefined and unregulated by the state. Challenging how public spaces are defined, what is deemed 'informality' tends to occur in sites not professionally intended or designed for micro-enterprises. However, despite breaching city by-laws and challenging conditions, these spaces provide an essential means of economic participation, livelihood, and survival characterized by innovation, adaptability, and flexibility.

Sites

In South Africa, the term 'informal' is a contentious composite that means different things to different people. To a substantial extent, the majority socially accepts Johannesburg's 'informality' despite its implied negativity. It can be considered a conflict between perceived modernity and outmoded tradition. *Urban Scripting* considers 'informality' as 'a twilight sector' that covers a spectrum of socio-economic production modes, conditions, and constantly adapting entrepreneurship. Also, its calibrating process engages omitted voices from *Others* to center this twilight's narrative base and theme, which *Alexandra: A Backstory*'s[1] panels demonstrate. Drawing from Heidegger's enframing concept,[2] *Urban Scripting* uses modern technology to order the self-revealing nature of *the twilight zone* as a standing reserve. In other words, truth is found in text, material assets, human resources, goods, and other city phenomena. The technology utilized in the enframing system consists of digital capture and processing tools, including comic grids that configure a page, panel, frame, gutter layout, and book.[3] This thinking and making modality uncovers, collects, orders, and transmits information.

Primed by mutual relations between the text and the reader, the technique is structured by the grid, which symbolizes the connection between Heidegger's technology, local storytelling, and urban materiality. Enframing establishes an epistemological foundation and ontological praxis for conceptualizing, theorizing, analyzing, and realizing street phenomena. The merging of an activity street, oral story, and cinematic sites configure composites that reveal new spatial and temporal realities. These collages highlight daily life by shifting the frame to the *Other*, thus presenting an unacknowledged agency, insurgency, and intelligence.

Approach

Framing is a collective source of remembrance. To promote social justice, this transdisciplinary technique responds to changing engagement and environmental conditions by harnessing life stories that optimize a story/image to understand better. Through concerted struggle, users' needs and operational bricolage underpin core social city life and offer a vital counter-narrative. Social "refers to the range of economic, social and political relations, institutions and practices that surround an image and through which it is seen and used."[4] Static and dynamic frames extend analytical methods and create a strategic data device to grasp city life. By uncovering real-life situations, its construction aims for coherence and signifies a 'democratic polemic'[5] to amplify and reconcile conceptual and spatial distortions. Zooming in and out, designing and disseminating knowledge used by academics, practitioners, and citizens, the frame interconnects the person, the street, and the city. This multidimensional approach, rooted in experiential, emotional, and moral meanings, has value potential outside spatial discipline.

Theoretical reference: Principles of African Storytelling

Although the South Africa of the 21st century is very different in almost all facets of lived reality and needs, its spatial practice remains firmly burdened by a Euro-American canon. Libraries are challenging to access because they are hegemonic, stigmatized, and full of Euro-American texts. In current norms, print knowledge is far privileged over oral, sign, image, and implicit modes, "while African concepts are embedded in the knowledge of the African language."[6] Integrating *Othered* knowledge into professional discipline mitigates this domination. It affords opportunities to learn from people whose culture (and gender) and right to exist have been historically considered of lesser importance and deviant by the politics of a colonial, heteronormative gaze and, therefore, never assimilated into mainstream life.

Using storytelling to incorporate *Other* wisdom provides a critical pathway to decolonizing elitist institutions of academia and practice. In addressing complexity, such conduits rewrite Johannesburg

to undo, across multiple scales and temporalities, colonial hierarchies of knowledge, power, and becoming and create a new understanding of socio-spatial needs. Storytelling untangles these dimensions by situating *the twilight zone* across distinct historical scales and geographical time frames. This composite initiates a dual interrelation between story/image and space, story/image as writing space and space as a subject for story/image.

DEFINITION OF URBAN SCRIPTING

Urban Scripting deploys audio-visual storytelling as a critical site engagement tool that merges concepts of art, making, and transmitting. It connects seeing and hearing with methods of looking and listening to optimize a liminal story/image, blending scientific reasoning (epistēmē), practical know-how (technē), and ethical wisdom (phronēsis).[7] Various [aspect ratio] frames draw on *Ubuntu*[8] principles to communicate city-making trajectories. Through enframing, the urban designer, as a spatial and content producer, orchestrates tensions between function and beauty. These zoom in on memory, ownership, and belonging and traverse topical, temporal, and spatial terrains. The resulting composition initiates a process of turning space into place. Collaborating with local voices (knowledge) to engender shared meaning, the producer generates graphic text (content) and develops an operational bricolage that exposes potential. Aesthetically, frames show how yesterday informs today to improve tomorrow's urban imaginaries. Artistically, they offer a vital insurgent city planning/design documentary to review the past, capture the present, and, from this, shape future possibilities.

Framing the Backstory

Entrepreneurial users run growing self-initiated and self-driven micro-enterprises in the street's constantly evolving twilight areas. Turning their emerging subaltern activities into accessible narratives allows undervalued voices to lead site assessment from the ground up. This ground-up, protagonist-led perspective ensures that more stakeholders have a role in defining a city's spatial needs, understanding its daily making, and contributes to its potential evolution.

The knowledge misalignment between colonial and Nguni thinking requires methods that expose obfuscated and undervalued layers and details, advance new critical insights, and contribute to a city's formation. Consequently, the city's administrative power, agents, and end users must establish a common ground to find solutions. This common ground is "an ethical concept that invokes the one thing a city ought to grant – a depth that accommodates with dignity the diversity of its peoples and their histories."[9]

As such, Johannesburg's activity streets provide novel historiographical perceptions of micro-architectures, space, and use. They also [re]present this common ground, which, for many, is a fundamental element of access to opportunity.[10] In Johannesburg's case, describing the making of an activity street in an apartheid-classified Black township reveals the knowledge of everyday life needed to create an improved multicultural urban. Additionally, it gives insight into the microentrepreneurs whose insurgency serves the broader public and their use of city space, a group integral to city life hitherto unnoticed by spatial practice. Lacking financial capital and property rights, twilight microentrepreneurs are flexible, adaptable, and innovative. What they can access and maximize is demonstrated in how Alexandra's activity streets unfolded. This elasticity is always becoming and continuously contested. It is a form of bricolage.

To understand it, audio-visual storytelling focuses on contemporary issues expressed within this incomplete and ever-mutating public space. The narrative emphasizes "the mutually reinforcing relationship between the individual and society, … the internal worlds of social subjects and the external material worlds [they] inhabit."[11] A less static Cartesian[12] form of freeze-frames, sequences,

and sequencing probes relations between identity and city. This movement reinforces multiple chronologies, dimensions, and scales, prompting a perceptual paradigm that aids in recognizing the plurality needed to uncover the everyday's emergence.[13]

Calibrating

Calibrating recites in two ways: as a cognitive organizer of sociological experience aspects to structure social interaction and as a data field library of audio-visual content. Combined, they create meaning through mental and material mise en scène assembled as a documentary. Grounded in lived experience, this explores activities with multiple spacetime dimensions to make sense of the urban and its making. Three actions comprise this reading process:

1. *Framing* (time) reimagines and creates hybrid urban spaces within timeframes defined by relevance.
2. *Shifting* (context) listens to the subaltern, assesses situations, and re-centers their identity.
3. *Positioning* (activities) writes multiple perspectives from the *framing* and *shifting* processes to construct trajectories that fulfill user activity needs.

To transform space into place, these interconnected actions complement each other and calibrate an analytical, reflective, and communicative practice that draws on the co-creator's critical knowledge. The social documentary's central concern is to reveal how the street connects people to themselves, others, and the city. The graphic novel *Alexandra: A Backstory* demonstrates this historicized link via the drawn picture. Against a political landscape, frames map the evolution of adaptive socio-economic and cultural forms. They question what values guide the city, for whose gain, and to what ends? Most importantly, they ask who has the right to occupy the street.

This approach is premised[14] on existing ineffective conventional assessment and participatory engagement methods, which are of little use in imagining and designing fair and democratic spaces, especially for the subaltern. Hence, the focus is on the characteristics that microentrepreneurs' bricolage adapts to, specifically, the elements from which malleable insurgency creates self-driven opportunities. Such contexts exist in Alexandra and hundreds of city environments elsewhere in South Africa, across the African continent, and beyond. Thus, the *backstory* rewrites Alexandra from these perspectives to permit richer and more practical insights than the Euro-colonial thinking that defined its genesis. The calibrating scale is a process and product that outlines pertinent information from expansive establishing views to tight close-ups, interconnecting macro, meso, and micro details. Its reflexive, ethical practice reveals omitted circumstances and creates new urban materiality.

African Storytelling: The Making of Alexandra: A Backstory

Alexandra: A Backstory is a work of art, a language, medium, or semiotic system that recounts Johannesburg's making by fusing the perspectives of the colonizer and the colonized. As a content and spatial producer, the urban designer deploys the street as a space (a set) to apprehend and reimagine the city's future. Revisiting its heritage shapes audio-visual content that constructs a new urban understanding. This composite defies imposed static architectural forms that defined contemporary movement and made the city. Curated visual narratives situate the ordinary *what is* rather than *what should be* and challenge the oversimplification of African life by interweaving yesterday, today, and tomorrow. Generating a more representative awareness of what exists spurs innovation, offering what could be.

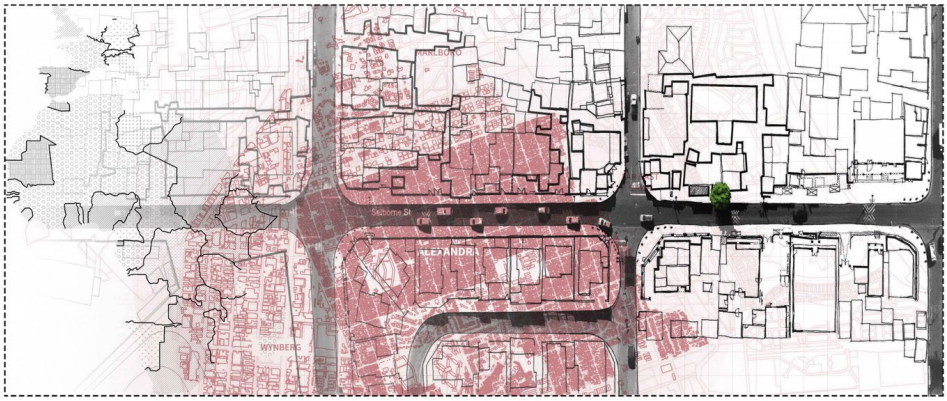
Calibrating Content in Alexandra: A Backstory

Framing

Framing establishes current effects from macro causes. From under the tree on the sidewalk, Bra Niky historicizes Johannesburg's formative events between 1834 and today. Beginning in 2017, his narration rewinds to the early 19th century. It shows how unspoiled, almost treeless veld (open country grassland) morphed into today's city with its urban forest mainly consisting of alien species planted by the colonizer. Compositing layers a collective blueprint and structures a linguistic style to make the city talk. Historical reflection highlights overlooked moments and depictions. Rereading these builds new memory banks and uncovers novel understandings.

Character dialogue embeds oral history textures in different layouts: single full-page panels, multiple panels, or combinations. A single panel expresses detail by outlining a moment's fragment and close-up details of a body, an arm, or a hand. To create sequences, juxtaposed panels form a space known as a gutter that generates time transitions[15] for readers to fill with information and action.[16] These variations configure a linguistic vocabulary, a cinematic trope that describes connections between then and now and potential. Single full-page panels signpost the past. Contextualizing Alexandra and Johannesburg, this linguistic vocabulary links the township and city to the country and the continent (defined by surrounding water bodies) to embody micro, meso, and macro spatial and temporal realities.

For example, the borders fracturing Africa dissolve into a contemporary building footprint map of Reverend Sam Buti Street in Alexandra (Figure 1).



FRAMING

Figure 1. Framing Time (timeframing)

Temporal markers illustrate reported or documented gold discoveries in 1834, 1852, 1853, and 1886, or the 1876 ox-wagon route between the Transvaal farms and the independent Boer republic's capital, Pretoria. Four full-page panels depict the apartheid laws that control African life in all its human capabilities. The Native Land Act of 1913, the Native Urban Areas Act of 1923, and the Group Areas Act of 1950 denote the legislative framework that created imbalanced socio-spatial realities. They hindered all aspects of black African life and extended enhanced rights to white settlers. The series ends with a composite of 1991's repeal of all segregationist laws and the subsequent promulgation of the new South African Constitution in 1996.

Page variations introducing activities and characters support the signposts. The most basic is a grid of single square panels. Six square panels are arranged into two columns of three rows according to Euro-American reading conventions, from left to right, top to bottom. Another variation omits a gutter between two panels to create a single rectangular frame.

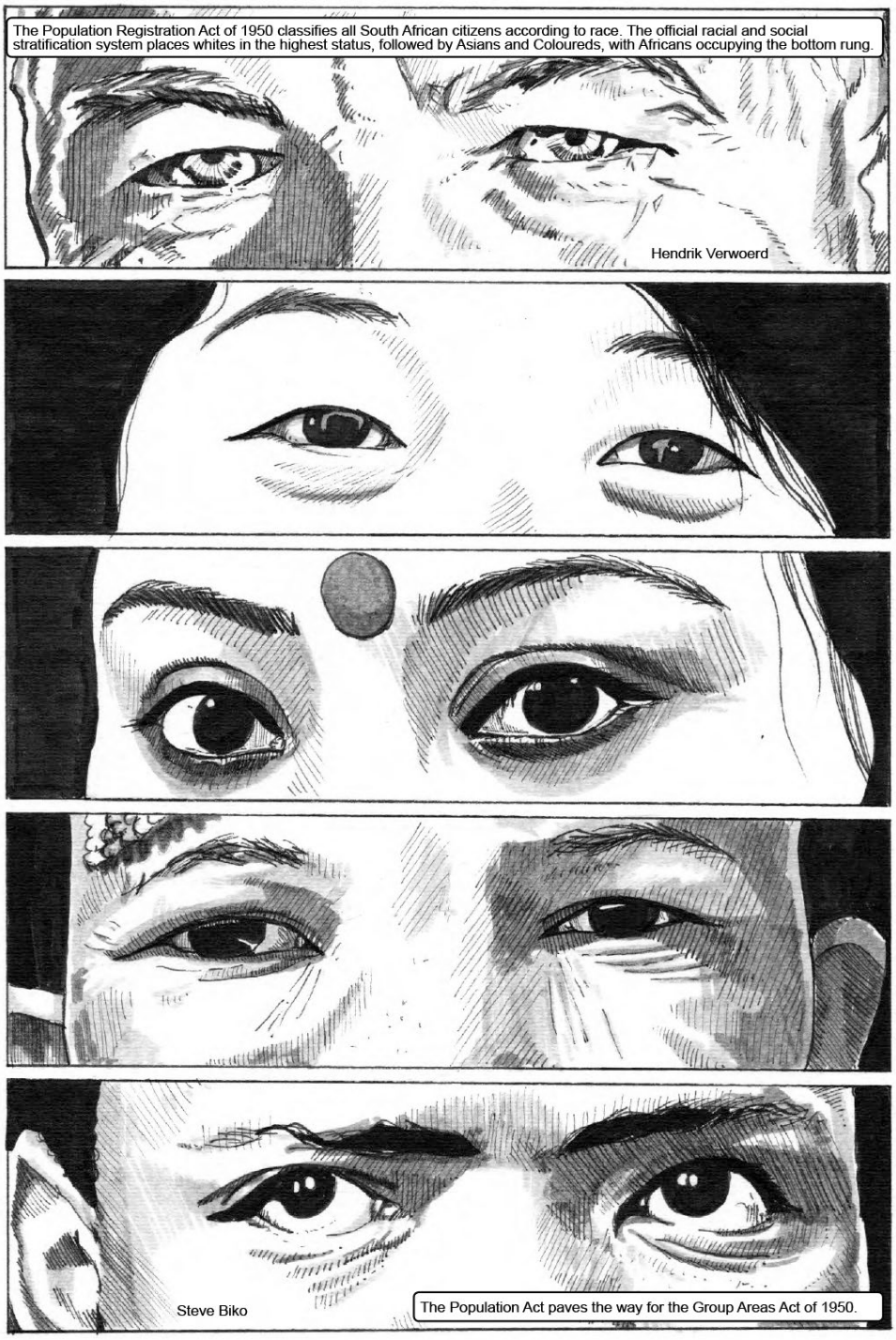


Figure 2. Apartheid Racial Classification

From edge to edge, its horizontality gives a stereoscopic view that mirrors a cinema's widescreen. This framing contributes to the data field's compositional atmosphere. Variations present intimate details, such as smallpox immunization in 1945 and Bra Niky's birth. He is pictured lying asleep in his mother's arms in 1949, watched over by his parents. A close-up of different sets of eyes (Figure 2) is drawn to illustrate the dehumanizing horror of the Population Registration Act of 1950, which classified South African citizens along racial lines.

Framing is a relational composite between continent, city, and street. It suggests a timeframe by which colonized Africa, carved up in the 19th century, merges with a segregated Johannesburg

assembled in the 20th century. With the contemporary street evolving daily, hourly, and momentarily, framing presents information that permits readers "to select, to narrate, to recast and personalize data for their […] uses."[17] In an infinitely complex context, the tree is a focal grounding point that epitomizes framing.

Shifting

Shifting zooms into the meso-level and identifies characters affected by macro causes. It builds on Escobar's[18] ontological design arguments that apply criticality to environmental, experiential, and political issues and their resulting social impacts while centering on the *buntfu*-grounded[19] human experience. Literally and metaphorically, the frame is shifted, time is compressed, and history's rhythms determine space. Hence, shifting rethinks the city and seeks other possibilities to form new mutual understandings. An example is how, in two ways, Bra Niky depicts Africa in Figure 3.

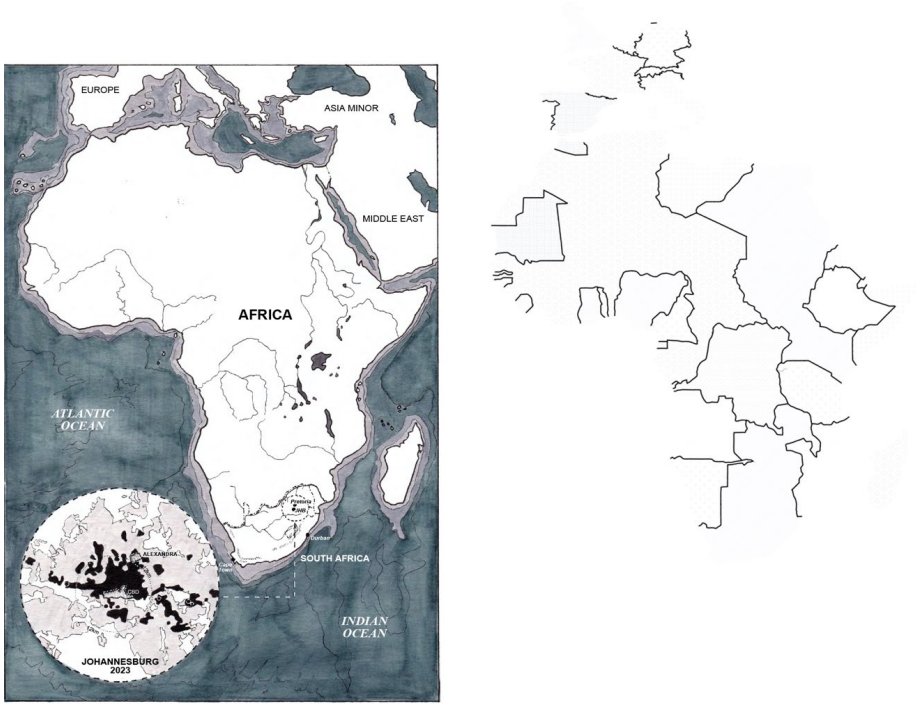


Figure 3. Africa

The first is the continent's outline, shaped by the natural divides that predate European colonization. It contextualizes Johannesburg by showing Africa's coastline, where land meets water. The lack of lines captures *what was* and projects *what if*. As a unifying and collective memory, Africa is drawn as a single geographical area, with only its significant rivers and lakes. Madagascar, southern Europe, Anatolia (Asia Minor), and the Middle East are also visible. The purpose of this depiction is to illustrate Africa's natural lines, escarpments, and rivers, contrasted with the artificial, imperial greed-driven lines that still fashion today's reality. It reassesses the existing situation to re-center African identity. It lays bare "The meaningless of borders."[20] The second shows the 1884 Berlin Conference's colonizing lines, which still separate Africans today. Drawn lines imply thought and documented form created as a direct product of imperial extraction. This depiction erases Africa's coastline. Erasing the continental outline does not compromise the recognizability and reading of Africa, which suggests our normative perception of the continent relies on its imposed political landscape rather than its natural terrain.[21] Shifting advances continuity based on framing. Inspired by collaboration, it argues that today's problems cannot be solved tomorrow using yesterday's conventions or technology.

Figure 4. Urban Scripting Scales

Compositions illustrate the banal power of existing human constructions, like the different sets of eyes in framing. New patterns of looking at and envisioning what is seen are set up to understand the complex and intricate relation of the person and space, the street and the city, the country and the globe (Figure 4). In another shifting frame demonstration, the tree reappears as a reference point. Offering a nuanced view of the context, it [re]presents modifications between plan and elevation to enable different storytelling. As a narrative source, the tree is where one can gauge the experiential qualities of place. We see Bra Niky alongside the tree, waiting to share his story and those of many *Others*.

Positioning

Positioning focuses on the micro to observe the macro-meso effects. Building multiple perspectives, it writes movement sequences or actions in relatable settings. Appropriately expressed, these counteract prevailing spatial discourse erasure. Chronology (time) delineates the story because macro, meso, and micro socio-spatial realities (context and activities) change with time. At a macro-level, the globe is the African continent, South Africa, Johannesburg, the township of Alexandra, and Reverend Sam Buti Street. At meso-level are the identified street blocks containing the story settings/locations. The micro-level are the close-ups of specific events, such as an African domestic worker ironing clothes, the repeated frames of laundry hung on clotheslines, and the erasure of mixed-race areas to create whites-only spaces.

These examples can be specific to any context – they provide insight into stories told in any medium and have value beyond spatial practice. Thus, intellectually and conceptually, *Alexandra: A Backstory* presents an assemblage of a specific field casework, research, and practice components. Its vignettes integrate macro-micro scales to illustrate fragments pertinent to telling a story of a story in a story.

Positioning assembles themes chronologically from a priori documentation to compose the structural violence executed to maximize capital profits that birthed Johannesburg. Historicizing the city

expresses its connective tissue, continuity, and temporality of experience and ties the continent, country, city, street, sidewalk, and tree together. Bra Niky's lived experience is an integral sub-theme that humanizes the mapping technique to reach broader audiences. Using improvisational calibrating, the producer sculpts the frame to compose a story that captures the heart of Johannesburg.

Recalibrating

Through conversations with the landscape, *Urban Scripting* offers views to explore new worlds that maintain coherence by building self and collective identity. Just as the skilled storyteller uses axiom, gesture, and metaphor to convey meaning and mood, the producer's use of different types of frame transitions narrates sequences that, even though the reader draws their own conclusions, significantly influence their deductions. Achieving diversity and difference in the narrative requires focused and empathetic listening, and the knowledge used in writing life experiences comes from human interactions.

Scripting urban potential in this way can improve the present if city makers act ethically and with a similar level of nuance and compassionate reading. This form of graphic novel writing is empowering as it involves city users in the spatial imagination of their environment. Frames are not rigid and allow the producer to stray from a pattern and instantly create a new counter-hegemonic narrative that critiques conventional norms. Driven by the desire to make space into place, Barthes's assertion that story and narrative have a universal role in human history roots scripting; they are everywhere: in oral or visual texts, still or moving pictures, gestures, and combinations.[22] *Alexandra: A Backstory*'s portrayal of specific activities gives space new meanings by showing how it becomes an existing, imagined, and constructed place. Therefore, it offers a more widely accessible alternative imagination.

CONCLUSION

Rooted in empathy and ethics, *Urban Scripting*'s retelling shifts and transforms the perspective of the hitherto marginalized from one that is *Othered* to one that is integrated and belongs. This is achieved by giving *Other* reality agency through active collaboration. Urban professionals across disciplines can draw from its resources, reorient their knowledge by gaining insights from the marginalized, thus provoking effective conceptualization. These concepts influence the future city's design evolution and tell a transformed story through honest storytelling as a counter to colonial hubris, epistemology, and pedagogy.

Most importantly, it aims to improve the translation of locally grounded research by demonstrating expanded and alternative site appraisal methods. The support of those with power, such as politicians and policymakers, is required to alter the city's trajectory. Hybrid storytelling is critical to reach, inform, and drive effective city evolution. Its contribution intersects literary and spatial studies, pedagogy and history, politics, sociology, technology, and art, creating an aesthetic documentary genre. Against a Euro-American gaze, this field interrogates colonial formations and episteme where the marginalized still experience loss of self, identity, and belonging by collaboratively rewriting Johannesburg as a space and theoretical site.

Polemically, writing twilight intelligence as a Nguni epistemological text contributes to the African archive's multilingualism with alternative thinking and makes micro-architectures related to streets. Programmatically, too, *Alexandra: A Backstory*'s mise en scène forms a way of speaking to help urban practitioners think with and through pictures and initiate a path to a reflective making of a hybrid city. Effectively, the objective is to stimulate a move towards the co-production of more practical and efficient (effective) symbolic or material street realities. This practice method is *Urban Scripting*.

NOTES

[1] Solam Mkhabela, *Urban Scripting: Audio-visual Forms of Storytelling in Urban Design and Planning* (Johannesburg: Wits University, 2023).
[2] Martin Heidegger, in *The Question Concerning Technology and Other Essays*, trans. William Lovitt (New York: Harper and Row. 1977), 19-20.
[3] Ernesto Priego and Peter Wilkins, "The Question Concerning Comics as Technology: Gestell and Grid." The Comics Grid: Journal of Comics Scholarship, 8(16) (2018): 4.
[4] Gillian Rose, *Visual Methodologies: An Introduction to Researching with Visual Methods* (Los Angeles: Sage Publications, 2016), 26.
[5] Scott MacDonald, *The Garden in the Machine: A Field Guide to Independent Films about Place* (Berkeley: University of California Press, 2001).
[6] Mfaniseni F. Sihlongonyane, "Ubuntuising Planning in the Age of Urban Anxiety" (Hybrid inaugural lecture presented at the University of the Witwatersrand, Johannesburg, 20 September, 2022).
[7] Aristotle, *Nicomachean Ethics* (Indianapolis: Hackett Publishing Company, Inc, 1999).
[8] The Nguni have a saying, umuntu ngumuntu ngabantu, a humanist philosophical term that translates to a person being a person because of their connection to others. Phrased differently, it means I am because we are. It is also commonly referred to simply as *Ubuntu*. For richer access, see Desmond Tutu (2013) discussing this concept of "Who we are: Human uniqueness and the African spirit of Ubuntu" accessed October 3, 2019, https://www.youtube.com/watch?v=ftjdDOfTzbk.
[9] Peter Carl, "Type, Field, Culture, Praxis." Architectural Design, 81(1) (2022): 38.
[10] Vikas Mehta, *The Street: A Quintessential Social Public Space* (London: Routledge, 2014).
[11] Garth Stevens, Foreword to *Being Black in the World*, by N. Chabani Manganyi (Johannesburg: Wits University Press, 2019), x.
[12] Taken from Descartes Cartesian plane - a two-dimensional coordinate plane formed by the intersection of two perpendicular lines. Here, two spaced apart horizontal lines, known as X-axis, and two spaced apart vertical lines, known as Y-axis, create a boundary that denotes a frame and its limited datascape [format]. That is the bounded surface containing storyteling elements. Format refers to the proportions of the frames specific height and width, in other words, the frames aspect ratio.
[13] For in depth discussion on questions pertaining to Africa of what is 'Development' and 'Underdevelopment,' see Walter Rodney, *How Europe Underdeveloped Africa* (London: Verso, 2018), 1-34.
[14] The premise structures the main thesis argument and forms the critical thrust of the literature review explored in *Urban Scripting* (Johannesburg: Wits University, 2023).
[15] Scott McCloud, *Understanding Comics: The Invisible Art* (New York: HarperCollins, 1994), 60-93.
[16] Eric Berlatsky, "Lost in the Gutter: Within and Between Frames," Narrative Theory. Narrative, 17(2) (2009): 162-187.
[17] Edward Rolf Tufte, *Envisioning Information* (Cheshire: Graphics Press, 1990), 50.
[18] Arturo Escobar, *Designs for the Pluriverse: Radical Interdependence, Autonomy, and the Making of Worlds* (London: Duke University Press, 2017).
[19] The Nguni term for the philosophy of [U]*Buntu* is how it is written in iSizulu. However, in Siswati when referring to people, it is written as *Buntfu*. Here I write the Zulu philosophical term in Siswati to underscore its root in relating the individual person as defined by being a part of a collective of others, as in other people. Hence experience is grounded simultaneously in personal and collective memory.
[20] Michael Sorkin, *Two Hundred and Fifty Things an Architect Should Know* (New York: Princeton Architectural Press, 2021), listed at number 79 of the two hundred and fifty.
[21] Francis Ikome, "Africa's international borders as potential sources of conflict and future threats to peace and security," (2012), accessed September 25, 2020, https://issafrica.org/research/papers/africas-international-borders-as-potential-sources-of-conflict-and-future-threats-to-peace-and-security.
[22] Roland Barthes, *S/Z* Trans. by Richard Miller Preface by Richard Howard (Oxford: Blackwell Publishing Ltd, 1990).

BIBLIOGRAPHY

Ajala, Adekunle. "The Nature of African Boundaries." *Africa Spectrum,* 18(2) (1983): 177—189.

Amin, Ash., and Thrift Nigel. *Seeing Like a City*. Cambridge: Polity Press, 2017.
Aristotle. *Nicomachean Ethics* (Vol. Second Edition). Indianapolis: Hackett Publishing Company, Inc, 1999.
Barthes, Roland. *S/Z* Translated by Richard Miller Preface by Richard Howard. Oxford: Blackwell Publishing Ltd, 1990.
Berlatsky, Eric. “Lost in the Gutter: Within and Between Frames.” Narrative Theory. Narrative, 17(2), (2009):162—187.
Carl, Peter. “Type, Field, Culture, Praxis.” Architectural Design, 81(1), (2011): 38—45.
Clandinin, D. Jean., and Connelly, F. Michael. *Narrative Inquiry: Experience and Story in Qualitative Research*. San Francisco: Lossey-Bass, 2000.
D’Arcy, Geraint. *Mise en scène, Acting, and Space in Comics*. Cham: Palgrave Macmillan, 2020.
Escobar, Arturo. *Designs for the Pluriverse: Radical Interdependence, Autonomy, and the Making of Worlds.* London: Duke University Press, 2017.
Griffiths, Ieuan. “The Scramble for Africa: Inherited Political Boundaries.” The Geographical Journal, 152(2 (July)), (1986): 204—216.
Havik, Klaske. *Urban Literacy: A Scripting Approach to the Experience, Use, and Imagination of Place*. Delft: TUDelft, 2012.
Havik, Klaske., and Sioli, Angeliki. “Stories for Architectural Imagination.” Journal of Architectural Education. (2021), accessed June 16, 2022, https://doi.org/10.1080/10464883.2021.1947670.
Heidegger, Martin. *The Question Concerning Technology and Other Essays*, trans. Lovitt, W., New York: Harper and Row, 1977.
Hou, Jeffrey. “(Not) your everyday public space.” In *Insurgent Public Space*, edited by Jeffrey Hou, 1—17. London and New York: Routledge, 2010.
Ikome, Francis. “Africa’s international borders as potential sources of conflict and future threats to peace and security.” (2012), accessed 25 September 25, 2020, https://issafrica.org/research/papers/africas-international-borders-as-potential-sources-of-conflict-and-future-threats-to-peace-and-security
Law Insider. "Activity Street Definition.” accessed August 18, 2022, https://www.lawinsider.com/dictionary/activity-street.
MacDonald, Scott. *The Garden in the Machine: A Field Guide to Independent Films about Place*. Berkeley: University of California Press, 2001.
McCloud, Scott. *Understanding Comics: The Invisible Art*. HarperPerennial ed. New York: HarperCollins, 1994.
Mehta, Vikas. *The Street: A Quintessential Social Public Space*. Paperback ed. London: Routledge, 2014.
Rodney, Walter. *How Europe Underdeveloped Africa*. London: Verso, 2018.
Rose, Gillian. *Visual Methodologies: An Introduction to Researching with Visual Methods*. Los Angeles: Sage Publications, 2016.
Pieterse, Edgar. “Grasping the unknowable: Coming to grips with African urbanisms.” In *Rogue Urbanism: Emergent African Cities*, edited by Edgar Pieterse & Abdoumaliq Simone, 19—35. Johannesburg and Cape Town: Jacana, 2013.
Priego, Ernesto., and Wilkins, Peter. “The Question Concerning Comics as Technology: Gestell and Grid.” The Comics Grid: Journal of Comics Scholarship, 8(16), September 24. (2018):1–26.
Sandercock, Leonie. “When Strangers Become Neighbours: Managing Cities of Difference.” Planning Theory & Practice, 1(1), (2000): 13—30.
Sandercock, Leonie. “Out of the Closet: The Importance of Stories and Storytelling in Planning Practice.” Planning Theory & Practice, 4(1), (2003): 11—28.
Sihlongonyane, Mfaniseni. F. “Ubuntuising Planning in the Age of Urban Anxiety” (Hybrid lecture). University of the Witwatersrand, Johannesburg. September 20, 2022.
Sorkin, Michael. *Two Hundred and Fifty Things an Architect Should Know*. New York: Princeton Architectural Press, 2021.
Stevens, Garth. Foreword to *Being Black in the World*, by N. Chabani Manganyi, xii—xvi. Johannesburg: Wits University Press, 2019.
Tufte, Edward. R. *Envisioning Information*. Cheshire (Connecticut): Graphics Press, 1990.
Tutu, Desmond. M. “Who we are: Human uniqueness and the African spirit of Ubuntu.” accessed October 3, 2019, https://www.youtube.com/watch?v=ftjdDOfTzbk.

MICRO URBANISM AND THE INFORMAL CITY

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INTRODUCTION

Beyond the scope of master planning and iconic skylines common to the 20th century metropolis, people experience the contemporary city as a complex network of intimate public encounters. Woven into macro-scaled initiatives guided by municipal government, mass transit authorities and commercial interests, a spectrum of modest interventions directly impact daily life. These human-scaled insertions furnish the everyday rituals, provide shelter, cultivate community and foster social engagement within the civic realm. Invisible when viewed through the lens of a 1:500 zoning map, bus stops, bike racks, parking meters, kiosks, light poles, park benches, sidewalks, trash cans, and shade structures allow for the haptic interactions that form the fundamental building blocks of our immediate, tactile engagement with the city.

The juxtaposition between top-down, macro-scaled urban planning methodology and an individual's daily life in the city is amplified by the increasingly heterogenous socio-economic, political, and cultural realities common to the contemporary phenomena of global cities in which liberal notions of public and private space are often blurred if not inverted. Mike Davis foreshadows a global shift toward the privatization of public space in his analysis of late 20th century Los Angeles where the "…city is being systematically turned inward. The 'public' spaces of new megastructures and supermalls have supplanted traditional streets and disciplined their spontaneity." [1]

Dubai, as the apotheosis of Davis' vision and the model for contemporary urbanism in much of the developing world, exemplifies the unique pedagogical challenges for architecture and urban design faculty operating in what Michael Sorkin calls the "ageographic city… [a place] that provides the bare functions of a city while doing away with the vital, not quite disciplined formal and social mix that gives cities life." [2] Teaching urban design in contexts with non-democratic forms of governance combined with increasingly multivalent definitions of 'public' reveal shortcomings in conventional, largely Western approaches to city making. This paper examines new modes that focus on the micro-scaled elements of the city. Historical precedents are studied alongside emerging urban conditions to speculate on the role of design pedagogy in the 21st Century Gulf city.

ALTERNATIVE URBANISMS: DUBAI

From the ancient Greek orthogonal plan to the fortified towns of the Italian Renaissance, to the Law of the Indies, the history of Western urban planning privileges formal strategies defined by clear boundaries and geometric patterns influenced by landscape features and strategies related to population control, the expression of power, and/or defense (Figure 1). Invariably, the center of traditional, planned cities in the West is reserved for hierarchical programs (religious, governmental, etc.) and public activities (market, city square, etc.).

Figure 1. A 1593 map of Palmanova (Italy) drawn by Joris Hoefnagel shows a discrete urban space bound by city walls with a central square. Toronto Public Library Digital archive.

Celebrated for precocious exuberance exemplified by a series of increasingly extraordinary constructions, the unprecedented evolution of Dubai embodies a new model of 21st century city building. Intrinsically linked to speculative real estate developments connected by an extensive network of automobile-centric infrastructure, the emerging city typology of the Gulf adapts and defies conventional planning practices. Dubai was a small fishing and trading settlement established on the coast of the Arabian Gulf before the discovery of oil in 1966. The first, formal master plan developed by John Harris in 1959 foreshadowed a new urban typology defined by piecemeal development projects, incomplete borders, and post-facto vehicular connections. While Harris' description called for maintaining and enhancing the focus on the historic center along the Dubai Creek the formal provisions evidenced in the graphic plan features a network of borderless roads extending north, south, and east into the undeveloped desert.

With only one natural boundary defined by the Gulf and security issues no longer dependent on fortification, Dubai developed a new approach to city building featuring a focus on discrete, developer-led enclaves, loosely connected by a decentralized network of roadways. Defined by incomplete borders and near constant flux the evolving city is not without precedent. Specifically, the historical model of non-figural morphology native to Gulf coastal villages prior to the discovery of oil allowed for "uncoordinated" growth through the accretion of "additions, alterations and demolitions-over time" as described by Varkki Pallathucheril in Dubai's northern neighbor the Emirate of Sharjah.[3]

STRATEGIC SEGREGATION

While the building materials, scale and programs have changed over time, this accretive model prefigures the underlying morphological pattern evident in the patchwork development of contemporary Dubai. But where the historic morphology included growth based on organic alternations to the existing urban form, layered augmentation, and internal reconstruction,

contemporary Dubai evolves exclusively through expansion and self-replication. New commercial developments and economic zones adopt 'city' nomenclature as a marketing strategy camouflaging conventional suburban enclaves developed by independent commercial real estate companies: Education City, University City, Expo City, etc. along with a proliferation of villages: Global Village, Knowledge Village, Green Community Village, etc. (Figure 2).

Figure 2. Dubai's clustered development and privately developed, gated neighborhoods. Image: Halah Fadhil & Ahmed Noeman

Eschewing any engagement with existing urban neighborhoods, the proliferation of these new 'cities' within Dubai serves to amplify strategic socio-cultural and economic segregation. Only 11.5% of the UAE's 10.5 million inhabitants are Emirati nationals and there is no path to citizenship for immigrants or expatriates. Expatriates from India make up 27.5% of the population while Pakistanis account for 12.7%.[4] While these populations overlap to some degree as service personnel and laborers are active in commercial spaces most of the industrial zones and construction sites are intentionally homogeneous and almost exclusively male. This socio-cultural segregation is further calcified by auto-centric mobility amplified by a pervasive lack of public transit and the near total absence of interconnected pedestrian or bicycle infrastructure.

Even beyond the extremes, domestic space and adjacent public recreation facilities in Dubai are exclusive to national sub-groups by policy and practice throughout the city. For example, strategic zoning laws define residential areas as exclusive to families (as opposed to immigrant workers isolated in camps), UAE citizens and Free-hold areas open to more affluent expatriates. Meanwhile, older neighborhoods in the historic center adjacent to Dubai Creek that serve a low to middle income community, "…are perceived by Emiratis and middle to upper-class "expats" as densely packed and seedy." [5] Laavanya Kathiravelu describes a culture of fear towards low-income migrants in the UAE grounded in the idea that working class expatriates "disrupt the order and aesthetics of middle-class space." [6] Dubai's built environment is layered with measures to augment this class separation, including entrance fees for parks and beaches, limited public transportation and gated communities to exclude the working class from more affluent amenities and neighborhoods.[7] Despite the increasing density the government has made little effort to enhance or rejuvenate the publicly accessible amenities in these parts of the city.

Strategic segregation sponsored by endemic bias and enabled by the conscious weaponization of conventional urban planning tools (mobility plans, zoning, homogeneous programming, etc.) asserts socio-cultural control over isolated economic groups while decreasing livability standards for all. Auto-centric mobility planning exacerbates the traffic problem as the lack of affordable housing pushes middle-income families to seek alternatives in the distant bedroom communities of Sharjah and Ajman, north of Dubai. Similarly, areas zoned for industrial production lack public open spaces and basic communal amenities. As a result, most immigrant laborers live in segregated, low-standard

housing and camps far from places of employment and urban amenities. Transit between the disparate work and living sites is typically accomplished by company owned buses as salaries preclude individual car ownership and the vehicular infrastructure does not accommodate bicycles or pedestrians.

ALTERNATIVE PEDAGOGY & PRACTICE: NEW TOOLS & TACTICS

When traditional, largely western urban planning tools developed for homogeneous societies are coopted by those in power, human-centered urban practice in the heterogeneous global city requires new tools aimed at the provision of basic public amenities for all constituents. In "The Practice of Everyday Life," Michel de Certeau juxtaposes the strategic and the tactical. He defines *strategy* as, "the calculation (or manipulation) of power relationships…" while articulating "The space of a *tactic* is the space of the Other…an art of the weak." [8]

To engage the underrepresented directly, an alternative urban design pedagogy is being developed and deployed in a series of upper-level, undergraduate architecture studios focused on the developing mega-cities of the Arabian Gulf. Eschewing conventional macro-scale urban strategies that operate at a distance, this work engages the human-scaled urban landscape. Using a variety of alternative tools these studios embark on a phenomenological and tectonic journey into the leftover spaces of the contemporary city with a focus on the small, innocuous, and often overlooked opportunities associated with the provision of housing, shade, respite, and mobility. Specifically, the studios examine the combined cultural, economic, environmental and technical issues related to the design of affordable housing and public space. Pedagogies were designed to enable students to learn from informal physical and social infrastructures and pursue an explicitly local approach foregrounding the layering of new public amenities in existing, mono-programed zones of the city populated by underserved constituents.

Project Finding

To avoid top-down approaches to design, assignments were structured to foreground first-person exploration and discovery. Intuition and observation replaced traditional planning tools such as programmatic or formal analysis. In this model faculty guidance is limited to broad questions aimed at directing research toward small interventions capable of outsized positive impacts. Some students begin with pre-existing interests while others leverage prior experience, but most start by simply wandering to and through the city. Regardless of how they begin, students are challenged to find a problem in need of definition and development through first-person investigations. This method owes much to William Whyte's study of the city based on careful observation of how people actually occupy and use public space.[9] Whyte's technique privileged first person experience conducted on the ground next to the people and behaviors he was studying. In a similar way students are encouraged to redefine the conventionally understood or celebrated city in favor of engagement that leads to new opportunity and discovery.

Defining Sites

Urban sites are dynamic rather than static, porous rather than contained, "messy" like da Vinci's Milan sketch rather than "neat" like the ideal plan of Palmanuova. Defining them….involves recognizing the overlay and interplay of multiple realities operating at the same time, on the same place.[10]

Once a project is discovered and located students work to define the potential extent of the site in or on which they will examine and test a project. In this process students are encouraged to understand their "site" beyond the local, physical boundary of a building lot. Several important questions compel

students to think beyond typical spatial constraints: What are the various cultures and societies who live and work in or around their site? Where are the nodes and hubs of various cultures within the built environment? What are the various types of flows and circulation routes through and around the area?

Initially, students' intuition, or training, leads them to initially select conventional 'empty' lots. In-class discussions seek to broaden the options to include more complex, dispersed, or spatially challenging sites. Faculty encourage consideration of left-over or conventionally insignificant spaces such as sidewalks, alleyways, semi-abandoned buildings, or other examples of terrain vague that allow students to propose interventions that augment an urban fabric without displacing current occupants (Figure 3). Similarly, generic, or mono-use sectors offer opportunities for weaving or overlaying new programs such as worker housing within an industrial zone or playgrounds within a dense commercial/residential area.

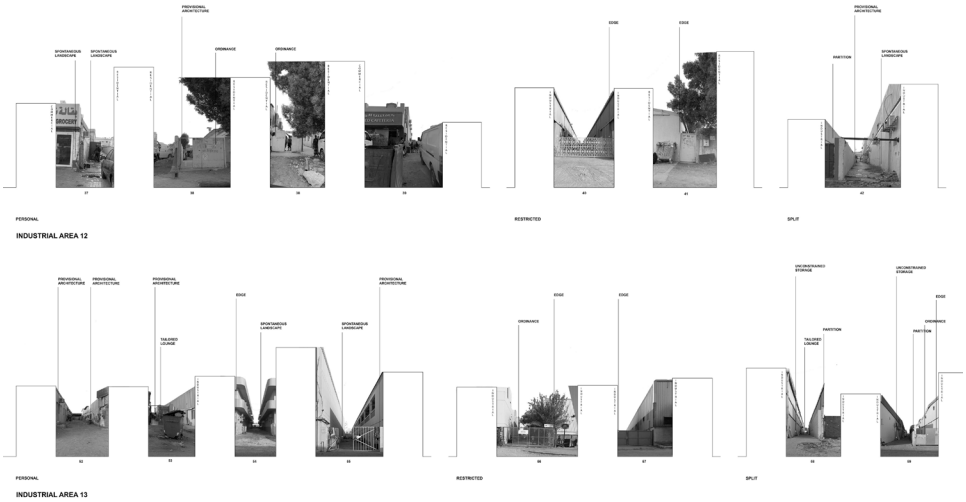

Figure 3. A graphic analysis and catalog of alleyways in the UAE's industrial zones. Image by Lamia Al Tayyari and Zuhal Imtiaz.

Mapping Beyond Form

"As a creative practice, mapping precipitates its most productive effects through a finding that is also a founding; its agency lies in neither reproduction nor imposition but rather in uncovering realities previously unseen or unimagined, even across seemingly exhausted grounds. Thus, mapping unfolds potential; it re-makes territory over and over again, each time with new and diverse consequences."[11]

In parallel with the effort to define a site, mapping exercises are introduced to reveal hidden information within the student's area of focus. Patterns of behavior, occupation, and activity not readily discernable in the physical environment are made manifest through representation. Existing maps are also interrogated as they can veil important informal economies, political forces, and social relationships. As explained by J.B. Harley, maps have the power to act as instruments of political power. "Both in the selectivity of their content and in their signs and styles of representation maps are a way of conceiving, articulating, and structuring the human world, which is biased towards, promoted by, and exerts influence upon particular sets of social relations." [12]

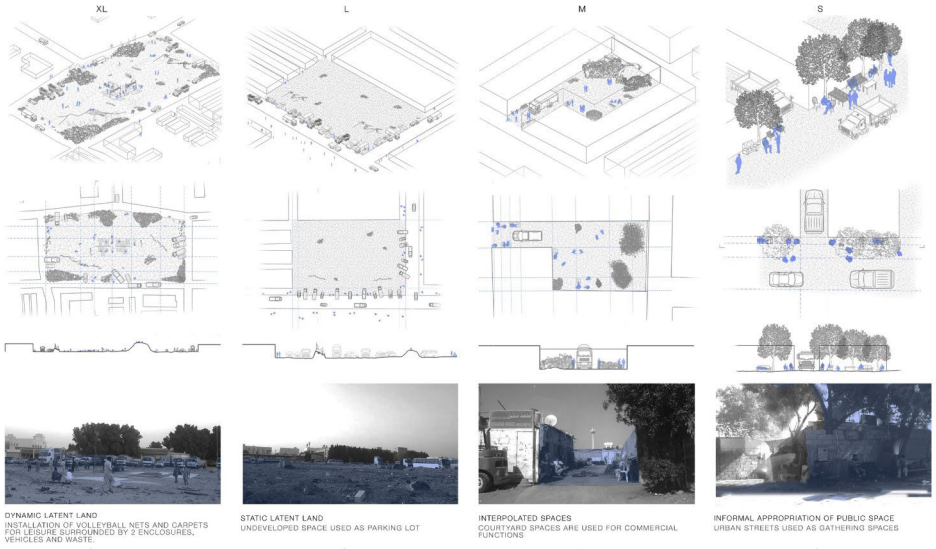

Figure 4. Diagrams show the informal occupation of spaces between buildings and in empty lots for leisure activities by foreign workers residing in the industrial areas. Drawings by Mona Moussalem and Maha Abdelsalam.

Beyond the conventional drawing of site boundaries and street layouts, students map ephemeral conditions to gain a more thorough understanding of how the city works. Investigations track intensities, flows, territories, edges. Site visits are conducted at different times of the day and the week to better understand fluctuations in patterns of inhabitation, leisure activities and commerce. Working across a range of different media, students record patterns of informal activities through a combination of photography, sketching, drawing, and three-dimensional modeling (Figure 4). The results augment conventional, formal site analysis focused on street/block geometry, traffic flows, and physical buildings to produce a more complete, composite picture that privileges existing and potential programs at the scale of the individual.

Micro Programming

At the human scale experience is not defined by skylines and street grids. In Dubai, "Iconic buildings have captured the attention of investors, but livability will ultimately be determined by the quality of so-called "back-ground" buildings that frame and enhance everyday experience." [13] Borrowing from Jan Gehl, it is the design of the spaces between the background buildings and their capacity to accommodate human activity that directly impact everyday experience. Gehl notes that, "Life…between buildings seems in nearly all situations to rank as more essential and more relevant than the… buildings themselves…" [14] In this context, simple, small things matter, and few things matter more for the ability to gather in public to sit (Figure 5). The availability, adjacency, and arrangement of formal and informal seating provides respite and sponsors a wide range of other activities.

Figure 5. "Respite from Cacaphony" by Dhruva Lakshminaray proposes a series of modest interventions to provide opportunities for rest and informal social engagement.

As they move through the city students are asked to observe the relationship between urban accommodation and individual behaviors with a particular focus on those places where people linger. The infrastructure of public respite exposes students to an alternative, first-person perspective in which small design elements can have an outsized impact. Micro-programs such as a bench, restrooms or a food vendor's stand reframe urbanism at a scale more familiar to architecture students. Amenities like playgrounds and bus stops can be evaluated qualitatively in simple terms: Do people have a choice to sit in the sun or in the shade, alone or in social groups? Is seating provided for parents in and around playgrounds? Is there shaded seating space at public transit stops? Are people inventing ways to sit where there is no furniture provided? In essence, students learn to assess the subtle programmatic variation, like the way an interior designer might consider the articulation of furnished subzones within a café or library. Discoveries of nodes, corners, and spaces with a lack of seating became opportunities to generate design interventions. (Figure 6).

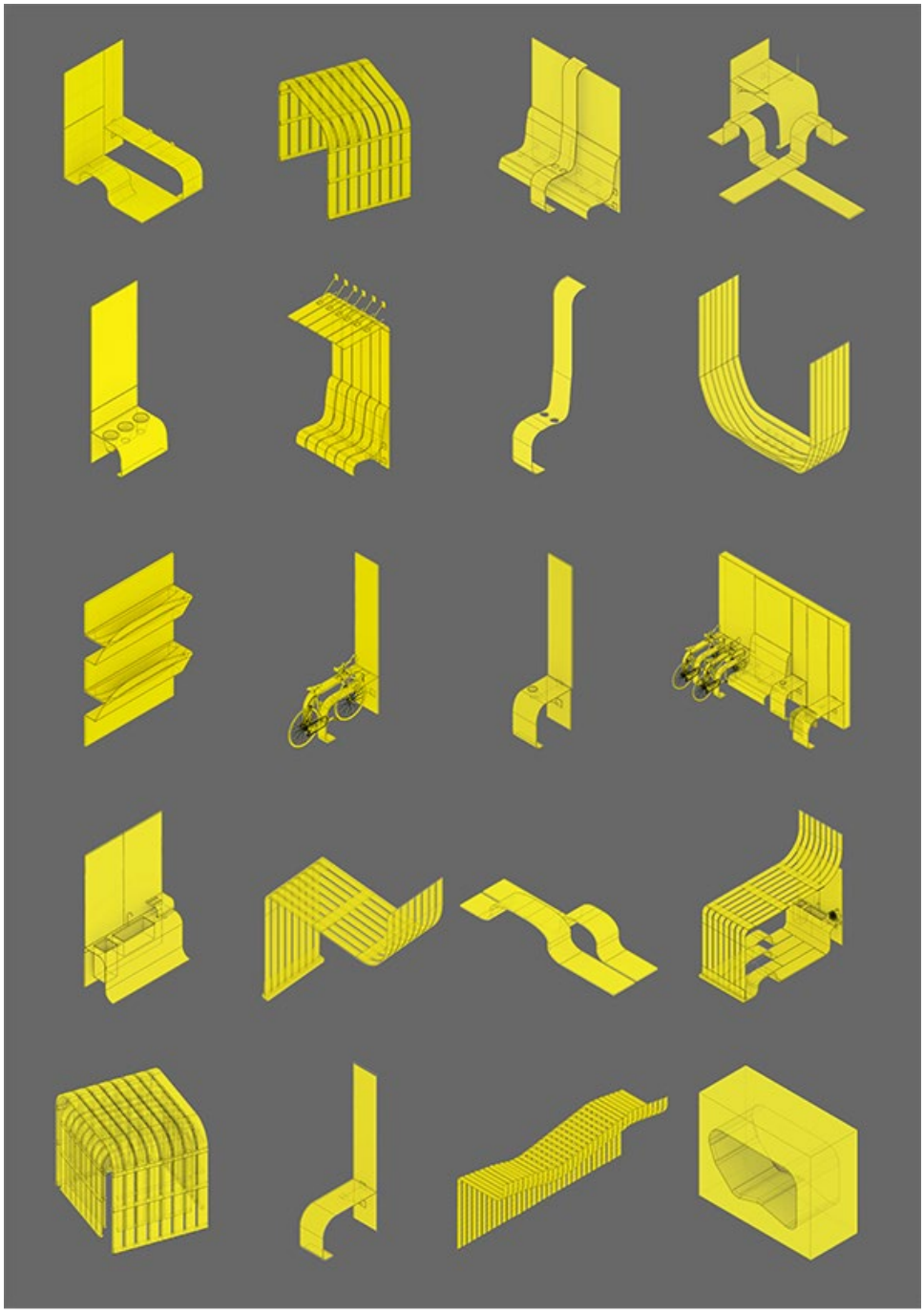

Figure 6. Catalogue of seating proposed for existing, dense, urban environments common to the Deira neighborhood in Dubai. Drawing by Dhruva Lakshminaray

Narrative + Storytelling

In an urban context where the socio-economic groups are segmented, many university students in the UAE are simply unaware of the conditions in the working and living environments of the expatriate working class. Exploring narratives through fictional writing and storytelling can help architecture students to break through the barriers of urban separation and engage empathetically with the populations for whom they are designing. Geographer Yi-Fu Tuan has shown that storytelling can reveal the intimate experiences of place and the diverse ways in which space is given meaning.

"Literary art," he notes, "draws attention to areas of experience that we may otherwise fail to notice" – the sensory perceptions, emotional resonances, and social relationships that animate space and place.[15] Before embarking on design projects, creative writing assignments in the form of fictional vignettes investigate the living conditions and lived experience of residents. The vignette assignments provide a conceptual framework to "imagine" urban space and socio-economic issues while encouraging empathy relative to the complex conditions inherent to affordable housing or public space (Figure 7). Through researching and producing their own narratives, students develop a nuanced understanding of the issues that various groups of residents face and how dynamics like geographical displacement, social segregation and global economies impact peoples' lives in the Gulf region.

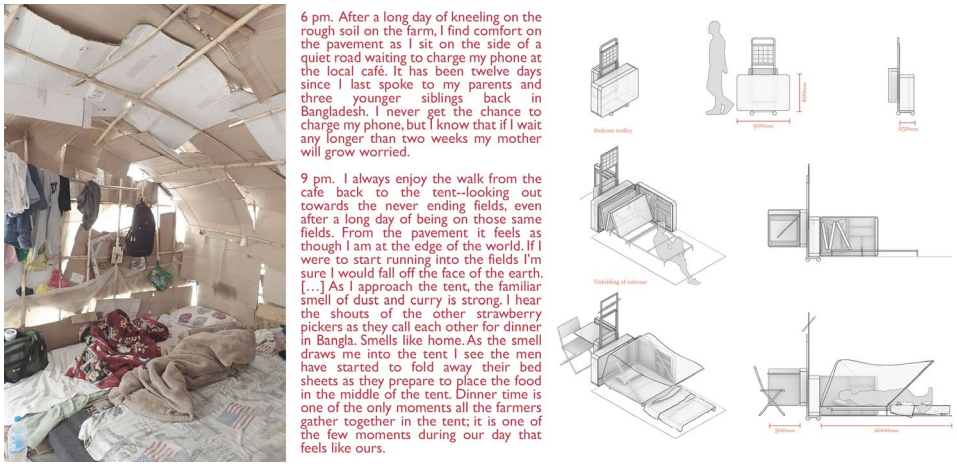

Figure 7. "Strawberry Pickers in Manolada," by Alya Alfahim is the product of a short design and storytelling exercise. Facilitating connection for a Bangladeshi worker in Greece, the vignette focuses on the cell phone as a bulwark against dislocation. The resulting design project (right) provides a sense of personal ownership for an itinerant worker through a moveable furniture piece.

CONCLUSION

Due to their "ageographic" nature, the 21st Century cities of the Gulf require a new approach to architectural design that engages urbanism in a humanistic way. The pedagogical methods presented here represent a curricular toolkit for design educators interested in challenging the urban conventions of the increasingly privatized, splintered, and segregated contexts of cities like Dubai. Design courses focused on the small-scale operations of the city have the capacity to yield proposals with innovative public spaces, urban amenities, and building types (Figure 8). Students who are taught to approach the city in this manner are better equipped to respond more thoughtfully to a broad range of existing conditions in hopes of improving the public amenities, civic openness, and social mobility. By introducing architecture students to nonconventional modes of understanding the urbanism at the micro-scale, future generations of designers will be better able to address the spatial, social, and economic side effects of top-down, large scale planning in the cities in which they operate.

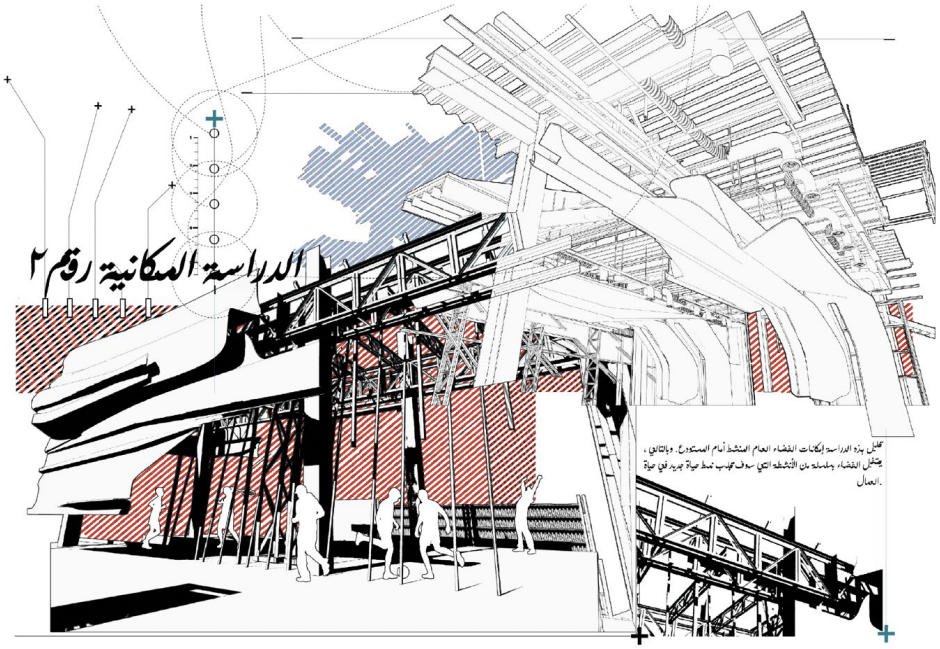

Figure 8. "Transient Deficiencies: A Speculative Representation of Sharjah's Industrial Area" by Saab Bourjane overlays new social, recreational, and domestic activities on the existing mono-use zoning typology.

NOTES

[1] Mike Davis, “Fortress LA,” in *Variations on a Theme Park: The New American City and the End of Public Space*, ed. Michael Sorkin, (New York: Hill & Wang, 1992), 156.
[2] Michael Sorkin, “Introduction,” *Variations on a Theme Park: The New American City and the End of Public Space*, ed. Michael Sorkin, (New York: Hill & Wang, 1992), xi.
[3] Varkki Pallathucheril, “New Hearts for Two Gulf Cities,” in *Architectural Design* 85 (1): 92–99.
[4] Global Media Insight, United Arab Emirates Population Statistics 2023, Accessed June 12, 2023, https://www.globalmediainsight.com/blog/uae-population-statistics/).
[5] Delphine Pagès-El Karoui, “Cosmopolitan Dubai: Consumption and Segregation in a Global City” https://link.springer.com/book/10.1007/978-3-030-67365-9), 83.
[6] Laavanya Kathiravelu, *Migrant Dubai: Low Wage Workers and the Construction of a Global City* (London: Palgrave Macmillan, 2016), 147.
[7] Jonathan Ngeh, “Living in the Shadows of Dubai,” Accessed June 12, 2023, https://developingeconomics.org/2021/11/29/living-in-the-shadows-of-dubai/
[8] Michel de Certeau, *The Practice of Everyday Life*, Translated by Steven F. Rendall. 3rd ed. (Berkeley: University of California Press, 2011), 36.
[9] William H. Whyte, *The Social Life of Small Urban Spaces,* 8th ed. (New York: Project for Public Spaces, 2021).
[10] Andrea Kahn, “Defining Urban Sites,” in *Site Matters: Design Concepts, Histories and Strategies*, eds. Carol Burns and Andrea Kahn (London: Routledge. 2005), 286.
[11] James Corner, “The Agency of Mapping: Speculation, Critique and Invention,” in *Mappings,* ed. Denis Cosgrove (London: Reaction Books, 1999), 213.
[12] John Brian Harley, “Maps, Knowledge, and Power,” in *The Iconography of Landscape: Essays on the Symbolic Representation, Design and Use of Past Environments,* eds. Denis Cosgrove and Stephen Daniels (Cambridge: Cambridge University Press, 1988), 278.
[13] Kevin Mitchell, “In What Style Should Dubai Build?”, in *Dubai* (Berlin: Birkhäuser, 2009), 139.
[14] Jan Gehl, *Life between Buildings: Using Public Space*. 6th ed. (Copenhagen: Danish Architectural Press, 2008), 30.
[15] Yi-Fu Tuan, *Space and Place: The Perspective of Experience* (Minneapolis: University of Minnesota Press, 1977), 162.

BIBLIOGRAPHY

Blogger, G. M. I. “United Arab Emirates (UAE) Population Statistics 2023.” Official GMI Blog. May 26, 2023. Accessed April 12, 2023, https://www.globalmediainsight.com/blog/uae-population-statistics.

Certeau, Michel de. *The Practice of Everyday Life*. Translated by Steven F. Rendall. 3rd ed. Berkeley, CA: University of California Press, 2011.

Corner, James. “The Agency of Mapping: Speculation, Critique and Invention,” in *Mappings, ed. Denis Cosgrove 213-300*. London: Reaction Books, 1999.

Gehl, Jan. *Life between Buildings: Using Public Space*. 6th ed. Danish Architectural Press, 2008.

Harley, J. Brian. “Maps, Knowledge, and Power”. *The Iconography of Landscape: Essays on the Symbolic Representation, Design and Use of Past Environments*. Ed. Denis Cosgrove and Stephen Daniels. 277-312. Cambridge: Cambridge University Press, 1988.

Kahn, Andrea. “Defining Urban Sites: Toward Ecotone-Thinking for an Urbanizing World.” In *Site Matters*, 189–203. London: Routledge, 2020.

Kathiravelu, Laavanya. *Migrant Dubai: Low Wage Workers and the Construction of a Global City*. London: Palgrave Macmillan, 2016.

Mitchell, Kevin. “In What Style Should Dubai Build?” In *Dubai*, 130–40. Berlin, Boston: Birkhäuser, 2009.

Ngeh, Jonathan. “Living in the Shadows of Dubai.” Developing Economics. November 29, 2021. Accessed April 12, 2023, https://developingeconomics.org/2021/11/29/living-in-the-shadows-of-dubai/.

Pagès-El Karoui, Delphine. “Cosmopolitan Dubai: Consumption and Segregation in a Global City.” In *IMISCOE Research Series*, 69–87. Cham: Springer International Publishing, 2021.

Pallathucheril, Varkki. “New Hearts for Two Gulf Cities: New Hearts for Two Gulf Cities.” *Architectural Design* 85 (2015): 92–99.

Sorkin, Michael. *Variations on a Theme Park: The New American City and the End of Public Space*. Edited by Michael Sorkin. New York: Hill & Wang, 1992.

Tuan, Yi-Fu. *Space and Place: The Perspective of Experience*. Minneapolis, MN: University of Minnesota Press, 2001.

Whyte, William H. *The Social Life of Small Urban Spaces the Social Life of Small Urban Spaces*. 8th ed. New York, NY: Project for Public Spaces, 2021.

