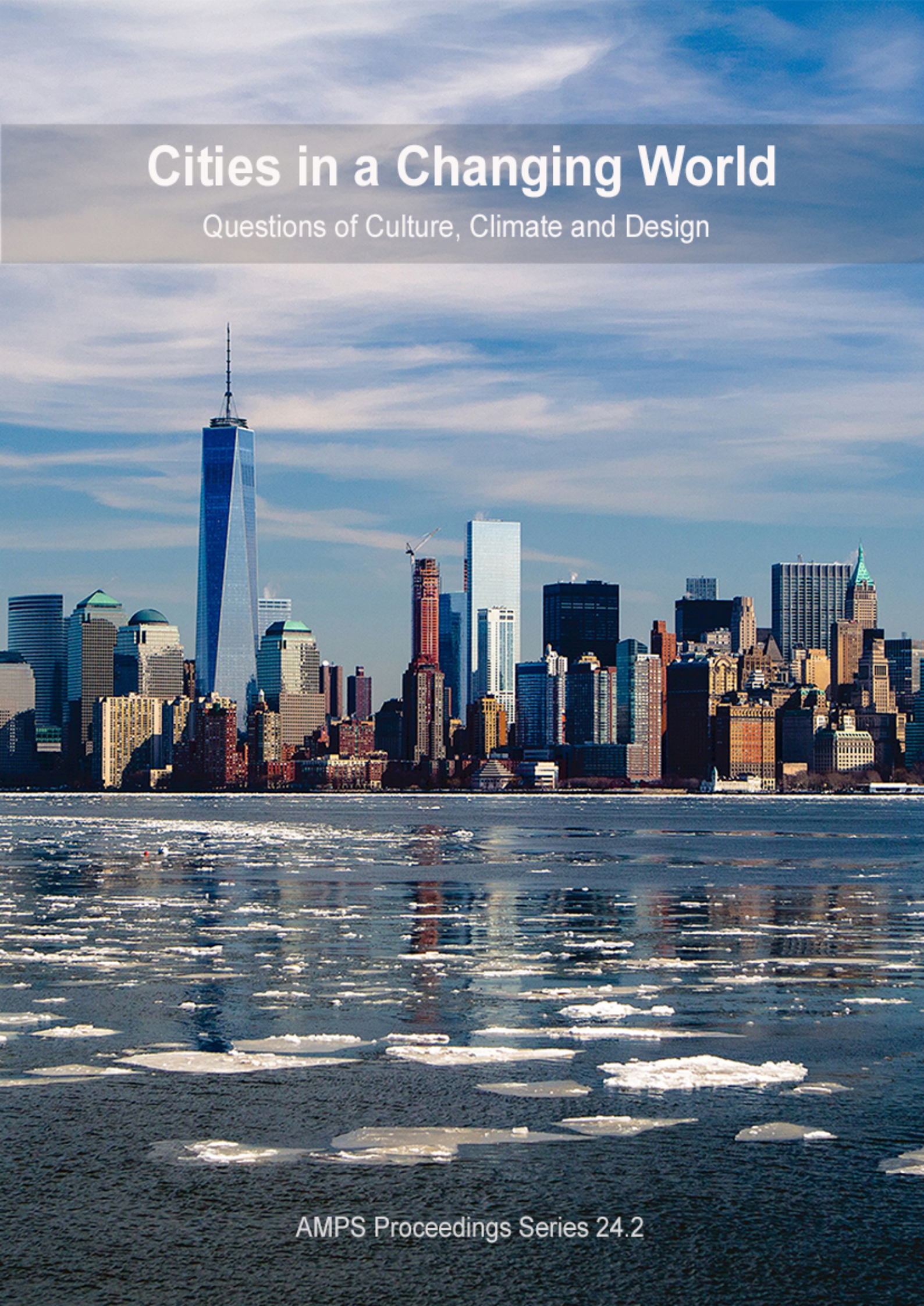
Cities in a Changing World

Questions of Culture, Climate and Design



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Cities in a Changing World: Questions of Culture, Climate and Design Online

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EDITOR:
Jason Montgomery

EXECUTIVE EDITOR:
Eric An

COPYEDITOR:
Amany Marey

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INTRODUCTION

Cities in a Changing World: Questions of Culture, Climate and Design Online

This proceeding publication is the outcome of the conference, Cities in a Changing World: Questions of Culture, Climate and Design Online, held in June 2021. It was coordinated the research group AMPS and City Tech, CUNY in New York.

A conference organised prior to an international pandemic found a prescience in setting a theme focused on cities and change. The widely observed urbanisation of the human population, despite the exposure of cities to climate impacts, places the city at the core of the human condition in our time, requiring analysis and investigation to identify and address significant social, economic, and environmental challenges that are compounding due to the intense pressures of the expansion and increasing displacement/migration of urban populations. The COVID-19 pandemic raised the stakes, provoking fundamental reconsideration of cities and the benefits but also dangers of density.

The theme of the conference, Cities in a Changing World, allowed scholars from over 30 countries to explore the nature of cities and countryside from the profound perspective of global disruption and abrupt change in patterns of daily life. In many cases, these scholars found the “new” normal exasperating ongoing challenges of climate degradation, social fragmentation and injustice, inequity and hardship. Others observed and documented creative adaptations that provide hope for critical analysis and constructive change for increased social equity and awareness/engagement with the environment supporting sustainable initiatives. Questions of the relationship of culture, climate, and design prompted scholarly investigation of place, heritage, climatic and geographic adaptation in the emerging scholarship of place-based sustainability.

This conference and the papers collected in these proceedings provide a rich exploration of cities in cultural, climatic, and geographic contexts. Theory, history, and design, separately or in combination, provide the basis for the presentation of diverse ideas that moves the scholarship of Cities in a Changing World forward.

Jason Montgomery
City Tech

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CULTURAL HERITAGE AND ENHANCEMENT FOR AN ECOMUSEUM IN TRECASTAGNI (NEAR ETNA, SICILY)

Author:
FERNANDA CANTONE

Affiliation:
UNIVERSITY OF CATANIA, ITALY

INTRODUCTION: TANGIBLE HERITAGE

The Italian word for heritage derives from the Latin word "patrimonium" originating from the word "pater, patris"[1], which means father. It is defined as the set of riches, tangible and intangible values that belong to a community or a single individual, as they were inherited or are part of tradition.
In some cases, the concept of heritage has unfortunately become an instrument to remove people's identities, an instrument of mass destruction, of ransom. It is abovehall the expression of a "conflict between oblivion and memory, between protection and abuse, between Viollet-le-Duc and Ruskin, between present and future, between stock and heritage, between tourism and museums, between economics and accuracy, between technique and art"[2]. Heritage has several enemies and at different levels: on one hand there are those related to nature (not only environmental factors causing degradation), uncontrolled building, negligence, incompetence demonstrated by governing bodies; and on the other hand, there are modern theories on global tourism that aim at transforming buildings or natural assets into sources of revenue without carrying out the necessary in-depth studies.

Figure 1. Trecastagni: the coast and the sea, the woods, the old town.

Nowadays, the debate is about building or tangible heritage, a term that goes beyond the concept of cultural heritage and indicates full awareness about the substantial unity and structure of the same culture that expresses itself through different linguistic structures, yet all belonging to a single code of expression. Tangible heritage recognizes an overlapping of traces and testimonies that make it something to be protected, but also available to the public.

Figure 2. Trecastagni tangible heritage: historical buildings.

Heritage should be considered as a book to read and learn from, as a past container that can be reused and transformed, not only an empty shell to be preserved. The instrument par excellence is enhancement.

Enhancement

In general, enhancement means increasing the value of a cultural asset, but above all "trasforming an asset into value"[3] that is, to express the full potential of the cultural asset, its material and immaterial values[4], in other words to increase the appreciation of the cultural values and to recognise the public use of the asset. Enhancement undertakes actions that increase value. These are cultural operations that can promote conservation on cultural and building assets. Enhancement deals with the physical data and its transformations, its functionality and usability.

Enhancement includes educational purposes closely linked to the heritage, in order to improve the knowledge and, consequently, also the conservation of cultural and environmental assets, increasing their usability.

The main purpose of the enhancement is also to provide guidelines and promote the coordination of good practices in collaboration with the services of the peripheral structures of the Administration operating in the territory, as well as other Administrations and Territorial Authorities, in order to give an increasingly significant role to local identities.

The integrated supply of resources can also generate direct economic impacts, with the outsourcing of activities and services related to its management, as well as indirect impacts[5].

The latter results not only from the evident impact on the tourist industry, but also from the fact that the system that develops around the heritage increases the competitiveness of a territory, making it capable of attracting more than other human and financial resources, increasing tourism, as well as the establishment of productive activities not necessarily belonging to the cultural sector.

In short, we must utilise all assets to their maximum potential and the creation of ecomuseums[6] is the optimal way of exploiting the integrated values.

Ecomuseum

An ecomuseum represents an innovative cultural project aimed at valorizing a specific region or a privileged context where there is a tight connection between mankind and nature. H. De Varine affirmed that: “An ecomuseum is an institution that manages, studies, uses for scientific, educational and cultural purposes the overall heritage of a community, including the whole of its natural and

cultural environment. Therefore, an ecomuseum is a tool which promots the people's participation in the management of a region and in the development of the local community. First of all, it is done on purpose in order to trigger some changes"[7].

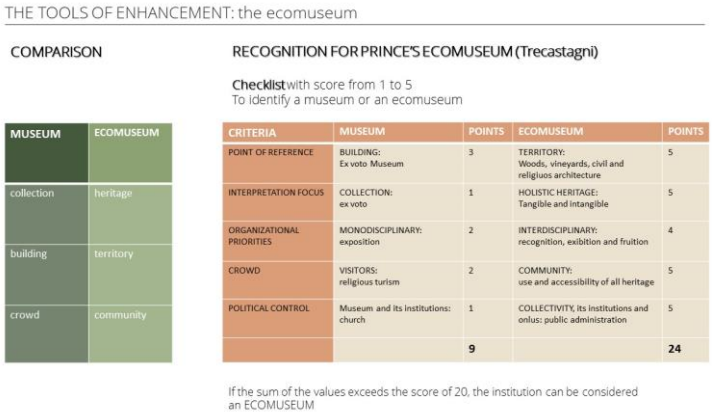

Figure 3. Comparison between museum and ecomuseum for Trecastagni.

The ecomuseum is intended to teach people how to work together, to trust each other, to acquire confidence when dealing with other players, be they public or private, to create and guarantee the functioning of groups promoting projects. In doing so, it can turn a population of individuals into a real community[8].

The ecomuseal project is based on economy, environment and society. Dealing with economy means to re-activate a productive development process aimed at offering interactive tourism proposals, not merely passive ones. This phase is particularly significant because users have an active role in choosing among the proposed services, thus giving a chance to implement and modify the project.

THE CASE STUDY[9]

The case study is Trecastagni, a small town near Catania, Sicily, Italy, at the foot of Mount Etna, a volcano declared a World Heritage Site in 2013.

Figure 4. Localization, a view of Mother Church, a small church during the eruption of Etna, 2021.

Trecastagni [12] has an ancient past whose traces are now lost. Archive sources mention a town, called Tres Castagnes, in 1357. For a few hundred years Trecastagni was under the control of the Bishop of Catania and subject to periodic visits. The reports of these visits, in particular one in 1640 and one in 1655, describe Trecastagni as a populous and rich village with 3400 inhabitants, grouped

into 770 families. The town developed along the north-south directions and went from the district of Santa Caterina to the church of S. Alfio, with winding streets and jumps of altitude, typical of the medieval plant. There is the presence of the majestic staircase of the cobbled Matrix among the useful information. In 1640, the territory of Trecastagni was sold to a wealthy merchant from Messina, Domenico di Giovanni, for the sum of 30,000 scudi. He settled in Trecastagni with the title of prince.
The 1693 earthquake destroyed most of the buildings, causing at least 500 deaths. The reconstruction, starting from 1700, is impressive: religious and civil buildings were built in the areas of the main streets. The nineteenth century marked great changes: monastic orders were abolished and many religious buildings were ceded to the administration. Mayors controlled the town and carried out works of improvement on streets, squares and public buildings. In this period the first cemetery was planned.
Precious churches and a large population made Trecastagni a pleasant place to live, even for short periods. The town was wealthy, mainly due to the cultivation of wine grapes, for chestnut woods that produce excellent timber for barrels and carpentry. Soap was also an important source of income for a period of time.

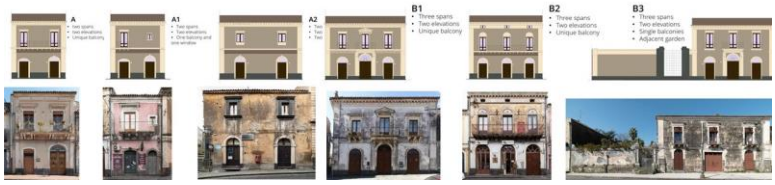

Figure 5. Tangible heritage: Trecastagni architectonic models.

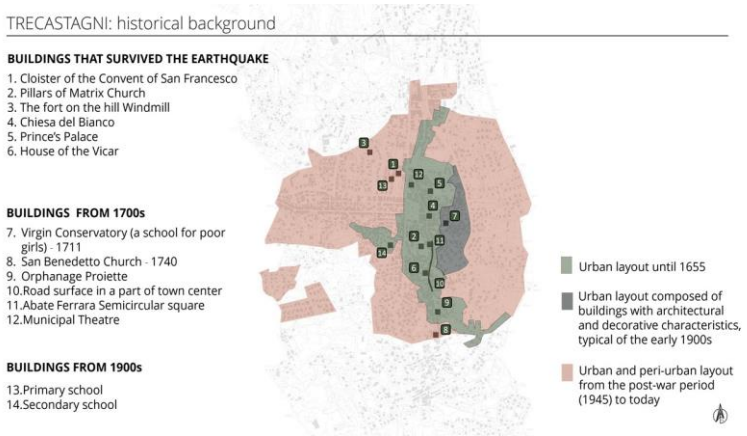

Figure 6. Trecastagni historical background

Since the 1950's of the last century, Trecastagni has been a destination for second-home tourism; this phenomenon has led to the development of many plots of land and the construction of a large number of villas with gardens; these are located in the southern part of the town, where there is an unparalleled view of the sea, and on the road to Pedara and Monterosso. Despite construction speculation, greenery is still present, private gardens are a feature of these places.
Today Trecastagni still has a beautiful old town; the seven-eighteeth century buildings are in fair condition and create a remarkable historical view. In the foothills of Etna, Trecastagni is, perhaps, the only municipality to be so rich in history, architecture and culture. It has beautiful churches with sumptuous portals carved in lava stone, a beautiful viewpoint over part of the town, to the sea and large public spaces.

Trecastagni is considered a "cultural, natural and architectural landscape" and reflects the combined works of nature and humanity

THE RESEARCH

The research aims to identify tools to enhance territories with complex forms of cultural, historical, natural, anthropogenic, constructive, social and economic values.
Following the principles of valorisation, the potential of the context was surveyed starting from the cultural heritage. In short, through the search for tangible and intangible heritage, buildings, places and traditions have been identified that make Trecastagni a unique place.
By doing so, the Constructed System, the Landscape System and the Intangible System were taken into account. The Constructed System is made up of all the buildings that express historical-artistic, cultural and material values. Among them there are valuable examples of late nineteenth-century dwellings that constitute an important part of the historic center of Trecastagni. The architectural models of the building have been analyzed within the Constructed System and have been classified in to two-span, three-span, five-span buildings. Within these models, sub-models have been identified that present small variations in scheme. Further details were made on the portals in lava stone and white stone and on the road surfaces. The latter appear in different configurations, almost all of which can be traced back to the past, which have been detected in their morphological and technological components.
The Landscape System includes the agricultural and forest landscape.
The Intangible System includes oral traditions, literature, patronal feasts, crafts and an important collection of “ex voto”, gifts to the Church for a miracle that has been granted.
All these elements, many of which are of great interest, converge in a system of values that must be valued. Knowing the limits of a traditional plant museum for such a vast collection of goods and traditions, the choice fell on the ecomuseum. To verify the real possibility of the creation of an ecomuseum in Trecastagni the criteria of a check list, a table of scoves that accredits point to goods and traditions was utilizied. Such findings clearly indicate that an ecomuseum could be the right choice.

Figure 7. Ecomuseum project: the Prince Ecomuseum.

A project, however, is not made only of purposes: to become a success, it must take into account the characteristics of the territory, the demands of the community[10] and the possibilities of economic improvement. The three pillars of the sustainable development triangle must be involved: economy,

environment and society[11]. Thus, the ecomuseum project must create opportunities for comparison between visitors and the resident population, promote research activities, educational projects and audiovisual documentation initiatives. From an operational point of view, initiatives of intergenerational social encounter have been promoted, in order to understand the needs of different groups of users but also to recover traditional techniques and workers and define a correct relationship between consumption and renewal of resources. On the Constructed System, the interventions concern the district of Giovanni (fig. 8), part of the historical center, characterized by a tortuous layout and simple buildings, often for productive use. A public space called Piano Pucita (fig. 9) and the warehouses of the prince's palace (fig. 10). The first project concerns the area created around the palace of the Prince di Giovanni, a seventeenth-century building, currently being restored and destined to become a museum of contemporary art. Beside the palace di Giovanni, several abandoned warehouses are present, all require a recovery intervention and a new purpose for utilization. Old roads, covered by asphalt, will be restored in a contemporary way with modern materials, retaining their old features, but at the same time with a modern functionality. Shading will be created by using a structure in Corten steel, covered by climbing plants, such as wisteria, which are common features in Sicilian gardens, in this area. Outdoor seating and waste disposal bing have also been designed in Corten steel.

Figure 8. Ecomuseum project: recovery of "di Giovanni district".

The second project involves the redevelopment of a large public space, known as Piano Pucita, to create a green and equipped space suitable for all age groups. the project aims to create a wide stepped staircase with a dual functionality, not only a staircase, but as a large seating area to watch open air performances from a large stage, created at a lower level. The project also included placing benches under the existing trees, the creation of a skate park, an area for the local market and a parking, all in harmony and safeguarding the existing greenery.

Figure 9. Ecomuseum project: redevelopment project of "Piano Pucita".

The third project concerns the reuse of the warehouses of the palace of the Prince di Giovanni where the headquarters of the ecomuseum, the archive, the documentation center, study and meeting rooms, recreational functions such as bar and restaurant will be located.

Figure 10. Ecomuseum project: redevelopment of the warehouses of the "di Giovanni Palace".

For the environmental system tours in the city and natural trails in the woods have been projected. Both tours have a network of complete facilities such as historic buildings to visit, places to eat, small businesses, visits and tastings at wineries and food companies, to create unforgettable memories. All in full respect of the building heritage, natural heritage and intangible heritage.

CONCLUSION

Trecastagni's ecomuseum will stimulate the participation of local residents and the members of this community who can guarantee the same conditions[12] necessary for local development and, in particular, the management of the common heritage. Trecastagni's ecomuseum is aimed at training citizens to become the players that will trigger development and social change. Such training will generate mutual capacities and knowledge among all citizens, that will turn into common actions starting from the shared heritage. It is a cultural exchange aimed at interaction, in order to cooperate. The ecomuseum is intended to teach people how to work together, to trust each other, to acquire confidence when dealing with other players, be they public or private, to create and guarantee the functioning of groups promoting projects. In doing so, it can turn a population of individuals into a real community[13].

In this regard, some minimum requirements are introduced, that are necessary to meet the goals of this research and are drawn from the studies by Andreas Jorgensen. They represent the main elements included in the project:

- The existence of an information centre;
- Several sites to be visited, with exhibitions (panoramic viewpoint, multimedia museum);
- Workshops promoting the active participation of visitors (educational settings);
- Connections with the surrounding environment (historic dwellings, green places, urban facilities);
- Theme routes and pathways (sound, olfactory, tactile journeys, naturalistic tours).

One of the most important preconditions for the success of an enhancement project is the protection of the natural and man-made landscape. If the integrity of landscapes is to be protected, valorization must provide economic benefit. Furthermore, it will succeed only if it includes all three pillars of the sustainable development triangle: economy, environment and society[14]. To assess the economic pressures that could result from valorization activities, not only today or tomorrow but in the future, it is necessary to identify innovative and sustainable interventions before the tourist pressure intensifies.

The enhancement strategies emphasize that Trecastagni is rich in natural and anthropogenic resources: the system of historical buildings, the system of forests, the agricultural system, the system of traditions. Thanks to the interest in sites with little transformation, quiet and rich in history and nature, the enhancement project provides excellent conditions for the success of the initiative and proposes a modified landscape whose characteristics allow the allocation of attractive and economically advantageous functions, but also satisfactory for the community. In fact, the development project must provide scope for the realization of sustainable activities in such a way as to remain viable for as long as possible, in relation to the climate and tourist flows. The ecomuseum must leave the environment unaltered (natural, social and artistic) and not prevent the development of other social

and economic activities. The sustainability of the project requires full respect for the fragile balance that characterizes many sites rich in history, architecture and nature.

NOTES

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CITIES AT THE AGE OF PANDEMICS

Author:
BOGDAN ANDREI FEZI

Affiliation:
ION MINCU UNIVERSITY OF ARCHITECTURE AND URBAN PLANNING, ROMANIA

INTRODUCTION

This paper aims to assess the relevance of the built environment in general health. It starts with an historical approach of previous pandemics, such as plague and tuberculosis, to highlight some of the constant architectural and urban health principles, such as sunlight and aeration. Based on an interdisciplinary approach, these constants are then compared with the COVID-19 pandemic findings. Finally, the paper highlights the main lines of future healthy cities development.

BUILT ENVIRONMENT MEASURES AGAINST HISTORICAL PANDEMICS

For centuries, lack of adequate pharmaceutical treatment, the means of prevention and containment for pandemics were social distancing, isolation, quarantine, the use of face masks and medical passport.

From plagues to built environment measures

Plagues were the deadliest pandemics. In Europe, the "Black Death" plague, presumably killed half of the population between 1346 and 1353[1]. Plagues are at the origin of some still contemporary measures. The term "quarantine", first introduced in Venice, in 1448, literally signifies the 40 days waiting period before getting off the ship, to exceed the 37 days plague incubation. The medical passport is not a new creation either, first introduced in the 1700s, by several Italian states as *fedi di sanità*.

In the absence of an adequate medical treatment, the built environment became the key measure in fighting plague. Space delimitations were placed outside cities as in the south of France, in the Vaucluse mountains, where a 27 km long, 6 feet heigh wall was built in 1721 to prevent the spread of plague[2] [3]. As for the cities themselves, they were perceived as a major factor in the plague spread. Present research on historical plagues focus on "particular types of urban structures, such as narrow streets or windowless rooms, as well as features of urban life, such as physical proximity[4]". As with further pandemics, it is assumed that a higher urban density might have been an aggravating factor for plague spread by rat populations[5]. Building activity is also considered a barometer for plagues, as "a significant decline in construction activity" preceded European plagues[6].

It is presumed that the end of pandemic plagues, after the 18th century, is due to urban sanitary improvements.

Tuberculosis interaction with the cities

Tuberculosis, the so-called "white plague", became the next deadliest pandemic. Tuberculosis reached 45% of all deaths causes in Bristol, between 1790-1796, 33.2% in Marseille, between 1751-1778, and 25% in New York City, between 1810 and 1815. As no pharmaceutical treatment was discovered until the 20th century, the built environment played the key role.

From scientific research to architecture

The beginning of the 19th century brought important empiric discoveries about tuberculosis, even before the 1882 tubercle bacillus discovery, by Robert Koch, that tuberculosis is prevented by ventilation and sunlight. These major findings, still relevant today despite pharmaceutical treatments, became the pillars for architecture principles, starting from the specialized architectural program, the sanatorium, to housing or offices, as well as for the urban development.

The sanatorium architectural program, as medical facility for curing or at least alleviate tuberculosis, started with George Bodington's sanatorium in Sutton Coldfield, in 1836. Scientific discoveries imposed the sanatorium's main features. The need for sunlight led to large windows, stretching from one side to another of the rooms, to south oriented spaces and to terraced roofs, intended for sunbaths. These principles were all applied in 20th century modernist facilities, such as the 1925 Jan Duiker's Zonnestraal or the 1929 Alvar Aalto's Paimio sanatoriums.

As for housing, an entire array of architectural prescriptions was developed by the French Hygiene movement. Starting from 1820s, the movement led to the creation of the Hygiene Commissions (1848) and of the Commission for Unhealthy Housing (1950)[7]. Hygienist requirements concerned sunlight, such as windows stretching from one side to another of the room and window orientation, interior ventilation, such as imposing ventilation in kitchens and bathrooms or ventilation of the interior courtyards.

Today we tend to forget that some of the Modernist movement principles are mostly derived from hygienist standards. Such is the case of Le Corbusier's *Five Points Towards a New Architecture*: the house on *pilotis*, allowing a better ventilation, the roof garden, a sanatorium inspired principle, the free plan, allowing the liberation from being the "slave of the load-bearing walls", the horizontal window, taken directly from sanatorium principles, an "essential goal of the house", and the free facade, allowing for an opening flexibility.

Tuberculosis and the urban scale

The health derived principles reshaped cities at a scale never seen for centuries. Starting from 1852, the transformations of Paris, under baron Haussmann as Prefect of Seine, were mainly based on sanitation theories. They allowed demolishing unhealthy areas and opening new boulevards, large and straight, therefore leading not only an improved traffic but also to ventilation and sunlight. The visible network of roads was doubled by hidden improvements in infrastructure: water supply and sewages, waste management and new means of transportation, such as subways. At the time, the French capital was one of the first cities to reform over itself[8].

New cities expansions followed the same path of integrating health derived urban principles, such as the 1859 Ildefons Cerdà's extension of Barcelona, the *Eixample*.

From the built environment to scientific observations

Vice versa, cities hygienist improvements became research fields for tuberculosis. The first *International Congress on Tuberculosis* appeared at the turn of the 20th century: Berlin (1899), London (1901), Paris (1905).

The built environment measures were scrutinized by the *First International Congress for Sanitation and Housing Health Safety*, held in Paris, in 1904. Several reports linked urban density to health: "In urban agglomerations where space is not closely measured, where population can spread on surfaces constantly enlarged, it is possible to build houses, to create public roads responding to all the wishes of hygiene, to broadly provide air and light, to reduce the height of homes, to avoid people overcrowding, in short to more or less realize the existence conditions called by M. E.Trélat dispersed life.[9]" A French research on existing European housing concluded that "The tuberculosis mortality is proportional to the housing density; the danger of infection is all the greater when the residents are more cramped in their housings.[10]"
The architectural and urban measures lead to a significant decrease in tuberculosis. In Paris, mortality was halved between the period 1872-1900 and 1901-1925[11].

The tuberculosis urban lesson

The main town planning principles imposed by the tuberculosis pandemic were sunlight, ventilation and the control of urban density. Not only the built environment was the only effective mean against tuberculosis in the 19th century, but this pandemic shaped urban theories to such an extent that today's cities would not be the same without the anti-tuberculosis measures.

Built environment health strategies temporarily obsolete after pharmaceutical breakthroughs

The French discovery of the BCG vaccine against tuberculosis, by Albert Calmette and Camille Guérin, between 1921 and 1928, led to the first pharmaceutical approach of the disease. The US discovery of the first effective treatment, the streptomycin antibiotic, by Selman Waksman, in 1943, further led to the control of the pandemic in the developed countries.
It seemed that medicine no longer needed the support of the built environment. The health principles of Modernist urbanism became secondary, face to the social impact and, later, to the ecological issues. The death of the Modernist urbanism was symbolically declared in 1972, with the demolition of a modernist US housing, a Pruitt-Igoe building[12].

Tuberculosis nowadays

Today tuberculosis came under control in most of the developed countries due to hygiene measures and to vaccination. It is often ignored that, in 2019, just before the COVID-19 pandemic, tuberculosis remained "the leading cause of death from a single infectious agent (ranking above HIV/AIDS)" and caused an estimated 1,45 million deaths annually worldwide[13].
The pharmaceutical findings led to a relaxation in building principles. Such is the case of the resettlement colonies of M-East Ward, Mumbai, India. Although the first regulations were implemented by the Bombay [Mumbai] Improvement Trust after the plague of 1896, in time the planning norms were subsequently lessened. Nowadays research show that poor ventilation and sunlight statistically led to high rates of tuberculosis of up to 10% of the apartments[14].
Facing the alarming progress of tuberculosis during the recent years, the built environment became once again relevant in mitigating the disease.

THE COVID-19 LESSON

The COVID-19 pandemic was forecasted by scientists decades ago: "Virtually every expert on influenza believes another pandemic is nearly inevitable, that it will kill millions of people, and that it could kill tens of millions—and a virus like 1918, or H5N1, might kill a hundred million or more—and that it could cause economic and social disruption on a massive scale. This disruption itself could

kill as well. Given those facts, every laboratory investigator and every public health official involved with the disease has two tasks: first, to do his or her work, and second, to make political leaders aware of the risk. The preparedness effort needs resources. Only the political process can allocate them.[15]"

Scientific research with impact on cities

The COVID-19 pandemic came with huge costs "estimated at more than $16 trillion, or approximately 90% of the annual gross domestic product of the US. For a family of 4, the estimated loss would be nearly $200 000. Approximately half of this amount is the lost income from the COVID-19–induced recession; the remainder is the economic effects of shorter and less healthy life.[16]" During the COVID-19 pandemic, a huge research effort was also put in place. The global "funding committed to combating the coronavirus has exceeded $21.7 trillion" by June 27, 2021[17].

Several research topics have a direct impact on architecture and urbanism. The recurrence of the healthy built environment themes, pollution, green areas, population density and air control, as they were already present in the 19th century health measures, proves their perennial importance and viability.

Pollution

For more than a century, pollution has been considered a major health issue for respiratory diseases, lung cancer[18] or heart diseases[19]. COVID-19 research found that pollution was correlated with significant health issues increase in US[20], China[21], several Asian cities[22] or Italy[23].

Green areas

The green areas were already associated with general health[24] or mortality[25]. What recent COVID-19 research showed was that the green areas, vegetation fragmentation and heat islands[26] are linked to the infection threats[27].

Population density

Starting from the tuberculosis pandemics, the 1918 Spanish Flu, or the avian flu, research found correlations between population density and pandemics. Most of the COVID-19 research consider high population density as a risk in the US[28], Japan[29], India[30], Algeria[31] or Turkey[32]. Some US studies showed no significant correlation[33], but further research is supposed to clarify the role of income, education and health systems in these statistics.

Air control

If other COVID-19 research topics reinforced previous convictions, the findings on the transmission mode were among the most relevant. Previously, there was "mounting evidence that aerosol-transmission is an important factor in the spread of influenza […] Despite this, virtually all infectious disease dynamics models on influenza have thus far ignored aerosol-transmission.[34]"

The COVID-19 allowed impressive collection of data that proved the importance of aerosol transmission in interior spaces. Research showed that "viable virus could be detected in aerosols up to 3 hours post aerosolization[35]", the high risk of the badly ventilated rooms[36] and that COVID-19 virus may travel through air-conditioned ventilation ducts[37].

Research also gives viable solutions showing that the legal 3 air changes per hour "generated reductions in expected outbreak sizes that would normally only be possible with a substantial vaccination coverage of 50–60%, which is within the range of observed vaccination rates in school settings.[38]"

Architecture and urbanism solutions to COVID-19

The built environment has several solutions, both in preventing and in mitigating pandemics:
– interior spaces: air quality through ventilation, humidifying and filtering
– residential: medium density and the intermediate housing
– public spaces: the key for the social interaction
– green areas: a perennial goal
– working: downsizing and dispersion
– shopping: proximity and downscaling
– transportation: walking, bicycling, shared mobility and robo-taxies
– city scale: mixed use neighborhoods that combine living, working, leisure, education and public spaces

URBANISM AND GENERAL HEALTH

It is noteworthy that the COVID-19 pandemic is not a theoretical breakpoint but more of a barometer of the previous urban theories impact on health. Some of the architectural and urban solutions were already present in late 20th century urban theories.
The New Urbanism movement, started in the US, in the 1980s, and defined its principles with the Congress for the New Urbanism, in 1993. It started as a reaction to the urban sprawl and suburban development. It underlined the importance of mixed-use neighborhood, both in use and in population, the accessibility to public spaces and encouraged walking and bicycle transportation.
Also, in the 1980s, the Urban village movement emerged in Europe, with the British Urban Villages Group. It emphasized mixed use zoning, with living, working and recreation, aiming to reduce traffic and create a certain self-containment. The movement encourages walking and bicycling. A greater sense of community and public spaces for encounters are stimulated.

CONCLUSION

Despite the medical progress, as pathogens adapt themselves and the zoonosis number increases, pharmaceutical measures become periodically overwhelmed.
This paper shows that built environment constants that served fighting pandemics remained essential for fighting COVDI-19. The interdisciplinary approach also proves that last decades topics retain their major impact on COVID-19, such as cities pollution, green areas, population density or air control.
This awareness of the built environment role on health should play a key role in further developments as the new pandemics tide inevitably keeps turning.

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A CITY WITHOUT NOISE: TACKLING THE UNINTENDED EFFECTS OF NOISE ABATEMENT, AND DEVELEOPING STRATEGIES TO ENHANCE THE QUALITY OF URBAN LIFE

Authors:
ELIAS BRANDENBERG, MARTIAL JOSSI, ANKE KASCHLIK, PETER STRECKEISEN

Affiliation:
ZURICH UNIVERSITY OF APPLIED SCIENCES, SWITZERLAND

INTRODUCTION

Like many other cities in the world, Zurich is rapidly growing since the start of the new millennium. This Swiss town, approaching a population of 500'000, can be categorized as a small global city[1] with its important financial sector, tech industry and universities, two out of which are performing high in international rankings. There have been signs of a construction frenzy in recent years.[2] In this situation, noise becomes an ever more disputed issue mainly for three reasons. First, people are living closer one to another as urban density gets higher in the growing city.[3] Second, as the city attracts many people of a higher social status now[4], gentrification becomes an issue[5] and hitherto somewhat neglected quarters, sometimes heavily affected by noise pollution, are transformed into residential areas for residents with higher income and/or education[67]. Third, city streets and places are hosting ever more big and small events,[8] whereas bars and restaurants serve their clients outdoors whenever possible. Hence a new intensity and plurality of sounds caused by leisure activities add to the well-known patterns of traffic noise.

The construction frenzy was recently somewhat retarded by court decisions regarding noise regulation. In 2016 the Swiss Federal Supreme Court declared the ventilation window practice previously practiced by the Canton of Zurich and other cantons in Switzerland to be unlawful in building permits.[9] According to new case law, only the kitchen and bathroom may have windows on a side of the building exposed to noise. As a result, several big construction projects are currently on hold. This kind of noise regulation practice restricts architectural design and does not take hold of the diversity of urban lifestyles. The resulting restrictions for architectural and urban planning, but also the fear of negative social effects like affordable housing withering away even more in the next years, were the reason for a joint research project of the Departments of Architecture and Social Work of the Zurich University of Applied Sciences.[10]

This paper presents results from this research regarding the following questions: What significance does noise have in the everyday lives of residents? How do they deal with noise pollution? The results are suitable for a critical questioning of the prevailing expert opinions on the topic, which the action of public authorities is based on. As a matter of fact, noise regulation practice in Switzerland is currently based on the following three premises: 1. Noise is an objective phenomenon that can be

measured (in decibel). 2. Noise is disturbing - Noise has a negative impact on health and must therefore be addressed. 3. The experiential knowledge of people affected by noise is irrelevant. Noise regulations should be made by experts only, and there is no reason to ask residents on the topic, or even to call for resident participation in noise management.

METHODS

A noisy and highly frequented street near the city center of Zurich was selected as the study area. The neighborhood is heavily affected by gentrification lately and consists of old houses, some of which are in rather bad condition, as well as of new buildings with modern noise protection measures.

The research was done in two phases. In the first phase 20 long-established as well as new residents at the selected street were interviewed about the living biography, their neighborhood, their appartement, noise pollution and their way of dealing with it. Noise itself was not addressed from the start of the interview in order to find out if the interviewees would eventually talk about it and therefore to find out the significance of noise for them. The interviews were transcribed and analyzed along the following categories: noise sources, valuation of noise and dealing with noise.

In the second phase, the same interviewees, as well as some new residents, were asked to participate in the "my perfect apartment" workshops. In these workshops, they were shown different floor plans from which they had to choose their favorite, as well as define which room would be the bedroom, the living room, etc. Step by step, they were given more information. First, the interviewers told them on which side of the apartment the noisy street was located. The second information referred to the position of the sun and the third to a backyard (as another possible source of noise). After each step, they had to choose their preferred floor map and reassign the rooms. The aim of this method was to find out whether or not street noise and other noise had an impact on the selection of an apartment.

RESULTS

Descriptive results from the interviews with residents of a noisy street

The analysis of the interviews in phase one showed that 17 out of 20 people mentioned the topic of noise itself when describing their living situation, but mostly without complaining about it. The first mention of noise was often descriptive and sometimes people even explicitly said that noise was not disturbing to them. Some people even stated that the neighborhood unfairly has a bad reputation because of noise. Nevertheless, negative mentions dominated over all: while noise was mentioned 49 times in a positive context, 37 mentions were neutral, while 96 mentions can be classified as clearly negative. In this context, the considerable differences between the interviewees are remarkable: in four interviews, there are no negative mentions of noise at all. In six interviews, positive mentions predominate, while in 12 interviews more than half of the mentions of the topic have negative connotations (in some cases significantly more than half).

Various sources of noise were mentioned. The most frequently mentioned was the constant traffic noise caused by passing cars, followed by other loud noises in road traffic (trucks, buses, motorcycles). Worth mentioning are specific experiences or behaviors of road users that were perceived as particularly disturbing: Accelerating, reversing, honking, loud music or particularly loud engines. Public transportation (tram, train) was also regularly mentioned, especially the additional vibrations in homes that were perceived as disturbing. It is worth mentioning that, according to the respondents, there are significant differences between old and new models of trams and trains. Also worth mentioning are the frequently mentioned noises that have nothing to do with traffic. On the one hand, these are noises from the leisure sector (restaurants, bars, parties, soccer fans, etc.). On the other hand, noises from the direct neighborhood in the same house were frequently mentioned. These can

be sanitary noises (exhaust air, sewage, washing machines, etc.), fighting neighbors, loud conversations, telephone calls or partying, within the apartments or on the balcony. Finally, noises from construction sites, public transport announcements, street cleaning or garbage collection were also described as disturbing.

To get answers to our central questions "What significance does noise have in the everyday lives of residents? How do they deal with noise pollution?" we used the stress model of Lazarus: "The tree concepts stress, emotion, and coping, belong together and form a conceptual unit, with emotion being the superordinate concept because it includes stress and coping."[11] In his opinion, not only negative emotions cause stress, but also neutral or positive ones, at the latest when the loss of the circumstances causing the positive emotions is feared. The starting point in his model is a person-environment relationship. There the person with his/her personal resources, goals and ideas about him- or herself and the world meets the environment, which holds threats, losses, challenges and gains. Stress develops, if the personal resources and those of the physical environment - which Lazarus do not pay attention on - are not sufficient, in order to manufacture a balance with the requirements and/or to master the challenges. Before coping can occur, a twofold appraisal is required. The first step is to appraise whether the situation is relevant at all, otherwise no emotion or stress is triggered. However, if stress is triggered, "the transactional alternatives are harm/loss, threat, or challenge"[12]. Lazarus refers to the secondary evaluation as the "cognitive-evaluative process" in which available resources are examined. Based on this examination, a more or less conscious decision for a coping strategy is made, although there is no universally successful or unsuccessful coping strategy. Even denial can be a successful strategy in certain cases. Success depends on personal resources, environmental conditions, resilience of social relationships, etc. "Two major functions are referred to as problem or emotion focused..."[13]. Problem-focused coping aims to change reality by mobilizing resources. Emotion-focused coping aims to change the emotions associated with the situation. Both forms of coping overlap to a greater or lesser extent in each person depending on the situation and change during the coping process. „[C]oping may not be capable of terminating the stress, but the person can often manage it, which includes tolerating or accepting the stress an distress.“[14]

The evaluation of the interviews showed that in many cases the perceived sounds were either described as easily manageable or not experienced as disturbing at all. The loud city sounds were even interpreted as a sign of urbanity as a positive attribute of their lives by some people. Some interviewees even criticized other residents for complained about noise. Thereby, noise is viewed as part of city life. Anyone who couldn't stand it was living at the wrong place. When noise was described as annoying, uncomplicated coping strategies (problem-focused) were often chosen: placing the bedroom on the quiet side of the apartment or closing the windows. Beyond that the possibilities of the residents to change something about the noisy living situation are very limited. Other interviewees chose an emotion-focused ways to cope with the noise: seeking compensation in quiet places in the living environment, distracting themselves with music or television, consciously incorporating traffic noise into everyday life (e.g., by observing street life from the balcony), or working on themselves to get used to the noise. The emotion-focused approach can also lead to a re-evaluation of the situation, so that noise is basically accepted and no longer perceived as disturbing. If these strategies aren’t successful, a problem-oriented approach can lead to looking for another apartment and moving. Three of the 20 people interviewed were considering this option at the time of the interview, although in one case noise pollution was not cited as the main reason.

As was to be expected, various noises were rated quite differently by the respondents. While traffic noise often was viewed as disturbing (this applies not so much to continuous traffic noise in the

background), neighborhood noise wasn't that often described as annoying. It also became apparent in some interviews that the personal valuation of the noise-causing activity or person was central to this. Noise that is considered unnecessary or senseless seems to be the most disturbing. While one interviewee especially was stressed out by speaker announces at a bus stop, several residents felt affected by so-called car posers who deliberately let the engine roar before parking in front of a kebab restaurant. And an elderly gentleman associated disturbing noise primarily with the improper behavior of teenagers and young adults. These facts underscore the emotional component of stress.

To get a full picture of the significance of noise for the living quality in an urban area, other positive and negative aspects mentioned by the interviewed residents were also analyzed. Examples for advantages, in contrast to the disadvantage of noise pollution when living in the neighborhood under study, are green spaces, squares and recreational areas, shopping facilities, accessibility by public transportation, cultural and gastronomic offerings and proximity to the city. About half of the respondents also identify very strongly with their neighborhood. Some of them have lived there for a long time and can hardly imagine ever moving away. For others, rather younger people, this neighborhood stands for urban or trendy place to experience and discover the city. Likewise, it was often mentioned by the interviewees how difficult it was to find an affordable apartment in Zurich and that it was therefore unavoidable to make certain concessions in one or another aspect - for example noise pollution. The bottom line is that the interviews reveal various facets of the attractiveness of this residential area. Simply describing it as a noisy area does not do that justice.

Phase two: workshops "my perfect appartement"

The analysis of the second research phases along the information on external influences showed that the two noise protection floor plans where favored by most of the participants. Five of the eleven interviewees switched to those floor plans when the information on street noise was provided, while the other six participants did not change their choice (three of them had already favored this particular floor plan before). However, noise protection is not always explicitly mentioned as a reason for the choice. Later additional information led to further changes of the selection. At the full information level, only three participants favored the noise protection floor plan. This trend indicates that noise is certainly a relevant factor in assessing the attractiveness of an apartment, but that other environmental influences can be just as decisive. Further, it must be mentioned that the floor plan workshop is not a representative survey, but rather a thought experiment. Many different influences and readings of floor plans can affect the selection of favorites differently.

These results show again that the attractiveness of appartements is valued differently, depending on the living situations and the lifestyles of the participants. This diversity should be taken into account both in housing construction and in noise abatement measures, if the goal is really to promote the quality of life for all people living in the city.

DISCUSSION

The three premises made at the beginning of this section will be taken up again and contrasted with the results of the study as just presented:

Premise 1: Noise is measurable

Contrary to the first premise, which states that noise is an objective phenomenon that can be measured, it can be clearly stated that there are different sources of noise (cars, cable cars, trains, restaurants/bars, music, neighborhood noise, street cleaning, construction sites) that have different meanings depending on the person and that not all of them are described as annoying or stressful

noise. Individual imprinting of perceptions of noise (and other environmental characteristics) became apparent.

Premise 2: Noise is disturbing

The results further showed that noise is not considered a disturbance for all residents. Previous experiences and emotions play a central role in the perception of environmental characteristics. Young people who like to go out themselves are attracted rather than disturbed by the background noise of bars. For them, the noise is a reason to live in that specific area. Some of the people interviewed even explicitly show a lack of understanding and rejection of people who complain about noise. Noise can also be understood as a sign of trendiness and urbanity, and its perception is thus (also) culturally shaped. Emotions also play an important role in the evaluation of street noise. The permanent street noise is found disturbing by (almost) all respondents, but most people find ways of dealing with it. The additional noise pollution perceived as disturbing, such as announcements at the streetcar stop or from car drivers, is seen as unnecessary and can therefore not be accentuated. It is much more difficult to find a constructive way of dealing with them. Those affected are not allowed to feel a good quality of life on site.

Premise 3: Noise regulations should be made by experts

People who are exposed to noise are experts. They have their own methods and strategies for dealing with noise. These can be problem-oriented and emotion-oriented. The possibilities of the dwelling itself, but especially of the physical environment, be it quiet places for a balancing local recreation or just the proximity to infrastructures, play a central role. More attention should be paid to these in noise abatement planning by involving those affected in planning.

CONCLUSION

In summary, the term noise only describes sounds that are perceived as annoying (or whose originators are perceived as annoying). These assessments are shaped by cultural values and social relationships in which they occur.[15] In the final analysis, noise is not at all a technical matter. It is about the many ways of living together in the city. Hence, in order to understand the various meanings of noise, the prevailing social relations and interactions in the city must be submit to empirical research. And consequently, the focus of noise regulations should not be on noise reduction alone, but also pursue the goal of increasing quality of life based on coexistence and community. After all, noise has always been part of city life. Most residents are ready to accept that and able to develop coping strategies.

The results are in line with an argument in favor of a more participatory approach to noise regulation too. During the last decades in Zurich as well as in many other cities, urban planning responded to citizen's protests and urban movements by developing new strategies and methods.[16] It seems that noise regulation has largely been left out of this process. It remains a domain of purely technical expertise. There is no good reason for that. Residents are experts in noise coping. In order to do justice to the reality of the residents, they must be involved both in the development of noise abatement regulations as well as in the construction of new housing, community development and outdoor areas design. Participatory urban development is essential for that. It can also compensate for negative effects of noise on health, because self-efficiency[17], that is the experience that one's actions have an impact on the lived environment, is suitable to improve the well-being of residents. Such a participatory approach also calls for an interdisciplinary collaboration in research and planning. It can start with architecture and social work like in the project this paper is based on, but other disciplines –

for instance health, arts, acoustics, engineering, natural environment, and many others – are invited to join in.

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HOW JOINT VENTURE DEVELOPMENT PROJECTS CAN BECOME A VIABLE ALTERNATIVE SURVIVAL MECHANISM FOR ARCHITECTURAL PRACTICES DURING ECOMOMICALLY CHALLENGING TIMES

Author:
OMID ROUHANI

Institution:
ZAYED UNIVERSITY, UAE

INTRODUCTION

The global financial crisis of 2008 instigated the redefining of conventional architectural practices, as a large number of new smaller architectural firms fiercely competed with their more well-established counterparts, in a landscape that saw an ever-declining number of available projects. This intense competition created the need for a shift, as the old fee-based business model was proving difficult to help survive those economically challenging times, necessitating an in-depth evaluation.

In this research paper, we start by examining the evolution of architectural practice to better understand why architects have, over time, lost control of the economic system governing the building industry, and then proceeding to discuss how, by altering or replacing the existing fee-based business model, they can regain better control of their future. One alternative is a hybrid business model that combines fee-based with profit based developmental joint venture (JV) projects. By examining the challenges of a land development JV case study in Dubai, UAE, and further analyzing its learnings, this paper recommends a set of risk management strategies that should help secure the financial merits of the proposed hybrid business model.

EVOLUTION OF THE ARCHITECTURAL PRACTICE

As defined by Wang & Ilham, architects are generalists who combine material from different domains of knowledge with creative powers to produce a design[1]. Historically, they were in control of the complete building process, starting with the conceptual design, all the way to its supervision and handover. In recent years, however, the role of the architect in the "value chain" has transformed dramatically[2]. More clients are appointing project managers to supervise and coordinate the complete project, reducing the authority and direct connection between the architect and the client. In some cases, architects have been relegated to one of many packages of consultants in a project, happily willing to forgo their responsibilities and liabilities in order to safeguard their creative acclaim[3]. The need for creative acclaim has unfortunately come at the very heavy cost of struggling business models. Ideally this should not be the case, since architecture is art applied to practical elements of our life rather than art just for its own sake. At the same time, architects also need not feel ashamed in

wanting to make a profit as well. Economic success should not be considered as a wholesale sellout to commercialism but rather, in the midst of economically challenging times, have the ability to maintain control over some parts of the economic system governing the building industry, in order to help them carry out their work and survive.

The current market for small to medium architectural firms contains comparatively more sellers than buyers, raising the question of how a seller can provide a resource unique enough to stand out from the competition[4]. Contrary to the common belief that an architect's signature style is what sets them apart from their competitors, most clients select their architects based on price, service values, personal connection, or ease of working with one architect over another. Since service value and the competencies required for delivering these values for their potential clients is what confirm design commissions, modern day firms should present these chosen values in their firms' portfolio. Some of these values as stated by Maister Coxe are: strong project delivery, strong service provider and strong ideas[5].

CHALLENGES OF THE MODERN PRACTICE

After the global financial crisis of 2008, most countries saw massive layoffs, high staff turnover and even the reduction of the working week from five days down to four. The impact of the layoffs on the architectural practice, in addition to the growing stream of new fresh graduates, meant that for many architects the only hope of practice was either in freelancing or attempt at setting up their own small firm[6]. This change was characterized by a large number of very small firms competing with existing and well-established ones for a handful of commissions. In other words, it became the survival of the small fish in a big pond. A further challenge facing most small firms and freelancers is the inability to deal with the uncertainty in their work due to the unique nature of every project and, secondly, how typically the value of the architectural service is not clear in the beginning of a design process. This challenge leads to these smaller-sized firms having to either provide a lot more service than what they had anticipated in their original fee proposal, or to make the tough decision of having to compromise their creative acclaims for satisfying the ever increasing demands and short-term needs of their clients.

As Heintz & Aranda-Mena highlighted in their 2012 paper, the problem facing startup firms, or firms in transition from either small to medium, or from medium to large, during economically challenging times is not to look at design-oriented solutions but rather the business perspective[7]. They need to either alter or replace their existing business models to ensure their survival in the midst of ongoing societal and industrial changes[8]. As defined by Afuah and Tucci, a good business model describes the process of design practice to create, deliver and capture values for a network of exchange partners[9]. A successful business model helps design firms either to further exploit standard fee-based business opportunities by creating value for its clients while generating a profit[10], or looking at a hybrid of alternative fee-based projects combined with architects as developers or members of a development team that initiates, designs and constructs projects for a profit.

This paper aims to look more at this hybrid option not only based on its financial merits, but also on the ability of the architect to contribute to their expertise at a much earlier stage of a building process, eliminating the typical set of preconceived solutions that generally restricts the ability to produce quality design solutions[11]. As stakeholders in development projects, architects would be afforded much greater freedom in the outcome of the final design and build[12]. The ability of an architectural firm to make more money through development projects than the standard professional fees is what can ultimately help it survive difficult financial downturn. This of course requires much greater

financial literacy by the principal or partners of the design firms who can either choose to use their own financial capital, if available, or JV with other investors, landowners or contractors.

JOINT VENTURE DEVELOPMENTAL PROJECTS

Romeli et al refer to Muhammed and Torrance's definition of JV, which is when two or more parties jointly execute a commercial enterprise, such as a development project[13]. This enterprise may be a consortium of professionals, partnership or JV. More specifically, JVs for architects can take the form of an arrangement where an individual or institutional investor provides partial or most of the cash or land equity, while the architectural firm provides the technical and managerial skills required for the design, supervision and completion of the development project. The advantage of JVs for small-to-medium sized firms with insufficient finances is that it can prove an effective method of obtaining the necessary financial resources in exchange for technical and professional knowledge and experience, which is very much needed to navigate the dynamic, risky but rewarding field of construction[14].