DESIGN FROM THE MARGINS: FIVE POTENTIALS FROM PLACE-BASED LAND CARE

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INTRODUCTION

Social movements are projects of reimagination and the organization of ongoing action. A landscape architect's tools are well-suited for these tasks of shaping public imaginations and defining the first steps to build it. Ideas for change, like gardens, require tending by many hands to take root and flourish. Creating actionable visions toward more environmentally sustainable ways of living require the slow work of learning the nuances of a site and its constituents. Realizing these visions of change requires an expanded capability to act beyond the limited moments of direct action within a project scope, for designers this is typically demolition, construction, occupancy. While the timeline for imagining, promoting, building and growing a landscape is slow and meandering, a landscape architect's work is often bound by limited time on the ground in the places we design and with the communities we serve. Our work may be further limited to the scale of a site boundary – while the issues we aim to address: the impacts of climate change, biodiversity loss, and income inequality register in our environment in patterns that do not obey land use boundaries or a specific agency's jurisdiction. Conventional landscape architecture projects are framed by these boundaries. The potential of our discipline to shape new imaginaries about how to engage these concerns lies in its complex contextual dependencies and its engagement with dynamic and constant change. Emerging conversations in design question the usefulness of obeying the conventions of landscape practice, recognizing that the way we have been building on and caring for land must change our relationships to labor and to land.

This article investigates models of creating and caring for urban landscapes from the margins of design practice through a cross-case evaluation of place-based projects that engage the politics of determining a landscape's future. In each study, designers and community organizers work toward environmental and social justice by demonstrating a long-term commitment to a contested landscape. Through brief analysis of each project, I hope to illustrate five approaches for contributing to social and environmental justice based in traditional design tools with an activist's mindset. The paper concludes with a discussion of how design practice might incorporate these models of activism, and suggests pathways for further research.

CARE AND MAINTENANCE IN CONTEMPORARY LANDSCAPE PRACTICE

Urban landscapes are created from living materials and shaped by human use. Maintenance and stewardship are essential actions that produce and sustain these landscapes over time. Designing maintenance allows designs to adapt in response to context, and to be stewarded as spaces of

environmental service through enhanced soil health and ecological biodiversity. Maintenance intersects with ecological, social, economic, and material impacts of landscape space and designing maintenance programs with intention allows designers to extend the impact of their work.

There is a long and robust discourse around the ethics of care, in political science, public health, and increasingly in design discourse. Care may be defined as "Care is everything that is done (rather than everything that 'we' do) to maintain, continue, and re-pair 'the world' so that all (rather than 'we') can live in it as well as possible. That world includes… all that we seek to interweave in a complex, life-sustaining web."[1] The origins of this discourse are in a critique of power; the imbalance of who and what we care for, reveals who we believe deserves a future. Shaping and caring for urban land is inherently political. Attention to care, calls to value maintenance and stewardship, as well as the workers who perform these activities, require that we confront the political and economic context that landscape architecture typically operates within. Though maintenance and care are essential, their budgets are often limited. Though landscapes operate as large systems, landscape architecture is often designed at the scale of one discrete site. As we begin to grapple with the impacts of climate change and biodiversity loss, the necessity of caring for and sustaining healthy environment will require labor – and that labor must be acknowledged and valued.

Care can be a general term, and particularly for landscape architecture, it can be deployed toward different outcomes. Within design practice, the activities of care can include gardening or actions of cultivation, stewardship activities to claim or maintain public spaces, and professional labor to create and maintain designed spaces. Each relationship and action of care has a different outcome, and designing those relationships and speaking about them allows us to be precise about their role in building a public environmental advocacy.

Figure 1. Care of the landscape requires knowledge, attentiveness, and physical labor. (Gowanus Canal Conservancy)

Case Studies are an established method of building disciplinary theories, while analyzing design practices and outcomes.[2] This paper uses a cross-case evaluation of design projects that engage maintenance processes. The case studies revealed five approaches for designers to engage care as a socio-ecological practice. These are: designing maintenance, revaluing environmental care labor, hosting social land care, training ecological docents, and defending subversive stewardship.

Being precise with our intentions allows for us to design toward political and social change. I'll be presenting one example of each here, to contribute to the emerging discourse on the role of maintenance in sustaining and shaping designed space as social and ecological relationships. I hope

that the Case Studies help 1) to detail design strategies that engage care and 2) disseminate these strategies into teaching and practice.

DESIGNING MAINTENANCE

Designed maintenance engages the labor and techniques of maintaining a landscape site as a choreographed element, prescribed by the designer. Rather than dictating only the physical outcome of the design, the designer engages more deeply with the methods of cultivation, pruning, and caring for a landscape as it grows. This prioritizes aesthetic qualities, and can highlight novel ecological assemblages or prototypes of adaptive management.

Michael Geffel has engaged these techniques throughout his work, particularly with his design of the Land Lab in Eugene Oregon.[3] Here he works in dialogue with the groundskeeper to prescribe mow patterns across a river-front site owned by the University of Oregon. The patterns signal intention and care, while allowing for some areas of tall habitat to remain.

Figure 2. Prescribed mowing techniques created novel landscapes. (Michael Geffel)

Over several years of work, the site's care has brought back native meadow species and attracted attention to a once neglected site. The site is used for studio-based installation art, and Michael performs some additional maintenance, but the project's goals are aesthetic and ecological, working within the typical parameters of labor for an institutional property. The change is targeted as material change and changes in practices within landscape architecture, in line with Raxworthy's call for designers to "return to the garden" as a means of creating more aesthetically and culturally dynamic landscapes.[4]

REVALUING ENVIRONMENTAL CARE LABOR

Though maintenance requires specific, local knowledge, it is often considered "unskilled" labor. In the, US, installation and maintenance is predominantly performed for low wages by immigrant workers and people of color. Landscape architects have opportunities to advocate for care labor as skilled, to reframe perceptions of the work with clients and the public.

A study of New York public spaces noted that those cared for by paid, skilled workers rather than volunteer stewardship were better cared for – and less costly over time.[5] This exemplified by the Brooklyn Naval Landscape,[6] where volunteer stewardship by a nonprofit was struggling to keep up with invasive removal. Shifting to a team of paid gardeners allowed the landscape to visibly cared for

with consistency, and has introduced opportunities for landscape interpretation while realizing the goals of a pollinator meadow. This also is targeting change within the practice of landscape architecture itself, in response to the need for landscape architects to acknowledge the discrepancy in pay and prestige given to the workers who build and maintain our landscapes.[7]

HOSTING SOCIAL LAND CARE

Land care activities take the form of gardening, stewardship and volunteer maintenance activities. These activities are political in that they bring people together to form connections in service to environmental goals, teach people about environmental issues, and create visibility for the need to care. These are methods of building political and environmental movements.

Figure 3. Workdays create and maintain landscapes along the Gowanus Canal as social events. (Gowanus Canal Conservancy)

The Gowanus Canal Conservancy (GCC) is a nonprofit that advocates for the ecological health of the Gowanus watershed.[8] The GCC hosts multiple activities that bring community members together to care for and learn about the ecology spaces within the watershed. Each activity contributes to an understanding of the Canal's watershed as already diverse, vibrant, resilient, and alive. These small acts of caretaking in public space arm the Conservancy with on the ground knowledge of the people and environment of the neighborhood, and help to shift a public imagination to continue advocating for investment in the area toward more ecological and equitable ends.

Figure 4. Maintenance is performed by GCC staff, Green Team interns, and volunteers on a regular schedule. (Gowanus Canal Conservancy)

Just as park conservancies use a combination of education and stewardship activities to promote investment and care for public spaces, the GCC advocates for an urban, polluted watershed as a public amenity. This framing of their relationship to the park underscores a reimagining of the industrial canal as an ecologically and culturally rich environment. A wide range of programming connects multiple constituents: current residents and industrial workers, city officials and developers, Federal and local environmental policy makers, and local design firms. The work is about building knowledge and social connection across a broad swath of the public – using methods of social practice: joy, friendship, and time together.

TRAINING ECOLOGICAL DOCENTS

Ecological docents share interpretations of the landscape as a cultural artifact. As Anne Spirn has noted in her community engaged working, learning that the landscape around us is the result of policy decisions allows us to question the inevitability of unequal investment, pollution, and erased histories.[9] Recovering historic narratives of how folks have lived within a landscape offers new public imaginaries about what might be possible in the future.

Bayou Road is the oldest road in New Orleans. At 6 blocks long, it is also the shortest, and home to many black-owned businesses. In recent years, the pressures of gentrification have threatened these businesses with displacement and created suspicions of the City's plans to improve the streetscape.

The Tulane Small Center worked with the local businesses to document the history and culture of the street, while decoding the City's proposed street improvement documents.[10] A celebration and conversation raised awareness, while the documentation advocates for the street as a cultural center – and has supported campaigns for investment in the existing businesses and their ability to stay in place.

Figure 5. Through interviews, Tulane students captured stories of Bayou Road and promoted its unique Afro-Caribbean culture using graphic advocacy. (The Small Center for Collaborative Design at Tulane School of Architecture)

Though these are ephemeral, narrative events and advocacy help to reframe what we value and what we imagine for the future.

DEFENDING SUBVERSIVE STEWARDSHIP

Social practice requires an artful use of social skills. Realizing design projects is always deeply relational work. Few designs can be constructed without collaboration. Working toward change and working to realize ideas outside of the ease of the status quo requires productive and trusting relationships. Political theorist, Danielle Allen describes this as a political use of the habits of friendship: reciprocity, turn-taking, mutual exchange, and recognition of a shared life. The trust and good will of political friendship opens opportunities to reconsider long-held beliefs or to offer a compromise.

When the City of New Orleans threatened to demolish Parisite Skatepark, an unpermitted DIY recreation space, the skating community succeeded in defending the park by activating these kinds of political friendships.[11] The skaters had been creating skateable surfaces in the area for two years, actively promoting an atmosphere that welcomed a mix of ages, races, and backgrounds. Their advocacy for the park as a benefit to the city included testimonials from skaters on the importance of the all-girls-skate-night, and the mentorship young skaters found in a sport that kept them out of trouble.

Figure 6. Parisite organizers promoted the need for active recreation space in the City, and developed a vision for their skatepark. (The Small Center for Collaborative Design at Tulane School of Architecture)

These important relationships within the Parisite community made a compelling case, and were complemented by the skaters' decision to work with The Small Center for Collaborative Design, the Tulane School of Architecture's community design program. Through the Small Center, the skaters' cause gained credibility and they were able to leverage the institutional relationships between the city and the university. Just as critical to making the case was the trust and goodwill associated with the Small Center's Design Build Manager, Emilie Taylor Welty, who had worked in collaboration with multiple city agencies throughout her career in community-based design. Nonprofit leaders and municipal workers across New Orleans have seen that Emilie is able Through Emilie's network, the skaters connected to leaders of the New Orleans Recreation Development Foundation, who were looking for a place to install skate ramps donated by Red Bull and Spohn Ranch.

These connections to corporate donors and municipal agencies further strengthened the case for approving the site's use as a DIY skatepark. The support of multiple constituents in a variety of positions of power helped to change the city officials' perception and embrace the idea that a park built by and for youth was an asset to the city. The skatepark's approval created the first designated skatepark in New Orleans, and a shift in the City's approach to community-led improvement of public space. None of this would have occurred without political friendships. These relationships take time

and consistency to build; the trust required to try new ideas is earned by demonstrating that we'll be there to fix what we break.

CONCLUSION AND AIMS

This paper has proposed five approaches to creating relationships of human care of landscapes to expand a design's social and environmental impact. The approaches for care prioritize aesthetic, social, or political outcomes.

The case studies demonstrate that designers can adapt these approaches toward more ecologically and aesthetically dynamic sites, as a means of addressing issues of equity in landscape labor, and for challenging outdated policies on land use and maintenance. Though projects may demonstrate one strategy more strongly there is often overlap across the arc of these ongoing practices, particularly as campaigns of advocacy and education succeed.

The case studies share an understanding that prioritizing care is a fundamentally a challenge to the way resources and labor are currently valued. The projects call attention to the ongoing need to care for our landscapes, expertise required, and demonstrate an alternative model for shaping and caring for our environment. The challenge is to find ways to sustain this work and scale up, while also being mindful of the relative access to power for different communities.[12] These projects call attention for the potential for reorienting the design fundamentals of landscape architecture away from architecture models and towards those that prioritize processes of participation, care, and policywork. Limitations exist about the methods of funding this work under current models of project delivery.

As we prepare future leaders in landscape architecture, this requires changes in the fundamental tools of our discipline. This means encouraging students to engage the natural dynamics of landscape, but also to understand the necessity of human stewardship in realizing or perhaps adapting these visions. Students need to practice studying the relationships that build, maintain and sustain landscapes over time. This means drawing our way through maintenance practices, learning to advocate for appropriate budgets, and engaging conversations about landscape practices beyond the scale of a single site.

NOTES

[1] Maria Puig de la Bellacasa, *Matters of Care: Speculative Ethics in More than Human Worlds,* (University of Minnesota Press, 2017): 161. This builds on earlier definitions of 'Care' by Joan Tronto, *Moral Boundaries: A Political Argument for an Ethic of Care,* (New York: Routledge, 1993), 103.
[2] See Simon Swaffield, "Case studies," in *Research in landscape architecture: Methods and methodology,* edited by A. v. d. Brink, D. Bruns, H. Tobi, & S. Bell, *(*Routledge, 2017): 105–119. and Mark Francis. "A case study method for landscape architecture," *Landscape Journal*, *20:*1 (2001): 15–29.
[3] For more on Geffel's approach, see Michael Geffel, "Terrestrial Practices: Pulling Landscape Back to Earth," *Kerb* 28 (2020): 84-85.
[4] Julian Raxworthy, *Overgrown: Practices between Landscape Architecture and Gardening* (Cambridge: MIT Press, 2018), 23.
[5] John Krinsky and Maud Simonet, *Who Cleans the Park? Public Work and Urban Governance in New York City.* (Chicago: The University of Chicago Press. 2017). Krinsky and Simonet position their research in describing a neoliberal privatization or public space within New York, that has coincided with the rise of stewardship groups. More research and discussion on this topic is certainly needed.
[6] For more on the Naval Cemetery Landscape, see https://www.brooklyngreenway.org/naval-cemetery-landscape/.
[7] Terremoto, "Landscape Architecture has a Labor Problem," Metropolis, April 14, 2021, https://metropolismag.com/viewpoints/landscape-architecture-labor-terremoto/
[8] For more on the Gowanus Canal Conservancy: gowanuscanalconservancy.org.
[9] Anne Spirn, "Restoring Mill Creek: Landscape Literacy, Environmental Justice and City Planning and Design." *Landscape research* 30: 3 (2005): 409-410.
[10] The Small Center for Collaborative Design at Tulane School of Architecture is the School's outreach arm and community design center. For more on the Bayou Road Initiative, see: https://small.tulane.edu/project/bayou-road-initiative/.
[11] Parisite Skatepark is named for its proximity to Paris Avenue in New Orleans, and is a project of Transitional Spaces, a nonprofit created by and for skaters. For more background, see: Rudy Bruner 2019 Silver Medal Report, rudybruneraward.org/winners/parisite-skatepark; Albert and Tina Small Center at Tulane School of Architecture profile, small.tulane.edu/project/parisite-skate-park.
[12] Studies of the political impact of urban gardening and stewardship activities have highlighted the potential for eco-gentrification. The relative access to power of the leaders tends to be replicated in the project, if leadership does not work to engage and address this. See for example: Claire E. Bach and Nathan McClintock, "Reclaiming the city one plot at a time? DIY garden projects, radical democracy, and the politics of spatial appropriation," Environment and Planning C: Politics and Space, 39:5 (2021): 859–878, or Yuki Kato, Catarina Passidomo, and Daina Harvey. "Political Gardening in a Post-Disaster City: Lessons from New Orleans." Urban studies, Edinburgh, Scotland, 51.9 (2014):1833–1849.

BIBLIOGRAPHY

Bach, Claire E. and McClintock, Nathan. "Reclaiming the city one plot at a time? DIY garden projects, radical democracy, and the politics of spatial appropriation," Environment and Planning C: Politics and Space, 39:5 (2021): 859–878.

de la Bellacasa, Maria Puig. *Matters of Care: Speculative Ethics in More than Human Worlds.* University of Minnesota Press. 2017.

Francis, Mark. "A case study method for landscape architecture," *Landscape Journal*, *20.*1 (2001): 15–29.

Kato, Yuki, Catarina Passidomo, and Daina Harvey. "Political Gardening in a Post-Disaster City: Lessons from New Orleans." Urban studies (Edinburgh, Scotland) 51.9 (2014): 1833–1849.

Geffel, Michael. "Terrestrial Practices: Pulling Landscape Back to Earth," *Kerb* 28 (2020): 84-87.

Krinsky, John and Maud Simonet. *Who Cleans the Park? Public Work and Urban Governance in New York City.* Chicago: The University of Chicago Press, 2017.

Raxworthy, Julian. *Overgrown: Practices between Landscape Architecture and Gardening.* Cambridge: MIT Press, 2018.

Spirn, Anne. “Restoring Mill Creek: Landscape Literacy, Environmental Justice and City Planning and Design.” *Landscape research* 30, no. 3 (2005): 395–413

Swaffield, Simon. “Case studies,” in *Research in landscape architecture: Methods and methodology,* edited by A. v. d. Brink, D. Bruns, H. Tobi, & S. Bell, 105-119. Routledge, 2017.

Tronto, Joan. *Moral Boundaries: A Political Argument for an Ethic of Care.* New York: Routledge, 1993.

THE SOCIAL SPACES OF THE GREEN TRANSITION

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INTRODUCTION

Due to new and necessary everyday routines, derived from the climate challenges and thereby the green transition, the urban life of our cities will expectedly change. This exploratory paper examines and discusses how architects and urban designers can address and cultivate these new conditions from an urban life perspective.

The way the inhabitants use cities has changed over time. Especially when it comes to the daily life in big cities. In Jan Gehl and Birgitte Svarre's known diagram for the historical development of urban life up to the millennium[1], it is obvious that urban life has changed from a necessary action into an activity- or experience-based action or presence. In Gehl & Svarre's perspective, urban life today consists of a higher extend of optional and recreational activities rather than being an act of an everyday practical necessity or need.

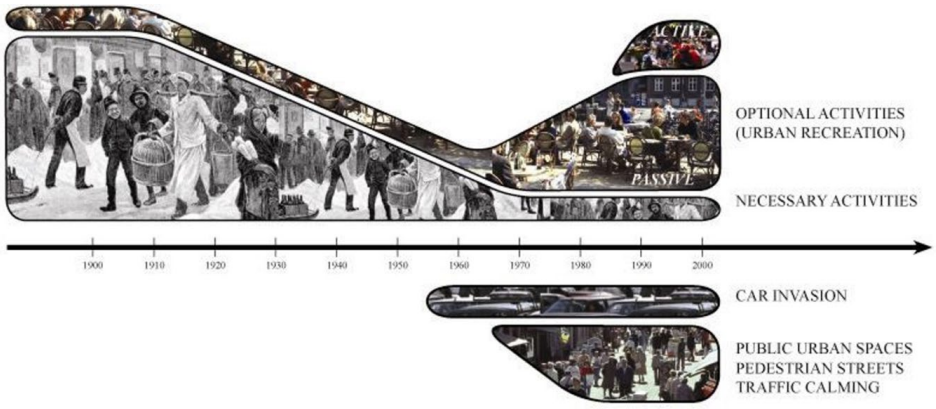

Figure 1. Jan Gehl and Birgitte Svarre's timeline of urban life development in the 20th century, with a distinction between necessary and optional activities.[2]

One of the claims in this paper is, that processes related to climate change will transform or recalibrate the current balance between the necessary and the optional activity balance of urban life, due to new sustainability based daily routines.

As a consequence of the climate change challenges[3] and thereby the green transition, cities must be governed taking sustainability paradigms into account, which will affect both the physical and social appearance and experience. Municipalities and other authorities tend to rely their policy making on different charters like UN's 17 Sustainable Development Goals or different certification standards for sustainability for urban areas.[4] Addressing the sustainability agendas and implementing new

paradigms in both policy making and in the planning system, these agendas are gradually embedded in the urban development processes, and thereby gradually affects the daily urban life and new approaches from architects. This means that Gehl & Svarre's timeline for development of urban life will have to be updated and added with new forms of activities – especially deriving from the sustainability-based paradigm shifts and changes in the everyday life.
Several everyday routines are already altered or are undergoing an alteration. The new sustainable actions require new facilities, which result in new urban settings and potential social spaces. E.g.:
- the increase of electrical cars replaces refueling with fossil fuel, and thereby changes the stops at the gas station.
- requirements of sorting waste in multiple fractions establish altered (and several) visits to waste stations.
- the expanded usage of light transportation and urban micro mobility changes the flows in the city and the need for parking and intermodal points.
What are the social / urban life potentials of these new routines, and how can architects, urban designers and planners support them architecturally, so they can contribute to urban life and experiences in the city? And with Gehl's mantra: *"Urban Life before Urban Space before Buildings"* in mind, which is sought to be implemented as a guiding principle in many cities: Which role can the new routines play, and how can they be embedded strategically?
This social-architectural approach and the discussion of design principles for urban life, has been on-going since the 1970'es. Gehl has been one of the main contributors, with principles and mantras. But also Whyte with his concept of triangulation,[5] Koolhaas' concept of the 'social condenser',[6] and Hajer and Reijndorp's concepts of a public domain[7] have pointed towards solutions. In this paper, the focus will be on Gehl's mantra in combination with Haijer & Reijndorp's concept, since they address working with urban life in a composed and complex manner in their models.

TENDENCIES - CASESTUDIES OF NEW DESIGNS

In the following, four cases which deal with the new sustainability-based routines in different urban settings are discussed. Some of the cases have integrated the sustainability-based routines to a large extend, whereas others function as an inserted or juxtaposed facility.
The cases represent two categories; mobility and recycling, and are followed up by a two examples of student projects from a short workshop in the beginning of the Spring Semester 2023, where some of the routines has been embedded as a design parameter in the development process.

Mobility:

Figure 2. The recharging station for electrical vehicles with the wooden canopies and the recreative landscape elements in Odense, DK.

In the modular design for charging stations for electrical cars, the new routine of waiting while charging has been addressed and used as a design parameter. The design is developed as a reaction or green reconfiguration of the conventional gas station, potentially establishing new recreative assets in a common space. The design lacks the conventional gas-station's offer for fast food, and the enhanced waiting time while charging is serviced by landscapes and recreational facilities.[8]
The basic module is a charging point with a wooden canopy, designed for possible disassembly, and additional modules are based upon play, sitting or landscape elements. The modularity allows the charging parks to be organized in multiple ways, and in larger arrangements, the recreative and playful elements are being brought into play. The use of wood in the constructions and outdoor furniture, bushes, trees and grass provide a feeling of being in a space for lesiure, more than a space for technical instrastructure, and the aesthetics could be called "cool green chique".
The new routine of charging an electrical car, and the facilitation of the expanded amount of time, one has to spend waiting while charging is a good example of how to work with one of the new routines in order to establish new social life, a *'life between cars'*, where the users either can take a rest, or have a conversation with fellow EV drivers.
A critique of the design would be, that it is only the more extensive and largest of the complexes of charging stations that apply the recreative or collective aspects of the modular design. And regarding the contextual situation, they are placed along highways, where they are primarily accessible by car, and primarily (only) relevant for drivers of electrical vehicles.

Recycling

In Kamikatsu, a Japanese mountain village on the island of Shikoku – waste handling and recycling has been a part of the everyday life for decades. Infrastructural and financial challenges led in 2003 the community to rethink their approach to waste, and develop a strong focus on how to treat waste, rather than generating waste.
The necessity or initiative also came with a potential: The recycling station became the place in the village, where you would meet your neighbor and other fellow villagers. The time-consuming new routine meant people and life in the recycle facility, which became an informal gathering place in the village.[9]
A new sorting plant was inaugurated in 2021, and is one of the latest results of the village recycling based strategies. The new facility is designed in wood and with re- and upcycled materials, and runs education on sustainability besides its main functions.
The design addresses its primary function of recycling, but could have addressed the social potentials even further. From a Gehl perspective, the facility could have embraced the development of city life potentials even further, and facilitated social activities with meeting places, places for rest or other recreative facilities. However, Kamikatsu shows that the routine of waste handling and recycling seems to have a great potential for new designs that can enhance city life and community development.

Figure 3. Left: The new waste handling facility in Kamikatsu, JP. Right: The temporary sharing station in Aarhus, DK.

In a Danish context, recycling appears in a limited number of fractions, compared to Kamikatsu, but there are tendencies, where the combination with social or urban life-based facilities are being tested or being attached to the primary function of recycling, such as 'Bytteboxen' in Aarhus.[10]
The attention also manifests in more permanent ways. In the recycling station in the Musicon district of Roskilde, a new building (recycling station) is made entirely of locally sourced and recycled materials. The nearby exterior of the facility is provided with planter boxes with flowers and herbs for sharing, and a bench is placed by the entrance.[11]
Today, the station is situated in a low-dense and car-based suburban area, which reduces its potential role as a meeting point. However - the future development of the area might turn it into a vibrant meeting point for the local communities.
The building's aesthetics communicates its purpose. The social aspects could have been more cultivated in the design than the benches in front, but it holds a potential for the city-to-come.

Figure 4. Vandkunstens recycling facility in Musicon in reused materials and with benches in front. To the right: a screendump from Kredsløb's website (waste and recycling authority), shoving a part of the recreational path (headline: "A green visit"). The facility is in the background.

The last case from a Danish context is the new recycling station in Lisbjerg, with 300.000 expected annual visitors/users in 2030, situated in the outskirts of Aarhus.[12] The station is primarily constructed of recycled materials to communicate its purpose; however, the entire facility is designed for access by car, and for loading and de-loading of cars and trucks. The facility has both a recycle/sharing part and a patch of green in the center of the circular complex.
The facility has been designed with a layer of experience economical aspects. It is designed with routes and paths in the adjacent hilly landscape in order to make the recycling station a destination. An experience is attached to the act of recycling by taking a walk or do a picnic, while the visitor is there. The paths are supported with playful elements for the kids adding a cultural or learning experience to the culture of recycling or waste handling.

HOW CAN ARCHITECTURE SUPPORT?

Gehl's call for an urban life based urban development, "urban life before urban space before buildings" is currently being embedded in some of the major Danish cities' planning documents and policies, such as the development of the inner harbour areas in Aarhus (DK).[13] In addressing urban life as the primary element in an urban development process, the sustainability-based routines offer an expanding group of actions/activities, which can be embedded and integrated in the public spaces as a part of the urban life. With the need and presence of the sustainability-derived routines, there is a potential in acknowledging them in the early planning- and design phases in order to create an urban space or an urban life.
In a Danish context, design of public spaces has been based upon the societal vision of the welfare state.[14] Through the recent decades, several of the larger cities have used their policies, strategies and

the physical design of the urban spaces to counter segmentation.[15] This moral-based approach has been heavily influenced by Gehl's mindset of 'inviting everyone', and to aim for informal urban spaces that are both specific in their function and design, but also universal appealing.[16] In that perspective, embedding and promoting elements as sustainability and sustainable routines or behavior is not far from previous and actual policies and strategies.
In two study projects, from a workshop project at Aarhus School of Architecture, spring 2023, dealing with respectively recycling and mobility, gives examples of how the new routines can be embedded in a design of a larger urban entity, contributing to the urban life. The students were asked to examine how different routines were changing due to sustainability agendas, and were asked to use Gehl's mantra as a point of departure for their projects.

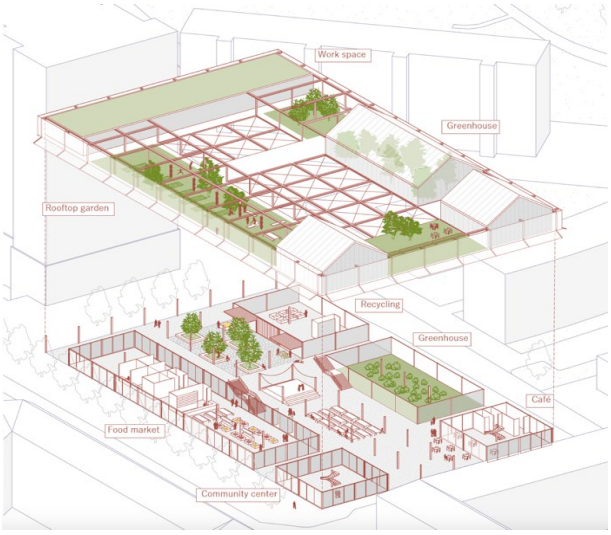

Figure 5. 'Langenæs Market'. Student project by Miriam Beyer, Studio 1D, Spring Semester 2023, Aarhus School of Architecture.

In 'Langenæs Market', the aspect of recycling was addressed. The project uses a recycling facility as an urban life generating element that is centrally placed and treated design wise equally with the more conventional life-generating programmes, such as community house, shops and cafés and playgrounds in an overall local center. Here, the new routines are present as an integrated part of the local urban hub, and the urban life generating programmatic mix. The project doesn't differ between the necessary and optional elements in the community complex, but uses a principle of proximity between different activities to create a more combined form of urban life.

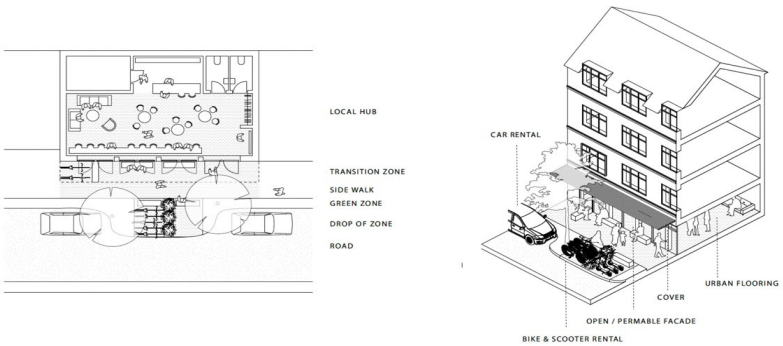

Figure 6. 'The Social Spaces of Mobility'. Student workshop project by Ida Fine Bøtker-Rasmussen, Emilie Waldstrøm and Sara Chire Jensen, Studio 1D, Spring Semester 2023, Aarhus School of Architecture.

In the workshop project, 'The Social Spaces of Mobility', the routine of sustainable transportation is addressed. An urban mobility hub of combined light, shared, public and micro-mobility-based transportation is joined and combined with recreative programs, and in that manner approached as an urban space. It seeks to combine the different flows and functional needs with resting and recreation in a meeting point, where the necessary activity of transportation and movement becomes not only a backdrop of urban life, but also provides facilities for optional urban life.
The approach of the designs can be explained through Haijer & Reijndorps concepts of a public domain.[17] In both cases, the projects seek to establish a new public domain by working with adjacent and proximity-based mix of programming in order to achieve encounters between different user groups.
The study projects show that there is a large potential in integrating the social dimensions of the sustainability-based routines in the early phases of a given project.
In the cases of Musicon or Kamikatsu, the simple and functional pairing with a possibility of sitting, resting or meeting at the facility (for sorting or for sharing in the given cases), proves that the sharing or recycling activity can be paired with recreative facilities, in order to establish an experience – both in a recreational sense, but also in an educational or informative sense, where sustainable habits and routines are present. Urban life is not, in these cases, centered around consuming, eating, drinking etc., but around sustainable actions and activities.

PERSPECTIVES ON IMPLEMENTATION

When the new and necessary routines are combined with an experience-based element (or even sharing economy), they begin to serve a broader purpose in an urban life perspective, and become a part of the urban spectacle. They add to the quantity of urban activity, and contribute to the urban life.
To visualize how the development of the current/contemporary urban life is undergoing an expansion through the last decades, Gehl & Svarre's historic overview can be updated with the some of the more recent paradigms or processes in the following way:

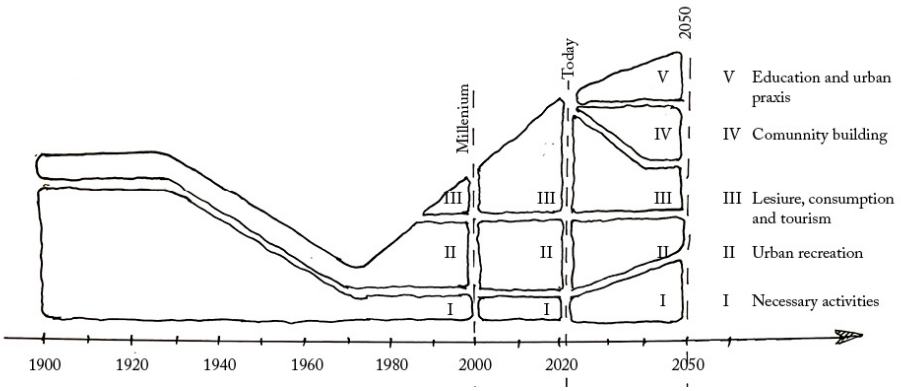

Figure 7. 'Diagrammatic and schematic extension of Gehl & Svarre's timeline. With new sustainability based everyday routines, the distinction between 'necessary' and 'optional' activities becomes complex.

The diagram is a schematic extension of Gehl & Svarre's diagram, and it is an attempt to exemplify and visualize assumptions of how the current paradigms of urban development, where sustainability, strategic experience design etc., is represented in the extension of the timeline. The representation of current elements or activities is incomplete in the version depicted above, but it illustrates how the multitude of some of the current and actual sustainability-based elements, can broaden the spectrum in

the model, and thereby add (sustainability based) diversity to the composition, which challenges the distinction between necessary and optional activities.
In order to address and enhance new sustainability-based routines or habits, it would require that different relevant planning authorities (municipalities etc.) review their plans for various technical or infrastructural facilities, as well as their approach and strategies for the urban spaces. A broader and more extended implementation (in more dense urban areas) would require an elaborated approach, where the routines are identified and addressed as required design parameters, in order to relocate, redesign, integrate and mix conventional urban life with a new set of activities, spawned from the sustainability agendas.
One of the key elements in combining the new sustainability-based routines with urban spaces and conventional urban life is to address the activity or urban life as a primary design parameter in a project's early phases. Jan Gehl's mantra with 'urban life before urban spaces before buildings' is a known example of this approach. However, when the urban life appears as a combination of multiple necessary and optional activities, where some of them potentially hold an added dimension of a sustainability-based experience, it becomes urgent to address and be specific on what kind of urban life (or urban life forms), one is working with, and equally important how it is being used as a design parameter in the design.
The 'what' (regarding urban life) and the 'how' (regarding design principles) which Gehl's mantra doesn't determine, would require an additional method, approach or set of conceptions that could operationalize the activities as design parametres in an architectural design. Haijer & Reinddorp's conception of a 'public domain' hold some of the elements that could both establish an awareness of how to address an extended and more combined form of urban life, and qualify a given set of design parameters. They present a set of instruments for how to achieve new social relations in an urban space such as theming, compressing, connecting, that can be used as principles or input to methods in a design process. Especially the strategy of 'compression' is relevant, since:
"The key to compression is the generation of public domain by bringing a number of elements that are meaningful for different groups into close proximity with one another (...) in order to generate public domain as experience."[18]
The enhanced focus on the possible encounters could be a supplemental and operational model to establishing new relations between Gehl's distinction between the necessary and the optional actions, and designing for situations, where new sustainable routines appear will be a contribution to the urban life and with a positive friction of encounters between the different users.
The combination of the mantra, an identifying of current necessary and optional activities, and an including and operational conception like Hajer and Reijndorp's 's public domain could hold some of the tools needed in strategically embedding the social dimensions of the green transitions into the urban practice from an architectural or urban design perspective.

NOTES

[1] Jan Gehl and Svarre, Birgitte. *How To Study Public Life*. Washington, DC: Island Press/Center for Resource Economics, 2013.
[2] Jan Gehl and Svarre, Birgitte. *How To Study Public Life*. Washington, DC: Island Press/Center for Resource Economics, 2013 p 147.
[3] As outlined in UN Habitat's Strategic Plan 2022-2023. UN Habitat. "Strategic_plan_2020-2023.Pdf." Accessed November 27, 2023. https://unhabitat.org/sites/default/files/documents/2019-09/strategic_plan_2020-2023.pdf.
[4] Using sustainability taxonomies such as DGNB or similar.
[5] William H Whyte. *City : Rediscovering the Center*. 2. printing. New York, N.Y.: Doubleday, 1988 p. 155 and William H Whyte. *The Social Life of Small Urban Spaces*. Washington D.C.: The Conservation Foundation, 1980 94-101.
[6] Rem Koolhaas. *Delirious New York : A Retroactive Manifesto for Manhattan*. Rotterdam: 010 Publishers, 1994 p. 152-158 and in: Koolhaas, Rem. *Small, Medium, Large, Extra-Large*. Edited by Jennifer Sigler. [New edition]]. New York: Monacelli, 1998 p. 921-934.
[7] Maarten A. Hajer, and Arnold Reijndorp. *In Search of New Public Domain: Analysis and Strategy*. Rotterdam: NAi Publishers, 2001.
[8] Cobe. "Cobe - Ultra-Fast Charging Stations for Electric Cars." Accessed November 27, 2023. https://www.cobe.dk/projects/ultra-fast-charging-stations-for-electrical-cars.
[9] Kamikatsu, "Kamikatsu Zero Waste Center." Kamikatsu Zero Waste Center. Accessed November 27, 2023. https://why-kamikatsu.jp/en/.
[10] The Concept of Bytteboxen is described here (in Danish) Kredsløb. "Giv og tag brugte ting og sager i Bytteboxen." Accessed November 27, 2023. https://www.kredslob.dk/produkter-og-services/genbrug-og-affald/sortering/bytteboxen.
[11] Vandkunsten. "Genbrug Og Cirkulært Byggeri i Bagtæppet Og Basgangen i Bydelen Musicon i Roskilde." Accessed November 27, 2023. https://vandkunsten.com/projects/musicon-genbrugsstationer.
[12] Kredsløb. "Ny genbrugsstation i Lisbjerg." Accessed November 27, 2023. https://www.kredslob.dk/produkter-og-services/genbrug-og-affald/genbrugsstation/lisbjerg-genbrugsstation/ny-genbrugsstation-lisbjerg.
[13] AAK, (Aarhus Kommune, Teknik og Miljø): "Sydhavnskvarteret Aarhus C, Bydelsplan nord for Jægergårdsgade, january 2020". "20200114_bydelsplan_sydhavnskvarteret_nord-for-Jaegergaardsgade_interaktiv.Pdf." Accessed November 27, 2023. https://sydhavnskvarteret.dk/media/39074/20200114_bydelsplan_sydhavnskvarteret_nord-for-jaegergaardsgade_interaktiv.pdf.
[14] Poul Bæk Pedersen. "Arkitektur og plan i den danske velfærdsby 1950-1990", Aarhus: Arkitektskolens Forlag, 2005.
[15] Boris Brorman Jensen, Kristoffer Lindhardt Weiss, and Martin Keiding Art of Many: The Right to Space, Copenhagen: Danish Architectural Press. (2016): (P. 12-18) And in: Jan Gehl, Boris Brorman Jensen. and Kristoffer Lindhardt Weiss. "The human dimension", in Boris Brorman Jensen and Kristoffer Lindhardt Weiss (eds): Art of Many: The Right to Space, Copenhagen: Danish Architectural Press. (2016) (P. 98-108)
[16] Tom Nielsen. "The making of Democratic Public Spaces in Denmark" in: Aelbrecht, Patricia, and Quentin Stevens, eds. *Public Space Design and Social Cohesion: An International Comparison*. New York: Routledge, Taylor & Francis Group, 2019. And in: Gehl, Jan. *Life between Buildings: Using Public Space*. Translated by Jo Koch. Washington, D.C.: Island Press, 2011.
[17] Maarten A Hajer, and Arnold Reijndorp. *In Search of New Public Domain: Analysis and Strategy*. Rotterdam: NAi Publishers, 2001.
[18] Maarten A Hajer, and Arnold Reijndorp. *In Search of New Public Domain: Analysis and Strategy*. Rotterdam: NAi Publishers, 2001. P. 117.

BIBLIOGRAPHY

AAK (Aarhus Kommune, Teknik og Miljø): "Sydhavnskvarteret Aarhus C, Bydelsplan nord for Jægergårdsgade, january 2020". "20200114_bydelsplan_sydhavnskvarteret_nord-for-Jaegergaardsgade_interaktiv.Pdf." Accessed November 27, 2023.

https://sydhavnskvarteret.dk/media/39074/20200114_bydelsplan_sydhavnskvarteret_nord-for-jaegergaardsgade_interaktiv.pdf.
Cobe. “Cobe - Ultra-Fast Charging Stations for Electric Cars.” Accessed November 27, 2023. https://www.cobe.dk/projects/ultra-fast-charging-stations-for-electrical-cars.
Gehl, Jan. *Life between Buildings: Using Public Space*. Translated by Jo Koch. Washington, D.C.: Island Press, 2011.
Gehl, Jan and Svarre, Birgitte. *How To Study Public Life*. Washington, DC: Island Press/Center for Resource Economics, 2013.
Hajer, Maarten A., and Arnold Reijndorp. *In Search of New Public Domain: Analysis and Strategy*. Rotterdam: NAi Publishers, 2001.
Kamikatsu, “Kamikatsu Zero Waste Center.” Kamikatsu Zero Waste Center. Accessed November 27, 2023. https://why-kamikatsu.jp/en/.
Koolhaas, Rem. *Delirious New York : A Retroactive Manifesto for Manhattan*. Rotterdam: 010 Publishers, 1994.
Koolhaas, Rem. *Small, Medium, Large, Extra-Large*. Edited by Jennifer Sigler. [New edition]]. New York: Monacelli, 1998.
Kredsløb. “Giv og tag brugte ting og sager i Bytteboxen.” Accessed November 27, 2023. https://www.kredslob.dk/produkter-og-services/genbrug-og-affald/sortering/bytteboxen.
Kredsløb. “Ny genbrugsstation i Lisbjerg.” Accessed November 27, 2023. https://www.kredslob.dk/produkter-og-services/genbrug-og-affald/genbrugsstation/lisbjerg-genbrugsstation/ny-genbrugsstation-lisbjerg
Nielsen, Tom. “The making of Democratic Public Spaces in Denmark” in: Aelbrecht, Patricia, and Quentin Stevens, eds. *Public Space Design and Social Cohesion: An International Comparison*. New York: Routledge, Taylor & Francis Group, 2019.
Pedersen, Poul Bæk. “Arkitektur og plan i den danske velfærdsby 1950-1990”, Aarhus: Arkitektskolens Forlag, 2005.
UN Habitat. “Strategic_plan_2020-2023.Pdf.” Accessed November 27, 2023. https://unhabitat.org/sites/default/files/documents/2019-09/strategic_plan_2020-2023.pdf.
Vandkunsten. “Genbrug Og Cirkulært Byggeri i Bagtæppet Og Basgangen i Bydelen Musicon i Roskilde.” Accessed November 27, 2023. https://vandkunsten.com/projects/musicon-genbrugsstationer.
Whyte, William H. *City : Rediscovering the Center*. 2. printing. New York, N.Y.: Doubleday, 1988.
Whyte, William H. *The Social Life of Small Urban Spaces*. Washington D.C.: The Conservation Foundation, 1980.

OPEN INFILL DESIGN IN CO-CREATION: PRACTICAL STEPS TOWARDS A NEW MODULAR WALL CONCEPT

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INTRODUCTION

Open Building, as conceptualized by John Habraken in the 1960s, implies that residents become facilitated to (re)arrange the layout of their homes in line with their requirements, and without too much effort, while structural architectural elements remain intact.[1] The Open Building philosophy builds on the notion that all residents are different, and so are needs and desires.[2] Dwellings should facilitate this variety and the associated changes through time. This is the foundation of a conceptual and physical divide between *fixed* structural supports and *adaptable* infills of multi-family housing. The fixed structure represents a long-term service life (potentially lasting centuries), whereas the adaptable infill follows shorter term social dynamics (months, years, decades). Changes in the infill domain, through interventions at foreseen and unforeseen moments in time, have a strong material implication, think of adjustments in partition walls, staircases, bathrooms, kitchens, HVAC-installations, and insulation, but also windows or other façade elements. Those products and materials are thus circulating through supply chains – and through the built environment – at rates that may be interesting for circular and regenerative design approaches.[3] From that vantage point, this design-study sets out to establish a prototype for an infill configuration that complies with open and circular principles.

The project-context is a one-year research & design trajectory coined 'Biobased, Inclusive & Circular' (BIC), initiated by Delft University of Technology in close conjunction with partners from design practice and the manufacturing industry. Moreover, the social context driving this innovation is 'Pluspunt' in Rotterdam, the Netherlands. Pluspunt is a social workplace, activation center, and meeting spot for people in Rotterdam with a distance to the labor market, often because of social, psychological, financial, housing or addiction problems. From 2020 to 2024, Pluspunt is developing a former municipal yard in Rotterdam. The old sheds are renovated and rebuilt in line with the current demands and standards, particularly concerning health, comfort, and circularity of material flows. The users of these sheds require appropriate working spaces. In line with the expertise, objectives and planning of the manufacturing partners, the project's contribution was aimed at non-structural inner walls.

OPEN, CIRCULAR CO-CREATION

In an Open Building context, adaptable infill of partitioning walls has a key role in customized interior space-division. The market for such non-bearing walls has seen several interesting innovations over the last years, with both social and environmental gains. However, from a *systems-*

integration perspective, these products are usually suboptimal: the ecological and social performance are seldom assessed adequately. Think for example of material-embedded circularity potential when the wall part is discarded after several years of service: how can that initial potential be safeguarded? This question connects multiple perspectives and disciplines, such as product design, material sourcing, manufacturing, construction, and facility management.

Many building materials and products that could qualify for a circular application face challenges in doing so. This concerns, both, an organizational and a technical challenge. Regarding the latter, there are obstacles related to renewability and health of the material flows, manufacturing processes, joining techniques, and acoustic performance, amongst others. Within the BIC project, a modular wall component is developed that can cope with such challenges. In a co-creative design/research process with the project partners, a proof of concept emerged, based on existing innovations in new configurations. The main research question is formulated as: *How can we generate an interior wall that is based on biotic material flows, performs circularly at material and product level, and has a strong emphasis on engagement, comfort, and health of the end-user?*

The objectives of the project partners overlapped but had diverging accents. For Pluspunt, the *Do-It-Yourself attitude of the target group* was paramount, anticipating engagement of the end-users, as well as the *acoustic performance* and *robustness* of the partitioning wall, relating to the intended use of the wall: functional separation of a (calm) meeting space/café and a (noisy) workspace. The other partners added *material circularity* and *health & Safety* into the mix, both of which imply a high level of purity of the applied resources. This set of objectives underscores the systemic scope, while integrating the manufacturing, operational, and end-of-use stages.

MATERIALISATION

BIC thus focused on developing a healthy and circular materialization for the non-structural partition wall of a multi-functional space. Primary materials in scope related to cellulose fiber panels, mycelium-fiber-composite insulation, and reversible binders. Below, the associated innovations are described.

Cellulose fiber panels

ECOR is a material as much as a platform technology. *ECOR* produces panels made from any pure cellulose fibres through a process that only uses water, heat, and pressure. Moreover, the fibres originate from a myriad of residual flows (such as agriculture, horticulture, food and beverage production, wood and paper industry, textiles). Thus far, the panels were targeted at the furniture sector. However, through a recent innovation step, the construction industry has become a new domain to explore. This innovation was developed in close collaboration with *NIAGA* – a daughter company of DSM Chemicals – and concerns the binding of separate panels with a reversible polyester adhesive to create solid and robust multi-board panels.[4] Figure 1 visualizes the Niaga Ecor Panel (NEP) production process. The raw material for the NEP in our application was post-industry cardboard material.

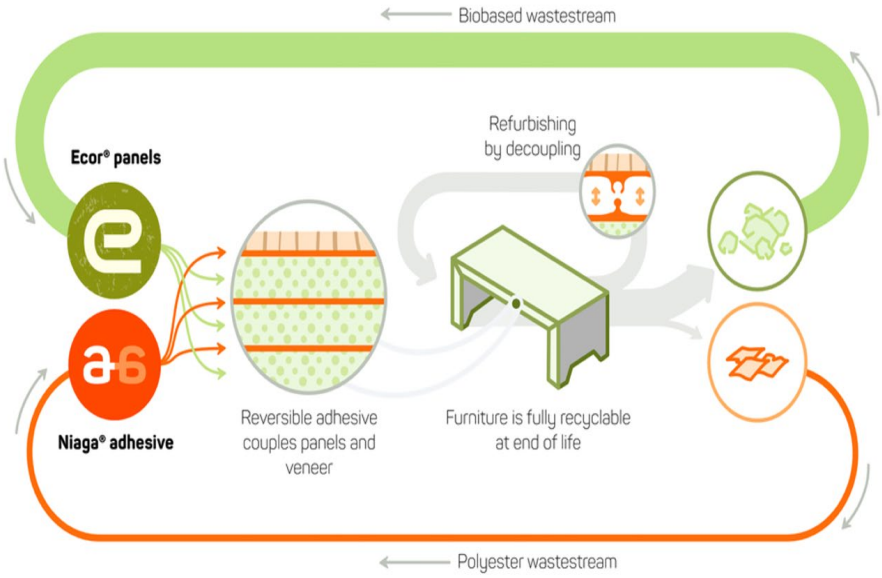

Figure 1. Schematic Niaga Ecor Panel principle, applied to furniture. (Copyright ©Ecor)

Mycelium-fiber insulation

Mycelium concerns the filamentous root-network of fungi. Mycelium strains can be combined with a fibrous substrate to produce boards with favorable insulating properties. For the mycelium-fiber insulation (MFI) two types of primary raw materials are required: fungal mycelium strains combined with cellulose fibers (from biotic – residual – origin). The fibrous residues are cleaned and pasteurized before being introduced to mycelium in standardized molds. The mycelium grows due to its symbiotic relationship with the fibers that feed it, forming a strong yet flexible composite.[5] After the growth is optimal, the process is stopped, and the inert MFI composite panels are dried (Figure 2).

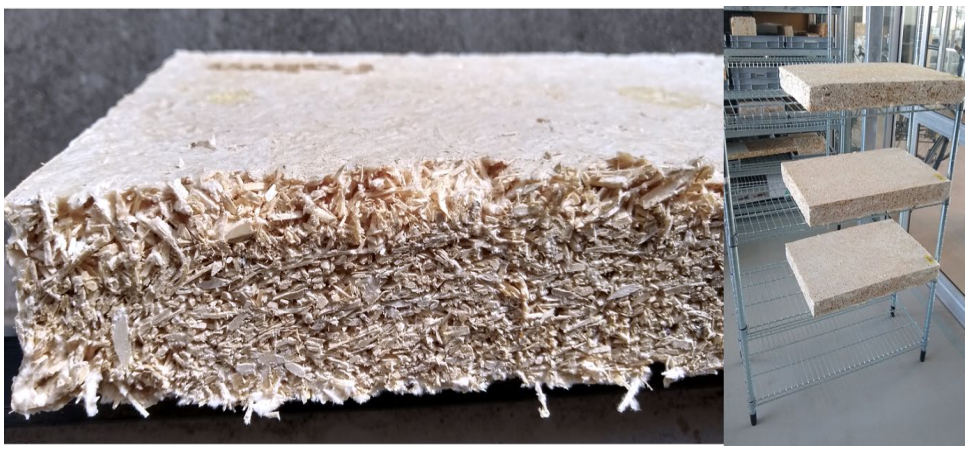

Figure 2. Mycelium Fiber Insulation board drying in the lab.

Detailing

Niaga Ecor Panels and Mycelium-fiber insulation are the two main components for our wall configuration. However, several design challenges had to be dealt with. First, we envisioned a modular system, enabling easy stacking of standardized, lightweight, and foldable ‘sandwiches’ of

two NEP side panels with the mycelium insulation as filling. Regarding this 'sandwich' model, we followed the existing *Quickpanell* cassettes, in terms of both size (40x60x10 cm) and foldability, using a cardboard U-profile on the inside. However, the materials used for the side paneling of *Quickpanell* cassettes are different and so are the positioning and binding of the U-profiles. In our design, the side panels were replaced by NEP and we adjusted the binder for connecting the cardboard U-profile to the NEP. Rather than using a conventional glue, we applied an innovation called CircuGlue. This type of glue is a reversible elastic resin, and (recycled) water-based binder with no added toxic or other harmful substances.[6] The operation is based on the principle of 'cohesion being greater than adhesion': making detachments easy by 'kinking' the glued products.[7]
The BIC-innovation comprises the following raw materials:
- post-industrial cellulose fibers + reversible polyester resin type 1 (NEP)
- mycelium strains + post-agricultural cellulose fibers (MFI)
- recycled cardboard fibers + reversible polyester type 2 (Connector)

Finally, positioning the connectors within the "cassettes" needed to be done in alignment with the MFI dimensions and the way in which the cassettes were going to be stacked. This closely connects to the effect that seams have for the acoustic performance, more specifically concerning sound leaks. In the end, MFI boards were placed vertically, to cover all seams once built up in a stacked wall. Figure 3 shows the BIC-module proof of concept.

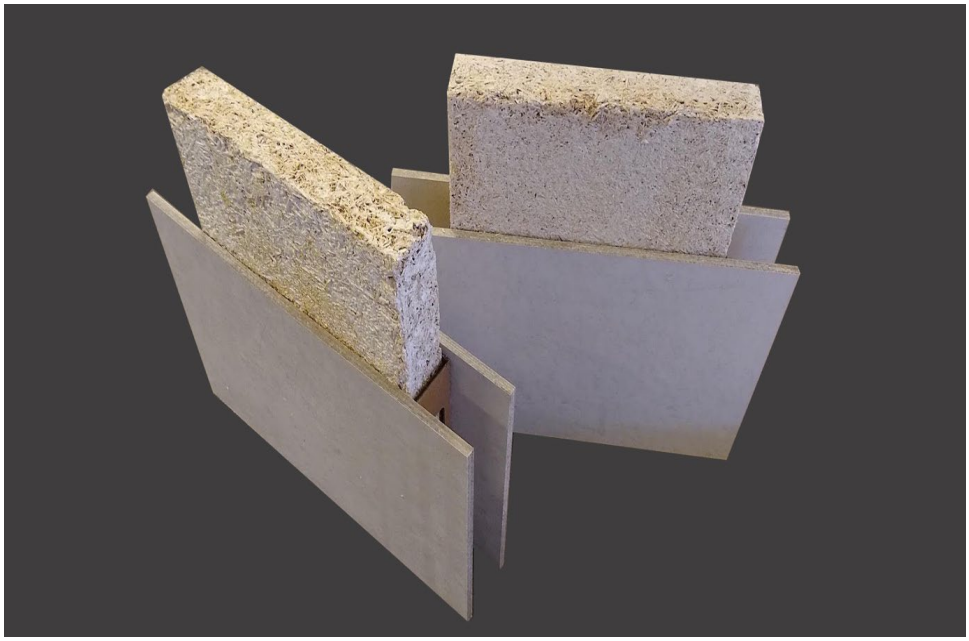

Figure 3. BIC-module proof of concept, first prototypes.

Acoustic testing

Acoustic performance of the wall was identified as an important point of attention, particularly regarding middle and high frequencies, which is linked to the human voice and noise resulting from most daily activity. We focused on 'sound insulation' tests, measuring how much noise travels through a wall (or floor, ceiling) to adjoining spaces through airborne or physical impact noise. Our main interest was the airborne acoustic insulation, related to sound waves (speech, music etcetera) transmitted through the air, causing vibrations of the wall element.
This test is conducted in an acoustic test-room at the Faculty of Applied Sciences (Delft University of Technology). We followed the EN-EN-ISO 10140-2 norm: Acoustics – Part 2: Measurement of

airborne sound insulation.[8] Figure 4 shows the set-up in the test-room, and Figure 5 displays the results. On the vertical axis of the graph depicted in Figure 5, sound-reduction levels are represented in decibels (dB), and on the horizontal axis, audio frequencies are represented in hertz (Hz). The sound reduction (Rw) is measured on different points through a series of Hz sound impulses. The numbers indicated in red are linked to the range of common environmental sound perception in the human ear. Highlighted are the numbers for the side panel (NEP of 12,5 mm thickness), the Mycelium insulation, and a combination of the two. As an assembled module of side panels (the 'cassette') and the insulating core, the Rw value is 43. This is a rather high score, relative to comparable wall configurations currently on the market.[9]

Figure 4. Set-up of sound insulation test: EN-EN-ISO 10140-2.

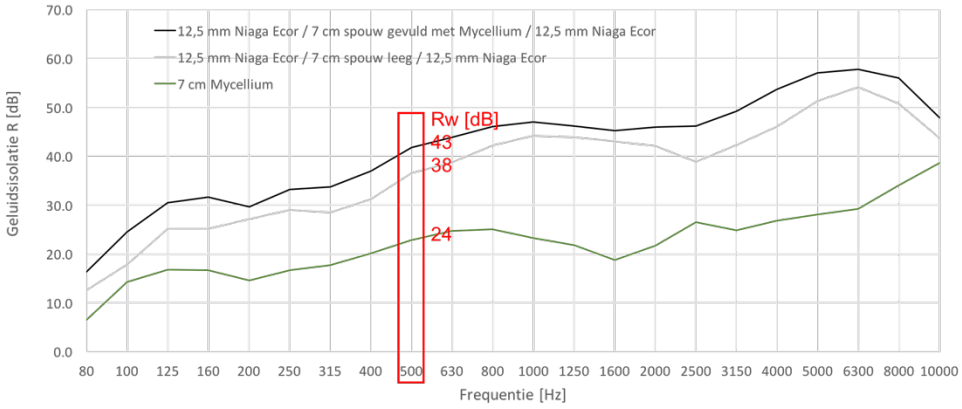

Figure 5. Results of the sound insulation test: EN-EN-ISO 10140-2.

SYSTEM CONSIDERATIONS

The wall module forms a vantage-point to explore other scale-levels in the supply network, whilst unravelling the functional trajectory from origin (raw material extraction) to destination (product in built context). Although much of the production and assembly takes place locally, some raw materials – particularly those relating to the synthetic binders – follow an inherently global market for chemicals. This pinpoints the fact that, despite good intentions and marketing efforts aimed at renewable and local sourcing, reality paints a different picture. Even for rather straightforward and deceptively simple products, such as the one under scrutiny. When zooming into the way raw materials end up in the wall configuration (*Figure 6a, above*) and zooming out again following a – non-specific – spatial grid-model (*Figure 6b, below*), it is illustrated that the smallest parts determine the extent of the spatial footprint or 'catchment area'. This significantly impacts the overall

sustainability-potential of the end-product. Figure 6 a & b visualize this phenomenon. The grid represents the spatial range, with the building in question as hyper local point of departure. Extraction, production, wholesale, retail, and transport then take place on the scale of building block, neighborhood, city-region, state, continent, or globe. Generally, embodied aspects become increasingly blurred from view, while "grip" on the associated stakeholders reduces accordingly. This is particularly so in cases where the interest is predominantly in the end-product itself or the building design context. Of course, analytical tools, such as Life Cycle Analysis (LCA), may assist in revealing such barriers. However, these tools are not tailored to guide design and co-creation activities. Moreover, innovative materials are often not accompanied by – nuanced – LCA data.[10]

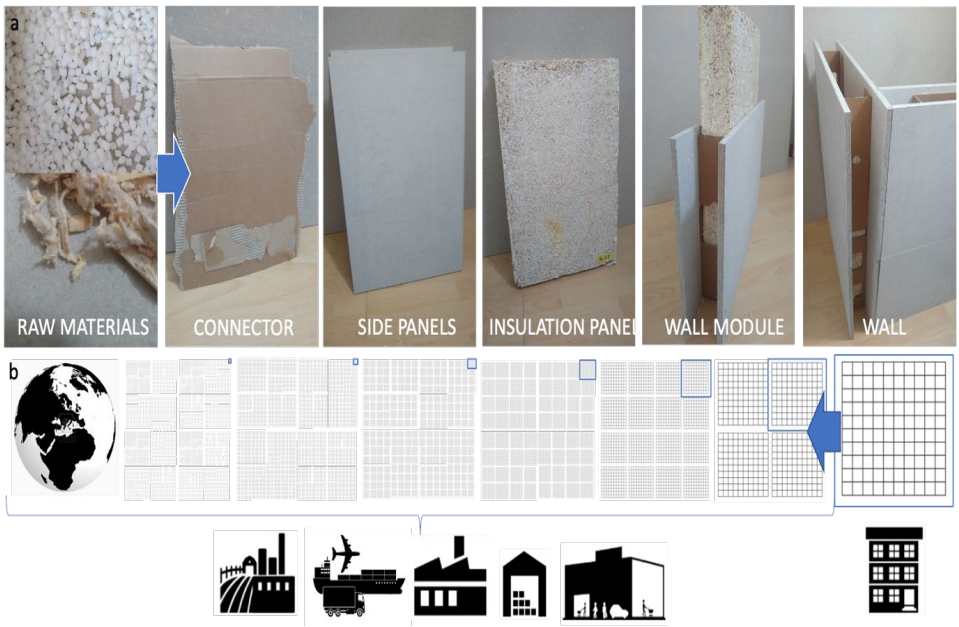

Figure 6. Integrated view on parts and spatial distribution. 6a: From raw materials to wall configuration, and 6b: from building scale to global supply network.

Co-Creation

The integrated view of Figure 6 represents a systems perspective that is hard to come by in common sustainability approaches, which are often rooted in siloed or reductionist thinking.[11] However, the associated complexity can be managed by combining perspectives, disciplines, and methods in a synergistic and co-creative manner.[12] We have guided this process with a matrix based on two frameworks: the shearing layers of change (or: "pace-layering") and hierarchic circular strategies for production chains. The Shearing layers of Change' (S-layers) were first put forward by Frank Duffy and Stewart Brand.[13] This concept is often applied in the discourse and practice around circular building, since it approaches a building as an assembly of parts with differentiating circulation properties. These properties are multi-faceted, concerning amongst others technical, spatial, social, and temporal aspects, relating to – the use and meaning of – various 'layers' of a building. The main – and mostly applied – categories are *structure, skin, services, space-plan, and stuff*. However, multiple sub-categories are imaginable, given the heterogeneity of many associated products (think of our 'simple' wall-module, for example, or an HVAC-device in comparison). Complementary to these S-Layers, the so-called R-Ladder can be applied as a framework, whilst prioritizing the most optimal sustainable and circular approach.[14] The R-Ladder represents multiple circular '*re-application*' routes,

usually including 5-10 strategies to narrow material flows (use less), slow down material flows (use longer), close material flows (recycle), and/or regenerate systems.[15] When joined in a matrix, these two methods provide a powerful tool to deal with systemic complexity. It can be applied as an analytical tool as well as a design method, not least for co-creation processes with partners from complementary disciplines. Moving through the matrix, specific points of attention and/or opportunity can be discussed – iteratively – at the crossing of the two parameters: differentiated S-Layers and optimal R-strategies. We have coined this the Circular Design & Impact matrix (CDIM), Figure 7 provides an example, highlighting wall-panels and insulation as part of the space-plan.

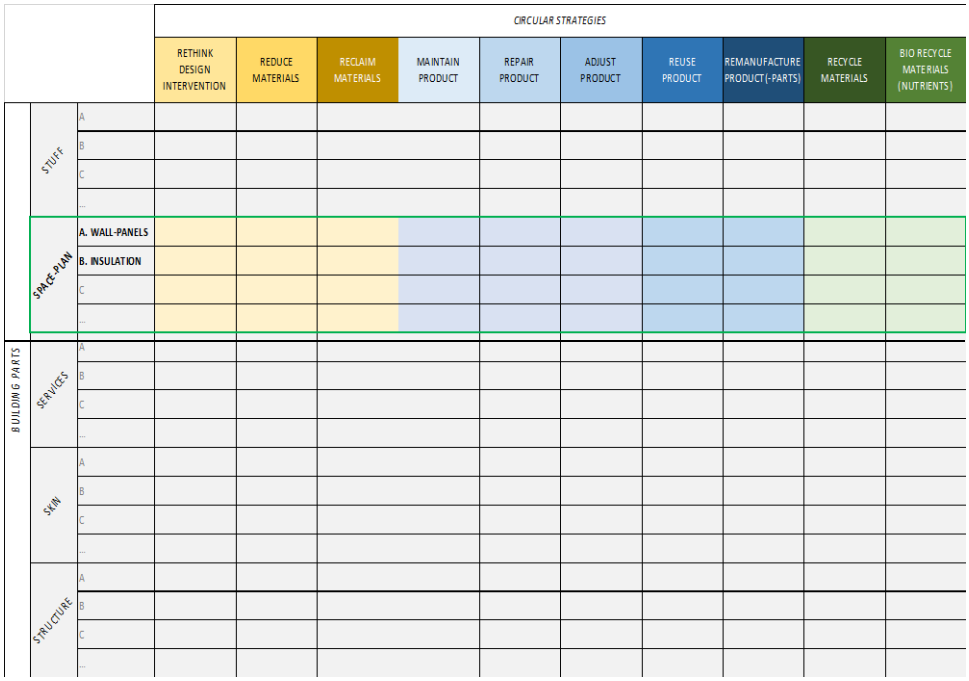

Figure 7. Circular Design Impact Matrix, differentiated building parts (vertical) + circular strategies (horizontal).