Generally, JVs consist of six major stages: the initiation stage, the early partner agreement stage, the learning stage, the change in dependency stage, the buyout stage and the termination stage. Even though all stages of the JV could potentially prove challenging, from the perspective of risk management assessment, the first two are the most critical. Firstly, it is in the stage of initiation where the land, project specifics and choice of partners, are usually made. The partners must be carefully chosen since their association is generally long term, and the success or failure of the venture depends greatly on mutual trust and co-operation. Secondly, in the partner agreement stage, it is critical that the article of association is not vague, but prepared only after careful consideration of the project objectives, risks and strategies of all the participants, both at the time of formation and as they might evolve or terminate in the future. It is at this early stage of the association that all parties must clearly understand and agree upon all the risks, as well as the methods of managing them.

Like all business ventures, JVs have their fair share of benefits and challenges. Through the following case study, we will examine some of the challenges and their possible risk management solutions[15].

CASESTUDY NARRATIVE

Background

The following case study narrative is based on my personal experience with a JV developmental project, which was aimed to better evaluate the potentiality of developmental JV projects as an optional survival mechanism during financially challenging times.

Having established a small architectural firm in Dubai, UAE, in 2009, I was facing major financial challenges. Almost all projects were either suspended or canceled in a short period of time, and the handful of active projects had their fees heavily renegotiated and discounted by the clients. It was at this time that a British developer approached me with the proposition of a JV developmental project on the Palm Jumeirah. The proposal was to design and build a custom luxury villa on a plot that he had purchased directly from the developer on the tip of one of the fronds of the Palm. The basic terms of the JV were that in return for the land and the funds for the construction, my design firm would provide the full technical support for the build. This would include the architecture, interior design, tendering, negotiation and supervision. The land being a prime location in Dubai, the owner was happy to give full creative design freedom as long as we could adhere to the maximum built-up area, construction budget and the project completion schedule. At the start of the negotiation, the proposal did not sound different to other fee-based projects except for the fact that our fees would be paid at the time of the sale of the home and as a share of the profit. After visiting the site and carefully reviewing the owner's business proposal and financial model, it was clear that such a project on the proposed

location was unique and different from the existing development projects in Dubai; as a result, it would have great potential despite the financial crisis of the time.

Without sufficiently extensive due diligence pertaining to owner background, in-depth market analysis, and land survey, I proceeded to prepare a JV agreement based on a typical fees-based contract. In foresight, many of the challenges covered in the next section could have either been eliminated or reduced, had both parties spent more time in the initiation and early partnership agreement stage more carefully assessing the risks, and ensuring that the JV agreement clearly covered issues such as the division of responsibilities, risk management, conflicts of interest, conflict management and terms and conditions for the termination and/or breach of contract.

Joint venture challenges

As with all architectural and civil projects, JV development has its own fair share of challenges. Not so much in the design process, but rather in supervision, construction and managing issues pertaining to conflicts of interest, breach of trust and expectations of the partners. As soon as the preliminary building permit application was submitted to the master developer, we were informed that even though the design had proposed a pilling foundational system (firstly due to the lot previously being allocated as a turning circle and not a building site, and the fact that the entire Palm Jumeirah was a land reclamation project) the regulations required soil improvement. This information was unfortunately neither provided at the time of sale nor was it highlighted in the soil investigation report. In order to balance out this extra cost, the structural drawings had to be revised at the expense of the design team. To make matters worse, once the soil improvement commenced, the main underground utility cables were detected, which required further months of delay, negotiation and costly relocation. These initial challenges could have easily been mitigated if the land was purchased after completing a thorough site survey and a much deeper understanding of the master developers' regulations and policies.

The project had also undergone a thorough tender review process by external qualified quantity surveyors, but the extent of the financial challenges of the main contractor selected was not highlighted until the generators powering the site dewatering pumps came to a sudden and full shutdown. The contractor had not been able to pay for the fuel. Then, despite clear instructions, the contractor started communicating directly with the land owner in a desperate attempt to divide and conquer in order to increase his cash advance and revise the agreed payment structure. After a heated debate between the JV partners, the contractor's request was declined and instead, the architectural team – as a desperate final measure – took over managing the daily cash flow of the contractor and all payments to suppliers and sub-contractors. Managing the financial and communication challenges of the contractor did not only cause further costs and delays to the project, but rather planted the seeds of distrust among the partners that could have been addressed if in the initial JV formation "rule of the road" on communication had been established.

With time, the distrust further extended when the landowner's expectation from his architectural partner grew, but without any desire to renegotiate an increase in the profit share beyond the initial scope of work. Other expectations from the design team were the unanticipated financial management of the contractors and designing the marketing material for the project. The final blow came when the landowner used the extra unwarranted work, which was eventually completed by the design team after much contention, as an excuse for attempting not to settle the full agreed profit share. It is unclear if the distrust was due to poor ethical values or inadequate cultural understanding[16]. A full settlement was of the share of the profits was eventually achieved, but the failure to respect the JV agreements effectively eliminated any chance of future collaborations.

Learnings

The aim of the above stated case study and narrative was the potential learning which can only be obtained by closely monitoring human behaviors within an alliance. As stated by Park and Ungson, the behavior within a JV is influenced by three conditions: firstly, *ex-ante condition*, which refers to the time the alliance is formed; secondly, *in situ conditions* that are forces affecting the development of a partnership; and thirdly, *ex-post condition*, which relates to the outcomes of an alliance[17]. For the sake of this discussion, we will be concentrating mainly on the *ex-ante* and *in situ conditions* and learnings.

The stated case study clearly demonstrated that, in order to assure a much higher level of performance in a JV, attention must be given at the time of the formation to both an in-depth business model study and a comprehensive JV agreement. Due diligence required for a business model should cover at the minimum: a partner audit to understand strengths and weaknesses, an understanding of local regulations, a land survey, a feasibility study, a study of market conditions, an appraisal and an investment analysis. Once the business model is completed and all parties are satisfied with its outcomes, the JV agreement should be prepared, taking into consideration some of the following points:

- A detailed planning of the JV structure, character and operation.
- A clear definition of the partners' roles and responsibilities.
- Alignment of financial expectations.
- Alignment and agreement on core values.
- "Rules of the Road" pertaining to channels of communication.
- Identification of potential project challenges and proposed risk management solutions.
- Addressing potential scope extension and how it can be addressed within the framework of the agreement.
- Addressing cultural issues.
- Eliminating as many preconceived preconceptions or expectations that might exist.
- A clear, fair and tangible exit strategy for all partners.

The above list is by no means exhaustive of all the points that need to be covered under a strong JV agreement, nor is the possible breakup of a JV a sign of failure. It is important to note that with each break down of an association and or partnership, there are major learnings to be gained and hopefully not repeated in future alliances.

CONCLUSION

By reviewing the challenges stated in the case study narrative, it is understandable to conclude that JV development projects are high risk and therefore not viable options for architectural practices. This would be partially correct; if design firms typically have an extensive list of fee-based clients, as well as the ability to predict financial recessions, they can ensure that necessary precautions are taken. However, most small-to-medium sized architectural firms are not so privileged; therefore, they should establish alternatives to the fee-based model as a survival mechanism, as illustrated in Figure 1. Development JVs would thus be a natural profit-based solution since architects can make more money in land development than they can in professional fees.

Figure 1. Joint venture developmental project on Palm Jumeirah, Dubai, UAE.

Naturally, anything related to the construction industry has a high level of risk and responsibility, but if the risk is managed and the responsibilities are shared amicably, the profits could outweigh the obstacles. The above case study demonstrates that the principal challenges for most JVs, particularly in property development, generally are: a poor management mechanism in areas of operations and control, a lack of trust, the inability to communicate effectively, and differences in organizational cultures.

Management Mechanism

With reference to Bernold and AbouRizk, establishing in the initiation stage of forming a JV a fair and effective management mechanism can help partners better coordinate project activities, to ensure that all their resources are used efficiently[18].

Trust and Communication

Not enough emphasis can be place on the importance of trust among JV partners. Trust will have a positive impact on the rate of exchange of knowledge, information and other resources that can be highly critical during testing times[19]. Trust can be generated between the partners through gained experiences from previous projects and cultural sensitivity but, most importantly, through stronger communication skills[20]. Communication allows for clear understanding of the roles, objectives and responsibilities of the stakeholders.

Organizational Culture

Strong organizational cultures can be established initially by all partners, adjusting their biases caused by cultural differences, followed by developing their values of mutual respect, harmony and friendship[21]. Then JV development projects, if managed well, can not only be a survival mechanism during financially challenging times, but can also establish a practice's design credibility both amongst their fellow architectural peers and potential future clients.

It is high time for architects to regain their voice in the construction industry as the "master builder", who is not only in control and responsible of their own future, but also a major player in the process of developing a more sustainable built environment.

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TO CONGREGATE OR TO DISPERSE? STRUCTURAL ANALYSIS AS A DATA-LIGHT TECHNOLOGICAL FEATURE FOR IDENTIFICATION OF SOCIAL INTERACTION IN PUBLIC SPACES

Author:
ZI-YU KHOO[a], AERILYNN TAN[b], KENG HUA CHONG[b]*

Affiliation:
[a] ÉLECTRICITÉ DE FRANCE LAB SINGAPORE, SINGAPORE; [b] SOCIAL URBAN RESEARCH GROUPE, SINGAPORE; UNIVERSITY OF TECHNOLOGY AND DESIGN, SINGAPORE

INTRODUCTION

As of 2018, over half of the world's population resides in urban areas[1]. For urban residents, public spaces provide space for social interaction and activities. Public spaces that offer entertainment, provide amenities that bring comfort, have seating spaces, or offer shelter are also attractors for urban residents[2], increasing the opportunity for social interaction.

However, not all public spaces become venues for social interaction. The identification of public spaces that attract urban residents and encourage social interaction has become of interest- due to the COVID-19 pandemic, individuals have been advised to avoid large gatherings[3]. Singapore's Urban Redevelopment Authority has introduced crowd monitoring and diversion measures to reduce crowding at public spaces[4]. The Whole-of Government has also deployed Safe Distancing Ambassadors to physically patrol and verbally remind Singaporeans to practice safe distancing at public spaces[5]. However, while crowd levels at commercial spaces are manually monitored by their operators, non-commercial spaces are not, and are too numerous to station staff at to monitor continuously. Therefore, there is a need to distinguish public spaces that are more attractive to urban residents for social interaction to efficiently distribute resources for safe distancing management.

This paper introduces the methodology and validation of a study that identifies public spaces which are likely to play host to social interaction. It is contextualized to a selected residential town in Singapore, but its application is generalizable. Public spaces in this study refer to precinct facilities provided in Singapore's public housing developments, catering to the social and recreational needs of the immediate urban residents[6]. The study creates a network of precinct facilities in the selected residential town, and performs a structural analysis. Based on degree centrality measures, geographic location and type of each precinct facility, points with high opportunity for social interaction are found and validated through comparison with field-observations. Additional observations are also made regarding how precinct facilities are used, designed, and distributed, that enable social interaction. With these observations, resources for safe distancing management can be effectively distributed among these precinct facilities to prevent the spread of COVID-19.

The study has culminated in a technological feature implemented in the City Application and Visual Interface (CAVI) digital platform developed by Électricité de France[7], targeted at urban planners and policy makers.

LITERATURE REVIEW

Study Site

The study site is the Toa Payoh residential town in Singapore. The town is currently home to 105,000 urban residents[8]. Toa Payoh was originally prioritized for massive resettlement. Over the years, other goals were introduced, including to nurture community spirit and social interactions[9]. Insight into the location of social interactions can help policy makers deploy staff for safe distancing management, and urban planners to modify existing towns by introducing or removing precinct facilities.

Social Interaction

Social networks and human interaction can be understood using social media data found online or via Wi-Fi, location-based services and the Internet of Things.

For social media, networks created using follower data between Twitter users identify the decline of network density with increasing geographical distance[10] that suggest prioritization of edges connecting nodes near each other. Furthermore, formed communities are centered around common interests of users[11] suggesting that similar physical communities can be formed around precinct facilities that support shared common interests of urban residents, such as chess-playing or exercise.

Pedestrians can also be accurately localized using mobile phones in indoor environments with Wi-Fi and pedestrian dead reckoning[12], and outdoor environments with sensors and GPS information[13]. However, urban residents such as young children and senior citizens may not carry mobile phones. This motivates research for a data-light method to localize urban residents to precinct facilities where social interaction can take place.

Structural Analysis

Structural analysis is a methodology for understanding and investigating social structures. Commonly referred to as social network analysis, it considers units in a network and exemplifies their relationships. Analytical methods applied to the social structure use the network structure to deal directly with the relationships between units instead of the attributes of each individual unit[14]. Following the growing use of structural analysis to understand the relationship between different units such as transport nodes[15], individuals [16] and buildings[17], this methodology can be applied to precinct facilities, to understand their relationships and relative importance to urban residents.

Degree centrality represents the involvement of each node in a network, quantified through the weights of adjacent edges of each node. In searching for hubs within the human brain network, the variation in degree centrality across a network identifies the relative importance of points in the network. A well-defined network can provide an understanding of the potential influence of highly connected nodes areas and subsequently be used to find convergence points[18]. This methodology can be applied to a network of precinct facilities, to identify convergence points for social interaction.

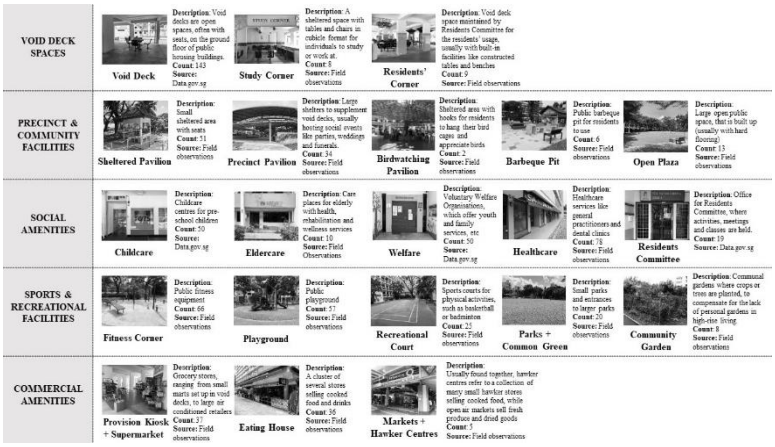

Figure 1. Table of precinct facilities documented in Toa Payoh, categorized into 5 broad types and labelled with descriptions and data sources.

DATA

Locations for precinct facilities were found online[19], or through field-observations from Toa Payoh. ***Figure 1*** describes all types of precinct facilities and their sources.

The study site included all residential areas on roads named Toa Payoh. The site was divided into verification and validation sites. The smaller verification site was used to build and tune the model to identify locations for social interaction. The model was then applied to the larger validation site. The study site with precinct facilities can be observed in ***Figure 2***.

Figure 2. Boundaries and distribution of precinct facilities in the Toa Payoh verification (left) and validation (right) sites, superposed on the OpenStreetMap layer available in QGIS 3.4.10. 697 precinct facilities were identified, comprising 219 in the verification site and 468 in the validation site.

TYPES OF SOCIAL INTERACTION IN RELATION TO ENVIRONMENT

Four types of social interaction in precinct facilities were of interest, categorized based on how urban residents use and interact within them. These categories include passive, reactive and creative[20], with a fourth type, 'active', proposed based on field-observations.

Figure 3. Top left: Children from different families spontaneously playing together through passive usage of the playground. Top right: Adults engaging in a yoga session at a precinct facility. Bottom left: Reactive usage of void deck space, by adding chairs to existing benches to facilitate conversations. Bottom right: Creative appropriation of green buffer space in front of ground-floor units.

Passive Usage

Passive usage of precinct facilities refers to when urban residents spontaneously make use of facilities for their intended purpose, "transforming neither use, space nor meaning"[21]. ***Figure 3*** shows children playing together at a playground as an example of passive usage. Social interaction of observational interest involved urban residents at the facility that interacted spontaneously through conversation or participation in the same activity. The social interaction that took place was a product of the precinct facility.

Active Usage

Active usage refers to using precinct facilities for planned activities like chess games or exercise classes. They are consistent in nature and of a larger scale as compared to passive usage. Participants in active usage make separate independent decisions to arrive at a specific precinct facility for a planned activity. They interact due to common interests within the precinct facility, and usually take on a sense of familiarity due to the regularity of these activities. An example of active usage is shown in ***Figure 3***.

Reactive Usage

Reactive usage refers to when a resident "modifies the physical characteristics of a space as needs change, but must choose from a narrow and predictable range of configurations largely defined by the architect"[22]. Such additions become pseudo-permanent, and are added reactionarily to insufficient infrastructure at precinct facilities. Most of the added furniture observed were chairs, to create more seating space for residents to converse in comfort. This temporal or semi-permanent modification of precinct facilities also allowed social interaction to be identified even when unused during observation. An example of reactive usage can be seen in ***Figure 3***.

Creative Usage

Creative users "either create a new space or give an existing one new meanings and uses"[23]. In context of Singapore's public housing, these usually involve the appropriation of unused or underutilized "white spaces", usually initiated by an individual or a group of like-minded residents who share a common desire to inject a sense of identity and a new point of interest in their neighbourhood[24]. For

example, residents were observed to appropriate spaces along empty green buffers outside ground-floor housing units with pop-up gardens and outdoor furniture. An example of creative usage can be seen in ***Figure 3***. Social interaction occurs when neighbors visit these spaces, whether out of curiosity, by coincidence, upon invitation, or self-invited. Mutual trust is required between the residents for its success, due to risks of vandalism and theft.

Combination of Usage

Combination-type usage for social interaction was also observed. This was observed at Block 179 Toa Payoh Central, where residents were observed to make passive use of public chess tables to play chess, but also reactively left their personal chairs near the chess table to sit while watching games. This constituted both reactive and passive usage of the precinct facility for social interaction.

METHODOLOGY

Social Network Creation

A simple undirected spatial network was created using each precinct facility as a node. The geographic location of all nodes were identified and the straight-line distance between them calculated. Edges in the spatial network were weighted such that spatial interaction between two nodes is inversely related to the square of their distance apart[25]:

$$Edge\ weight = \frac{1}{(Distance\ Apart)^2} \quad (1)$$

For a weighted network, the degree centrality of a node is calculated by aggregating weights of all its edges, where $C_D^w(i)$ is the weighted degree centrality of node i, and w is the weight of the edge connecting nodes i and j.

$$C_D^w(i) = \sum_{j \neq i}^{N} W_{i,j} \quad (2)$$

Tuning via Application to Verification Site

Within the verification site, nodes with a comparatively higher degree centrality than other nodes within a search radius were identified. A search radius of 100m was ideal- it was fine enough to identify local peaks in degree centrality within the network, and coarse enough to capture a sufficient number of nodes. The results were consistent and stable when the search radius varied between 85-115m.

Of the 20 nodes identified in the verification site, eight corresponded to commercial or social amenities. As these are programmed spaces with a pre-specified purpose, they lack space for social interaction, and were replaced with the closest distance non-programmed space.

Using this replacement methodology, 20 nodes representing non-programmed precinct facilities were identified for potential social interaction. A post-analysis visit to the verification site found that 17 out of the 20 identified nodes hosted social interaction at the precinct facility itself, or directly adjacent to it.

RESULTS

Application to Validation Site

A network was built using 468 precinct facilities within the validation site. Identical to the methodology applied to the verification site, nodes of high degree centrality were found using a 100m search radius, then filtered to replace programmed spaces.

Discussion and Analysis

Combining the verification and validation sites, 57 nodes with high potential for social interaction were identified. ***Figure 4*** gives a breakdown of their types and locations. Social interaction was found through field-observations at 50 of the 57 nodes. Details regarding the social interaction and passive, active and reactive usage at these 50 nodes can be found in the Appendix.

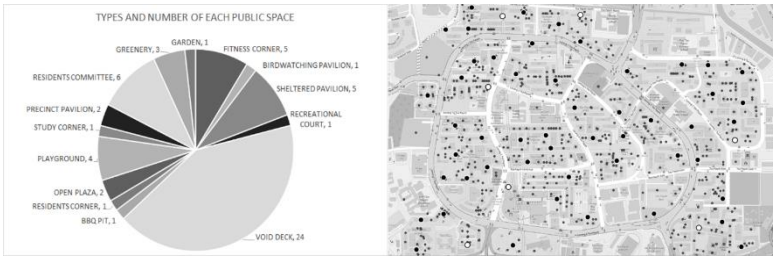

Figure 4. (Left) Of the 57 nodes, the most frequent type was void decks, followed by Residents Committees, fitness corners, sheltered pavilions and playgrounds. (Right) Nodes of high degree centrality where social interaction was found (large black points), or not found (large white points), superposed on 697 precinct facilities.

Void Decks

Void decks refer to the ground floor of public housing- a design decision of the Housing Development Board to construct public housing on "pillars" and free up ground level open, sheltered spaces[26]. 23 of the 24 void decks identified had a high degree centrality because they shared space with other programmed spaces. During field-observations, 20 of the 24 void decks hosted social interaction with passive usage by urban residents who made use of programmed spaces in the void deck, were waiting for the programmed spaces to open, or passed through the void deck to reach other precinct facilities, demonstrated in ***Figure 5***.

Figure 5. Urban residents having spontaneous conversation at void decks in Block 226 Lorong 8 Toa Payoh (top left) and Block 122 Lorong 2 Toa Payoh (top right) respectively. (Bottom left) Block 202 Toa Payoh North, urban residents chat at an open space adjacent to the void deck. (Bottom right) Block 80A Lorong 4 Toa Payoh, urban residents play at the path adjacent to a void deck.

In some cases, void decks were close to other precinct facilities but lacked space for activities, resulting in urban residents overflowing to adjacent spaces, as shown in Figure 16 and 17, or reactively bringing their own chairs, as shown in ***Figure 5***.

Residents Committees

Six out of 20 Residents Committees in Toa Payoh were found to have high social interaction potential. All six hosted social interaction. Five shared a void deck space with other programmed spaces and three were adjacent to a playground or fitness corner. Another seven Residents Committees in Toa Payoh were near other points of high potential for social interaction. Residents Committees foster harmonious inter-ethnic relationships through their activities[27], and encourage interaction by providing seating spaces for passive usage and spontaneous conversation near these facilities. Social interaction near Residents Committees are seen in ***Figure 6***.

Residents Committees are also close to clusters of non-programmed spaces have high degree centrality and can attract urban residents to attend organized events. These promote active usage of precinct facilities shown in ***Figure 6***, enabling social interaction.

Figure 6. (Top left) Urban residents at Block 207 Toa Payoh North chatting and making passive use of fitness corners behind a Residents Committee.(Top right) Urban residents at Block 228 Lorong 8 Toa Payoh, chatting and making passive use of fitness corners behind a Residents Committee. (Bottom left) Posters of activities organized by Residents Committees at Block 99c Lorong 2 Toa Payoh. (Bottom right) Silat classes organized by the Residents Committee at Block 141 Lorong 2 Toa Payoh.

Sheltered Pavilions

Five sheltered Pavilions were identified to have high social interaction potential. All hosted social interaction due to their proximity to other programmed spaces, playgrounds and fitness corners. An example is shown in ***Figure 7***A.

Figure 7. (Top left, A) Urban residents make active use of a sheltered pavilion for a yoga session by a playground at Block 138C Lorong 1A Toa Payoh. (Top right, B) Urban residents (parents) make use of a fitness corner, and chat, while their children play in a playground at Block 131 Toa Payoh Crest. (Bottom left, C) Reactive usage of the sheltered linkway at the Residents Committee at Block 29 Lorong 5 Toa Payoh. (Bottom right, D) Urban residents making use of the reactively placed chairs for conversation outside the Residents Committee at Block 29 Lorong 5 Toa Payoh.

Fitness Corners and Playgrounds

Five fitness corners and four playgrounds were found to have high social interaction potential. Of these, eight hosted social interaction- six were clustered between programmed spaces while two were between precinct pavilions or void decks, and playgrounds, resulting in their high potential for social interaction. Most involved passive usage of the precinct facility.

48 out of 60 playgrounds (80%) and 55 out of 72 fitness corners (76.3%) were built within 100 meters of another fitness corner or playground. This pairing of playgrounds and fitness corners resulted in their high and similar degree centralities. This resulted in children playing with the exercise equipment at fitness corners. Simultaneously, their elderly caretakers were able to use the fitness corners, facilitating inter- and intra-generational social interaction, such as that in ***Figure 7***B.

Other Social Interaction

The structural analysis failed to identify social interaction at a sheltered walkway outside a Residents Committee at Block 29 Lorong 5 Toa Payoh, shown in ***Figure 7***C and D. Its closest node of high social interaction potential was a nearby playground, with degree centrality 1.3% higher than that of the Residents Committee. Reactive use of this pedestrian linkway provided sheltered seating for urban residents visiting the Residents Committee or playground nearby, supporting the idea of Residents Committees building on existing social interaction or attracting residents for social interaction.

Locations Lacking Social Interaction

Seven out of 57 nodes of high degree centrality did not host social interaction. Of these, three were observed to have heavy human traffic, enabling spontaneous conversations. The remaining four were under 150 meters from other points of high centrality with very heavy usage, which may have diverted urban residents.

CONCLUSION

The proposed structural analysis is a data-light methodology for identifying social interaction in precinct facilities. Of the 57 nodes recommended by the analysis, 50 were found to host social interaction through field-observations. For future work, the methodology may be improved to

consider both degree centrality and precinct facility type to identify the social interaction or usage of the precinct facility.

In context of the COVID-19 pandemic, safe distancing measures are set to continue in Singapore, even as her vaccination programme progresses (MOH, 2021). The methodology outlined in this paper can be used to identify public spaces with high potential for social interaction to encourage safe distancing through two means. Firstly, resources for safe distancing can be distributed to these public spaces. Secondly, field-observations suggest attractors to adjacent public spaces include seating and shade. The installation of seats at adjacent sheltered areas will encourage passive usage of these spaces, naturally dispersing crowds at public spaces with high potential for social interaction, and encouraging social distancing.

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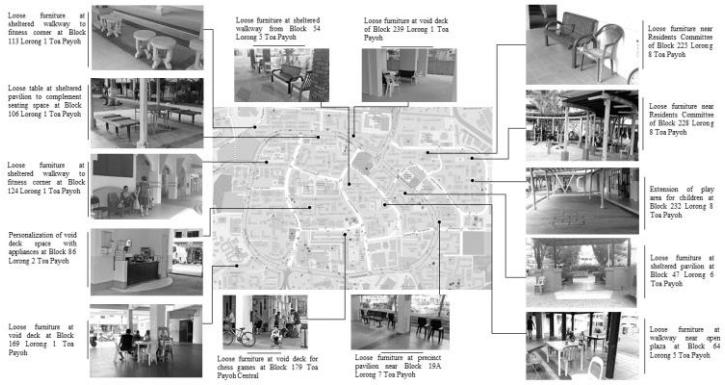

Figure 8. Examples of reactive usage found in Toa Payoh.

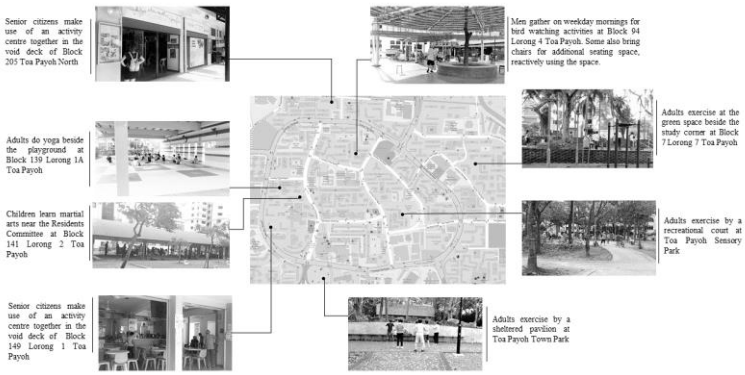

Figure 9. Examples of active usage found in Toa Payoh

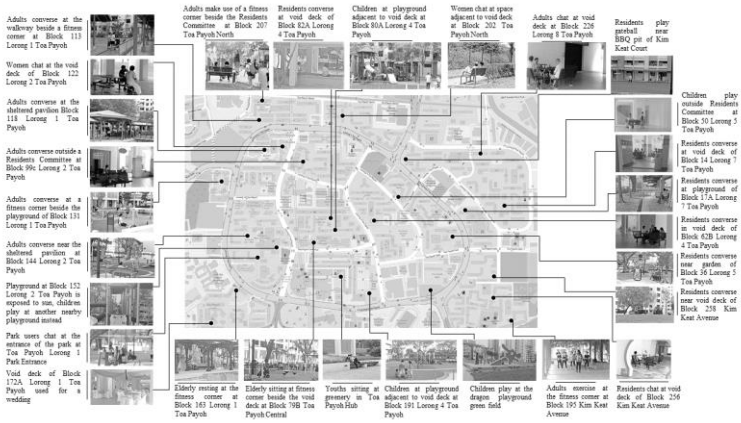

Figure 10. Examples of passive usage found in Toa Payoh

NOTES

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INCREMENTAL HOUSING: A STRATEGY TO FACILITATE HOUSEHOLDS PARTICIPATION?

Author:
GORAN IVO MARINOVIC

Affiliation:
WENZHOU-KEAN UNIVERSITY, CHINA

INTRODUCTION

Incremental housing represents an open-ended housing platform which allows people to transform their habitable space through time.[1] This strategy is based on a progressive system where construction is incomplete but in conditions of habitability.[2] The households are encouraged to personalise their habitat by using micro-loans; moreover, this housing strategy includes the less privileged in the banking system by providing land tenure and promoting entrepreneurialism at a small scale.[3] It depends on a social policy that encourages households' participation in using the subsidy as a leg-up into the private housing market so that residents can benefit from the capital gains.[4] The outcome of this participation is various dwelling forms dependent on the residents' opportunities and challenges they are facing.[5]

Incremental construction offers low-income households a means of affordable homeownership otherwise unavailable to them. This gradual building is also seen as the process by which low-income households make steady investments in housing as their income permits.[6] There are several steps in the process of incremental housing: connection to electricity/water supply to enable a de jure recognition, initiation of a project to demarcate plot perimeters, construction of the base house to enable a de facto recognition of tenure, "horizontal addition of extra rooms, and vertical extension of existing buildings."[7] This building method depends on the community organisation based on families' participation that is under continuous negotiation between members of incremental neighbourhoods.[8] Furthermore, it acknowledges the importance of a particular urban location, financing mechanism, design strategies and construction methods.[9]

Predominant top-down decision making in Chilean incremental housing fails to meaningfully include marginalized groups, and thus it presents a hindrance to the success of the programme. Overwhelming evidence points out that marginalised groups are perceived as beneficiaries of social housing programmes rather than active parties in the decision-making processes "that influence resource distribution."[10] In view of this, the study examines the impediments of self-building practices imposed on low-income families as a subject to criticism of the Chilean incremental housing programme. The hypothesis holds that occupants' current adjustment issues acknowledge the consequences of top-down decision-making practices. The focus is on three consequences from atop planning and designing Lo Espejo social condominium (2007) and Las Higueras houses (2006) that correspondent

to a low degree of flexibility of the base house, restriction for extension of houses (hard adjustment), and disincentives on families' achieving comprehensive cultural aesthetic through customisation process (soft adjustment).

Designing flexible floor plans has been experimented since the beginning of the twentieth century.[11] The open plan house with "a minimum physical boundaries offers flexibility to the space".[12] Several publications agree (Rabeneck;[13] Groak;[14] Till & Schneider[15]; Albostan[16]) that the purpose of flexibility is to develop the layout with the capacity to accommodate diverse physical arrangements and to meet different expectations of the occupant. The spatial design of housing must allow internal transformations of space over time, including changes in the position of rooms, their size and number.[17] Concerning data collected during the fieldwork, this study focuses on the factors of the base house flexibility[18] that include the changing aspirations for inhabiting unfinished house[19] and the evolution of occupants' needs due to the combination of rapid changes that usually arise from the size and composition of the family.[20]

The second consequence from atop development of incremental housing is the challenges during families' extension of delivered houses. The extension represents hard adjustment that consists of removal, displacement and construction of internal and external walls. This adjustment is linked with the technical flexibility that refers to the usage of lightweight demountable fixtures and fittings, and movable floors, walls and ceiling panels.[21] Against this background, during the extension, "the house owner will have to devote time to managing the building, organising labour, materials, and sub-contractors."[22] With this in view, the study brings to light the changes in the building structure and spatial adjustment of the base house. This extension of dwellings directly influences the customisation process for creating a distinct visual identity of incremental neighbourhoods.

The second consequence is limited aesthetic adaptation of houses performed by families. The incomplete part of the house looks odd until infilled, so the settlement has quickly acquired the variegated aesthetic for matching the original idea in materials and forms that resemble a more mature neighbourhood.[23] This aestheticisation of houses represents soft adjustment that consists of changes made by painting, doing carpentry, and using different materials for cladding. According to German philosopher Gernot Böhme, our contemporary lifestyle is based on the intensification of life, 'being seen', an outward presentation that leads to an increased appreciation of aesthetics over functionality.[24] For the philosopher, the aesthetic appeal increasingly assumes the role of a new use-value that relates to low-income families' customisation of houses. In this study domestic aesthetics represents families building as "a vehicle for the co-production of a new aesthetics of social identity in the local context."[25] Opposite to domestic aesthetic, this study introduces households' customisation based on the aesthetic preference of the architect that is characterised as obedient anesthetisation.

The author examines two case studies in the Santiago Metropolitan Region for proposing more balanced power relationships between involved actors in incremental housing projects. In addition to a questionnaire of twenty-five participants from each project, the author uses semi-structured interviews and photographic surveys of nine families from Lo Espejo and nine from Las Higueras. Together with these research methods, the argument is relying on interviews carried out with architects from the Elemental Architectural Office and Gubbins Arquitectos responsible for designing the base houses in two projects and the representatives of the Ministry of Housing and Urbanism of Chile (MINVU).

THREE PHASES OF INCREMENTAL HOUSING

This study recognises three phases of incremental housing: the base house, extension, and aesthetic customisation of units (figure 1). The base house represents an unfinished unit whose completion depends on the investments made by low-income families. This construction phase is acquired with only the most rudimentary features and is upgraded later, at a pace, based on the financial capacities of the household.[26] The idea originates from the study of "the core house" or "sanitary unit system" for upgrading informal settlements in the developing world.[27] The author adopted the definition of the base house as a unit that contains a kitchen, a bathroom, a dining room and a bedroom.[28] This housing

solution is financed by the government and represents an opportunity for low-income households to leave informal settlements. Professionals plan the delivered houses as the guideline that imposes certain safety conditions for future adjustment.

The second phase, an extension of the house, is the households' exertion for developing the delivered void of the house "deliberately left undefined by architects."[29] After taking possession of a base house, households extend it using the precarious materials of their previous dwelling or other, generally recycled, materials which are easy to install.[30] Extension is not only fluid, multi-scalar, and resulting from ever-changing social relations,[31] but it alters over time as families expand, shrink and change.[32] With this in view, enlarging houses demands "more complex construction operations . . . often-requiring technical skills" imposed on low-income households.[33]

The third phase, aesthetic customisation of the houses, represents transformations of dwellings by families for improving the built quality of their home. It is shaped by people's own activities, capabilities, interests and skills, which influence modification over time.[34] With this in view, the customisation of houses brings to light ways to rethink the aesthetic of housing. The more diverse the ways in which the house is customised, "the more people will be able to feel themselves at home in it."[35] The outcome of residents' customisation is argued to be crucial to an emergent sense of belonging and identity.[36]

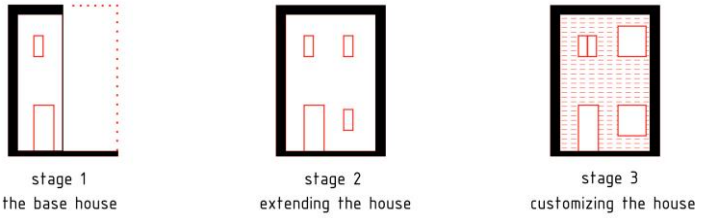

Figure 1. Three phases of incremental housing, source: the author.

TWO CASE STUDIES

For examining the importance of three steps of incremental housing, this research focuses on houses from Lo Espejo and Las Higueras.

Lo Espejo

Vista Hermosa is a Chilean informal settlement inhabited by more than 300 low-income households. It is located in Lo Espejo, a commune in the south of Santiago. In 2003, three female community leaders from this neighbourhood started meeting representatives of MINVU for initiating a social housing project. During these meetings, government representatives involved young volunteers from Techo and architects from Elemental in preparing the Lo Espejo condominium for 30 families on a plot occupying 1000 square metres.[37]

In June 2007, the base houses were constructed and delivered to low-income families. Elemental designed the base houses as one-story units on the ground floor and duplex units on the first and second floors (figure 2). The ground floor units comprised a completed floor area of 6 x 6 metres and an additional external patio area beyond with a width of 6 metres for accommodating further extension (figure 2). For the duplex units, there was an area of 3 x 6 metres on each floor and void of the same size between each duplex to accommodate later expansion of the internal living areas.[38]

Figure 2. Lo Espejo ground floor and duplex house layout (left), Las Higueras layout (right), source: the author.

Las Higueras

Las Higueras houses are situated near Avenue Departamental, on the border of the Peñalolen municipality in the southeast of Santiago. This housing project was a part of the government initiative to house low-income families from the informal settlement La Toma de Peñalolen, the biggest informal neighbourhood in Chile at the time. One of the seven projects delivered to house families from this informal settlement is Las Higueras, constructed in 2006, comprising 145 houses and embodying a complex network of streets.

This project is very popular in Chile owing to its coloured facades, which gave the project the discreditable name "Las Casas Chubi" that portraits house as coloured candies. Nonetheless, it is worth examining this project and its importance for incremental housing construction. Initial houses were delivered in a form of four modular units (one module is an area of 3 x 3 metres): two on the ground floor comprising a bathroom, a kitchen and a dining room and two modular units on the first floor for a bedroom and a hallway (figure 2). As originally planned by the government officials and architects, most families have been able to enlarge and customise their initial house, although it was not as easy to perform as they had been told it would be.

REPERCUSSIONS OF LIMITING HOUSEHOLDS' PARTICIPATION

Participation in housing project means "altering alignment in interaction" between people.[39] One of the major analytical instruments that have been applied in studies of interaction was presented by Goffman, who introduced the notion of the participation framework.[40] The participation framework is under continuous negotiation, and so is an individual's participation status, which is partly influenced by members' own choice, partly by how people relate to others.[41] The objective of families' participation in incremental housing is assuming different roles through which "social identities are discursively created and reproduced."[42]

In two case studies, the author recorded a low level of participation in decision-making processes. Most of the decisions, such as the location for Las Higueras neighbourhood, the number of the constructed base houses in Lo Espejo, and the design layout of the base houses for both projects, were executed behind the closed door. Design solutions were imposed on households without any prior consultation. Families from Las Higueras dealt with this exclusion inconspicuously by taking additional time, effort, and finance to adjust the base house. In contrast, families from Lo Espejo rejected the proposed design solution, which led to confrontations between the representatives from MINVU, the architects and community leaders. Community leaders labelled the base house as "a matchbox" due to its size and lack of flexibility of units. This limited flexibility of units directly influenced low-income households' productive capabilities, followed by confines during the extension of houses and aesthetic customisation.

These repercussions discourage households' creativity and label incremental housing as a work of art. The outcome is the asymmetry of power relations between different actors in the incremental

construction process. Against this background, this study identifies three repercussions from atop planning and designing incremental housing project, present in two cases, which are a low degree of flexibility of the base house, restriction for extension of houses (hard adjustment), and disincentives on families' achieving comprehensive cultural aesthetic realised through customisation process (soft adjustment).

THE CONSTRICTED FLEXIBILITY OF THE BASE HOUSE

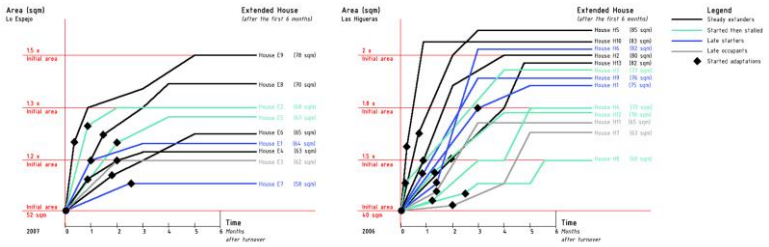

Figure 3. Adjustment during the first six months of inhabiting Lo Espejo (left) and Las Higueras (right), source: the author.

The measurement of flexibility is made through families' acceptance of the base house and their adjustments during the first six months of inhabiting it. Regarding their changing aspirations to inhabit the unfinished house, after the first visit of the base houses, 84 per cent of Lo Espejo families expressed strong dissatisfaction with the units, while only 6 per cent were satisfied and willing to inhabit them. With this high level of dissatisfaction, the authorities were forced to provide them with the second subsidy for extending the units, which was realised by the building company Simonetti, hired for building the base houses. After the agreed extension was completed, families' acceptance rate changed, so there were 25 per cent strongly satisfied, 60 per cent satisfied, and 10 per cent were dissatisfied and demanded delivery of completed houses. In Las Higeras, even though families inhabited smaller and less developed starter house, 68 per cent of participants were encouraged to inhabit their first owned house, while 25 per cent struggled to inhabit them, which lead to a negative perception of incremental construction process.

During the first six months of inhabiting Lo Espejo houses, three households (E2, E8, and E9) achieved more than 1.3 times larger house (figure 3). Most of houses (E1, E3, E4, E5, and E6) attained 1.2 larger areas while they invested only in living areas and maintained the night zone as delivered. Quite the opposite to Las Higuears houses, four families (H2, H5, H6, and H10) realised more the 2 times larger dwelling. The lowest level of adjustment was recorded in H8 family that achieved 1.5 times larger unit, equivalent to the largest house (E9) in Lo Espejo.

RESTRICTION FOR EXTENSION OF HOUSES

In two cases, the author observed adjustment of components of the building structure (walls, columns and beams, etc.), and the displacements of the partition walls (enlargement, reduction, closing, opening and changing of position and function of rooms) for creating special modification. Regarding changing the building structure, it was recorded that all participants respected the architects-imposed limitation. In Lo Espejo, 55 per cent of participants displaced partition walls, while 30 per cent did not pay attention to constraints presented by the architect (figure 4). In Las Higueras, 75 per cent of households adjusted the delivered houses without overburdening the structure, while 20 per cent did not pay attention to constraints presented by the authorities.

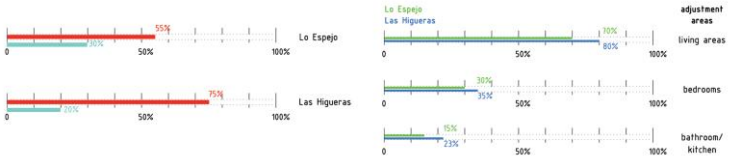

Figure 4. Extension of houses (left), adjustment areas of houses (right), source: the author.

As for spatial adjustment, from families' preference to gather with kin and neighbours for accommodating traditional cultural activities, living areas were adjusted in 70 per cent of cases in Lo Espejo and 80 per cent in Las Higueras (figure 4). For 30 per cent in Lo Espejo and 35 per cent in Las Higueras, these adjustments were closely followed by bedrooms upgrades, the creation of new hallways and the replacement of staircases. Few households, 15 per cent in Lo Espejo and 23 per cent in Las Higueras, transformed the bathroom in a way it included laundry areas and enlarged or replaced the kitchen. On the one hand, there was a specific need for a larger living area, and on the other, changes of layouts that consider water and especially toilet drainage require a significant investment for families of scarce resources. These adjustments presented a means of advancement for the aesthetic customisation of houses performed by residents.

DISINCENTIVES OF COMPREHENSIVE AESTHETICS FOR SOCIAL IDENTITY

Households' desire to express their vision of home identity is realised through anesthetisation of houses. With this in view, the author recorded two levels of households' aesthetic preference, such as obedient and domestic customisation. Obedient customisation of houses serves to capture the predictable scenario proposed by the architect. These adjustments are made in order to make an aesthetic point or to promote an architects' vision for the neighbourhood.[43] The level of recorded obedient aesthetic in Lo Espejo is 35 per cent of all participants. These families followed the instructions provided by community leaders, while in Las Higueras 28 per cent of households maintained the appearance of their house by following the visual identity provided directly by the architect.

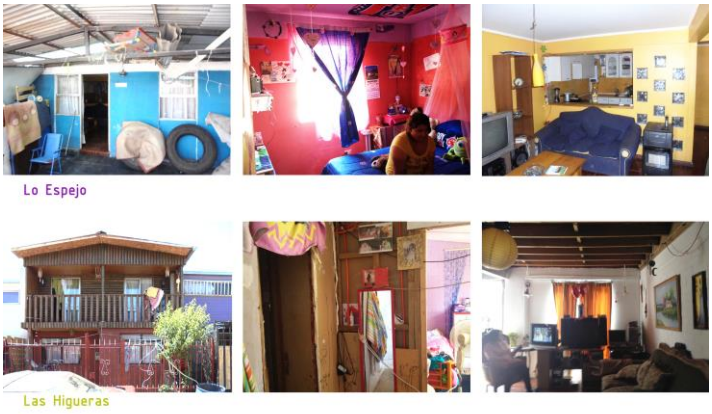

Figure 5. Customised houses, Lo Espejo (up), Las Higueras (down), source: the author.

Quite the reverse to this acquiescence, domestic customisation creates an autochthonous environment while at the same time "making the environment worthy of aesthetic attention and admiration."[44] This aesthetic preference is 40 per cent of all cases from Lo Espejo. These households painted and covered their facades and interior for expressing their way of living. The level of families' creativity in Las Higueras is higher, reaching 63 per cent of all households. Although the authorities should provide some assistance for households' extension of houses, it is not advised to limit or support their aesthetic customisation.

CONCLUSION

Although incremental housing motivates the occupants' participation and focusing on households' self-building process by redeveloping floors, walls and ceiling panels, this study revealed three consequences from atop planning and designing houses. These issues included limited flexibility of the base house, organisational hindrances for extending the unit, and the imposed restrictions to families' cultural adaptation of space defined as occupants' obedient aesthetic preference. These predicaments on self-building are the outcome of imbalanced power relationships between actors involved in incremental construction. For altering the current practice of incremental building, the author introduced:

(a) more flexible design outline of the base house based that should be delivered with column structure, without needless interior partitions.

(b) for successful extension of dwellings, the main concern of the architect should remain structure of the base houses, however they should educate occupants to encourage different possibilities of completing their houses.

(c) regarding families' comprehensive aesthetics attained by customising houses that support their identity through the homemaking process, the architect should have in mind families' preference of aesthetics over functionality in housing. With this in view, the architect should provide more space to households' demodectic aestheticization.

For accomplishing the aim of a more balanced power relationship between the professionals and the low-income neighbourhoods, this study is invitation for an extending theory of flexibility in incremental housing. Future research will be needed for comprehensive theory of flexible design. Furthermore, this study outlined the aesthetics characteristic of incremental housing. This examination should be developed further in future research for developing the aesthetic theory of incremental housing construction.

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STRIVING FOR OUR OWN SPOT WHILE AVOIDING THE EMBRACE OF THE OTHER. AN ARCHITECTURAL PROBLEM OF TODAY

Author:
ANA LUISA RODRIGUES

Affiliation:
UNIVERSITY OF MINHO, PORTUGAL

INTRODUCTION

The COVID-19 outbreak in 2020 somehow changed our lives, at least for a while. The public spaces were no longer able to be shared by anyone, as an extension of our daily use space. Our existence' space did shrink abruptly. The home was also the office, the school, the restaurant, the cinema, the gym, and the playground at the same time. Any house turns out to be the most crowed and almost unbearable place of the world. Now we're striving for our own spot, while avoiding the embrace of the other, everywhere. Even at home. The question of our own privacy and safety gains new meaning today. Particularly in urban and dense areas, it became an architectural problem that urges to be unraveled. It's time to rethink the domestic space and the nearby space – as the new need of an outside domestic space – while we crave to maintain our health and sanity.

Thus, the aim of this paper insists mainly on how to keep any space opened and free, but simultaneously private and controlled, regarding the domestic realm. Through two filters of approach: the dwelling and the street level of the city, it aims to reflect upon the broad issues of individual isolation and privacy in order to outline some solutions to ease the problem somehow.

Home issues: finding solutions

In a fair world everyone would live in a perfect house with lots of space, pure air, clean water and all the means to fulfill any need. Nature, people and the built world of men would tie together in harmony. However, our reality is quite different. We live in a damaged planet, ignoring the Mother Nature's alarming signals like we could control it all. Stressed by our contemporaneity, people are forced to live mainly in crowded cities, swamped in pollution and diseases. In order to stay alive in the city, they struggle to afford living squeezed in few square meters, regardless of the conditions and the comfort of their homes. Actually, the world's urban population increased enormously and cities became denser and denser. Thus, it's not possible to ask for anti-density planning and greenbelts[1] anymore. It's not possible to ask for single family houses with little backyards, for everybody. Rather, it's time to question how to deal with so many people living in such high-dense-buildings in a city center.

Criticism apart, concerning the urban planning and its several questionable decisions and impositions, all over the world, in this paper we just want to emphasize some housing problems related to the

living conditions and daily life routines in a big city. Aside from any family type or sociological, cultural and economic consideration, the risks and constraints of the present moment are felt wherever and affect us all, no matter how. Yet, they are no longer associated just to marginality and poverty: they can interfere with anyone. Hence, it's essential to face them urgently in a comprehensive way, as we can't solve its causes or problems promptly, as well as it has no easy solutions.

When we ought to confine at home for long periods of time; when home offices and remote work become more mainstream practices, we really need to rethink our homes in order to maintain our health and also our sanity. Moreover, if the main reason is a contagious and fatal pandemic, which implies the physical distance and isolation of people, it gets even more challenging at home. Focusing upon these worries, here we'll outline some ideas.

AT HOME: PRIVATE AND CONTROLLED

To live in an apartment requires several limitations and habits that we are used to override. Above all we have to respect the use rules of the shared common spaces, no matter how big, high or sophisticated the building is. Some are guaranteed by public laws, others concern just the private condominium (gated complex). Anyway, we can't use them randomly and most of the time we tend to avoid using these spaces. Furthermore, we hardly know our neighbors, so we easily ignore them. But as we cross our own door, we feel free and safe. We feel *at home.*

Once at home, there are some ordinary and daily routines that demands the right conditions and a specific useful area, where function and form/space are associated, like: to cook/*kitchen* to shower/*bathroom*, to sleep/*bedroom*, to rest/*living-room*, etc. Usually, the living-room is the social area where we spend most of the time doing lots of domestic and personal actions like resting, seeing television, listening to music, playing around, eating our meals or even to work, and so on. On the other hand, the bedroom is the most quiet and private zone. Nonetheless, the comfort of it all depends on the relation between the square meters (m2) vs the number of occupants to each function/space.

In fact, at home we share. We share touches, smells and sounds. We share things, spaces and air. We contact, we control. Within our privacy we cherish our intimacy, thereby the corridors organize the space distributing its functions; the walls delimit each area; the doors let us enter and lock them back; the windows let the light gets through the rooms and also allows us to look outside; and if we are lucky to have a balcony or a terrace, then the green may grow and flourish and we can breathe the open-air.

However, if our personal behavior and way of living ought to change by the need of self-isolation, even between the members of the same family, then we surely need to rethink it all. Although, there isn't just one solution or "the right recipe", from an architectural point of view, there are some topics that we should take more seriously, like:

Flexibility: let it slid

Sliding away walls and doors may be a solution to improve the flexibility of the spaces. Retracting walls allows space to transform completely, whenever we need to use the same area for different actions/functions and for several family members at the same time. For example: the *living-room* may be the "office", "high school" and "nursery", at once. Assured by soundproof acoustics walls, when it's closed, we can personalize each space providing silent workplaces, as the day goes by. Then at night it can be opened, giving back the living space, so the family may gather together again.

Transparency: let it be seen

The importance of the natural light in our lives is proved crucial. The sun light interferes daily with our system and mood, so if we subdivide the inner space, then we'll need to improve the natural light in it. Consequently, we need more transparency (glass-walls) not only to let the light gets through the spaces, but also to control what is happening on the other rooms: where the kids are having on-line classes or just playing around, for instance. However, on an outside-in visual relation, sometimes it may be used translucent rather than transparent glass, to assure more privacy.

Verticality: let it be air

More simultaneous multiple functions in the same spaces, means more people breathing the same air. So, if we increase the m3, we are enlarging the same m2. For that, we just need apartments with higher ceilings to make use of half-sized levels. This way, we can double de action area allowing also the implementation of transformable furniture to create and shape new spaces. For example: If the ceiling is high enough, the bathroom on the lower-level may support the bedroom on its ceiling (upper/half-sized level), accessing by a ladder that is a bookshelf as well, opened to a high-ceiling living-room where so many things can happen – as illustrated in Figure 1.