OUTLOOK AND CONCLUSION

In this article, the BIC project was introduced, briefly outlining a proof of concept based on five parameters: 1. *Do-It-Yourself attitude, 2. Acoustic performance*. 3. *Robustness 4. Material circularity,* and 5. *health & Safety*. The resulting lightweight and stackable wall module, made from renewable regional fibers, assembled with reversible joints, and customizable for specific communities, addresses multiple Sustainable Development Goals. For example, SDG 3 relating the health & well-being of end-users; SDG 11 concerning the co-creative power of communities, both from a supply perspective and an end-use perspective; and SDG 12 regarding clean and reversible production methods, whilst avoiding potentially harmful substances.[16] It was shown that even a seemingly straightforward product like the BIC-module can be surprisingly complex when resetting the system boundaries to include larger supply systems. We applied the Circular Design & Impact Matrix to guide the discussions among the multi-disciplinary project-team. The CDIM tool enabled us to identify and test fitting design and production choices. This proof of concept is meant as a starting point for follow-up steps, including the construction of a pilot wall in a community center, whilst engaging the end-users in fabrication and, not least, finishing activities. The latter has already been explored with the project-team, based on a recent innovation to secure the panels' integrity with paint

and latex based on natural raw materials that are suitable for recycling and are fully degradable. Apart from coloring the side panels, other possibilities arose, for example using the paints for image-printing, to be initiated by the target group. These aspects are essential from the BIC-rationale, since it focuses on one of the main pillars, namely engagement of the target end-user. As such, this provides a step up to the next stage in which the proof of concept meets a real setting. Covid-19 has been a barrier for this implementation-stage, and further progress was put on-hold. However, new opportunities are sought to continue this co-creation project, while securing viable business models. Lastly, the interplay between different stakeholders, interests, and – social and economic – mechanisms has been relatively straightforward in this project. Furthermore, this interplay was driven by diverging yet shared incentives, and with clear agreements on the boundaries of the project, in time, scope, as well as funds. Once reality kicks in and the stakes become higher, regarding security and quality of livelihoods, the – level and intensity of – engagement of stakeholders will most likely change. Although the CDIM tool shows significant merits in collaborative design and implementation decisions, with an anticipative eye on operational scenarios, it only works in combination with complementary tools, methods, and agreements. In that respect, CDIM could be seen as part of the toolbox for 'retaining circularity potential', closely interacting with appropriate facility management strategies and multi-year maintenance plans, as well as tools such as Building Information Modeling (BIM) and Material Registration Systems (Material Passports).

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NOTES

[1] John Habraken, *De dragers en de mensen – Het einde van de massawoningbouw* (Scheltema & Holkema, Amsterdam, the Netherlands, 1961).
[2] "Openbuilding.co Manifesto," Openbuilding.co, accessed August 15, 2022, https://www.openbuilding.co/manifesto; Frans van der Werf, *Open Ontwerpen*. (010 Publisher, Rotterdam, the Netherlands, 1993).
[3] Bob Geldermans, *Securing Healthy Circular Material Flows in the Built Environment – The Case of Indoor Partitioning* (Delft University of Technology, A+BE | Architecture and the Built Environment, 2020).
[4] "Niaga® Design Philosophy," Niaga, accessed August 15, 2022, https://www.dsm-niaga.com.
[5] Mitchell Jones et al., "Engineered mycelium composite construction materials from fungal biorefineries: A critical review," Materials & Design, Volume 187 (2020), https://doi.org/10.1016/j.matdes.2019.108397
[6] "Circuglue," Circuwall, accessed August 15, 2022, https://www.circuwall.nl/circuglue.
[7] Gonçalo Nuno Costa Cruz Simões et al. "Preliminary study of the acoustic behaviour concerning an innovative prototype for indoor modular partitioning" (paper presented at Inter Noise Conference, Melbourne, Australia 2014).
[8] *Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation,* 10140-2: NEN-EN-ISO, (NEN, 2021).
[9] Alberto Quintana-Gallardo et al. "Life-cycle assessment and acoustic simulation of drywall building partitions with bio-based materials," Polymers, 12(9), 1965 (2020), https://doi.org/10.3390/polym12091965
[10] Matthias Buyle et al. "The Future of Ex-Ante LCA? Lessons Learned and Practical Recommendations*,"* Sustainability, 11, 5456 (2019). https://doi.org/10.3390/su11195456
[11] Raquel Balanay and Anthony Halog, "A review of reductionist versus systems perspectives towards 'doing the right strategies right' for circular economy implementation," Systems, 9(2) (2021). https://doi.org/10.3390/systems9020038
[12] Rupert Baumgartner and Jouni Korhonen, "Strategic thinking for sustainable development," Sustainable Development 18 (2010). https://doi.org/10.1002/sd.452
[13] Stewart Brand, *How Buildings Learn (*Viking Press, New York, USA, 1994); Frank Duffy, *The Changing Workplace* (Phaidon Press, London, UK, 1992).
[14] Bob Geldermans, "Design for Change and Circularity – Accommodating Circular Material & Product Flows in Construction," Energy Procedia Volume 96 (2016). https://doi.org/10.1016/j.egypro.2016.09.153
[15] José potting et al., *Circular economy: measuring innovation in the product chain,* (Netherlands Environmental Assessment Agency, 2017), https://www.pbl.nl/sites/default/files/downloads/pbl-2016-circular-economy-measuring-innovation-in-product-chains-2544.pdf; Nancy Bocken et al. "Product design and business model strategies for a circular economy," Journal of Industrial and Production Engineering, 33(5) (2016). https://doi.org/10.1080/21681015.2016.1172124; Netherlands Environmental Assessment Agency, *Outline of the Circular Economy,* (PBL, The Hague, The Netherlands, 2019), https://circulareconomy.europa.eu/platform/sites/default/files/pbl-2019-outline-of-the-circular-economy-3633.pdf
[16] "Sustainable Development Goals," United Nations Development Program, accessed June 15, 2023, https://www.un.org/sustainabledevelopment/sustainable-development-goals/.

BIBLIOGRAPHY

Balanay, Raquel M., and Anthony Halog. "A Review of Reductionist versus Systems Perspectives towards 'Doing the Right Strategies Right' for Circular Economy Implementation. "Systems 9, no. 2 (2021): 38. https://doi.org/10.3390/systems9020038.

Baumgartner, Rupert J., and Jouni Korhonen. "Strategic Thinking for Sustainable Development." Sustainable Development 18, no. 2 (2010): 71–75. https://doi.org/10.1002/sd.452.

Brand, Stewart. *How Buildings Learn.* Viking Press, New York, USA, 1994.

Bocken, Nancy, Ingrid De Pauw, Conny Bakker, and Bram van Der Grinten. "Product Design and Business Model Strategies for a Circular Economy." Journal of Industrial and Production Engineering 33, no. 5 (2016): 308–20. https://doi.org/10.1080/21681015.2016.1172124.

Buyle, Matthias, Amaryllis Audenaert, Pieter Billen, Katrien Boonen, and Steven Van Passel. “The Future of Ex-Ante LCA? Lessons Learned and Practical Recommendations.” Sustainability 11, no. 19 (2019): 5456. https://doi.org/10.3390/su11195456.

CircuWall. “CircuGlue”. Accessed August 15, 2022. https://circuwall.nl/

Duffy, Frank. *The Changing Workplace.* London: Phaidon Press, UK, 1992.

Geldermans, Bob. “Design for Change and Circularity – Accommodating Circular Material & Product Flows in Construction.” Energy Procedia 96 (2016): 301–11. https://doi.org/10.1016/j.egypro.2016.09.153.

Geldermans, Bob. “Securing Healthy Circular Material Flows in the Built Environment – The Case of Indoor Partitioning”. PhD Diss., A+BE | Architecture and the Built Environment, Delft University of Technology, 2020.

Habraken, John. *De dragers en de mensen – Het einde van de massawoningbouw.* Scheltema & Holkema, Amsterdam, the Netherlands, 1961.

Jones, Mitchell P., Andreas Mautner, Stefano Luenco, Alexander Bismarck, and Sabu John. “Engineered Mycelium Composite Construction Materials from Fungal Biorefineries: A Critical Review.” Materials & Design 187 (2020): 108397. https://doi.org/10.1016/j.matdes.2019.108397.

Netherlands Environmental Assessment Agency. “Outline of the Circular Economy”. The Hague, The Netherlands: Planbureau voor de Leefomgeving, 2019.

NEN-EN-ISO. “10140-2: Acoustics - Laboratory measurement of sound insulation of building elements - Part 2: Measurement of airborne sound insulation”. Version May 2021. NEN, 2021.

Niaga. “Niaga® Design Philosophy”. accessed August 15, 2022. https://www.dsm-niaga.com.

Openbuilding.co. “Openbuilding.co Manifesto”. Accessed August 15, 2022. https://www.openbuilding.co/manifesto.

Potting, José, Marko P. Hekkert, Ernst Worrell, and Aldert Hanemaaijer. *Circular Economy: Measuring Innovation in the Product Chain*. The Hague, The Netherlands: Planbureau voor de Leefomgeving, 2017. https://www.pbl.nl/sites/default/files/downloads/pbl-2016-circular-economy-measuring-innovation-in-product-chains-2544.pdf

Quintana-Gallardo, Alberto, Jesús Alba Fernández, Romina Del Rey Tormos, José Enrique Crespo Amorós, and Ignacio Guillén-Guillamón. “Life-Cycle Assessment and Acoustic Simulation of Drywall Building Partitions with Bio-Based Materials.” Polymers 12, no. 9 (2020): 1965 1-16. https://doi.org/10.3390/polym12091965.

Simões, Gonçalo Nuno Costa Cruz, Jorge Patrício, and Paulina Faria. “Preliminary Study of the Acoustic Behavior Concerning an Innovative Prototype for Indoor Modular Partitioning.” Paper presented at Inter Noise, January 1, 2014. https://run.unl.pt/bitstream/10362/14003/1/CI64-wall%20prototype_IN2014_p592.pdf.

Van der Werf, Frans*. Open Ontwerpen.* Rotterdam, the Netherlands: 010 Publisher, 1993.

United Nations Development Program. “Sustainable Development Goals”. Accessed 15 June 2023. https://www.un.org/sustainabledevelopment/sustainable-development-goals/.

INTERNET OF THINGS (IoT) SENSING OF INDOOR ENVIRONMENTAL QUALITY (IEQ): A REVIEW OF POSSIBILITIES, CHALLENGES, AND OPEN PROBLEMS

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INTRODUCTION

Digital solutions are rapidly embraced in various aspects of our lives and create unprecedented opportunities to mitigate the adverse impacts of the built environment on human well-being. Examples include Internet of Things (IoT) and the Internet of Robotics of Things (IoRT) whose applications in buildings and cities to enhance indoor environments have exponentially grown in recent years.

Being part of an ongoing Ph.D. project, this paper is a constituent part of an extended comprehensive survey of the existing literature that aims to: a) delve into the applications, opportunities, and limitations presented by Internet of Things (IoT) and Internet of Robotic Things (IoRT) solutions in the context of indoor air quality sensing, and b) identify best practices for integrating IoRT within the domain of indoor environmental quality (IEQ) sensing. The overarching goal of this work is to contribute to the existing literature on IoRT-IEQ and offer an understanding of strategies and approaches for built environment professionals. Understanding of limitations and possibilities helps future developments and paves the way for opportunities to incorporate the Internet of Robotic Things (IoRT) with IEQ sensing, monitoring and visualization, ultimately optimizing the building operations' performance.

There is a growing recognition of the importance of monitoring indoor environmental parameters to create healthier indoor built environments, especially that people spend a significant amount of time indoors, whether at home, in the workplace, or in public indoor spaces. The quality of the indoor environment directly impacts our health, well-being, and productivity. According to the World Health Organization (WHO), around 4.3 million people die each year due to exposure to indoor air pollution which can lead to a range of health issues, including low birth weight, sick building syndromes (SBS), acute respiratory problems, allergies, and fatigue[1]. Consequently, there is a demand for utilizing new technologies and robotic features to enhance indoor environmental factors.

Indoor environmental quality (IEQ) comprises several components, such as thermal comfort and indoor air quality (IAQ).[2] Thermal comfort plays a significant role in occupants' productivity, well-being, and satisfaction.[3] Meanwhile, air pollution, both indoors and outdoors, poses a significant global challenge, affecting human health. However, despite technological advancements, addressing thermal comfort and IAQ concerns remains a challenge, with occupant behavior emerging as an influential factor.

While capturing accurate data for all thermal comfort and IAQ indicators can be challenging due to the complex parameters involved, continuous monitoring and data collection using environmental sensors is a requirement to help improve thermal models and facility management systems.[4] Wearable devices, infrared cameras, occupancy sensors, and smart thermostats are among the tools that can assist in data collection.[5]

Additionally, Integrating the Internet of Things (IoT), intelligent sensors, and robotics capabilities with machine learning algorithms help develop integrated environmental models for optimizing thermal comfort and IAQ. This integration yields advantages such as real-time monitoring with maximum spatial and temporal coverage, and prediction capabilities, eventually leading to a harmonious and healthful indoor environment.

REVIEW METHODS

The articles used in this literature review were obtained from the Web of Science and SCOPUS which index major journals published on the subject. We included only the articles published between 2013 and 2023 to cover the majority of related work in this field. A systematic methodology was used to select articles for content analysis using important keywords including Internet of Things (IoT), Indoor environmental quality (IEQ), Thermal comfort, Indoor air quality (IAQ), Sensors, Arduino, Autonomous mobile and robotic sensing, and Machine learning. Other keywords, such as The Internet of Robotic Things (IoRT), yielded results with no relevance to the scope of this work and were eliminated from the search.

The article inclusion and classification criterion for content analysis was the relevance to the integration of indoor built environment monitoring and sensing with IoT or IoRT. We searched for keywords in titles, abstracts, and published keywords.

We identified 354 articles published since 2013 in the initial search, out of which 62 were found directly relevant to the topic. We found 68% (42) of the articles in this area to have been published between 2019 and 2023 which indicates a growing interest in this topic.

RESULTS

Models and methodologies based on the Internet of Things (IoT) are increasingly used to forecast building performance, indoor air quality (IAQ), thermal comfort, and occupancy behavior, which are then used to assist with building system management and operation.[6] Our literature review included 50 research articles and 12 review articles. 75% (9) of review articles were authored by computer scientists and engineering experts and focused on the IoT equipment, methods, and devices for building installation, without IEQ being a significant feature in their focus. We identified only a few review articles that focused on integrating IoT, sensors, and indoor environmental quality, and most of them approached the topic from a computer science perspective. There is also a limited number of review articles by architects or built environment experts on the subject.

Our literature review showed that research in this topic primarily focus on the application of IoT in two areas including energy monitoring and thermal comfort monitoring for the HVAC system control, especially that intelligent devices and sensors are believed to be important tools in reducing energy consumption and improving IEQ inside.[7] Our review also reveals that limited research exists that focuses on other components of IEQ such as indoor air quality and occupant satisfaction of thermal comfort.

Figure 1 outlines the overall themes and focus points found in the review of surveyed articles. A primary focus of this review was the low-cost sensors for indoor built environment monitoring which has received significant interest after the Covid 19 pandemic necessitated the enhancement of the indoor environment quality at both community and individual levels. A new trend in using these

sensors is the DIY (Do It Yourself) approach to create small sensing systems to detect indoor air quality.

Figure 1 shows that 96% of the reviewed articles utilized an experimental design approach, where designing a measuring device using low-cost sensors to monitor one or more parameters of IEQ was the main method to detect either the quality of such sensors, their connectivity to IoT, or the status of IEQ. Additionally, 82% of the reviewed articles focused on using the stationary fixed system with low-cost sensors to investigate IEQ parameters, while only 18% (mostly published in recent years) focused on the mobile system for IEQ sensing. The figure visually depicts the various factors that exert an influence on Indoor Air Quality (IAQ) and that were monitored by these systems. It also highlights the diverse data analytics services utilized. For instance, out of the reviewed articles, 75% incorporated a cloud server approach, whereas the remaining 25% of studies utilized local servers.

As well as other relevant characteristics related to IoT; It can also be observed that 58% of the articles represented interest in IoT technology for IEQ management, thermal comfort, and IAQ parameters in smart buildings, using different connectivity networks, user interface platforms, and various microcontroller units (MCU).

IoT can produce massive amounts of data over time, resulting in the need for data analytics services capable of storing, managing, processing, and analyzing the stored data. These tasks can be accomplished utilizing a desktop computer as a local server, an IoT datastore server, or a cloud server; with the latter being the preferred method. Our review revealed that 75% of the articles report on using a cloud server as a data storage service.

Using MCU boards as a base for sensing models has been a persistent need for their capabilities in detecting, collecting, and recording environmental data such as air temperature, relative humidity, particulate matters (PM), volatile organic compounds (VOC), carbon dioxide (CO2) and many other gases and parameters. Despite some limitations, such as Arduino requiring additional support for a complete protocol stack and Raspberry Pi lacking the ability to function as servers, routers, or gateways.[8] These boards remain the preferred choice in the field.

The popularity of MCU boards can be attributed to their open-source computing platform characteristics, which provide flexibility and reliability in data processing. They excel in performing tasks with high accuracy and demonstrate significant potential for future development. These factors contribute to their widespread usage in sensing applications, particularly within the realm of the Internet of Things (IoT).[9]

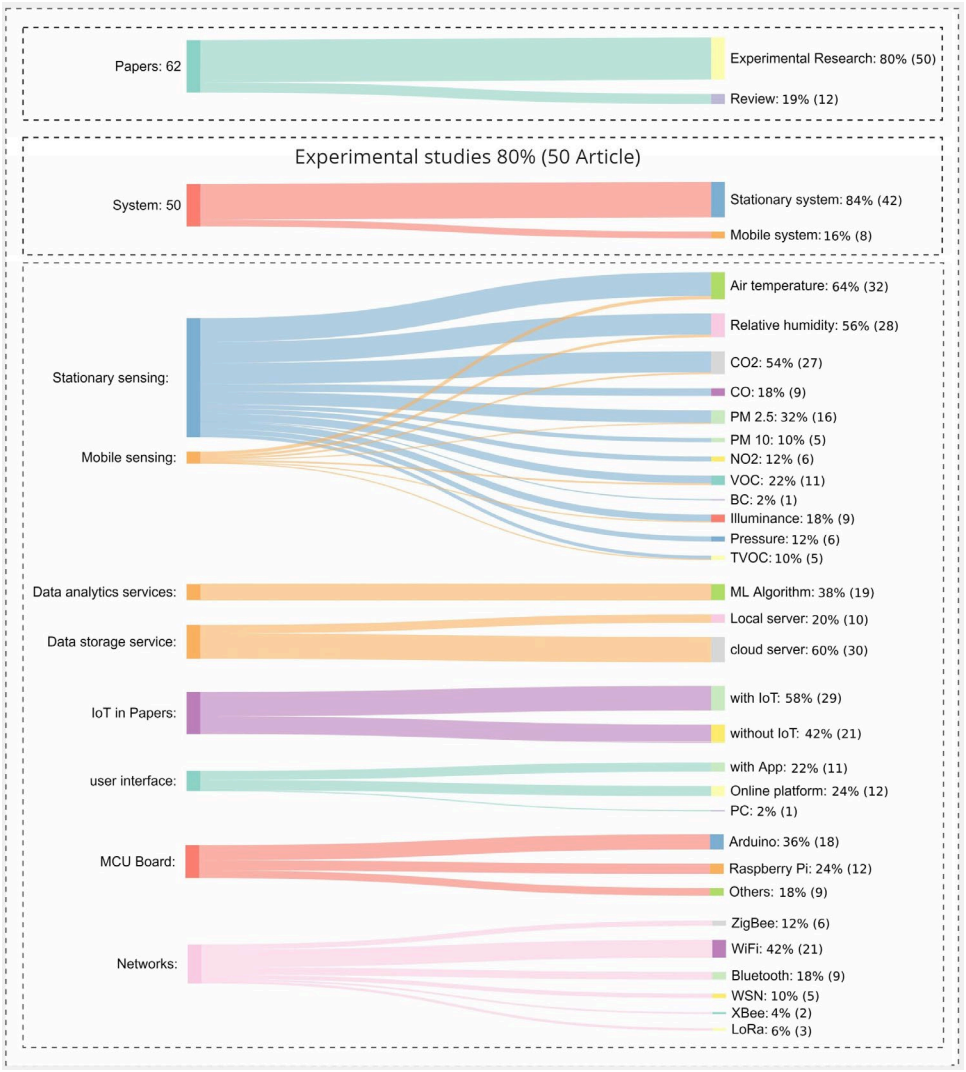

Figure 1. Displays an overview of the common features found in the methods used in the reviewed studies, including the research methods employed, the systems utilized, the types of data collected, and other relevant characteristics related to IoT presented as a percentage and number of articles

Table 1 outlines the reviewed studies with the measured parameters and the sensor brands. Depending on the model, these sensors can cost anywhere from a few dollars to several hundred dollars. The literature review revealed that various types of indoor environmental parameters were studied by researchers, including temperature (Temp), relative humidity (RH), carbon dioxide (CO2), carbon monoxide (CO), particulate matter 2.5 (PM2.5), particulate matter 10 (PM10), nitrogen dioxide (NO2), volatile organic compounds (VOCs), total volatile organic compounds (TVOC), Illuminance, and other.

Paper	Indoor Parameter										Sensor Brand
	Temp	RH	CO2	CO	PM 2.5	PM 10	NO2	VOC	TVOC	Illuminance	
(Salamone et al., 2016)	●	●	●	-	-	-	-	-	-	●	CO 2 concentration (Not mentioned), DHT22 (T+RH), infrared (IR) led,ABB OD 1365(energy meter)
(Marques & Pitarma, 2016)	●	●	●	●	-	-	-	-	-	●	SHT10 (TEMP+HUMID), MQ7 (CO), T6615 (CO2), LDR(LIGHT)
(Qian et al., 2016)	-	-	-	-	-	-	-	●	●	-	PID-AH sensor (VOC). Kinect sensor (detect human)
(Ray, 2016b)	●	●	-	-	-	-	-	-	-	-	DHT11 sensor
(Salamone et al., 2017)	●	●	●	-	-	-	-	-	-	●	HIH6130, DHT11 (T+RH), The anemometer (wind sensor), (k-30 (CO2), LDR (lux meter)
(Konis & Annavaram, 2017)	●	●	-	-	-	-	-	-	-	-	Samsung S4 embedded thermal sensor
(M. Jin et al., 2018)	●	-	●	-	-	-	-	●	-	●	K-30 (CO2), TGS2620 module (VOC), SI1145 (Illuminance), MCP9808 (temperature)
(Afolarani et al., 2018)	-	-	●	-	-	-	-	●	-	-	NDIR CO2 sensors: GMT220 Carbocap, TGS4160, Figaro, Alphasense, Cozir Ambient CO2 sensor
(J.-Y. Kim et al., 2014)	●	●	●	●	●	-	●	●	-	-	Gas sensors (TGS2600, TGS2602, GSNT11 and TGS5042), TGS2600 Gases); TGS2602 (VOCs); GSNT11 (NO2); TGS5042 (CO); T6613 (CO2); MiCS-2610 s(O3); SO2-AF sensor (SO2); GP2Y1010AUF(PM), and DHT11 (T&RH

(Mahanth & Karishma, 2017)	-	-	●	●	-	-	-	-	-	-	MQ-7 (CO), COZIR-A (CO2)
(Marques et al., 2018)	-	-	-	-	-	●	●	-	-	-	PMS5003 (PM)
(Moiş et al., 2018)	●	●	●	-	●	-	-	●	-	●	CCS811 (CO+TVOC), SHT21 (T+RH), OPT3001(LIGHT)
(Taştan & Gökozan, 2019)	●	●	●	●	●	-	●		-	-	GP2Y1010AU (dust sensor) MH-Z14- co2 (NDIR), MICS-4514(CO, NO2) and DHT22 (T+ RH)
(Marques & Pitarma, 2019)	●	●	-	-	-	-	-	●	-	-	Bosch BME680 + BME680
(Kang & Hwang, 2016)	●	●	-	●	●	-	-	●	-	-	GP2Y1010AU0F (PM), GSBT11(voc), MQ7 (co), DHT22 (T+RH)
(Cheng et al., 2019)	-	-	-	-	●	-	-	-	-	-	SidePak and PTQS (PM 2.5)
(Quan Pham et al., 2019)	●	●	●	-	-	-	-	●	-	-	air quality sensor - CCS811, humidity and temperature sensor (HDC1080,20 Watt LED (SZHLD11
(Cashikar et al., 2019)	-	-	-	-	●	-	-	-	-	-	AAQRL-ROBOPM (PM sensor), KY-013-Keyes (temperature), and KY-015-Keyes (humidity)
(Marques et al., 2019)	-	-	●	-	-	-	-	-	-	-	MHZ-19 CO2 sensor
(Trilles et al., 2019)	-	-	-	-	●	●	-	-	-	-	PM sensor (HM-3301)
(Folea & Mois, 2020)	●	●	-	-	-	-	-	-	-	-	BME680 Bosch, Cyble-222014-01, LDO (low-dropout regulator) (pressure)
(Agrawaal et al., 2020)	-	-	-	-	●	-	-	-	-	-	GP2Y1010AU0F (dust)
(Mahbub et al., 2020)	●	●	●	-	-	-	-	-	-	-	DHT11 (T+RH), MQ-135 (Gas), PIR Motion Sensor - Passive

											Infrared Sensor (infrared signals)
(Coulby et al., 2021)	●	●	●	●	●	-	-	-	-	●	Onset HOBO® MX1102 (CO2 and eCO2), IQAir Air Visual Pro (PM2.5), Onset HOBO® MX1104 (Light intensity). temperature, humidity), Omega HHSL-101 (noise levels)
(Floris et al., 2021)	●	-	-	-	-	-	-	-	●	●	DHT11 (T+RH), VEML7700 (luminosity), eCO2 and TVOC (CCS811)
(Yang et al., 2021)	-	-	●	-	-	-	-	-	-	-	TOWER DSeCO2
(C. Choi et al., 2021)	●	●	●	●	●	●	●	-	●	-	SPS 30 (PM), SVM 30 (TVOC, CO2, TEMP, RH), DGS-CO 968-034(CO2), DGS-H2S 968-036 (H2S), DGS-NO2 968-043 (NO2), FECS44-100 (NH3)
(Peladarinos et al., 2021)	-	-	-	-	●	-	-	-	-	-	SVM30 (TVOC), ZMOD4410(CO2), BOSCH- BME680 (Temp, RH, Pressure), SPS30 (PM), Omron B5WLD0101-1/2 (light)
(Geng et al., 2022)	●	-	-	-	-	-	-	-	-	-	WSZY-1 sensor (Temp)
(Troncoso-Pastoriza et al., 2022)	●	●	●	-	-	-	-	-	-	●	adxl345 (Acceleration), amg8833 (Temperature), ME680 (T+RH), mlx90614 Surface (temperature), sds011(PM), tsl2561 (Illuminance)
(Salamone et al., 2022)	●	●	●	-	-	-	-	-	-	-	RTC, DHT22 (Temp,RH),DHT11(Temp,RH),DHT20(Temp,RH),SHTC3(T+RH),BME680 (pressure+T+RH),SHT85, (CO2)
(Al-Okby, Roddelkopf, et al., 2022)	-	-	-	-	-	-	●	●	-	-	MOX gas sensor, SGP41 (VOC)

(Riffelli, 2022)	●	●	●	-	-	-	-	-	-	●	BME280 (temperature), BME280 (humidity), LTR-559 (Illuminance), K-30 (CO2)
(Al-Okby, Neubert, et al., 2022)	●	●	-	-	-	-	-	-	●	-	TVOCs from the SGP30 gas sensor and the IAQ-index from the SGP40 gas sensor, SGP30 Gas Sensor, WeMos D1 Mini Wi-Fi board
(Abraham & Li, 2014)	●	●	●	-	-	-	-	●	-	-	TGS2602 (VOC), MG811 (CO2), RTH03 (T+RH)
(Marzouk & Atef, 2022)	●	●	●	●	●	-	-	-	-	-	DHT 11 (T+RH), BMP180 (Pressure), MQ135 (CO2), MQ7 (CO), GP2Y1010AU0F (PM).
(Ma et al., 2023)	●	●	●		●	-	-	-	-	-	SHTC3 (T+RH), T6713(CO2), SPS30 (PM)

Table 1. Low-cost sensors in the reviewed studies

With the availability of building automation systems, smart building systems, and IoT platforms, which enhance the amount of data accessible, there is often an increase in machine learning applications in the last few years.

Based on the findings of this review, Table 3, it is evident that the application of machine learning (ML) models varies across studies based on the data collected. In addition to observing a gap in investigating other IEQ parameters, machine learning was used in only 38% of the reviewed papers. Despite this, more research is needed to realize the full potential of machine learning, especially since it is developing rapidly.

DISCUSSION

IoT Hardware and Software: The literature review findings highlight the importance of flexible and robust systems for IoT applications. Several studies[10] have emphasized the need for a unified reference model for the architectural component of IoT. Although attempts have been made to provide a general architecture based on the needs of researchers and industry, a widely accepted unified model is still lacking.[11] The general framework of IoT consists of two main components including the physical hardware component and the software component. The hardware component includes IoT devices, sensors, network devices, and connectivity equipment, while the software component encompasses cloud-based platforms, data management and storage services, and end-user applications for data visualization and dashboarding.[12]

Various models have been proposed by researchers to structure the IoT architecture. These models include middleware-based, SOA-based, and multi-layer models.[13] One commonly used model suggests five layers: hardware/robotic things layer, network layer, internet layer, infrastructure layer, and application layer.[14] Another well-known model comprises four essential layers: perception or sensing layer, network layer, data management and processing layer, and application layer.[15]

Paper	Machine learning & Data analytics services
(Qian et al., 2016)	SLAM algorithms, Adaptive Particle Filter (APF) algorithm, Gaussian process, Monte Carlo sampling method. Used ROS system to support the control software development, including robot localization and navigation.
(Konis & Annavaram, 2017)	Logistic regression model using computing software "R," data storage (MySQL database)
(M. Jin et al., 2018)	Spatio-temporal interpolation algorithm, Kriging and Markov random field with Gaussian MRF, Bayesian network, K-nearest neighbors' algorithm (KNN), Lasso, support vector regression (SVR), Adaptive boosting (AdaBoost), random forest, and extra trees, they were trained by Empirical Risk Minimization (ERM) Algorithm.
(J.-Y. Kim et al., 2014)	Using two versions of multilayer perception neural network to calculate air quality values. Also, using the Bayesian room localization model to estimate air quality value
(Folea & Mois, 2015)	A LabVIEWTM application processes the data from the sensors
(Taştan & Gökozan, 2019)	Linear Correlation" algorithms
(Kang & Hwang, 2016)	Database = MySQL Workbench, Data Analysis Tool= R Studio Plotting Tool=Plotly. Exponential Moving Average (EMA)
(Benammar et al., 2018)	PostgreSQL for database management
(Cashikar et al., 2019)	Quadrant algorithm
(Sung et al., 2019)	Fuzzy control logic rule
(Mahbub et al., 2020)	Linear Regression, Multivariate Regression, Support Vector Regression, Support Vector Machine (SVM), k-Nearest Neighbor (KNN), Clustering algorithms
(Floris et al., 2021)	ANOVA, Gaussian process regression
(Luo et al., 2021)	R version 3.6.1 software
(Yang et al., 2021)	SLAM on ROS, Gmapping algorithm, RBPF algorithm, DWA (Dynamic Window Algorithm)
(C. Choi et al., 2021)	Linear interpolation, Spline interpolation, Last observation carried forward imputation (LOCF), Kalman, and Moving average methods are traditionally used. In multivariate imputation, KNN, Random Forest, regression, Support vector regression (SVM), and SVD.
(Geng et al., 2022)	2-D lidars using a Simultaneous Localization and Mapping (SLAM) algorithm
(Troncoso-Pastoriza et al., 2022)	MultiLayer Perceptron (MLP) neural network, Random Forest (RF), and Support Vector Regression (SVR).
(Salamone et al., 2022)	SciPy with Numpy to calculate the coefficient of determination R2, Scikit-learn metric to calculate the RMSE, Pandas was used to enable the provision data structure, while Pythermalcomfort was used to calculate PMV,
(Marzouk & Atef, 2022)	ANN model, NumPy: Sklearn provides statistical operations, Matplotlib is imported to visualize data, MinMaxScaler is used for data normalization, TensorFlow is imported to start the modeling process, The Keras library, which operates within the TensorFlow system, is imported for quick modeling, allowing multiple architectures to be tested for better results.

Table 2. Different Machine learning techniques were used in the reviewed papers

Different communication models are employed to connect various components within the IoT system. Some devices, like Arduino, require external support to implement a complete protocol stack, while others like ESP8266 can implement it but have limited resources and higher power consumption.

Raspberry Pi is capable of implementing a complete protocol stack but lacks server, router, or gateway capabilities.[16]

IoT MCU Boards and low-cost sensors (LCS): The emergence of micro-sensing technology has brought about a paradigm shift from conventional air quality monitoring networks to air quality monitoring systems (AQMS) driven by IoT MCU boards and low-cost sensors (LCS).[17] The availability of commercially accessible low-cost sensors in recent years has revolutionized the field, enabling various applications.[18]

These cost-effective sensors offer real-time measurements with the potential for broader spatial coverage compared to conventional sensors, particularly in indoor air measurements. Moreover, they require minimal maintenance and calibration expertise, reducing the need for skilled operators.[19]

Despite the advantages and proliferation of low-cost sensors (LCS), concerns remain about the reliability of the collected data due to their sensitivity.[20] To address these concerns, manufacturers have implemented solutions such as pre-calibration before distribution, periodic device calibration, and embedded auto-calibration features. Users also need to consider factors like the sensor's service life and the intended usage, as using an indoor sensor for outdoor measurements can introduce inaccuracies due to environmental parameters like wind speed.

Despite their limitations, low-cost sensors are an attractive option for individuals who cannot afford expensive devices. Research has demonstrated that these sensors are sufficient for comprehensive analysis of indoor air quality at a high spatial resolution,[21] (see Table 1).

The market for low-cost sensors is continuously evolving, with manufacturers constantly upgrading and improving the existing sensors, necessitating ongoing research studies to investigate these changes and their potential implications.

However, these sensors cannot operate independently and require a reference board to manage their functioning. This is where Microcontroller Unit (MCU) boards come into play. MCU boards are small, affordable electronic circuit boards that integrate a microcontroller, memory, input/output interfaces, and other components into a single package. They are commonly used for prototyping and developing embedded systems applications. MCU boards enable the connection of multiple sensors to perform specific functions such as sensing, tracking, blinking, or responding to environmental inputs.[22]

Machine learning applications in the IEQ field

The utilization of IoT technologies in building management generates a significant amount of data, which can be effectively analyzed using Big Data tools. Machine Learning (ML) algorithms offer accurate analysis of large datasets, enabling predictive models to be built based on sensor data without extensive human input.[23]

ML algorithms are categorized into supervised, unsupervised, semi-supervised, and reinforcement learning (RL) algorithms. Various studies have applied ML techniques in intelligent building environments, such as using Bayes naive classifiers to identify human activity and location indoors.[24] Neural networks have been employed to improve indoor environmental quality and control building energy management systems.[25] Simultaneous localization and mapping techniques, along with machine learning models, have been utilized for occupancy grid mapping and VOC distribution forecasting.[26] Support vector machines and recurrent neural networks have been used to predict electricity loads and occupancy patterns in public buildings.[27]

Other approaches include global and local trend estimators, fuzzy neural networks, long short-term memory networks, and deep neural networks, all contributing to improved indoor environmental quality assessment and forecasting.[28] Additionally, studies have investigated the architecture and performance of deep neural networks for predicting indoor airflow distribution.[29]

These ML techniques enable enhanced analysis and prediction of building conditions, leveraging the vast amount of data collected through IoT technologies.

CONCLUSION

The present systematic review examined the integration of IoT, indoor environmental quality (IEQ), and low-cost sensing systems. The findings indicate that, while incorporating IoT technology into buildings and indoor environments is reported to enhance indoor monitoring, there are multiple obstacles to the widespread adoption of integration of these technologies into the built environment. A key obstacle is the lack of awareness and understanding of these technologies and their methodologies by built environment experts which doesn't allow architects and engineers to fully incorporate them in the early architectural design phases in order to prevent or address indoor space issues and complaints in the post-occupancy phase. Additionally, we found that research on IoT in buildings often focuses on energy consumption and HVAC management, leaving indoor environmental quality an underexplored area of research. We also observed in the reviewed articles that the user feedback and interface design primarily focus on thermal comfort, monitoring air temperature and humidity to integrate HVAC control with energy-saving schemes. However, other parameters and continuous user feedback are often overlooked, despite their importance in enhancing the built environment.

While recent studies highlight the scalability of IoT in indoor environmental quality monitoring, further research is needed to understand its application across different building types and at large scales. Storage and data management concerns center around the storage capacity required for the substantial data collected by sensors. While cloud services offer a solution, they require upgrading to support various data structures and types. Edge computing technology could also be leveraged to reduce data processing and save energy. Cybersecurity concerns arise from the vulnerability of IoT applications transmitting data through wireless networks, necessitating safeguards against cyber-attacks. The literature review also shows that low-cost sensors have limitations such as a limited lifespan, occasional calibration requirements, and reliance on temporary batteries. Advanced sensors may offer improved performance but at higher costs and energy consumption.

With the trends in IoT, IoRT, and sensing technology development, it is important that architects and building professionals enhance awareness and understanding of these technologies for their effective integration into building services and IEQ. There is also a need for guidelines and frameworks to facilitate this integration. Additional research is also needed to investigate the functionality, efficiency, adaptability, user connectivity, and energy demand of these systems. Furthermore, a solid understanding of algorithmic solutions and data processing models is essential for efficient data analysis.

NOTES

[1] Apte and Salvi, “Household Air Pollution and Its Effects on Health”; Austin and Mejia, “Household Air Pollution as a Silent Killer”; Corlan et al., “The Importance of Indoor Air Quality (IAC) Monitoring”; Ahmed et al., “Investigating Health Impacts of Household Air Pollution on Woman’s Pregnancy and Sterilization”; Kumar et al., “Critical Review on Emerging Health Effects Associated with the Indoor Air Quality and Its Sustainable Management.”
[2] Piasecki, Kostyrko, and Pykacz, “Indoor Environmental Quality Assessment.”
[3] Guoyi Hou, “An Investigation of Thermal Comfort and the Use of Indoortransitional Space.”
[4] Kim, Schiavon, and Brager, “Personal Comfort Models – A New Paradigm in Thermal Comfort for Occupant-Centric Environmental Control.”
[5] Yoon DW, Sohn JY, and Cho KH., “The Comparison on the Thermal Comfort Sensation between the Results of Questionnaire Survey and the Calculation of the PMV Values.”; Frontczak and Wargocki, “Literature Survey on How Different Factors Influence Human Comfort in Indoor Environments”; Enescu, “A Review of Thermal Comfort Models and Indicators for Indoor Environments.”
[6] Zhang, Wu, and Calautit, “A Review on Occupancy Prediction through Machine Learning for Enhancing Energy Efficiency, Air Quality and Thermal Comfort in the Built Environment.”
[7] Al-Obaidi et al., “A Review of Using IoT for Energy Efficient Buildings and Cities”; Broday and Gameiro da Silva, “The Role of Internet of Things (IoT) in the Assessment and Communication of Indoor Environmental Quality (IEQ) in Buildings”; Imran, Iqbal, and Kim, “IoT Task Management Mechanism Based on Predictive Optimization for Efficient Energy Consumption in Smart Residential Buildings”; Rafsanjani and Ghahramani, “Towards Utilizing Internet of Things (IoT) Devices for Understanding Individual Occupants’ Energy Usage of Personal and Shared Appliances in Office Buildings”; Wang et al., “Thermal Environment and Thermal Comfort in Metro Systems”; Zhang, Wu, and Calautit, “A Review on Occupancy Prediction through Machine Learning for Enhancing Energy Efficiency, Air Quality and Thermal Comfort in the Built Environment.”
[8] Al-Obaidi et al., “A Review of Using IoT for Energy Efficient Buildings and Cities.”
[9] Afolaranmi, Ramis Ferrer, and Martinez Lastra, “Technology Review”; Marques, Roque Ferreira, and Pitarma, “A System Based on the Internet of Things for Real-Time Particle Monitoring in Buildings”; Ray, “Internet of Things Cloud Enabled MISSENARD Index Measurement for Indoor Occupants.”
[10] Krco, Pokric, and Carrez, “Designing IoT Architecture(s)”; Al-Fuqaha et al., “Internet of Things”; Madakam, Ramaswamy, and Tripathi, “Internet of Things (IoT)”; Gupta and Quamara, “An Overview of Internet of Things (IoT)”; Kamilaris and Botteghi, “The Penetration of Internet of Things in Robotics.”
[11] Krco, Pokric, and Carrez, “Designing IoT Architecture(s)”; Gupta and Quamara, “An Overview of Internet of Things (IoT)”; Kamilaris and Botteghi, “The Penetration of Internet of Things in Robotics.”
[12] Sung and Hsiao, “Building an Indoor Air Quality Monitoring System Based on the Architecture of the Internet of Things”; Yasin et al., “The Design and Implementation of an IoT Sensor-Based Indoor Air Quality Monitoring System Using Off-the-Shelf Devices.”
[13] Miao Wu et al., “Research on the Architecture of Internet of Things”; Zhihong Yang et al., “Study and Application on the Architecture and Key Technologies for IOT”; Mohamed Elbashir and Awad Ali, “Internet of Things: Current Trends, Architectures and Challenges.”
[14] Mohamed Elbashir and Awad Ali, “Internet of Things: Current Trends, Architectures and Challenges.”
[15] Al-Fuqaha et al., “Internet of Things”; Madakam, Ramaswamy, and Tripathi, “Internet of Things (IoT).”
[16] Alduais, Abdullah, and Jamil, “RDCM”; Al-Obaidi et al., “A Review of Using IoT for Energy Efficient Buildings and Cities.”
[17] CEN Ambient Air, “Standard Method for the Measurement of the Concentration of Carbon Monoxide by Non-Dispersive Infrared Spectroscopy.”; Karagulian et al., “Review of the Performance of Low-Cost Sensors for Air Quality Monitoring.”
[18] Karagulian et al., “Review of the Performance of Low-Cost Sensors for Air Quality Monitoring.”
[19] CEN Ambient Air, “Standard Method for the Measurement of the Concentration of Carbon Monoxide by Non-Dispersive Infrared Spectroscopy.”; Karagulian et al., “Review of the Performance of Low-Cost Sensors for Air Quality Monitoring.”
[20] Venkatraman Jagatha et al., “Calibration Method for Particulate Matter Low-Cost Sensors Used in Ambient Air Quality Monitoring and Research.”
[21] Venkatraman Jagatha et al.
[22] Liu and Wang, “Development and Use of an MCU Experimental Development Board.”

[23] Fleury, Vacher, and Noury, “Introducing Knowledge in the Process of Supervised Classification of Activities of Daily Living in Health Smart Homes.”; Floris et al., “An IoT-Based Smart Building Solution for Indoor Environment Management and Occupants Prediction.”
[24] Floris et al., “An IoT-Based Smart Building Solution for Indoor Environment Management and Occupants Prediction.”
[25] Jin et al., “Household Ventilation May Reduce Effects of Indoor Air Pollutants for Prevention of Lung Cancer.”
[26] Qian et al., “Gaussian Process Based IAQ Distribution Mapping Using an Interactive Service Robot.”
[27] Al-Fuqaha et al., “Internet of Things”; Zhao et al., “Thermal-Sensor-Based Occupancy Detection for Smart Buildings Using Machine-Learning Methods.”
[28] Jin et al., “Occupancy Detection via Environmental Sensing”; Hitimana et al., “Implementation of IoT Framework with Data Analysis Using Deep Learning Methods for Occupancy Prediction in a Building”; Lei et al., “A Comprehensive Evaluation Method for Indoor Air Quality of Buildings Based on Rough Sets and a Wavelet Neural Network”; Zhou, Montazeri, and Albertson, “Mobile Sensing of Point-Source Gas Emissions Using Bayesian Inference.”
[29] Zhou and Ooka, “Comparison of Different Deep Neural Network Architectures for Isothermal Indoor Airflow Prediction”; Marzouk and Atef, “Assessment of Indoor Air Quality in Academic Buildings Using IoT and Deep Learning.”

BIBLIOGRAPHY

Afolaranmi, Samuel Olaiya, Borja Ramis Ferrer, and Jose Luis Martinez Lastra. “Technology Review: Prototyping Platforms for Monitoring Ambient Conditions.” *International Journal of Environmental Health Research* 28, no. 3 (May 4, 2018): 253–79. https://doi.org/10.1080/09603123.2018.1468423.

Ahmed, Mansoor, Chuanmin Shuai, Khizar Abbas, Faheem Ur Rehman, and Wali Muhammad Khoso. “Investigating Health Impacts of Household Air Pollution on Woman’s Pregnancy and Sterilization: Empirical Evidence from Pakistan, India, and Bangladesh.” *Energy* 247 (May 2022): 123562. https://doi.org/10.1016/j.energy.2022.123562.

Alduais, Nayef Abdulwahab Mohammed, Jiwa Abdullah, and Ansar Jamil. “RDCM: An Efficient Real-Time Data Collection Model for IoT/WSN Edge With Multivariate Sensors.” *IEEE Access* 7 (2019): 89063–82. https://doi.org/10.1109/ACCESS.2019.2926209.

Al-Fuqaha, Ala, Mohsen Guizani, Mehdi Mohammadi, Mohammed Aledhari, and Moussa Ayyash. “Internet of Things: A Survey on Enabling Technologies, Protocols, and Applications.” *IEEE Communications Surveys & Tutorials* 17, no. 4 (2015): 2347–76. https://doi.org/10.1109/COMST.2015.2444095.

Al-Obaidi, Karam M., Mohataz Hossain, Nayef A. M. Alduais, Husam S. Al-Duais, Hossein Omrany, and Amirhosein Ghaffarianhoseini. “A Review of Using IoT for Energy Efficient Buildings and Cities: A Built Environment Perspective.” *Energies* 15, no. 16 (August 18, 2022): 5991. https://doi.org/10.3390/en15165991.

Apte, Komalkirti, and Sundeep Salvi. “Household Air Pollution and Its Effects on Health.” *F1000Research* 5 (October 28, 2016): 2593. https://doi.org/10.12688/f1000research.7552.1.

Austin, Kelly F., and Maria Theresa Mejia. “Household Air Pollution as a Silent Killer: Women’s Status and Solid Fuel Use in Developing Nations.” *Population and Environment* 39, no. 1 (September 2017): 1–25. https://doi.org/10.1007/s11111-017-0269-z.

Broday, Evandro Eduardo, and Manuel Carlos Gameiro da Silva. “The Role of Internet of Things (IoT) in the Assessment and Communication of Indoor Environmental Quality (IEQ) in Buildings: A Review.” *Smart and Sustainable Built Environment*, March 1, 2022. https://doi.org/10.1108/SASBE-10-2021-0185.

CEN Ambient Air. “Standard Method for the Measurement of the Concentration of Carbon Monoxide by Non-Dispersive Infrared Spectroscopy.” Brussels, Belgium: European Committee for Standardization, 2012. https://standards.iteh.ai/catalog/standards/cen/46e97f97-9007-4b4c-8040-3ce5b0187ed5/en-14211-2012.

Corlan, R V, R M Balogh, I Ionel, and St Kilyeny. “The Importance of Indoor Air Quality (IAC) Monitoring.” *Journal of Physics: Conference Series* 1781, no. 1 (February 1, 2021): 012062. https://doi.org/10.1088/1742-6596/1781/1/012062.

Enescu, Diana. “A Review of Thermal Comfort Models and Indicators for Indoor Environments.” *Renewable and Sustainable Energy Reviews* 79 (November 2017): 1353–79. https://doi.org/10.1016/j.rser.2017.05.175.

Fleury, Anthony, Michel Vacher, and Norbery Noury. “Introducing Knowledge in the Process of Supervised Classification of Activities of Daily Living in Health Smart Homes.,” 322-329. New York, USA, 2010. https://hal.science/hal-00503242/file/Classification_HealthCom2010.pdf.

Floris, Alessandro, Simone Porcu, Roberto Girau, and Luigi Atzori. “An IoT-Based Smart Building Solution for Indoor Environment Management and Occupants Prediction.” *Energies* 14, no. 10 (May 20, 2021): 2959. https://doi.org/10.3390/en14102959.

Frontczak, Monika, and Pawel Wargocki. “Literature Survey on How Different Factors Influence Human Comfort in Indoor Environments.” *Building and Environment* 46, no. 4 (April 2011): 922–37. https://doi.org/10.1016/j.buildenv.2010.10.021.

Guoyi Hou. “An Investigation of Thermal Comfort and the Use of Indoortransitional Space.” PhD Thesis, Cardiff University., 2016.

Gupta, Brij B., and Megha Quamara. “An Overview of Internet of Things (IoT): Architectural Aspects, Challenges, and Protocols.” *Concurrency and Computation: Practice and Experience* 32, no. 21 (November 10, 2020). https://doi.org/10.1002/cpe.4946.

Hitimana, Eric, Gaurav Bajpai, Richard Musabe, Louis Sibomana, and Jayavel Kayalvizhi. “Implementation of IoT Framework with Data Analysis Using Deep Learning Methods for Occupancy Prediction in a Building.” *Future Internet* 13, no. 3 (March 9, 2021): 67. https://doi.org/10.3390/fi13030067.

Imran, Naeem Iqbal, and Do Hyeun Kim. “IoT Task Management Mechanism Based on Predictive Optimization for Efficient Energy Consumption in Smart Residential Buildings.” *Energy and Buildings* 257 (February 2022): 111762. https://doi.org/10.1016/j.enbuild.2021.111762.

Jin, Ming, Nikolaos Bekiaris-Liberis, Kevin Weekly, Costas J. Spanos, and Alexandre M. Bayen. “Occupancy Detection via Environmental Sensing.” *IEEE Transactions on Automation Science and Engineering* 15, no. 2 (April 2018): 443–55. https://doi.org/10.1109/TASE.2016.2619720.

Jin, Zi-Yi, Ming Wu, Ren-Qiang Han, Xiao-Feng Zhang, Xu-Shan Wang, Ai-Ming Liu, Jin-Yi Zhou, et al. “Household Ventilation May Reduce Effects of Indoor Air Pollutants for Prevention of Lung Cancer: A Case-Control Study in a Chinese Population.” Edited by Xiaoping Miao. *PLoS ONE* 9, no. 7 (July 14, 2014): e102685. https://doi.org/10.1371/journal.pone.0102685.

Kamilaris, Andreas, and Nicolò Botteghi. “The Penetration of Internet of Things in Robotics: Towards a Web of Robotic Things.” *Journal of Ambient Intelligence and Smart Environments* 12, no. 6 (November 26, 2020): 491–512. https://doi.org/10.3233/AIS-200582.

Karagulian, Federico, Maurizio Barbiere, Alexander Kotsev, Laurent Spinelle, Michel Gerboles, Friedrich Lagler, Nathalie Redon, Sabine Crunaire, and Annette Borowiak. “Review of the Performance of Low-Cost Sensors for Air Quality Monitoring.” *Atmosphere* 10, no. 9 (August 29, 2019): 506. https://doi.org/10.3390/atmos10090506.

Kim, Joyce, Stefano Schiavon, and Gail Brager. “Personal Comfort Models – A New Paradigm in Thermal Comfort for Occupant-Centric Environmental Control.” *Building and Environment* 132 (March 2018): 114–24. https://doi.org/10.1016/j.buildenv.2018.01.023.

Krco, Srdjan, Boris Pokric, and Francois Carrez. “Designing IoT Architecture(s): A European Perspective.” In *2014 IEEE World Forum on Internet of Things (WF-IoT)*, 79–84. Seoul, Korea (South): IEEE, 2014. https://doi.org/10.1109/WF-IoT.2014.6803124.

Kumar, Pradeep, A.B. Singh, Taruna Arora, Sevaram Singh, and Rajeev Singh. “Critical Review on Emerging Health Effects Associated with the Indoor Air Quality and Its Sustainable Management.” *Science of The Total Environment* 872 (May 2023): 162163. https://doi.org/10.1016/j.scitotenv.2023.162163.

Lei, Lei, Wei Chen, Yu Xue, and Wei Liu. “A Comprehensive Evaluation Method for Indoor Air Quality of Buildings Based on Rough Sets and a Wavelet Neural Network.” *Building and Environment* 162 (September 2019): 106296. https://doi.org/10.1016/j.buildenv.2019.106296.

Liu, Jingrui, and Yannan Wang. “Development and Use of an MCU Experimental Development Board.” In *2012 2nd International Conference on Consumer Electronics, Communications and Networks (CECNet)*, 2541–43. Yichang, China: IEEE, 2012. https://doi.org/10.1109/CECNet.2012.6202251.

Madakam, Somayya, R. Ramaswamy, and Siddharth Tripathi. “Internet of Things (IoT): A Literature Review.” *Journal of Computer and Communications* 03, no. 05 (2015): 164–73. https://doi.org/10.4236/jcc.2015.35021.

Marques, Gonçalo, Cristina Roque Ferreira, and Rui Pitarma. “A System Based on the Internet of Things for Real-Time Particle Monitoring in Buildings.” *International Journal of Environmental Research and Public Health* 15, no. 4 (April 21, 2018): 821. https://doi.org/10.3390/ijerph15040821.

Marzouk, Mohamed, and Mohamed Atef. “Assessment of Indoor Air Quality in Academic Buildings Using IoT and Deep Learning.” *Sustainability* 14, no. 12 (June 8, 2022): 7015. https://doi.org/10.3390/su14127015.

Miao Wu, Ting-Jie Lu, Fei-Yang Ling, Jing Sun, and Hui-Ying Du. “Research on the Architecture of Internet of Things.” In *2010 3rd International Conference on Advanced Computer Theory and Engineering(ICACTE)*, V5-484-V5-487. Chengdu, China: IEEE, 2010. https://doi.org/10.1109/ICACTE.2010.5579493.

Mohamed Elbashir and Awad Ali. “Internet of Things: Current Trends, Architectures and Challenges.” *International Journal of Scientific & Engineering Research* 10, no. 6 (June 2019). https://www.citefactor.org/journal/pdf/Internet-of-Things-Current-Trends-Architectures-and-Challenges.pdf.

Piasecki, Michał, Krystyna Kostyrko, and Sławomir Pykacz. “Indoor Environmental Quality Assessment: Part 1: Choice of the Indoor Environmental Quality Sub-Component Models.” *Journal of Building Physics* 41, no. 3 (November 2017): 264–89. https://doi.org/10.1177/1744259117702882.

Qian, Kun, Xudong Ma, Xianzhong Dai, Fang Fang, and Bo Zhou. “Gaussian Process Based IAQ Distribution Mapping Using an Interactive Service Robot.” *Journal of Ambient Intelligence and Smart Environments* 8, no. 3 (April 27, 2016): 359–73. https://doi.org/10.3233/AIS-160376.

Rafsanjani, Hamed Nabizadeh, and Ali Ghahramani. “Towards Utilizing Internet of Things (IoT) Devices for Understanding Individual Occupants’ Energy Usage of Personal and Shared Appliances in Office Buildings.” *Journal of Building Engineering* 27 (January 2020): 100948. https://doi.org/10.1016/j.jobe.2019.100948.

Ray, Partha Pratim. “Internet of Things Cloud Enabled MISSENARD Index Measurement for Indoor Occupants.” *Measurement* 92 (October 2016): 157–65. https://doi.org/10.1016/j.measurement.2016.06.014.

Sung, Wen-Tsai, and Sung-Jung Hsiao. “Building an Indoor Air Quality Monitoring System Based on the Architecture of the Internet of Things.” *EURASIP Journal on Wireless Communications and Networking* 2021, no. 1 (December 2021): 153. https://doi.org/10.1186/s13638-021-02030-1.

Venkatraman Jagatha, Janani, André Klausnitzer, Miriam Chacón-Mateos, Bernd Laquai, Evert Nieuwkoop, Peter van der Mark, Ulrich Vogt, and Christoph Schneider. “Calibration Method for Particulate Matter Low-Cost Sensors Used in Ambient Air Quality Monitoring and Research.” *Sensors* 21, no. 12 (June 8, 2021): 3960. https://doi.org/10.3390/s21123960.

Wang, Chunqing, Chao Li, Lang Xie, Xinru Wang, Li Chang, Xiangming Wang, Hong Xian Li, and Yiqiao Liu. “Thermal Environment and Thermal Comfort in Metro Systems: A Case Study in Severe Cold Region of China.” *Building and Environment*, October 2022, 109758. https://doi.org/10.1016/j.buildenv.2022.109758.

Yasin, Alim, James Delaney, Chi-Tsun Cheng, and Toh Yen Pang. “The Design and Implementation of an IoT Sensor-Based Indoor Air Quality Monitoring System Using Off-the-Shelf Devices.” *Applied Sciences* 12, no. 19 (September 21, 2022): 9450. https://doi.org/10.3390/app12199450.

Yoon DW, Sohn JY, and Cho KH. “The Comparison on the Thermal Comfort Sensation between the Results of Questionnaire Survey and the Calculation of the PMV Values.” *Proceedings of Indoor Air* 99, no. 2 (1999): 137–41.

Zhang, Wuxia, Yupeng Wu, and John Kaiser Calautit. “A Review on Occupancy Prediction through Machine Learning for Enhancing Energy Efficiency, Air Quality and Thermal Comfort in the Built Environment.” *Renewable and Sustainable Energy Reviews* 167 (October 2022): 112704. https://doi.org/10.1016/j.rser.2022.112704.

Zhao, Hengyang, Qi Hua, Hai-Bao Chen, Yaoyao Ye, Hai Wang, Sheldon X.-D. Tan, and Esteban Tlelo-Cuautle. “Thermal-Sensor-Based Occupancy Detection for Smart Buildings Using Machine-Learning Methods.” *ACM Transactions on Design Automation of Electronic Systems* 23, no. 4 (July 31, 2018): 1–21. https://doi.org/10.1145/3200904.

Zhihong Yang, Yingzhao Yue, Yu Yang, Yufeng Peng, Xiaobo Wang, and Wenji Liu. “Study and Application on the Architecture and Key Technologies for IOT.” In *2011 International Conference on Multimedia Technology*, 747–51. Hangzhou, China: IEEE, 2011. https://doi.org/10.1109/ICMT.2011.6002149.

Zhou, Qi, and Ryozo Ooka. “Comparison of Different Deep Neural Network Architectures for Isothermal Indoor Airflow Prediction.” *Building Simulation* 13, no. 6 (December 2020): 1409–23. https://doi.org/10.1007/s12273-020-0664-8.

Zhou, Xiaochi, Amir Montazeri, and John D. Albertson. “Mobile Sensing of Point-Source Gas Emissions Using Bayesian Inference: An Empirical Examination of the Likelihood Function.” *Atmospheric Environment* 218 (December 2019): 116981. https://doi.org/10.1016/j.atmosenv.2019.116981.

GENTRIFICATION OF HERITAGE. RECONQUERING HISTORICAL CENTERS IN LATIN-AMERICAN CITIES

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INTRODUCTION

A raft of challenges face new housing design, at the forefront of which is a triumvirate of interrelated needs – to make dwellings more spacious, more affordable and less damaging to the environment. Each of these is important in their own right, but are they reconcilable? Conventional thinking suggests larger dwellings cost more, as does increasing their environmental sustainability, so consequently they become less affordable.

This paper explores these apparently conflicting priorities. It draws on a broad church of research, and argues that by thinking creatively it is possible to make advances in each separate area to mutual advantage. In so doing, housing can be created which is more spacious, sustainable and affordable.

Heritage has become a constant in the discourses for maintaining a collective history when we talk about cities. Even more so if we focus on characterizing typologies that aim, mainly, at the human scale. It is then that a dichotomy is generated. Preserve or demolish. When you demolish, you give way to new typologies and, therefore, new inhabitants and uses. However, when preserving, it is not guaranteed that these dynamics will be maintained over time. What's more, over the years, they give way to gentrified neighborhoods that end up expelling their residents and transform into urban centers for tourism touristification.[1]

This research proposes to review the Latin American historic centers, raising those cases in which it is clearly evident how gentrification has taken over the urban/built heritage and has given rise to new ways of commercializing the historical notion. In Latin America, it is normal to see gentrification processes associated with deteriorating heritage neighborhoods. Many of them suffer the classic previous steps, stagnation, delinquency, real estate speculation to later generate cultural centers and attractions for people with greater purchasing power.[2] Specific heritage characteristics are observed in these neighborhoods. Mainly that they account for a neighborhood life that is not appreciated today. A different city scale. That is another factor that makes them attractive assets for real estate. In addition, they are usually central neighborhoods located near main roads within the city. Some are observed in good condition, however, others are more deteriorated.

Gentrification in Latin American cities has originated mainly as a process of elitization of some sectors. In this case, the urban components, such as the heritage background, green areas or cultural characteristics, have been influential factors in how the displacement process develops and articulates in some neighborhoods. "One by one, many of the working-class neighborhoods have been invaded by the (upper and lower) middle class...Once this process of "gentrification" begins in a

neighborhood, it progresses rapidly until all or most of the occupants of the working class are displaced, modifying the social character of the district".[3] Glass focused preliminarily on the residential housing market and the rehabilitation of existing houses. However, from this , the definition has been extended to include vacant sites, old industrial use, along with new housing neighborhoods and densification in. Smith[4] points out that gentrification has spread to become a new politics neoliberal urban.

Hamnett according to his own compilation establishes 3 explanations for the gentrification process:

1. The change of location of the manufacturing industry towards the city, caused an organizational restructuring of the workforce, from producers to professionals interested in living in the main cities.
2. The change in the composition of the middle class, modified its cultural orientation, preferences and labor patterns, encouraging to locate in the interior of the city, instead of moving to suburban areas
3. The growing difference between the potential value within the cities and the underlying land value, causes an "income gap". Finally, Smith[5] argues that gentrification mainly points to a movement of capital shares over people including that the latter is a consequence of the former.

Hamnett argues that the process has a complex character, understanding that it goes through several dimensions taking its origin in socioeconomic variables, before this he points out that "Gentrification implies both a change in the social composition of the area and its inhabitants, as well as a change in the nature of the supply of the housing stock"[6]

Figure 8. Two Buildings in Yungay

In this regard, the valorization of heritage in cultural or historical terms revitalizes neighborhoods as a model of urban renewal[7] ,which ends up generating a process of urban mobility that originates both from changes in use inside of these as well as by the attraction of new capital that promotes and encourages different actors that contribute to the maintenance of the neighborhood. Rojas[8] promotes an idea of sustainable heritage development which, with the arrival of new capital that not only enhances but also activates these neighborhoods, which undoubtedly generates a change not only in

the way of understanding the current dynamics of the place but also through the displacement of the residents[9] who in many cases were the managers of the citizen movement in these places.
Urban displacements have been a common trend in the urban and political conformation of cities. The main migratory movements were linked to the process of the Industrial Revolution that caused an exodus from the countryside to the city. Another cause can be attributed to the processes derived from the post-war period. However, the contemporary effects that define the current city are defined by internal processes, that is, city-city.
One of the most preponderant factors that have become visible in historic neighborhoods or neighborhoods considered heritage, has been the constant presence of colonization of artists in these sectors who "have expressed their concern about the increase in tall buildings, that invade and replace the tangible and intangible heritage of the place".[10] This displacement that originates from the movements of artists in historic and central neighborhoods of the city, is directly consistent with the process of Gentrification described by Ruth Glass who observed that the movements generated occurred mainly by a return to a place already known instead of a colonization of central neighborhoods.[11]
Finally, when transferring the gentrification process to the local context, it is established that: "gentrification increases the scale of segregation, by dispossessing most of the land rent from those who traditionally own it, expelling from the pericenter those who do not have the ability to pay extra to remain, that is, the two lowest quintiles of the population, with a high probability of being relocated to the distant regional space, as a result of increases in the price of peripheral metropolitan land and housing produced there"

Figure 9. New Building in Yungay.

In this regard, gentrification has constituted a new paradigm in the contemporary urban landscape. It has defined a new way of understanding and comprehending not only the Chilean reality but also a Latin American context. From then on, citizen movements arise that face these situations, urban and social changes; however, they are elitizing and generating suitable aspects for possible gentrifying

movements from internal developments in certain places. Gentrification as such configures an external landscape to the naked eye, but the underlying factor, which is socio-cultural and economic changes, are aspects that can be appreciated from within neighborhood life. From the inhabitant, the user, the settler.[12]

METHODOLOGY

As a methodology, three historic centers were built considering the construction characteristics, age and deterioration of each one of them. The cases to choose from are Barrio Yungay, Chile, Buenos Aires, Argentina and Mexico City, Mexico. Although they are cases that could be different by scale, they all include similar buildings and that are undergoing processes of accelerated change. Based on this, it is proposed to build an index of gentrification in historic centers based on these data. For the construction of the index, three variables were taken. State of assets, increase in the price of land and migrant population. Three visual appreciation scales are established in which factors from 1 to 3 are given depending on the condition of low, medium and high.