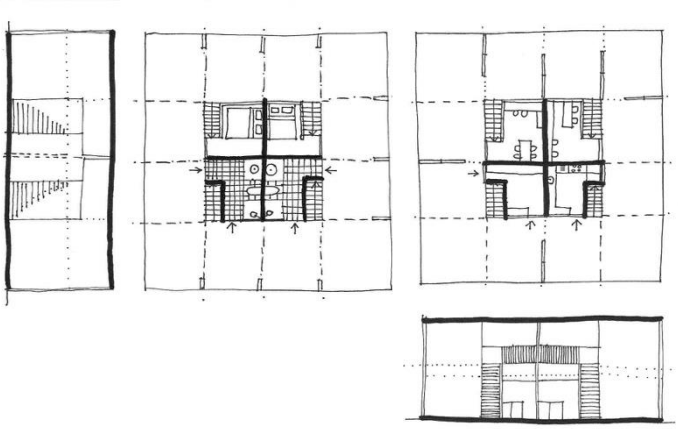

Figure 1. Half-sized levels: Bath+bed_box; kitchen+office-box

Ecology: let it be green

As we may be inhibited to go outside (to public spaces) for long periods of time, we do need an alternative place to breath open-air. Besides the use of natural materials; the implementation of ecological systems to consume less energy and water; or just to keep the building cooler (with green facades, for example), as the eco-conscious demands nowadays, the roof-tops common gardens may be an option[2] – as illustrated in Figure 2. It's a healthy and useful entertainment that can be shared properly by the inhabitants of the same building, giving them a chance to experience nature a bit closer, instigating ecological values. But we can also interweave "green" and "light" by creating inner gardens, adjoining courtyards: some belonging to each apartment; others to the common areas of the building. Aiming to emphasize the natural lighting harmony, this shall help to tie the outside/inside relation, providing suitably that required sensation we use to feel on an opened public space, creating a connection with natural environment and encouraging a new living urban style, at the same time.

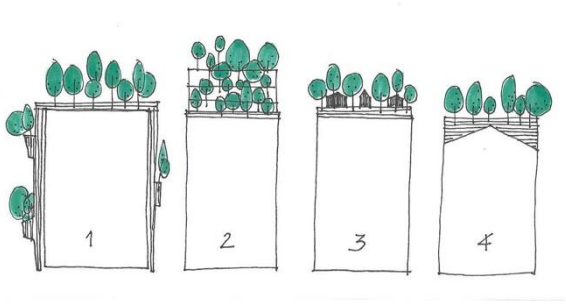

Figure 2. 1_Orverhang with common intermediate layers; 2_Adding vertical parks (stacked); 3_Adding private gardens + facilities + community workshops; 4_filling up pitched roofs

THE STREET LEVEL: PRIVACY AND SAFETY

The street is a public and vibrant urban space which can perform multiple functions and activities. It provides not only the mobility of people and goods, but also the infra-structures we need to inhabit in an urban context, like the supply of energy, telecommunications, water, the collection of waste, etc.
Essentially, the street is the public thoroughfare where people may freely gather, interact and move around, therefore it should offer to the pedestrians the right conditions: the bench where to sit; the growth of trees; plants; birds; the shadow and sun radiation; the place to talk with neighbors; or even the playground for the kids. And this is even more pertinent concerning the adjoining residential areas.
But, if a lockdown is in question, then the public space' use is the issue. More than ever, the street level of our neighborhood is relevant. Somehow it will be the outdoor extension of our homes, so we do need to rethink it all, in order to permit the safety of their users, above all.

Availability: right downstairs

When we are forced to remain at home or nearby, avoiding the circulation of cars or public transports, then it's important to assure walk-distance not only to reach the bakery where to buy the bread, but also all the daily needs (grocery store, drugstore, takeaway food, laundry, etc.). According to this, the segregation between residential areas and the tertiary sector no longer makes sense. A *"balanced neighborhood"* – which Jane Jacobs[3] talks about, that means "living close to everything we need" – may be the solution to gain and restore urban quality of life. Moreover, if a street is potentially dangerous if it discourages foot traffic, then this functional mixtures in the city will also improve the street safety, implying a greater flow of frequent "familiar faces" routines.

Proximity: side by side

It's already well known that the sidewalks should be large enough to suitably accommodate pedestrians, even more when regarding the distances implied by a pandemic, for example. In this sense, the streets should be oriented more toward pedestrians, rather than cars.
But if the intention is to control the crowd, forcing the segregation of different familiar groups, then uneven subdivided sidewalks (with different elevations and functions) may be a solution. It suggests, above all, different oriented directions, therefore more organized and narrow pedestrian traffic. It should also afford some specific relaxing zones (with different elevation) just to sit around, or where coffee shops, restaurants, etc., may use as an open-air extension of their trades – as illustrated in Figure 3.

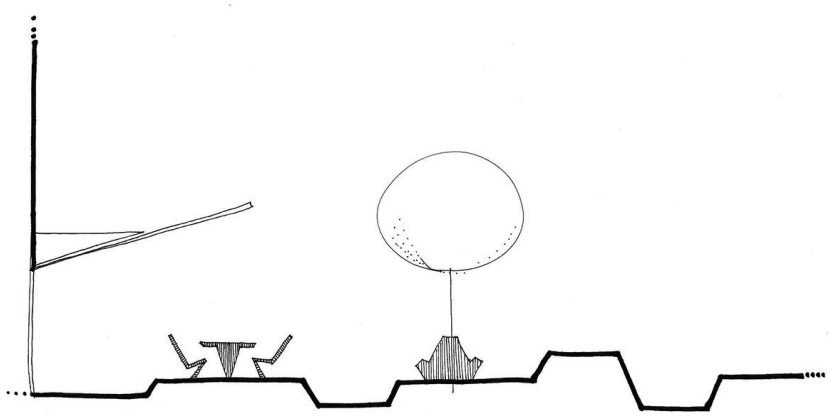

Figure 3. Uneven subdivided sidewalks.

Sanity: playing around

There is no doubt that people sanity is at stake in times of pandemic. More than ever, it is needed to readjust energies and stay healthy. Sports and the use of open spaces reveals essential for everybody (kids and adults). Therefore, parks have to be well situated and attractive to enhance their use as desirable outdoors meeting places. More than a large scale, they should be well equipped with interactive urban furniture, playgrounds, sports zones and other different interventions, prevailing the flexibility of uses, creativity, comfort and safety. Nowadays there are already good examples, spread all over the world, which should be proliferate with this kind of ideas and designs, for example: Loop/FAHR 021.3[4]; LentSpace/Interboro[5]; The Infinite Bridge/Gjøde & Povlsgaard Arkitekter[6]; Five Fields Play Structure/Matter Design+FR|SCH[7]; Paprocany Lake Shore Redevelopment/RS+Robert Skitek[8]; Red Planet/100 architects[9]; etc., between many others – as illustrated in Figure 4.

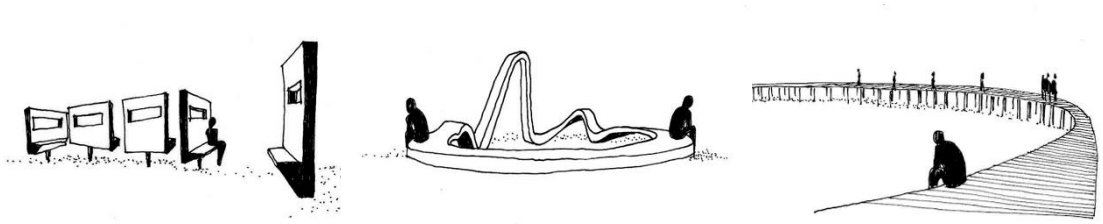

Figure 4. Some examples of street furniture, structures and public space.

Diversity: community gardens

Striking a smart balance between the pleasures of nature and funny outside activities, offers genuine added value in a daily basis. If parks can provide amusement and energetic open-air activities, the closet relation to nature may be reinforced through gardening activities. When there is no chance to implement roof-tops common gardens in the buildings, then the creation of small community gardens, with direct and controlled access, spread around the residential areas, may provide an alternative leisure activity so desirable in times of lockdowns.

CONCLUSION

Attending to the urgency of rethinking the domestic space and the nearby area (as the new need of an outside domestic space) – to preserve our health and sanity – is the main goal of this paper. It necessarily calls into question the essential issues relating privacy and safety to inhabitation, particularly in urban and dense areas, regarding nowadays constraints caused by the pandemic, and to prevent the embarrassments of eventual futures ones, as well.

In this sense, at home, if the need of self-isolation (even between the members of the same family) is the main problem, the idea is to apply to: *Flexibility*: let it slid; *Transparency:* let it be seen; *Verticality:* let it be air; *Ecology:* let it be green. This way, we can easily reshape the space, subdividing them into multiple functions with creativity, better acoustic conditions, luminosity, visual connection and well-ventilated areas, enabling a comfortable elasticity of our homes. As well as, bringing "the green" to our domesticity will make us more wholesome or self-sufficient, like Dima Stouhi writes: *"Architects and designers are now searching for design solutions that will resonate well into the future, turning to 'biophilia' as an important source of inspiration that promotes well-being, health, and emotional comfort."* [10]

On the other hand, if a lockdown is in question, then the public space' use is the issue. Thus, the street level of our neighborhood will be the outdoor extension of our homes, so we emphasize *"the need of cities for a most intricate and close-grained diversity of uses that give each other constant mutual support, both economically and socially (...),"*[11] in order to avoid people from leaving the cities and their tiny apartments in favor of suburbs or rural areas which offers more safety and autonomy. Hence, the question of *Availability:* right downstairs; *Proximity:* side by side; *Sanity:* playing around; *Diversity:* community gardens, are the solutions we outline here, in the attempt to ease the problem somehow. It is time to relate the residential buildings (our homes) to the street level more seriously. Our neighborhood, the walk-distance in our district, may be our survival area for a while, thus it is important to feel safe and to have all the facilities and amenities we need, just around the conner.

Back in 1966, Edward T. Hall wrote about the essential and existential need of distances between man: *"Birds and mammals not only have territories which they occupy and defend against their own kind but they have a series of uniform distances which they maintain from each other (...). Man, too, has a uniform way of handling distance from the fellows. (...) Personal distance and social distance, however, are obviously still present."*[12] More than ever – and according to the official guidelines of central organizations involved in the global response to COVID-19 – it's important to consider these distances as a crucial architectural matter, either at home or in public spaces.

But at the same time, we have to be careful with the meaning and the implications of self/social isolation. It surely brings waves of desolation, uncertainty and disturbance – damaging our mood and well-being – rising up the need to connect and socialize with others. While striving in our own spot, we yearn for the embrace of the other. And this became also an architectural problem of today. Through a well-conceived circulation, for example, it's possible to restore the confidence in urban life. For that we really need to enhance the space qualities, its unique value, ability and effectiveness, learning to adapt and adjust with creativity and flexibility, both outside-in and inside-out.

If *"crisis, upheavals, illness do not arise by chance. They serve us as indicators to rectify a trajectory, explore new directions, experience another life path"* – quoting Carl-Gustav Jung – then we believe this is the right moment to take the chance to change things for the sake of humanity, empowering the role of architecture in our societies.

NOTES

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REGENERTAING MENTAL HEALTH: EXPLORING THE IMPACT OF THE URBAN ENVIRONMENT ON THE MENTAL HEALTH OF YOUNG PEOPLE IN GLASGOW, UK

Author:
MOLLY BROOKS

Affiliation:
UNIVERSITY OF EDINBURGH, UK

INTRODUCTION

This paper will focus on the impact of the urban environment on young people's mental health. This involves exploring the background of Glasgow as a city and a case study, taking stock of the resources these young people have in Drumchapel, a deprived neighborhood in Glasgow. “Mair et al conclude that 'Measures of the built environment appeared to be more consistently associated with depression than socioeconomic deprivation, residential stability, or race”.[1] This lends credence to the concept that 'place' matters as much, if not more, than individual characteristics and behavior in the prevalence of mental disorders. Deprived areas in Glasgow exhibit more mental health issues among its population. “The data suggest the characteristics of impoverished, urban neighborhoods are associated with depressive symptoms in developing countries, just as they are in developed countries”.[2]

Existing literature demonstrates that vulnerable populations and low-income populations are at the greatest risk for health inequalities due to their location. Taking an environmental justice framework, which Pearce sees as a link between health inequalities and socioeconomic position between neighborhoods, supports the exploration of the gap in research for mental health inequities in young people.[3] This proposal will illustrate the need for further studies on how the built environment affects young people’s mental health as well as explore the choice of methods that will be used.

This seeks to show how this exploratory research proposal can be used in other cities, and how it amplifies the voice of the young person.

Research Question, Objectives and Aims

The research questions are informed by the literature and seek to further the discussion around place and health. The overarching research question is: How do young people's interaction with environments, (economic, physical, social) shape their mental health in Glasgow, UK? The sub-questions are:

Q1. How do young people perceive their environment and how does it affect their mental health?

Q2. What are the resources available in the community that promote positive development and mental well-being in young people?

Q3. What do young people think are appropriate ways of supporting their mental health?

Q4. To what extent do local and state policies address the relationship between mental health and environment?

Mental Health and the Urban Environment

The connection between mental health and urban spaces has long been discussed. Ebenezer Howard in 1898 first started to incorporate green spaces into cities, recognizing the benefit of combining town and country.[4] We have now started to shift our purposes for incorporating green space and focusing on mental health. In the early 20th century, many urban environments were plagued with overcrowding and disease, causing epidemics and giving way to high mortality rates. In the present day, the eradication of many diseases has shifted focus to the benefits of well-planned cities to combat isolation, depression, diabetes, obesity and heart disease. [5]

The 2015 study conducted by Maantay and Maroko [6] was the first of its kind looking and vacant and derelict land (VDL) in Glasgow and the adverse effects it had on the communities surrounded by it. They concluded through an index known as Priority Areas for Re-use of Derelict Land Index (PARDLI) of VDL and number of prescriptions for anti-anxiety, anti-depression, and psychosis that there was a relationship between VDL and levels of poor mental health. The finding that VDL is mostly congregated in lower socioeconomic communities speaks to the health disparities that are linked to them like anxiety and depression. [7] One could infer that VDL could be a contributing factor to some of these higher rates of anxiety and depression in these communities. Health inequalities between neighborhoods also speaks to the larger issue of environmental justice. Health inequalities is defined by the World Health Organization (WHO) as "the differences in health status or in the distribution of health determinants between different population groups. Health inequities are a subset of health inequalities, where they are attributable to the external environment primarily outside the control of the individual (i.e., the social conditions)". [8] Taking this framework, we can explore how the urban livability of a community is also an environmental issue. [9]

Urban livability refers to the makeup of a city or urban environment and the resources it provides such as economic opportunity, walkability, public transport and more. [10] While acknowledging that urban livability is a part of a complex system, further exploration into urban livability's and linear and nonlinear relationships in the system is needed. [11] This call fits within my proposed research and how environmental justice and urban livability, or lack thereof, in Glasgow neighborhoods influences mental health support for young people.

The Glasgow Effect

After exploratory research in 2008 [12], the WHO examined further studies in Glasgow and in 2010 coined the term the Glasgow Effect. Their study found that Glaswegians from socially deprived communities had lower life expectancy and poorer health than people from similarly deprived communities in other areas in the UK. [13] This research will be using the definition of deprivation in accordance with the measurements of deprivation by the Scottish Government in the SIMD. They say: "If an area is identified as 'deprived', this can relate to people having a low income, but it can also mean fewer resources or opportunities." [14] Phelan, Link and Tehranifar [15] consider deprivation a key factor in health outcomes and look to understand why these inequalities exist. Urbanization and modernity have eliminated many of the causes that were once thought to link socioeconomic status and low mortality. Spread of disease due to lack of infrastructure in public housing has been mostly eliminated in the UK.

There are other points of view suggesting that there is not an unequal distribution in resources in the city of Glasgow. This includes a study that quantified the number of resources like grocery stores and

schools and leisure centers per community. [16] The findings showed that despite hypotheses based on historical literature, what were considered deprived communities were not greatly disadvantaged when it came to access to resources compared to affluent communities. However, this does not prove that people in these deprived areas have access to the same quality of resources as their affluent counterparts in Glasgow.[17] Such equality of access was assessed through the SIMD.

HEALTH INEQUALITIES

Barton has created a social detriments of health model to better understand the layers and nuance of how the built environment affects the individuals. [18] This helps to illustrate how urban planners consider economic, environmental, and social aspirations of the built environment and shows how to integrate health into those wishes.[19] Here you can see that the natural environment helps to shape the built environment and everything down to the people, is then influenced by that. The detriments of health and wellbeing is shaped by the built environment. Similarly, Allen and Allen declare that: "physical and social environments are important detriments of health."[20] Some of the five areas of inequality they focus on is housing, transportation, the social environment, healthy food, and green space. Coincidentally, and to the point of this research, all these areas of inequality are also some of the key things in urban livability and what makes a community livable. [21]Poor urban livability contributes to the detriments of health and thus, due to unequal living space, creates health inequality.

Health and Planning

This brings us to the present day in Glasgow. The lack of consideration of health in planning in the post war period and in the past 30 years can be seen today. Glasgow has identified these problems and has put documents and plans forth to rectify this. In 2011 The Glasgow Centre for Population Health produced a report to address health inequities in the city through planning. [22] Their goal through this project is to understand the needs and causes of health inequities of the people in communities in Glasgow. Some of their main findings include the need of walkable neighborhoods and close resources and amenities.[23] Also, the need to work with people in local communities to truly understand their needs. These plans and findings of almost a decade ago support the trend of reintegrating health and urban planning. This also suggests that the Scottish government and Glasgow council are aware of the importance the physical environment has on people. My study will contribute to the growing nature of their plans and involve the voices of the young people in the community who may not have been considered. Additionally, it is my hope that my study will reinspire Glasgow to continue this research and project which seems to be at a stalemate.

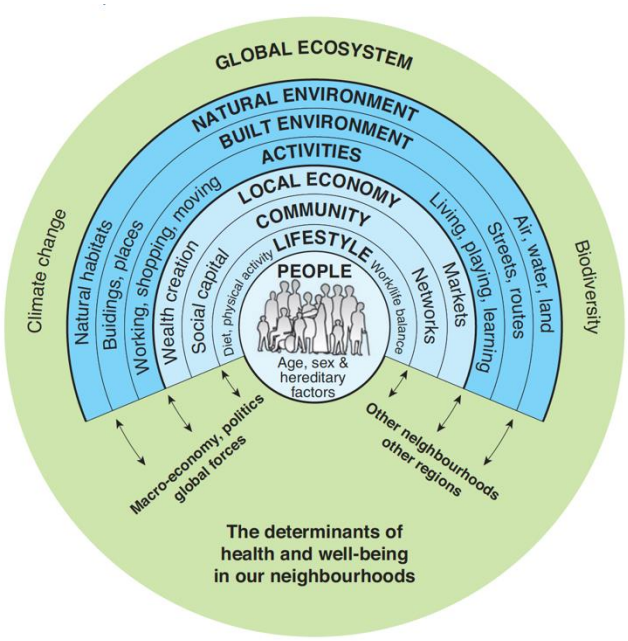

Figure 1. Health Map

Rationale and Collection Methods

The methodology for this study will use qualitative methods and rely on several activities for data collection. Data collection will be done by partnering with a grassroots community organization G15. This is a youth outreach organization in the community of Drumchapel on the northwest side of Glasgow. The data will be connected through activities and ethnographic observation. The data analysis will be conducted in partnership with the participants. The data analysis will be ongoing throughout the data collection so the participants an elaborate or correct any misrepresentations, including cross-cultural communications. [24] This should be done three or four times throughout the time in the field to avoid treating the participants as tokens and to help form the thematic analysis of the data early on. [25] Sharing the findings with the participants is an example of how this study is intended to be a participatory research study.

Participatory Methods

Participatory methods are defined as enabling people to play an active and influential part in decisions that will affect their lives.[26] Challenging the traditional top-down narrative of developmental research, this study will aim to use representation participation as well as transformative participation. This means that in addition to giving community members a voice in what is asked, who is asked, and the means of sampling, it could result in empowerment that has the potential to alter the structures and ideas that have led to exclusion. [27] It is important that the young people continue to stay involved through the research. I intend to discuss with them their anxieties and expectations of the research and what involvement looks like to them.

Participatory Activities

A popular method has been to provide cameras for young people to capture their lived experience on film. It is creative and allows the viewer to see exactly what the photographer sees and to have a brief explanation accompanying it to ensure the correct interpretation. However, there are pitfalls to this method which includes photos not turning out, and sabotage, a participant taking phots that are

not appropriate or in line with the data collector's intent and skewing data. [28] Another more serious pitfall is the idea of taking expensive technology into a deprived area and using it for your purpose, and then taking it away. [29] This does not consider the power dynamics and the problematic effects it can have. Giving and taking away, based on the completion of our own agenda, only increases distrust, and may make the participants feel used which is counterproductive to the point of this study.

Creating trust with participants is a crucial step in collecting data, if young people do not trust you than you may not get access to their experiences. The young people have the same rights in research as adults which also means they decide how much they share with you and are free to withdraw at any time.[30] Collecting accurate data and taking care to respect all ethical considerations has led me to the decision to implement participatory methods. I intend to share the possible activities to the participants and ask them to agree on which ones are most appropriate.

Data Analysis Strategy

Thematic analysis will help me to have a critical lens when organizing materials from the data collection phase. Thematic analysis is widely used in qualitative research as a way of making sense and organizing data to synthesize conclusions. [31] The researcher, like myself, must be careful because our initial bias can create a false narrative and pick out themes and evidence that help to paint a picture that supports our own picture of reality. [32] This fact will be mitigated by presenting the data back to the participants for them to communicate the findings appropriately and accurately. This approach best serves the context and the point of this study. It also allows me flexibility as a researcher to change my approach if circumstances were to change, as is key in fieldwork.

Thematic analysis is also easily communicated which is important in relaying the findings to young people for us to discuss, and to communicate to key decision makers in the dissemination phase. [33] Organizing the data by themes and involving the young people in which themes to include, is also easier for them to disseminate. The young people will be encouraged to communicate the findings of the data in a medium they choose such as a video or a mural. Thematic analysis is also helpful as it gives a wider picture of the lived realities of these communities. Narrative or biographical analysis would only focus on an individual and not consider differing experiences which would ignore the community aspect of this study as well as give a perhaps narrow and inaccurate view of urban livability and its impact on mental health. [34] I intend to review data with participants 3 or 4 times throughout the year, as is necessary. This helps to focus or refocus the fieldwork considering the findings.

ETHICAL CONSIDERATIONS

This collaborative analysis will allow fewer or no misinterpretations of the data, and make it a truer participatory process. [35] This will be done several times throughout the fieldwork process. My positionality and background, as well as my voice and perceptions as an American, middle class, female and adult researcher may view things differently than what the participant intended. Crow says that it is rare to give participants a chance to veto information and how they are represented in the research, however I disagree and think it is best to do this.[36] I would not feel that I have done my best as an ethically collaborative researcher if I included something that a participant did not feel comfortable with.

There are other views about when to screen evidence for what should be included in the final report. Some argue that it is beneficial to safeguard information if it were to reiterate negative stereotypes

about a place, culture, or group of people. [37]They say that this is censoring evidence or being dishonest but protecting these groups and their research from contributing to a negative stereotype that it was not meant to support. This is something that I may have to consider in this project. As it has been discussed, Drumchapel and Glasgow have a negative reputation.[38] It is not my intention for this study to put the communities, organizations, youth, or the city of Glasgow in a negative light.

Strengths and Limitations

To enhance the quality and validity of participatory activities, Brooks et al. reconceptualize contextualized interpretations and reflexivity.[39] Furthermore, they consider validity with reference to plausibility, relevance, and authenticity. This is an exercise for researchers to practice not as a method of intervention, but because it is the ethical duty of the researcher. [40]Although these methods do intend to shift power this is not always the case. These methods are not an intervention in and of itself. It is possible that other factors lead to empowerment in participants, not only their participation in the process of research.

Despite all of the strengths that have been discussed, any methodology is not without fault. Working with children as a researcher tends to create unequal power dynamics. There is still the researcher research dynamic, however this is layered with an adult, child dynamic. Despite participating with children and being active in their activities one cannot be their equal. Konstantoni and Kustatscher discussed these power roles and explains even by making yourself the least adult, we cannot cross those bridges. [41]

CONCLUSION

The literature situates this research among the backdrop of the city of Glasgow as well as among current policy around the world prioritizing safe neighborhoods and mental health such as the WHO Commission on Social Detriments of Health,[42] Goal 11 in United Nations Sustainable Development Goals,[43] The World Health Organization Action Plan for Mental Health for 2013-2020, [44] and the Resilient Cities strategic plan.[45] These policies illustrate that there has been significant focus on both subjects, but little has been done incorporating the young peoples lived experience.

The research questions outlined above, How do young people's interaction with environments, (economic, physical, social) shape their mental health in Glasgow, UK, will be answered through the methods discussed. The ethnographic observation and participatory methods will produce data that will be analyzed by me and the participants. Following collaborative thematic analysis, the data will be shared in a medium of the participants choosing with key stakeholders to further the understanding of the impact of the urban environment on mental health of young people and incorporate the voice of the young people.

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+6 LOSING STRUCTURE – FINDING STRUCTURE WHAT WE HAVE LOST AND WHAT WE CAN GAIN?

Author:
JITKA CIRKLOVÁ

Affiliation:
UNIVERSITY OF FINANCE AND ADMINISTRATION IN PRAGUE, CZECH REPUBLIC

INTRODUCTION

The vulnerability of the globalized world has been discussed for many years. The fact that the coronavirus crisis gives us new opportunities is slowly becoming a cliché. But we realized how fragile our social reality is, how easy it is to interrupt and stop almost everything we took for granted in a matter of days. What do we want our society to look like and what reality will we return to? Will we continue to adhere to the current (difficult to maintain) model? Or will we invest our time, money, and creativity socially, economically and ecologically?

Our students have created a visual patchwork of annotated photos of best practice examples that they consider important and would like to preserve as part of the better post-COVID society that we all dream of. Here we can find completely new elements and reality – remote work and online learning. Some activities are rediscovered under new circumstances – crafts or cooking, tangible objects like cottages and weekend houses. As well as intangible values (the importance of family and friends), perspectives and standpoints of privileged and marginalized. While all images reflect unique personal demands, they are all interrelated.