CONTENT DEVELOPMENT

The Yungay neighborhood is a Chilean neighborhood located in the northwestern sector of the commune and city of Santiago. It is a traditional residential neighborhood, which shows its own characteristics in the face of the advance of modernity that other neighborhoods in the city manifest.
Its boundary streets are San Pablo to the north, Ricardo Cumming to the east, Alameda to the south, and Matucana to the west. A sector was declared a National Monument by the Council of National Monuments of Chile in the Typical Zone category, by Supreme Decree No. 43 of February 19, 2009. The total protected area has an area of 117.34 hectares (289 acres). In the three sectors analyzed, historic neighborhoods, similarities are observed in terms of processes. Decay, deterioration of heritage, rise in housing prices, arrival of migrant population but above all, sectors very well located within the urban radius.
The processes as described by Janoschka,[13] especially in Latin America, occur in a similar way. This occurs mainly because in all cases, three classic variables are observed, attributable to a gentrification process in this sector.[14] These are real estate development, patrimonial obsolescence and price variation.[15] In the three sectors analyzed, historic neighborhoods, similarities are observed in terms of processes. Decay, deterioration of heritage, rise in housing prices, arrival of migrant population but above all, sectors very well located within the urban radius.

RESULTS

From the analyzes carried out according to the methodology, an index is generated that shows that the Barrio Yungay sector has a higher level of gentrification as it has greater deterioration in the three areas. Followed by Mexico City and lastly Buenos Aires.

CITY	F1	F2	F3	INDEX
YUNGAY	3	3	3	3,0
CIUDAD DE MÉXICO	3	2	3	2,7
BUENOS AIRES	3	2	1	2,0

Figure 10. Gentrification Index

In the case of Buenos Aires, it is normal to see in recent times how the destruction of heritage is giving way to a form of gentrification through new high-rise buildings. The new real estate projects of

more than 10 floors in residential neighborhoods are a clear example of how they are mutating and changing scale, generating a displacement of the original residents.
On the other hand, the Yungay neighborhood in Santiago de Chile shows a total deterioration in the three variables analyzed in the methodology. In addition, a clear way is already presented in how the neighborhood is to be built or rebuilt based on new uses, new constructions and housing typologies. Low-rise buildings but with a high price that changes and alters the user and consumer of the neighborhood.[16]

Figure 11. Buenos Aires, Argentina.

In Mexico City, such a marked gentrification process is not clear, unlike what can be seen in the other two. This happens mainly because this change also has an extra variable that is criminalization and associated crime in some specific points of different neighborhoods. This generates that, above migrant processes, there are sectors stigmatized by crime which, later, are gentrified in another way that does not respond to a classic process.

CONCLUSIONS

Equalizing the processes of gentrification in Latin America is complex. Especially when you have different levels of development that occurs due to issues of economy, land use, investment policies and strategies on how to approach and grow in the city. Although they are paradigmatic cases and complex cities, they have similarities in terms of heritage protection. However, this protection is generating problems about how the cultural enrichment of these neighborhoods is being carried out since touristification processes associated with gentrification are unleashed with uncontrolled protection and without planning of both tangible and intangible heritage.
In many cases, government aid over private initiative prioritizes and generates even more effects associated with gentrification since the effects associated by private actors with state causes cannot be

differentiated. In the Latin American case, gentrification in heritage areas is often associated with the lack of the state as the main actor. By leaving the constructive variable to the private sector, differences are generated between what society and mainly the communities seek versus what the private sector builds from their initiatives.

Figure 12. Yungay, Chile.

NOTES

[1] Ernesto José López-Morales, Ivo Ricardo Gasic Klett, and Daniel Alberto Meza Corvalán, "Urbanismo pro-empresarial en Chile: políticas y planificación de la producción residencial en altura en el pericentro del Gran Santiago," *Revista invi* 27, no. 76 (2012).
[2] Elke Schlack and Neil Turnbull, "Capitalizando lugares auténticos: Artistas y emprendimientos en la regeneración urbana," *ARQ (Santiago)*, no. 79 (2011).
[3] Ruth Glass, "Aspects of change," *London: Aspects of change* (1964).
[4] Neil Smith, "Gentrification and the rent gap," (1987).
[5] Neil Smith, "Nuevo globalismo y nuevo urbanismo: La gentrificación como estrategia urbana global" (paper presented at the El mercado contra la ciudad: sobre globalización, gentrificación y políticas urbanas, 2015).
[6] Neil Smith, "Toward a theory of gentrification a back to the city movement by capital, not people," *Journal of the American planning association* 45, no. 4 (1979).
[7] Elke Schlack and Neil Turnbull, "La colonización de barrios céntricos por artistas," *Revista 180*, no. 24 (2009).
[8] Andrea Ortega Esquivel, María de los Ángeles Carvajal, and Luis Rojas Morales, "COLECTIVO RESCATA-Barrio Obrero y Ferroviario: Iniciativa de gestión del patrimonio industrial en la ciudad de Santiago de Chile (2007-2013)," *Llámpara: patrimonio industrial*, no. 6 (2014).
[9] Matías Leal-Yáñez and Jorge Inzulza-Contardo, "Movimientos patrimoniales y sus efectos en la estructura urbana: La Zona Típica en la Población León XIII, comuna de Providencia, Santiago de Chile," *AUS [Arquitectura/Urbanismo/Sustentabilidad]*, no. 23 (2018).
[10] Joseph L Scarpaci, *Plazas and Barrios: Heritage Tourism and Globalization in the Latin American Centro Hist—rico* (University of Arizona Press, 2005).
[11] Glass, "Aspects of change."
[12] Matias Leal Yáñez, "Gentrificación en el contexto de movimientos patrimoniales: el caso de la población León XIII de Providencia, Chile" (2016).
[13] Michael Janoschka and Jorge Sequera, "Procesos de gentrificación y desplazamiento en América Latina, una perspectiva comparativista," *Desafíos metropolitanos. Un diálogo entre Europa y América Latina* (2014).
[14] Jorge Inzulza and Ximena Galleguillos, "Latino gentrificación y polarización: transformaciones socioespaciales en barrios pericentrales y periféricos de Santiago, Chile," *Revista de Geografía Norte Grande*, no. 58 (2014).
[15] Leal Yáñez, "Gentrificación en el contexto de movimientos patrimoniales: el caso de la población León XIII de Providencia, Chile."
[16] López-Morales, Gasic Klett, and Meza Corvalán, "Urbanismo pro-empresarial en Chile: políticas y planificación de la producción residencial en altura en el pericentro del Gran Santiago."

BIBLIOGRAPHY

Casgrain, Antoine, and Michael Janoschka. "Gentrificación Y Resistencia En Las Ciudades Latinoamericanas: El Ejemplo De Santiago De Chile." *Andamios* 10, no. 22 (2013): 19-44.

Delgadillo Polanco, Víctor Manuel. "El Derecho a La Ciudad En La Ciudad De México.¿ Una Retórica Progresista Para Una Gestión Urbana Neoliberal?". *Andamios* 9, no. 18 (2012): 117-39.

Delgadillo, Víctor. "Ciudad De México, Quince Años De Desarrollo Urbano Intensivo: La Gentrificación Percibida." *Revista INVI* 31 (2016): 101-29. http://www.scielo.cl/scielo.php?script=sci_arttext&pid=S0718-83582016000300004&nrm=iso.

Esquivel, Andrea Ortega, María de los Ángeles Carvajal, and Luis Rojas Morales. "Colectivo Rescata-Barrio Obrero Y Ferroviario: Iniciativa De Gestión Del Patrimonio Industrial En La Ciudad De Santiago De Chile (2007-2013)." *Llámpara: patrimonio industrial*, no. 6 (2014): 36-47.

Glass, Ruth. "Aspects of Change." *London: Aspects of change* (1964): xiii-xlii.

Harvey, David, and Neil Smith. *Capital Financiero, Propiedad Inmobiliaria Y Cultura.* Vol. 1: Univ. Autònoma de Barcelona, 2005.

Hidalgo, Rodrigo, and Michael Janoschka. *La Ciudad Neoliberal: Gentrificación Y Exclusión En Santiago De Chile, Buenos Aires, Ciudad De México Y Madrid.* Rodrigo Hidalgo y Michael Janoschka, 2014.

Inzulza, Jorge, and Ximena Galleguillos. "Latino Gentrificación Y Polarización: Transformaciones Socioespaciales En Barrios Pericentrales Y Periféricos De Santiago, Chile." *Revista de Geografía Norte Grande*, no. 58 (2014): 135-59.

Janoschka, Michael. "El Nuevo Modelo De La Ciudad Latinoamericana: Fragmentación Y Privatización." *Eure (Santiago)* 28, no. 85 (2002): 11-20.

———. "Gentrificación, Desplazamiento, Desposesión: Procesos Urbanos Claves En América Latina." *Revista invi* 31, no. 88 (2016): 27-71.

Janoschka, Michael, and Jorge Sequera. "Procesos De Gentrificación Y Desplazamiento En América Latina, Una Perspectiva Comparativista." *Desafíos metropolitanos. Un diálogo entre Europa y América Latina* (2014): 82-104.

Leal-Yáñez, Matías, and Jorge Inzulza-Contardo. "Movimientos Patrimoniales Y Sus Efectos En La Estructura Urbana: La Zona TíPica En La PoblacióN LeóN Xiii, Comuna De Providencia, Santiago De Chile." *AUS [Arquitectura/Urbanismo/Sustentabilidad]*, no. 23 (2018): 12-19.

Leal Yáñez, Matias. "Gentrificación En El Contexto De Movimientos Patrimoniales: El Caso De La Población León Xiii De Providencia, Chile." 2016.

López-Morales, Ernesto José, Ivo Ricardo Gasic Klett, and Daniel Alberto Meza Corvalán. "Urbanismo Pro-Empresarial En Chile: Políticas Y Planificación De La Producción Residencial En Altura En El Pericentro Del Gran Santiago." *Revista invi* 27, no. 76 (2012): 75-114.

Scarpaci, Joseph L. *Plazas and Barrios: Heritage Tourism and Globalization in the Latin American Centro Hist—Rico.* University of Arizona Press, 2005.

Schlack, Elke, and Neil Turnbull. "Capitalizando Lugares Auténticos: Artistas Y Emprendimientos En La Regeneración Urbana." *ARQ (Santiago)*, no. 79 (2011): 28-42.

———. "Emerging Retail Gentrification in Santiago De Chile: The Case of Italia-Caupolicán." *Global gentrifications: Uneven development and displacement* (2015): 349-75.

———. "La Colonización De Barrios Céntricos Por Artistas." *Revista 180*, no. 24 (2009).

Smith, Neil. "Gentrification and the Rent Gap." (1987).

———. "Nuevo Globalismo Y Nuevo Urbanismo: La Gentrificación Como Estrategia Urbana Global." Paper presented at the El mercado contra la ciudad: sobre globalización, gentrificación y políticas urbanas, 2015.

———. "Toward a Theory of Gentrification a Back to the City Movement by Capital, Not People." *Journal of the American planning association* 45, no. 4 (1979): 538-48.

Smith, Neil, and Verónica Hendel. *La Nueva Frontera Urbana: Ciudad Revanchista Y Gentrificación.*Traficantes de sueños, 2012.

Valencia Palacios, Marco Antonio. "¿ Gentrificación En Zonas Patrimoniales? Estudio De Cinco Casos En Santiago De Chile." *Revista INVI* 34, no. 95 (2019): 71-99.

CHINA' CREATIVE CITY DEVELOPMENT WITH CHINESE CHARACTERISTICS

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INTRODUCTION

Against the backdrop of post-Fordism and deindustrialisation, the concept of the creative city (CC) prevails worldwide, attracting cultural and innovation-led industries and urban growth since the 1990s. Since then, numerous megacities have taken advantage of the CC paradigm in urban development, particularly London, New York and Paris in the Global North. In contrast to the West, the CC notion only appeared in China in the 21st century. Recently, however, CC has been positively utilised in China, even being adapted using the term 'Chinese characteristics'. Thus, this paper's central research question is how to better comprehend CC in Chinese cities using the idea of 'Chinese characteristics'. To address this question, the paper offers an introduction to and discussion of urbanisation and neoliberalism s in China. Second, it focuses on two smaller CCs rather than a Chinese metropolis. Third, it gives critical remarks regarding CCs' Chinese characteristics. Finally, the paper draws attention to Chinese CC development with Chinese characteristics and the knowledge and lessons it offers for Global South countries.

URBANISATION IN CHINA AND NEOLIBERALISM

After the initiation of China's reform and open policy in 1978, urban areas underwent rapid and substantial transformations. Notably, this period coincided with the global ascendancy of neoliberalism during the late 1970s and early 1980s. Governments play a pivotal role in propelling urban change, but their centralized control can also lead to challenges, particularly in managing urbanization - a process entailing the migration of people from rural to urban regions, thereby augmenting urban populations and expanding cities and towns. To limited urbanisation, the central Chinese government adopted state intervention and a long-term strategic perspective,[1] which aligns with the traditional Chinese inclination to resist change.[2] Nevertheless, the benefits of urbanisation observed in other countries prompted a reevaluation by the Chinese government. Moreover, rural residents contributed valuable labor skills to urban development make the government reconsidered.

Former Premier of China, Keqiang Li, acknowledged urbanisation as a strategy for achieving modernisation and asserted its continuous potential to stimulate economic growth in 2012. Wang further assessed China's emphasis on urbanisation as unparalleled on a global scale, with the country relying on it as a catalyst for economic expansion.[3] Distinct levels of government have nurtured

urbanisation in various cities, resulting in a surge from 1995 to 2010, ultimately reaching 65 percent by 2023 (as illustrated in Figure 1).

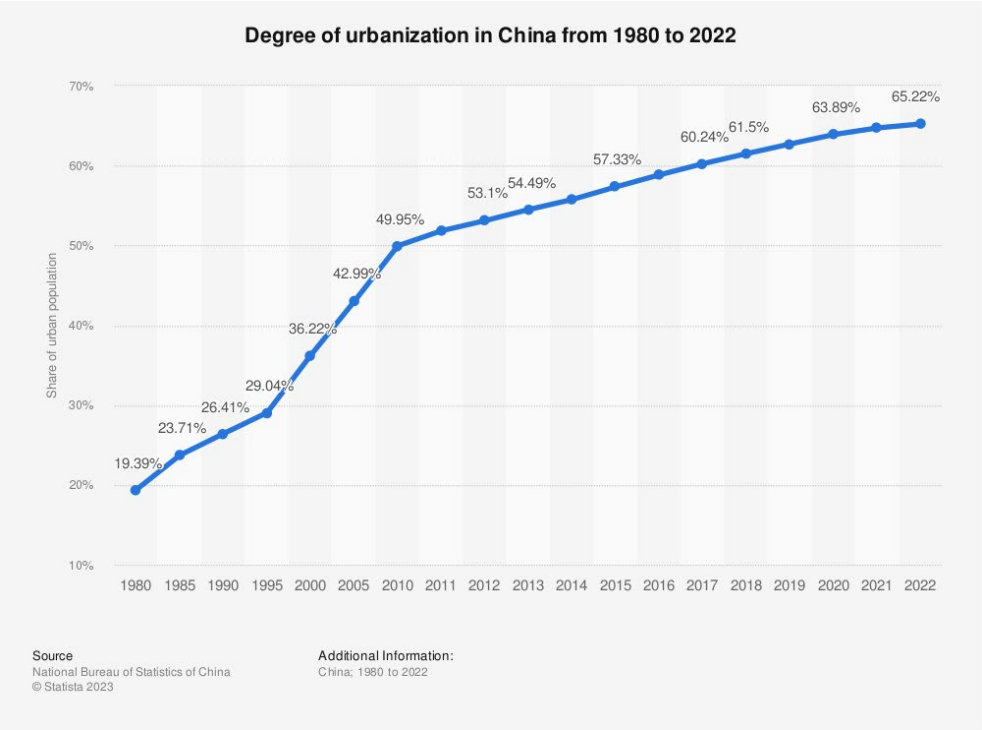

Figure 1. Urbanisation in China from 2008 to 2022[4]

China's urbanisation process exhibits a distinct dualistic driving mechanism, setting it apart from Western countries. It amalgamates government-led internal forces with externally driven investments. The current urbanisation embodies a politico-economic process influenced by neoliberalisation. China's urbanisation, while resulting from state-market interactions, fundamentally legitimizes and accelerates market mechanisms, irrespective of direct government leadership. In contrast to capitalist European countries, where neoliberal ideas were embraced in around 1995s, emphasizing economic liberalism and free-market capitalism, China's urban development with 'Chinese characteristics' is more likely to adopt neoliberalisation at the local level rather than national policies. Local neoliberalisation in Chinese urbanisation serves to legitimize a growth-first strategy, promoting capital, real estate, and technology-intensive industries as priorities, with some temporary disregard for other concerns.[5] State intervention persists in various processes of urban development at the local level.[6] Figure 2 provides an overview of the similarities and differences between the neoliberalism of urban development in Western countries and China. China's 'neoliberal urbanism with Chinese characteristics' exhibits a resilient and responsive system, fostering increased state-market interaction.[7]

However, it is essential to recognize that while neoliberalisation has its merits, it is not a universal remedy for stimulating economic growth; it has its weaknesses as well.[8] On a global scale, neoliberalisation has demonstrated limited efficacy in fostering broad-based economic growth.

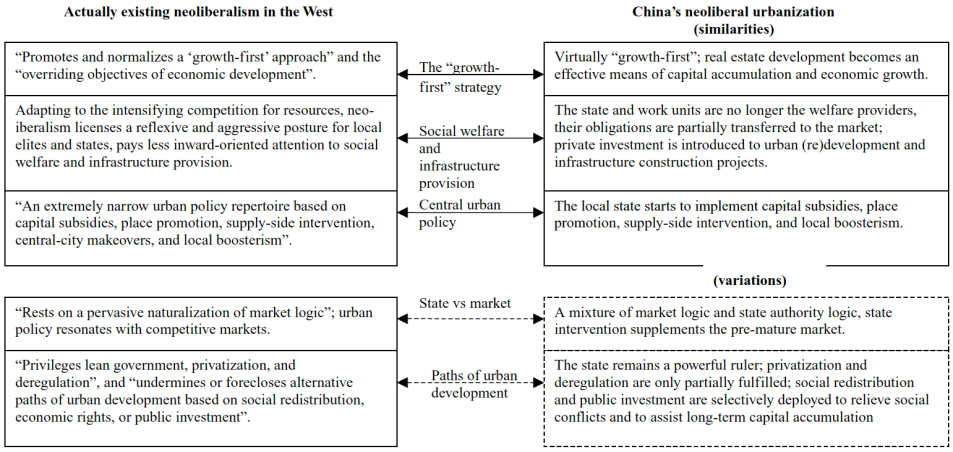

Figure 2. Comparison of Neoliberalism in Developed Capitalist Economies and China.[9]

CREATIVE CITIES IN CHINA

The ideas of creative industries and the creative economy were introduced in mainland China in late 2004 by a Chinese professor of economics.[10] Scholars, entrepreneurs and developers positively exploited these ideas and tried to build an alternative vision of China. However, the Chinese government resisted these ideas during that period due to cultural differences. Keane suggested that the reason for government resistance might be that traditional Chinese thinking led people to follow prescriptive philosophies. Agreeing with this view, Makeham offered that, from a Confucian perspective, a sage only transmits and does not create.[11] Hence, the Chinese way of thinking differs significantly from that of Western countries, which likely explains the resistance.

In recent decades, local Chinese governments have changed their attitude and published plenty of strategies and policies supporting the development of creative businesses. For instance, the National Development and Reform Commission (NDRC) argued for innovation-driven development in *The 13th Five-Year Plan for Economic and Social Development of the People's Republic of China* (2016–2020).[12] By 2019, 12 Chinese cities had joined the UNESCO CC Network.[13] Today, CCs have begun to thrive in China, and, as mentioned earlier, the concept has been adapted to the local context under the term 'Chinese characteristics'.

Hall emphasised that CCs should evoke a sense of ambiguity among outsiders, striking a delicate balance by engaging their creativity without overwhelming them.[14] Evaluating whether Chinese CCs align with this definition warrants careful consideration and prompts an examination of how they integrate ambiguity and inclusive creativity. The Chinese central government, influenced by global urban policy trends[15] and neoliberalisation, has embraced the development of CCs, and local governments have implemented state-devised strategies to foster CCs, resulting in competitive dynamics fuelled by state support.[16] However, challenges have arisen in China's diverse cultural landscape, necessitating policy adaptations and the involvement of new stakeholders and resources. For example, the creative industries cluster developed in an unsustainable manner. Until 2013, only 10 per cent of the creative industries in China made a profit, while over 70 per cent found themselves in debt.[17]

Given these complexities, a singular conceptualisation of CCs may not fully capture their distinctive 'Chinese characteristics'. To address this, this study conducts a comparative analysis of two smaller metropolitan areas, examining the impact of policy interventions and implementation within the Chinese context.

Chengdu

After the Wenchuan earthquake in 2008, Chengdu embarked on a comprehensive endeavour to craft its distinct urban brand.[18] Taking advantage of the national policy to revitalise the western regions, Chengdu planned its own creative city and creative industry.[19] Thanks to the influence of branding and the city's rich history of culinary culture, Chengdu became the first Asian city designated as a 'City of Gastronomy' within the UNESCO CC Network in 2010. According to a UNESCO report, the CC title brought about significant economic opportunities for its food industry, with the catering sector experiencing almost 20% annual growth.[20] This success can be attributed mainly to its enhanced national and international recognition; for instance, when Chengdu held its 8th Food Festival in 2011 after receiving the award, it witnessed a 15.58% rise in attendance. Beyond the quantifiable economic gains, the award likely contributed to increased social capital, fostering pride among individual residents and nurturing social cohesion.[21]

Local government support played a crucial role in earning the award for the city. The government engaged in detailed planning, formulating complementary policies to facilitate the development of the 'City of Gastronomy'. Following extensive investigations into the city's catering industry, the city put forth a scientifically devised 'Construction Plan for the Capital of Gastronomy', focusing on promoting branding, internationalisation and standardisation in the catering sector. Specific aspects included safeguarding traditional cooking methods, promoting culinary training institutions (such as the Sichuan Higher Institute of Cuisine, which has over 7,000 students), establishing new food retail centres and enhancing overseas brand promotion.[22] However, in some sense, Chengdu's CC strategy lacked creativity, as it remained centred on industrialisation, interactive culinary festivals and international gastronomic exchanges. Zhan and Cheng have argued that these chosen events possess inherent validity and practicality in the Chinese context. They pointed out that for Chengdu to plan events, underscoring the value of culinary culture was crucial.[23]

While the local government supported these events, the creative class in Chengdu remained largely unseen. Not only does Chengdu lack high-end creative talents and have an imbalanced talent structure[24], but Chengdu's artisans and artists who performed creative labour were given little support. Most lived far outside the city centre due to decreasing profits and increasing rents. Apart from a tiny minority of the extreme elite, the other creative classes faced economic instability and fluctuation.[25]

Hangzhou

Hangzhou is designated as a 'creative cluster' due to the signs of creative activity in the city and the establishment of creative industries in post-industrial urban spaces.[26] As early as 2006, the local government raised the concept of 'creative industries' and built cultural and creative industry parks based on the high-tech zones and cultural enterprise clusters that had already been established. Today, the layout of the industrial cluster in Hangzhou comprises a multi-centre spatial structure of 'one main centre and multiple sub-centres'.[27]

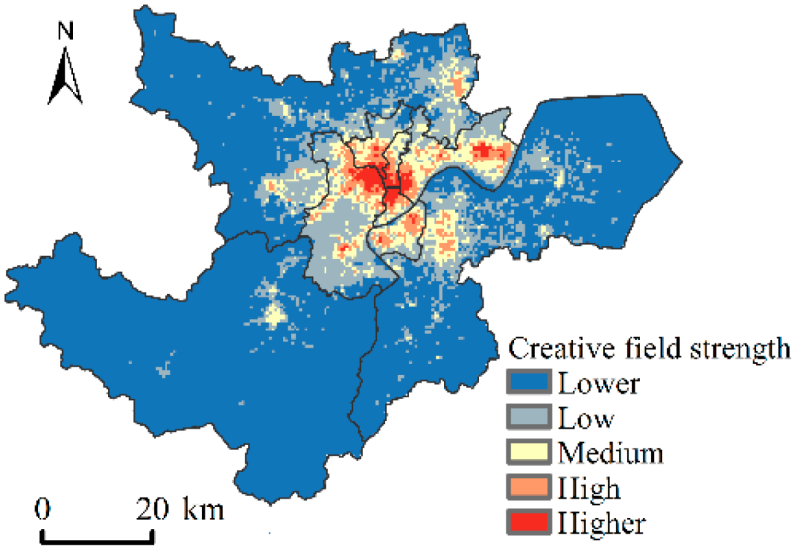

Figure 3. Map of creative industry layout[28]

Moreover, the local government proposed the strategic goal of 'establishing a national cultural and creative industry centre' in 2007. In 2010, an official document from the State Council of China explicitly stated the objective of 'building Hangzhou into a national cultural and creative centre'. Thanks to state intervention, the cultural and creative industry has contributed more to the city's GDP each year, becoming a driver of economic development. In 2012, the added value of Hangzhou's cultural and creative industry reached 106 billion yuan, accounting for 13.59% of the city's GDP.[29] In the same year, Hangzhou joined UNESCO's 'Global CC Network' program, becoming China's first 'City of Crafts and Folk Art'.

The purview of policies related to the creative economy transcends conventional economic modalities, encompassing not only the production and cultivation of cultural creativity but also the consumption thereof. The local government employed legal and policy inducements to stimulate, bolster and direct the advancement of the cultural and creative sectors. Unlike Chengdu, Hangzhou attached importance to the creative class and talented people. In 2011, the local government issued the 'Implementation Opinions on Accelerating the Construction of Talents in Cultural & Creative Industries', with plans to introduce around 100 industry leaders, develop 1,000 local outstanding talents in cultural and creative industries, and train over 10,000 college students. Additionally, Hangzhou implemented various talent training measures, such as the 'Three-Year Action Plan for Training and Introducing 100 Masters of Arts and Crafts'.[30]

CREATIVE CITIES IN CHINA WITH CHINESE CHARACTERISTIC

The case studies indicate that the performance of CC in each city is different. Chengdu became a CC earlier than Hangzhou, but according to the Chinese CC index report, Chengdu has ranked lower than Hangzhou for many years.[31] Various factors caused these two cities of similar scale in China to have different characteristics, and one involves state intervention. Chengdu relied on state support instead of developing its own industries. Hangzhou had its own creative industry, which became a driver of city development. Due to its reliance on state intervention, Chengdu used less of its own creativity in growing its industry, paying more attention to conserving the tradition of the gastronomy industry than to innovation. By contrast, Hangzhou paid more attention to its creative class. Florida proposed that artists are the super-creative core of the creative class.[32] Hence, state intervention leads to an environment with a constrained, manipulated and instrumentalised atmosphere for the creative class

or even precarious creativity.[33] While creativity has differed between the two cities, they have the same issue: increasing real estate prices. This reflects the development of the real estate industry in the cities. Real estate may become the dominant power in the artistic sector, which can be considered a negative consequence of CC.

Compared with Western countries, the significance of 'Chinese characteristics' lies in extensive state intervention that influences both urbanisation and CCs. Cities in China based their development on the state view and tried to use various financial and tax policies as levers to promote the construction of CCs.[34] In some cases, state intervention has had a positive influence, such as adjusting to the economic market;[35] meanwhile, it has had a negative consequence for artists and urban development. As for the CC discourse, CCs in China may not satisfy the previously mentioned definition by Hall. Previous studies have found that traditional Chinese culture has stifled creativity; in other words, the idea of the CC appears incongruous with the cultural environment. In contrast, the state ideology in China still emphasises developing traditional culture rather than developing Western ideas. Hence, in a way, the debate around CCs in China might be utopian, as cities do not have enough resources and power to provide the environment described by Hall. The idea of CCs with 'Chinese characteristics' thus relies on cultural policy discourse and state support for further development.

CONCLUSION

In conclusion, it is evident that without state support, CCs are hindered from shedding the label of having 'Chinese characteristics' or advancing their developmental prospects. Nevertheless, one positive aspect of the burgeoning of creative ideas in China lies in the transformation of numerous industries from 'made in China' to 'created in China'. However, for most Chinese cities, CC initiatives often remain merely a formalised tool utilised to achieve development through policy support rather than focusing on the essential element – the creative class. Hangzhou, as a city that emphasises the im-portance of the creative class, has achieved success with the aid of state policies. Nevertheless, the applicability of safeguarding traditional culture in the realm of creative cities remains a thought-provoking question for China on a global scale. For other nations in the Global South, the implementation of creative cities necessitates early-stage government guidance. Following their establishment, market forces can direct the evolution of creative industries or the creative economy. Excessive governmental intervention may result in a depletion of creativity.

NOTES

[1] Guixin Wang, 'The Basic Theory of Urbanization and Problems and Countermeasures of China's Urbanization', *Population Research* 37, no. 6 (2013): 43–51.
[2] Michael Keane, 'Creative Industries in China: Four Perspectives on Social Transformation', *International Journal of Cultural Policy* 15, no. 4 (November 2009): 431–43, https://doi.org/10.1080/10286630902989019.
[3] Wang, 'The Basic Theory of Urbanization and Problems and Countermeasures of China's Urbanization'.
[4] Statista, 'Urbanization in China 1980-2022', 2023, https://www.statista.com/statistics/270162/urbanization-in-china/.
[5] Julan Du, Hongsheng Fang, and Xiangrong Jin, 'The "Growth-First Strategy" and the Imbalance between Consumption and Investment in China', *China Economic Review* 31 (December 2014): 441–58, https://doi.org/10.1016/j.chieco.2014.09.002.
[6] Shenjing He and Fulong Wu, 'China's Emerging Neoliberal Urbanism: Perspectives from Urban Redevelopment', *Antipode* 41, no. 2 (March 2009): 282–304, https://doi.org/10.1111/j.1467-8330.2009.00673.x.
[7] He and Wu. 'China's Emerging Neoliberal Urbanism: Perspectives from Urban Redevelopment',
[8] David Harvey, 'Neoliberalism as Creative Destruction', *The ANNALS of the American Academy of Political and Social Science* 610, no. 1 (March 2007): 21–44, https://doi.org/10.1177/0002716206296780.
[9] He and Wu. 'China's Emerging Neoliberal Urbanism: Perspectives from Urban Redevelopment'
[10] Shenggao Yuan, 'New Economy Business Becomes a Growing Driver of City Development.', *China Daily Global*, 7 May 2020; Keane, 'Creative Industries in China'.
[11] John Makeham, *Transmitters and Creators: Chinese Commentators and Commentaries on the Analects*, 1st ed. (Harvard University Asia Center, 2003), https://doi.org/10.2307/j.ctt1tg5j9s.
[12] National Development and Reform Commission of the People's Republic of China (NDRC), 'The 13th Five Year Plan for Economic and Social Development of the People's Republic of China (2016–2020)' (National Development and Reform Commission of the People's Republic of China (NDRC), National Development and Reform Commission of the People's Republic of China (NDRC)), https://en.ndrc.gov.cn/policies/202105/P020210527785800103339.pdf. National Development and Reform Commission of the People's Republic of China (NDRC).
[13] Shenjing He and Jun Wang, 'State-Led Creative/Cultural City Making and Its Contestations in +East Asia: A Multi-Scalar Analysis of the Entrepreneurial State and the Creative Class', *Geoforum* 106 (November 2019): 305–9, https://doi.org/10.1016/j.geoforum.2018.10.004.
[14] Peter Hall, 'Creative Cities and Economic Development', *Urban Studies* 37, no. 4 (April 2000): 639–49, https://doi.org/10.1080/00420980050003946.
[15] Robin Visser, 'Posthuman Policies for Creative, Smart, Eco-Cities? Case Studies from China', *Environment and Planning A: Economy and Space* 51, no. 1 (February 2019): 206–25, https://doi.org/10.1177/0308518X18765481.
[16] He and Wang, 'State-Led Creative/Cultural City Making and Its Contestations in East Asia'.
[17] Jianfei Yang and Jūratė Černevičiūtė, 'Cultural and Creative Industries (CCI) and Sustainable Development: China's Cultural Industries Clusters', ed. Manuela Tvaronavičienė, *Entrepreneurship and Sustainability Issues* 5, no. 2 (31 December 2017): 231–42, https://doi.org/10.9770/jesi.2017.5.2(6).
[18] Visser, 'Posthuman Policies for Creative, Smart, Eco-Cities?'
[19] Michael Keane, 'Great Adaptations: China's Creative Clusters and the New Social Contract', *Continuum* 23, no. 2 (April 2009): 221–30, https://doi.org/10.1080/10304310802691597.
[20] UNESCO, 'Reviewing Report on City of Gastronomy Chengdu China' (Paris: UNESCO, 2012), https://fr.unesco.org/creative-cities/sites/default/files/EvaluationReport_Chengdu.pdf.
[21] David Pearson and Thomas Pearson, 'Branding Food Culture: UNESCO Creative Cities of Gastronomy', *Journal of Food Products Marketing* 23, no. 3 (April 2017): 342–55, https://doi.org/10.1080/10454446.2014.1000441.
[22] Pearson and Pearson, 'Branding Food Culture'.
[23] Yihong Zhan and Xiaomin Cheng, '"City of Gastronomy "of UNESCO Creative Cities Network: From International Criteria to Local Practice', *Journal of Central China Normal University (Humanities and Social Sciences)* 55, no. 6 (2016): 76–86.
[24] Lie Chen, 'Research on Cultivation of Creative Class under Industrial Environment Cluster-Take Cartoon Game Industry as an Example': (2014 International Conference on Education Technology and Social Science, Taiyuan, China, 2014), https://doi.org/10.2991/icetss-14.2014.56.

[25] Visser, 'Posthuman Policies for Creative, Smart, Eco-Cities?'
[26] Wen Wen, 'Realizing "Four Comforts" in the Urban Fringe: The Case of White Horse Lake Eco-Creative City Project, Hangzhou, China', *International Journal of Cultural Studies* 15, no. 3 (May 2012): 273–85, https://doi.org/10.1177/1367877911433749.
[27] Dandan Wu et al., 'The Location and Built Environment of Cultural and Creative Industry in Hangzhou, China: A Spatial Entropy Weight Overlay Method Based on Multi-Source Data', *Land* 11, no. 10 (30 September 2022): 1695, https://doi.org/10.3390/land11101695.
[28] Wu et al., 'The Location and Built Environment of Cultural and Creative Industry'.
[29] Mingchao Li, 'Research on Government's Guide in the Process of CC Promoting the Development of Cultural & Creative Industries – A Case Study of Hangzhou', *Journal of Management* 26, no. 6 (2013): 31–36+42.
[30] Yijun Huang, 'Analysis on Role Positioning of the Local Government Against the Background of Creative Cities Network A Case Study of Hangzhou, Suzhou and Jingdezhen', in *Proceedings of the 3rd International Conference on Judicial, Administrative and Humanitarian Problems of State Structures and Economic Subjects (JAHP 2018)* (3rd International Conference on Judicial, Administrative and Humanitarian Problems of State Structures and Economic Subjects (JAHP 2018), Domodedovo, Russia: Atlantis Press, 2018), https://doi.org/10.2991/jahp-18.2018.39.
[31] Xiaomin Cheng and Yihong Zhan, 'Practice and Consideration for Construction of "City of Gastronomy" From Perspective of Creative City—A Case of Chengdu', *Journal of Researches on Dietetic Science and Culture* 34, no. 02 (2017): 22–28.
[32] Richard L. Florida, *The Rise of the Creative Class: Revisited*, Updated 2019 Paperback Edition (New York: Basic Books, 2019).
[33] Tim Oakes, 'Making Cultural Cities in China: Governance, State-Building, and Precarious Creativity', *Environment and Planning A: Economy and Space* 51, no. 1 (February 2019): 178–86, https://doi.org/10.1177/0308518X18793422.
the Creative Class: Revisited. Updated 2019 Paperback Edition. New York: Basic
[34] Keane, 'Creative Industries in China'.
[35] Keane, 'Creative Industries in China'.

BIBLIOGRAPHY

Chen, Lie. 'Research on Cultivation of Creative Class under Industrial Environment Cluster-- Take Cartoon Game Industry as an Example': Taiyuan, China, 2014. https://doi.org/10.2991/icetss-14.2014.56.

Cheng, Xiaomin, and Yihong Zhan. 'Practice and consideration for construction of "city of gastronomy" from perspective of creative city—A case of Chengdu'. *Journal of Researches on Dietetic Science and Culture* 34, no. 02 (2017): 22–28.

Du, Julan, Hongsheng Fang, and Xiangrong Jin. 'The "Growth-First Strategy" and the Imbalance between Consumption and Investment in China'. *China Economic Review* 31 (December 2014): 441–58. https://doi.org/10.1016/j.chieco.2014.09.002.

Florida, Richard L. *The Rise of the Creative Class: Revisited*. Updated 2019 Paperback Edition. New York: Basic Books, 2019.

Gan, Lin, and Yan Tang. 'Creative Cities: From International Experience to Local Practice'. *Urban Planning International* 27, no. 03 (2012): 54–59.

Hall, Peter. 'Creative Cities and Economic Development'. *Urban Studies* 37, no. 4 (April 2000): 639–49. https://doi.org/10.1080/00420980050003946.

Harvey, David. 'Neoliberalism as Creative Destruction'. *The ANNALS of the American Academy of Political and Social Science* 610, no. 1 (March 2007): 21–44. https://doi.org/10.1177/0002716206296780.

He, Shenjing, and Jun Wang. 'State-Led Creative/Cultural City Making and Its Contestations in East Asia: A Multi-Scalar Analysis of the Entrepreneurial State and the Creative Class'. *Geoforum* 106 (November 2019): 305–9. https://doi.org/10.1016/j.geoforum.2018.10.004.

He, Shenjing, and Fulong Wu. 'China's Emerging Neoliberal Urbanism: Perspectives from Urban Redevelopment'. *Antipode* 41, no. 2 (March 2009): 282–304. https://doi.org/10.1111/j.1467-8330.2009.00673.x.

Huang, Yijun. 'Analysis on Role Positioning of the Local Government Against the Background of Creative Cities Network A Case Study of Hangzhou, Suzhou and Jingdezhen'. In *Proceedings of the 3rd International*

Conference on Judicial, Administrative and Humanitarian Problems of State Structures and Economic Subjects (JAHP 2018). Domodedovo, Russia: Atlantis Press, 2018. https://doi.org/10.2991/jahp-18.2018.39.

Keane, Michael. 'Creative Industries in China: Four Perspectives on Social Transformation'. *International Journal of Cultural Policy* 15, no. 4 (November 2009): 431–43. https://doi.org/10.1080/10286630902989019.

Li, Mingchao. 'Research on Government's Guide in the Process of Creative Cities Promoting the Development of Cultural & Creative Industries-- A Case Study of Hangzhou'. *Journal of Management* 26, no. 6 (2013): 31-36+42.

Makeham, John. *Transmitters and Creators: Chinese Commentators and Commentaries on the Analects*. 1st ed. Harvard University Asia Center, 2003. https://doi.org/10.2307/j.ctt1tg5j9s.

National Development and Reform Commission of the People's Republic of China (NDRC). 'The 13th Five Year Plan for Economic and Social Development of the People's Republic of China (2016–2020)'. National Development and Reform Commission of the People's Republic of China (NDRC), National Development and Reform Commission of the People's Republic of China (NDRC). https://en.ndrc.gov.cn/policies/202105/P020210527785800103339.pdf.

Oakes, Tim. 'Making Cultural Cities in China: Governance, State-Building, and Precarious Creativity'. *Environment and Planning A: Economy and Space* 51, no. 1 (February 2019): 178–86. https://doi.org/10.1177/0308518X18793422.

Pearson, David, and Thomas Pearson. 'Branding Food Culture: UNESCO Creative Cities of Gastronomy'. *Journal of Food Products Marketing* 23, no. 3 (3 April 2017): 342–55. https://doi.org/10.1080/10454446.2014.1000441.

Statista. 'Urbanization in China 1980-2022', 2023. https://www.statista.com/statistics/270162/urbanization-in-china/.

UNESCO. 'Reviewing Report on City of Gastronomy Chengdu China'. Paris: UNESCO, 2012. https://fr.unesco.org/creative-cities/sites/default/files/EvaluationReport_Chengdu.pdf.

Visser, Robin. 'Posthuman Policies for Creative, Smart, Eco-Cities? Case Studies from China'. *Environment and Planning A: Economy and Space* 51, no. 1 (February 2019): 206–25. https://doi.org/10.1177/0308518X18765481.

Wang, Guixin. 'The Basic Theory of Urbanization and Problems and Countermeasures of China's Urbanization'. *Population Research* 37, no. 6 (2013): 43–51.

Wen, Wen. 'Realizing "Four Comforts" in the Urban Fringe: The Case of White Horse Lake Eco-Creative City Project, Hangzhou, China'. *International Journal of Cultural Studies* 15, no. 3 (May 2012): 273–85. https://doi.org/10.1177/1367877911433749.

Wu, Dandan, Yang Wu, Xinxin Ni, Yuandan Sun, and Renfeng Ma. 'The Location and Built Environment of Cultural and Creative Industry in Hangzhou, China: A Spatial Entropy Weight Overlay Method Based on Multi-Source Data'. *Land* 11, no. 10 (30 September 2022): 1695. https://doi.org/10.3390/land11101695.

Yang, Jianfei, and Jūratė Černevičiūtė. 'Cultural and Creative Industries (CCI) and Sustainable Development: China's Cultural Industries Clusters'. Edited by Manuela Tvaronavičienė. *Entrepreneurship and Sustainability Issues* 5, no. 2 (31 December 2017): 231–42. https://doi.org/10.9770/jesi.2017.5.2(6).

Yuan, Shenggao. 'New Economy Business Becomes a Growing Driver of City Development.' *China Daily Global*, 7 May 2020.

Zhan, Yihong, and Xiaomin Cheng. '"City of Gastronomy"of UNESCO Creative Cities Network: From International Criteria to Local Practice'. *Journal of Central China Normal University (Humanities and Social Sciences)* 55, no. 6 (2016): 76–86.

THE LEGACY OF ITALIAN PSYCHIATRY AS A LEVER FOR INNOVATING THE GOVERNANCE MODEL OF CARE-LED WELFARE SPACE IN FRAGILE CITIES

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INTRODUCTION: THE LEGACY OF ITALIAN PSYCHIATRY

The deinstitutionalization of Italian psychiatric hospitals, promoted by Franco Basaglia during the 1970s, overturned the concept of therapy and reformed places of care, radically questioning the role of the hospital as the only opportunity for healing for people with mental health disorders and putting forward the creation of community mental health services. Such a process, which culminated with the laws 180/1978 on the closure of asylums and 833/1978 on the reform of the health system through prevention and community medicine, took shape in a border region of Italy, the Friuli Venezia Giulia, since Basaglia had started his experimentation with a therapeutic community in the psychiatric hospital of Gorizia.

Three factors can be identified as innovative in the radical reform of mental health care. First, de-institutionalizing the psychiatric hospital meant bringing seeds of life into the total institution, breaking it back thanks to networks capable of "city making" starting from the common mission. The second factor consisted in inventing new forms of territorialized management of mental health services, locating places of care inside residential neighbourhoods, thus breaking the isolation of the hospital. The third outcome is related to the learning process triggered by the reform, which has consolidated an elite of public administrators, psychiatrists, healthcare assistants, social workers, and entrepreneurs who have reinvented the therapy of vulnerable subjects and carry out Basaglia's legacy in different regions of Italy, albeit within limited niches.

At the national level, the community mental health strategy based on home care, personalization of care and the involvement of families in the therapeutic process, developed until the mid-1990s. However, after the Law 502/1992, the commodification of welfare systems started, with the private sector gaining the upper hand over the public sector. This law marked the turning point towards the ongoing welfare financialization and the spread of inequalities, thus privileging standardized to tailored responses to psychiatric disorders: the personalization of care becomes a paid chimera.[1]

Nowadays in Italy the standardized quality of public services no longer impacts inequalities because it relies solely on the economic aspects, allocating equal resources to unequal people, and distributing products that do not take into account either the social diversity of users, or the different conditions of context. Yet, while welfare appears heavily under attack, the public finance crisis is beginning to question the economic sustainability of Western and, specifically, European welfare systems. For this reason, attention is returning to the idea of starting from the needs of the most deprived, marginalized

and excluded people as a driving force for the development of a new area of capability production which is called the social economy.[2]

The needed step to make welfare productive consists in overturning the dominant idea that the provision of a service (both by public and private hands) is an action that does not create added value, but spends resources generated in other areas of the economy and society. Within this economic perspective, the patient is considered only a passive user of an activity. Basically, what the heirs of the Basaglian model suggest is to evolve social welfare policies tailoring them for local contexts and promoting public/private co-management paths aimed at recovering the traditional value of the social capital in order to relaunch local cohesion and economy.

Within this framework, it is necessary to implement a model of "family and community welfare" capable of focusing on tailored care practices, starting from the collective responsibility of care, and working on the unexplored capacities of local communities and on the potential of places as drivers of sharing. Therefore, health and social institutions should overcome the institutionalization of suffering, with tangible interventions in support of social habitat, training, and work. The Microareas project underway in Trieste is an exemplary implementation of this approach.

THE CARE-LED WELFARE SPACE MODEL: MICROAREAS PROGRAMME

In the 1970s, the process of deinstitutionalization of the mental asylum in Trieste established a new approach to caring for people suffering from mental distress, reverberating far beyond the hospital boundaries to pervade every corner of the city. Since the 1990s, psychiatrist Franco Rotelli, former director of the Trieste Health Authority, would have turned this approach into a real socio-health model, calling it the caring city.[3]

The Microareas program was launched in 2005 by the Department of Health and Social Policies of the Friuli Venezia Giulia Region through a memorandum of understanding signed among the Health Authority, the Municipality of Trieste, and the Public Housing Authority.[4] The program experiments with a welfare-based policy capable of integrating social, health, and housing issues by promoting synergies between social and institutional innovation,[5] adopting a territorialized approach. It aims to enhance living conditions of vulnerable residents in popular neighborhoods, to protect health, and prevent social distress through sophisticated practices of social activation among inhabitants.

The Microareas program experiments with a new setting of socio-health services, starting from people and places. This means interpreting the territory as the result of virtuous interactions between citizens and operators to develop actions focused on places, responding to social, health, and buildings and public spaces regeneration.[6]

The governance model, applied to seventeen microareas located in the four health districts of the city –as illustrated in Figure 1 – involves institutional actors, cooperatives and associations belonging to the Third Sector, and residents.

Each microarea has a dedicated contact person (Microareas Referent), its own headquarters, and regular monitoring meetings.

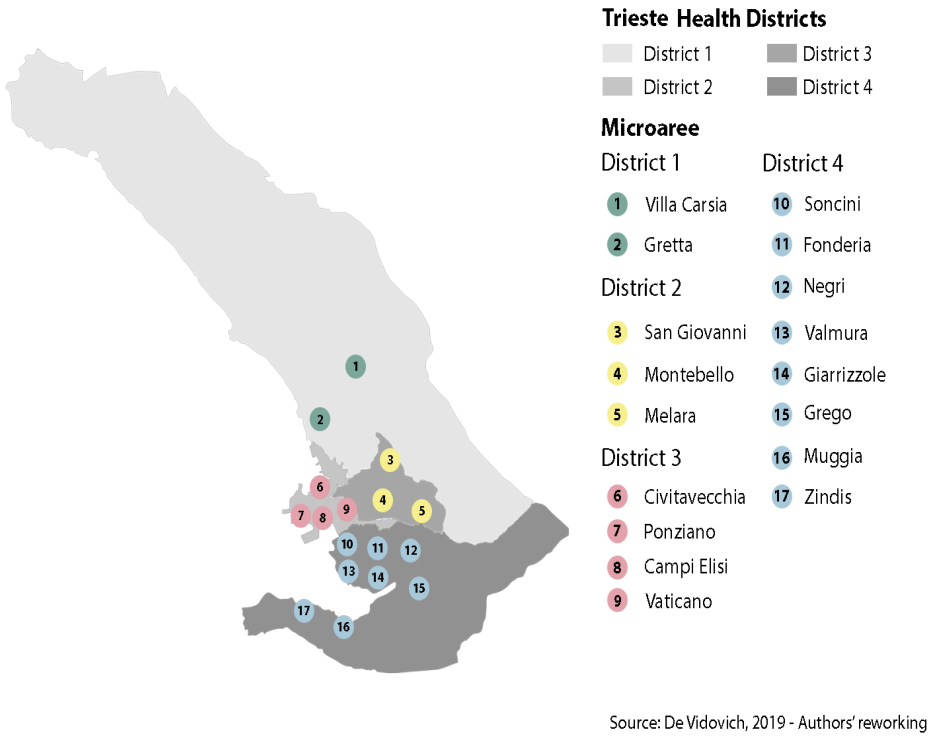

Figure 1. Localization of Microareas.

The referent is the main actor of the governance model. He coordinates activities, promotes community involvement, and fosters the integration of health and social aspects into community development processes. The referent can be recruited either from the Municipality of Trieste, or from social cooperatives involved in the program. He plays the role of context case manager, immersing himself in the territory to trigger capacity-building processes, and generating social capital in fragile neighborhoods inhabited by needy social groups, in particular older populations,[7] and suffering from precarious maintenance systems.

The Microareas program is designed as an integrated policy based on inter-institutional collaboration. Innovations consist in the active presence on the territory and in the coordination of activities, adopting a management approach based on learning by monitoring, that is capable of branching out on the territory to meet emerging needs.

Furthermore, attention to multi-scalar governance dimensions contributes to integration among different levels of territorial government, networking municipal and regional institutions.

An essential success factor for the program lies in the role of the Health Authority, which, thanks to its long experience with social cooperatives promotes care and territorial maintenance to regenerate public residential neighborhoods.

EFFECTS OF URBAN FRAGILITY ON THE GOVERNANCE MODEL OF NAPLES

Naples is the capital of a metropolitan area with over 3 million inhabitants. The city, with about 955,000 inhabitants living in an area of 119 square Kilometers, is the regional capital of Campania (550 municipalities and 5.827 million inhabitants) and is located at the heart of the South of Italy.

In the latest 20 years, the national economic policy has reduced investments in the South and eroded the interdependencies of the south with the center-north, thus weakening the Italian internal market and even the contribution of Italy to the growth of Europe. As a consequence, we can observe massive gaps in the infrastructure provision and service allocation.

If we apply urban fragility indicators to the city of Naples, we can classify it as the one, among the Global North cities, where the level of poverty is increasing, the governance model is underdeveloped, and the local institutions, undersized compared to the needs of the city, are unable to provide basic services to the citizens. Furthermore, being the pact of trust between the local institutions and the citizens about to collapse, citizens seldom mobilize for the public good.

The global Fragile Cities Atlas edited by Muggah,[8] together with the Igarapè institute of Rio de Janeiro, the World Economic Forum, and the 100 Resilient Cities' network confers Naples an average level of fragility due to unemployment, unequal incomes, crime rate, and difficulties in accessing public services. If we agree, according to Selby and Desouza,[9] that the institutional side of urban fragility lies in the inability to fulfill the social contract between administrators and the citizens, Naples is fully embracing this kind of fragility.

A recent report on the management of the Recovery Plan funds underlines, indeed, that the city suffers both in providing civic services, and in building infrastructure.[10]

The number of municipal employees has decreased by 46% over the last ten years, and the city administration has had to face an incessant and growing workforce' loss,[11] with a rebalancing of budget which has affected the administrative efficiency. Budget cuts undermined the administrative performance, affecting the urban policies' effectiveness, as clearly emerging by measuring impacts on the maintenance of urban greenery. In this sector, in fact, the number of public gardeners decreased from one thousand in 2011, to fifty in 2023, causing the abandonment of urban public spaces and parks.

Due to the described situation, our attention, as governance studies scholars, has been caught from a specific dynamic: while municipal services withdrew from the public green management, which began to be abandoned due to the lack of dedicated staff, the Drug Addiction Service depending on the Local Health Authority of Naples succeeded in trying how to rehabilitate vulnerable people. These therapies proved to be capable, over time, to turn the care for places into a way for social reintegration and physical regeneration.

It is important to emphasize how the legacy of Basaglia's territorialization of welfare still safeguards quality and safety of the places it takes care of, changing them by means of therapies whose regenerative effects just reverberates on spaces left abandoned by municipal services.

We can deduce the opportunity of learning from those particular practices, which are based on the territorialization of socio-sanitary welfare, in order to innovate the management of public spaces.

THE VERDEFACENDO PROJECT AS A STRATEGY TO RECOVER DRUG ADDICTS AND ABANDONED PLACES

First evidence in achieving civic activation, interacting with the vulnerable social capital of which Naples is plentiful, are producing effects through the recovery and protection of abused spaces, both in the middle-class city core, and in peripheral public districts.

Weaknesses were partially contained thanks to a provision of social-health practices successfully impacting on the care of urban greenery and/or abandoned buildings. These practices have been carried out from 2010 in the framework of the VerdeFacendo Project (in English: Green Making Project), under the initiative of the Local Health Authority of Naples 1 (LHA Na1), with the contribution of a few social cooperatives including Era, who takes care of patients undergoing drug rehabilitation therapies.

Being place-based, this kind of therapies can be considered as part of "the caring city" approach,[12] giving the opportunity to rebuild communities around the patients and turn them into recovery agents for places returned to public use.

Taking inspiration from capabilities which originate from the recovery of former asylums,[13] initiatives change places into "social construction sites" by using rehabilitative therapies in liberating ways.[14]
The Basaglian legacy is still evolving: if in Trieste it has been producing the Microaree Project, conversely, in Naples, it has been coupling drug addicts' rehabilitation to the recovery of wasted land, allowing two vulnerabilities to be mutually supportive.
We will explain the power of the welfare territorialization approach underway in Naples, through two practices within the Verdefacendo Project which are based on the care of space as a driving force for healing and social redemption. These practices concern a public park located in the Ponticelli suburb, and a square in the middle-class district of Posillipo.

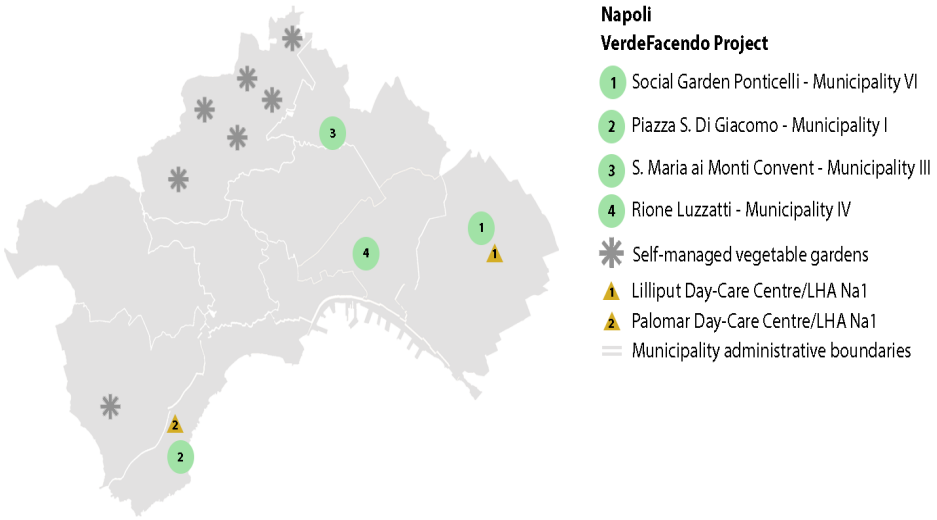

Figure 2. VerdeFacendo Project Areas.

First of all, we analyze the rebirth of the urban park Fratelli De Filippo. Although implemented during the 1980s as a fair compensation to the Ponticelli suburb decay, the park has been repeatedly closed and reopened due to vandalisms. After being closed from 2008 to 2015, the park has been gradually repurposed to horticulture and reopened to collective uses by means of a public entrust by the City of Naples to the Lilliput Day Care Centre at the service of the LHA Na1.
With the desire to break the stigma due to abuse of drugs, a project to rehabilitate patients was developed aimed at returning the denied public good to the community. The Era social cooperative was able to construct a community of intents around the conversion of the park into collective gardens, in order to facilitate the rehabilitation of drug addicts in cooperation with schools, parish churches, local associations, and interested citizens and families. While shared rules and events have been planned, the patients of the Lilliput Day Care Centre have been trained as gardeners thanks to local retirees' voluntary mentoring, whose know-how belongs to the Ponticelli rural culture of the pre-industrial past. Patient's work, in the beginning paid by means of a public internship, is now due to private donations. In 2015, the LHA Na1 was entrusted with the park custody with a first memorandum of understanding with the City of Naples, ratified in 2019 by means of an inter-institutional resolution involving also Urban greening and Social Policies offices. According to the pact, LHA Na1 has the task of managing the park's opening hours and, at the same time, carry on the "Social Garden of Health" project together with a local committee of inhabitants. Since the very beginning, the Social Garden of Health has been drawing the attention of foreign visiting scholars in the framework of international researches, and Lilliput Day Care Centre, accordingly, is still involved

in many training experiences aimed at disseminating the best practice among metropolitan administrations.
The local committee behaves as a guarantor for sharing the social garden, collaborating for the common good according to municipal rules on citizens' care of urban public green.
In Posillipo residential district, the Palomar Day Care Centre, present since 2010 close to Piazza Salvatore Di Giacomo, supervises to the care and maintenance activities of the square, that had lost its previous vitality, reinventing a vegetable garden on the grounds of an old public car park.
After some failed attempts to attract citizens, the activities were relocated, installing a nursery gardening laboratory and organizing meetings for the sale of floral arrangements and fruit and vegetables which facilitated user/resident interaction. When integration started, a project was launched to take care of the once vital square due to the presence of a bar, restaurant, children's playground, as well as a public road transport stop.
As in Ponticelli district, also in Posillipo one of the project's main aims was about breaking drug users' stigma, reintegrating them into society. The teamwork proceeded step by step: first, facilitating door-to-door sales of vegetables from the garden to create opportunities to build bonds among patients, shopkeepers, and inhabitants; secondly, giving patients gardening skills.
Palomar Day Care Centre, Beyond the Garden Association, and l'Aquilone Services for job placement social cooperative have been cooperating in taking care of the square since 2019, involving patients. During 2021 new promoters were found, in order to create micro-economies, building networks and identifying resources, while Beyond the Garden Association was involved in empowering patients about gardening abilities.
Internships in the field of floriculture were paid to patients by means of public and private funds. The custody of areas is inspired by the formula "adopt a flowerbed", ratified by an agreement with the City aimed at the green regeneration of public spaces. The collaboration has just allowed the practice to be upscaled, configuring the possibility to replicate this kind of intervention in the public spaces of the seafront, as well as in further areas of the historic center. The success of the practice has awakened residents and local traders' control over the square.

CONCLUSION: MAKING THE CARING CITY MODEL WORK AT THE CORE OF FRAGILE CITIES

The legacy of Basaglian psychiatry and its interesting recent developments is the territorialized care as an antidote to hospitalization and isolation of the patient. Thanks to this approach, what is generally meant inconsistent with social order and rules or out of place – vulnerable people in particular – finds its proper place in urban life. Many years after the closure of psychiatric hospitals, we can still learn from the process of de-institutionalization and from therapeutic alternatives developed to replace hospital care. This is what we argue by describing the recent effects that the Caring City model is having on the city of Naples. Here, the urgency of countering urban fragilities related to the breaking of the pact between institutions and society in relation to the management of public parks and open spaces suggests following a path which, adopting the Basaglian legacy, leads to strengthening the needed intersection between health policies, rehabilitation therapies centered on users and citizen involvement. Such an approach stresses the importance of working on new alliances between public and private actors in order to make creative intersections among sectors and trigger regeneration effects.
From the fieldwork in Naples the passive role of the city administration emerges, based only on entrusting the LHA Na1 with the management of part of its open spaces. This is due to a lack of adequate staff involved in the management of green areas, to difficulties in managing the reappropriation of abandoned spaces, and deficiencies of the administrative apparatus, unable to

promote synergies and advances in the technical skills of municipal offices. Although the City lacks resources for territorial governance, not all local institutions are equally fragile. For example, the Addiction Service of LHA Na1 counts on the connection between intermediate services located in its area and social cooperatives as mediators between users and communities. Unlike the ten Municipalities of Naples, from Ponticelli to Posillipo, through which the City governs the urban territory, the intermediate centers of the LHA, thanks to the work carried out by cooperatives for supporting the social fabric, succeed in affecting the neighborhoods and making the difference. This basic territorial work allows, at the appropriate time, to prepare networks aimed at the implementation of specific projects.

Reflecting on the fertility of the vision connected to processes of territorialization of welfare, the therapy that rehabilitates vulnerable people by encouraging them to take care of their own living space and the community that surrounds them, activates the resilience of stigmatized subjects by overturning the traditional formulas of urban regeneration based on the aestheticization of danger in favor of communities taking control of their territories. [13]

NOTES

[1] Angelo Righetti, "I budget di salute, progetti terapeutici contro la finanziarizzazione del welfare," in *1° Atlante delle esperienze di riutilizzo e mancato riutilizzo dei terreni confiscati e delle realtà di agricoltura sociale in Campania*, ed. Antonio Esposito (Soveria Mannelli: Rubbettino, 2018), 371.
[2] Angelo Righetti, *Il budget di salute e il welfare di comunità: Metodi e pratiche* (Roma: Laterza, 2013).
[3] Franco Rotelli, "Verso la città che cura," Rivista delle Politiche Sociali 15, no. 2 (2018): 53-63.
[4] Rotelli, 58.
[5] Lorenzo De Vidovich, "Urban regeneration through the territorialization of social policies: Findings from the Microareas Programme in Trieste, Italy," Journal of Urban Regeneration and Renewal 13, no. 4 (2019): 406-421.
[6] Ota De Leonardis and Raffaele Monteleone, "Dai luoghi di cura alla cura dei luoghi a Trieste e dintorni," in *La contrattualizzazione nelle politiche sociali: forme ed effetti*, ed. Raffaele Monteleone (Roma: Officine, 2007), 167.
[7] De Leonardis and Monteleone, 170.
[8] "Fragile cities," Igarapé institute, accessed July 27, 2023. https://fragilecities.igarape.org.br/
[9] David John Selby and Kevin C. Desouza, "Fragile cities in the developed world: A conceptual framework," Cities, no. 91 (2019): 180-192, doi: 10.1016/j.cities.2018.11.018.
[10] "In quali comuni italiani la realizzazione del PNRR incontrerà le maggiori difficoltà?," Fondazione con il sud, accessed July 30, 2023, https://www.fondazioneconilsud.it/wp-content/uploads/2023/01/RAPPORTO_COMUNI-e-PNRR.pdf
[11] "Relazione di fine mandato anni 2016-2021," Comune di Napoli, accessed July 30, 2023, https://www.comune.napoli.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/22970/UT/systemPrint
[10] Rotelli, *Verso la città che cura*, 60.
[11] Tommaso Vitale, "Invisibilità e disinteresse. Come uscire dalla trappola delle policy community," in *Casi di politiche urbane. La pratica delle pratiche d'uso del territorio*, ed. Pier L. Crosta (Milano: Franco Angeli, 2009), 323.
[12] Lavinia Bifulco and Tommaso Vitale "Da strutture a processi: servizi, spazi e territori del welfare locale," Sociologia urbana e rurale 72, no. 25 (2003): 95-108, doi: 10.1400/70351ff. hal-01018178.
[13] Sharon Zukin, *The cultures of Cities* (Cambridge, MA: Blackwell Publisher,1995).

BIBLIOGRAPHY

Berruti, Gilda and Maria Federica Palestino. "New Alliances with The Environment in The Governance of The Metropolitan Naples." Iglus Quarterly 8, no. 4 (2023): 32-39.

Bifulco, Lavinia and Tommaso Vitale. "Da strutture a processi: servizi, spazi e territori del welfare locale." Sociologia urbana e rurale 72, no. 25 (2003): 95-108. doi: 10.1400/70351ff. hal-01018178.

Bifulco, Lavinia, Massimo Bricocoli and Raffaele Monteleone. "Activation and Local Welfare in Italy: Trends and Issues." Social Policy Administration 16, no. 2 (2008): 143-159. https://doi.org/10.1111/j.1467-9515.2008.00600.x

Bifulco, Lavinia. "Urban welfare and Social innovation in Italy." Social work and society International on-line journal 16, no. 2 (2018): 1-10.

Comune di Napoli. "Relazione di fine mandato anni 2016-2021." Accessed July 30, 2023. https://www.comune.napoli.it/flex/cm/pages/ServeBLOB.php/L/IT/IDPagina/22970/UT/systemPrint

Cresswell, Tim. *In Place/Out of Place: Geography, Ideology, and Transgression*. Minneapolis: University of Minesota Press, 1996.

De Boer, John, Robert Muggah, and Robert Patel. "Conceptualizing city fragility and resilience." Working Paper 5, Centre for Policy Research United Nations University (2016): 1-24. https://collections.unu.edu/eserv/UNU:5852/ConceptualizingCityFragilityandResilience.pdf

De Leonardis, Ota and Ludovico De Vidovich. "Innovazioni per l'apprendimento istituzionale: Il programma microaree della regione Friuli Venezia Giulia." Working Paper, Rivista online Urban@it 1 (2017): 1-11, ISSN 2465-2059.

De Leonardis, Ota and Raffaele Monteleone. "Dai luoghi di cura alla cura dei luoghi a Trieste e dintorni." In *La contrattualizzazione nelle politiche sociali: forme ed effetti*, edited by Raffaele Monteleone, 165-182. Roma: Officine, 2008.