City as a Social Space

Successful management and development of cities, towns, and urban areas is based on an understanding of the real needs and experience of those who live in them – the citizens. Traditional ways of city management and decision-making are often based on little data or in-depth analysis of key stakeholders and their needs. A low level of satisfaction creates an endless spiral of inefficiency and hostility. It is possible to purposefully involve stakeholders in a process of any complexity and create an environment of constant flow of information and the formation of social consensus in decision-making that will improve the quality of life for all and help create sustainable cities and communities with strong and transparent institutions. Very often, city dwellers feel that the public and social spaces of the city are created for them, and not for their needs. Given the global systemic problems inherent in today's reality, we begin to look for ways to work, produce, consume and motivate all possible human organizations to participate in socio-technical transformations. We must abandon our unsustainable lifestyles, destructive businesses and governments and revitalize the human factor and social processes of socio-technological transformation and innovation.

Society defined by fears

Consumer culture is understood as a coping mechanism that is used to restore stability, certainty, and a sense of identity. Marketing researchers have repeatedly confirmed that a confident person who is temporarily exposed to self-doubt will often look for products (and brands) that symbolize and reinforce their identity. This again helps to explain why young people are particularly inclined to focus on material goods when socializing and forming peer groups. Rindfleisch, Burroughs, and Wong (2009)[1] argue that wealth and brand connections are a constant center in the continual stream of changes that young people have to face. Understanding the relationship between consumer culture and self-esteem is only one part of the following paragraphs.

The famous scholar Zygmund Bauman, who died in 2017, is known for using the concept of liquidity as an example of modernity. In his well-known work, *Liquid Modernity*[2], he argued that in an increasingly interconnected, globalized, and prosperous world, an individual can now smoothly move from one social position to another. This fluid environment allowed people to free themselves from several traditional roles, but also created new problems, namely a suffocating form of anxiety and fear along with the desire to escape or find stable orientation points.

„Imagine sitting in a plane, flying high above the clouds when suddenly the passengers realize there is nobody in the cockpit. The plane is flying itself, but it is unclear where the aircraft is headed and whether it will land.“[3] This hypothetical situation, which he used, is an illustration explaining the fears that define modern society. Safety and security issues are global agenda, as people do not feel safe. Young generations are growing up in the collective awareness of the fact that events such as natural disasters, climate changes or epidemics are beyond our control. *“Fear,”* concluded Bauman, *“is arguably the most sinister of the demons nesting in the open societies of our time. But it is the insecurity of the present and uncertainty about the future that hatch and breed the most awesome and least bearable of our fears.”*

If we can meaningfully engage the full range of stakeholders in a process that creates an environment of constant information flow and gradually builds social consensus in decision-making, we will be able to improve the overall well-being of the residents and visitors of our cities. In urban communities and with strong and transparent institutions, we can better cope with the fear of losing control again.

City as a Collective Identity

This research was inspired by the work of urban sociologist William Helmreich, who passed away from COVID-19 in 2020. Helmreich brought a different approach to the study of the city – for four years, he walked through almost every block of New York. *„You need to walk slowly through an area to capture its essence,“* wrote Helmreich[4] and stated that by walking slowly through the city streets and observing the behavior of local residents and the surrounding area, we can understand how this place works, what values are shared, what is the collective understanding of a specific public space – in Helmreich's words – the essence and identity of the place. The aim of the visual research project was to see how the pandemic reality can help us to build a different everyday reality in the city we live in. The search for a static structure and dynamic elements that change everyday reality is one of the main goals of urban sociology. The dynamic element of social change is the structures of values that we have learned throughout our lives.

Values also relate to the desired goals and motivate us to take action. In his basic model, Schwartz (1992)[5] presents four groups of value sets. The first is individual interest or personal focus: *Power, Achievement, Hedonism, Stimulation, Self-direction*. In opposition are the values that regulate the attitude towards society and others: *Tradition, Conformity, Security*. Even though the values of *Self-direction* and *Tradition* are in opposition, within the the framework of Values they are perceived as

theoretical prerequisites and concepts that trigger the individual's activity to change the static structures of social places, spaces and institutions (Figure 1).

According to Schwarz, values are beliefs that are inextricably linked to affect and emotions when we activate them. We can take a closer look at the contemporary strategies young people use to create their own social and public places and sense of identity.

We often use the term "identity" as the idea of self, proposed by Erikson[6], associated with individuality and the differences that distinguish one person from the other. With the emergence of sociological problems relating to social movements in the 1970s, we continue to examine identity as a reference to similar qualities in relation to a person's connection with others and with a certain group of people.[7]

Individuals, as well as groups, visit particular public places to define their sense of belonging or as a denial of a certain lifestyle, attitude, or value model. The wide range of events that we participate in or refuse to participate in is a way to demonstrate the ethical or political viewpoints that we want to bring to life. The goal of social transformation processes is to establish a balance in accordance with value models, image and identity of individuals and their reference group. The main feature of the identity-building process is the constant search for sources that provide solid guidelines. The experience of oneself unfolds against the background of anxiety, discontent and attempts to stylize itself to the personality of others, hoping to find its own. A more detailed study of the value patterns of groups living in the same city can help us understand their social behavior and their needs for better, more sustainable cities.

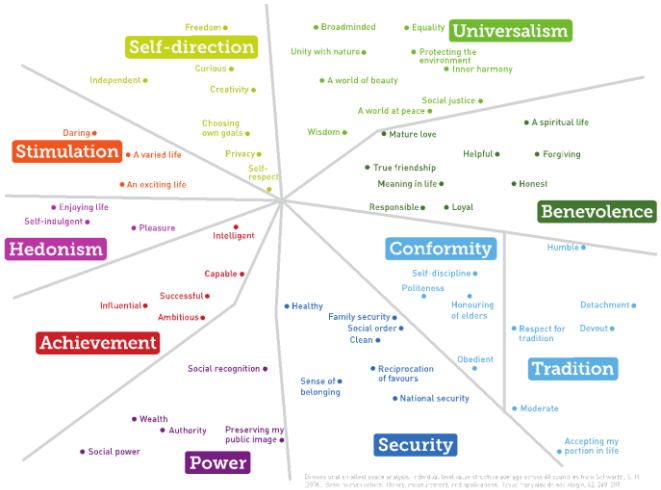

Figure 1. S. Schwartz Simple Space Analysis of Value Structure
Source: Schwartz, S. H. 1992. "Universals in the Content and Structure of Values: Theoretical Advances and Empirical Tests in 20 Countries." Advances in Experimental Social Psychology: 1–65.

METHODOLOGY

Methodologically, the research draws on the sturcture of an integrated platform for visual social research combined with a research concept known as the Urban Living Lab, as shown in Figure 2.[8]. This workshop concept is defined as a user-centerd, interactive, open innovation ecosystem. When developed in the context of a particular city or region, it can generated innovative processes that reflect the perspectives of many stakeholders, including architects and government.

Our students have created a visual patchwork[9] of annotated photos[10] of best practice examples they consider important and would like to preserve as part of the better post-pandemic society that we all dream of. The origin and production context of the visual material was created by researchers and concerned the concepts, relationships and/or abstractions associated with daily life during the lockdowns associated with the COVID-19 pandemic. Analytical attention was focused on the depicted content and verbal feedback on visual stimuli. The discussed choice of theories is related to the aspects and theme of the applied field of research, that is, the search for new social structures and the need to have a significant visual dimension. The purpose of the colleted material was to provide examples of occurence, special or exceptional cases, conceptual construction, or visualized argument. The latter was mainly used to illustrate elements that students would like to leave behind and not include in post-pandemic cities.

After conducting a content analysis of the visual material, we can turn closer to the following categories. Here we can find completely new elements and reality – remote work and online learning. Some activities are rediscovered under new circumstances – crafts or cooking, tangible objects like cottages and weekend houses. As well as intangible values (the importance of family and friends), perspectives and standpoints of privileged and marginalized. While all images reflect unique personal demands, they are all interrelated.

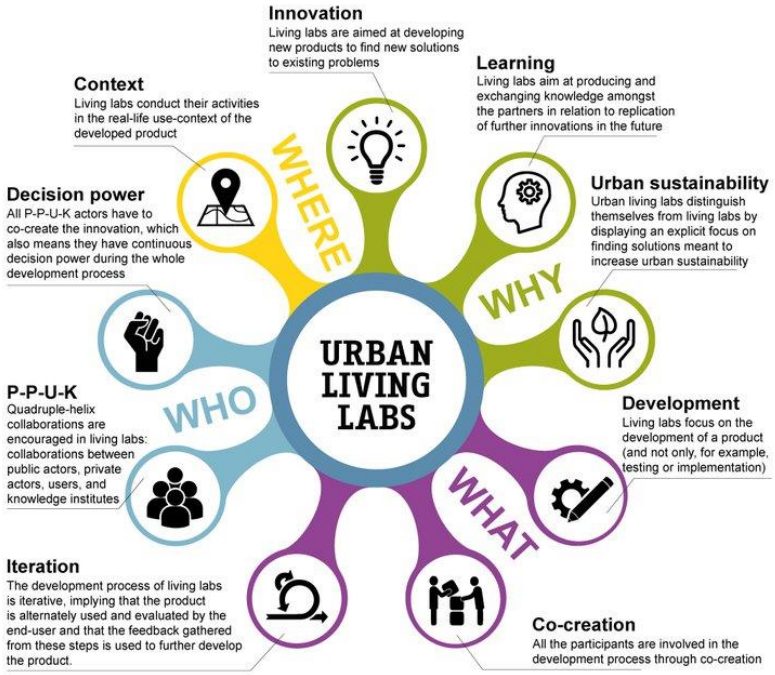

Figure 2. Urban living labs structure
Source: https://www.ams-institute.org/how-we-work/living-labs/

URBAN LIVING LAB RESEARCH RESULTS

Changing reality through participation

The process of changing reality through participation was formulated by the concept of reality proposed by Jean Baudrillard in his work *Simulacra*: *"The real is produced from miniaturized units, from matrices, memory banks and command models – and with these, it can be reproduced the indefinite number of times."* Actively participating in the search for essence, values or elements of a

new desired social structure, Urban living lab participants can better deal with fears of losing control of the social reality that we have built, structured, and taken for granted.
The public space and urban forms that we are used to are under threat due to long-term blockages. In the conditions of the blockade, the importance of every house and every district of the city where people live was revealed. We can use the terms "Situated presence" – there was no concept of "downtown" or "periphery". Each participant was concerned about the complexity of the area in which they live. Together, they began to consider the elements of a sustainable landscape and the complexity of well-being, which, according to our research, includes, among other things, the following units:

Cooperative mobility

In the context of extensive lockdowns, mobility within the city was limited. Limited mobility has become an important factor in managing the pandemic. Restrictions, along with individual abilities and spatial organization of the area, were a significant factor in meeting the current needs of city dwellers. From our data, there is a clear shift towards the concept of a Sustainable Enviroment or Urban Village as one of the respondents called the concept of a pedestrian area, with a significant shift in public confidence from central municipalities to local support communities, small non-governmental organizations and local municipal administrative units.

Figure 3. Public space and sociability

"We walk the dogs together and we talk. People now find themselves deprived of the simples and yet most important aspects of their lives such as their contact and presence of other people around them. This has however brought a phenomenon that was previously mostly neglected by many.
Through isolation, people have found themselves in need in company and have been adopting animals from shelters in great numbers. I have been talking to people I would usually just passed by." Daniel, 19

With the closure of pubs and other places with a communicative function, public parks and areas available to anybody with a good reason (there really is such a need to walk the dog) to be there have become the only places of gathering and meeting. These places brought together all generations and sparked a debate about design, accessibility and innovation management.

Semi-private spaces as community hubs

As public spaces became sources of fear and potential infection, we could clearly identify the growing interest of people in gaining access to semi-private spaces, often located in the periphery, in the fields, or in other areas not yet repaired. The requirement to conclude a contract for the use of land and membership in a horticultural colony near a city or in a city increased the cost of transferring land tenfold.

Figure 4. Allotment garden became a sanctuary for the entire family", Jana, 20
Figure 5. I started to enjoy gardening and learn from my grandmother", Květa, 32

Besides the revival of allotment areas, the community gardens, street or guerrilla gardening became very popular. With this trend, a social learning environment has emerged. The younger generation began to show an interest in acquiring skills and knowledge in the field of various crafts, cooking, beekeeping or woodworking.

Collaborative innovation

It is necessary to collect ideas for innovative urban development with an emphasis on the importance of the built environment for the social well-being of the area.

Figure 6. Country road in the periphery

In the time before the outbreak of the pandemic, I rarely went out into nature. However, after the introduction of anti-pandemic measures, nature has become almost the only place where one does not feel the burden of the time in which we are currently living and it is the only refuge outside the home in which we can spend our free time. We moved from indoor fitness centers to outdoor sports, trips to the Czech nature replaced the Euro weekends (short stays abroad). Forests and meadows help us to maintain our mental and physical health, and through this finding I became more interested in ecology and sustainability.

Dina, 22

The current situation has led to a dynamic change in the requirements not only for the quality of buildings and transport, but also for the environment, as a result of which the nearest natural area has become the central and most integral part of every residential area.

(Re)Discovering of a Sustainable Landscape

We can use the term Sustainable Landscape or Balanced Ecosystem that our respondents would like to create in their city. Ecosystem as a social space based on the relationships between subjects, objects and activities in an interconnected environment. The term *ecosystem* also opens up the discussion about the complex structure of the term *sustainable urban landscape* as a combination of environmental, social, economic, political and aesthetic elements. We are witnessing a modern practice in which public administrations, architects, investors and firms are trying to find solutions for dynamic social change. The corporate entertainment of companies is increasingly complemented by specific local projects aimed at solving the problems of local communities by finding a sustainable solution.

Kathe Raworth's[11] donut model is one illustration of a sustainable society. A society is sustainable if it does not cross its ecological ceiling, but provides a solid social foundation. A good social foundation ensures the autonomy for the citizens without endangering nature. There is currently no country that fits into this sustainable model.

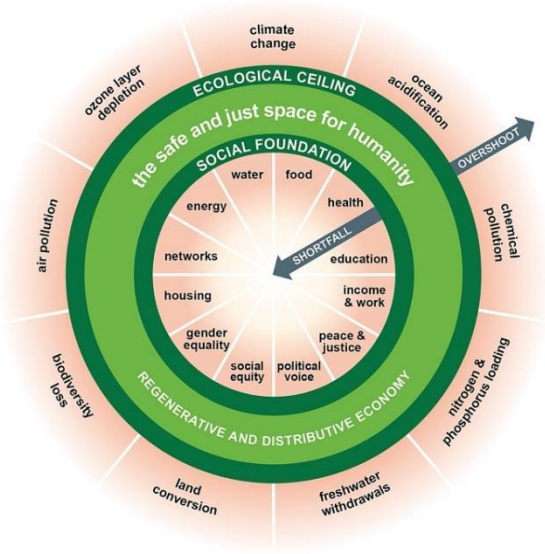

Figure 7. The diagram of Kate Raworth. A Safe and Just Space for Humanity.
Source: Doughnut Economics: Seven Ways to Think Like a 21 st-Century Economist.

The main goal of the new model is to rethink economic problems and set new goals. In this model, an economy is considered sustainable and prosperous when all twelve social pillars are respected without exceeding any of the nine ecological ceilings. This situation is represented by the area between the two rings, regarded by its creator as a safe and just space for humanity.
In recent years, much has been said about the development of the city, but only now the long-term prospects of transforming a public space into a social space seem to be accepted as an additional value of projects that lead to an improvement in the quality of the urban environment.

Distruction and creative changes

Recently, more and more people are realizing the impact of their own consumption and are beginning to look for strategies to minimize the negative impact of overconsumption and the lifestyle created by marketers. Consumer focus is on quality, price, and production context.

Figure 8. Kiosk in the city center

„These small shops "kiosks" we use to call them would always spoil the view in Venceslav Square. Every time I am walking in Venceslav Square I feel extremely sad about the way these ugly constructions were spoiling the beautiful view and esthetics of my favorite city.
My questions were : why they are there and why they are so ugly? I was very happy when Venceslav Square got rid of the "Sausages Kiosks" finally I was hoping we would never see them again in such a beautiful location in the very heart of the city. I took pictures of them , because I am very glad that " Covid-19" made them close. It gives me little hope they will never open again."
Sabina, 29

Elements that were presented as outdated, ready for destruction or innovation could be understood as steps proposed to transform cities and achieve a common goal. The kiosk represent the old scenario of public space and the feeling that the public space is static – that is, there is no need or opportunity to change, create, develop or innovate urban tangible and intangible structures.

Among the main ones is the need to study common interests and opportunities for cooperation with other cities and relevant departments, initiatives, business associations, and academia. Also, new media and modern digital communications should contribute to the development of strategic concepts for the rapid modernisations of the city –projects need more „user friendly" presentations. These media platforms can give voice to a group of like-minded city representatives, researchers and architects with a vision that we need to rethink for our city.

CONCLUSION

A new and reopened public space can expand the safe and resilient areas of our cities. In the end, we see that cities understand the pandemic in a broader context. In Prague, the post-pandemic transformation is part of a well-thought-out plan to make the city healthier, greener and friendlier. Schools are social hubs where such a change can be initiated. Ideas and data can be collected,

participation increased – which is beneficial for the whole area. The Safe Zone becomes a meeting place where local community can be built and further incremental changes that we would like to see as possible innovative reconfigurations of our living spaces can be fostered.
This opportunity, which the pandemic opens up for us, must be seized as soon as possible, as we are still in search of a transformation in our daily reality.

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NOTES

[1] A. Rindfleisch, J. E. Burroughs and N. Wong, “The safety of objects: Materialism, existential insecurity, and brand connection”. Journal of Consumer Research*, 36*(1), (2009): 1–16. https://doi.org/10.1086/595718

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[3] Zygmunt Bauman, *'No one is in control. That is the major source of contemporary fear',* accessed February 1, 2020. *https://www.youtube.com/watch?v=73Nmv-4jvSc*

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[9] Visual Lab of Good Practice, accessed March 1, 2021. https://losingstructuresfindingstructures.wordpress.com.

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THE LANGUAGE OF HABITATION: AN INVESTIGATION OF HOUSING TERMS AND MEANINGFUL DWELLING SPACE

Author:
HINA IRFAN, ZEESHAN SARWAR

Affiliation:
BEACONHOUSE NATIONAL UNIVERSITY, PAKISTAN

INTRODUCTION

Architectural theory posits different approaches to the design and construction of buildings and physical structures. These approaches are meant to hone the noble desires of the architect while serving select representatives of society (the end-users) – thus creating functional, desirable spaces with sound enclosures, ensuring a positive and heightened user experience. Here, meaning in architecture becomes relevant – somehow the architecture is successful if the desires of the architect manifest themselves in a way that matches the interpretation by the end user. A seemingly difficult task, as the number of end users increases; however, the same could be said of any form of translation – even in direct conversation. As we try to express our thoughts to another person, the chances of miscommunication may be high – the chances that part of the message is lost may be even higher. While the faculties of language and perception operate via distinct cortical pathways, there is an increasing amount of research devoted to understanding the link between the two.

If we consider housing, what comes to mind may be an archetype of a cottage house – perhaps a rectangular shaped front with two windows, a centralized door and gabled roof? The shortage of housing, now a worldwide phenomenon, has resulted from the failure of governance and policy making regarding land use and available finance. But this may still be an architectural problem. As cities develop into megacities and the human population increases exponentially, controlled high density housing may be the only viable solution – if this is not done with due consideration to context and urban quality, the deterioration of our living environment is imminent.

HOUSING AND ARCHITECTURE

In his book entitled ‘6000 years of Housing’, Schoenauer claims that historically, due to a low population, the transformation in housing across civilizations occurred steadily and organically since it was in harmony with the psychosocial and economic forces of the time.[1]

For many decades now, this has not been the case.

Countries may suffer from housing inequality, a lack of available financing, or housing projects that become hotspots of crime and segregation within communities; governments may be at the mercy of private developers or their own inadequate policy. Marginalized citizens then make their own squatter settlements and cities increasingly become victims to urban sprawl and uncontrolled density. The problem of ‘informal settlements’ and ‘encroachment’ in Pakistan is a prime example of how

planning and management can go wrong at every scale (local, regional and national). Arif Hasan's report on Pakistan's housing crisis outlines the issues of informal development on government and agricultural lands, the lack of communication between communities and provincial governments, the rise of gated communities (that cater to the elite on prime arable land) as well as the subsequent problems with development authorities and the largesse of the speculative real estate market.[2]

Architects may balk at the thought of trying to resolve this by making do with smaller more confined units – of coming up with a less is more approach to what may be primarily a policy or land use issue. Dluhosch believes that architects are taught in a way that only makes them useful towards a singular client of similar background and taste; he also claims that 'based on the evidence of the last century, one must conclude that the architect cannot fill the role of both interpreter and trustee of the values of small elites and at the same time pretend to be a spokesperson for the so-called masses. The former requires the architect to represent society by proxy; the latter requires representation by direct engagement with the end user'.[3] He concludes that the *process* of design has to change – ongoing consultation with the end users is necessary and the design support from the architect needs to extend towards the entire life span of the building, until demolition.

This is in agreement with Hamdi; in his book 'Small Change' he indicates that designed infrastructure should facilitate 'emergence' and that the role of design (or the designer) is to provide opportunities for people (the community) to engage with civic authorities to further assist their efforts in enterprise and acquire the necessary facilities to improve their quality of life.[4] If we consider the urban scale, architecture will need to respond to challenges of a burgeoning human population and the preservation of urban quality.

By taking the city of Sao Paulo as a case study, Van Sluys references housing projects within the city from 1937 to 1964 that 'although numerically insufficient to solve the problem of housing shortage, the discussion of the residential amount and the urban quality were addressed in these projects through changing the concept of inhabiting, that means understanding that this action involves an "inhabiting space" that exceeds the housing unit. This new idea caused the incorporation of new uses, in addition to the residential one, and the appreciation of the collective spaces; high densities, urban land and verticalization in central areas: these were proposed spaces with a new urban order, which encouraged the collective housing and framing new scale relations with the existing city'.[5]

When it comes to urban quality, housing seems to be the prime contributor towards new developments; but we cannot be too quick to forget the human scale of it all. One only has to revisit 'The Poetics of Space' by Bachelard to understand that the house is a container of human consciousness; the home being the first universe man encounters and the ideal setting for *daydreaming*: a phenomenon that links memory, thought and dreams.[6]

If Vitruvius proposed the characteristics of commodity, firmness and *delight* in his first century treatise on architecture then much work on the modern design solution of housing for thinkers and dreamers of the 21st century remains to be done – the provision of amenity within urban settings also needs to be considered, since human requirements are seldom categorized by simple function. Housing settlements that proved to be more successful (in terms of occupant satisfaction and habitation) differentiated between residential space and habitable space.

In the Razia Hassan School of Architecture, one way we sought to 'reassociate' architecture and urban housing was to consider the language of residential architecture and its relationship to built space. The house itself consists of a series of rooms, arranged in hierarchies that signify patterns of use and named accordingly in a language that implies a function; when these rooms are inhabited these *names* may take on a more layered meaning. Works of literature and poetry have done wonders

to add to the soul of language – what significance do the terms used to designate spaces within a house have in shaping the identity of housing stock?

For housing to have considerable architectural value, we propose an exploration of adding meaning to housing architecture through the study of housing terms; it is proposed that increasing knowledge of design vocabulary (in various languages) could potentially impact design processes (and outcomes) in the short term. Also, for urban housing to be 'rooted' in its context and reflective of its inhabitants, local culture is considered through language.

LANGUAGE, MEANING AND PERCEPTION

For an architect, the relationship between language and perception is important to study for several reasons. Namely, of all the arts, architecture is the most experiential. Thus, to understand experience, we talk about what we perceive; we try to express our thoughts. Architecture provides affordances – a call to action or options to navigate within enclosed space. One way to study the link between these distinct modes of cognition (language and perception) is to examine the relationship between perceived space and spatial language.

Carlson and Reiger's work[7] suggests that spatial language is grounded through non-linguistic processes of attention and vector sum coding of direction. Grounding aspects of spatial language within perception suggests there are underlying structures – a perceptual apparatus - which all human beings share. Carlson and Reiger also referenced studies on color categorization where 'the best example of color terms, across languages, occurred at the same 11 foci on the color spectrum, regardless of the color categorizing scheme of the language in question'. The argument here is that defining spatial relationships through language and perception has to address the mechanism – a linguistic representation of space that uses perception processes that are independent of language itself. This suggests that we are already encoded with the hardware to understand the message, before the stimulus to do so even arises.

If we examine thought, according to Pylyshyn[8], thinking is done in a conceptual language – our written and spoken words get translated into this, as does imagery - this is then re-communicated once thought becomes expression. He claims that 'an adequate account of the process underlying thought will show it as occurring in a symbolic mode which has few of the properties we would normally ascribe to either natural language or to images. The vehicle of thought does not require words (but only concepts), nor does it have such intrinsic properties as size or shape. Rather it consists, as do all computations, of the transformation of formal symbolic expressions whose terms are given an intentional interpretation by the theoretician; thought is a symbol manipulation process'.

Also, perception plays a role in giving language meaning. Pylyshyn claims that, 'one of the main reasons why language and perception are inextricably related is that the perceptual system is the primary means through which language acquires a semantics. A system which contained a body of data and a language processor might conceivably be able to carry on a coherent dialogue. But without a perceptual component it would, in an important sense, not know what it was talking about.'

Therefore, due to context and underlying meaning, communication, expression and ultimately creative expression all come under regular scrutiny by a discerning target audience. Language has the means to describe where an object is, as well as what that object is. The visual field also allows us to make those inferences. Another approach to understanding the relationship between natural language and spatial perception, proposed by Kemmerer[9] was 'to concentrate on aspects of the linguistic encoding of space that correspond closely to aspects of the visual system' and 'to explore the ways in which

spatial expressions diverge from the organizational properties of the visual system and reflect instead language-internal semantic and pragmatic factors.' Again this supports the theory of an underlying mechanism that links perception and language through non-linguistic means.

While language denotes space, and conveys meaning, it seems that the interpretation can be linked with context and sentence structure. When we consider semiotics, architectural theorists like Geoffrey Broadbent and Roland Barthes also consider architecture to be meaningful – open to evaluation and interpretation – whether the architect desires this or not. However, in discussing meaning in architecture, Hershberger[10] claims that 'if there is a primary purpose for architecture, it is not communication or meaning at all, but provision. The central purpose of architecture is to provide shelter, protection, and accommodation for the physical activities of man. The communication function of architecture is necessary, however, to guide people into using buildings as intended and to enrich the experience of so doing.'

Yet he further claims that, 'the duality of meaning (representational and responsive) becomes even more important with regard to predicting behavior. The architect must first have a good understanding of the design will be representative of. Then he must learn how the user will react (feelings, emotions, valuations, prescriptions, etc.) to what he has represented. Taken together the architect has a reasonable estimate of how people will behave in his buildings - not to mention how they will feel'.

While the linkage between language and perception (via thought) may be important, the role of this is still under debate. Based on experimentation done through a visual search task, Klemfuss, Prinzmetal and Ivry[11] found that 'language may have an influence at multiple levels of processing' and that 'the effect of language is on decision processes, rather than by directly influencing perception' and that 'while linguistic coding can be a useful tool to aid processing, the current findings demonstrate that language can both facilitate and impede performance. Language can provide a concise way to categorize familiar stimuli; in visual search, linguistic coding would provide an efficient mechanism to encode and compare the display items. However, when the linguistic nature of the stimulus is irrelevant to the task, language may also hurt performance.'

This is interesting in that the cues or directives that emerge from an understanding or framework of language can limit thinking, possibly dampening the creative process. Conversely, knowing more than one language, opens up horizons. Kramsch[12] claims that 'the act of speaking a different language can both threaten the speaker's self and relocate it in the third place of art and the imagination. Travelers between languages can, like the tricksters in folktales, play with double meanings in the interstices of words and codes. They can imagine possible scenarios based on cross-linguistic connotations; they can draw on the sounds and shapes of different languages to conjure imagined worlds inaccessible to the monolingual traveler.'

Casasanto et al.[13] is quick to point out that just because people talk differently doesn't mean they think differently. However, their studies on temporal thinking when it came to time estimation in different languages showed that 'that the metaphoric relationship between time and space is not just linguistic, it is also conceptual. Not only do people talk about time in terms of space, they also think about time using spatial representations' and 'performance on a pair of psychophysical time estimation tasks differed dramatically for speakers of different languages, in ways predicted by their language-particular spatiotemporal metaphors.'

Alternative constructed realities, the ability to conjure imagined worlds, differences in temporal thinking and how we map time onto space – all of these linguistic attributes may be prerequisites to creating valuable architectural design. In terms of meaning, overt visual symbolism may not always be inherent in works of architecture. However, we must consider the viewpoint of the designer as the imagination gets to work in conceiving complex and interesting space; during this process certain

language terms may be seen as generative. Of particular interest is the issue of domestic architecture – as cities become larger and the influx of rural communities becomes rampant, many regions find themselves with a shortage of housing. While this is widely accepted as a sociopolitical, environmental and economic problem, it also has to be addressed architecturally, as an architectural problem. Housing is also a typology that can be successful in adding considerable value to the experience of a city's inhabitants – considering that engagement with an end-user is necessary, language may be the link in not only making the communication successful, but also in understanding social and cultural aspects of inhabitation that would otherwise be overlooked or lost in translation. Also, the effects (and perhaps benefits) of being multilingual is clear in terms of depth and breadth of thought and potential creative fodder; can this be advantageous to an architect trying to design habitation intended for a mass client? Housing terms within the Punjab province were studied and analyzed to determine if any spatial linkages can be determined from the associated linguistic meaning or etymology.

URDU HOUSING TERMS

برآمدہ (Bramda): The covered terrace

Bramda which is commonly translated as the covered terrace could be understood by looking into the etymology of this word. Bramda: Br-Amad-A could be divided into two words 'br' and 'amad' with an additional 'a' which makes it a noun. 'Br' means high or upper part which gives a sense of a raised terrace or an elevated ground that acts as a deck. When it is at ground floor it is raised a step or two to protect it from water and also acts as a transition between the outdoor and the indoor.

It also means the 'width' which suggests the volumetric proportions of this space. These terraces are usually wider with lesser depth which makes them suitable to protect from harsh sun but allow enough diffused light. Wider and continuous terraces are also use to connect different rooms they could be present at the periphery of building or around an inner courtyard.

'By the side' is also referred as 'br'. These terraces are always adjacent to a main room. These are extensions of these rooms by their sides.

'Bramad' means to emerge or to come outside. This is a place where someone emerges to the outside. From a private room a person emerges to the terrace to talk to people outside. This is a verb that suggests an activity, a space which reveals you.

'Bramda' (noun) also means the shade or a space before the main room.

صحن (Sehan): The Courtyard

Sehan is commonly translated as the courtyard but in Urdu language there are number of meanings that this word refers to. It is an open piece of land that is surrounded by the buildings but it also means the cross roads. Which suggests a transient space that people can walk through. It is a circulation space that allows to pass by in multiple directions.

Sehan is also an Arabic word which means 'the face'. A large amount of Urdu lexicon is borrowed from Persian and Arabic with minor alterations in meaning.

This is a space that offers a semi private social area and caters to a variety of activities such as meeting guests, having food, household servicing and even night time sleeping. This is the nucleus of the household. It is the manifestation of a lifestyle.

It is also referred as "bara" an enclosed space. A flat paved outdoor space.

بیٹّھک (Baithak): The Drawing Room

'Baithak' is commonly translated as a drawing room but the term is also used to denote the time of a meeting, when the people will gather. It is a room of reception but is also translated as a session. Therefore it suggests the temporal usage of the space that is active for a limited duration only.

It also refers to a posture of seating on ground which gives it a sense of a ritual where people fold their legs and sit together.

It also means the lower part of something as this room is always at lower and frontal part of house to make it easily accessible and separate from the private areas of a home.

چوکھٹ(Choukhat): Threshold

Synonymous Urdu terms include Dehleez, Aaghaz, Ibteda and Sang E Aastan. And the meanings include Door, Doorstep, Doorway, Edge, Entrance, Inception, Origin, Outset, Point, Sill, Start, Verge, Vestibule, Starting Point and Point of Departure.

It denotes a part of the building that is right at the entrance but it also refers to an edge of departure. It is a transition between what's outside and what's inside.

برساتی (Barsaati) : Attic

Barsaati, is also known as an attic. It is also used to denote a raincoat. Barsaat is the local name of the rainy month that matches the monsoon season. And Barsaati's meaning is rooted in the memory of rain that comes at a specific time of the year.

DISCUSSION

At preliminary level all the architecture that is designed conforms to generic problems of the utility i.e. subdivision, size, access, control etc. it is only through our association with meaning that space transcends to an experience and character. It is quite appropriate to name different types of houses by different names. For example the villa, bungalow, retreat house, hut, can suggest different styles, scales, arrangements, and also experience of similar building type. Bungalow which is single story house with pitched roof and porch at front and usually surrounded by verandas has origins in Bengal and its name is also derived from it. In Punjab the similar house type was called Bangla. All the rest houses that were built during the British rule for government officers were call 'Daak Bangla'. These were built away from towns and were similar to Bengali Bungalow except the flat roofs that were more suitable in this region. In popular language ironically any house which is quite large in size is refereed as a bungalow.

For multi-story home the term Haveli was used. The word is derived from Arabic word "hawali" which means the partition or private space. These houses were not very open towards the outside and all the activity centered towards the open space inside the building known as the courtyard. Early on these multi-story houses were different from *bungalow* but not affiliated to any architectural style. It was later that the term got associated with temples and then intricate ornamentation. Most of the *havelis* in Punjab were inspired by the Rajistani architecture with a fountain in the courtyard and delicate face work e.g. Haveli of Nau Nehal Sing in Lahore, Jangua Haveli in Gujrat, Omer Hayat Mehal in Chiniot. The general term Haveli got used to be identified with large mansions and townhouses.

CONCLUSION

It is imperative that the meaning and connotations of a language infers to the experience of space that is associated with diverse qualities. The meaning suggests its function but it could also suggest its size, location, and purpose, relation with other space / user, and reference to the local culture or lifestyle. An architect that imagines a space could be influenced by the tacit meaning of the terms that a language holds. It's very unlikely for someone to detach his thoughts from his language. Architecture is a visual language but how we describe it can have very particular impact on the visualization of other person. We can no longer dissociate our cities with housing; imbuing housing space with these qualities (at the design end, as well as in terms of the user's experience) could embed the project within its context and make it more enriching for the inhabitants, as it draws from ideas that are relatable, understandable and personal.

NOTES

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EFFECTS OF ENVIRONMENTAL FACTORS ON THE SPREAD OF COVID-19 IN INDOOR AND OUTDOOR SPACES

Authors:
KARIM M. AYYAD, HEBA HASSAN

Affiliation:
MSA UNIVERSITY, EGYPT; BENI SUEF UNIVERSITY, EGYPT

INTRODUCTION

Since the discovery of Covid-19 disease in December 2019, the world has been following the news of new cases and fatalities on a daily basis. Several statistical platforms provide the numbers of reported cases in each country and analyze the data, based on age, gender, and other demographic information. Moreover, medical practitioners and institutions have been trying to discover the modes of infection in order to educate the general public on how to prevent infection.

However, there is little research on how the environmental factors may enhance or slow down infection. The two initial modes of infection announced by the World Health Organization were direct exposure to the droplets of an infected person, and exposure to contaminated surfaces.[1] In both modes, droplets carrying the virus must enter the body through mouth, nose, or eyes. However, in a later report, the WHO stated that the virus could also be 'air-borne'.[2] This means that micro-droplets can float in the air for enough time to infect a person that was not in direct contact with the sick person who produced them. As a result, air has become a basic role-player in the transmission of the disease. Aerodynamics in indoor spaces have also proved to affect infection patterns.[3,4]

On the other hand, studies have shown that heat can help kill the virus -or at least deactivate it- in both outdoor and indoor spaces.[5,6] This happens as heat dries up the direct context of the virus, which significantly reduces its ability to survive in the environment. Moreover, sunlight also has disinfectant properties, due to the presence of ultraviolet rays.[7,8]

Thus, it is obvious that air, sunlight, heat, and humidity all affect the patterns of transmission of SARS-CoV-2, the virus that causes Covid-19. In this study, we will demonstrate the different mechanisms of their effect on virus transmission in both indoor and outdoor environments. But first, let us understand the history of interaction between people, the built environment on one hand and pandemics on the other.

About pandemics and Covid-19

Humanity has seen many pandemics throughout history. Some of them were very deadly such as the Bubonic plague which killed almost 25 million people in the 14th century,[9] and others were mild such as the yellow fever which ended no more than 150,000 lives. The current Covid-19 pandemic has

claimed the lives of over 1.8 million people as of January 1st, 2021,[10] and is still going. However, the growing global concern is due to the mode of transmission of the virus; simple human interaction such as talking to each other, or even simply existing in the same space. Therefore, it is important to understand what activities and behavior can help spread the virus, in both indoor and outdoor spaces.
The severity of the disease, its modes of transmission, and its ability to spread quickly between people, all shape the public response towards it. For example, the HIV virus which causes the on-going AIDS pandemic can only be transferred through bodily fluids, such as blood and semen/vaginal fluids which cannot be easily contracted in the environment.There must be physical interaction between an infected person and the other to transmit the virus. Therefore, the effect of the pandemic on daily lives of people is limited. People are just advised to use means of protection while taking part in sexual intercourse, and to avoid contaminated blood transfusion and sharing of personal tools that may contain bodily fluids. Perhaps therefore the number of infected persons world-wide is on the average of 35 million people in a period of more than 40 years since the pandemic started.[11] On the other hand, the Bubonic plague could infect many more people due to the variety of modes of transmission; droplets, flea bites, and exposure to bodily fluids.[12,13] The current Covid-19 disease has modes of transmission that are closer to those of the Bubonic plague, except for flea bites which is not studied yet as a possible route of transmission. As a result, the public fear of Covid-19 infection has grown and the use of protection means is expanding, both affecting people's daily human conducts.

Effect of Covid-19 on daily life

Billions of people around the globe had to change their lifestyle due to Covid-19 pandemic, either voluntarily or due to mandatory government rules. The use of masks has become compulsory in most countries, in order to be able to use certain services or merely walk in the street in some cases. Even taking a street walk was restricted in some cities for long periods of time. Gatherings such as weddings, funerals, parties, and the like were prohibited. Attending schools and colleges was halted for months. Businesses had to restrict access, or switch to working from home in many countries. Shopping for basic needs has also been done remotely in many communities. These effects on daily life are directly linked with the mode of transmission of the virus. The mere presence of an infected person near others can result in numerous new infections. Situations like this were documented, where one person -called super spreader- can infect hundreds. Interestingly, most of those documented cases were inside buildings or around them. Therefore, the dynamics of interaction between pandemics and buildings must be studied.

The environment and Covid-19

The interaction between the virus and the environment is so deep that some scientists consider this pandemic to be an environmental catastrophe.[14] The pandemic that shook the world is seen by many as a wakeup call to humanity to start taking environmental concerns seriously. In the following points the interaction between the pandemic and the environment, whether natural or built, through its different stages will be discussed.

The start of the pandemic

There is strong evidence that the virus started in a market for live wild animals in Wuhan, China.[15] The first specimen is believed to have been transmitted to humans from a wild bat through a pangolin,[16] a type of anteater. The unusual existence of these wild animals on the menu for human consumption is explained by many wildlife scientists to be due to the infiltration of human settlements deeper into the wild.[17] Many species started showing up near cities and villages, after the

disappearance of their natural habitat, only to be caught and eaten later by their dwellers. Thus, it is safe to say that the pandemic is partially linked to forest clearance and loss of natural habitat of animal species.

The spread of the pandemic

The fast spread of the pandemic that occurred in 2020 and 2021 cannot be blamed only on the fact that it is a respiratory disease. Humanity have experienced respiratory pandemics before, such as the Spanish Flu, but it did not spread in a pace similar to that of Covid-19. The main factor that made the difference today is the fact that Covid-19 is air-borne. This fact, combined with the unhealthy lifestyles that billions of people lead, have caused the fast spread. At the same time, the built environment has not been designed with the possibility of transmission of such a disease in mind. Many buildings have poor ventilation and/or depend entirely on mechanical ventilation. Such buildings have recorded a higher number of Covid-19 infections than others. On the other hand, buildings which could achieve adequate natural ventilation have a lower rate of infections. A hospital in Wenzhou, China reported having less infections when its administration decided to stop mechanical ventilation and open the windows.

Another portion of buildings do not let in adequate sunlight, helping the virus to live longer on indoor surfaces. This is due to the fact that in sunny countries, architects tend to decrease exposure to the sun in order to reduce heat gain. For the same reason, some energy efficiency codes restrict the use of glass in facades to a certain figure.[18] On the other hand, architects in cold countries tend to provide more glass in facades, but sunlight in those countries is already too weak to be effective against viruses.[19]

Effect of weather on the spread of the pandemic

This section discusses the proven effects of weather conditions on the spread of Covid-19 pandemic, either positive or negative. They can be populated as follows.

Wind

Fast wind movement can help reduce disease transmission by flushing away virus concentrations in outdoor spaces. If combined with good building design, it can also flush virus-loaded micro aerosols out of indoor spaces. Slow or stagnant wind means slower flushing for high concentration of viruses inside buildings and in narrow streets.

Solar radiation

High solar radiation can reduce disease transmission by killing/deactivating viruses on surfaces both indoors and outdoors. At the same time, it reduces moisture level in air and dries up micro aerosols that carry the virus. Low solar radiation means longer life for the virus on surfaces. At the same time, it will allow more moisture in the air and on surfaces, and will decrease heat, all enhancing the activity of the virus.

Cloud cover

Low cloud cover will allow sunlight to go through for longer periods of time, helping it trigger the events mentioned in the previous point. A high cloud cover will decrease solar radiation and thus trigger events like those in the previous points.

Temperature

High temperature can help reduce disease transmission by drying up virus-carrying micro aerosols that are floating in air both outdoors and indoors. Lower temperature levels seem to preserve the virus,[20] keeping it active and infectious for longer periods.

Relative Humidity

High RH in the air means more moisture and more condensation on surfaces. Such circumstances prolong the lifetime of the virus. A dry environment, whether dry air and dry surfaces, reduces the lifetime of the virus both indoors and outdoors.

Clear weather

Clear weather with no rainfall/snow can reduce the virus lifetime outdoors. On the other hand, rainfall means wet surfaces, which creates a better habitat for the virus. This can elongate the virus lifetime in outdoor spaces.

BUILT ENVIRONMENT AND COVID-19

During many pandemics, the built environment played important roles in preventing or slowing down their spread. By definition cities, and more precisely buildings, are the human refuge which is supposed to protect people from outside threats. However, recent studies show that Covid-19 infections are more likely to occur in crowded environments, i.e., in buildings and crowded outdoor areas. The shift of the role of the built environment from a protector to its dwellers into an inhibitor for diseases can be catastrophic. In the following points the issue is discussed with a stress on how diseases can be spread inside and around buildings.

Indoor transmission of the disease

Either at home, work, or shopping malls, one can be susceptible to a wide range of transmissible diseases. The list includes bacterial and viral infections, and in a few cases fungal too. Moreover, the type of activity carried out in each space can enhance or obstruct the transfer of certain kinds of diseases. In the case of air-borne diseases, no certain activity is required -more than mere breathing- in order to catch the disease. At the same time surfaces inside buildings can carry the live virus for hours, allowing another mode of transmission. In the next points these issues are discussed in more detail.

Indoor air

This is exactly the case with Covid-19, which can be transmitted even without the carrier being present, as micro-droplets containing the virus can float in the air for up to 30 mins. This means that an infected person can sneeze or cough in a closed space and leave, and another person can pick the virus 30 mins later. Therefore, ventilation is a crucial factor in the prevention of infection in indoor spaces. Therefore, buildings with poor natural ventilation will be riskier to stay inside. Buildings with mechanical ventilation that does not change indoor air regularly will be the riskiest, as contaminated air will keep circulating in the indoor environment for hours.

At the same time, air flow properties can greatly affect the way the virus is transmitted inside a given building. In a recent case, a group of people having lunch in a restaurant were infected by SARS-CoV-2 although the only infected person around was sitting 9 meters away from them.[21] At the same time other clients who were sitting next to the infected person did not catch the virus.

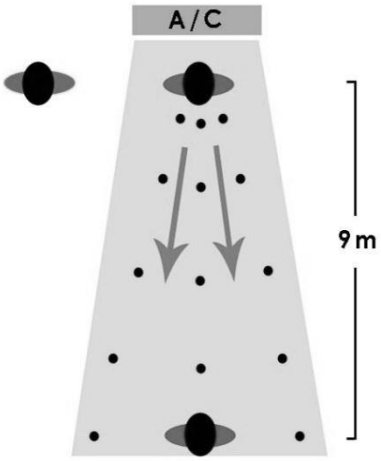

Figure1. Effect of mechanical ventilation on disease transmission. (Authors)

After investigation scientists found out that the reason was the A/C unit which was right behind the infected person. It had been blowing into the direction of the clients who got infected.[7] The powerful airflow coming from the A/C unit could help the floating micro-droplets travel such a long distance and infect people. This shows that the direction and intensity of airflow inside buildings can alter the pattern of infection, increasing the chances of infection for some users and decreasing it for others.

Sunlight

The infiltration of sunlight into a building can also have a considerable effect on the transmission of the virus. Sunlight can help reduce the viral load in the indoor environment by two ways; drying up micro-droplets that contain the virus and killing/deactivating viruses that are present on surfaces.[19,22] Therefore, buildings with bigger windows, and with higher solar exposure can be much healthier than those with small windows and low solar exposure.

Moisture

It has been proven that high relative humidity can prolong the lifetime of the virus outside the human body. This means that buildings with high indoor relative humidity will pose more risk to its users than other buildings.

Outdoor transmission of the disease

SARS-CoV-2 survives less outdoors than indoors.[23] This is mainly because sunlight is a powerful factor in killing the virus, killing/deactivating it in a few minutes. At the same time, the movement of air outdoors flushes away any concentration of micro aerosols carrying the virus. Therefore, there are very few cases of Covid-19 infection in outdoor spaces. However, the presence of many people in a small outdoor area, especially in narrow alleys with poor air movement, can pose a risk of infection.[24]

Material/Surface	Lifetime of SARS-CoV-2	Examples
Metal	5 days	doorknobs, handrails
Glass	5 days	windows, curtain walls
Ceramics	5 days	floors, vases
Wood	4 days	floors, decks, seats
Plastics	2-3 days	seats, plant pots, toys
Stainless Steel	2-3 days	bus handles, seats
Cardboard	1 day	Boxes
Aluminum	2-8 hrs	windows, soda cans
Copper	4 hrs	kettles, wires

Table 1. Lifetime of SARS-CoV-2 virus on different surfaces [25]

Hence, social distancing of 1.5-2 meters is advisable even in outdoor spaces.[26,27] This fact can alter urban design in the future, in order to provide healthier but still delightful outdoor spaces. At the same time, the choice of materials to use outdoors is of great importance, as surfaces are touched by a big number of people in public spaces. In Table 1 a list of materials and the proven lifetime of the virus on each of them is shown. It is clear that copper and aluminum provide the least habitable conditions for the virus.

RECOMMENDATIONS

In Architectural Design

Natural ventilation

Buildings must be designed to provide natural cross ventilation in each of its spaces. This would be ideally achieved without the existence of two windows in each space, one of them facing the main wind direction and the other on the opposite side. If the depth of the building design does not allow it, an inner courtyard can be introduced in the middle of the building plan in order to help create air current.

Solar infiltration

Buildings must be designed to allow in the maximum solar radiation when needed. Windows and the outer skin of the building can be flexible in design, in order to be able to minimize solar exposure during hot summers too.

Dehumidification

Buildings must be designed to reduce moisture level inside. This can help with disease transmission as well as fighting insect infestations.

Materials & surfaces

Materials on which viruses and bacteria cannot live for long must be given priority when choosing finishing materials for walls, floors and for furniture.

Semi-outdoor areas

Architects must be encouraged to add semi-outdoor areas such as courtyards, backyards, porches, roofs, and gardens in all kinds of projects. The switch to using these areas instead of indoor ones can be very useful during the times of pandemics.

In Urban design

Urban aerodynamics

Urban designers should pay attention to creating easy air flow in urban spaces around buildings in order to reduce disease transmission.

Solar exposure

Urban designers should allow maximum solar exposure in public areas, especially those with a big number of users. In hot countries, flexibility should be provided so that users can switch from sunny areas to shaded areas whenever needed.

Outdoor seating

Arrangement of outdoor seating should be revised in order to promote social distancing. Gathering of large crowds should be discouraged using design techniques.

Materials & surfaces

Priority should be given to materials on which viruses survive the least when choosing outdoor finishing and furniture.

CONCLUSION

There is strong evidence that environmental factors played a major role in the start and the spread of Covid-19 pandemic. If well-understood, the spread of the virus can be slowed down at least to some extent, saving hundreds of thousands of lives. Moreover, with the right architectural and urban design more lives can be saved in the future from similar diseases, while providing healthier living and working environments for millions of people.

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FEASIBLE SOLUTIONS FOR THE POST-COVID-19 CITY: INSIGHTS FROM THE 15-MINUTE CITY, TACTICAL URBANISM, AND SUPERBLOCK APPROACHES

Authors:
LUCA MARIA FRANCESCO FABRIS[1], FEDERICO CAMERIN[2], GERARDO SEMPREBON[1], RICCARDO MARIA BALZAROTTI[1]

Affiliation:
[1] POLITECNICO DI MILANO – DASTU, ITALY; [2] UNIVERSITÀ IUAV DI VENEZIA – DEPARTMENT OF ARCHITECTURE AND ARTS, ITALY

INTRODUCTION

The COVID-19 outbreak has affected cities across the world in monumental ways. Local and national lockdowns, physical spacing, shut-downs of public and private sectors (business, venue and schools), social mixing restrictions, face covering mandates, self-isolation measures, remote working prioritization and stay-at-home guidelines have transformed personal lives. Not only, but the pandemic may exacerbate existing global urban issues[1], such as socio-spatial segregation (i.e., the lack of inclusive communities and healthy public spaces)[2], inequality between people and territories that may result in new waves of migration from territory to territory[3], and severe environmental issues (congestion and air pollution) that can aggravate the climate change side effects[4].

The essay focuses on three current strategies proposed before the outbreak of the COVID-19 to tackle urban, infrastructure and climate issues inherited from the evolution of the global city.[5] Authors dealt with the application of measures related to 15-Minute City[6], Tactical Urbanism[7], and Superblock[8] by an analysis of the cases of Barcelona, Milan and Shanghai. The research questions are the following: Are global cities improving the quality of their urban environment and guaranteeing the "right to the city"? May the experiences of these global cities pre-COVID-19 succor health, social, and economic inequities and, consequently, may prevent the spread of infectious diseases such as COVID-19? A desk research activity and specific fieldworks carried out in the three global cities helped us to understand the way these cities have been implementing these concepts. In particular, we dealt with three main aspects for each city. First, the renewal of the existing built environment; second, governance issues in the short, medium and long term; and, third, the concerns on the possible risk of gentrification as the improvement in the quality of citizens' life may lead to the rise of real estate values.

BARCELONA'S SUPERBLOCKS

Urban Renewal

Barcelona's City Council seeks to divide the city in 503 artificial urban cells on the ground of the so-called "Ecosystemic Urbanism" principles[9]. The experiment of Superblocks[10] is about to apply in

different ways depending on the two city morphologies. First, the 19th-century Cerda's Extension, which is set up by 550 identical square blocks of 113.3 m side in an orthogonal grid of identical 20 m wide streets, with the exception of two diagonals and some minor streets. This case regards the grouping of nine square-shaped blocks of which results in a standardized 400m-x-400-m urban cell each with 5,000 and 6,000 inhabitants, and including public open spaces, i.e. streets, sidewalks and at least a square[11]. Second, when it comes to apply the Superblocks unit out of Cerdà's Extension, the size of the urban cell will be adapted depending on the existing morphology. The forecasted impacts of the 503 Superblocks on the Barcelona's citizens quality of life[12] should be the following: abatement of private motorized transport by 19.2% in order to better air quality and reduce urban noise and consequently prevent 667 premature deaths; green surface would increase from 2.7 sqm/inhab to 6.3 sqm/inhab in all Extension district area and up to 7.6 sqm/inhab in Sant Martí district; the current heat island effect in a 3x3 block would drop of about -35.9%; and public space green, blocks' interior patio's green and green surfaces would increase of 35.8%.