De Vidovich, Ludovico. “Urban regeneration through the territorialisation of social policies: Findings from the Microareas Programme in Trieste, Italy.” Journal of urban Regeneration and Renewal 13, no. 4 (2019): 416-421. https://www.ingentaconnect.com/content/hsp/jurr/2020/00000013/00000004/art00007

Fondazione con il Sud. “In quali comuni italiani la realizzazione delle opere del PNRR incontrerà le maggiori difficoltà?” Accessed July 30, 2023. https://www.fondazioneconilsud.it/wp-content/uploads/2023/01/RAPPORTO_COMUNI-e-PNRR.pdf

Igarapè institute. “Fragile cities.” Accessed July 27, 2023. https://fragilecities.igarape.org.br/

Righetti, Angelo. *I budget di salute e il welfare di comunità: Metodi e pratiche*. Roma: Laterza, 2013.

Righetti, Angelo. “I “Budget di salute”, progetti terapeutici contro la finanziarizzazione del welfare.” In *1° Atlante delle esperienze di riutilizzo e mancato riutilizzo dei terreni confiscati e delle realtà di agricoltura sociale in Campania*, edited by Antonio Esposito, 365-380. Soveria Mannelli: Rubbettino, 2018.

Rotelli, Franco. "Verso la città che cura." Rivista delle politiche sociali, no. 2 (2018): 53–63.

Selby, J. David and Kevin C. Desouza. “Fragile cities in the developed world: A conceptual framework.” Cities, no. 91 (2019): 180–92. https://doi.org/10.1016/j.cities.2018.11.018.

Vitale, Tommaso. “Invisibilità e disinteresse. Come uscire dalla trappola delle policy community.” In *Casi di politiche urbane. La pratica delle pratiche d’uso del territorio,* edited by Pier L. Crosta, 315-330. Milano: Franco Angeli, 2009.

Zukin, Sharon. *The Cultures of Cities*. Cambridge, MA: Blackwell Publishers, 1995.

LIVING IN THE URBAN VOIDS: ENHANCING THE INTERSTITIAL SPACES OF THE CITY

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INTRODUCTION

City, urban life, and its citizens are linked inextricably. Cities operate as crucial global economic platforms, attracting numerous migrants in search of job opportunities. Currently, 56% of the world's population resides in cities. The urban population is projected to nearly double by 2050 as per the World Bank Data.[1] With the influx of migrants in the city, the infrastructure demand to cater to the population increases drastically. This often results in the planning and designing of new infrastructure such as road networks, water supply, housing, etc. As cities compete to be more livable for their citizens, public open spaces are becoming a scarce resource, Urban planners frequently develop a frozen vision of the city disregarding the urban voids created within the planned domain.[2] As the cities continue to grow their perimeters, it is crucial to revisit and revitalize the neglected urban voids/lost spaces.[3]

Urban Voids

The topic of urban voids has been in academic circles for nearly half a century. Urban voids have been conceptualized and labeled by numerous researchers and academics using various nomenclatures throughout the years. Trancik used the phrase "lost space" to refer to anti-spaces that fail to add anything valuable to their surroundings or users. These areas are poorly defined and ineffectively integrate various urban components leading to city fragmentation and social isolation for the community.[4] Greenberg, Popper, and West used the term "TOADS" to describe unused land, commercial and industrial structures, and vacant properties that endanger public safety or have been deliberately disregarded by their owners or management. It draws attention to the possible risks and neglect connected to these abandoned places.[5] According to Abraham and Ariela, "Urban Voids" refers to underutilized areas outside of formal physical places in the city. The phrase emphasizes their capacity for change and reactivation.[6] The phrase "terrain vague" was created by Ignasi de Sola-Morales to characterize ambiguous, uninhabited areas with hidden potential. This word emphasizes the ambiguity of such areas, which may not have a clearly defined purpose but have the potential for growth or creative change in the future.[7]

For the research study, urban voids would be defined as an area that is currently unoccupied and unused but can be better utilized. They may result from man-made infrastructures like bridges, highways, shopping centers, and industrial zones, or natural limits like rivers, marshes, mountains, and woodlands.[8] The scale of the urban void ranges from that of a building, plot, or block to that of a

neighborhood or community. These are the abandoned locations where, despite their full separation from urban life, just a few residual values seem to have persisted.[9] Urban voids may come across as unclear and uncared for, as suggested by their different titles. The presence of urban voids and neglect of their usage hampers the livability of cities to a great extent. They pose a threat to the citizens as they become the points of unconstitutional and illegal activities, urban blight, crime risks, etc.[10] (Figure 01) The spaces contribute to the urban heat island effect with reduced urban greenery, and increased heat absorption of these spaces.[11] All of the research articles analyzed during the process focused on the subject of urban void space in a city and the need for adaptable spaces in terms of users, activities, or even acreage to ensure that the city complies with and meets the rising demand. Temporary spaces are far more inclusive than rigid and permanent design solutions.[12].

Figure 13. Urban Voids and Livability of Cities

Urban Void Management

Urban void management may run into several obstacles and limitations that might prevent its successful execution. Due to fragmented ownership, ambiguous property tenure, or complicated legal issues, it is difficult to obtain or use vacant areas. Implementation and maintenance, programming, and infrastructure upgrades for urban voids are at an impasse due to the local administration's inadequate financial resources. Effective management efforts for urban voids are complicated by a lack of coordination and collaboration among various stakeholders, including governmental, and community organizations, and corporate businesses.[13] The adaptive reuse or redevelopment of urban voids can be hampered by rigid planning laws, zoning limitations, and administrative procedures, which reduces their capacity for efficient administration.[14] Urban void spaces may not be used to their full potential or may even be neglected if there is little community involvement in management and decision-making processes. They have limited functioning and appeal due to inadequate infrastructure, such as a lack of utilities or access to transit. The study looks at the multiple facets of urban void management and aspects concerning assuring effective utilization of urban void spaces.[15]

RESEARCH DESIGN

The research looks at several facets, approaches, and procedures that may be used to manage urban voids to improve city livability. The study's aim is to look at methods and procedures for managing urban voids to make cities more livable. The research's objectives would be:

1. To examine and assess recent research on the idea of urban voids, their characteristics, and the management issues they raise.
2. To identify various components of urban void management, as well as the available tools and approaches. This would include identifying urban voids, managing stakeholders, assessing the value of the area, and planning for urban openings, among other elements of managing urban voids.
3. To identify and evaluate multiple strategies and techniques for managing urban voids in cities all around the world done through compilation of several case studies. This would make it easier to comprehend how various cities are using these areas and what the benefits and drawbacks of such space interventions are.

METHODOLOGY

The literature study expands current knowledge, highlights research needs, and develops a solid theoretical foundation. Researchers enhance their research questions and approach by extensively analyzing relevant literature. This research examines the literature on urban void management, covering the process from subject discovery through the summarization of major findings.
1. Establishing the Study's Scope and Research Question: This entails determining the main problems, obstacles, or occurrences connected to urban voids and sets the parameters and emphasis of the research, as well as the scope of the study.
2. Consolidation of Terms Related to the Study: It is crucial to group and define pertinent terms to maintain consistency throughout the literature review. Among them are the terms like "Urban Void," "Stakeholder," "Value Evaluation," and "Strategies and Solutions of Urban Voids."
3. Acquiring Literature from Multiple Sources: The following stage is doing a thorough literature search relevant to the research question, including investigation of several sources, such as scholarly databases, journals, conference proceedings, books, and reports.
4. Selection of Literature Based on Relevance: After identifying a sizable body of literature, it will be necessary to critically assess each piece to establish its relevance to the research topic and field of study.
5. Data Extraction and Consolidation: Each source is thoroughly investigated and examined after the pertinent literature has been chosen. Urban void management-related critical data, conclusions, tactics, and techniques are gathered and structured.
6. Summarizing the Key Findings: The last phase entails writing a summary of the major conclusions, ideas, and methods found in the literature. Finding recurring themes, patterns, and trends in urban void management techniques is part of this. The research gaps and prospective topics for additional research are also consolidated giving a direction to further the study.

RESULTS

Aspects of Urban Void Management

Urban void management encompasses several facets that are essential for the efficient utilization and optimization of spaces in the city. The first phase would be the identification of urban voids, by a thorough study of the area. This would require surveys, mapping, and data analysis to assess the geographical distribution of the spaces.[16] The second phase would be effective stakeholder management which would entail collaboration, inclusion, and alignment of the initiatives taken for the spaces with community needs. The third phase would be space evaluation. This would include determining the potential social, economic, and environmental worth of identified urban voids. This would evaluate the viability of different interventions for the spaces.[17] The subsequent phase would be the planning and design stage. By doing so, the desired use of the area, its aesthetics, and the spatial integration of urban void spaces into urban fabric can all potentially be addressed. The

administration of the areas would be the final phase. To draw people and create active places, effective management requires activating vacant areas through programming, events, and amenities.[18] Modifications in the space would be feasible through constant surveillance and adaptive management, which take into account community feedback and shifting demands.[19]

Identification and Classification of Urban Voids

Numerous variables, such as border delineation, land use categorization, development size, and land utilization, can be used to identify urban voids. These methods offer insightful information on the location and nature of urban void areas in a city. Established boundaries would serve as the foundation for the first degree of identification. These areas are frequently devoid of physical confinement, which makes them simple to identify. This category includes areas such as flyover spaces and abandoned railway trestles. once the fenced-off areas have been occupied. The analysis of land use data would be the next stage in the identification process to find places with little to no development activity. Potential urban voids might be indicated by areas designated as open spaces, empty land, or lands with temporary constructions.[20] Based on the level of expansion in a certain location, urban voids can be located. Small, scattered plots of land or isolated pockets of undeveloped land within densely populated regions may be signs of void spaces. Additionally, it would encompass areas that have a certain land use but have not been developed per it.[21] The analysis of land use intensity would be the next step in the identification process. Areas having minimal or no use, such as vacant lots, underused parks, etc., are referred to as void spaces. Figure 02 illustrates the various stages of identification of urban voids. Integrating the aforementioned criteria and doing spatial analysis to find locations with potential for redevelopment or activation would provide a complete strategy for detecting urban voids. Visualizing and mapping these vacant areas frequently involves the use of Geographic Information System (GIS) tools and data analysis techniques.[22]

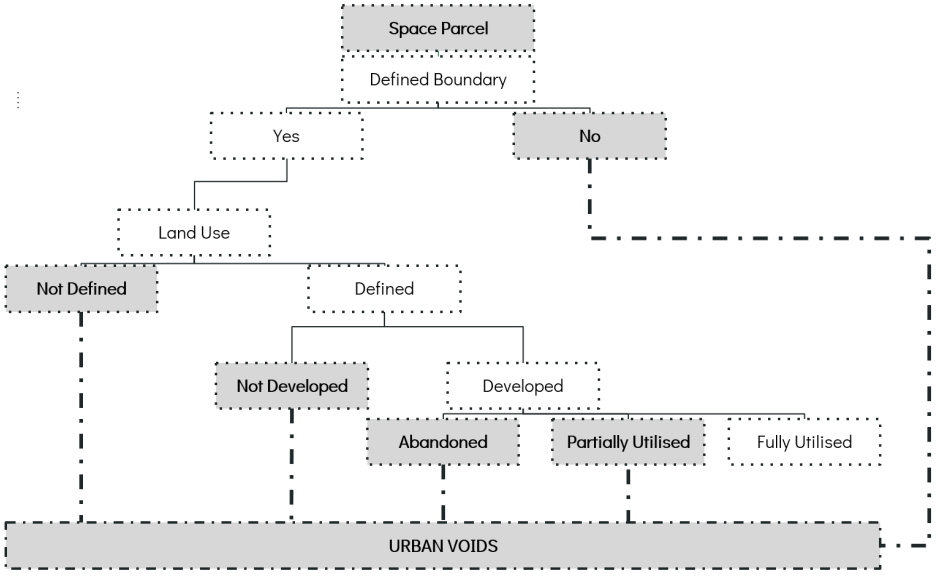

Figure 14. Identification of Urban Void Space

Stakeholder Management Plan

Due to their varied agendas and interests, stakeholders are frequently portrayed as the parties or people who have an effect on or are impacted by any project's objectives. They can use their decisions to impact the project in a favorable or bad way[23]. The activity of coordinating, monitoring, and

enhancing communication among stakeholders is known as stakeholder management. It involves locating the stakeholders, understanding their requirements and expectations, and including them in the process. For the identification, analysis, and prioritization of stakeholders, conventional methods such as Surveys, Focus Groups, Workshops, etc. are considered.[24] Some non-conventional methods for the same are Salience Model, Social Network Analysis, Stakeholder Knowledge Base Chart, etc. For stakeholder engagement, conventional methods are Surveys, Polls, Workshops, Open houses, etc., and non-conventional methods include PPGIS, Mobile Participation, 3D Visualization, etc (Table 01) .[25] The best methods for stakeholder management have to be chosen as per the local context in terms of social-economic background of the demography, level of community involvement, and financial funding available. [26]

Stakeholder Management Plan						
	Identification, Analysis and Prioritization			**Engagement**		
Conventional Methods	Survey	Focus Groups	Snowballing	Poll	Survey	Field Trips
	Interviews	Power/Interest Matrix	Workshops	Focus Groups	Workshops	Internet
				Interview	Open House	Public Hearing
Non-Conventional Methods	Stakeholder Analysis SHA	Actor-Network Theory	Stakeholder Knowledge Base Chart	PPGIS	3D Visualization	AR VR
	Salience Model	Social Network Analysis		Mobile Participation	Social Media and Big Data Analytics	Gamification

Table 1. Stakeholder Management Plan

Value Evaluation of Spaces

All techniques for describing or predicting a piece of space's use potential can be categorized as space evaluation. The monetary value of land that might be produced from the parcel of land makes up the tangible value of the space.[27] These include the economic and commercial value of the land. The social and environmental value of land, also known as the intangible worth of land, is the value of land associated with the community's view and aspirations for the place.[28] Various tools and techniques can be used for the value evaluation of spaces as has been illustrated in Figure 02. These can be prediction mathematical models or methods wherein community perception is taken into consideration to determine the potential of the land .[29]

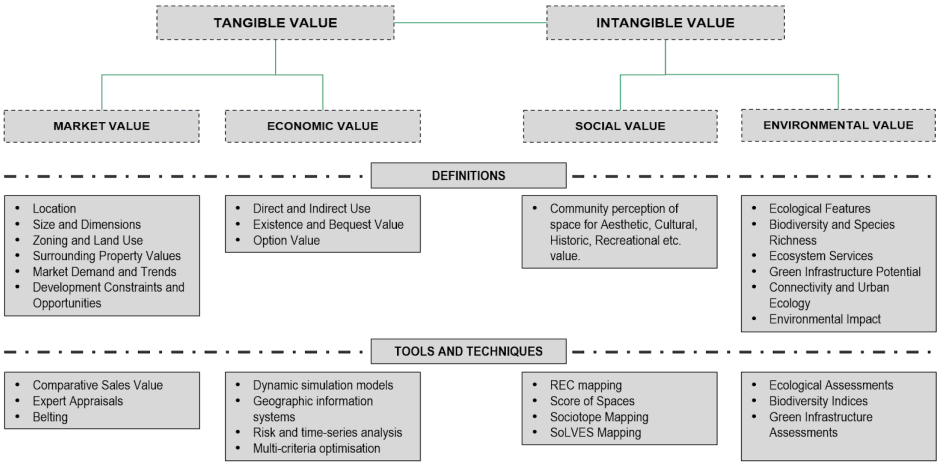

Figure 3. Value Evaluation Tools

Strategies for Urban Void Optimization

Once the potential of the space and stakeholders associated with the space is identified, the optimization plan for the spaces is made using placemaking strategies. Placemaking is a broad tactic that includes the planning, design, and administration of public places with the goal of optimizing resource utilization and promoting community well-being. It encourages engagement between people and places by emphasizing a location's physical, cultural, and social characteristics. It helps the community shape the public domain to meet their requirements. Strategic placemaking focuses on particular goals, such as economic or institutional reforms to attract investment or revitalize neighborhoods. The goal of creative placemaking is to restore and promote community identity via artistic interventions such as cultural events and public art installations. Tactical placemaking is beneficial for addressing social and economic challenges through small-scale, low-cost trials. Providing inclusive, dynamic, and people-centric public places, strategies promote urban vibrancy, develops a sense of belonging, and encourage community progress.[30]

National and International Case Studies

Various case studies worldwide were analyzed to address different types of urban void spaces. Abandoned urban voids included L'Aquila, Italy; North Lanarkshire, Scotland; and Land's End Precinct, Mumbai, India, transformed into multifunctional public spaces and woodlands. Undeveloped voids comprised L'Aquila, Italy, transformed into a community space; Victoria, Australia, turned into a cultural community area; and Jabalpur, India, converted into a lakefront recreational space. Residual voids encompassed Sydney, Australia's laneways; Kuala Lumpur, Malaysia's flyover spaces; and MG Road Boulevard, Bengaluru, India, transformed into cultural and commercial hubs. All proposals contributed to the cities' economic and social vitality. Table 02 consolidates these case studies with stakeholder involvement, space valuation, and implemented solutions.

Name	Present Status of Space	Interventions
Land Parcel, L'Aquila, Italy	**Classification**: Abandoned **Stakeholders**: Public, Government and Community Volunteers **Value Associated**: Informally used as community space; Not maintained	**Solution Criteria**: Tactical and Strategic **Solution:** Multifunctional public spaces and meeting places. Temporary Housing Modules **Benefits:** Social and Economic Value Addition
Landfill Site, North Lanarkshire, Scotland	**Classification**: Abandoned **Stakeholders**: Public, and Government **Value Associated**: Degraded land No social and economic value.	**Solution Criteria**: Strategic **Solution:** New woodland habitat Space for public congregation **Benefits:** Social Value Addition
Land's End Precinct, Mumbai, India	**Classification**: Abandoned **Stakeholders**: Public, and Government **Value Associated**: Aesthetic and Historical Value	**Solution Criteria**: Strategic **Solution:** Retention of space as social cohesion point with minimum intrusion in spaces **Benefits:** Social and Economic Value Addition
Unused space, L'Aquila, Italy	**Classification**: Undeveloped **Stakeholders**: Public, NGOs, Volunteers, and Government **Value Associated**: Informally used as community space.	**Solution Criteria**: Tactical **Solution:** Revitalization with low-cost rubble stone street furniture **Benefits:** Social Value Addition
Name	**Present Status of Space**	**Interventions**
Under-utilized street, Victoria, Australia	**Classification**: Undeveloped **Stakeholders**: Public, and Government **Value Associated**: Historical significance	**Solution Criteria**: Tactical **Solution: I**nviting public space with active sports, food fests and cultural performances **Benefits:** Social and Economic Value Addition
Gullaua Taal, Jabalpur, India	**Classification**: Undeveloped **Stakeholders**: Public, NGOs, and Government **Value Associated**: Unmaintained space Used as Dumping ground	**Solution Criteria**: Strategic **Solution:** Conversion into a lakefront promenade with Open Air Theater. Exhibition space, Cafeteria, Hawker's Zone, Musical fountain and public utilities **Benefits:** Social and Economic Value Addition
Laneways, Sydney, Australia	**Classification**: Residual **Stakeholders**: Public, Business Owners, and Government **Value Associated**: Historical significance Serves as a service lane	**Solution Criteria**: Strategic, Tactical and Creative **Solution:** Outdoor extended sitting spaces for cafes, bars, and restaurants, Installation of street furniture, Permanent and Temporary Art Installation. **Benefits:** Social and Economic Value Addition
Underneath Flyover, Kuala Lumpur, Malaysia	**Classification**: Residual **Stakeholders**: Public, Business Owners, and Government **Value Associated**: Point of traffic congestion and illegal parking.	**Solution Criteria**: Strategic **Solution:** Food Stalls, Community Cultural and Social Activity Arena **Benefits:** Social and Economic Value Addition
MG Road Boulevard, Bengaluru, India	**Classification**: Residual **Stakeholders**: Public, Metro Development Authorities, and Government **Value Associated**: Aesthetic and culturally significant	**Solution Criteria**: Strategic, and Creative **Solution:** Urban Art Space with areas for workshops and activities and restaurant space **Benefits:** Social and Economic Value Addition

Table 2. Case Studies

CONCLUSION

Urban void management plays a crucial role in improving city livability. Through effective planning, these spaces can be transformed into active and useful areas, fostering a sense of ownership and pride in the community, promoting social interaction, creating vibrant and inclusive settings for all residents. The study highlighted the benefits of planning interventions of such spaces to enhance the city image and experience. Cities in developing nations face challenges in achieving resilient and sustainable urban design. By incorporating urban voids as essential elements of urban design and governance, these cities can promote more sustainable, inclusive, and resilient ecosystems. Despite lacking formal recognition in the city master plan, these urban voids are cherished by the community and offer diverse opportunities and uses throughout the city. Although the numerous benefits of activating urban voids, the literature review discovered that these places are frequently not taken into account within city's master plan. The void spaces are often planned as an afterthought, resulting in fragmented planning. The research highlights the importance of integrating these spaces at master plan level to enable a comprehensive approach ensuring a planned integration into the broader urban fabric using technologies like GIS and AI for decision-making, supporting sustainable design, community involvement, and data-driven decision-making.

NOTES

[1] The World Bank, *"Urban Development Overview",* April 03, 2023, https://www.worldbank.org/en/topic/urbandevelopment/overview#1.
[2] Yulia Nurliani Lukito, and Rumishatul Ulya. *"Negotiated Urban Space At Manggarai Station Jakarta: The Appropriation Of Space By Bajaj Drivers."* Journal of Architecture and Built Environment (2018) 45 (1): 9-18.
[3] Jasim Azhar, Morten Gjerde, Brenda Vale, and Muhammad Asif. *"Perception of Urban Leftover Spaces: A Comparative Study of Built Environment and Non-Built Environment Participants."* Architecture (2022) 2: 231-244. https://www.mdpi.com/2673-8945/2/2/13.
[4] Roger Trancik. *"Finding lost space: theories of urban design"*. New York: Van Nostrand Reinhold, New York (1986).
[5] Michael R. Greenberg, Frank J. Popper, and Bernadette M. West. *"The TOADS: A New American Urban Epidemic."* Urban Affairs Quarterly (1990) 25 (3): 435-454.
[6] Abraham Akkerman, and Ariela F. Cornfeld. *"Greening As An Urban Design Metaphor: Looking For The City's Soul In Leftover Spaces."* Structurist (2010) 30-35.
[7] Ignasi Sola de Morale. *"Terrain Vague."* In Anplace. New York: MIT Press, 1995.
[8] Omnia Mamdouh Hashem, Sherine Mohy-Eldin Wahba & Tarek Ibrahim Nasr-Eldin. *"Urban voids: identifying and optimizing urban voids potential as a revitalization source in enhancing developing countries' city income."* Journal of Engineering and Applied Science (2022) 69 (1).
[9] Seog Jeong Lee, Soewon Hwang, and Dongha Lee. *"Urban Voids: As a Chance for Sustainable Urban Design."* (2015) 06. 474-489.
[10] William Solecki, Karen C. Seto, and Peter J. Marcotullio. *"It's Time for an Urbanization Science."* Environment: Science and Policy for Sustainable Development (2013) 55 (1): 12-17.
[11] Mattheous Santamouris. *"Cooling the cities – A review of reflective and green roof mitigation technologies to fight heat island and improve comfort in urban environments."* Solar Energy (2014) 103: 682-703.
[12] Hannah Shaw, and Alapana Sivam. *"A temporary city: temporary use as a tool for urban design in the creation of convivial urban space."* State of Australian Cities Conference Proceedings – SOAC (2016). https://find.library.unisa.edu.au/primo-explore/fulldisplay?vid=ROR&id=9916023110601831.
[13] Ali Madanipour, Sabine Knierbein, and Aglaée Degros. *"Public space and the challenges of urban transformation in Europe."* Routledge. Routledge (2013).
[14] Patrick Barron, and Manuela Mariani. *"Terrain vague: interstices at the edge of the pale."* Routledge (2013).
[15] Nadia Amoroso. *"The exposed city: mapping the urban invisibles."* Routledge (2010).
[16] Agata Pluta. *"The importance of empty spaces in cities and a proposed set of tools to support their use."* Biblioteka Regionalisty (2019) 168-179.
[17] John Montgomery, John. *"Making a city: Urbanity, vitality and urban design."* Journal of Urban Design (1998) 3 (1): 93-116.
[18] Project for Public Spaces. *"Ten Strategies for Transforming Cities and Public Spaces through Placemaking."* Project for Public Spaces. 8 January, 2018. https://www.pps.org/article/ten-strategies-for-transforming-cities-through-placemaking-public-spaces.
[19] Jan Gehl. *"Cities for People."* Island Press (2010).
[20] Hana Abdel, and Paula Pintos. *"Interstitial Spaces and Public Life, the Overlooked Interventions that Weave our Built Environment."* ArchDaily. 8 July, 2022. https://www.archdaily.com/984818/interstitial-spaces-and-public-life-the-overlooked-interventions-that-weave-our-built-environment.
[21] Jimly Al Faraby. *"Street Space and Informality: Towards an Inclusive Community.", 2016*
[22] Kathryn Ewing. *"Spaces of Transformative Practice: Co-producing, (Re)Making and Translating Fractional Urban Space in Gugulethu, Cape Town."* Urban Forum (2021) 32 (4): 395-416.
[23] Rebecca Jing Yang. *"An investigation of stakeholder analysis in urban development projects: Empirical or rationalistic perspectives."* International Journal of Project Management (2014) 32 (5): 838-849.
[24] Sebastian Toukola, and Tuomas Ahola. *"Digital tools for stakeholder participation in urban development projects."* Project Leadership and Society (2022) 3.
[25] NOAA. *"Introduction to Stakeholder Participation Social Science Tools for Coastal Programs."* Office of Coastal Management, US, 2015.
[26] R. Edward Freeman, and John F. Mcvea. *"Strategic Management: A Stakeholder Approach", 2010.*

[27] Walter Timo de Vries, and Winrich Voß. *"Economic Versus Social Values in Land and Property Management: Two Sides of the Same Coin?"* Raumforschung und Raumordnung | Spatial Research and Planning (2018) 76 (5).
[28] RICS. *"Measuring social value in infrastructure projects: insights from the public sector."* London: Royal Institution of Chartered Surveyors, 2020.
[29] Biswas Sattwick Dey. *"Plural Values of Land: An Empirical Investigation."* Journal of Land and Rural Studies (2021) 9 (1): 140-157.
[30] Project for Public Spaces. *"Ten Strategies for Transforming Cities", 2018*

BIBLIOGRAPHY

Abdel-Aziz, Ayat Ayman, Hassan Abdel Salam, and Zeyad El-Sayad. "The role of ICTs in creating the new social public place of the digital era." *Alexandria Engineering Journal* (2016) 55 (1): 487-493. doi:10.1016/j.aej.2015.12.019.

Appleyard, Donald, M. Sue Gerson, and Mark Lintell. *Liveable Streets.* University of California Press, 1981.

Auziņš, Armands, and Uchendu Eugene Chigbu. 2021. "Values-led planning approach in spatial development: A methodology." *Land* 10 (5). doi:10.3390/land10050461.

Azhar, Jasim, and Sidra Ahmed Qureshi. "Smart Cities: The role of Entrepreneurship for Urban Leftover Spaces." *11th International Conference on Smart Cities and Green ICT Systems.* (2022) 165-172. doi:10.5220/0011104500003203.

Azhar, Jasim, Gjerde Morten, and Brenda Vale. "Re-imagining Urban Leftover Spaces." In *Smart and Sustainable Cities and Building*, 307-318. Springer International Publishing, 2020. doi:10.1007/978-3-030-37635-2_21.

Azhar, Jasim, Morten Gjerde, Brenda Vale, and Muhammad Asif. "Perception of Urban Leftover Spaces: A Comparative Study of Built Environment and Non-Built Environment Participants." *Architecture* (2022) 2 (2): 231-244. doi:10.3390/architecture2020013.

Battle, Guy, and David Green. 2017. *Integrating Social Value Value into Planning Overview.* DeltaPlanning.

Bhaskaran, Rekha. "Urban Void - a 'Bypassed' Urban Resource." *International Conference on Urban Sustainability: Emerging Trends, Themes, Concepts & Practices (ICUS) 2018.* doi:10.2139/ssrn.3208217.

Bishop, Peter, and Lesley Williams. *The Temporary City.* Routledge, 2012.

Biswas, Sattwick Dey. "Plural Values of Land: An Empirical Investigation." *Journal of Land and Rural Studies* (2021) 9 (1): 140-157. doi:10.1177/2321024920968333.

Biswas, Sattwick Dey. "Social Citizenship and Plural Values of Land: Land Acquisition Cases from India." *Social Policy and Society* (2020) 19 (2): 331-342. doi:10.1017/S1474746419000496.

borealis by Gregoire, Patrick. *Stakeholder Analysis: Definitions, Tools and Techniques.* Borealis, 2022. https://shorturl.at/nL367.

Brown, Gregory, and Christopher Raymond. "The relationship between place attachment and landscape values: Toward mapping place attachment." *Applied Geography* (2007) 27 (2): 89-111. doi:10.1016/j.apgeog.2006.11.002.

Capital by Lepcha, Mensholong. n.d. *Stakeholder definition.* capitak. https://capital.com/stakeholder-definition.

Carmona, Matthew. *Public Places Urban Spaces: The Dimensions of Urban Design.* 1st. London: Routledge, 2003. doi:10.4324/9780080515427.

Carnemolla, Phillippa, Deborah Debono, Fleur Hourihan, Suyin Hor, Hamish Robertson, and Jo Travaglia.. "The influence of the built environment in enacting a household model of residential aged care for people living with a mental health condition: A qualitative post-occupancy evaluation." *Health and Place* 71. doi:10.1016/j.healthplace.2021.102624.

Centre for Policy Research. "India's urbanisation challenge: Interstitial spaces and their governance."

Ciria Open Space Website. n.d. *Opportunities for previously developed land.* Ciria Open Space, 2019. https://shorturl.at/pKLP6.

Cunha, Manuela Alves da, Lidice Almeida Arlego Paraguassú, Jose Geraldo de Aquino Assis, Arthur Benjamin de Paula Carvalho Silva, and Ryzia de Cassia Vieira Cardoso. "Urban gardening and neglected and underutilized species in Salvador, Bahia, Brazil." *Journal of Ethnobiology and Ethnomedicine* (2020) 16 (1). doi:10.1186/s13002-020-00421-0.

darzin software. n.d. *Stakeholder Management The ultimate guide.* darzin software. https://shorturl.at/kIKPU.

Drake, Luke, and Laura J. Lawson. “Validating verdancy or vacancy? The relationship of community gardens and vacant lands in the U.S.” *Cities* (2014) 40: 133-142. doi:10.1016/j.cities.2013.07.008.

El Gawad, Nehad S. Abd, Khalid S. Al-Hagla, and Dina M Nassar. “Place making as an approach to revitalize Neglected Urban Open Spaces (NUOS): A case study on Rod El Farag Flyover in Shoubra, Cairo.” *Alexandria Engineering Journal* (2019) 58 (3): 967-976. doi:10.1016/j.aej.2019.08.011.

Foo, Katherine, Deborah Martin, Clara Wool, and Colin Polsky. “The production of urban vacant land: Relational placemaking in Boston, MA neighborhoods.” *Cities* (2014) 40: 175-182. doi:10.1016/j.cities.2013.12.006.

Franck, Karen, and Quentin Stevens. *Loose Space: Possibility and Diversity in Urban Life.* Routledge, 2006. doi:10.4324/9780203799574.

Freeman, R. Edward, and John F. Mcvea. *Strategic Management: A Stakeholder Approach,* 2010.

Gehl, Jan. *Cities for People.* Washington, DC: Island Press, 2010.

Godrej Properties. *What is the Market Value of Land (or Guidance Value)?* Magicbricks, 2022. https://shorturl.at/ruFXY.

Groot, Rudolf de, Rob Alkemade, L. Braat, Lars Hein, and Louise Willemen. “Challenges in integrating the concept of ecosystem services and values in landscape planning, management and decision making.” *Ecological complexity* (2010) 7 (3): 260-272. doi:10.1016/j.ecocom.2009.10.006.

Halstead, John M. “Measuring the Nonmarket Value of Massachusetts Agricultural Land: A Case Study.” *Journal of the Northeastern Agricultural Economics Council* (1984) 13 (1): 13-19. doi:10.1017/s0163548400004027.

Hashem, Omnia Mamdouh, Sherine Mohy-Eldin Wahba, and Tarek Ibrahim Nasr-Eldin. “Urban voids: identifying and optimizing urban voids potential as a revitalization source in enhancing developing countries’ city income.” *Journal of Engineering and Applied Science* (2022) 69 (1). doi:10.1186/s44147-021-00053-5.

Hossed, Asad. “Urban voids or Lost Space in High-Density City.” *Thesis Report,* 2019.

Hussain, Sarah Silan, and Asmaa Muhamad Hussain. “The Role of Addition in Leftover Places in the Sustainability of Historical Buildings.” *IOP Conference Series: Materials Science and Engineering,* 2020. doi:10.1088/1757-899X/881/1/012011.

Institute Project Management. *What are Stakeholders and Why are They Important?* Institute Project Management, 2022. https://www.projectmanagement.ie/blog/stakeholders/.

Investopedia: Fernando, Jason. *What Are Stakeholders: Definition, Types, and Examples.* Investopedia. March, 2023. https://www.investopedia.com/terms/s/stakeholder.asp.

Johnson, Michael P., Justin Hollander, and Alma Hallulli. “Maintain, demolish, re-purpose: Policy design for vacant land management using decision models.” *Cities* (2014) 40: 151-162. doi:10.1016/j.cities.2013.05.005.

Kalfas, Dimitirious, Fotios Chatzitheodoridis, Efstratious Loizou, and Katerina Melfou. “Willingness to Pay for Urban and Suburban Green.” *Sustainability* 14, 2022. https://www.mdpi.com/2071-1050/14/4/2332.

Karacor, Elif Kutay, and Ezgi Akcam. “Comparative Analysis of the Quality Perception in Public Spaces of Duzce City.” *Current Urban Studies* (2016) 4 (3).

Kasarabada, Divya. *Urban Leftovers: Identifying and Harnessing their potential for the Agenda 2030 in Malmö.* Malmo University, 2020.

Kim, Gunwoo. “The Public Value of Urban Vacant Land: Social Responses and Ecological Value.” *Sustainability (Switzerland)* (2016) 8 (5). doi:10.3390/su8050486.

KPMG. *Envisioning Urban India at 2047,* 2022. KPMG. https://rb.gy/efmd2.

Kuo, Frances E., and William C. Sullivan. “Environment and crime in the inner ciyt: Does vegetation reduce crime.” *Environment and Behaviour* (2001) 33 (3): 343-367. doi:10.1177/0013916501333002.

Kuranchie, Francis Atta, Francis Attiogbe, Joseph Tettey Quarshie, and Richard Agbo Kwabena Ntibrey. “Land scarcity as a site selection challenge for the management of municipal solid wastes in Accra, Ghana.” *International Journal of Environment and Waste Management* (2020) 26 (4). doi:10.1504/ijewm.2020.10029038.

Kushwah, Neelam, and Keshav Rathi. “Urban Voids – Reclaiming Urban Space.” *International Journal of Advance Research, Ideas and Innovations in Technology* (2017) 3. https://api.semanticscholar.org/CorpusID:157301120.

Langegger, Sig. “Emergent public space: Sustaining Chicano culture in North Denver.” *Cities* (2014) 40: 183-189. doi:10.1016/j.cities.2013.12.007.

Lee, Seog Jeong, Soewon Hwang, and Dongha Lee. *Urban Voids: As a Chance for Sustainable Urban Design,* 2015. doi:10.3390/ifou-D007.

Lukito, Yulia, and Rumishatul Ulya. “Occupying Leftover Urban Space by Bajaj in Manggarai Station, Jakarta.” *DIMENSI (Journal of Architecture and Built Environment)* (2018) 45: 9. doi:10.9744/dimensi.45.1.9-18.

Lv, Hong, Xinjian Guan, and Yu Meng. “Study on economic value of urban land resources based on emergy and econometric theories.” *Environment, Development and Sustainability* (2021) 23 (1): 1019-1042. doi:10.1007/s10668-019-00573-4.

Madurapperuma, B.D., and K.A.J.M Kuruppuarachchi. “Rehabilitating a landfill site of lowland tropical landscape into an urban green space: A case study from the Open University of Sri Lanka.” *International Journal of Sustainable Built Environment* (2016) 5 (2): 400-410. doi:10.1016/j.ijsbe.2016.09.001.

Ministry of Housing and Urban Affairs. “Report of the high-powered committee on urbanisation.”, 2019.

MoHUA. *Handbook of Urban Statistics 2019.* MoHUA.

Moulay, Amine, and Norsidah Ujang. “Insight into the issue of underutilised parks: what triggers the process of place attachment?” *International Journal of Urban Sustainable Development* (2021) 13 (2): 297-316. doi:10.1080/19463138.2021.1885039.

Naghibi, Maryam, Mohsen Faizi, and Ahmad Ekhlassi. n.d. “The role of user preferences in urban acupuncture.” *Urbani Izziv* 31 (2): 114-126.

Nakamura, Hiroki. “Relationship among land price, entrepreneurship, the environment, economics, and social factors in the value assessment of Japanese cities.” *Journal of Cleaner Production* (2019) 217: 144-152. doi:10.1016/j.jclepro.2019.01.201.

NIUA. *Transforming Urban Landscape in India.* National Institute of Urban Affairs, New Delhi, 2022. https://niua.in/blogs/transforming-urban-landscape-india-compendium-75-public-spaces.

NOAA. *Introduction to Stakeholder Participation Social Science Tools for Coastal Programs.* Office of Coastal Management, US, 2015.

n.d. “Non-Market Valuation Methods.” In *Social Cost Benefit Analysis and Economic Evaluation*. The University of Queensland.

Omar, Nermeen Ali, and Engy Hassan Saeed.. “Urban Voids as Potential Resources for the City Development.” *Journal of Engineering Sciences* (2019) 47 (5): 585-600. doi:10.21608/jesaun.2019.109853.

Pearsall, Hamil, and Susan Lucas. “Vacant land: The new urban green?” *Cities* (2014) 40: 121-123. doi:10.1016/j.cities.2013.10.001.

PM Vidya. n.d. *Salience Model Stakeholder Classification in Project Management.* PM Vidya. https://shorturl.at/ryCKV.

ProductPlan. n.d. *Stakeholder Analysis.* ProductPlan. https://shorturl.at/inDPU.

Project for Public Spaces. *What is Placemaking?* Project for Public Spaces, 2004. https://www.pps.org/article/what-is-placemaking.

Project Manager by Landau, Peter. *What Is a Stakeholder? Definitions, Types & Examples.* ProjectManager, 2022. https://rb.gy/tp9qai.

Qamaruz -Zaman, Nurulhusna, Zalina Samadi, and Nik Farhanah Nik Azhari. “Opportunity in Leftover Spaces: Activities Under the Flyovers of Kuala Lumpur.” *Procedia - Social and Behavioral Sciences* (2012) 68: 451-463. doi:10.1016/j.sbspro.2012.12.241.

Rahmann, Heike, and Marieluise Jonas. *Urban Voids: The hidden dimension of temporary vacant spaces in rapidly growing cities, 2011.*

Raisoni, Harshad, Jitendra Singh, and Arati Petkar. *An Introspection of formulation of Urban Voids in highly urbanized Indian Cities, 2020.*

Ramos, Caryl. “Student Homelessness : Sheltering Our Future An Adaptable Approach to Underutilised City Spaces.”, 2018.

Raymond, Christopher M., Brett A. Bryan, Darla Hatton MacDonald, Andrea Cast, Sarah Strathearn, Agnes Grandgirard, and Tina Kalivas. “Mapping community values for natural capital and ecosystem services.” *Ecological Economics* (2009) 68 (5): 1301-1315. doi:10.1016/j.ecolecon.2008.12.006.

RICS. “Measuring social value in infrastructure projects: insights from the public sector.” London: Royal Institution of Chartered Surveyors, 2020.

Rooney-Browne, Christine. “Methods for demonstrating the value of public libraries in the UK: a literature review.” *Library and Information Research* (2011) 35 (109): 3-39. doi:10.29173/lirg469.

Sahu, Manoj, Kailash Chandra Das, and Bibhishana Bhuyan. “Role of Census Towns in Rising Urbanisation of India.”, 2019.

Santamouris, Mattheos. "Cooling the cities–a review of reflective and green roof mitigation technologies to fight heat island and improve comfort in urban environments." Solar energy 103 (2014): 682-703. doi:10.1016/j.solener.2012.07.003.

Shaw, Hannah, and Alpana Sivam. “A temporary city: temporary use as a tool for urban design in the creation of convivial urban space.” *7th State of Australian Cities Conference, 9-11 December 2015, Gold Coast, Australia.* Gold Coast, Australia, 2015. doi:https://doi.org/APO-63352.

Shi, Jie, and Carlos Marmolejo Duarte. “Study of the leftover space in the city based on reutilization: Take the space under elevated road in Shanghai as an example.” Thesis, 2016.

Shih, Wan-yu, John Handley, and Iain White. “Mapping Biotope and Sociotope for Green Infrastructure Planning in Urban Areas.” *REAL CORP, 2009.*

Simplystakeholders by Hendricks, Allison. n.d. *Which Stakeholder Mapping Method Should You Use?* simplystakeholders. https://shorturl.at/bfvU7.

Solecki, William, Karen C. Seto, and Peter J. Marcotullio.. “It's Time for an Urbanization Science.” *Environment: Science and Policy for Sustainable Development* (2013) 55 (1): 12-17. doi:10.1080/00139157.2013.748387.

Stahle, Alexander. “Sociotope mapping - exploring public open space and its multiple use values in urban and landscape planning practice.” *Nordic Journal of Architectural Research* (2006) 19: 59-71.

Sundaresan, Muthu Kumaarr. n.d. “Potential of Urban Voids as public spaces A Tactical Urbanism guide for Torino.”

t2informatik. n.d. *Stakeholder Identification.* t2informatik. https://shorturl.at/kwxW6.

The World Bank. *The Hidden Wealth of Cities.* The World Bank Group, 2020.

The World Bank. “Urban population – India.”, 2020.

Troy, Austin, and J. Morgan Grove. “Property values, parks, and crime: A hedonic analysis in Baltimore, MD.” *Landscape and Urban Planning* (2008) 87 (3): 233-245. doi:10.1016/j.landurbplan.2008.06.005.

Tyrvainen, Liisa, Kirsi Makinen, and Jasper Schipperijn. “Tools for mapping social values of urban woodlands and other green areas.” *Landscape and Urban Planning* (2007) 79 (1): 5-19. doi:10.1016/j.landurbplan.2006.03.003.

UN Department of Economic and Social Affairs. *World Urbanisation Prospects 2018 Highlights.* New York: UN, 2019.

Wang, Ruxing, Yechen Zhang, Hongmei Zhang, and Hu Yu. “Social Value Assessment and Spatial Expression of National Park Ecosystems Based on Residents’ Perceptions.” *Sustainability (Switzerland)* (2022) 14 (7). doi:10.3390/su14074206.

Whittington, Dale, and Joseph Cook. “Valuing Changes in Time Use in Low- and Middle-Income Countries.” *Journal of Benefit-Cost Analysis* (2019) 51-72. doi:10.1017/bca.2018.21.

Wright, Lloyd. “Reclaiming public space: The economic, environmental, and social impacts of Bogotá's transformation, 2004.”

Zecca, Cecilia, and Richard Laing. “Reading underused urban spaces: Aberdeen views.” *Sustainable Cities and Society* (2020) 56. doi:10.1016/j.scs.2020.102108.

QUALITATIVE AND QUANTITATIVE METHODS TO MEASURING PUBLIC SPACE

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INTRODUCTION

The public realm plays a crucial role in ensuring sustainable cities and communities: providing ecosystem services, enhancing health and wellbeing, fostering social inclusion, and facilitating economic exchange. Through innovative community-led approaches and scalable catalytic pilots, UN-Habitat demonstrates how to turn public spaces around, transform communities, and change minds.[1] This global effort has developed innovative approaches to urban design based on community participation in order to cope with the challenges posed by rapid urbanization. In 2020, UN-Habitat published a toolkit to assist cities in conducting city-wide assessments of public spaces.[2] It aimed to assist local governments in promoting social inclusion, integration, connectivity, environmental sustainability, and safe streets and public spaces, in order to improve quality of life for all. These steps should be followed within the process to ensure that the assessment of public space meets the city's objectives. By integrating multisectoral and iterative approaches, the program supports local governments to develop vibrant and inclusive public spaces, long-term urban strategies, and national policies, focusing on the most vulnerable. [3]

The built environment of cities is a subject of study in a wide range of fields, including architecture, urban design, planning, transportation research, geography, and psychology. The use of descriptive methods to describe urban form such as public space, is not universally accepted. In the blind man's study of an elephant in which different blind professionals examined its parts without understanding its overall structure.[4] Similarly, we should explain the importance of developing these larger measurements for the improvement of public spaces. Also, the view of whether and how public space should be described varies even within urban design. This paper provides an overview of geometric analysis of settlement patterns, followed by a discussion of different methods for measuring urban forms and a discussion of how public spaces contribute to social equity and livability in cities.

Practical measure of the "public realm"

The physical dimension of the public realm provides a framework for access to space, while the social environment facilitates and constrains access. To create a sense of community, social interaction must occur within the public realm. The interaction is constrained both by access controls and by constraints on interaction after gaining access to public spaces. Social interaction within the public realm, depending on access, is also affected by these opportunities and limitations. Furthermore, social interaction occurs within a defined or constrained public sphere, which, in turn, contributes to the building of a sense of community. A better characterization of domain will facilitate analysis of

public space: what constitutes a superior public realm in one neighborhood versus another? WE can measure aspects of the public realm that may contribute to increased resident interaction by using a vocabulary designed for that purpose. To provide a practical measure of the "public realm," the method is based upon Owens's *Neighborhood form and pedestrian life: Taking a closer a closer look* and Southworth and Owens's *The evolving metropolis: Studies of community, neighborhood,*[5] *and street form at the urban edge*.[6] Our goal is to clarify, in pragmatic terms, the geographic aspects of public life and how they vary from neighborhood to neighborhood in order to facilitate discussion about the use, meaning, and role of public space. Developing the methodology required translating the role public space plays in fostering social interaction into spatial analytic terms so that the geographic implications of the theories could be addressed.

Examination of a qualitative and quantitative method of measuring:

Public life plays a crucial role in fostering community, as well as the importance of locating public spaces appropriately, and much of this theory has been developed in the works of urban theorists in the design tradition, including Peter Calthorpe, William H. Whyte, Dolores Hayden, Leon Krier, and Peter Katz.[7] There is growing awareness of the importance of public spaces in urban development as plans for urban villages, transit-oriented developments, and other variations of urbanism proliferate.[8] The establishment of common open spaces, sidewalks, and other public gathering areas has enhanced the establishment of a "living community" in each of them.[9] What can be done to evaluate the connection between public space and the sense of community? A starting point should be the measurement of the physical dimensions of public space. A public realm's physical dimensions provide a framework, while its social environment facilitates and constrains access. Obtaining access to the public realm can also affect the degree of social interaction within it. The analysis of a qualitative and quantitative methods for measuring the different public realms revealed that a significant methodology was used to provide a starting point for translating public space and urban form between communities.

TOPOLOGICAL TO MORPHOLOGICAL MEASURES OF PHYSICAL FEATURES

Physical characteristics of the city include its size, density, grain, outline, and pattern. The quality of life in a community is greatly affected by all of these factors. It is necessary to make decisions concerning them more frequently as we rebuild and expand humankind's peculiar environment.[10] Within the city, there is a network of spaces that create and strengthen connections at different levels of influence. There would be implicit meaning between concrete and implicit meaning between the lines.

Besides size, density and grain, there is the matter of the shape of cities. Even the silhouette of a city tells us a great deal about its living quality. As the population grows, the compact shape of a traditional city begins to exhibit difficulties. Growth must occur by crowding within or by annular accretion, like the growth rings of a tree. It becomes a critical problem to serve the spreading mass with transportation. A second city form is the long, narrow ribbon, usually lying along a road or river. The typical "street village" is a good example. The road or river serves as the primary datum, and topography may also play a role in determining the shape of the town. [11]

Cities have an intimate subtext that is visually captivating: their streets, squares, and openings - not just the land left over in the traditional sense, but the spaces that make buildings livable and accessible. The physical and social investment of public space within its existing structures has never been so complex. Nevertheless, growth and change are continuous processes as an urban complex grows in size. Each of these city shapes has its own set of challenges. The city can be reshaped

through continuous decisions that could eventually reorganize the effective public spaces. The public realm has a number of other possible forms yet to be explored imaginatively.

Axiometric patterns of streets as a measurement of city form, leading into and away from centers, have become increasingly important for city planning. This pattern is made for movement. City plans often repeat the axial form, which is so natural to great cities with dominant centers. Grids are also a common alternative method of arranging streets. Although the grid could also take other forms, such as triangular or hexagonal, it has always been rectangular in practice. By using these patterns, people can move around more freely and use the ground more effectively. However, towering buildings situated on open ground may have only an illusory advantage if overall densities remain high and the open space is overcrowded. An entire city would lose its sense of urbanity and function as a meeting place for large numbers if new pattern were adopted. A rhythmical balance is required between enclosure and openness, concentration and freedom in the contemporary city.

There are several factors that contribute to the construction of a city and influence the relationships developed within it. Public spaces, which fill the urban gaps with life, play a key role in the construction of what we call a city. Public areas shape community ties in neighborhoods. They are places of encounter and can facilitate political mobilization, stimulate actions and help prevent crime. They are environments for interaction and exchange of ideas that impact the quality of the urban environment. While not considered “public spaces,” cafes, bookstores and bars have similar impacts. Public spaces also present health benefits, both physical and mental: people feel better and tend to be more active in attractive, public spaces.

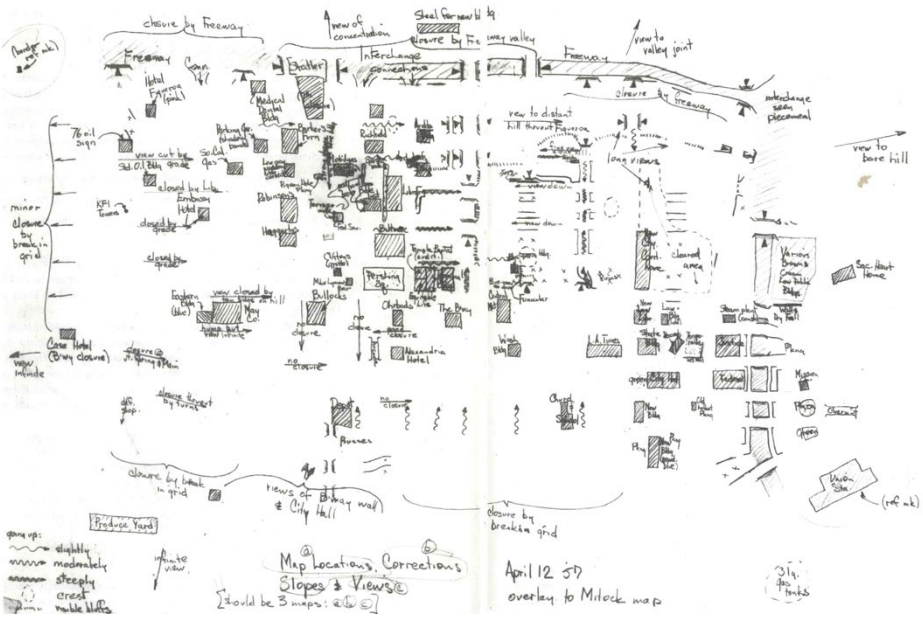

Figure 1. The as a set of places, Los Angeles by Kevin Lynch.

COGNITIVE MAPPING VS. VISUAL MAPPING OF URBAN FORM

There are two critical questions urban theorist Kevin Lynch asked when applying the basic concept of research on city legibility and visual perception: *How reliable are the methods, and how accurate are they when they indicate a certain conclusion? Can the conclusions be used to make planning decisions, and is the effort expended worthwhile?* [12]

His research focused on two principal methods: interviewing a small sample of citizens regarding their perception of the environment, and examining how trained observers perceive cities and urban

forms based on the environmental image evoked in them. Through the use of visual elements, Lynch argues that urban designers are able to create places that are more legible and psychologically satisfying. Besides providing organizational clues and way-finding devices, these elements may also engender feelings of emotional security and a sense of place-based ownership after one recognizes familiar terrain.

Visual character is not limited to the characteristics of the visible environment itself or the particular places where its inhabitants observe it. The study of the visible environment itself can further be divided according to its character as a set of places that people inhabit and use, and as a set of journeys they undertake to move through the area, and thus experience it. While this is a study of visual character, it would logically also involve studies of other sensory qualities associated with a place, such as sound, climate, touch, and smell. In A Process of Community Visual Survey by Lynch, the issues of Managing the Sense of a Region are discussed in greater detail with examples, elaborations, and explanations.[13]

"The Image of the Environment" is based on the idea that people comprehend and mentally process cities' forms by recognizing key physical elements. In Lynch's definition, "imageability" refers to that quality in a physical object that increases its likelihood of evoking a strong image in the mind of the observer. In other words, it refers to those shapes, colors, or arrangements of objects that facilitate the creation of vividly recognizable, powerfully structured, and highly useful mental images of the environment (Fig.1).

The Visual Survey Process:

The basic district mapping can be supplemented by an objective survey called a *photogrid*,[14] which consists of an arbitrary grid with manageable distances between intersections. A densely populated or intricately laid out area will require a finer grid compared to an area with an open and homogeneous map which coordinates each grid intersection on the base map and locates the nearest accessible point at each intersection. Taking a photograph at each of these points, determining what is the most characteristic or revealing aspect, then printing the photographs and identifying them by grid locations, begins the fieldwork.

With this method, the visual character of the area is comprehensively sampled, a sample that can be filed and consulted later for detail or general verification. A repeat test can be taken at regular intervals to maintain a permanent record. It is only necessary to make judgments when choosing grid spacing and deciding what view to take from a particular point. Ideally, it is keyed to vertical aerial photographs of the region, giving a complete record of visible form.

Using visual and cognitive matrices as indicators of public space is the topic of this student research project (Fig.2). Public expression is impossible without people to occupy and interpret the space. Those spaces must be capable of accommodating people and their desired actions in order to qualify as public spaces. Public spaces are valid and successful because of the actions of people. The experience of public space can be divided into three categories; Movement, Activity, and Goal, for further visual evaluation. Each of these can offer different levels of accommodation to the occupants. With the addition of a minor axis, we may be able to create a more comprehensive visual language to assess each instance in its own vacuum of assessment.

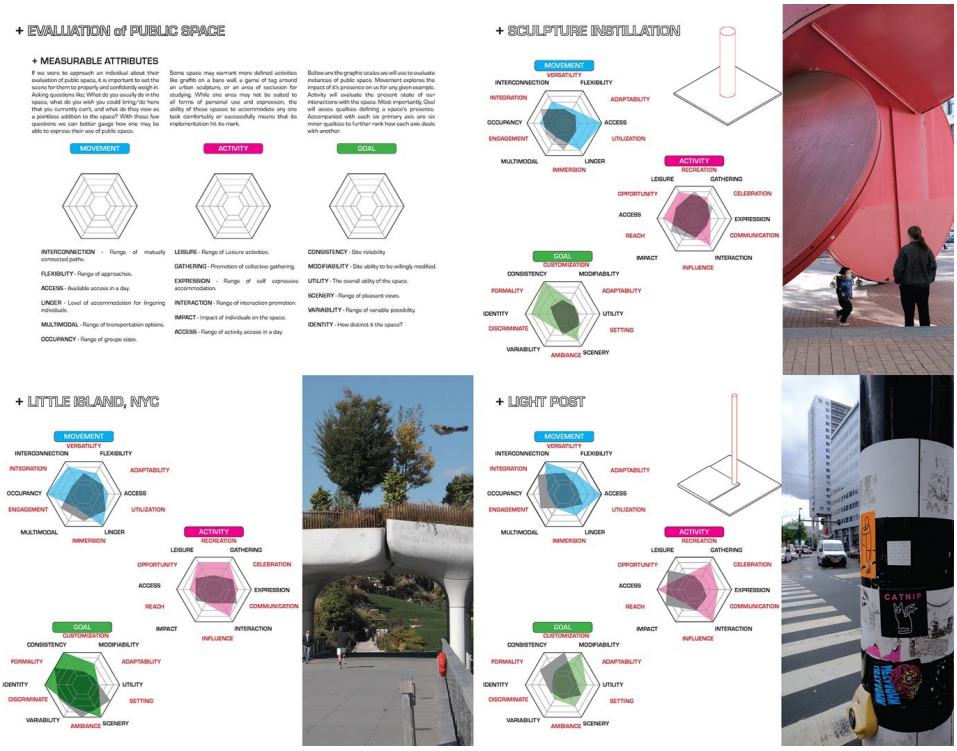

Figure 2. Evaluating Public SpacE
Source: (Oklahoma State University Urban Studio student work 2023)

MEASURING BY OBSERVATION

As a research tool, *observing physical traces* can yield valuable insights at the beginning of a project, help to test hypotheses during the course of the project, and serve as a source of new ideas and concepts throughout. It involves systematically searching for traces of previous activity that have not been measured.[15]

In Zeisel*'s Inquiry by design: Tools for Environment-behavior research*, he argued that researchers in environmental behavior can infer from such traces how an environment got into its present state, the decisions the designers and builders made, how people actually use the environment, how they feel about their surroundings, and if it meets their needs in general. Additionally, researchers gain a sense of the culture and affiliations of the people who inhabit the place, as well as their manner of presentation.[16] Consequently, measurements conducted through observation are analyzed to determine what caused them, what the person who made them intended, and what sequence of events led to them. As physical traces are imageable, researchers are able to formulate hypotheses about causes, intent, and sequence. However, from the trace alone, researchers cannot determine whether their hypotheses are valid or false.[17]

An observation type is determined by how the data will be used, or what to look for when collecting the data. Zeisel identified categories of visual data and what to collect for physical traces. These categories are also designed to increase people's ability to control the behavioral effects and side effects of their decisions, as well as to increase their personal control over their environment. Then, why do some urban spaces work well for people, whereas others do not? A question arises regarding how a public space can be considered a good gathering place. Despite the fact that some spaces have been newly designed, some remain vacant. In William White's and his research group's the *Street Life Project*, he asked these vital questions for New York City. [18] These are rather simple, yet essential questions for the current realm of urban space. White was convinced that there is a lot to learn from

simply observing spaces and the people using them**.** For instance, his project analyzes various rituals, habits, and behavior in public space. Descriptive methods capture the most meaningful qualities of public space. He had a pioneering approach to urban planning, along with his common-sense principles. Sociological and field studies had been done in other fields, but it had never been done before at the urban scale. Planners and designers can gain a lot of insight into what people want from public spaces if they "look hard, with a clean, clear mind, and then look again - and believe what they see."[19]

Through simple observation, Whyte was able to generate counterintuitive insights, such as this one regarding the "undesirables". He proposed that rather than constructing unfriendly urban furniture that will eventually drive people away, we should instead make places more inviting and attractive. The challenge Whyte presents is to leave our assumptions behind and to observe what people need and want at the ground level. Public spaces can be enjoyed by people based on a few simple, basic elements. No matter how grandiose a space may be, people will not utilize it if they do not feel comfortable in it. William H. Whyte's humble approach to urban planning serves as a gentle reminder that the magic is found in the ordinary. Thus, this message conveyed in words and images about urban environments is that those who make changes are guided by their visions and take actions based on what they observe. Observing, wondering, and simply enjoying cities is a requirement for an effective city and regional planner. Similarly, a careful observation is a crucial tool for the kind of analysis and questioning required for good planning. A city planner or urban activist can use observation to determine when a neighborhood was built, who lives there today, how it has evolved, and what improvements could be made.

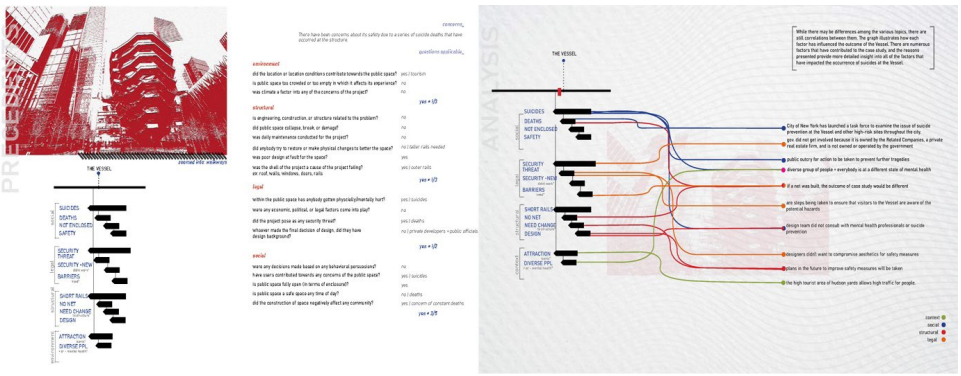

Figure 3. Evaluating Public Space
Source: (Oklahoma State University Urban Studio student work 2023)

The process of observing people and their surrounding environment differs from that of gaining knowledge from secondhand sources. In other words, it demonstrates the difference between reality and abstraction. By associating real places and faces with decisions, we suggest that policies and actions are made more cautiously. For example, Jacobs argued that city and regional planners' careful observation is a crucial tool for the kind of analysis and questioning necessary to achieve effective urban planning.[20] By observing an area, city planners and urban activists can gain insight into when it was built, who built it, what it is like today, and what can be done to improve it (Fig.3). People who make decisions in cities are guided by what they see, and their vision and actions, which have a significant impact on millions of lives, are influenced by how they perceive urban environments.

CONCLUSION

The research and discussion themes between the design of the public realm and forms of interactivity are based on the existence of underlying social factors beyond the control of urban design, according to a conceptual model of how the physical measurement of public space fits into the overall space between the public realm and architectural form.

An analysis of the topological and morphological dimensions of the urban built environment is presented in this paper, along with how social interaction occurs within a defined or constrained public scope, thereby affecting the physical and social development of the community. A significant amount of research remains to be conducted on the physical measurement and form of the public realm. In this context, the public realm is defined as spaces in an environment that are accessible to residents and provide, at least in principle, opportunities for contact and proximity.[21]

Urban designers discuss the "visible public spatial framework,"[22] but planning should actively engage in assessing that framework and, ultimately, determining which descriptive methods capture the most meaningful qualities of urban built environments. The complex interaction between environment and behavior will make this difficult to accomplish. Understanding how the public realm might be quantified, future research focused on the relationship between public space and sense of community might address the following questions:

What is the extent to which the public realm limits perceptions of public space quality and safety as well as social constraints? What are the methods for measuring these limitations? Within this context, what is the best way to measure social interaction?

Is the existence of invisible public space a hindrance to the promotion of a sense of community in the public realm? What kind of phenomena are being measured in those representations? Do access constraints or determinants undermine the integration of public and private space?

It will be necessary to develop appropriate methodologies for each of these questions. The empirical application of such methods could result in a more comprehensive, multidimensional understanding of the role of public space in urban social life, which may help preserve and develop more meaningful urban public spaces. The measurement of the public realm presented in this paper is designed to provide a useful first step in this broader analysis.

NOTES

[1] "Global Public Space Programme," The United Nations Human Settlements Programme (UN-Habitat), accessed June 19, 2023, https://unhabitat.org/programme/global-public-space-programme.
[2] "City-Wide Public Space Assessment Toolkit: A guide to community-led digital inventory and assessment of public spaces," The United Nations Human Settlements Programme (UN-Habitat), accessed July 8, 2023, https://unhabitat.org/sites/default/files/2020/07/city-wide_public_space_assessment_guide_0.pdf.
[3] "Public Space," The United Nations Human Settlements Programme (UN-Habitat), accessed July 8, 2023, https://unhabitat.org/topic/public-space.
[4] Knaap Song et al. "Seeing the Elephant:Multi-disciplinary Measures of Urban Sprawl," National Center for Smart Growth (2005), 7, DOI: https://doi.org/10.13016/M20G3H292.
[5] Peter M. Owens, "Neighborhood form and pedestrian life: Taking a closer a closer look," Landscape and Urban Planning 26(1993):132, DOI: https://doi.org/10.1016/0169-2046(93)90011-2.
[6] Michael Southworth & Peter M. Owens. "The Evolving Metropolis: Studies of Community, Neighborhood, and Street Form at the Urban Edge," Journal of the American Planning Association, 59 (1993) :3, 280, DOI: 10.1080/01944369308975880.
[7] Emily Talen. "Measuring The Public Realm: A Preliminary Assessment Of The Link Between Public Space And Sense Of Community." Journal of Architectural and Planning Research 17, no. 4 (2000): 345, DOI: http://www.jstor.org/stable/43030552.
[8] Peter Calthorpe, *The next American metropolis: Ecology, community, and the American dream*. (New York: Princeton Architectural Press, 1993), 44-45.
[9] Alexander Christoforidis, New Alternatives to the Suburb: Neo-Traditional Developments. *Journal of Planning Literature*, *8*(4) (1994), 429–440, DOI: https://doi.org/10.1177/088541229400800404.
[10] Kevin Lynch, Banerjee Tridib, and Michael Southworth, *City Sense and City Design : Writings and Projects of Kevin Lynch* (Cambridge, Mass: MIT Press, 1990), 41.
[11] Lynch, Tridib, 42.
[12] Kevin Lynch, *The Image of the City* (Harvard-MIT Joint Center for Urban Studies Series. Cambridge, Mass.: MIT Press, 1960), 140.
[13] Lynch, Tridib, 263.
[14] Lynch, Tridib, 266.
[15] John Zeisel, *Inquiry by Design: Tools for Environment-Behavior Research* (Cambridge: Cambridge University Press, 1985), 98.
[16] Zeisel, 89.
[17] Zeisel, 91.
[18] William H. Whyte, The *Social Life of Small Urban Spaces* (Washington D.C: Conservation Foundation, 1980), 10-39.
[19] "William H. Whyte," Project for Public Spaces, accessed July 28, 2023, https://www.pps.org/article/wwhyte.
[20] Allan B. Jacobs, *Looking at Cities* (Cambridge Mass: Harvard University Press, 1985), 30-83.
[21] Raymond Fleming, Andrew Baum, & Jerome E. Singer, "Social support and the physical environment," In S. Cohen & S. L. Syme (Eds.), *Social support and health*: 327–345.
[22] Southworth & Owens, 286.

BIBLIOGRAPHY

Calthorpe, Peter, *The next American metropolis: Ecology, community, and the American dream*. (New York: Princeton Architectural Press, 1993).

Fleming, Raymond, Andrew Baum, & Jerome E. Singer, "Social support and the physical environment," In S. Cohen & S. L. Syme (Eds.), *Social support and health*: 327–345.

Jacobs, Allan B., *Looking at Cities.* Cambridge Mass: Harvard University Press, 1985.

John, Zeisel, *Inquiry by Design : Tools for Environment-Behavior Research*. Cambridge: Cambridge University Press, 1985.

Lynch, Kevin, Banerjee Tridib, and Michael Southworth, *City Sense and City Design : Writings and Projects of Kevin Lynch*. Cambridge, Mass: MIT Press, 1990.

Lynch, Kevin, *The Image of the City*, Harvard-MIT Joint Center for Urban Studies Series. Cambridge, Mass.: MIT Press, 1960.

Owens, Peter M., “Neighborhood form and pedestrian life: Taking a closer a closer look,” Landscape and Urban Planning 26(1993): 115-135, DOI: https://doi.org/10.1016/0169-2046(93)90011-2.

Project for Public Spaces. “William H. Whyte.” Accessed July 28, 2023. https://www.pps.org/article/wwhyte.

Song, Knaap et al. “Seeing the Elephant:Multi-disciplinary Measures of Urban Sprawl,” National Center for Smart Growth (2005), 1-46, DOI: https://doi.org/10.13016/M20G3H292.

Southworth, Michael & Peter M. Owens. "The Evolving Metropolis: Studies of Community, Neighborhood, and Street Form at the Urban Edge,” Journal of the American Planning Association, 59 (1993) :3, 271-287, DOI: 10.1080/01944369308975880.

Talen, Emily. “Measuring The Public Realm: A Preliminary Assessment Of The Link Between Public Space And Sense Of Community.” Journal of Architectural and Planning Research 17, no. 4 (2000): 344–60, DOI: http://www.jstor.org/stable/43030552.

The United Nations Human Settlements Programme (UN-Habitat). “Global Public Space Programme.” Accessed June 19, 2023, https://unhabitat.org/programme/global-public-space-programme.

The United Nations Human Settlements Programme (UN-Habitat). “City-Wide Public Space Assessment Toolkit: A guide to community-led digital inventory and assessment of public spaces.” Accessed July 8, 2023, https://unhabitat.org/sites/default/files/2020/07/city-wide_public_space_assessment_guide_0.pdf.

The United Nations Human Settlements Programme (UN-Habitat). “Public Space.” Accessed July 8, 2023, https://unhabitat.org/topic/public-space.

Whyte, William H., The *Social Life of Small Urban Spaces*. Washington D.C: Conservation Foundation, 1980.

TACOMA: THE QUIET CITY

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INTRODUCTION

Downtown Tacoma represents the cultural center of the city and the headquarters for many companies, which are all connected to the Port of Tacoma. Despite the existence of many attraction points such as the Washington State History Museum, the Museum of Glass, the Bridge of Glass, the Tacoma Dome, the Tacoma Art Museum, and the Greater Tacoma Convention Center, Tacoma is described as a quiet city by many Tacomans. My goal in this paper is to examine how to revitalize downtown Tacoma to create a vibrant livable city, while maintaining its unique character and preserving its historic buildings to keep the residents' sense of belonging. In downtown Tacoma, there are not many activities that can be done even during the Holiday season, and the city seems the same as any time of year, whereas other places have streets filled with Christmas lights and other decorations. And instead of celebrating in their own town, many Tacomans prefer to drive three to four hours to other Bavarian cities where festivals are held. During the summer when the Pacific Northwest (PNW) becomes an attractive destination to many people, Tacoma downtown is still quiet, and few pedestrians can be seen enjoying the beautiful weather. Due to this, many families have started to go to Point Ruston, which has recently been established as a new attraction center with restaurants and activities along the water. This paper discusses the factors that affect downtown Tacoma and how it can be more livable and approachable like surrounding cities such as Point Ruston, Bellevue, and Seattle. The objective is to contribute to a better understanding of the built environment of downtown Tacoma from the architectural and urban form, specifically an area in downtown Tacoma starting from the Stadium District and ending at S 21st St., and taking into consideration its historic characteristics, to create a vibrant livable center.

The ROLE OF COMMENCMENT BAY AND THE NORTHERN PACIFIC RAILROAD IN SHAPING TACOMA

The British navigator George Vancouver entered the area that he named Puget Sound in 1792. However, Charles Wilkes and his crew were the first Americans who explored Puget Sound and Commencement Bay in 1841.[1] Wilkes like many explorers looked at the Native American strangely rather than a people with their own culture.[2] In 1853, Washington became a territory, and a new county which included the Commencement Bay was named Pierce to honor President Franklin Pierce. In July 1873, the south shore of Commencement Bay was selected by the board of the Northern Pacific Railroad Company and announced the site as the terminus for its transcontinental line, and the board created the Tacoma Land Company to establish a city above the terminals. The landscape architect Frederick Law Olmsted was hired to create a plan for what called "New Tacoma" which was

completed by September 1873.[3] Even though the Native Americans allocated a reservation area within Puyallup River delta, this development of New Tacoma affected a major village of Puyallup Indians which is the area of South 15th Street today.[4]

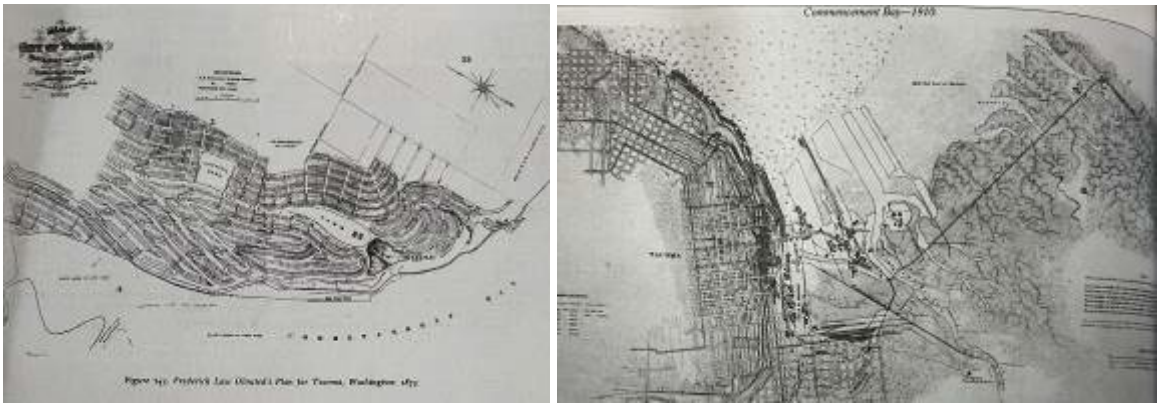

Figure 1. Left: Fredrick Law Olmsted's Plan for Tacoma 1873. Right: Commencement Bay 1910

On the southwest corner of South 9th Street and Broadway, Theodore Hosmer, the general manager of Tacoma Land Company started the construction of the Company's sales office in 1874. After selling lots, a hotel was built by Jacob Halstead at 707 Pacific Ave. in 1879, and the Steilacoom Beer Hall was built by Fred Seger in 1885, in addition to many other buildings such as theater, saloon, gambling, etc. and by early 1880s, New Tacoma became a city of wood frame businesses and houses.[5] The city council mandated to construct brick buildings to avoid fires. Many buildings were constructed on Pacific Avenue, such as the Charles B. Wright building located at 902 Pacific Avenue completed in 1884 as the first essential commercial building, the Tacoma National Bank at 921 Pacific Avenue completed by 1885. From this time forward local architectural firms or individuals would design most of the buildings in Tacoma, like the firm of Farrell and Darmer that designed many buildings such as the Union Block at 1301 Pacific Avenue and the Citizens Bank at 1340 Pacific Avenue, both in 1888.[6]

The Northern Pacific headquarters building was designed by the railroad engineer Charles B. Talbot in 1887 and completed in 1889 at 621 Pacific Avenues[7] to symbolize the important role that railroads had played in Tacoma.[8] On November 11, 1889 Washington became a state.[9] Tacoma's urban landscape started to change after the arrival of trains via Stampede Pass, so the features of a permanent city began to appear such as the brick business blocks that replaced the old buildings and houses. While downtown Tacoma transformed from the Pacific Avenue side during the late 1880s, the west side of the city remained undeveloped due to the steep hillside of that part.[10]

It is clear what the effect of Commencement Bay and the Northern Pacific Railroad in establishing and flourishing Tacoma was during the late of the nineteenth century. According to Patricia Sias, "The bones of the economic and cultural life of that community were dependent on financial success of the Northern Pacific Railroad"[11]

Figure 2. The Northern Pacific Headquarters Building.

TRANSPORTATION

The new transportation of Streetcars and cable car, that was established by the Tacoma Railway and Motor Company, created the central business district, and transformed the City of Destiny. After extended lines of streetcars, residential areas moved away from the commercial zones allowing for more business blocks to be established in these spaces.[12] So Tacoma witnessed a new phase of construction after WWI, where earlier houses were demolished and replaced with commercial buildings.[13]

As a result of the new transportation, large department stores started to emerge.[14] So, at the beginning of the twentieth century, people engaged with the idea of a department store where they go to one building that includes different items such as furniture, clothing, books, pharmacy, groceries, and entertainment. It was a way for families to take the streetcar from their neighborhoods and go to downtown, places of commerce.[15] Between the 1920s and 1930s, the automobile started to dominate Tacoma and caused crowding and parking problems around downtown,[16] and this led to reshape the city again, where buildings were demolished to leave space for the new high rise parking garage.[17] June 11, 1938 marked the end of the streetcar since the automobile and delivery trucks started to occupy the space, and the left picture below shows that day when Tacomans gathered in front of the Pantages theater to ride the streetcars for the last time.[18]

Figure 3. Streetcars and Automobile.

For fifty years, streetcars and cable cars helped take people up the steep S 11th Street and down S 13th Street. Public transportation was the bond of Tacoma. After buses took over during the 1930s, Tacoma Railway and Power Company removed the rails and that is when planners faced the problem of how to help pedestrians go up and down the steep streets in downtown. So, they proposed escalades or moving sidewalks.[19] Then, these were removed due to mechanical problems.

ARCHITECTURE AND PLANNING IN TACOMA BETWEEN PAST AND PRESENT

In this section, the iconic buildings that shape the landmark of downtown Tacoma will be addressed along with how they have been changed, demolished, or preserved over the years.

The Tacoma Hotel that was opened in 1884 on South A and 9th Street and overlooked the Commencement Bay,[20] was ruined by fire in 1935 and the land remained as a parking lot until 1988 when the headquarters of Russell Investment Company built there.[21]

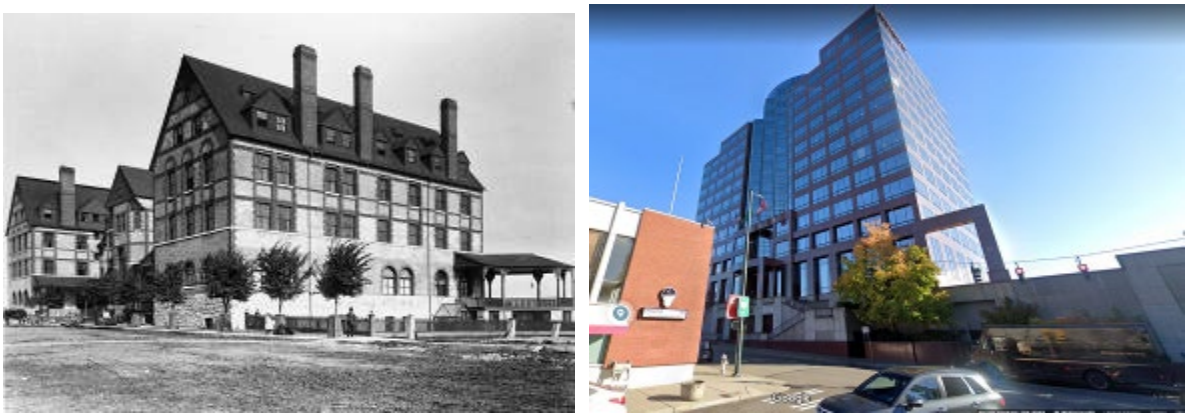

Figure 4. Tacoma Hotel on the left and Russell Investment Company in modern day on the right.

In 1890, the Tacoma Land Company decided to construct a Tourist Hotel when the city was witnessing an economic boom. Then a worldwide depression happened in 1893, and construction stopped with the shell left vacant and prone to fire. Later Frederick Health, Tacoma school district architect, decided to take the burned-out shell and convert it into a high school. In 1904, voters issued bonds to fund the construction of Tacoma high school which welcomed its first graduation class in September 1906.[22] The high school named later as Stadium High School went on to be one of the iconic buildings in Tacoma's skyline and is located in the historic neighborhood, the Stadium District, which is named after Stadium High School. The Stadium District is located at the north end of downtown Tacoma and is listed on the National Register of Historic Places due to the incredible architecture of Stadium High School and many historic homes, in addition to the Wright Park and the Seymour Botanical Conservatory that is located to the SW of The Stadium District.

By the end of 1901, the city council decided to locate a new downtown library at 1120 Tacoma Avenue South (today 1102), which was funded by Andrew Carnegie and designed by The New York architectural firm of Jardine and Kent. Jardine designed the building with a glass dome, and it opened to the public on June 5, 1903.[23] Towards the end of WWII, the library had limited space and it was in need of an addition, so the library acquired the commercial building on the corner of S 19th Street and Tacoma Avenue and commissioned the architect Silas E. Nelson to design it, to be finished in 1952.[24] Today the original Carnegie old building is part of a bigger building, and the circular base is just what is left from the glass dome.

Figure 5. Tacoma Public Library, the original Carnegie building and the modern-day library.

New Technologies of steel structure and elevator affect the design of the buildings and the first city skyscrapers appeared in 1906 when the Fidelity Trust Company announced to add six-stories to the original 1890 building that is located at 949 Broadway which was completed in 1909 with a rooftop weather tower.[25]

Many religious institutions existed in downtown Tacoma. The Elks Lodge, which was one of many fraternal organizations in Tacoma, decided to build its headquarters in downtown at 565 Broadway in 1914 and completed it in 1916. The Spanish Stairs that connect Broadway and Commerce Street were built as a fire escape for the building that was designed by the architect E. Frere Champney.[26] It now represents a landmark and symbol of Tacoma's urban spirit.[27]

Figure 6. McMenamins Elks Temple and the Spanish stairs.

During the WWI years, Pantages Theater was constructed to occupy the intersection of Broadway, Commerce, and S 9th Street where small hotels and commercial spaces linked with the theater. Across from the theater, the Winthrop Hotel was built and was designed by the Tacoma architect Ronald E. Borhek and named to honor Theodore Winthrop, who was an inspiration in naming the city Tacoma, according to his book The Canoe and Saddle.[28] The Colonial Theater, which was designed by Roland E. Borhek and constructed in 1914 at 916 Broadway Avenue, witnessed various remodels under many owners until its demolition in 1988 to be a parking lot.[29]

Figure 7. Left to right: The Winthrop Hotel, the Pantages Theater, and the Colonial Theater

According to Kipp and Olson, between 1900 and 1920, C street became the "Broadway" of Tacoma, as music and theater houses and major retail merchants moved into buildings rising between Ninth and Thirteenth Streets. Large apartment buildings filled the extended boundaries beyond the central business district core."[30]

The historic photos below show the streetscape that is still familiar to most Tacomans with Bostwick Block on the right, and Tacoma Theater on the left (the name was originally Broadway Theater, then the Music Box),[31] whose establishment inspired many entertainment places to emerge and create what is known as the Theater District. In 1963, the Tacoma Theater was destroyed by fire, during a showing of Alfred Hitchcock, leaving a void in the Theater District. On the left, in the background,

there is the Rialto Theater which still exists.[32] Around 1964, the architectural firm of Lea, Pearson & Richard designed the Broadway Terrace Building instead of restoring the Tacoma Theater.[33] The Pantages Theater was about to be demolished in the 1970s, but the City of Tacoma preserved it to become the core of the theater district today.[34]

Figure 8. Upper: The streetscape in 1963 shows Bostwick Block on the right, Tacoma Theater on the left, and the Rialto on the far left. Lower: Same area of theater and Bostwick Block in the present.

Figure 9. Upper from left to right: The area of Tacoma Theater that was destroyed by fire leaving a void in the Theater District; Bostwick Block, Middle from left to right: Rialto Theater; Theater District context, Lower: Pantages Theater

1958 marked the urban renewal planning in Tacoma when local merchants and city agencies developed reports to design the central business district.[35] During this time, the City of Tacoma was asked to build parking garages in the downtown area by urban planners as a step to the urban renewal.[36]

The 1960s marked the replacement of old buildings with modern ones in downtown Tacoma.[37] During the 1960s, the I-5 freeway was completed and transportation engineers from Tacoma and Washington State considered a link along Commencement Bay from downtown to Old Tacoma and Ruston Way. The original plan of the I-5 freeway was designed to include demolition of both the Tacoma City Hall (Old City Hall now) and Northern Pacific Headquarters' buildings, but after public objection which led to establishing the Tacoma Landmark Preservation Commission in 1975, engineers redesigned the road to avoid these two important buildings.[38] Alan Liddle, Tacoma architect, played an important role in changing the city's opinion and the plan by clarifying the importance of the old buildings in Tacoma downtown.[39]

Figure 10. Right: Road under construction in 1974, left: I-5 freeway today.

The opening of Tacoma Mall in 1965 marked the end for downtown Tacoma as a place for people. Caroline Gallacci said in her book *Downtown Tacoma*, "The dedication of the Tacoma Mall in 1965 meant the beginning of the end for downtown as a people place. The Bon Marche and Penney's were the first department stores to go. Others followed, each assured that unlimited parking spaces would lure the shopper to this new paradise."[40] When this happened, urban planners decided to create a Broadway Mall, where traffic was blocked from S 9th to S 15th Street to let shoppers move smoothly. Also, streets were provided with furniture and shelters for a more convenient experience.[41]

According to Caroline Gallacci, freeway construction and development throughout the region caused damage to the urban fabric of Tacoma, which accompanied by the opening of Tacoma Mall around the same time where people could have a more convenient shopping experience, and a huge parking lot to go with it, this signaled the beginning of the end for downtown Tacoma.[42]

By 1970, two big concrete structures were built as garages to occupy earlier business blocks that were demolished. These two garages, Park Plaza North and Park Plaza South (Pacific Plaza Garage now), consumed most of the city blocks between South 9th and 11th Streets, and South 11th and 13th Streets respectively.[43]

The historic buildings along the lower part of Pacific Avenue, from S 13th to 15th Street did not last the developer's plans and the city council decided to clean up this part in 1986.[44] Also, the construction of the Tacoma Dome which started in 1981 and was completed within 2 years was accompanied with the demolition of Hawthorne School and many houses in the area.[45] On the other hand, there are two buildings that survived the downtown urban renewal. One is the Massasoit Hotel at 1702 Broadway which restored and encompassed offices, and the other building is the Swiss Society at 1900 South Jefferson Avenue, which became a tavern and gathering venue for University of Washington students and Tacomans.[46]

The Union Station is part of a historic district that includes the warehouse district which is to the west across Pacific Avenue. The Union Station hosts federal courts, and it is not a train station as it used to be. In 1991, the Moore Anderson architectural firm of Austin, Texas designed the Washington State History Museum in the same style as the Union Station. On the other hand, the University of Washington decided to transform buildings in the warehouse district into a campus beyond the school in Seattle, which was a part of a 1990 legislative decision. This decision has saved parts of Tacoma's urban fabric.[47]

The architectural style that shaped Tacoma and started after the Civil War was derived from the European styles by architects who either trained in England and Germany or who studied at the Beaux Arts in France. However, the styles were not a copy of the European buildings, rather they were a combination of various styles and motifs that were used as symbols of different periods to convey the architectural vocabulary that could be comprehended by people. This mixture of the European styles

can be recognized in residential and public buildings and examples of these buildings that still exist today are Stadium High School, the Old City Hall, and the Union Depot.[48]

The four monumental buildings which are the Old City Hall, the Northern Pacific Headquarters Building, the Elks Temple, and the Winthrop Hotel represent the first historic landmark buildings in the central business district (CBD).[49] This area is designated as the Old City Hall Historic District. On the other hand, the Pacific Avenue Historic District is the link between both the Old City Hall and the Union Depot/Warehouse historic districts, and it is the integrated block of historic commercial buildings without new construction.[50]

CONCLUSION

Tacoma grew because of people who settled or moved to it as the Northern Pacific Railroad started and grew by the end of nineteenth century. The expansion of Tacoma that started from the central business district (CBD) during the twentieth century as an economic need stopped in the twenty-first century. Even though downtown Tacoma has many characteristics that makes it qualified for a vibrant downtown of a city, such as the historic iconic buildings, water view, transportation, open spaces, and culture, it is a quiet city and many Tacomans prefer to spend more time in the downtowns of the surrounding cities, weather they are near Tacoma such as Point Ruston, or further away like Bellevue and Seattle.

If many systems within downtown Tacoma would be evaluated, such as infrastructure, public transportation, education, and the health system, it would seem that the city is in good conditions. In that case there should be other factors that need to be taken care of such as the economy, vacant buildings, investment regulations, public and private developments on behalf of residential, commercial, and retail sectors.

So, in spite of historic buildings in the Central Business District (CBD) that identify Tacoma's architecture and heritage, beautiful water view due to its location, in addition to many other locations of interest which include but are not limited to: the Chihuly Bridge of Glass that connects the Museum of Glass to the Washington State History Museum and Tacoma Union Station, Tollefson Plaza near Tacoma Art Museum and the city's convention center, the Children's Museum of Tacoma, Foss Waterway Seaport and Harbor Marina, Tacoma Dome, and LeMay's Car Museum, Tacoma misses other important factors from the urban planning perspective.

There is a comprehensive plan for Tacoma which is known as "One Tacoma: Comprehensive Plan" which is a design plan for the community's development over the long term for the future character of Tacoma. This plan addresses the physical, social, and economic issues of Tacoma through guidelines that focus on land use, transportation, housing, capital facilities, parks, and the environment, in addition to zoning and development regulations.[51] The Downtown Regional Center subarea plans have been developed in accordance with the Growing Transit Communities Compact and zoning capacity is sufficient enough to accommodate planned growth of 76,200 new residents and 67,900 new jobs by 2040."[52]

There is a successful example of a neighboring city, Point Ruston[53], which succeeded to create a vibrant area through mixed-use developments. Its location connects downtown Tacoma and Point Defiance as it is minutes away from the Museum District. The coastal road of this area extends along 2-miles to provide paved walking and biking trails, scenic views of Mount Rainier to the West, the Olympic Mountain to the East, and the Commencement Bay, in addition to waterfront dining spots.

In order for cities to thrive and become more livable, they should follow the rule of mixed-use districts, where there are buildings and streets that can be used during the day and night, so that no more districts would be just residential and left empty during the day, and no more business districts would be left vacant during night, because this creates separated zones that people perceive as unsafe

during certain times as they are unpopulated. Cities that have mixed-use zones where people work, live, eat, and go to the gym in the same area, are the cities that are livable. Social interaction within physical structures is a must to vibrant, livable cities. Tacoma needs mixed-use redevelopments where ground level is allocated for retail, while apartments and office spaces are up above. In addition, community gardens and parks are needed to increase the value of adjacent properties and trigger more developments. The study "Attracting Locals Downtown: Everyday Leisure as a Place-Making Initiative." acknowledges the challenges faced by urban centers due to suburbanization, sprawling, and neglect, leading to decay and abandonment of city centers, so it marks the need for redevelopment strategies that make downtown areas appealing and lively by emphasizing the significance of everyday forms of urban leisure which involves a mix of commercial, recreational, and public spaces that foster social interactions and enhance the local character which are central to place-making and urban revitalization.[54]

Donovan D. Rypkema examines the evolving role of downtown areas in U.S. cities amidst globalization and cultural shifts and argues that downtowns are essential for the economic and cultural vitality of cities. He emphasizes the role of downtowns as hubs for symbolic buildings and gatherings, which are increasingly important in the globalized world.[55]

Robert C. Ellickson discusses the impact of street layouts, particularly grid patterns, on the economic and social fabric of downtown areas and how street layouts in a city's central business district significantly affect the ability to obtain agglomeration benefits, which are critical for social and economic interactions. Despite the aesthetic limitations of the grid layout, which is characteristic of downtowns in most U.S. cities, it is largely successful because it helps in orientation and movement, and is conducive to creating rectangular lots, which are ideal for structuring buildings and minimizing disputes between landowners.[56] Tacoma uses this characteristic which makes it easy to develop.

Another important factor that has significantly affected city life is the pandemic, where the shift to telework has led to a decrease in downtown activity, raising questions about future viability. Gary Sands provides insights into the challenges and strategies for revitalizing downtown areas in mid-sized cities, especially in the context of post-pandemic. These include converting empty spaces to mixed-use development, expanding outdoor dining and entertainment, investing in greenspace, increasing pedestrian traffic and transportation models friendly to walking and biking, supporting local housing markets, and providing subsidies and incentives for development.[57] This agrees with Conrad Kickert's comprehensive analysis of the evolving landscape of urban retail in the face of challenges posed by e-commerce, COVID-19, and changing consumer behaviors, highlighting the significant increase in online sales and corresponding decline in physical store viability. The potential loss of urban retail poses risks to the social life, entrepreneurial opportunities, and walkability of cities. Thus, Kickert calls for significant shifts in policy, design, and real estate paradigms to accommodate the changing landscape of urban retail. This includes the adaptation of commercial streets to include more personal services, food service industries, and hybrid retail models. In addition to post-transactional storefronts that are not primarily focused on direct sales or transactions, instead, they serve as multifunctional spaces that may host various activities, such as social gatherings, cultural events, community activities, or services that cannot be digitized or delivered online. This concept can be a transformative approach to urban retail spaces, focusing on broader social, cultural, and experiential roles rather than solely on commercial transactions. This concept is part of a larger trend in urban design and planning that responds to evolving economic, technological, and social dynamics in urban environments.[58]

Jeff Speck in his book, *"Walkable City: How Downtown Can Save America, One Step at a Time"* critiques the car-centric urban planning practices that have dominated the post-World War II era in the United States and led to urban sprawl, environmental problems, and a decline in community

engagement, on the other hand he advocates for the transformation of urban spaces into walkable, human-centered environments and provides a guide for creating more livable and sustainable urban environments. Speck argues that making cities more walkable can address a multitude of urban challenges, including economic stagnation, public health crises, environmental degradation, and social isolation. Design principles that are necessary for creating walkable spaces include providing a reason to walk (mixed-use development), a safe walking environment (traffic calming measures), a comfortable walking experience (quality public spaces), and an interesting walk (aesthetic considerations). Jeff Speck uses several examples and case studies of cities that have successfully implemented walkability principles, including New York City and the pedestrianization of Times Square, where sections of Broadway were closed to vehicle traffic, which not only improved pedestrian safety but also increased foot traffic and boosted the local economy. Specks also cited Portland as a success story in urban planning and walkability due to the city's strategic investment in public transit, the development of an extensive network of bike lanes, and mixed-use developments. In addition to not forgetting Seattle's efforts in improving walkability through public space redesign and transportation policies that prioritize pedestrians and cyclists over vehicles in certain areas. Seattle has invested in creating pedestrian plazas, widening sidewalks, creating accessible pathways for people with disabilities, improving street lighting, adding street furniture, and expanding and improving its public transportation system. Also, Seattle has embraced zoning policies that promote mixed-use development, where residential, commercial, and recreational spaces are integrated, naturally encourage walking by reducing the distances people must travel for various activities. These zoning reforms help create vibrant, diverse neighborhoods where living, working, shopping, and leisure activities are all within walking distance.[59]

Finally, it is important to highlight how the relationship between population ageing and urbanization identified a major demographic trend of the twenty-first century. The book "*Ageing in Place in Urban Environments: Critical Perspectives*" offers a critical perspective on the challenges and opportunities faced by ageing populations in urban environments and critically examines how social changes in urban environments, such as widening inequalities, gentrification, migration, and climate change, contribute to diverse experiences of ageing. The authors Tine Buffel and Chris Phillipson emphasize the need for policies that address ageing issues with a deep understanding of local circumstances, including communities' economic assets, history, and culture. This approach is crucial as cities, where most people now live and will spend their old age, are typically designed with a younger, working-age demographic in mind, often neglecting the needs and preferences of older populations. This book aims to understand the specific needs, preferences, and challenges of older residents which includes housing, transportation, social participation, respect and social inclusion, civic participation and employment, communication, and community support services. Then, develop age-friendly communities using social infrastructure that provides venues for older adults to engage with others, reducing isolation and loneliness, such as community centers, clubs, and recreational facilities offer spaces for social activities, group exercise, educational classes, and cultural events, encouraging community engagement and interaction. In addition to providing opportunities for older adults to engage in the workforce, whether through part-time work, volunteer roles, or entrepreneurial ventures to bring together older adults and younger people which can lead to mutual learning and understanding across generations. Also, promotes the role of older residents as agents of urban change, who actively engage in the development and production of urban space, influencing both individual and collective experiences of ageing.[60] Using all the recommendations above Downtown Tacoma can be a vibrant, livable space where people feel more intimate in public spaces, so they are able to see themselves closer, which encourages safety, collectiveness, and belonging.

NOTES

[1] Caroline Gallacci and Ron Karabaich, *Tacoma's waterfront* (Charleston, SC: Arcadia Publishing, 2006), 9-10.
[2] Gallacci and Karabaich,11.
[3] Caroline Gallacci and Ron Karabaich. *Downtown Tacoma* (Charleston, SC: Arcadia Publishing, 2009), 9.
[4] Gallacci and Karabaich, 10.
[5] Gallacci and Karabaich, 12-14.
[6] Gallacci and Karabaich, 32.
[7] Gallacci and Karabaich, 29.
[8] Gallacci and Karabaich, *Tacoma's waterfront*, 23.
[9] Gallacci and Karabaich, *Downtown Tacoma*, 44.
[10] Gallacci and Karabaich, 25-26.
[11] Patricia A. Sias, "An Examination of Influences on Selected Tacoma Architecture, 1890-1914." (master's thesis, University of Puget Sound, 1971), 1.
[12] Gallacci, and Karabaich, *Downtown Tacoma*, 35.
[13] Gallacci, and Karabaich, 71.
[14] Gallacci, and Karabaich, 47.
[15] Gallacci, and Karabaich, 54.
[16] Gallacci, and Karabaich, 76.
[17] Gallacci, and Karabaich, 56, 76.
[18] Gallacci, and Karabaich, 56, 86.
[19] Gallacci, and Karabaich, 99, 102.
[20] Gallacci and Karabaich, *Downtown Tacoma*, 17-19.
[21] Gallacci and Karabaich, 85.
[22] Caroline Gallacci and Ron Karabaich, *Vanishing Tacoma* (Charleston, SC: Arcadia Publishing, 2013), 28.
[23] Gallacci and Karabaich, *Downtown Tacoma*, 53.
[24] Gallacci and Karabaich, 97.
[25] Gallacci and Karabaich, 57.
[26] Gallacci and Karabaich, 62.
[27] Gallacci and Karabaich, 127.
[28] Gallacci and Karabaich, 72-75.
[29] Gallacci and Karabaich, *Vanishing Tacoma*, 96.
[30] Judith Kipp and Pamelia S. Olson, *Tacoma Rediviva: Tacoma's downtown rehabilitated buildings* (City of Tacoma Community Development Department, September 1985), 11.
[31] Gallacci and Karabaich, *Vanishing Tacoma*, 26.
[32] Gallacci and Karabaich, *Downtown Tacoma*, 107.
[33]Gallacci and Karabaich, *Vanishing Tacoma*. 26.
[34] Gallacci and Karabaich, 71.
[35] Gallacci and Karabaich, *Downtown Tacoma*, 109.
[36] Gallacci and Karabaich, 105.
[37] Gallacci and Karabaich, 102.
[38] Gallacci and Karabaich, 116.
[39] Gallacci and Karabaich, *Vanishing Tacoma*, 51.
[40] Gallacci and Karabaich, *Downtown Tacoma*, 103.
[41] Gallacci and Karabaich, 109.
[42] Gallacci and Karabaich, *Vanishing Tacoma*, 50.
[43] Gallacci and Karabaich, *Downtown Tacoma*, 105.
[44] Gallacci and Karabaich, 106.
[45] Gallacci and Karabaich, *Vanishing Tacoma*, 60.
[46] Gallacci and Karabaich, *Downtown Tacoma*, 126.
[47] Gallacci and Karabaich, 119-120.
[48] Sias, "An Examination of Influences on Selected Tacoma Architecture," 9, 20, 21.
[49] Kipp and Olson, *Tacoma Rediviva,*15.
[50] Kipp and Olson, 16-17.
[51] "One Tacoma: Comprehensive Plan," Home - City of Tacoma, accessed June 12, 2023,

https://www.cityoftacoma.org/cms/one.aspx?portalId=169&pageId=15801.
[52] City of Tacoma, "Downtown Tacoma - Regional Growth Center," accessed June 12, 2023, https://www.cityoftacoma.org/cms/one.aspx?portalId=169&pageId=117951.
[53] Ruston started as a town surrounded by the city of Tacoma, but it had its own identity and was separate from Tacoma. The city acquired its name from the original owner William R. Rust who bought the area from Dennis Ryan in 1905 and insisted that the area never be part or an extension to Tacoma.[53] The Ruston Way shoreline was located at the southern border of Commencement Bay, where the early industrial area of Tacoma is located, but with time the industrial center for Tacoma changed and this area was abandoned. So, by mid 1960s a potential plan appeared to develop this area for recreation and a future public waterfront. In 1976, Tacoma's Master Program for Shoreline Development was adopted and classified Ruston Way shoreline as an area for mixed public and private development. In 1981, the City of Tacoma Planning Commission, with the help of citizen participation, created a draft to develop Ruston Way Plan and recommended it to the City Council.[53] The intent of this draft was to recognize the marine setting and achieve continuity and a panoramic waterfront, address the historic nature of the area, include design details that are harmonic with the Pacific Northwest waterfront, and consider the special needs of disabled persons. The policies encouraged to create paths, benches, picnic areas, maintain view access using walkways, windows, and decks in public and private buildings. The draft plan also included several circulative modes of pedestrian, bicycle, public and private transportation, in addition to off-street parking.
[54] Amanda J. Johnson, Troy D. Glover, and William P. Stewart.. "Attracting Locals Downtown: Everyday Leisure as a Place-Making Initiative." *Journal of Park & Recreation Administration* (2014) 32 (2): 28–42. https://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=97203590&site=ehost-live.
[55] Donovan D Rypkema. "The Importance of Downtown in the 21st Century." *Journal of the American Planning Association* (2003) 69 (1): 9-14. doi:10.1080/01944360308976290.
[56] Robert C Ellickson. "The Law And Economics Of Street Layouts: How A Grid Pattern Benefits A Downtown." *Alabama Law Review* (2013) 64 (3): 463–510. https://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=86276706&site=ehost-live.
[57] Gary Sands, Laura A. Reese, Chade Saghir, and Pierre Filion. "Planning for Post-Pandemic Downtowns of Mid-Size Urban Areas." *Planning Practice & Research* (2022) 37 (3): 393–405. doi:10.1080/02697459.2021.2016200.
[58] Conrad Kickert. "Fight, Flight, or Adapt – the Future of Our Commercial Streets." *Journal of Urban Design* (2022) 27 (1): 55–58. doi:10.1080/13574809.2021.1986939.
[59] Jeff Speck, *Walkable City: How Downtown Can Save America, One Step at a Time* (North Point Press, 2013), 79-83, 124, 195, 217.
[60] Tine Buffel and Chris Phillipson, *Ageing in Place in Urban Environments: Critical Perspectives*. (Milton: Taylor & Francis Group, 2023). 38-71, 95-166.

BIBLIOGRAPHY

"ArcGIS web application." Accessed June 12, 2023. https://wspdsmap.cityoftacoma.org/website/PDS/OneTacoma/.
City of Tacoma, "Downtown Tacoma - Regional Growth Center," accessed June 12, 2023, https://www.cityoftacoma.org/cms/one.aspx?portalId=169&pageId=117951.
City of Tacoma, Tacoma Planning Department, Washington, *Ruston Way Plan: Design and Development Guidelines for Ruston Way Waterfront Revitalization*, June 1981.
Gallacci, Caroline and Ron Karabaich. *Tacoma's waterfront*. Charleston, SC: Arcadia Publishing, 2006.
Gallacci, Caroline and Ron Karabaich. *Downtown Tacoma*. Charleston, SC: Arcadia Publishing, 2009.
Gallacci, Caroline and Ron Karabaich. *Vanishing Tacoma*. Charleston, SC: Arcadia Publishing, 2013.
Kipp, Judith and Pamelia S. Olson. *Tacoma Rediviva: Tacoma's downtown rehabilitated buildings.* City of Tacoma Community Development Department, September 1985.
"One Tacoma: Comprehensive Plan," Home - City of Tacoma, accessed June 12, 2023, https://www.cityoftacoma.org/cms/one.aspx?portalId=169&pageId=15801.
Sias, Patricia A. "An Examination of Influences on Selected Tacoma Architecture, 1890-1914." Master's thesis, University of Puget Sound, 1971.
"Tacoma Map." Accessed June 12, 2023. https://tmap.cityoftacoma.org/

Rypkema, Donovan D. “The Importance of Downtown in the 21st Century.” *Journal of the American Planning Association* 69, no. 1 (Winter 2003).

Johnson, Amanda J., Troy D. Glover, and William P. Stewart. “Attracting Locals Downtown: Everyday Leisure as a Place-Making Initiative.” *Journal of Park & Recreation Administration* 32, no. 2 (Summer 2014): 28–42. https://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=97203590&site=ehost-live.

Ellickson, Robert C. “The Law And Economics Of Street Layouts: How A Grid Pattern Benefits A Downtown.” Alabama Law Review 64, no. 3 (April 2013): 463–510. https://search.ebscohost.com/login.aspx?direct=true&db=a9h&AN=86276706&site=ehost-live.

Sands, Gary, Laura A. Reese, Chade Saghir, and Pierre Filion. “Planning for Post-Pandemic Downtowns of Mid-Size Urban Areas.” *Planning Practice & Research* 37, no. 3 (June 2022): 393–405.

Kickert, Conrad. “Fight, Flight, or Adapt – the Future of Our Commercial Streets.” *Journal of Urban Design* 27, no. 1 (February 2022): 55–58.

Speck, Jeff. *Walkable City: How Downtown Can Save America, One Step at a Time*. North Point Press, 2013.

Buffel, Tine, and Phillipson, Chris. *Ageing in Place in Urban Environments: Critical Perspectives*. Milton: Taylor & Francis Group, 2023.

APPLICATION OF KAWAGOE MODEL FOR REGENERATION OF MERCHANT STREET IN YANGON, MYANMAR

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INTRODUCTION

An application of the Kawagoe model for regeneration of Merchant Street in Yangon, Myanmar identifies an innovative method for physical and economical regeneration of historic street located in the downtown of the city. Kawagoe in Japan is a picturesque historic town with a population of 333,218 persons in 2023 with an area 42.14 square miles. After World War II, the town lost its glory due to decline in trade. Further, later in the 1960's, the old commercial shops started to decline due to the beginning of large shopping malls in the nearby areas. The main street passing though the town is known as Ichibangai street with many historic old buildings of "Kurazukuri" style of architecture. This street declined due to the formation of shopping malls in the nearby surrounding. However, in 1980's the town found an innovative model for regeneration which consisted of institutions known as Ichibangai Main Street Regeneration Council, City Council and a Town Planning Company Ltd. The research here develops a hypothesis for how this model can be applied on Merchant Street in Yangon? What are the benefits, problems and potentials of an application of such model for regeneration of the historic street? An application of the Kawagoe model is possible on Merchant Street in Yangon. As Yangon city lacks finance for regeneration, this model can bring a large scale of private investment. Moreover, the model can develop co-ordinated and planned intervention for regeneration of street. The urban context in Japan and Myanmar are different in planning, policy initiatives, and available finance for development of cities. After World War II, the war-torn Japanese cities needed immediate planning for redevelopment and renewal of major cities. Around 1960, Machizukuri was the major method of town planning adapted by the cities. "Machi" means a city and "Zukuri" means making of city. The "Machizukuri" method is mainly a community-based method of city planning.[1] In the 1980's, in the city of Nagahama, an innovative model of "Machi Zukuri Kaishya" was found for regeneration of cities.[2]

The city of Nagahama is located in Shiga Prefecture in Biwa-Ku. The decline of the historic city of Nagahama started with shifting of the shopping and businesses in large shopping centres in the periphery of town.[3] The citizens centric planning invented a model of "Machizukuri Kaishya", which means a Town Planning company.[4] The model within 10-15 year regenerated the historic city. Today, Nagahama is an important tourist destination in Japan.[5] Many visitors visit the town, as it is famous as "City of Museum of Glass".[6] Later, this model was adopted in various cities like Kawagoe and Sawara.

Unfortunately, cities in Myanmar do not have sufficient planning framework to regenerate the historic cities. Due to political changes, the cities have less planning initiatives and funds for regeneration. The city of Yangon (Rangoon) was once famous as "Paris of East". During its heyday, Merchant Street was famous for its historic architecture and economic activities. However, due to political instability, and lack of planning interventions, the street lost its glory. Hence, regeneration of Merchant Street in Yangon can revive the lost glory of the historic city.

KAWAGOE CITY PROFILE

The historic city of Kawagoe is located in the south western part of Saitama prefecture about 18 miles from Tokyo. The city is 42 square miles and part of the greater Tokyo area. It is significant for its trade and commerce in Saitama prefecture, and as a suburb to Tokyo, many citizens travel for work every day to Tokyo. Historically, during the Edo period, the city has gained political and economic significance, and is also known as "Little Edo". Edo is the historic name of Tokyo city. The city is well connected to Tokyo, Kamakura and many other parts of Japan. After 1973, during the great Kawagoe fire, the reconstruction of old historic buildings led to development of historic townscape.[7] Now the city economy is based on electronics products, food processing and various agricultural products. Every weekend a large number of tourists visit the historic sites and spend time on the main street known as "Ichibangai Street". This street has many historic buildings articulated in the Japanese style of "Kurazukuri" architecture.

Decline of Ichibangai Street

The historic city centres in Japan went into decline from 1960 to 1970, when many large shopping complexes started developing businesses in the periphery of cities. This gradually became a phenomenon and many cities started struggling to sustain businesses in old town shopping districts. In Kawagoe, after 1980's decline of the main street and historic city center started as many shopping centers were developed near the station area (Figure 1 and 2). The ageing population and changing shopping preferences were another reason related to decline of the shopping districts. The early decline of the historic city center of Kawagoe started in 1950's when departmental shops were constructed south of the Ichibangai street near Kawagoe station. Later, in 1959, more departmental stores opened near the new Kawagoe station. Moreover, the historic center lost visitors and investment declined. Subsequently, this led to demolishing the historic buildings into mansions or parking lots. But in 1983, a group of local shops launched "Kawagoe Kura no Kai" (Kawagoe Historic Building Committee).[8] It started to preserve the local shopping street which led to Machizukuri, a community-based town planning movement in the city.[9]

Figure 1. Ichibangai Street, Kawagoe, Japan

THE KAWAGOE MODEL

The model for regeneration of Ichibangai street in Kawagoe includes Ichibangai Main Street Regeneration Committee, City Council and Kawagoe Town Planning Co. Ltd. (Figure 3). The Ichibangai Main Street Regeneration Committee is part of the community and shop owners and plays a major role in planning and executing the goals of the city plan. The City Council develops regeneration

Figure 2. Map of Ichibangai Street, Kawagoe, Japan

vision and provides incentive to other two organizations. The Kawagoe Town Planning Co. Ltd. is an innovative organization inspired from the Nagahama city. It is a private town planning company started by the community in Kawagoe to provide investment and execution support. The committee looks after the planning and development of the regeneration process. The Kawagoe Town Planning Ltd. was started by community-based group of investors in 2012 with shareholding of 21 % by community-based investors, 14 % of city, and 7 % of the Chamber of Commerce. All these organizations develop a continuous regeneration cycle to regenerate the historic main street.

The history of this model can be traced back to the 1960-70s when the residents of the city were moving away from the historic city. The Ichibangai street architecture, mainly was dark color historic buildings with warehouses inside once owned by the merchants of Kawagoe known as Kurazukuri buildings. The Osawa family residence was the oldest and first merchant building rehabilitated in Kawagoe which later got designation of national cultural heritage. In 1971, the Castle Town Kawagoe Committee was formed which conducted research in the field of regeneration of historic districts. From 1970 to 1980, the regeneration further gained momentum as the condominiums were developed in the city. During this time, Kawagoe city design codes were framed for historic areas and main street. In 1983, Kawagoe Kura no Kai (Kawagoe Historic Buildings Committee) was established by the shop owners as a citizen's initiative to conserve the main street to plan and overlook the regeneration of the historic shopping street. In 1981, Kawagoe City was designated as a cultural district. In 1987, Kawagoe Ichibangai Main Street Regeneration Committee was established to execute and manage the historic street. In 1988, building codes were framed for the historic city and main street. During 1985-1983 a prefectural tourist city development project was initiated by the city. In 2009, the complete street was regenerated and tourists from all over Japan started visiting Kawagoe.

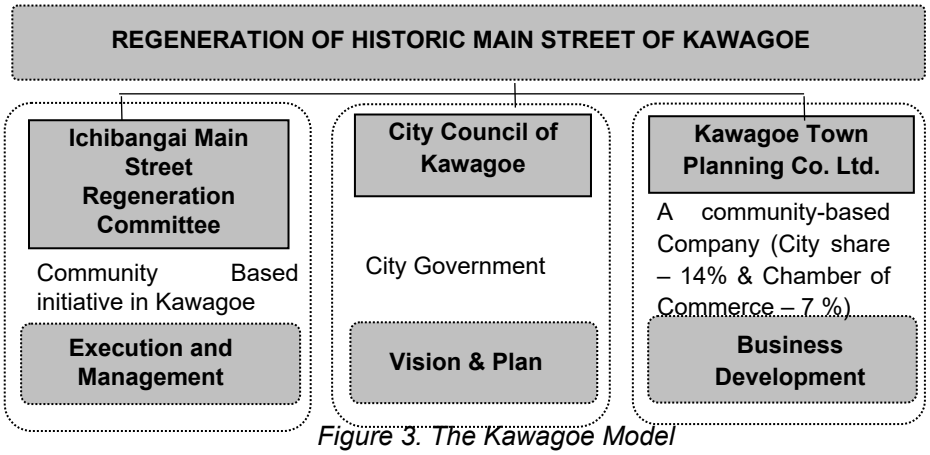

Figure 3. The Kawagoe Model

The Kawagoe model[10] is based on three pillars of urban planning: 1) pillar of design, 2) pillar of business, and 3) pillar of institution and finance. The pillar of design looks into a compact, safe and beautiful city, and regeneration of main street. This pillar looks into conserving old historic buildings along main street by developing building codes to control spaces, heights and zoning. The pillar of business proposed to make the city core for business for local, national and international tourists. It focuses on revival of the local economy and providing new business in the historic buildings which directly lead to conservation of the historic buildings. One of the concepts of revival was making the street as "Community Mart" to promote sale of products and increase the market for the businesses with branding of products for modern lifestyle. The pillar of institute and finance promotes Machizukuri Kaishya (Town Planning Company) as a core of business development. As the businesses decline, the Machizukuri Kaishya[11] as an institution is an innovative approach to bring private investment in old historic shopping streets. The community-based company is established with a group of investors from the community. It focuses on profit making in the regeneration process. It has a business development group, Non-Governmental Organization (NGO) and project management consultant. The business group develops new business in old dilapidated historic buildings. The NGO goes door to door to help the community members by providing technical, and training support. The project management consultant undertakes restoration of old historic buildings. The complete model develops a continuous regeneration cycle.[12]

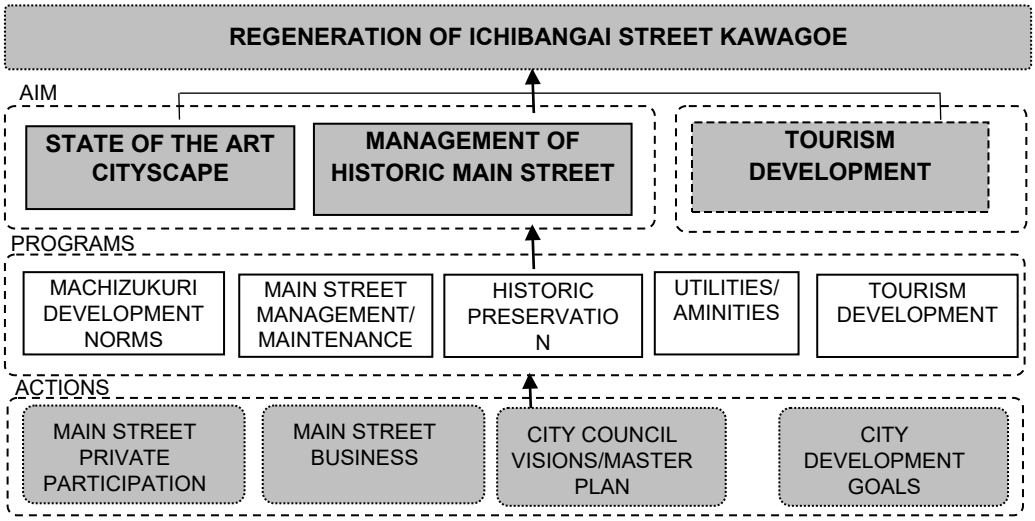

Figure 4. Actions, Programs and Aims

Now to understand this model, it is important to know the aims, program and actions by various authorities. Significantly, this model, plan and execute the main street regeneration as “bottom to top” approach (Figure 4). So, the actions which are essential in main street regeneration are main street private partnership with city government which allows private investment and faster execution of the regeneration program. These actions are implemented by the programs coordinated by the various authorities in main street regeneration. Some of these programs are: a) development norms and guidelines, b) main street management, c) historic preservation guidelines, utilities and amenities, d) main street maintenance, e) revitalization though events and tourism.[13] All these programs lead to achieve following aims: a) developing the state-of-the-art cityscape by regenerating main street, and b) management of historic city, and develop tourism.

BENEFIT OF KAWAGOE MODEL

The Kawagoe model has many benefits for regeneration of shopping streets and its application can provide innovative approaches towards regeneration of main street. The benefits are private partnership and investment, community participation, management and maintenance, tourism development and state-of-the-art cityscape. Generally, a decayed main street lacks finances for regeneration and achieving master plan objectives. This model provides an innovative approach by developing private companies with a group of investors from the community. As the funds are invested by multiple members or shareholders, larger investment is possible in main street regeneration. The key innovation of this model is community participatory approach for planning and execution of regeneration objectives. The community participation is achieved at various levels like, formulation of a community-based company, master planning, and implementation and management of main street. Another important part of the model is the main street management organization which looks after the management and maintenance. Furthermore, the amenities and facilities require frequent maintenance. As the regeneration cycle process keeps on generating development charges, it becomes easy to undertake maintenance of the main street. Important part of any historic regeneration project is to develop tourism for economic improvement of the cities. This model has the benefit of improving the economy by developing local, national and international tourism. Finally, implementation of state-of-the-art amenities and facilities requires substantial funds for infrastructure, amenities and facilities. Many city governments do not have sufficient funds for such implementation. This model particularly benefits to fetch private investment in developing infrastructure, amenities and facilities.

YANGON: CITY PROFILE

Yangon, also known as Rangoon, is the capital city of Myanmar (Burma). The city has been famous for gem and jewellery business from historic times. During the colonial period, the city was designed as a port city with Marchant Street as main street passing east and west. In this period many heritage buildings were constructed in the downtown. However, the political changes have affected the development of the city leading to rise and fall in economy and architecture. After independence from British rule, the city remained under military rule, but in 1948 democratic governance was formed leading to economic progress. Unfortunately, in 1962 again the military rule dominated and the economy collapsed causing the decline of Merchant Street. The earliest planning efforts in the city include formation of Yangon City Development Committee (YCDC). The key role of YCDC is to look after the planning and development of the city. Later, Yangon Heritage Trust (YHT) was formed in 2012 as a non-profit organization to look after the conservation of the heritage buildings. Along with the other organization, the Chamber of Commerce remained as an organization supporting business along Merchant Street in Yangon.

MERCHANT STREET: PROFILE

Yangon was taken over by the British after the war of 1852. British engineer Lt. Alexander Fraser planned the city with Marchant Street as a business thoroughfare with major institutions, commercial buildings, parks, hotels, banks and markets (Figure 5). The street starts from 24th street in the east and ends at May Yu Road on the west. The eastern zone of the street has mainly Chinatown, institutions and commercial buildings. The central zone comprises Maha Bandula Park, Yangon Stock Exchange and many other important buildings. The western zone mainly has residential buildings. Majority of the heritage is located in the central and eastern zone. The main reason for the decay of the heritage of Marchant Street is intense rain for eight months in the city of Yangon. The continuous rain causes damages to the rain water system of the buildings. This led to collection of water and water passes through the structural element and led to decay of the building. Because of this, the heritage buildings on Marchant Street are extensively damaged with exterior and interior. The second reason for the decay is the decline of the economy due to political changes. This has resulted into poor financial situation of the building owners to maintain the heritage buildings. The third reason for decay is lack of funds with the local authority for planning, management and maintenance of Marchant Street.

Figure 5. Marchant Street, Yangon (Top Row– East Zone, Middle Row – Central Zone, and Bottom Row – West Zone)

APPLICATION OF KAWAGOE MODEL

An application of the Kawagoe model in the regeneration of Merchant Street in Yangon proposes a model which includes Yangon Heritage Society (YHT), Yangon City Development Committee (YCDC) and Yangon Town Development Co. Ltd. (Figure 6). The YHT has been an instrumental organization looking at the development of heritage. It has identified various methods to regenerate historic buildings. Significantly, YHT can be developed into an institution which can manage and maintain the main street.

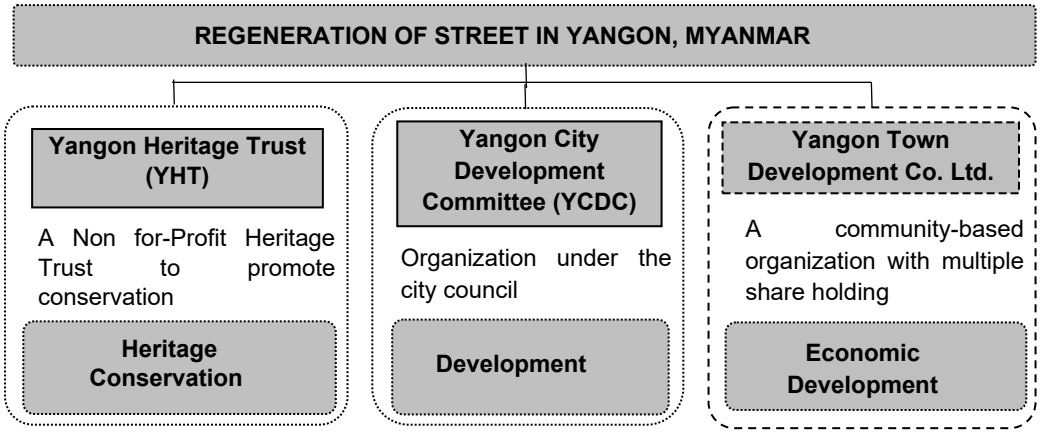

Figure 6. Proposed Marchant Street Model

The Yangon Town Development Co. Ltd. can be an innovative model of private investors by a company limited by shares. The main benefit of creating such a company will be to increase private investment in the main street regeneration process. The company can be developed with a group of private investors based in the community. The company can further look into development of businesses along the main street. The historic building along the main street can be adaptively reused into commercial and institutional activities. The company can invest in business, at the same time it will be a lender to small and medium businesses along main street.

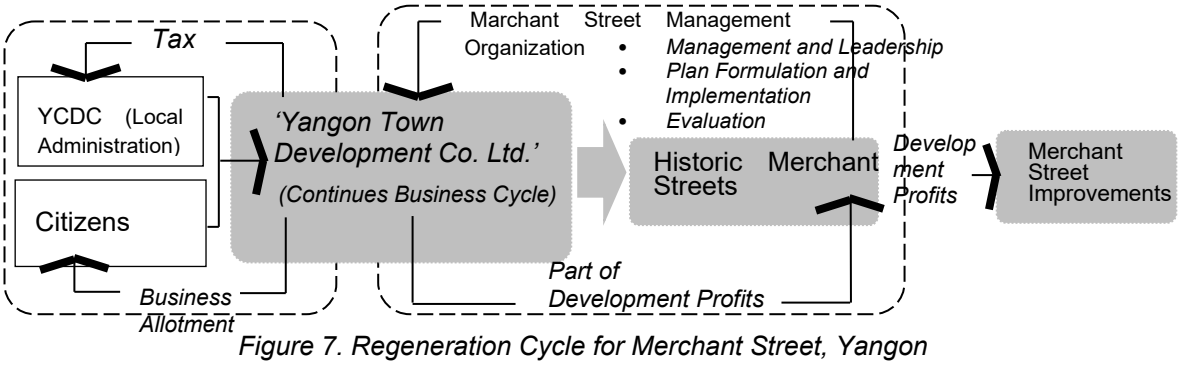

Figure 7. Regeneration Cycle for Merchant Street, Yangon

The model can develop a continuous business cycle of generating new businesses on the main street with an independent institution of Merchant Street Management Organization (MSMO) (Figure 7). The core role of MSMO will be to look after the management of main street. Moreover, it will be a lead for the regeneration process to formulate plan, and implement the goals. Finally, it will look into evaluation of the regeneration process. The Yangon Town Planning Co. Ltd. will give the business allotment to the community members of Marchant Street and invest to develop profits. Moreover, it will involve the citizens in the complete regeneration process. The YCDC will be the regulatory authority by providing incentive in the regeneration process and generating development profits and use it for investment in infrastructure development and maintenance.

Figure 8. Rehabilitated Historic Building on Merchant Street Yangon (Before and After)

This model's validity was found suitable during the rehabilitation of two historic buildings on Marchant Street between 2016-2024 with international funds and a community-based construction company located in Yangon. The first project was known as "Regeneration of NIC building". It was adaptively reused into a cultural center to promote local and international culture. The rehabilitation process of NIC building indicated that it is possible to regenerate the main street with a large-scale private investment, this investment could be through a group of investors from the community. Thus, to regenerate the Merchant Street in Yangon, such an innovative model can provide large scale private investment through a community-based company.

CONCLUSION

An application of the Kawagoe model can benefit to generate private finances, manage and develop state-of-the-art infrastructure at Merchant Street in Yangon. Some of the important problems associated with this application are: a) as the model need an institution with community-based investors, sometimes these types of interventions are difficult in regeneration of main streets in developing countries; b) generally, the approach promotes "bottom to top" approach for development. To achieve such development strong community initiatives are required along with a Master Plan vision. Such a process needs planning legislation which can promote the participatory approach. The city of Yangon, in particular, does not have sufficient legal mechanisms to promote community participation; and c) the main street shop owner's initiative and coordination is another important part of the regeneration process. To achieve this, it is important to have non-for-profit institutions with an aim to conserve heritage and promote business development. As it is found that this model has significant benefit and generate large scale investment in the main street regeneration. Similar models can be applied to regenerate historic streets in various cities around world.

NOTES

[1] Atsuyuki Okazaki, Yukihiko Harashina, “A Case Study on Consensus Building in the Process of Urban Development Utilizing Historical Townscapes”, *Journal of City Planning Institute of Japan*, 29,. 697-702. (Japanese Language)
[2] Fukukawa Yuichi and Saigo Mariko, “A redevelopment by a non profit organization – A Mahchizukuri Kaiysha”, *Journal of Architecture Institute of Japan*, no. 467 (1995), 153-162, (Japanese Language)
[3] Fukukawa Yuichi, “Bokutachi no Machizukuri (Our Town Planning)”, *Iwanami Syoten Co.*, no. 2 (1999), 41-43. (Japanese Language).
[4] Fukukawa Yuichi, “Central Town Area Activation by Town Management Organization”, *Journal of City Planning Institute of Japan, (October 1998).* (Japanese Language)
[5] Nojima Shinji and Matsumoto Saigo, “A study of process and development of organization – A case study at central district of Nagahama City”, *Journal of City Planning Institute of Japan*, no. 36, (2001), 7-12.(Japanese Language).
[6] Nojima Shinji and Matsumoto Saigo, “A study of process and development of organization – A case study at central district of Nagahama City”, *Journal of Town Planning Institute of Japan*, no. 36, (2001), 7-12..(Japanese Language)
[7] Koi Katsumata, Yoko Sone, Hideaki Katsumata, “A Study on Regeneration of Central Urban Area by Chained Urban Development on Kawagoe Taisho Romantic Dream Street”, *Architectural Institute of Japan Technical Report*, vol.7, no.12, (2001), 173-176. (Japanese Language)
[8] Katsushin Minami and Yuichi Fukukawa, “Town Development and Townscape Committee in Kawagoe First Avenue”, *Journal of City Planning Institute of Japan*, no. 27, (1992), 67-72. (Japanese Language).
[9] Fukukawa Yuichi, “Traditional Row Houses : Revival by community based development company”, *Federation of traditional houses in Japan publication*, (October 1999), 78-87. (Japanese Language)
[10] Imai, Heide. "Balancing urban revitalization, tourism, and development issues in times of crisis: Kawagoe's historical district as a self-sustaining and resilient community." *Journal of the German Institute for Japanese Studies Tokyo*, 24, no. 2 (2012): 149-178. DOI: https://doi.org/10.1515/cj-2012-0008.
[10] Fukukawa Yuichi, “Central Area Shopping District and Machizukuri Kaiysha”, *Journal of Architectural Institute of Japan*, no. 9, (September 2005), 66 – 79. (Japanese Language).

BIBLIOGRAPHY

Fukukawa Yuichi, December, ‘Central town area at crossroads - Inner city strategy’ (2000) no. 30, pp. 78-82 (Japanese)

Kakiuchi Emiko and Hayashi Takashi, ‘Economic Impact Study of Kurokabe Square, Nagahama, Shiga, and its policy implications’, Journal of the City Planning institute of Japan April 2005, No. 40-1, pp 751 -755. (Japanese)

Anderson Graduate School of Management at UCLA, Darft report on ‘Kurokabe : The Street of Glass in Nagahama’ (English), June 20, 1996

Nojima Shinji and Matsumoto Saigo, ‘A study of process and development of organization – A case study at central district of Nagahama City’, Journal of Town Planning Institute of Japan, (2001) No. 36, pp. 7-12.(Japanese)

‘Kurokabe : The Evolving Company’, Report prepared on economic impact analysis by Kurokabe Inc., by Hiroyuki Ando, Kazuhiro Kaneko, Charlotte Kuo, Jae-jun Han, James Opdyke and Lorna Yanagihara, Management 444AB, University of California, Los Angeles, John E. Anderson Graduate School of Management. (English) , March 1997

Inaba, Yushi. ‘Creating New Local Industry Through Inter – organizational Collaboration: A study of Japanese Initiatives from Joint Entrepreneurship Perspective. PhD dissertation, School of Management, University of Cambridge.(English) , 2002

Koi Katsumata, Yoko Sone, Hideaki Katsumata, A Study on Regeneration of Central Urban Area by Chained Urban Development : On Kawagoe Taisho Romantic Dream Street, Architectural Institute of Japan Technical Report, 2001, vol.7, no.12, p.173-176 (Japanese)

Atsuyuki Okazaki, Yukihiko Harashina, A Case Study on Consensus Building in the Process of Urban Development Utilizing Historical Townscapes, Journal of City Planning, 1994, 29, p. 697-702, Published 2019/02/01 (Japanese)

Katsushin Minami, Yuichi Fukukawa, Town Development and Townscape Committee in Kawagoe First Avenue, Journal of City Planning, 1992, 27, p. 67-72 (Japanese)

Building The Future – Role of Heritage in Sustainable Development of Yangon, Report of an International Conference held in Yangon, Myanmar, January 15-17, 2015

Yangon Heritage Strategies – Combining Conservation and Development to Create Asia;s most Liveable Cities, Yangon Heritage Trust, 2016

A Strategic Urban Development Plan for Greater Yangon, Final Report II, Nippon Koei Co., Ltd. NJS Consultants Co., Ltd. YACHIYO Engineering Co., Ltd. International Development Center of Japan Inc. Asia Air Survey Co., Ltd. ALMEC Corporation, January 2014

HISTORIC BUILDING DIGITAL MANAGEMENT FOR A LIVEABLE CITY: A CASE STUDY BASED ON ONE NETWORK UNIFIED MANAGEMENT IN SHANGHAI, CHINA

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INTRODUCTION

Historic buildings are the immovable treasures of a city that strongly link its cultural, social, and economic resources, and when considering the comprehensive developments required to promote urban liveability, the novel historic building conservation scene should be seen as an indispensable part. Smart city discourse has been on the rise for about thirty years, but old urban components may slow the pace of a city becoming smart, especially, in the case of a metropolis. Smart city solutions offer innovative ways to manage urban heritage. The aim of this article is to provide a new application scenario for historic building management in the context of liveable urban development in a big city – Shanghai, China.

The case study analysis is based on one network unified management (ONUM) platform in Shanghai, and this study contributes to an approach to historic building management based on smart urban operations. When the issue of liveability and smart cities intersect, the new conservation mode produced not only digitalises the archive of heritage buildings but also enables various stakeholders to better access them. In a liveable city, decision-makers can better conduct urban planning. Residents and tourists can visit and study culture and history more conveniently. The benefits of novel urban historic building conservation are worthy of deeper research.

A path to making cities more liveable

In an era of increasing urbanisation, regulated sustainable growth and deliberate urban regeneration caused concerns on booming urbanisation in Asian and African urban areas.[1] According to the United Nations (2018),[2] the amount of people living in urban areas will increase from 3.5 billion to 5 billion by 2030. Cities tend to develop significantly to cope with the requirements resulting from population expansion, but, even if cities are expanding, limited resources always restrain that expansion to a certain extent.

Therefore, it is worth considering how to use existing resources to better achieve urban liveability. Cultural heritage is a crucial bridge that links humanity's past, present, and future and, over the years, its definition has been considered a dynamic category subject to constant social and cultural evolution.[3] Urban regeneration might entail rehabilitating existing buildings, developing new sites and buildings, or just reusing urban spaces,[4] but, currently, urban development is moving in the smart direction.

In the context of urban transformations in the network society, smart discourses influence how advanced technological applications affect cultural and historical urban fabrics.[5] New academic and industrial domains are emerging to integrate technologies and services, creating novel discussions around different disciplines.[6] Developing smart cities is regarded as a strategy for dealing with problems associated with urban liveability. Whether this represents the rise of smart discourse or the practice of smart city initiatives, historic buildings are an indispensable part of the city and should not be left behind.

SMART CITY DEVELOPMENTS FOR HISTORIC BUILDING CONSERVATION

Smart cities in different countries

Singapore announced the commencement of the Smart Nation programme in 2014. Both the governmental and private sectors have since adopted smart technologies in order to build a city fuelled by digital innovation and technology that can adapt to the shifting requirements of its residents. The Smart Nation mobile application has been developed to allow residents to access a variety of government services and information.[7]

The national goal in Japan is to develop Society 5.0, a data-driven and human-centred society that has adopted artificial intelligence (AI), big data, and the Internet of Things (IoT).[8] The intention is to create a new kind of society that uses cutting-edge digital technology combined with traditional methods to address social problems and promote economic growth.[9]

The Smart Cities Mission (SCM) was launched in India in 2015, as an initiative intended to boost economic growth and the standard of living for Indians.[10] By encouraging local area development and utilising technology, particularly that which produces smart results, the SCM has the aim of spurring better urban construction while ensuring that cities are liveable, inclusive, and sustainable, and have thriving economies that provide people with numerous opportunities to pursue their varied interests.[11]

According to the European Union (2022),[12] existing networks and services are enhanced by digital technologies benefitting locals and businesses in a smart city. In an essay written for the UK government's Foresight Future of Cities project, future cities must have high-quality infrastructure if they are to be well-led and well-managed and offer the finest services for high quality of life.[13] Remarkable developments across different urban elements benefit the local economy, liveability, productivity, et cetera.

The Marketplace of the European Innovation Partnership on Smart Cities and Communities and the Smart Cities Information System were combined to produce a brand-new platform known as the Smart Cities Marketplace. The Marketplace's three primary areas of cross-cutting activity that are pertinent to heritage are: 1) sustainable urban mobility; 2) sustainable districts and built environment; and 3) integrated infrastructures and processes in energy, information and communication technology, and transportation.[14]

Smart cities in China

In 2009, the construction of smart cities was launched in various parts of China, and the total number of cities proposing to build smart cities was estimated to be over 230.[15] The Chinese Academy of Engineering conducted a study on the construction of smart cities in 2010 and launched a major consultancy research project entitled ‘Strategic Research on the Construction and Promotion of Smart Cities in China’ in 2012.[16] In recent years, China's smart cities have been developing rapidly and with remarkable results.

China’s smart city development has broadly gone through four stages. The first stage was the exploration and practice period, running from the end of 2008, when the smart city concept was proposed, to 2012. The main feature of that stage was that various departments and places promoted

the construction of smart cities. The second phase was the standardisation and adjustment period, from 2012 to 2015, mainly characterised by the linkage that progressively developed in various business areas in terms of smart city construction.
The third phase was the strategic assertion period (2016 to 2020), which was mainly characterised by the introduction of the new smart city concept and its elevation to a national strategy. The fourth phase runs from 2020 to now and highlights the digital twin cities and human-centred developments in different industries with the use of technologies, such as deep learning, and collaborations between government and corporations.[17]

A new perspective from for historic building conservation

Digitalisation is an unavoidable topic in the smart city discourse. Digital twins seem to have brought a new perspective to architectural heritage conservation, which has laid a solid foundation. Florida Institute of Technology Research Professor Michael Grieves introduced the initial terminology in a 2003 lecture, which was later codified in a white paper that traces the future evolution of digital twins. The digital twins concept initially emerged for future NASA and US Air Force vehicles,[18] combining the IoT, machine learning, AI, and data analytics to construct dynamic, live digital simulations of real-world objects.[19]
With the help of these cutting-edge technologies, the revolution of integration between IoT and data analysis is led by digital twins.[20] The amount of diverse, useable data from industry, healthcare, and smart city applications has expanded as a result of the IoT[21] with the its environment offering a valuable resource for mistake detection and predictive maintenance, especially for the long-term viability of smart city plans, which undoubtedly involve the preservation of architectural heritage.
It is now feasible to develop digital twin smart cities due to growingly massive and precise building information modelling (BIM) and the enormous data produced by IoT sensors in a city.[22] Virtual 3D models of the cities have been around for a while for visualisation purposes, enabling visual cityscape exploration for various users.[23] However, although digital twin technology is still in its infancy, relevant smart city or digital twin applications for cultural and historical elements still needs to be investigated.[24]
Under the background of cultural heritage digital transformation, it is time to fully adopt digital components into heritage methods and practice.[25] Point-cloud visual models or historic BIM can be conventionally treated as crucial components of a heritage digital twin. However, that may mean that heritage preservation stops at the digital. Compared with the other characteristics (e.g. art values) of heritage, pure visual environments are insufficient to promote heritage conservation; therefore, this study demonstrates a scenario of architectural heritage conservation in the contexts of smart cities and digital twins.

CASE STUDY: HISTORIC BUILDING DIGITAL MANAGEMENT BASED ON ONE NETWORK UNIFIED MANAGEMENT (ONUM)

ONUM overview

ONUM can be described as an integrated system for the comprehensive management and operation of urban affairs and is a direction translation of the Chinese name of this idea. Currently, there is no official, accurate English phrase used to express it. According to some national governmental documents, this phrase represents management via a single website or a network to enable unified management. Based on this, the management platform is interpreted and translated by the authors as “one network unified management”.
In this phrase, “one” refers to an integrated platform, highlighting the policies practices, unity of infrastructure, consistency of data and information, standard operation, and synergy of disposal. The

term “management” denotes the idea and practice of life-cycle management. The aim of ONUM construction is to investigate management concepts, methods, and procedures that are consistent with the needs of the whole life-cycle of urban development. Since the promotion of grid-based management, the digital urban management system has provided strong support for effective urban operation and development.[26]

The so-called platform originated in business management and it refers to a data support platform for business supply chain collaboration and business ecology.[27] O'Reilly initially presented the notion of “Government as a Platform”, maintaining that the government, as a platform, should first open up standards to drive innovation and growth, and foster entrepreneurial innovation through a decentralised strategy that not only produces dynamism but also mitigates the hazards of single business domination.[28]

In essence, one network management is the full use of big data, cloud computing, IoT, (AI), Geographic Information System (GIS), and other advanced technologies.[29] It should continually optimise and iterate based on what the government should manage and how to manage it successfully. Urban governance platform is a comprehensive aggregate that refers to economic, governance, and infrastructural penetration into the Internet and application ecosystem. Its role in cultural heritage monitoring, conservation, and management should be considered as a branch represent of the complicated system.

Why select Shanghai?

Shanghai is a model city for comprehensive, holistic digital transformation and governance, and its ground-breaking ONUM mode of digital governance makes it a fully developed digital governance role model.[30] Shanghai’s core variables in the ONUM mode include technology application, organisational reform, and functional implementation. They have brought together 185 systems and nearly a thousand applications from more than 50 departments, and it has formed an urban work system that runs through the city, district, and block levels, covering economic governance, social governance, and urban governance.[31]

Qishancun, Shanghai, China

Qishancun is located in the historic district of Shanghai. It is a typical “Linong” building. Linong or Longtang originated in the later nineteenth century as a unique architectural style in Shanghai, becoming the main form of modern local dwellings.[32] It is a fusion of the traditional Jiangnan residential architectural style and the British conventional row-house style, a combination of Chinese and Western architectural styles.[33] Most of the buildings (about 20 buildings in total) in the lane at Qishancun were built between 1925 and 1930. In 2005, Qishancun was included in the fourth batch of outstanding historically protected buildings in Shanghai.[34]

Figure 1. Linong building[35]

As a pilot area for the installation of smart sensing equipment in historical buildings, the local government in Shanghai arranged 60 vibration sensors. The digital protection, monitoring, and management of architectural heritage is one of the divisions of ONUM, and there are three levels of monitoring and management: city, district, and sub-district.

Historic buildings vibration monitoring

The potential hazards existing in the historic buildings in Shanghai mainly include man-made damages (e.g., illegal decorations and constructions), subsidence, and structural materials erosions. The pilot monitoring in Qishancun focused on structural vibrations from the direction of building construction and arterial roads, monitoring areas including roofs and concealed locations on some floors. By monitoring the structural vibration of the building and analysing the impact of vibration on the stability of the building, it is possible to prevent or mitigate the occurrence of human-induced vibration sources. Information of monitoring and management is available and accessible on the district-level command terminal screen, as shown in Figure 2.

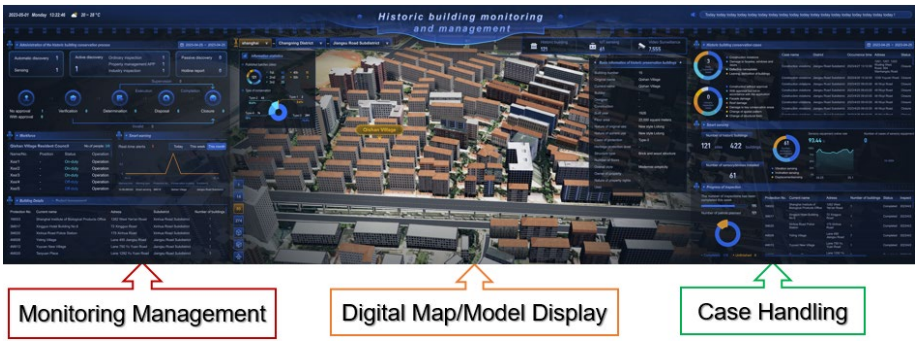

Figure 2. District-level command terminal screen (by the authors)

Monitoring management section

Figure 3. Administration process section (by the authors)

The top left corner of the screen is the administration process section, which is intended to iterate the three actions (automatic, active, and passive) for early warnings and the disposal mechanism of historic buildings. Active discovery action means finding potential damages via daily inspections

from monitoring staff, which would be compared with previous recorded information on the historic buildings to assess whether they are harmful. If yes, the potential damages will be delegated for verification, and on-site verification will be completed in 24 hours. Following that, a case detailing the problems is filed in a report to the supervisor of the sub-district management centre for evaluation in another 24 hours.

Figure 4 demonstrates the workflows of these three discovery actions. Each stage of the whole process is represented by a colour. Each generated case will be dispatched to administrators in the district housing authority and district urban management bureau. Solutions are developed respectively. These authorities collaborate to practice proposed schemes. A new verification is subsequently conducted by the monitoring staff and supervisors before the conclusion. Passive and automatic discoveries have the same procedures in terms of filing cases, dispatch, and solving, but different discovery mechanisms. The former is reported via hotlines by residents or managers and the latter via alarms attached to the sensors implemented in the buildings.

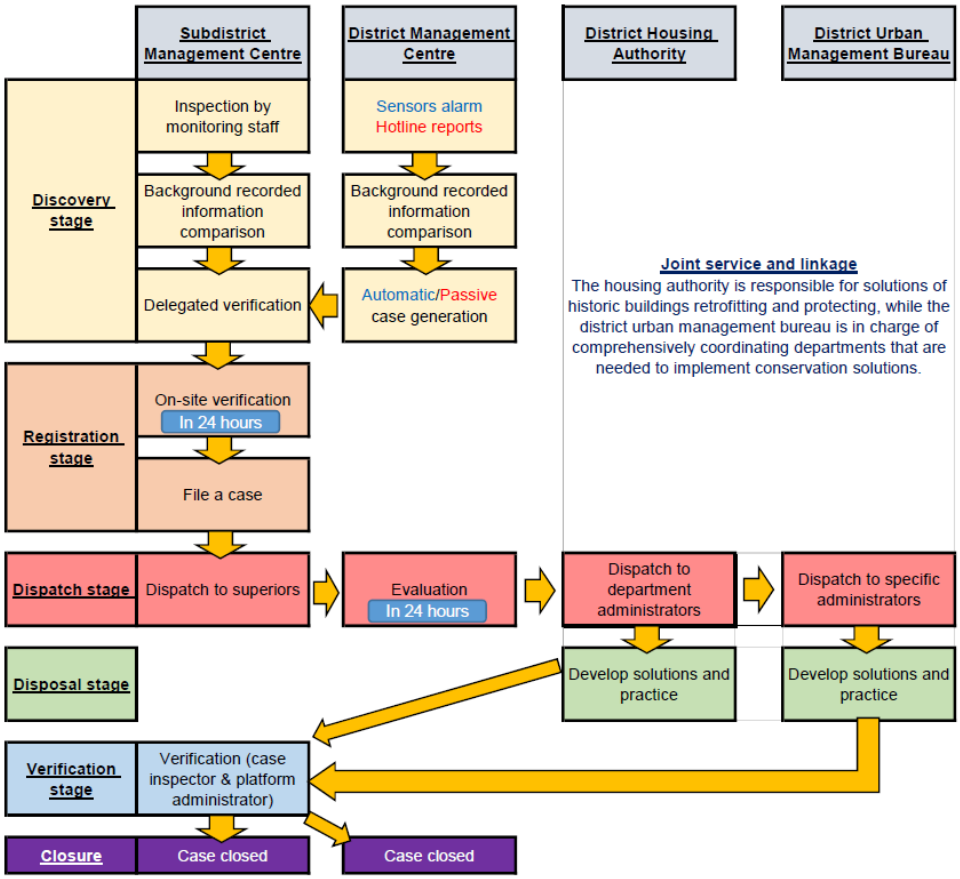

Figure 4. Active, automatic, and passive discovery (by the authors)

Figure 5. Sections workforce, smart warning, and building details (by the authors)

Case handling section

Information regarding workforce, smart warning, and building details is available on the left part of the command screen (Figure 5). Smart warning is based on vibration sensors placed in the buildings, in which data can be filtered according to different time limits (day, week, and month). Building details list locally or nationally protected historic buildings in this district, while workforce data shows information about on-duty staff. On the right-hand part of the command screen, as shown in Figures 6 and 7, historic building conservation cases are listed with reasons for filing, status of disposal, and compared ratios also presented.

Figure 6. Historic building conservation cases in the case handling section (by the authors)

Figure 7. Smart sensing and progress of inspection in the case handling section (by the authors)

In the smart sensing section, the number of historic sites and buildings and number of installed sensory devices in this district are summarised. Different types of sensory devices and online rates are demonstrated. Vibration sensing is the representative category. Progress of inspection, which corresponds to active discoveries, including detailed records of generated conservation cases, presents inspecting information to the terminal administrator in real time.

Digital Map And Model Display Section

ONUM provides 3D visualisation interactions of the architectural heritage and surrounding streets for fundamental information display. In the middle section of the district-level command screen, panoramas of Qishancun and approximate position of placed sensors are provided (Figure 8). On the top left of the middle screen (Figure 9), general conservation types and numbers of each publication regarding excellent historic buildings in this district are summarised. According to the drop-down menu, relevant information about the selected districts and sub-districts can be presented. Basic information on the selected historic conservation building are filtered and presented on the right-hand side of the middle screen (Figure 10).

Figure 8. Panoramas from different angles (by the authors)

Figure 9. General historic building conservation information in Changning District (by the authors)

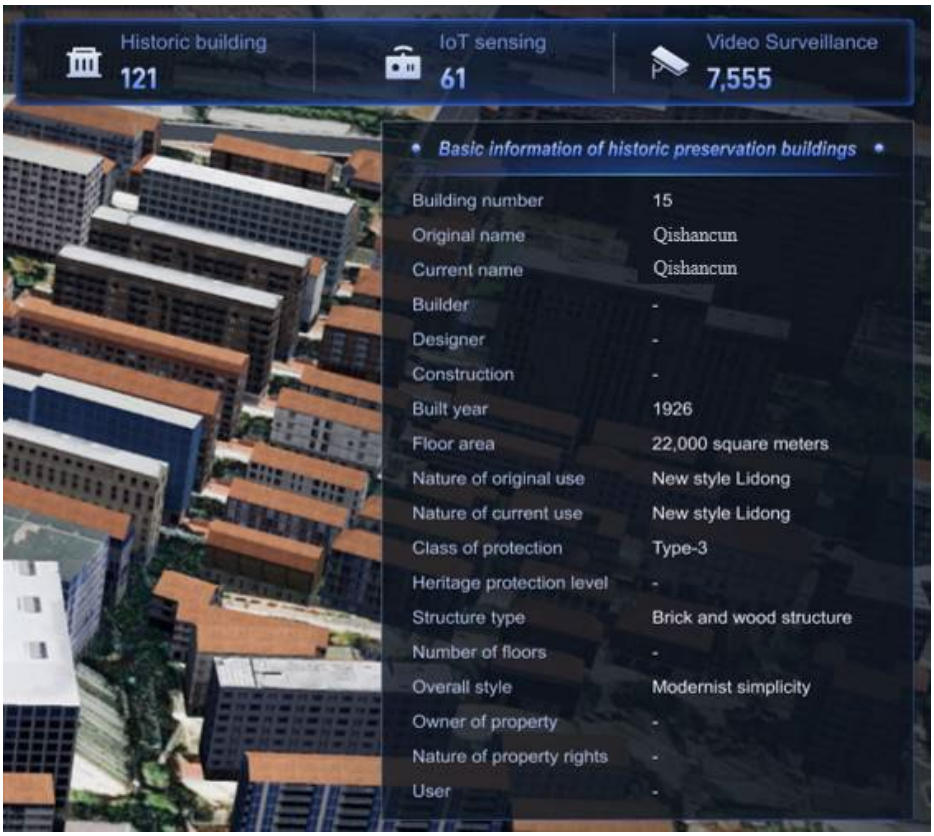

Figure 10. Basic information regarding the historically preserved historic building (by the authors)

DISCUSSION

The emergence of ONUM in architectural heritage represents the possibility of extending smart city initiatives in urban historic components, proposing to comprehensively improve urban management and operations by reshaping governance concepts and processes through technologies. Based on the goal of improving urban users' quality of life, ONUM has realised the leap from digitisation to application in the field of heritage conservation.

Under the smart city initiatives, the digital archive of architectural heritage is formed firstly to provide initial protection. According to the beliefs supporting ONUM, online and offline collaboration of

historic building conservation produces better co-movements and co-ordinations among stakeholders and means historically relevant data is used effectively. The practice in Qishancun demonstrates that the foundation of a platform is not purely about running smart cities, but also enriching the meaning of being smart. Smart cities, digital twins, and architectural heritage can develop a linkage based on a special service objective. The case study shows a monitoring-oriented scenario.

CONCLUSION

Urban digitalisation and platformisation for fast and efficient governance have been analysed increasingly often in academia. Novel technologies continuously provide opportunities for well-rounded applications to enhance urban liveability. Liveability in cities involves all aspects, including heritage and its users, and ONUM's application in historic building management provides an example of intellectualising old urban materials while corresponding to urban smart development. However, this approach should not be limited to this, and future historical and cultural applications based on digital grid management should be constantly proposed and created.

NOTES

[1] Steffen Lehmann, "Introduction: The Complex Process of City Regeneration: Presenting a Ten-Point Strategy for Urban Regeneration of UK Cities," (Cham: Springer International Publishing, 2019).
[2] "Around 2.5 billion more people will be living in cities by 2050, projects new UN report," 2018, accessed 1st May, 2023, https://www.un.org/en/desa/around-25-billion-more-people-will-be-living-cities-2050-projects-new-un-report.
[3] Mathieu Dormaels, "Participatory management of an urban world heritage site: The Table de Concertation du Vieux-Québec," *Journal of Cultural Heritage Management and Sustainable Development* 6, no. 1 (2016).
[4] Corina M. Radulescu et al., "Management of stakeholders in urban regeneration projects. Case study: Baia-Mare, Transylvania," *Sustainability (Basel, Switzerland)* 8, no. 3 (2016), https://doi.org/10.3390/su8030238.
[5] Z Allam, "Focus group findings for smart urban regeneration," *J. Urban Regen. Renew* (2018).
[6] Liisa Ilomäki et al., "Digital competence – an emergent boundary concept for policy and educational research," *Education and information technologies* 21, no. 3 (2016), https://doi.org/10.1007/s10639-014-9346-4.
[7] "Singapore: The World's Smartest City," Thales, 2023, accessed 15th June, 2023, https://www.thalesgroup.com/en/worldwide-digital-identity-and-security/iot/magazine/singapore-worlds-smartest-city.
[8] "Smart Cities in Japan: Practical Innovations for Conscious Future Living," Tokyoesque 2022, accessed 15th June, 2023, https://tokyoesque.com/smart-cities-in-japan/.
[9] Kantei, Japan's Smart Cities, (2020).
[10] "Smart Cities Mission 2023: All You Need to Know about Smart Cities," magicbricks, 2023, accessed 15th June, 2023, https://www.magicbricks.com/blog/smart-cities-mission/127407.html.
[11] Rumi Aijaz, "India's Smart Cities Mission, 2015-2021: A Stocktaking," (2021).
[12] "Smart cities - European Commission," 2022, accessed 1st May 2023, 2023, https://commission.europa.eu/eu-regional-and-urban-development/topics/cities-and-urban-development/city-initiatives/smart-cities_en.
[13] Professor Robert Mair, How will city infrastructure and sensors be made smart?, (Cambridge Centre for Smart Infrastructure and Construction, 2022).
[14] European Commission, The Marketplace of the European Innovation Partnership on Smart Cities and Communities (EIP-SCC), (2016 SMART CITIES | An initiative of the European Commission: European Commission, 2016).
[15] "The Chinese Academy of Engineering has set up a project to invest two trillion dollars in the construction of smart cities.," icspec, 2014, accessed 1st May, 2023, https://icspec.com/news/article-details/231135?type=prefecture.
[16] Herald, "The Chinese Academy of Engineering has set up a project to invest two trillion dollars in the construction of smart cities.."
[17] "2022 China Smart City Construction Development Insight Report," TianYanCha Research, 2022, accessed 15th June 2023, http://www.199it.com/archives/1512143.html.
[18] Edward Glaessgen and David Stargel, "The digital twin paradigm for future NASA and US Air Force vehicles" (paper presented at the 53rd AIAA/ASME/ASCE/AHS/ASC structures, structural dynamics and materials conference 20th AIAA/ASME/AHS adaptive structures conference 14th AIAA, 2012).
[19] Weichao Luo et al., "Digital twin for CNC machine tool: modeling and using strategy," *Journal of ambient intelligence and humanized computing* 10, no. 3 (2019), https://doi.org/10.1007/s12652-018-0946-5.
[20] Francesco Gabellone, "Digital Twin: a new perspective for cultural heritage management and fruition," *Acta IMEKO* 11, no. 1 (2022).
[21] Arash Heidari, Nima Jafari Navimipour, and Mehmet Unal, "Applications of ML/DL in the management of smart cities and societies based on new trends in information technologies: A systematic literature review," *Sustainable cities and society* 85 (2022), https://doi.org/10.1016/j.scs.2022.104089.
[22] Gary White et al., "A digital twin smart city for citizen feedback," *Cities* 110 (2021), https://doi.org/10.1016/j.cities.2020.103064.
[23] Timo Ruohomäki et al., "Smart city platform enabling digital twin" (paper presented at the 2018 International Conference on Intelligent Systems (IS), 2018).
[24] Zaheer Allam and Peter Newman, "Redefining the smart city: Culture, metabolism and governance," *Smart cities (Basel)* 1, no. 1 (2018), https://doi.org/10.3390/smartcities1010002.
[25] Franco Niccolucci, Achille Felicetti, and Sorin Hermon, "Populating the Data Space for Cultural Heritage with Heritage Digital Twins," *Data (Basel)* 7, no. 8 (2022), https://doi.org/10.3390/data7080105.

[26] Shannon Hastings et al., "A Grid-Based Image Archival and Analysis System," *Journal of the American Medical Informatics Association : JAMIA* 12, no. 3 (2005), https://doi.org/10.1197/jamia.M1698.
[27] Shendong; Yang He, Dapeng, "The Connotation and Path of Digital Government Construction--Based on Zhejiang's Analysis of the Experience of "Running at Most" Reform," *Zhejiang Journal* 05 (2018).
[28] Tim O'Reilly, "Government as a Platform," *Innovations: technology, governance, globalization* 6, no. 1 (2011).
[29] "This is how we understand the relationship between Shanghai's "one network unified management" and data elements.," Sohu.com, 2020, accessed 20th February, 2022, https://www.sohu.com/a/427486082_657456.
[30] "Build the base of Shanghai's "one network unified management" with safety, and show the world the new realm of "China's governance".", China National Radio, 2021, accessed 20th February, 2022, http://www.cnr.cn/shanghai/tt/20210427/t20210427_525473276.shtml.
[31] "Shanghai's "one network unified management" at the Digital China Construction Summit," CHINANEWS, 2021, accessed 20th February, 2022, https://www.chinanews.com.cn/gn/2021/04-26/9464725.shtml.
[32] "Shanghai Urban Renewal Report ① | Comprehensive Renovation of Qishan Village in the Yuyuan Road Historic District," 2023, accessed 20th June, 2023, https://www.sohu.com/a/684684470_121286085.
[33] Shaozhou; Chen Wang, Zhimin, *Linong Architecture*, vol. 1 (Shanghai Science and Technology Literature Publishing House, 1987).
[34] "Fourteen historic buildings in Giselle Village to complete façade repairs to recreate 90-year-old glory," Shangguan, 2018, accessed 20th June, 2023, http://sh.sina.com.cn/news/m/2018-07-12/detail-ihfefkqq6760632-p2.shtml.
[35] "The Strange Landscape of Lane in Shanghai: The Water Tower Apartment in the Old Town in the 1920s," THEPOLYSH, 2016, accessed 20th June, 2023, https://thepolysh.com/blog/2016/06/02/house-design-by-wutopia-lab/.

BIBLIOGRAPHY

Aijaz, Rumi. "India's Smart Cities Mission, 2015-2021: A Stocktaking." (2021).

Allam, Z. "Focus Group Findings for Smart Urban Regeneration." *J. Urban Regen. Renew* (2018).

Allam, Zaheer, and Peter Newman. "Redefining the Smart City: Culture, Metabolism and Governance." *Smart cities (Basel)* 1, no. 1 (2018): 4-25. https://doi.org/10.3390/smartcities1010002.

"Shanghai's "One Network Unified Management" at the Digital China Construction Summit." CHINANEWS, 2021, accessed 20th February, 2022, https://www.chinanews.com.cn/gn/2021/04-26/9464725.shtml.

Commission, European. *The Marketplace of the European Innovation Partnership on Smart Cities and Communities (Eip-Scc)*. 2016 SMART CITIES | An initiative of the European Commission: European Commission, 2016.

"Smart Cities - European Commission." 2022, accessed 1st May 2023, 2023, https://commission.europa.eu/eu-regional-and-urban-development/topics/cities-and-urban-development/city-initiatives/smart-cities_en.

Dormaels, Mathieu. "Participatory Management of an Urban World Heritage Site: The Table De Concertation Du Vieux-Québec." *Journal of Cultural Heritage Management and Sustainable Development* 6, no. 1 (2016): 14-33.

Gabellone, Francesco. "Digital Twin: A New Perspective for Cultural Heritage Management and Fruition." *Acta IMEKO* 11, no. 1 (2022): 7 pp.-7 pp.

Glaessgen, Edward, and David Stargel. "The Digital Twin Paradigm for Future Nasa and Us Air Force Vehicles." Paper presented at the 53rd AIAA/ASME/ASCE/AHS/ASC structures, structural dynamics and materials conference 20th AIAA/ASME/AHS adaptive structures conference 14th AIAA, 2012.

Hastings, Shannon, Scott Oster, Stephen Langella, Tahsin M. Kurc, Tony Pan, Umit V. Catalyurek, and Joel H. Saltz. "A Grid-Based Image Archival and Analysis System." *Journal of the American Medical Informatics Association : JAMIA* 12, no. 3 (2005): 286-95. https://doi.org/10.1197/jamia.M1698.

He, Shendong; Yang, Dapeng. "The Connotation and Path of Digital Government Construction--Based on Zhejiang's Analysis of the Experience of "Running at Most" Reform." *Zhejiang Journal* 05 (2018): 45-53.

Heidari, Arash, Nima Jafari Navimipour, and Mehmet Unal. "Applications of Ml/Dl in the Management of Smart Cities and Societies Based on New Trends in Information Technologies: A Systematic Literature Review." *Sustainable cities and society* 85 (2022): 104089. https://doi.org/10.1016/j.scs.2022.104089.

"The Chinese Academy of Engineering Has Set up a Project to Invest Two Trillion Dollars in the Construction of Smart Cities." icspec, 2014, accessed 1st May, 2023,

https://icspec.com/news/article-details/231135?type=prefecture.
Ilomäki, Liisa, Sami Paavola, Minna Lakkala, and Anna Kantosalo. "Digital Competence – an Emergent Boundary Concept for Policy and Educational Research." *Education and information technologies* 21, no. 3 (2016): 655-79. https://doi.org/10.1007/s10639-014-9346-4.
Kantei. *Japan's Smart Cities*, 2020.
Lehmann, Steffen. "Introduction: The Complex Process of City Regeneration: Presenting a Ten-Point Strategy for Urban Regeneration of Uk Cities." 1-54. Cham: Springer International Publishing, 2019.
Li, Ji, Sukanya Krishnamurthy, Ana Pereira Roders, and Pieter van Wesemael. "State-of-the-Practice: Assessing Community Participation within Chinese Cultural World Heritage Properties." *Habitat international* 96 (2020): 102107. https://doi.org/10.1016/j.habitatint.2019.102107.
Luo, Weichao, Tianliang Hu, Chengrui Zhang, and Yongli Wei. "Digital Twin for Cnc Machine Tool: Modeling and Using Strategy." *Journal of ambient intelligence and humanized computing* 10, no. 3 (2019): 1129-40. https://doi.org/10.1007/s12652-018-0946-5.
Mair, Professor Robert. *How Will City Infrastructure and Sensors Be Made Smart?*: Cambridge Centre for Smart Infrastructure and Construction, 2022.
"Smart Cities Mission 2023: All You Need to Know About Smart Cities." magicbricks, 2023, accessed 15th June, 2023, https://www.magicbricks.com/blog/smart-cities-mission/127407.html.
"Shanghai Urban Renewal Report ① | Comprehensive Renovation of Qishan Village in the Yuyuan Road Historic District." 2023, accessed 20th June, 2023, https://www.sohu.com/a/684684470_121286085.
Niccolucci, Franco, Achille Felicetti, and Sorin Hermon. "Populating the Data Space for Cultural Heritage with Heritage Digital Twins." *Data (Basel)* 7, no. 8 (2022): 105. https://doi.org/10.3390/data7080105.
O'Reilly, Tim. "Government as a Platform." *Innovations: technology, governance, globalization* 6, no. 1 (2011): 13-40.
Radulescu, Corina M., Ovidiu Stefan, Gheorghe M. T. Radulescu, Adrian T. G. M. Radulescu, and Mihai V. G. M. Radulescu. "Management of Stakeholders in Urban Regeneration Projects. Case Study: Baia-Mare, Transylvania." *Sustainability (Basel, Switzerland)* 8, no. 3 (2016): 238-38. https://doi.org/10.3390/su8030238.
"Smart Cities in Japan: Practical Innovations for Conscious Future Living." Tokyoesque 2022, accessed 15th June, 2023, https://tokyoesque.com/smart-cities-in-japan/.
Ruohomäki, Timo, Enni Airaksinen, Petteri Huuska, Outi Kesäniemi, Mikko Martikka, and Jarmo Suomisto. "Smart City Platform Enabling Digital Twin." Paper presented at the 2018 International Conference on Intelligent Systems (IS), 2018.
"Fourteen Historic Buildings in Giselle Village to Complete Façade Repairs to Recreate 90-Year-Old Glory." Shangguan, 2018, accessed 20th June, 2023, http://sh.sina.com.cn/news/m/2018-07-12/detail-ihfefkqq6760632-p2.shtml.
"Singapore: The World's Smartest City." THALES, 2023, accessed 15th June, 2023, https://www.thalesgroup.com/en/worldwide-digital-identity-and-security/iot/magazine/singapore-worlds-smartest-city.
"2022 China Smart City Construction Development Insight Report." TianYanCha Research, 2022, accessed 15th June 2023, http://www.199it.com/archives/1512143.html.
"Around 2.5 Billion More People Will Be Living in Cities by 2050, Projects New Un Report." 2018, accessed 1st May, 2023, https://www.un.org/en/desa/around-25-billion-more-people-will-be-living-cities-2050-projects-new-un-report.
"The Strange Landscape of Lane in Shanghai: The Water Tower Apartment in the Old Town in the 1920s." THEPOLYSH, 2016, accessed 20th June, 2023, https://thepolysh.com/blog/2016/06/02/house-design-by-wutopia-lab/.
Wang, Shaozhou; Chen, Zhimin. *Linong Architecture*. Vol. 1: Shanghai Science and Technology Literature Publishing House, 1987.
White, Gary, Anna Zink, Lara Codecá, and Siobhán Clarke. "A Digital Twin Smart City for Citizen Feedback." *Cities* 110 (2021): 103064. https://doi.org/10.1016/j.cities.2020.103064.
"Build the Base of Shanghai's "One Network Unified Management" with Safety, and Show the World the New Realm of "China's Governance"." China National Radio, 2021, accessed 20th February, 2022, http://www.cnr.cn/shanghai/tt/20210427/t20210427_525473276.shtml.
"This Is How We Understand the Relationship between Shanghai's "One Network Unified Management" and Data Elements." Sohu.com, 2020, accessed 20th February, 2022, https://www.sohu.com/a/427486082_657456.

EXPLORING RESIDENTS' DEFINITION AND USE OF NEIGHBOURHOOD LEFTOVER SPACES IN COLOMBO, SRI LANKA

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INTRODUCTION

Urban leftover spaces are the residual spaces or cracks in cities that form due to rapid urban development.[1] These types of spaces have also been referred to as "lost spaces",[2] "loose spaces",[3] "urban voids"[4] and "informal urban green spaces".[5] They are typically vacant, neglected, or under-utilized spaces within highly urbanized areas and can be permanent or temporary. They are often considered urban spaces awaiting future use.[6] These types of spaces have been studied for over five decades, with much of that research aimed at understanding their characteristics and potential uses in urban environments. The specific socio-economic and environmental context in which the spaces occur often influences the results. While these spaces occur at different urban scales and land use zones, their presence at the neighbourhood level has often been overlooked.[7] Furthermore, although interest in these spaces has dramatically increased in recent years, their specific uses and definitions are often unclear due to the various ways they are interpreted and perceived.

Urban leftover spaces

Based on a review of current discourse, leftover spaces are commonly portrayed as hostile and wasted spaces[8] and merely inconvenient barriers to the future growth of a city.[9] There is an impression of these leftover spaces as vacant and lacking formal functions and neglected by authorities, leading to negative connotations that these spaces lack environmental quality, are associated with illicit activities, and exhibit an absence of maintenance and aesthetic appeal.[10] On the other hand, these spaces have been found to perform similarly to or possibly more effectively than other types of open spaces due to the ecological and community integrative potential of these spaces.[11] This is observed in the informal community uses they are often put to and the unappreciated ecological value they possess,[12] highlighting the inherent positive nature of these types of spaces.

Informality

As with any landscape, the informal nature of urban leftover spaces gives way to improvised uses and varied perceptions, generating somewhat informal public spaces. The theory of informal urbanism further emphasizes the need to understand the informality of leftover spaces, as these spaces have produced improvised adaptations and impermanent alternate uses. Although predominantly related to the study of informal settlements in the Global South,[13] informal urbanism defines these spaces as a

product of urban life from unplanned and unregulated development,[14] co-existing within the formal urban landscape. With the myriad opportunities available to redevelop leftover spaces,[15] the notion of informalism highlights the importance of understanding the uses and appropriations of such spaces to inform the future of planning and regeneration of urban landscapes. However, while informal practices are considered a critical strategy for urban development in most parts of the world today, Perera[16] argues that professionals in the Global South prefer a more top-down approach, disregarding how spaces have been perceived or 'lived in' by the people, in favour of heavily formalized urban development. This has often led to spaces with projected uses and functions unresponsive to the community's needs. Hence, it can be argued that a bottom-up approach can better facilitate community responsiveness and the production of spaces within their geographic and social-cultural contexts.

While the reimagination and possible formalization of these spaces at various urban scales have been speculated upon, people's perceptions of these types of spaces have played an essential role in understanding their social value[17] and their potential use in neighbourhoods for the communities that inhabit them.[18] However, they have not been sufficiently explored to understand them within different socio-cultural contexts, particularly in developing South Asian cities. Addressing this need, this paper reports on the findings of a study on neighbourhood leftover spaces conducted in Colombo, Sri Lanka. It explores how these spaces occurring within selected neighbourhoods in this city are characterized and used by the residents.

STUDY CONTEXT AND METHODS

Colombo is a developing city in South Asia and the commercial capital and most populous city in Sri Lanka (see Figure 1). The city has undergone increased urban development in recent years. Regarding land use, a study by Li and Pussella[19] revealed that the available open and green space has dramatically reduced over the past few years owing to disorganized planning and uncontrolled development. This includes mismanagement of existing open spaces and the emergence of under-utilized spaces. Recent policies have focused on developing public green spaces and addressing the decline of such open spaces. However, most of the attention is given to centralized urban areas, while leftover spaces within the less central neighbourhoods and their associated communities have been neglected.

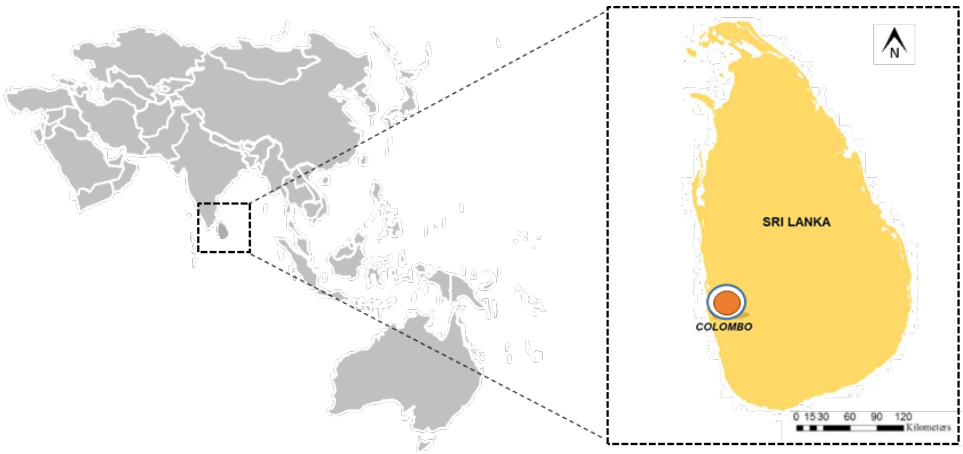

Figure 1. Study context – Colombo, Sri Lanka

For this study, leftover spaces within the residential precinct of Kirulapone were selected. Kirulapone is situated within primary residential and mixed development land use zones.[20] It is an area that has

been least considered in future landscape planning.[21] It includes neighbourhoods with varying socio-economic and demographic characteristics and several different types of leftover spaces.
The methods employed to study these spaces adopt a perceptual-based approach for landscape quality assessment initially pioneered by Zube et al.[22] and Daniel and Vining,[23] who focused specifically on what has been termed the cognitive and experiential approaches of this type of research. The residents in the selected neighbourhoods were recruited using a snowball sampling approach. Using a projective mapping technique, the participants were first given a map of their neighbourhood area and asked to identify the spaces they considered as being leftover. Semi-structured interviews were then conducted to investigate how these spaces were perceived and how residents defined and interacted with them. The interviews were designed to elucidate residents' knowledge and experiences of the spaces identified on the maps to reveal the underlying physical and social characteristics that had shaped their perceptions. Four neighbourhood leftover spaces were selected for analysis based on the projective mapping responses and the frequency of their mention, as illustrated in Table 1. The open-ended, qualitative responses of 63 participants were then content analyzed. The selected leftover spaces within their identified neighbourhoods are shown in Figure 2.

	Leftover spaces identified	**N1 (22)**	**N2 (20)**	**N3 (9)**	**N4 (12)**	**Frq**
LS1	Open space on Gajaba Road	16				16
LS2	Playground on Nagaswatte Road		20			20
LS3	Space along Robert Gunawardene Road	13		8		21
LS4	Wetland				12	12
	Kirulapone Community Centre	4		2		6
	Privately-owned spaces	1	2	3	1	7

Table 1. Sample of participants and frequency of identified neighbourhood leftover spaces

The four leftover spaces identified by most of the participants were described as being diverse in their typology (see Figure 3). The first space (LS1) was one of three open spaces in a planned neighbourhood. The second space (LS2) was a designated community playground now described as being in a derelict state. The third and most frequently identified space (LS3) was a road reserve along a central roadway in Kirulapone. The fourth space (LS4) was identified as a remnant wetland space, which was commonly perceived as being leftover space.

Figure 2. Leftover spaces selected for analysis

LS1 – Unattended open space

LS2 – Derelict play area

LS3 – Road reserve

LS2 – Natural site

Figure 3. Different typologies of the perceived leftover spaces

FINDINGS

Perceived physical features

The interviews revealed that the spatial characteristics most commonly described as distinct across all four leftover spaces were their state of abandonment and vacancy. All four spaces were perceived to be leftover due to the absence of formal development; no development was planned, or proposed developments were uncertain. For instance, one resident described the road reserve space (LS3), saying, *"They* [authorities] *have been saying that this land will be used to widen the road for many years now, but we still have not seen any development here"*. These spaces were, therefore, considered to be forgotten by the authorities. This was also reflected in their being described as having poor maintenance and lacking evidence of care, a recurring theme across all interviewees. They revealed that no authoritative body has regularly maintained these spaces, leading to the common notion of abandonment. For example, one resident described LS1 by stating, *"It* [the space] *looks like it has been abandoned, and no one is taking the initiative to develop it"*. Indicators of the lack of maintenance and management included waste, garbage or persistent littering by residents and outsiders and the presence of untended or wild vegetation. These also contributed to these spaces' lack of aesthetic appeal. For instance, one interviewee commented on LS4, saying, *"I think this space is ugly the way it is now. There is garbage everywhere, and the vegetation is messy"*. This corresponds to Nassauer's[24] theory of "cues to care", which explicitly identifies these characteristics as indicative of spaces that are not intentionally managed or actively cared for and are hence perceived to be unsightly. They are also consistent with the findings of Farahani and Maller[25] and Hofmann et al.[26]

As a result of being unmaintained, these spaces were, however, also found to have a diversity of vegetation species, significantly more in LS3 (road reserve) and LS4 (wetland). Most participants appreciated the large amounts of vegetation not evident in other areas of these neighbourhoods, as one respondent observed: *"It's good that there is vegetation here. It's pleasing to the eyes"* (this resident was describing LS3). While most vegetation in these spaces was unintended, parts of LS1 and LS4 were also reported to have been landscaped or maintained by the residents, at least within the immediate vicinity. LS1 was found to have ornamental and medicinal herbs, while LS4 had informal crops growing in addition to the natural wetland vegetation. These leftover spaces were accessible to the residents and had unrestrictive boundaries. While physical accessibility allowed residents to use these spaces informally, visual accessibility influenced their degree of use. For instance, spaces LS1 and LS2 were physically and visually accessible to the respective neighbourhood residents, and the street reserve LS3 was open and more publicly accessible. These spaces, as a result, had greater informal use. In contrast, the wetland LS4 was typically concealed from the public and had less physical permeability than the other spaces and low visibility; thus, it had more limited use. Increased accessibility has also led to the emergence of temporary structures and other built elements resulting from informal uses over time.

Although unrestricted access was perceived positively, it was also revealed to be the cause of issues to do with safety and hygiene. There were concerns about residents and outsiders engaging in alcohol consumption, dealing illicit substances, and littering. Such behaviours were perceived as socially and culturally inappropriate within these neighbourhood environments. This aligns with the findings of Groenewegen et al.,[27] who revealed that the sense of safety is weaker in places used for illicit activities. Moreover, dense vegetation (LS4) and enclosed structures and spaces (LS2) were also described as encouraging these activities and were perceived as unsafe. In these instances, residents associated enclosed spaces with dangers and uncertainty related to illicit behaviour or threats from wildlife. This resonates with previous studies that identified a negative relationship between landscape enclosures and safety due to lower visibility.[28] In addition to concerns regarding safety, the littering and accumulation of garbage in these spaces were reported to encourage the breeding of mosquitos

and rats and negatively affect air quality. Thus, these spaces were considered unclean and often compared to a garbage dump. For example, one resident described LS2 saying, *"They* [the residents] *don't care about the playground. Everyone has gotten used to throwing all their garbage"*. At the same time, another person overlooked the litter in the road reserve space (LS3), instead suggesting its potential, *"It's a strip of land that has gone to waste. It's dirty but has potential for development"*.

Current uses

The interviews revealed that, although considered abandoned and neglected, these spaces have several current uses. The absence of management and uncertainty regarding their future development incited ambiguity in these spaces' formal ownership and future land use. This, together with the high accessibility to these spaces, their informal appropriation by residents in these neighbourhoods was encouraged. While LS2 (the playground) was attempted to be used for its intended purpose as a playground, uses reported in LS1, LS3 and LS4 were not formally assigned. However, although reserved for a future road expansion, LS3 had a Buddhist shrine maintained by the residents, which has become a formal element in this space and is visited by residents and outsiders alike.

All four spaces were revealed to be used informally to park vehicles or dry laundry. These uses were most evident in LS1 and LS2, with both spaces being found to have greater visual permeability and levels of privacy within the neighbourhoods. Furthermore, as previously stated, LS1 was also used as a private garden, while other residents appropriated parts of the wetland (LS4) for food cultivation, which had been ongoing for several generations. The road reserve (LS3), being the most accessible space, was the most heavily appropriated, with multiple uses ranging from car parking, kids' play to temporary food stalls. These informal uses also encouraged the building of more structures, and there were concerns of encroachment by the residents near this space. However, some residents also complemented these uses, as one respondent suggested: *"The shops there have created some activity, so it doesn't look completely neglected… it is being used"*. Figure 4 illustrates some of these uses.

Figure 4. Informal uses of the leftover spaces

While residents acknowledged the informal uses, they were not all deemed appropriate for the neighbourhood. Recreational activities, such as children's play, were generally accepted, while activities perceived to affect neighbourhood health and safety or that indicated encroachment of public property were generally considered inappropriate. For instance, the vegetation planted and maintained by some residents in LS1 was frowned upon by another resident in that neighbourhood, saying, "*...some people have landscaped parts of the ground on their own and won't let anyone else touch it. They seem to have taken over the land*". Accordingly, any uses perceived as benefitting individual residents or associated with illegal behaviour or littering were also considered a misuse of the space. Therefore, these related uses were negatively perceived in all four spaces.

While these spaces were not designated or developed as neighbourhood recreational or green spaces, however, they were still considered valuable open space resources for the neighbourhood. For example, one resident living close to LS1 claimed, *"This is the only space we have to spend time outdoors"*. Furthermore, in their unprogrammed state, these spaces were also described as giving children the freedom to play and, for those who are constantly indoors, an opportunity to go outside and interact with their neighbours.

CONCLUSION

This paper explored how urban leftover spaces at the neighbourhood level are defined and used from the perspective of the residents who live in the neighbourhoods where these spaces are found. This study focused on leftover spaces found in the residential precinct of Kirulapone in Colombo, Sri Lanka. The findings suggest that the general absence of development or designation of formal uses renders spaces in this context as being leftover. The uses of these spaces also imply that appropriations may be involuntarily encouraged when a space does not have programmed use. This is consistent with the interpretation of similar spaces in other geographic and social-cultural contexts.[29] This also encourages residents to informally appropriate these spaces and use the public open space available to them in various ways. This underscores a socio-cultural value inherent in these spaces. On the other hand, the diversity of vegetation and associated benefits underscore their ecological value.[30] While the characteristics of these spaces may have some similarities with those found in other geographic contexts, the spaces in this context were found to be a consequence of a lack of care by public authorities and the residents of the area. Furthermore, highlighting the socio-cultural distinctions in this context, their informal uses demonstrate that residents treat these spaces as an extension of their properties, like their backyards, blurring boundaries between the public and private spatial realms. Furthermore, perceptions of the appropriateness of uses also show that while most private uses were disapproved of, uses that encouraged community integration were generally preferred.

The findings of this study thus suggest that neighbourhood leftover spaces can be considered informal spaces, and this informality can be explored further and integrated into their future landscape development. Furthermore, how residents perceive and use these spaces suggests that these leftover spaces could be treated in ways that address open space requirements in neighbourhood areas. Specifically, these leftover spaces could provide avenues for community recreation and green infrastructure while aesthetically enhancing them for the enjoyment of the local community. Moreover, as previously mentioned, these spaces have the potential to enhance the ecological value of the area and address environmental sustainability issues and residents' health and well-being within the context of the neighbourhood environments. Considering this potential and diverse potential for functionality, these spaces could be further explored as multifunctional open spaces.

NOTES

[1] Anastasia Loukaitou-Sideris, "Cracks in the City: Addressing the Constraints and Potentials of Urban Design," Journal of Urban Design 1, no. 1 (2007): doi: 10.1080/13574809608724372.
[2] Roger Trancik, *Finding Lost Space: Theories of Urban Design*. (New York: Van Nostrand Reinhold, 1986).
[3] Karen Franck and Quentin Stevens, "Tying Down Loose Space." in *Loose Space: Possibility and Diversity in Urban Life*, ed. Karen Franck and Quentin Stevens, (London: Routledge, 2006): 1.
[4] Marieluise Jonas and Heike Rahmann, *Tokyo Void: Possibilities in Absence* (Berlin: Jovis, 2014).
[5] Christoph Rupprecht, "Informal Urban Green Space: Residents' Perception, Use, and Management Preferences across Four Major Japanese Shrinking Cities," Land 6, no. 3 (2017): 59, doi: 10.3390/land6030059.
[6] Gunwoo Kim et al. "Urban Vacant Land Typology: A Tool for Managing Urban Vacant Land," Sustainable Cities and Society 36 (2018): 144, doi: 10.1016/j.scs.2017.09.014.
[7] Leila Mahmoudi Farahani and Cecily Maller. "Investigating the Benefits of 'Leftover' Places: Residents' Use and Perceptions of an Informal Greenspace in Melbourne," Urban Forestry & Urban Greening 41 (2019): doi: 10.1016/j.ufug.2019.04.017.
[8] Carol Vidal et al. "Reclaiming Public Spaces: The Case for the Built Environment as a Restorative Tool in Neighborhoods with High Levels of Community Violence." Journal of Community Psychology 50, no. 5 (2022), doi: 10.1002/jcop.22783.
[9] E. Alanyali Aral, *Redefining Leftover Space – Value and Potentiality for the City*. (Saarbrücken, Germany: VDM Verlag, 2009).
[10] Charles C. Branas et al. "Citywide Cluster Randomized Trial to Restore Blighted Vacant Land and Its Effects on Violence, Crime, and Fear." Proceedings of the National Academy of Sciences, USA 115, no. 12 (2018): doi: 10.1073/pnas.1718503115; Joan Iverson Nassauer et al. "Care and Safety in Neighborhood Preferences for Vacant Lot Greenspace in Legacy Cities." Landscape and Urban Planning 214 (2021): 104156, doi: 10.1016/j.landurbplan.2021.104156.
[11] Peleg Kremer et al. "A Social–Ecological Assessment of Vacant Lots in New York City." Landscape and Urban Planning 120 (2013): doi: 10.1016/j.landurbplan.2013.05.003; Gunwoo Kim et al. "Urban Regeneration: Community Engagement Process for Vacant Land in Declining Cities." Cities 102 (Jul 2020): 102730, doi: 10.1016/j.cities.2020.102730.
[12] Jonas, *Tokyo Void*; Gunwoo Kim, "The Public Value of Urban Vacant Land: Social Responses and Ecological Value." Sustainability 8, no. 5 (2016): doi: 10.3390/su8050486.
[13] Kim Dovey, "Informal Urbanism and Complex Adaptive Assemblage." International Development Planning Review 34, no. 4 (2012): doi: 10.3828/idpr.2012.23.
[14] Kim Dovey, *Becoming Places: Urbanism/Architecture/Identity/Power.* (London: Routledge, 2009). https://doi.org/10.4324/9780203875001
[15] Elsa C. Anderson and Emily S. Minor. "Vacant Lots: An Underexplored Resource for Ecological and Social Benefits in Cities." Urban Forestry & Urban Greening 21 (2017): doi: 10.1016/j.ufug.2016.11.015.
[16] Nihal Perera, *People's Spaces: Coping Familiarizing, Creating.* (New York: Routledge, 2016). https://doi.org/10.4324/9781315867069
[17] Christoph D. D. Rupprecht et al. "'It's Real, Not Fake Like a Park': Residents' Perception and Use of Informal Urban Green-Space in Brisbane, Australia and Sapporo, Japan." Landscape and Urban Planning 143 (2015): doi: 10.1016/j.landurbplan.2015.07.003.
[18] Katherine Foo et al. "The Production of Urban Vacant Land: Relational Placemaking in Boston, Ma Neighborhoods." *Cities* 35 (2013): doi: 10.1016/j.cities.2013.06.012; Farahani, "Investigating the benefits…"
[19] L. Li and P.G.R.N.I. Pussella, "Is Colombo City, Sri Lanka Secured for Urban Green Space Standards?". Applied Ecology and Environmental Research 15, no. 3 (2017): 1795, doi: 10.15666/aeer/1503_17891799.
[20] Urban Development Authority. *Colombo Commercial City Development Plan 2019-2030*. (Sri Lanka, 2019). https://www.uda.gov.lk/attachments/devplan_detailed/Development%20Plans%202019-2030/commercial%20city/CommercialCity-eng-v1.pdf.
[21] Western Region Megapolis Planning Project. *Western Region Megapolis Master Plan.* (Colombo: Ministry of Megapolis and Western Development, 2016). http://www.slembassykorea.com/eng/download/Megapolis%20Master%20Plan.pdf.
[22] Ervin H. Zube et al. "Landscape Perception: Research, Application and Theory." Landscape Planning 9, no. 1 (1982): doi: 10.1016/0304-3924(82)90009-0.

[23] Terry C. Daniel and Joanne Vining, "Methodological Issues in the Assessment of Landscape Quality." In *Behavior and the Natural Environment*, edited by Irwin Altman and Joachim F. Wohlwill. (Boston, MA: Springer US, 1983), https://doi.org/10.1007/978-1-4613-3539-9_3.
[24] Joan Nassauer, "Messy Ecosystems, Orderly Frames." Landscape Journal 14, no. 2 (1995): doi: 10.3368/lj.14.2.161.
[25] Farahani, "Investigating the benefits…", 297
[26] Mathias Hofmann et al. "Perceptions of Parks and Urban Derelict Land by Landscape Planners and Residents." Urban Forestry & Urban Greening 11, no. 3 (2012): 311, doi: 10.1016/j.ufug.2012.04.001.
[27] Peter P. Groenewegen et al. "Vitamin G: Effects of Green Space on Health, Well-Being, and Social Safety." B.M.C. Public Health 6 (2006): 149, doi: 10.1186/1471-2458-6-149.
[28] Frances E. Kuo et al. "Transforming Inner-City Landscapes: Trees, Sense of Safety, and Preference." Environment and Behavior 30, no. 1 (1998): doi: 10.1177/0013916598301002; Anna Jorgensen et al. "Woodland Spaces and Edges: Their Impact on Perception of Safety and Preference." Landscape and Urban Planning 60, no. 3 (2002): 147, doi: 10.1016/S0169-2046(02)00052-X.
[29] Franck, "Typing down loose space"; Jonas, *Tokyo void*
[30] Kim, "The public value…"

BIBLIOGRAPHY

Alanyali Aral, E. *Redefining Leftover Space – Value and Potentiality for the City*. Saarbrücken, Germany: VDM Verlag, 2009.

Anderson, Elsa C., and Emily S. Minor. "Vacant Lots: An Underexplored Resource for Ecological and Social Benefits in Cities." Urban Forestry & Urban Greening 21 (2017): 146-52, doi: 10.1016/j.ufug.2016.11.015.

Branas, Charles. C., Eugenia South, Michelle C. Kondo, Bernadette C. Hohl, Phillippe Bourgois, Douglas J. Wiebe, and John M. MacDonald. "Citywide Cluster Randomized Trial to Restore Blighted Vacant Land and Its Effects on Violence, Crime, and Fear." Proceedings of the National Academy of Sciences, USA 115, no. 12 (2018): 2946-2951, doi: 10.1073/pnas.1718503115.

Daniel, Terry C., and Joanne Vining. "Methodological Issues in the Assessment of Landscape Quality." In Behavior and the Natural Environment, edited by Irwin Altman and Joachim F. Wohlwill, 39-84. Boston, MA: Springer US, 1983. https://doi.org/10.1007/978-1-4613-3539-9_3.

Dovey, Kim. "Informal Urbanism and Complex Adaptive Assemblage." International Development Planning Review 34, no. 4 (2012): 349-68, doi: 10.3828/idpr.2012.23.

Dovey, Kim. Becoming Places: Urbanism/Architecture/Identity/Power. London: Routledge, 2009. https://doi.org/10.4324/9780203875001

Farahani, Leila Mahmoudi , and Cecily. Maller. "Investigating the Benefits of 'Leftover' Places: Residents' Use and Perceptions of an Informal Greenspace in Melbourne." Urban Forestry & Urban Greening 41 (2019): 292-302, doi: 10.1016/j.ufug.2019.04.017

Foo, Katherine, Deborah Martin, Clara Wool, and Colin Polsky. "The Production of Urban Vacant Land: Relational Placemaking in Boston, Ma Neighborhoods." Cities 35 (2013): 156-63, doi: 10.1016/j.cities.2013.06.012.

Franck, Karen, and Quentin Stevens. "Tying Down Loose Space." In *Loose Space: Possibility and Diversity in Urban Life*, edited by Karen Franck and Quentin Stevens, 1-33. London: Routledge, 2006.

Groenewegen, Peter P., Agnes E. van den Berg, Sjerp de Vries, and Robert A. Verheij. "Vitamin G: Effects of Green Space on Health, Well-Being, and Social Safety." B.M.C. Public Health 6 (2006): 149-58, doi: 10.1186/1471-2458-6-149.

Hofmann, Mathias, Janneke R. Westermann, Ingo Kowarik, and Elke van der Meer. "Perceptions of Parks and Urban Derelict Land by Landscape Planners and Residents." Urban Forestry & Urban Greening 11, no. 3 (2012): 303-12, doi: 10.1016/j.ufug.2012.04.001.

Jonas, Marieluise, and Heike Rahmann, *Tokyo Void: Possibilities in Absence*. Berlin: Jovis, 2014.

Jorgensen, Anna, James Hitchmough, and Tig Calvert. "Woodland Spaces and Edges: Their Impact on Perception of Safety and Preference." Landscape and Urban Planning 60, no. 3 (2002): 135-50, doi: 10.1016/S0169-2046(02)00052-X.

Kim, G., G. Newman, and B. Jiang. "Urban Regeneration: Community Engagement Process for Vacant Land in Declining Cities." Cities 102 (Jul 2020): 102730, doi: 10.1016/j.cities.2020.102730.

Kim, Gunwoo, Patrick A. Miller, and David J. Nowak. "Urban Vacant Land Typology: A Tool for Managing Urban Vacant Land." Sustainable Cities and Society 36 (2018): 144-156, doi: 10.1016/j.scs.2017.09.014.

Kim, Gunwoo. "The Public Value of Urban Vacant Land: Social Responses and Ecological Value." Sustainability 8, no. 5 (2016): 486-505, doi: 10.3390/su8050486.

Kremer, Peleg, Zoé A. Hamstead, and Timon McPhearson. "A Social–Ecological Assessment of Vacant Lots in New York City." Landscape and Urban Planning 120 (2013): 218-33, doi: 10.1016/j.landurbplan.2013.05.003.

Kuo, Frances E., Magdalena Bacaicoa, and William. C. Sullivan. "Transforming Inner-City Landscapes: Trees, Sense of Safety, and Preference." Environment and Behavior 30, no. 1 (1998): 28-59, doi: 10.1177/0013916598301002.

Li, L., and P.G.R.N.I. Pussella. "Is Colombo City, Sri Lanka Secured for Urban Green Space Standards?". Applied Ecology and Environmental Research 15, no. 3 (2017): 1789-99, doi: 10.15666/aeer/1503_17891799.

Loukaitou-Sideris, Anastasia. "Cracks in the City: Addressing the Constraints and Potentials of Urban Design." Journal of Urban Design 1, no. 1 (2007): 91-103, doi: 10.1080/13574809608724372.

Nassauer, Joan Iverson, Noah J. Webster, Natalie Sampson, and Jiayang Li. "Care and Safety in Neighborhood Preferences for Vacant Lot Greenspace in Legacy Cities." Landscape and Urban Planning 214 (2021): 104156, doi: 10.1016/j.landurbplan.2021.104156.

Nassauer, Joan. "Messy Ecosystems, Orderly Frames." Landscape Journal 14, no. 2 (1995): 161-70, doi: 10.3368/lj.14.2.161.

Perera, Nihal. *People's Spaces: Coping Familiarizing, Creating*. New York: Routledge, 2016. https://doi.org/10.4324/9781315867069.

Rupprecht, Christoph D. D. "Informal Urban Green Space: Residents' Perception, Use, and Management Preferences across Four Major Japanese Shrinking Cities." Land 6, no. 3 (2017): 59-83, doi: 10.3390/land6030059

Rupprecht, Christoph D. D., Jason A. Byrne, Hirofumi Ueda, and Alex Y. Lo. "'It's Real, Not Fake Like a Park': Residents' Perception and Use of Informal Urban Green-Space in Brisbane, Australia and Sapporo, Japan." Landscape and Urban Planning 143 (2015): 205-18, doi: 10.1016/j.landurbplan.2015.07.003

Trancik, Roger. *Finding Lost Space: Theories of Urban Design*. New York: Van Nostrand Reinhold, 1986.

Urban Development Authority. *Colombo Commercial City Development Plan 2019-2030*. Sri Lanka, 2019. https://www.uda.gov.lk/attachments/devplan_detailed/Development%20Plans%202019-2030/commercial%20city/CommercialCity-eng-v1.pdf.

Vidal, Carol, Colin Lyman, Gwen Brown, and Briony Hynson. "Reclaiming Public Spaces: The Case for the Built Environment as a Restorative Tool in Neighborhoods with High Levels of Community Violence." Journal of Community Psychology 50, no. 5 (2022): 2399-410, doi: 10.1002/jcop.22783.

Western Region Megapolis Planning Project. *Western Region Megapolis Master Plan*. (Colombo: Ministry of Megapolis and Western Development, 2016). http://www.slembassykorea.com/eng/download/Megapolis%20Master%20Plan.pdf.

Zube, Ervin H., James L. Sell, and Jonathan G. Taylor. "Landscape Perception: Research, Application and Theory." Landscape Planning 9, no. 1 (1982): 1-33, doi: 10.1016/0304-3924(82)90009-0.

INTEGRATION OF BIOPHILIC DESIGN WITHIN INFRASTRUCTURE

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INTRODUCTION

Infrastructure is an essential part of our society. It has both integrated and segregated communities across cities, at the same time as it has neglected connection to nature. Although bridges and roads are an invaluable resource to urban settings, the demise of green space and natural landscapes has been systematically repeated. Trees and fields were paved over; marshes and wetlands were erased - all for the sake of human progress and interconnection. Efficient paths and low budgets took over the landscape. Today, a heightened awareness and need to be surrounded by nature has awakened the desire to improve urban infrastructure. More and more parks are popping up and buildings are beginning to be covered in greenery, but what of the actual infrastructure, especially bridges? Bridges offer the unique opportunity to blend both natural and man-made elements in a purposeful and beautiful duet, they have the ability to dedicate new green space in urban contexts and allow communities to return to the natural environment without hindering growth or innovation. Their elevated nature along with their vertical and horizontal planes acts as a perfect framework for implementing greenery within its structure. This allows bridges to provide and integrate biophilic design to help communities and cities thrive for the next generations. This paper will look at existing case studies as a guide to developing a future "how-to" for modular solutions in urban contexts. It will become a resource for engineers, architects, and community leaders to use on a wide scale of urban infrastructure projects.

DEFINING A LIVABLE CITY

What makes a city "livable"? What makes one better than the other or makes one more attractive to people than others? Are some cities healthier? Can a city encourage productivity? What about happiness, can it increase what most of us are in a constant pursuit for? A livable city is almost impossible to define as the perception of livable is different for most. The University of Oregon's Sustainable Cities Initiative (SCI) discusses the word livability and what makes a city livable.[1] Although every single one of us may have a different image of our perfect livable city, some elements are crucial to allow those images to exist. The following are the perceived basic human needs for a city to be considered livable based on the topics in SCI's article on livable cities.

Accessibility

A city should be accessible for all. This goes beyond universal design but socio-economic, cultural, and physical. It also means that basic needs and rights are accessible as well including, food, groceries, healthcare, transportation, etc. This also includes housing, infrastructure, and jobs.

Live, Work, Play

A city should be a comfortable and inviting place to live, work, and play at all times and for all ages. A city should not be defined by its 9-5 or in contrast its nightlife. It should be more than a single part; it should be a living organism constantly changing and adapting to its residents and visitors.

Connections

A city should be connected as a whole and avoid barriers and implied borders. Roads and highways have historically divided cities and neighborhoods. Connections should exist between neighborhoods, districts, parks, and nature. These can be physically connected using trails, paths, bridges, and roads, but they should also be visually connected through aesthetics guidelines and styles, themes, and color. This continuity creates an identity and sense of place. It also enhances wayfinding which encourages connectivity.

Health, Safety, & Welfare

A city should not only be safe and healthy for its inhabitants but also encourage healthy lifestyle and improve the lives of the people living and working there. This includes well-lit streets, clean air and water, access to nature and parks, and encouraging walking and cycling by providing designated trails and paths. Although each one of these strategies may seem logical, they are still widely underutilized within our cities even though our connection to nature and vegetation is crucial for a healthy lifestyle.

Each one of these four staples are interwoven in order to create a livable city. One can not have a truly successful connection without accessibility and vice versa, without connections it creates pocket neighborhoods that lack cohesion, leading to segregation. A city can have all the amenities and venues it can afford but without a healthy lifestyle, the city will not prosper. Although an entire paper could be written solely on the research of what makes a city livable, this paper uses the livable city ideaology as a guiding principle to improve the lives within the cities that we live in. So how can one enhance the health, safety, and welfare of a city? Biophilic Design!

BIOPHILIC DESIGN IN CITIES

Biophilia, at its root definition, means love (philia) of life (bio). Life here is synonymous with nature because the survival of humanity depends on the maintenance of natural systems. Although this is not a new or innovative concept, cities were built at odds with their native fauna, flora, and landscape. Timothy Beatley, in 1957, framed the necessary paradigm shift in the title of his book, highlighting that *integration* with nature is the key to transforming cities into *nature-loving* environments.[2] Nature is currently compartmentalized in cities, which is the opposite of integration by definition.

With reason, architecture and infrastructure were designed to shelter humans from storms, diseases, predators, flooding, hail, wind,...The list is vast. Over time, practices related to sustaining cities, such as adding impermeable surfaces, engineering rivers, and extractivism, led to much more complex vulnerabilities. The Mississippi River is a clear example of the multi-scalar tensions caused by attempts to control the river, resulting in multiple, at times, catastrophic consequences, including flooding, drought, and subsidence across entire cities in Louisiana.[3] While new technology and materials will play a big role in addressing these issues, the “philia” part is a fundamental aspect of community buy-in.

There is an abundance of studies highlighting the importance of being in nature. From improvement in health conditions, cognitive development, and economic factors. As Leonhardt frames in his book "Bridges," in 1982, human beings "...need a direct relationship with nature, because we are a part of her and for thousands of years have been formed by her."[4] Emotional connection with nature is often overlooked and, indeed, a factor that is challenging to quantify. It is, nonetheless, an essential piece for integration.

Emotions are a core driving principle of being human. Biophilia in cities means creating a holistic experience, including emotional connection, that combines urban living and nature as an integral part of everyone's daily routine. A biophilic city is "about the spirit of a place, its emotional commitment and concern about nature and other forms of life, its interest in and curiosity about nature…"[5] The goal is not just a city that provides access to nature but one that fosters a connection with nature in mundane activities. Because bridges have been historically regarded as landmarks, they provide a strategic opportunity to act as a connector between urbanity and nature.

A Clear line of separation

The built environment and natural parks have typically been separated and organized as very different areas within a city. There was a defined threshold between built and natural. One had to physically venture to a park in order to have it within arm's reach. It was one or the other. Today this is clearly changing, and these two previously segregated environments are beginning to bleed into each other becoming seamless transitions. More and more parks are growing within our cities, and vegetation is now becoming a desirable amenity on buildings. This stems from the countless research involved with biophilia and the benefits it brings to individuals and communities.

Breaking the confinements of parks and allowing vegetation to spread into our neighborhoods, roads, and even our private and public buildings allow it to become part of our daily lives rather than a forced moment. This method of incorporating nature within our urban fabric creates a connection that does not restrict individuals to access it. Today, vegetation is growing within every inch of our built environment, but there is one area that is still lacking innovation and guidelines. Our infrastructure, more specifically our bridges, are rarely, if ever, part of the biophilic conversation, and this must change for the betterment of our cities and to make them truly livable.

Bridges exist within every metropolis in the world. They are the stitches of our urban fabric, connectors of goods and people, and allow for uninterrupted movement. They offer a large amount of horizontal and vertical surface area within our cities that is traditionally made of steel, concrete or stone. This potential "real estate" can be used as a framework for new vegetation to exist within our already-built environment. They offer a new opportunity to connect us even more to our biophilic needs and to a healthier future.

PRECEDENTS

The implementation of vegetation within bridges exists in multiple forms today. It ranges from truly natural to purposeful and intentional design. Some of these examples are more successful than others but still offer an opportunity for study, inspiration, and implementation. Each different type of precedent has a lesson for the future of integrated vegetation in/on bridges.

The living bridges of India are interwoven rubber fig trees used to cross rising rivers susceptible to flooding, *fig. 1*. Their roots are flexible and allow them to grow into their final bridge form, getting stronger and stronger every year.[6] This is both an act of patience and a symbiotic relationship between human and the environment. This unique bridge type is the ideal and most successful type of integrated structure. Unfortunately, our society is not at the stage to implement this type of

bioengineering within our cities yet. One can only hope to achieve something that is close to the natural beauty and elegance of these grown bridges.

Figure 1. Living bridge in India. Courtesy of NPR.

Wildlife crossings offer the next best thing following the impressive living bridges. They are predominant within rural natural areas. These bridges are designed to bridge wildlife from one side to the other due to human intervention from when highways divided what was once connected, *fig 2*. They offer safe passage for both drivers and wildlife but are also used to encourage biodiversity by linking both sides. These bridges offer a very specialized function and are the foundations for incorporating vegetation within our infrastructure. Although these bridges are typically heavier structurally and secluded from urban centers, their successful designs and detailing will offer a plethora of information for future bridges within urban centers.

Figure 2. Wildlife bridge proposal for Seoul, South Korea. Courtesy of Apexx Architecture.

Wildlife bridges are purposeful and intentional designs, they were designed to have vegetation part of the structure and details were incorporated to deal with the complexities of this. What happens though when nature finds a way into our bridges that were never design to include life. Usually this creates beautiful but dangerous results. As with anything that is built, nature seems to always find a way to grow, from cracks in pavements to roof gutters on houses. Bridges are not exempt from this; one need only take a drive anywhere and see some kind of vegetation grasping at life and attempting to grow on these structures. They can be found in cracks of MSE walls, piers, abutments, and even the bridge decking, *fig. 3 & 4*. Although this can be beautiful and even poetic at times, this causes more concerns than benefits. As plants grow, their roots expand and enter the structure as they demand more water into the cavities. This creates unnecessary force and moisture to enter the structure, preventing proper inspections and maintenance.

Figure 3. Vines growing on abutment of a bridge in Chicago, IL. Courtesy of Apexx Architecture.

Figure 4. Ferns growing in the gaps of the MSE walls of an overpass in Tallahassee, FL. Courtesy of Apexx Architecture.

As beautiful as some of these examples are, allowing uncontrolled and unintentional vegetation growth on existing structures could pose serious structural issues that can cause cracking, allowing water intrusion, spalling, and even failure. It becomes even more serious as vegetation can also prevent engineers from seeing minor issues during inspections because it is covered by vegetation. In order for inspections to be accurately and safely completed, the vegetation must be removed/killed to properly see all the surfaces of the structure. This typically adds unnecessary cost and time for the city and the engineers providing the inspection services.

By designing intentional and purposeful frameworks for vegetation to grow on/in prevents these issues from becoming an added cost and unsafe condition. The goal is to create a clear separation between the structure and the vegetation, allowing for either access and sightlines or both.

The better solution is to design a vegetation system that is purposeful and intentional to the structure. Bridges have multiple areas where this can be applied either singular or in combination. The bridge deck is a commonplace for this to be implemented. Similar to wildlife bridges the idea is to allow vegetation to grow on the surface but contained either above or with the decking as seen in figure 5. Examples of this can be found in Seoul's Seoullo 7017 Skygarden and New York City's High Line, *fig. 5*. This solution is the most prominent and successful to date. It allows for direct connections with users and can even connect parks together.

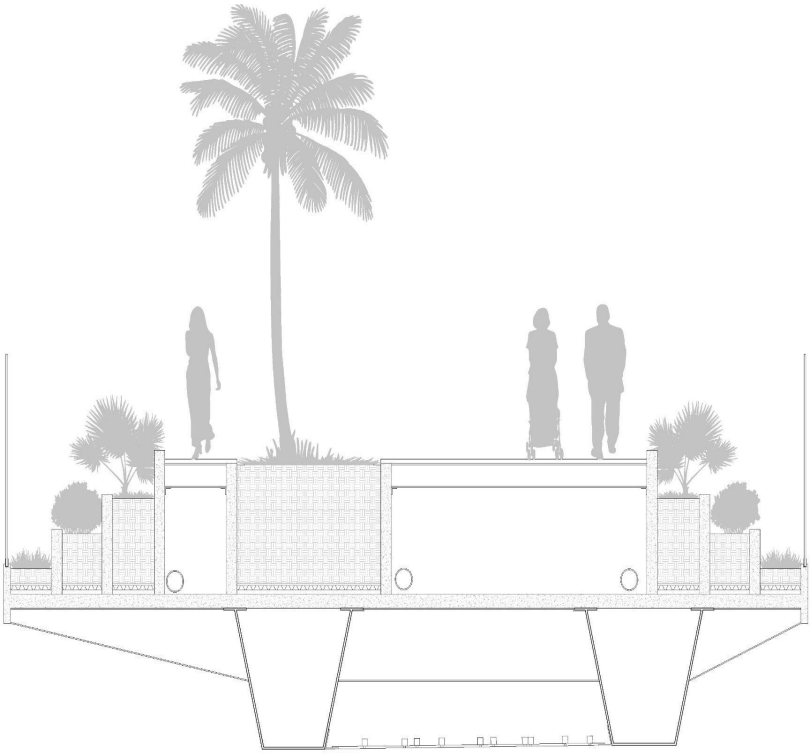

Figure 5. Section of bridge implementing vegetation above deck. Courtesy of Apexx Architecture.

Figure 6. The Highline in New York City. Courtesy of Apexx Architecture.

Piers or the substructure of bridges are rarely considered for vegetation. This is usually because they are vertical surfaces located beneath the bridges they support. As such, they would require specialized plants that can live in low light conditions and grow vertically. Another reason why vegetation is seldom seen on piers is the need to separate the vegetation from the structure to prevent structural damage. The only way this can be done is either specialized modular pods to enable plants to grow individually or a separate framework that surrounds the piers. The latter can be seen in Mexico City's Via Verde, *fig. 7*. This example showcases how piers can be used as structure for vegetation within cities. It is designed to keep the piers and the vegetation framework physically separate. This also allows any visual inspections from engineers to access the piers through gates.

Figure 7. Via Verde Mexico City. Courtesy of ViaVerde

CONCLUSION

Although there are successful examples throughout the world, they are very far and few between. How can communities begin to implement this within our cities? When is it the right solution? The first step is to develop a plan to study the various precedents over a multi-year process to gather important data to help gain quantifiable results. This data will represent realistic outcomes to avoid the often-biased greenwashing that is too often implemented in projects like these. Some of the data that will be collected includes:

- Yearly cost
- Initial cost
- Maintenance Plan
- Planting Types
- Public Perception
- Structural Issues
- Additional Structural Cost

It is clear that integration of biophilic elements within our everyday routines is beneficial to our wellbeing in more ways than one. The goal of this research is to allow most if not all future bridge projects to incorporate at the very least a minimal amount of vegetation within the design framework. Therefore, this is not necessarily geared towards the signature and award-winning project but mostly for the "typical" interchange project or the new prefabricated pedestrian bridge in a small community. The solution is not to greenwash our cities and to add undue hardship on our cities by covering every bridge with plants. The goal is to implement the best solution for the right place and this research will allow us to create a set of guidelines. Ideally there would be enough green space within our cities that this would not become necessary but for better or worse that is not the world we live in and there shows no signs of diminishing in population or density. This is to offer a set of instructions and guides for the designers, municipalities, and various stakeholders. Through planning, research, and a detailed set of guidelines this research will be able implement this idea of biophilia within our infrastructure to help designers, municipalities, and stakeholders to have the confidence to tackle these types of projects. This will become a "how to" to help with initial questions and concerns that would normally become too costly to even consider. The only way this can ever become a normal part of design conversations is with the buy in from the communities and the stakeholders. Through education and studying the benefits of existing precedents, our research will offer a glimpse into what is possible for each community as an individual since each one will have a differing definition of what is livable and appropriate for them.

Bridges are lagging behind the biophilic integration movement and it is time to catch up and bridge the gap.

NOTES

[1] Tyce Herman and Rebecca Lewis, “Framing Livability What Is Livability?,” University of Oregon - Sustainable Cities Initiative, 2018, https://sci.uoregon.edu/sites/default/files/sub_1_-_what_is_livability_lit_review.pdf
[2] Timothy Beatley. *Biophilic Cities: Integrating Nature into Urban Design and Planning* (Island Press, 2011), 151-154
[3] Kenneth Olson and Cory Suski. *Mississippi River Delta: Land Subsidence and Coastal Erosion.* (Open Journal of Soil Science, 11, 2011) 139-163
[4] Fritz Leonhardt. *Bridges: Aesthetics and Design* (The MIT Press, 1984), 30
[5] Timothy Beatley. *Biophilic Cities: Integrating Nature into Urban Design and Planning* (Island Press, 2011),17
[6] “Living Tree Bridges in a Land of Clouds,” NPR, accessed August 1, 2023, https://www.npr.org/sections/goatsandsoda/2020/08/01/892983791/photos-living-tree-bridges-in-a-land-of-clouds

BIBLIOGRAPHY

Apexx Architecture. Accessed August 1, 2023.https://www.apexxarchitecture.com
Austin, Gary. Green infrastructure for Landscape Planning. Abingdon, Oxon: Routledge, 2014.
Beatley, Timothy. *Biophilic Cities: Integrating Nature into Urban Design and Planning.* Island Press, 2011.
Calvino, Italo. *Invisible Cities*. New York, N.Y: Harcourt Brace Jovanovich, 1974.
Dover, John W. Green infrastructure incorporating plants and enhancing biodiversity in buildings and Urban Environments. London: Routledge, 2015.
Herman, Tyce, and Rebecca Lewis. “Framing Livability What Is Livability?” Sustainable Cities Initiative, 2018. https://sci.uoregon.edu/sites/default/files/sub_1_-_what_is_livability_lit_review.pdf
Leonhardt, Fritz. *Bridges: Aesthetics and Design*. The MIT Press, 1984.
Meinig, Donald William, and John Brinckerhoff Jackson. The Interpretation of Ordinary Landscapes: Geographical Essays. New York: Oxford University Press, 1979.
Montgomery, Charles. Happy city: Transforming our lives through urban design. New York, NY: Farrar, Straus and Giroux, 2014.
Natural England. *Green Bridges: A Literature Review - NECR181*. Natural England, July 27, 2015. https://publications.naturalengland.org.uk/publication/6312886965108736.
NPR. “Living Tree Bridges in A Land of Clouds.” Accessed August 1, 2023. https://www.npr.org/sections/goatsandsoda/2020/08/01/892983791/photos-living-tree-bridges-in-a-land-of-clouds
ViaVerde. Accessed August 1, 2023. http://viaverde.com.mx/v2/?lang=en

POLICY INNOVATION: BANGKOK SMART SAFETY ZONE

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INTRODUCTION

The Economist Intelligence Unit has conducted the Safe Cities Index internationally since 2015.[1] In 2019, 60 cities were assessed and ranked from various continents across the globe based on 57 indicators covering four security dimensions: 1) Digital Security, 2) Health Security, 3) Infrastructure Security, and 4) Personal Security. For Bangkok, Thailand, the rankings were as follows: Digital Security ranked 40th, Health Security ranked 45th, Infrastructure Security ranked 48th, and Personal Security ranked 52nd. In all four dimensions, Bangkok ranked 47th out of 60 cities worldwide. This indicates that there are still safety concerns within the city, especially compared to other major cities like Tokyo, Singapore, Osaka, Amsterdam, and Sydney.

Addressing these concerns, the Royal Thai Police (RTP), responsible for maintaining public order and safety in Thailand, implemented various strategies. Traditional approaches focused on enhancing law enforcement efficiency and fostering collaboration between police and the public to tackle public safety challenges. Two key projects exemplify this: "Police I Alert You," a mobile application aimed at improving police responsiveness by allowing citizens to report incidents with timestamped information, precise location data, and situational details. "Cyber Village," inspired by the Community Policing model, sought to engage the public in problem-solving through social media platforms given the limitations of face-to-face interactions during the COVID-19 pandemic. However, these initiatives, while valuable, lacked a comprehensive framework. Recognizing this, the RTP embarked on a new venture: the Safe City project.

Launched in 2021, the Safe City project represents a strategic shift towards knowledge creation and innovation in policing. Drawing on design thinking methodologies like the double diamond model, the project seeks to co-create and implement effective security solutions. This collaborative approach aims to achieve three key objectives:

1. Facilitate networking and co-creation among the Royal Thai Police and various stakeholders.
2. Provide policy recommendations to the Royal Thai Police concerning safety and security in Bangkok, Thailand
3. Enhance the credibility of the Safe City Index in terms of security and safety in Bangkok, a responsibility that lies with the Royal Thai Police.

Design Thinking Principle

The design thinking process is being utilized in the project to facilitate policy innovation. This comprehensive approach to problem-solving underscores empathy, user-centricity, and iterative experimentation as key elements for generating innovative solutions.[2] To extract valuable ideas from this process, a diverse group of individuals is brought together, convinced that exceptional ideas often emerge when participants represent a wide range of stakeholders.[3] Consequently, this principle is embraced here to expound upon the breakthroughs in transforming Bangkok, Thailand, into a safer city.

The method employed in the project is the double diamond model developed by the UK Design Council.[4] This model comprises two diamond shapes, each representing a phase of the design process. This process is broadly divided into two spaces: the problem space and the solution space. The first diamond represents the problem space consisting of the discovery and the definition stages, where the problem is explored and defined. The second diamond represents the development and delivery stages of the solution space, where solutions are generated, refined, and implemented.

Four stages of the double diamond model

The four stages are illustrated in Figure 1.

Discover - The initial diamond guides individuals in comprehending the problem through direct engagement, avoiding assumptions. This entails conversing with and immersing oneself in the experiences of those impacted by the concerns.

Define - The understanding garnered from the exploration phase can assist in reframing the challenge from a fresh perspective.

Develop - The subsequent diamond encourages individuals to present diverse responses to the precisely defined problem. This process involves seeking inspiration from external sources and collaborating with diverse individuals.

Deliver - Implementation involves testing various solutions on a small scale, discarding ineffective ones, and enhancing those with potential success.

Furthermore, this model aids teams in recognizing that design is not a linear progression but rather a process involving multiple iterations of divergence (exploration and idea generation) and convergence (selection and refinement) to arrive at effective solutions.[5]

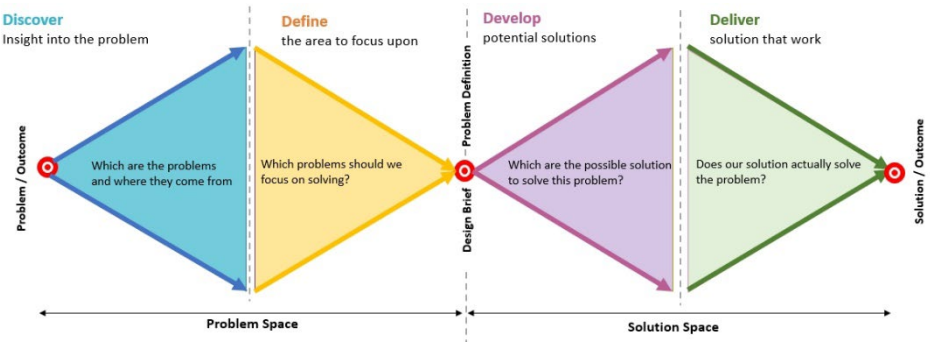

Figure 1. Double diamond model

While both the design thinking approach and the double diamond model have been criticized for potentially overlooking valuable perspectives from marginalized communities or those directly affected by the problem due to the convening of a limited group of "experts" or stakeholders, this limitation can be mitigated. By strategically employing inclusive engagement strategies and diverse

stakeholder involvement throughout the process, the double diamond can lead to more empathetic and user-centered solutions that address a broader range of needs and perspectives.
In the case of the safe city, public hearings were conducted to ensure the outputs of the design thinking process met public needs. Furthermore, recognizing that the safe city concept involves surveillance technologies like CCTV that could impact public privacy, engaging the public in discussions encompassing the realm of security and privacy ensures their agreement is considered.

RESULT

Overall, utilizing the Double Diamond model in design thinking provides a comprehensive framework for addressing complex problems and fostering innovative solutions. By comprehending the problem space and the solution space, the project is effectively navigated through the different phases of the design thinking process.
Through this approach, the finding reveals that the participants desire law enforcement to efficiently prevent and combat crime by utilizing various technologies to facilitate their duties. Examples include leveraging big data systems to analyze criminal activities, installing CCTV cameras capable of facial recognition and license plate identification, implementing automated alert systems to notify authorities of law violations, establishing a centralized incident reporting and control center for the police, enabling rapid deployment and guidance of officers to incident scenes. In addition, it was also discovered incorporating technology into operations may help reduce conflicts between police officers and the public.

POLICY RECOMMENDATIONS

Infrastructure Development and Technological Capacity Enhancement: It is recommended that a strategic focus be placed on the development and reinforcement of infrastructure, coupled with the augmentation of technological capabilities specifically designed to address security concerns across diverse domains. This approach aims to establish a comprehensive framework that bolsters security measures through advanced technological systems, fostering a safer environment.
Legal and Regulatory Adaptation: In response to the evolving landscape, it is advised that a comprehensive review and adjustment of existing laws and regulations be conducted to ensure their alignment with current circumstances and contextual nuances. Regulatory measures can proactively address emerging security issues by recalibrating the legal framework to correspond effectively with contemporary challenges.
Promotion of Public Engagement and Community Collaboration: To facilitate a more robust problem-solving ecosystem, an emphasis on elevating public participation and fostering community collaboration is recommended. Encouraging engagement from diverse segments of society in the security discourse can lead to the identification of comprehensive solutions and the cultivation of a shared sense of responsibility.
Enhancement of Public Security Awareness: To mitigate potential risks, it is advised that initiatives be implemented to augment public awareness and understanding of security protocols. By disseminating accessible and informative resources, individuals can be better equipped to recognize and address security threats, reducing potential risks.
Incorporating these policy recommendations into the broader security strategy can yield a multifaceted approach that addresses both immediate challenges and long-term security considerations.

SMART SAFETY ZONE 4.0

Following the policy recommendation of the Safe City project, the Royal Thai Police launched the "Smart Safety Zone 4.0" as a policy sandbox. This project involves implementing proactive measures to prevent criminal activities rather than increasing crime suppression attempts. The main idea of this sandbox originates from blending the concept of a Smart City with the idea of establishing safe areas, or Safety Zones, through collaborative efforts and active participation of everyone in the area. The primary objective is to develop innovative methods for preventing crimes, utilizing innovations while placing the needs of people at the core.[6]

The approach for implementing the Smart Safety Zone 4.0 Project begins with establishing a collaborative network of crime prevention with the "Big 6." This consortium includes 1) Police, 2) Public sector, 3) Local administrative organizations, 4) Private sector, 5) Non-profit agencies or government agencies relating to specific community issues, and 6) Media.

Subsequently, the consortium analyzes the local situation and selects the operational areas or Safety Zones based on the genuine needs of the community for resolving crime issues. The selection of the areas is guided by three key factors: 1) Risk: Areas with a high risk of criminal activities based on previous crime statistics or where the community needs crime control. 2) Landmark: Locations of national symbolism. If criminal activities occur in such areas, it will impact the public's confidence in law enforcement's ability to maintain security. 3) Economic: Zones of economic significance featuring commercial establishments, service centers, public and private office buildings, or educational institutions.[7] The suggested size of the operational area should not exceed 2 square kilometers to efficiently mobilize resources, technology, and innovations to control crime issues effectively.

After selecting the desired areas, the process involves deploying contemporary technologies and innovations to address criminal issues and enhance crime prevention effectiveness. The example includes installing a cutting-edge surveillance system with face recognition, suspect searching, target-area detection, license plate detection, SOS emergency pole, and public announcement functionalities. Moreover, the Command-and-Control Operation Center (CCOC) is established as a centralized hub for real-time monitoring, analysis, and decision-making related to public safety. Furthermore, with the collaborative network with "Big 6", the private CCTV camera map is surveyed, and the private IP CCTV cameras in the area are integrated into the surveillance infrastructure.

In addition to investing in infrastructure, various applications are also used to enhance the efficiency of police operations. For instance, the Police 4.0 app is a mobile application that facilitates patrolling officers' tasks. It includes logging duty shifts, crime mapping, defining checkpoints, scanning QR codes for checkpoint inspections, and logging checkpoint deployments.

Besides, the police collaborate with local government agencies to collectively reshape the landscape of vulnerable areas into safer zones. This collaborative effort extends to involving the public in crime prevention through reporting incidents via smartphone apps, fostering a sense of community ownership and vigilance. This comprehensive approach ensures the effectiveness of the project implementation.

In 2021, the Royal Thai Police successfully initiated a pilot project phase with 15 selected police stations nationwide as part of their flagship Smart Safety Zone 4.0 project. Several notable findings emerged based on a survey conducted before and after implementing the Smart Safety Zone project involving 4,180 respondents. First, people expressed a heightened awareness of increased surveillance and monitoring within the area. Additionally, the perceived crime rate within the pilot area has shown a significant decrease, indicating a positive impact on the project. Furthermore, the respondents also noted an increased perceived efficiency in arresting offenders, suggesting that the project has contributed to more effective law enforcement. Moreover, respondents indicated an enhanced

perception of quicker response times from the police. These findings collectively suggest the successful impact of the Smart Safety Zone project, as it effectively contributed to an elevated sense of security among the residents within the designated pilot area.[8]

CONCLUSION

The Safe City project has opened new possibilities for safety and security in Bangkok. Initiated through

Utilizing the design thinking principle with the double diamond model fosters collaborative creation among various stakeholders within the area to formulate policy recommendations. The outcome of this policy formulation has steered the Royal Thai Police to invest in technological advancements, prioritize community involvement, and seamlessly integrate safety considerations into urban planning. When considering the Safe Cities Index 2021 compared with the Safe Cities Index 2019, even though in the realm of Digital Security, Bangkok has experienced a decrease in ranking from 40th to 44th place, and in terms of Personal Security, it has descended from 52nd to 55th place. [9] However, in the domain of Infrastructure Security, Bangkok has managed to elevate its position from 48th to 39th place. Similarly, notable progress has been achieved in Health Security, moving from 45th to an impressive 22nd place. These shifts have collectively contributed to an enhancement in the Overall Score, elevating Bangkok's rank from 47th to a commendable 43rd place. With continuous effort, the Royal Thai Police can create a safer and more resilient city for all.

NOTES

[1] The Economist Intelligence Unit, *Safe Cities Index 2019* (2019).
[2] Nigel Cross, *Design Thinking: Understanding How Designers Think and Work* (Bloomsbury Publishing, 2011).
[3] Tim Brown, *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation* (HarperCollins, 2009). and Tim Brown and Jocelyn Wyatt, "Design thinking for social innovation," Development Outreach (2010): 29-43.
[4] "Framework for Innovation," Design Council, accessed June 11, 2019, http://www.designcouncil.org.uk/our-resources/framework-for-innovation/.
[5] Katja Tschimmel, "Design thinking as an effective toolkit for innovation," The International Society for Professional
Innovation Management (ISPIM) (2012): 1.
[6] Supapitch Tirawat, *Smart Safety Zone 4.0 Project* (Bangkok: The Secretariat of The House of Representatives, 2022).
[7] Jakkrit Chosungnoen, *Smart Safety Zone 4.0 Project Handbook "Ratchaprasong Safety Zone"*, (Bangkok: Royal Thai Police, 2021).
[8] Royal Thai Police, *Smart Safety Zone Project for the Security of People's Lives and Property* (Bangkok: Royal Thai Police, 2021).
[9] The Economist Intelligence Unit, *Safe Cities Index 2021* (2021).

BIBLIOGRAPHY

Brown, Tim. *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation.* HarperCollins, 2009.
Brown, Tim, and Jocelyn Wyatt. "Design thinking for social innovation." Development Outreach (2010): 29-43.
Chosungnoen, Jakkrit. *Smart Safety Zone 4.0 Project Handbook "Ratchaprasong Safety Zone"*. Bangkok: Royal Thai Police, 2021.
Cross, Nigel. *Design Thinking: Understanding How Designers Think and Work.* Bloomsbury Publishing, 2011.
Design Council. "Framework for Innovation.", accessed June 11, 2019. http://www.designcouncil.org.uk/our-resources/framework-for-innovation/.
Office of the National Economic and Social Development Board, National Strategy Secretariat Office. *National Startegy 2018 - 2037.* Bangkok: National Strategy Secretariat Office, 2017.
Royal Thai Police. *Smart Safety Zone Project for the Security of People's Lives and Property*. Bangkok: Royal Thai Police, 2021.
The Economist Intelligence Unit. *Safe Cities Index 2019*, 2019.
The Economist Intelligence Unit. *Safe Cities Index 2021*, 2021.
Tirawat, Supapitch. *Smart Safety Zone 4.0 Project.* Bangkok: The Secretariat of The House of Representatives, 2022.
Tschimmel, Katja. "Design thinking as an effective toolkit for innovation." The International Society for Professional Innovation Management (ISPIM) (2012): 1.

POTENTIAL OF ABANDONED RAILWAY SITES IN PARIS BEIRUT AND NEW YORK

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INTRODUCTION

When an urban rail line shuts down, a well-established network of people, equipment, places, rules, and schedules collapses, leaving valuable urban real estate suddenly devoid of activity. As new uses and users of the abandoned spaces vie to define the character of a new network, alliances are formed, organizations established, and conflicts identified. Paris's Petite Ceinture, Lebanon's Beirut-Bekaa line, and Queens's Rockaway Beach (RBB) LIRR branch are each in a different stage of transforming abandoned rail lines to new uses, each with its unique unstable network of actors competing for greater agency and authority. In each case, an NGO focused on reviving transit has made itself prominent within its network amid the transit authorities, city governments, and other private and community interests. This paper uses an actor-network theory (ANT) approach to examine QueensLink, the NGO devoted to re-establishing transit on the RBB, and some of the other actors within its network. It tracks how QueensLink and other actors have adjusted their vision of the RBB's future to enroll other actors and accommodate the unique physicality of the rail line – itself an actor within the network. The paper goes on to provide a simplified ANT map of the RBB actor-network, from which to better understand its relations within that network. Last, this paper suggests that ANT (and other relational methodologies) can be applied to analyze unique individual sites and cases – such as the abandoned lines in Paris, Beirut and New York – to identify salient commonalities that then allow for an approach rooted in comparative urbanism.

ANT AND ABANDONED RAIL LINES

Actor-Network Theory (ANT) is a methodology that focuses on understanding the complex interactions and relationships (network) among human and non-human entities (actors/actants) in various contexts.[1] It was first formulated by scholars like Bruno Latour, Michel Callon, Madeleine Akrich, and John Law.[2] It offers a unique perspective on studying urbanism by focusing on the interactions and relationships among diverse actors and elements that shape urban spaces.[3] Its rejection of traditional dualisms and emphasis on networked relationships provide researchers with a valuable lens through which to explore the complexity of urban formations and their underlying dynamics.[4]

A working rail line unquestionably forms a stable actor-network.[5] The present work forms part of a larger inquiry based on a thornier question:

How can we map and understand the actor-networks (assuming they exist) formed around an abandoned rail line?

At least one researcher has suggested that abandoned rail lines form unstable, inchoate, and evolving actor-networks ("network ruins") on their way to becoming new, stable actor-networks.[6] For simplicity, we can consider an actor-network stable when a durable configuration of relations, roles, and uses is largely recognized and accepted by the actors in the network.[7] Unstable actor-networks are likely to form around abandoned rail lines because their use and meaning is often varied, contradictory and disputed, resulting in uncertainty and fluidity in the relations among its actors.[8] For example, will temporary shelters be pulled down by transit or municipal authorities? Will trespassers be prosecuted? Do community gardens built on the rails need official approval? Such questions – utterly absent on a working rail line – become more uncertain as an abandoned line becomes more overgrown and dilapidated.

The feature of ANT most often discussed in summaries is its inclusion of non-human objects (e.g. buildings, plants, roads, machines, geography) and quasi-objects (e.g. laws, affiliations, ownership) as active participants – actors – within the network. Yet these inclusions are especially helpful in understanding how an actor-network comprising an abandoned urban railway function, for three pragmatic reasons. First, the physical spaces and structures of an abandoned railway tend to have an actor-like effect on communities and their inhabitants. Railways contour neighborhoods, divide socio-economic communities (as the common English phrase "the other side of the tracks" indicates), and attract trespass. The spaces carved by abandoned railways are uniquely linear, cutting through neighborhoods, geographic features, and other assemblages, simultaneously embedding into, and separating from the urban fabric. For these spaces, the question of "how it acts" on other actors within its network is especially appropriate, whether or not its ability to "act" is ontologically "real," or "entirely metaphorical."[9]

Second, the legal status, ownership, and control of abandoned railways are often unique within a city.[10] The easements and rights of way acquired to build and maintain the working railway are usually still in place, while its ownership and control – like its shape – tends to cut across other public and private rights.[11] The laws, policies and regulations in place that prescribe who can do what on abandoned railroads can rightly be construed as entities – actors – in their own right, as can the physical barriers, signs, warnings and personnel enforcing those prescriptions.[12] Third, overgrowth on the rail (or its lack) can significantly act on the way people use and approach the railroad over time. Each of these aspects of abandoned railroads makes it appropriate for analysis as an actor (real or metaphorical) in a larger actor-network, and each also reinforces the others, further reifying the rail line as an actor.

Two More Basic ANT Terms – Translation and Enrollment

The following two (non-authoritative) definitions of terms and examples may be helpful in understanding the ANT map developed below:

Translation - the establishment of the conditions of interaction, and the mutually-accepted identities and representations within a network.[13] Translation is "the interpretation given by the fact builders" of their own interests and those of the actants they seek to enroll in order to transform their claim to a matter of fact.[14] A claim – for instance about the significance and use of an abandoned rail line – moves from being a "claim" to being a "fact" through translation.[15]

Enrollment – Enrollment is the recruitment of other actors into the network, granting them agency.[16] Within the stable actor-network of a working rail line, there is a universally-accepted **translation** of spaces, roles and technology, and nearly every human and non-human actor is enrolled. When that rail line is decommissioned, an unstable network of changing actors is left to compete with each other

(and with the vestiges of the old network) to define the next dominant translation, enroll actors, and establish the next stable network.

Enrollment and translation are ongoing processes that work to define the shifting actor-network and its actors. In unstable networks, both processes are mutual rather than unilateral. As Latour observed, "the easiest means to enroll people in the construction of facts is to let oneself be enrolled by them! By pushing their explicit interests, you will also further yours."[17]

THREE CITIES, THREE ABANDONED RAIL LINES, AND THREE NGOS

The reclamation of abandoned railways has become a recurring narrative in many cities in the past few decades. This article is part of an ongoing PhD about the transformation and potential of the abandoned spaces of Beirut's abandoned railway, New York's Rockaway Beach Branch in Queens, and Paris' Petite Ceinture. The three abandoned railways are all in different stages of transformation, and each forms the sites of an inchoate, emerging actor-network, where the future uses of the site and its infrastructure are hotly contested.

- In Beirut the railway system has been closed since the early 1990s, and Lebanon currently lacks any proper public transportation infrastructure, despite many proposals for reviving the railway for transit or public space. Meanwhile, several informal, cultural, and artistic practices along the tracks have been inspired by nostalgia for the old railway.
- Paris's Petite Ceinture (PC), a train belt that once encircled the city, has been abandoned since the early 1990s. It too has been the site of unsuccessful transit proposals, partially successful park proposals, informal uses, and heritage-focused nostalgia.
- In Queens, the Rockaway Beach Branch (RBB) of the Long Island Railroad (LIRR) comprises 3.5 miles of railway abandoned since 1962. It too has sparked a transit vs. park controversy about the future of the line – yet one which seems to lack the nostalgia of the other two sites.

Each of the unstable actor-networks developing around these three sites is unique in the actors it comprises, the geophysical characteristics of the site, the political landscape, and the urban environment in which these are placed. Yet the circumstances in each also bear striking similarities: a linear tract of land that cuts across the urban fabric, "blighting" the landscape as it falls into decay, caught between public and private interests, neither quite being saved for future transit nor fully authorized for other uses. Given these similarities, it is no surprise that some actors within these emerging actor-networks also share commonalities.

For example, in each case, a community-based NGO is devoted to preserving the rails and their continuity, either for transit, for heritage, or some combination of both. In Paris, the Association Pour la Sauvegarde de la Petite Ceinture Réseau Ferré (ASPCRF) has spent over 30 years trying unsuccessfully to define the emerging actor-network as one ultimately devoted to transit,[18] during which time 1/3 of the line has been converted to reversible parks.[19] In Lebanon, Train Train has effectively raised awareness for Lebanon's near-forgotten rail system and ineffectively advocated for better transit for over 20-years,[20] yet has been largely ignored by political decision-makers. In Queens, QueensLink is in the midst of a losing struggle to prevent the construction of a Highline-like rail park which would effectively prevent the future possibility of neighborhood rail transit for years to come.[21]

These actor-networks also share other cognate actors – such as the relevant transit authorities, the pro-park organizations, the encroaching plant overgrowth, the community groups, and the illicit trespassers – all of which are distinctly acted upon by the central actor – the rail line itself.

One way of thinking about these inchoate, unstable networks is that they are in the process of transformation. Yet in almost every case, there is explicit resistance to almost any widescale transformational initiative. This resistance comes from other actors vying to defend and promulgate

their particular vision (translation) for the use and meaning of the inchoate network, and trying to enroll/recruit other actors. For example, community groups leading neighborhood-focused initiatives at each of the sites have opposed what they see as corporatized development of the line as a whole.[22]
This paper is therefore the first step of a larger, partially comparative approach, in which the actor-networks or assemblages around abandoned urban rail infrastructure are illuminated through the examination of actors and their relations, some of which seem to play similar – yet edifyingly distinct – roles within their networks. Notably, the identification of these actors was the result of a genuine, non-comparative mapping of these three distinct actor-networks. Only after recognizing the extent of their similar functions within their respective networks, and how starkly their differences illuminate the unique characteristics of their respective networks, was any comparison envisioned.

BACKGROUND OF THE ROCKAWAY BEACH BRANCH

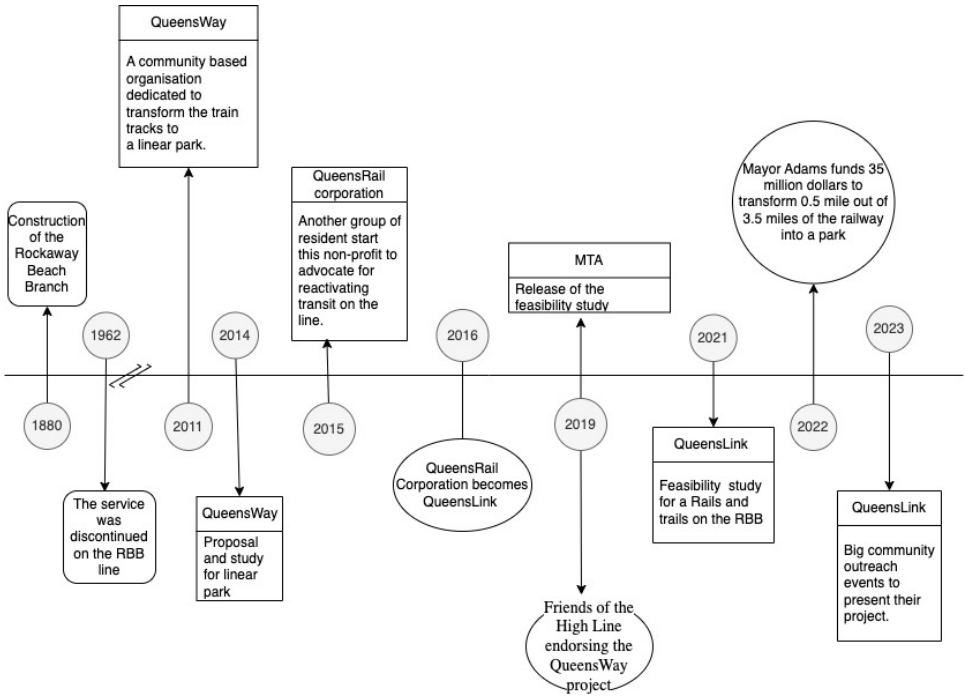

Figure 1. Timeline of the Rockaway Beach Branch. By Author.

The Rockaway Beach Branch (RBB) of the Long Island Railroad (LIRR) ran from the 1880s to 1962, connecting the mainline of the LIRR at Rego park to the Rockaway peninsula in Queens and later to the far Rockaways.[23] After its decline and relative obsolescence due to subway and automobile travel, the RBB was shut down in 1962 as passengers decreased and maintenance costs increased.[24] Since then, it has become overgrown and dilapidated, despite several proposals for its revival as a transit corridor, greenway, or other uses.
After its closure in 1962, the RBB was the subject of several JFK-to-Manhattan transit proposals, all of which were express, with no stops within Queens.[25] In 2011, a community-led NGO called QueensWay proposed a 3.5-mile, Highline-esque linear park on the RBB as a more Queens-centric, neighborhood-friendly alternative. QueensLink was founded in 2015 as the QueensRail Corporation, likely a deliberate response to the QueensWay proposal. QueensRail advocated from its inception for the restoration of transit within Queens on the RBB, in opposition to both the proposed greenway, and to the JFK-Manhattan express.[26] Neighborhood green-gentrification[27] and the success of another linear rail park (the Highline) provide one explanation for why – after fifty years of closure – the

RBB's use, value and fate became relevant again. QueensRail may have also viewed QueensWay's 2014 greenway proposal as a threat to the potentiality of later transit uses (a threat not posed by mere abandonment).

In 2015, overtures of compromise and cooperation from QueensRail were rejected by Queensway, which rejected the idea of near-term transit projects for the RBB and doubled down on the greenway.[28] Despite this rebuff, QueensRail – now redubbed QueensLink to convey openness to some non-rail uses – proposed a compromise solution in 2016, which would include transit, parks, and cycle paths in the disputed area, without compromising the continuity of the rail line itself.[29]

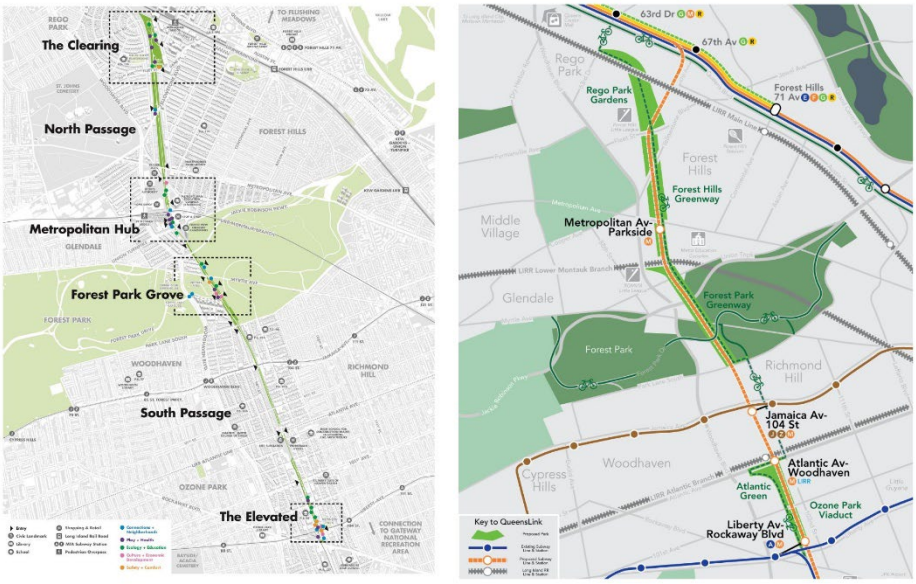

Figure 2. Left to right; QueensWay proposal map; QueenLink proposal map. By Queensway and Queenslink accessed on their website.

In 2019, the MTA disclosed the results of an $800,000 study started in 2013 by consulting firm SYSTRA, putting the cost of renewed transit on the RBB at between $6.7 and $8.1 billion.[30] Believing both payment and estimates were suspiciously high, and suspecting the MTA wanted to quash transit proposals, QueensLink commissioned a review of that study, which suggested actual estimates were closer to between $3.4 and $3.7 billion.[31] QueensLink then began a lobbying and public awareness campaign highlighting this apparent discrepancy and polling community members about transit needs.[32]

Finally, in September 2022, Mayor Adams approved $35 million to open a half-mile park along the RBB, an apparent victory for Queensway.[33] Undeterred, QueensLink continued its opposition and community outreach, while voicing concern about preserving the RBB's legal right-of-way for future transit. The MTA chairperson and CEO Janno Lieber responded with an assurance of reversibility[34]– a common concern in rail conversion projects, because as long as new changes are theoretically reversible, future transit is always an option. QueensLink representatives, for their part, doubted whether the reversal of a $35 million linear park would ever be practically, politically, or economically realistic.[35]

AN ANT MAPPING OF THE ACTOR-NETWORK AROUND THE RBB

ANT falls under the broad rubric of material semiotics: it explores how the meanings we attach to physical objects interact within broader networks of the social. Here, the physical aspects of the RBB itself act to transform ideas and change motivations within its actor network.

At the start of our story, one actor (the MTA) envisions transit as defining the RBB's actor-network. "Transit" in this sense is a token or quasi-object – an idea passed between actors to promote connectivity and enrollment to the actor-network – it exists only in the RBB's past or perhaps its future, and thus MTA can define "transit" in the limited JFK-Manhattan sense that overlooks Queens entirely.

A competing translation is then proffered by Queensway – "linear park" – an idea supported by the success of the Highline, which also operates as a token within the network. [36] A third translation is then proffered by QueensLink – "local transit," a concept which applies Queensway's neighborhood focus to the MTA's original concept, thereby mediating both.[37]

Although we can only speculate on the MTA's motives, the local transit option would likely be both more expensive and less lucrative than an express train, while it would derail entirely Queensway's linear park. QueensLink therefore presented a threat to both other actors, and it is entirely possible that the MTA "enrolled" in Queensway's burgeoning actor-network, accepting the linear park idea, as the less expensive alternative.

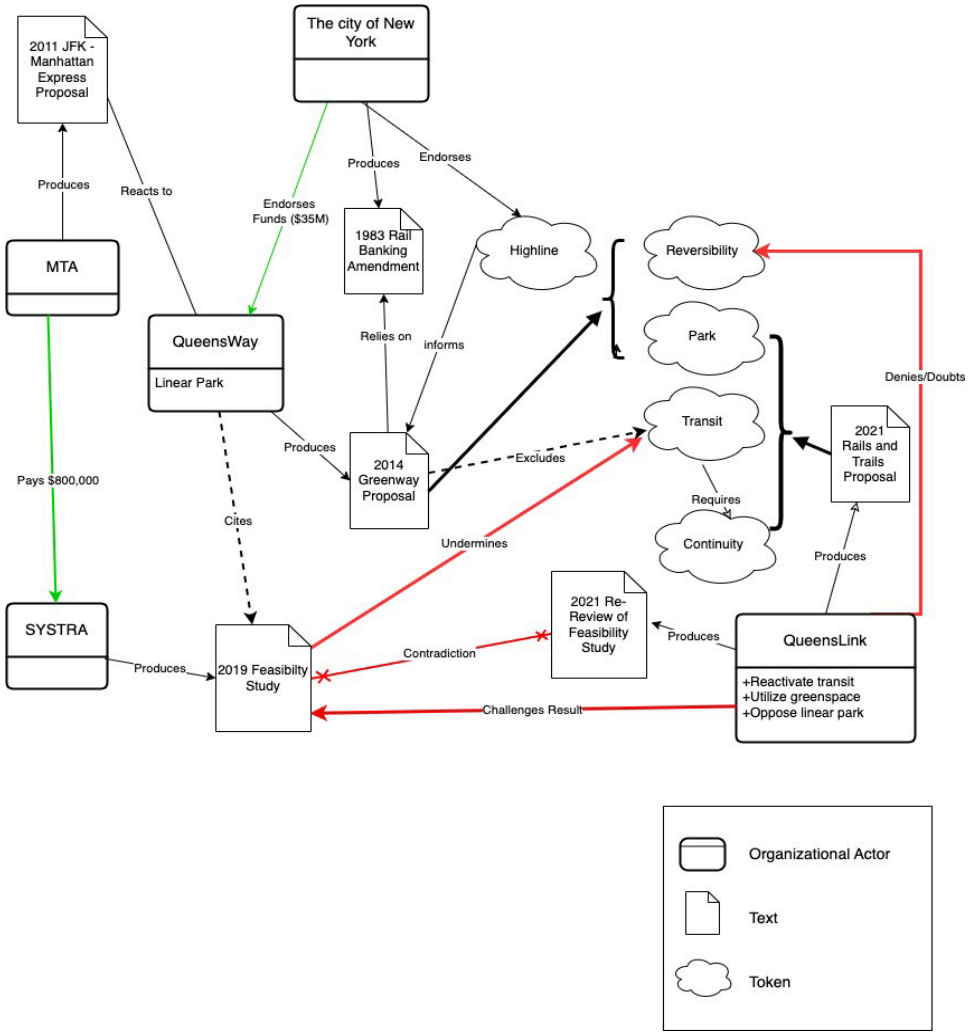

Figure 3. QueensWay vs QueensLink Actor Network Diagram by author

At this point, QueensLink is firmly against a park on the rails, and the physical-geographical aspects of the RBB become active. First, the idea of transit on the RBB is dependent on the idea of the line's continuity – any realistic transit proposal must ultimately connect with one or more of New York's transit networks, so any permanent interruption would effectively kill such a proposal.[38] Second, the linear nature of the line makes it more difficult to marshal community support, because it cuts across rather than circumscribes communities. Third, the dilapidation of infrastructure and overgrowth on the sites significantly increase the cost of a transit solution. Queensway is similarly firmly against a transit solution at this point, so much so that it refuses to negotiate with QueensLink.[39]

Another physical aspect of the RBB is the inclusion of significant land area on either side of the rails and embankments. Unlike the Highline, the area around the RBB is largely wooded and elevated by earth embankments. This prompts QueensLink to formally propose a transit solution that also includes parks and bike paths.[40] It also implicitly raises the question of why Queensway's linear park must be placed directly on the tracks instead of beside them, as if intentionally preventing transit.

CONCLUSION

It is notable that some actors eventually shift their position in response to the realities of the physical aspects of the rail line. QueensLink opens its translation to include parks, which it once rejected outright – a solution possible only because of the area around the tracks. QueensLink in fact changed its name from QueensRail explicitly to indicate this expanded interpretation of the RBB's future uses. Similarly, the Mayor – clearly won over by Queensway – points to the theoretical reversibility of a linear park because both the required continuity and the rights of way of the RBB would be lost otherwise. Thus, each actor shifts its stance on the future use of the RBB in response to the others, simultaneously enrolling and being enrolled by one another. This give-and-take within these emerging, unstable networks is far more pronounced than in a stable actor-network: few passengers, for example, ever obtain such compromise from transit authorities.

The value of ANT in exploring how abandoned railroads are transformed for new uses does not lie in its explanatory power – other theories are equally capable of describing how shifting power dynamics, compromises, and alliances play out in such complex negotiations. ANT is rather a helpful methodology for developing a robust understanding of the actors, their relations, and motivations, with an eye toward identifying patterns and trends that may provide a basis for comparison in analogous cases.

NOTES

[1] Bruno Latour. “On Actor-Network Theory.” *A Few Clarifications plus More than a Few Complications.[Acessado 2018 Nov 10]. Disponível Em: Http://Www. Bruno-Latour. Fr/Sites/Default/Files/P-67* 20 (1997)
[2] Madeleine Akrich, Michel Callon, and Bruno Latour, eds. “Préambule.” In *Sociologie de La Traduction : Textes Fondateurs*, 5–6. Sciences Sociales. Paris: Presses des Mines, 2013. http://books.openedition.org/pressesmines/1187
[3] Ignacio Farías, and Thomas Bender. *Urban Assemblages: How Actor-Network Theory Changes Urban Studies*. London ; New York: Routledge, 2009.
[4] John Law. “Actor Network Theory and Material Semiotics.” *The New Blackwell Companion to Social Theory*, 2008, 141–58
[5] Latour, *Reassembling the Social*; Latour, “Trains of Thought.”
[6] Mattias Qviström. “Network Ruins and Green Structure Development: An Attempt to Trace Relational Spaces of a Railway Ruin.” *Landscape Research* 37, no. 3 (June 1, 2012): 257–75. https://doi.org/10.1080/01426397.2011.589897
[7] Jonathan Murdoch. “The Spaces of Actor-Network Theory.” *Geoforum* 29, no. 4 (November 1, 1998): 357–74. https://doi.org/10.1016/S0016-7185(98)00011-6.; Latour, *Science in Action*.
[8] Murdoch, “The Spaces of Actor-Network Theory.”
[9] José Corpataux, and Olivier Crevoisier. “Lost in Space: A Critical Approach to ANT and the Social Studies of Finance.” *Progress in Human Geography* 40, no. 5 (October 1, 2016): 610–28. https://doi.org/10.1177/0309132515604430.
[10] Ely Jr, James W. *Railroads and American Law*. University Press of Kansas, 2001.
[11] Thomas A Duda. “The Use of Discontinued Railroad Rights-of-Way as Recreational Hiking and Biking Trails: Does the National Trails System Act Sanction Takings.” . . *Louis ULJ* 33 (1988): 205
[12] Farías and Bender, *Urban Assemblages*.
[13] Akrich, Callon, and Latour, *Sociologie de la traduction*.
[14] Latour, *Science in Action*, 110.
[15] Latour, 108.
[16] Murdoch, Jonathan. *Post-Structuralist Geography: A Guide to Relational Space*. London, 2006, 34, 90, 109. https://doi.org/10.4135/9781446221426.
[17] Latour, *Science in Action*, 110.
[18] ASPCRF. “Notre Association.” Association Sauvegarde Petite Ceinture. Accessed August 9, 2023. https://petiteceinture.org/
[19] Petite Ceinture, Info. “Espaces ouverts au public sur la Petite Ceinture.” Petite Ceinture Info, August 10, 2023. https://www.petiteceinture-info.fr/Espaces-ouverts-au-public-sur-la-Petite-Ceinture.html
[20] L’Orient-Le Jour. “Il y a 124 Ans, La Ligne Ferroviaire Beyrouth-Damas Était Inaugurée,” August 14, 2019. https://www.lorientlejour.com/article/1182644/il-y-a-124-ans-la-ligne-ferroviaire-beyrouth-damas-etait-inauguree.html
[21] Bardolf Deirdre. “Fight for Rails and Trails Trudges On.” Queens Chronicle, March 23, 2023. https://www.qchron.com/editions/queenswide/fight-for-rails-and-trails-trudges-on/article_c2c7d421-c420-52b5-94f6-303c868b418e.html
[22] Kevin Loughran. “Parks for Profit: Selling Nature in the City.” In *Parks for Profit*. Columbia University Press, 2022. https://doi.org/10.7312/loug19404
[23] Herbert George. *Change at Ozone Park. A History and Description of the Long Island Rail Road Rockaway Branches*. Rae Publishing, 1993
[24] Herbert George. *Change at Ozone Park.*
[25] Philip Betheil. “Community Involvement and the Reuse of Rail Rights-Of-Way.” Columbia GSAPP, 2015.
Corpataux, José, and Olivier Crevoisier. “Lost in Space: A Critical Approach to ANT and the Social Studies of Finance.” *Progress in Human Geography* 40, no. 5 (October 1, 2016): 610–28. https://doi.org/10.1177/0309132515604430.
[26] “QueensLink – Connecting Communities with Rails & Trails.” Accessed August 11, 2023. https://thequeenslink.org/.
[27] Katie Jo Black, and Mallory Richards. “Eco-Gentrification and Who Benefits from Urban Green Amenities: NYC’s High Line.” *Landscape and Urban Planning* 204 (December 1, 2020): 103900. https://doi.org/10.1016/j.landurbplan.2020.103900

[28] Andrew Lynch, and Paul Trust. Interview with QueensLink. Zoom, May 2023.
[29] Vanshnookenraggen. “Introducing the QueensLink.” *Vanshnookenraggen* (blog), July 8, 2021. https://www.vanshnookenraggen.com/_index/2021/07/queenslink/
[30] Vanshnookenraggen.
[31] “The Report – QueensLink.” Accessed August 11, 2023. https://thequeenslink.org/the-report/.
[32] Lynch and Trust, Interview with QueensLink.
[33] “Mayor Adams Announces $35 Million Investment in Phase One of New Linear Park in Queens.”
[34] https://www.thecity.nyc/authors/jose-martinez and https://www.thecity.nyc/authors/haidee-chu, “As City Plots Greenway in Queens, Neighbors and Transit Advocates Wait for Trains.”
[35] Deirdre, “Fight for Rails and Trails Trudges On.”
[36] “QueensWay.”
[37] “The Report – QueensLink.”
[38] Lynch and Trust, Interview with QueensLink.
[39] Vanshnookenraggen, “Introducing the QueensLink.”
[40] “The Report – QueensLink.”

BIBLIOGRAPHY

Akrich, Madeleine, Michel Callon, and Bruno Latour, eds. “Préambule.” In *Sociologie de La Traduction : Textes Fondateurs*, 5–6. Sciences Sociales. Paris: Presses des Mines, 2013. http://books.openedition.org/pressesmines/1187.

———. *Sociologie de la traduction : Textes fondateurs*. *Sociologie de la traduction : Textes fondateurs*. Sciences sociales. Paris: Presses des Mines, 2013. http://books.openedition.org/pressesmines/1181.

ASPCRF. “Notre Association.” Association Sauvegarde Petite Ceinture. Accessed August 9, 2023. https://petiteceinture.org/.

Betheil, Philip. “Community Involvement and the Reuse of Rail Rights-Of-Way.” Columbia GSAPP, 2015.

Corpataux, José, and Olivier Crevoisier. “Lost in Space: A Critical Approach to ANT and the Social Studies of Finance.” *Progress in Human Geography* 40, no. 5 (October 1, 2016): 610–28. https://doi.org/10.1177/0309132515604430.

Deirdre, Bardolf. “Fight for Rails and Trails Trudges On.” Queens Chronicle, March 23, 2023. https://www.qchron.com/editions/queenswide/fight-for-rails-and-trails-trudges-on/article_c2c7d421-c420-52b5-94f6-303c868b418e.html.

Duda, Thomas A. “The Use of Discontinued Railroad Rights-of-Way as Recreational Hiking and Biking Trails: Does the National Trails System Act Sanction Takings.” . . *Louis ULJ* 33 (1988): 205.

Ely Jr, James W. *Railroads and American Law*. University Press of Kansas, 2001.

Farías, Ignacio, and Thomas Bender. *Urban Assemblages: How Actor-Network Theory Changes Urban Studies*. London ; New York: Routledge, 2009.

George, Herbert. *Change at Ozone Park. A History and Description of the Long Island Rail Road Rockaway Branches*. Rae Publishing, 1993.

https://www.thecity.nyc/authors/jose-martinez, and https://www.thecity.nyc/authors/haidee-chu. “As City Plots Greenway in Queens, Neighbors and Transit Advocates Wait for Trains.” The City, September 22, 2022. https://www.thecity.nyc/transportation/2022/9/22/23367558/greenway-queens-neighbors-advocates-wait-trains.

Jo Black, Katie, and Mallory Richards. “Eco-Gentrification and Who Benefits from Urban Green Amenities: NYC’s High Line.” *Landscape and Urban Planning* 204 (December 1, 2020): 103900. https://doi.org/10.1016/j.landurbplan.2020.103900.

Latour, Bruno. “On Actor-Network Theory.” *A Few Clarifications plus More than a Few Complications.[Acessado 2018 Nov 10]. Disponível Em: Http://Www. Bruno-Latour. Fr/Sites/Default/Files/P-67* 20 (1997).

Latour, Bruno. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oup Oxford, 2007.

Latour, Bruno. *Science in Action: How to Follow Scientists and Engineers through Society*. Cambridge, MA: Harvard University Press, 1988.

Latour, Bruno. “Trains of Thought: Piaget, Formalism, and the Fifth Dimension.” *Common Knowledge* 6 (1997): 170–170.

Law, John. “Actor Network Theory and Material Semiotics.” *The New Blackwell Companion to Social Theory*, 2008, 141–58.

L’Orient-Le Jour. “Il y a 124 Ans, La Ligne Ferroviaire Beyrouth-Damas Était Inaugurée,” August 14, 2019. https://www.lorientlejour.com/article/1182644/il-y-a-124-ans-la-ligne-ferroviaire-beyrouth-damas-etait-inauguree.html.

Loughran, Kevin. “Parks for Profit: Selling Nature in the City.” In *Parks for Profit*. Columbia University Press, 2022. https://doi.org/10.7312/loug19404.

Lynch, Andrew, and Paul Trust. Interview with QueensLink. Zoom, May 2023.

Madden, David J. “Urban ANTs: A Review Essay.” *Qualitative Sociology* 33, no. 4 (December 1, 2010): 583–89. https://doi.org/10.1007/s11133-010-9167-8.

Murdoch, Jonathan. *Post-Structuralist Geography: A Guide to Relational Space*. London, 2006. https://doi.org/10.4135/9781446221426.

Murdoch, Jonathan. “The Spaces of Actor-Network Theory.” *Geoforum* 29, no. 4 (November 1, 1998): 357–74. https://doi.org/10.1016/S0016-7185(98)00011-6.

Petite Ceinture, Info. “Espaces ouverts au public sur la Petite Ceinture.” Petite Ceinture Info, August 10, 2023. https://www.petiteceinture-info.fr/Espaces-ouverts-au-public-sur-la-Petite-Ceinture.html.

“QueensLink – Connecting Communities with Rails & Trails.” Accessed August 11, 2023. https://thequeenslink.org/.

“QueensWay.” Accessed August 11, 2023. https://www.thequeensway.org/.

Qviström, Mattias. “Network Ruins and Green Structure Development: An Attempt to Trace Relational Spaces of a Railway Ruin.” *Landscape Research* 37, no. 3 (June 1, 2012): 257–75. https://doi.org/10.1080/01426397.2011.589897.

The official website of the City of New York. “Mayor Adams Announces $35 Million Investment in Phase One of New Linear Park in Queens,” September 16, 2022. http://www.nyc.gov/office-of-the-mayor/news/675-22/mayor-adams-35-million-investment-phase-one-new-linear-park-queens.

“The Report – QueensLink.” Accessed August 11, 2023. https://thequeenslink.org/the-report/.

Vanshnookenraggen. “Introducing the QueensLink.” *Vanshnookenraggen* (blog), July 8, 2021. https://www.vanshnookenraggen.com/_index/2021/07/queenslink/.

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