Strong impacts are expected with the Superblocks system implementation but it is still far from completion. Up to mid-2021, actions have been implemented just in six neighborhoods units, but the City Council took advantage of the pandemic to accelerate these measures. The launching of a competition in the late 2020 started a process that will end in 2023 to reconvert most of Barcelona's Extension in a great Superblock[13]. Supported by a public expenditure around €37.8 million, the area will be divided into 21 green hubs and 21 squares, providing 33.4 hectares of pedestrian areas and 6.6 hectares of urban green space[14]. This will mean that one in every three streets will become a green hub, and that each resident will have one of these green hubs or squares no more than 200 meters away from their home[15].

Governance

By taking into account the implementation of the first two Superblocks carried out in Poblenou (Figures 1, 2 and 3)[16] and Sant Antoni[17] neighborhoods[18], the governance of the urban renewal projects basically concerns three main features. First, Superblocks require a considerable budget availability to expand them in the entire city due to the high cost of implementation. The first Superblock in Poblenou costed 3.5 million euros (2016-2017), while the amount spent for the Sant Antoni neighborhood unit raised up to 8 million euros (2017-2019)[19]. Second, the lack of open debates with citizens in Poblenou caused protests against the poor involvement of local residents[20]. The launching of the successive Superblocks, such as the Sant Antoni one, have been accompanied by open debates with citizens. Thirdly, the overlapping of Poblenou unit to the existing built environment implied two types of issues: the mobility system showed incoherence when it changed the traffic flows without implementation in the whole system and bicycle-lanes were not fully reallocated thus generating conflicts between pedestrian and cyclists[21]. Moreover, no underground parking replaced the removed parking lots.

Risk of gentrification

Upgrading the quality of citizens' life in Superblocks implies the risk that rents inside the neighborhood units may rise and longtime residents may consequently be forced out. However, Poblenou and Sant Antoni Superblocks' market values have seemingly followed the average real estate trends, not suffered by the Superblock-operated change. The data on housing and rental costs confirm this claim. El Parc i la Llacuna del Poblenou neighborhood's price €/sqm of second-hand houses for sale grew from 3,761 €/sqm of 2016 to 4,567 €/sqm of 2020, thus exceeding the average price of Sant Martí district (from 3,382 €/sqm of 2016 to 3,541 €/sqm of 2020). Sant Antoni

neighborhood's price €/sqm of second-hand houses for sale deflected from 4,591 €/sqm of 2017 to 4,219 €/sqm of 2020, according to the changes of the average price of Eixample district (from 5,005 €/sqm of 2017 to 4,492 €/sqm of 2020). In addition, in September 2020 the Catalan Parliament passed a law regulating rent prices on new housing contracts (approved in December 2020) to guarantee accessibility in sixty Catalan municipalities, including Barcelona.[22]

Figure 1. Signals of the Poblenou's Superblock. Photo by F. Camerin (August 2017)

Figure 2. Inside the Poblenou's Superblock. Photo by F. Camerin (August 2017)

Figure 3. Works on Poblenou's Superblock. Photo by F. Camerin (August 2018)

SHANGHAI'S SUPERBLOCKS EXPERIENCE

Urban Renewal

Superblocks, or "megaplots," are the basic planning module for the contemporary Chinese developmental city.[23] With its unique "East meets West" culture, we selected Shanghai as the most emblematic case among Chinese global cities. Shanghai is implementing the *Shanghai Master Plan 2017-2035 "Striving for the excellent global city."* In this plan, the idea of dealing with health-related issues typical of superdense environments was envisioned already in 2017 with the formula "curb urban malaises" and coupled with the necessities of "flexible adaptation" and "to keep in mind the uncertainty of urban development."[24] In this perspective, we can observe the blueprint of this ambitious program, which is articulated in two dialectic points, today appearing crucial for Shanghai's future. One is to strengthen 360 degrees competitiveness at a global level, consolidating the achievements that illuminate the recent past. The other is to enhance everyday livability by realizing a human-scale built environment. The life circle concept, also named 15-minute city, permeates Shanghai's developmental agenda, aligning to this challenging aspiration.[25]

In 2016 a guidelines manual was released by the urban planning and land resources Administration Bureau. The most important aspects emerging from this document are two. On the one hand, we find the attempt of defining a benchmark for the 15-minute life circle construction as part of a broader urban renewal action. On the other hand, we read the government's will to engage communities from below, promoting grassroots participation.[26] Both factors entwine inextricably with Chinese superblocks' strategic approach to city-making, questioning, for instance, on the relations materializing between neighborhoods supersizing and communities' accommodation.[27] Hou and Liu found that, in order to fit with the concept of 15-minute city, an urban portion should cover between 3 and 5 km^2 and host a population of 50 to 100 thousand people.[28] In the same year, 2017, the first comprehensive research on the 15-minute city applied to Shanghai appeared in a book collecting data from interviews, questionnaires, and practical implementations.[29] The Master Plan for 2035 portrays a scenario in which Shanghai will drastically increase the presence of public space across the city: providing parks and squares covering over 400m^2 within 5 minutes walking distances; furnishing inhabitants with at least 4 m^2 of community public space per capita; distributing 99% of public facilities within 15-minutes walking distance in communities; and reducing to 2,5 km the average travel distance for the daily life needs.[30]

Governance

The 15-minute city strategy is still in its experimental phase, and some criticalities already emerged. For instance, in Guangzhou, Zhou found that the implementation is imposed with excessive uniformity regardless of local differences.[31] The principal reason resides in the spatial characteristic of housing compounds that substantially repeat ubiquitously and generate homogeneous urban environments. Indeed, since the proclamation of the People Republic, Chinese urban living depends largely on superblocks' construction, renewal, and governance.[32] Superblocks-made cities like Shanghai result in fluid public urban forms where the human scale becomes approachable within the scale of megaplots, which host gated housing communities. (Figure 4, Figure 5, Figure 6). Literature on Chinese urbanization as the development engine is vast and covers domestic social issues[33] as well as global impacts.[34] The standard implementation, barely altered by local and circumstantial variations, consists of a simple sequence of actions: the government who owns the land sells the use rights to developers, who, in turn, built and sell the dwelling units to inhabitants. A complex issue will emerge in the following years, considering that land leasings for housing purposes usually last for 70 years. The first tranches of housing use rights will expire soon, and what will happen in terms of

housing properties is still uncertain. It will undoubtedly impact the harmonious construction and governance of human-scale superblocks and their capacity to integrate the 15-minute concept.

Risk of gentrification

The last two decades of urban planning generated undoubtedly positive effects on Shanghai city life if considered from a general perspective.[35] Two symbolic data, measured over the previous ten years, synthetically portray its transformation trajectory. On one side, urban green space decisively grew, passing from 120.148 to 157.785 hectares in 2019. On the other side, investments in real estate development more than doubled, shifting from 1.980 million yuan in 2010 to 4.231 million yuan in 2019.[36] However, the impressive numbers of the real estate industry, which also encompass the paradoxical phenomenon of ghost towns,[37] coupled with housing problems for a large slice of the population, mainly the migrant workers. Such issues remain substantially unsolved, facilitating Shanghai's turbo-development to generate striking frictions, i.e. unfair compensations, people relocation, and even homelessness.[38] The economic shift started with the open Doors Policy introduced capitalistic mechanisms on the statal stewardship of urban land, turning the housing industry into speculative real estate activities. Forbes reports that some neighborhoods in Shanghai have risen prices by 40% in the last five years.[39] Gentrification and speculation are two reasons why Shanghai Master Plan 2017-2035 set the goal of realizing at least 8% - 10% of housing dedicated to low-rent housing, public rental housing, common-property rights housing, and resettlement housing.[40]

Figure 4. Typical Chinese Superblock seen from outside. Shanghai, Minhang District. Photo by G. Semprebon (2018)

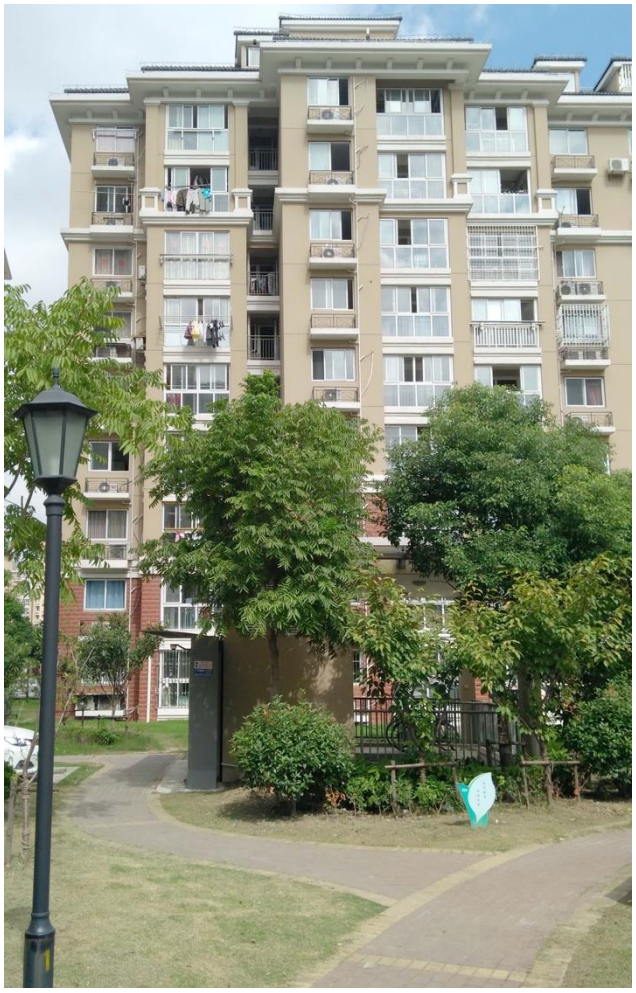

Figure 5. Typical Chinese Superblock seen from inside the gated community. Shanghai, Minhang District. Photo by G. Semprebon (2018)

Figure 6. Typical Chinese Superblock seen from inside a housing unit. Shanghai, Minhang District. Photo by G. Semprebon (2018)

MILAN'S OPEN

Urban Renewal

Compared to the size of many others global cities, Milan city proper, in terms of both area and population, is quite small[41]. Despite the small scale, problems of connections, access to local services and availability of public open areas are emerging, highlighted by the pandemic. This led to the adoption of the 15-minute city principles as a possible solution to these issues, implementing urban strategies that were already ongoing before the pandemic, since 2012, when the new PGT[42] *Piano di Governo del Territorio* (the new city master plan) was adopted. The master plan included the identification of the NIL *Nuclei di Identità Locale* (Local Identity Cores), which were an in-depth mapping of eighty-eight areas characterized by a strong local identity, much smaller than the administrative division of the city of Milan into nine sub-municipalities. The goal was to underline local problems and specific needs[43], focusing on public services, green areas, safety and schools. A second element in the urban renewal process of these identity cores appeared in 2018, with the adoption of the *Piano Quartieri* (Neighbourhood Plans), an annual program to allocate economic resources to local intervention. This instrument included the *Piazze Aperte* program (Open Squares),[44] a project developed in collaboration with Bloomberg Associates, NACTO (National Association of City Transportation Official) and Global Designing Cities Initiatives[45]. It aimed at revovering and increasing public spaces using Tactical Urbanism tools that consist in fast implementing[46] and low-budget intervention[47] to modify the public spaces, mainly re-organizing the car circulation and parking using temporary and movable urban furniture or ground paintings. After the first two intervention decided by the Municipality in two peripheral areas (Dergano and Corvetto), fourteen more followed in 2019 (Figure 7). At the end of 2019 the second edition of *Piazze Aperte* was open to proposals from citizens and local associations, who submitted 65 proposals, when the pandemic occurred. The administration took the new scenario as an occasion to propose some more radical changes. Following the previous Tactical Urbanism experience, they released a programmatic document called *Strade Aperte* (Open Streets),[48] where the 15-minute city is mentioned and proposed the immediate realization of 22 new km of cycling paths using the Tactical Urbanism tools (Figure 8). The document also introduced the following *Delibera Tavolini* (Dehor Tables Act), which consisted in the possibility for bars and restaurants owners to occupy public surface free of charge, even subtracting parking and part of the road. (Figure 9)

Governance

The Tactical Urbanism positive aspects are many: it is fast to build, it requires small budgets and its flexibility allows choices that are more radical and adjustable in a sort of *learning-by-doing* process. Nevertheless, some negative aspects may occur. The temporality of the interventions is sometimes related to fast-decaying solutions and the short-term modifications risk to become ineffective if they are not transformed into permanent solutions in a medium-term perspective.

Also, the local and public urban strategies for the renewal of the city of Milan contained in the PGT, and its recently adopted update called 'Milan 2030', are just a part of the planning, which tend to promote the public-private cooperation at many levels. Massive and more traditional recent urban transformations, including green areas and public facilities, are to be addressed to private investors, both in real estate (*CityLife Area*, *Garibaldi-Porta Nuova Area*) or cultural fields (*Fondazione Prada*). The benefits of having public infrastructures provided by private investors appears to be good in the short-term, but in the long-term is hard to say what kind of effect they will have on the local cores of the NIL, starting from the appearance of gentrification phenomena.

Risk of gentrification

Even though usually market prices go in parallel with the local improvements of citizen's life quality, Tactical Urbanism actions may not have excessively influenced the real estate market values. Looking at the average cost for sqm in Corvetto area, the variation from 2014 and 2020 doesn't appear to be significant, passing from a range of 2,700-3,900 €/sqm for a second-hand house in excellent conditions to a range of 2,800-3,600 €/sqm. In the same span of time the average price of the *Farini-Isola* area rised from 3,500-4,400 €/sqm to 4,300-5,600 €/sqm, This area, which was a semi-central residential area, surrounds the new luxury district of *Garibaldi-Porta Nuova* (whose average prices were almost constant in a range of 7.000-9.5000 €/sqm),[49] suggesting a correlation with the proximity of the new public (and fancy) infrastructure built and maintained by private developers.

Tactical Urbanism interventions could be less effective on the housing market values for many reasons: they are small-scale projects, often requested by local communities and their attractiveness is limited to the neighborhood scale. Their fast and not expensive realization allow developing a vast number of projects at once, reducing polarization effects. Their main purpose is to provide services to the people of a specific area and not to emphasize forms of 'competition between districts'.

Figure 7. The cycling lane adopted in Corso Buenos Aires (one of the main city axis), created reducing the space for motorized traffic. The new lane is separated from the cars by parking stalls for cars and scooters. Photo by R.M. Balzarotti (2021)

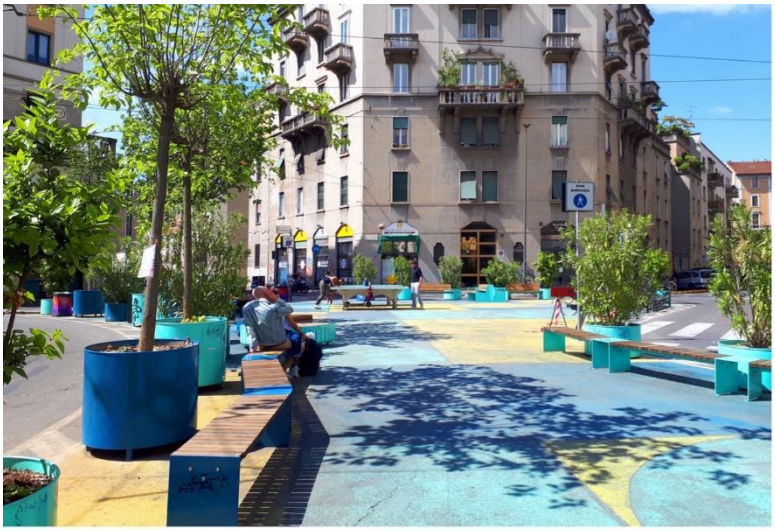

Figure 8. One of the first Tactical Urbanism intervention in Milan created a small pedestrian 'piazza' by subtrating space from a chaotic crossroad, facing a school in Via Spoleto. Photo by R.M. Balzarotti (2021)

Figure 9. The reorganization of via Borsieri allowed bars and restaurants managers to offer large outdoor spaces in one of the most vibrant neighborhood (Isola). Photo by R.M. Balzarotti (2021)

CONCLUSION

The analysis based on aspects related to urban renewal, governance and risk of gentrification of urban interventions promoted by three Global Cities in a changing world shows diverse features.

First, the implementation of the 15-Minute City, Tactical Urbanism, and Superblock has started before the pandemic outbreak in dense compact neighborhoods, giving the open spaces back to the slow mobility. These solutions, despite being different actions applied to diverse contexts, provide healthier urban environment that may prevent the spread of infectious diseases such as COVID-19. This is why architects, planners and public authorities claim that the transaction recovery from COVID-19 should start from the city.[50]

Second, recent surveys[51] found that air pollution, social vulnerability, and extreme weather conditions are vectors of the transmission rate of the virus. Global cities like Barcelona, Shanghai and Milan, which are experimenting high levels of air pollution, severe socio-economic inequalities and climate change impacts, have been trying to put sustainability and resilience at the core of their urban transformations to sort inequalities, climate change and pollution out. The COVID-19 pandemic gave city authorities the chance to accelerate these experiments with traffic-quietening initiatives, extending cycle lanes and creating new pedestrianised zones. Long-term exposure to air pollutant concentrations is contributing to chronic lung inflammation, a condition that may increase the severity of Covid-19 effects.[52] Reducing the reliance on cars is vital to enhancing Global Cities' liveability, along with tackling lower life expectancy and premature deaths due to environmental issues.

Eventually, in the frame of the so-called 'post-COVID-19 city', the city is radically redefining modes and forms of being together. Physical distancing will characterize social interactions in presence for a long time to come, and this will require new combinations of the physical and temporal dimensions of urban social life with the aim of meeting diversified social needs in spaces capable of promoting collective well-being and accessibility. The research on three Global Cities in a changing world is a first approximation of the understading of the role that new urban design solutions (15-Minute City, Tactical Urbanism, and Superblock) play in mitigating the effects of COVID-19. Notwidstanding growing research on post-COVID-19 cities in the field of urban studies,[53] large public surveys should be released by the public to give a more comprehensive outlook of the post-COVID-19 city.

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THE SPIRIT OF PLACE: HOME, WORK AND THE SPACE BETWEEN (PHENOMENA HEIGHTENED BY COVID-19)

Author:
KENNETH CONZELMANN, CHRISTIAN CAMACHO, THEA KHABELASHVILI

Affiliation:
CITY UNIVERSITY OF NEW YORK, USA

INTRODUCTION

Since the start of the COVID-19 pandemic, we are facing a reimagining of the home and the workplace. In fact, the office is essentially an invention of the 18th century, as prior to this, besides farms, shipyards, factories and the like; there was no "office". But today many of us are working from home via virtual methods in a place meant for the domestic side of life. This home place comes with its own “spirit of place” or “place psyche” which should allow for an informal relaxed environment. Adam Scharr, Lecturer at the Welsh School of Architecture, and author on the works of philosopher Martin Heidegger wrote:

“Building Dwelling Thinking was structured around two questions: ‘What is it to dwell?’ and ‘How does building belong to dwelling?’ Heidegger claimed dwelling to be a peaceful accommodation between individuals and the world…”[1]

For many people, this private domicile has now become the ersatz platform and setting for public activities and engagement typically conducted via in-person interactions like school, business, and health care. Melissa Kirsch, an assistant editor for Culture and Lifestyle in the New York Times, describes:

“Home has not just been refuge; it’s been office and classroom, exercise studio and movie theater. And the furniture: Kitchen table became school desk; the sofa a therapist’s couch; the bed, perhaps, a sick bed.”

There is also the phenomenon of the 'third place'. For many, this entails the commute from home to work: the subway, the bus, the commuter train, the car, the bike ride, the walk to work, or the airplane flight for weekly meetings in DC. For those travel methods which result in carbon release contributing to global warming, yes, this is a good thing for them to be shut or diminished.

But our daily experience of the interstitial space - the time and space in between - that *“big-mix”* realm between our homes and our workplaces and beyond, can be a vital source of cultural, social and community connection, engagement, inspiration, and growth.[2]

This paper will look at the current COVID-caused reconfigured world and its impacts on our built environments and its effects on our physical, emotional, mental, psychological, and sociological wellbeing.

Home / Work (Pre-Industrial)

Figure 1. Moxihatetema Village, Yanomami Indigenous Territory, Brazil

The word home has various interpretations and translations throughout various cultures, which bring to mind different meanings.[3] In the United States, there is a fallacious notion of what the word "home" means to Americans. In the suburbs, the image of the green lawn, white picket fence, pitched roof, and a driveway for a car comes to mind. To those in rural areas, home may be a trailer, farm, or barn. In cities, it may be an apartment, penthouse, townhouse, or loft. Regardless of what their location is, one thing is usually common amongst American homeowners, which is that the meaning of home is an extension of them. Susan Clayton, an environmental psychologist at the College of Wooster, says:

"For many people, their home is part of their self-definition, which is why we do things like decorate our houses and take care of our lawns. These large patches of vegetation serve little real purpose, but they are part of a public face people put on, displaying their home as an extension of themselves."

Amazonian tribes such as the Munduruku, and the Yanomami would not understand the concept of home in the same way as an American. These tribes would most likely refer to the rainforest as their "home", but not as a way to project an image of themselves onto society, but rather as a place where they are an integral part of the rainforest's ecosystem. These tribes understand their environment in an incredibly intimate way, indescribable to westerners, that allows them to co-exist with their "home".

One thing that we can agree on, regardless of language or culture, are the common concepts that lay within the idea of a home. Let's consider these concepts to be safety, protection, security, and the ability to thrive. In the concept of 'Work' normally one would think about this word in direct connection to making a profit, making a living, having a career, etc. In the case of a city dweller, it would be something that provides monetary stability in order to live and thrive. In the case of a hunter in the Amazon, the idea of work is much different, opposite to the concept of home, it is a concept of survival – where hunting or fishing a meal for the next couple of days, can be considered "work".

With the advent of cities starting with Mesopotamia (c. 3100 BCE), the concept of home and work began to have interesting dynamics. It would have such infrastructural, agricultural, and bureaucratic advancements, that it required citizens to work particular jobs to keep the city running.[4] In an article published by the BBC, Agustin Chevez and DJ Huppatz, from the Swinburne University of

Technology in Melbourne Australia claim that the idea of the "office space" is actually not such a new idea:

"The origins of the modern office lie with large-scale organizations such as governments, trading companies and religious orders that required written records or documentation. Medieval monks, for example, worked in quiet spaces designed specifically for sedentary activities such as copying and studying manuscripts. As depicted in Botticelli's St Augustine in His Cell, these early "workstations" comprised a desk, chair and storage shelves."

Similarly, in the early Middle Ages (c. 10th century CE) the idea of live/work spaces began to develop. Specialists such as metallurgical artists, weavers, glassblowers etc., tended to live in or near the spaces that they worked and sold their merchandise. In the case of blacksmiths, they were considered to be highly valuable due to their ability to manufacture weapons and tools in a time where iron was scarce. Their skills granted them with the protection of kings, often living and working within the castle walls. [5, 6]

Work (Industrial Onset)

Figure 2. History of American Agriculture.

In the United States, prior to the industrial revolution the home was mainly constructed around the concept of farming and agriculture. In 1790 the total US population: 3,929,214, farmers made up about 90% of the labor force.[7] In Europe, smiths, printers, cobblers etc. continued to live above or behind the space in which they worked, with their workspace acting similarly to what we would consider to be a store front today.

In her book "Housing and Dwelling", author Barbara Lane includes an essay by Dawni Freeman entitled "Home and Work: The use of space in a Nebraska farmhouse" which describes the continuous expansion of the farming industry beyond the homestead:

"The influence of farming on the home also had significant implications for my Aunt and Uncle's interaction with the wider community. Great distances separated individual farms and farmhouses and the gaps are expanding because of changes in farming technology…[But] these great distances are surmounted by attachments to a common community."[8]

The idea of live/workspaces in agricultural and city settings soon changed, beginning in Great Britain with the first industrial revolution and later in the United States with the second industrial revolution.[9]

Home and Work (Separated)

Figure 3. Workers Housing in the 19th Century. Levittown, Long Island, NY and 1950s Mid-Town Manhattan

As cottage industries began to outgrow their home-based shops, larger manufacturing buildings were planned and constructed. Heavy industries began to proliferate around the world, creating industrial work belts, regions planned for and dominated by major and massive factories and manufacturing.
The industrial revolution required that home and work be divided into geographically separated places, due to the incompatibility of specific requirements needed for "at-home" daily tasks and "at-work" daily tasks and consequences such as pollutions (noise, air, water, land) forced the two to divide.[10] This created a space, a physical realm, which acted as a conduit connecting home and work and created a place that generated its own infrastructure, economy, culture, and lifestyle.
Work and home eventually reached a point where they were completely separated, both physically and mentally. Manual workers were able to retreat to their homes, to cleanse themselves of the day's filth from labor. Office workers too returned to their homes for mental cleansing, rest, and refreshment and to ponder and reflect on the events of the day. One of the ideas behind the Villa Savoye, conceived of as a "machine for living", was to create a place where one can cleanse themselves of a day's work, and enter a place of rest.

Figure 4. Villa Savoye / Le Corbusier. Johnson's headquarters in Wisconsin / FL Wright.

The Space Between or The Third Place

Figure 5. Grand Central Station. The Scientific American (journal), 1913

As the physical distancing of home and work increased, it inherently created a space between – the commute – "the big mix" - which needed to be utilized in order to transport people from their homes to different places in and around the city, whether it is for their job or for leisure. The space between became the infrastructure that we know today, existent around the world. New York City is a great example of a robust infrastructure that moves people every day. It is comprised of streets, sidewalks, ferries, subways, railroads, bridges, bicycle routes, and the list goes on.

COVID-19 Strikes

Figure 6. 7th Avenue NYC, Parks and Chelsea Market.

Covid-19 confined most people to their homes making the physical commutation to the workplace unnecessary, if not dangerous, thus leaving city streets, and the spaces between, empty. Office

buildings, schools, shopping centers were virtually abandoned. Restaurants, cinemas, theaters, museums around the world were closed. Public squares, mass transit and sidewalks found few users. NYC emptied, “the great exodus”, for those who could. People of the world were on high alert, with uncertainty, at home.

We Watch, We Protest, We Learn, We Adapt

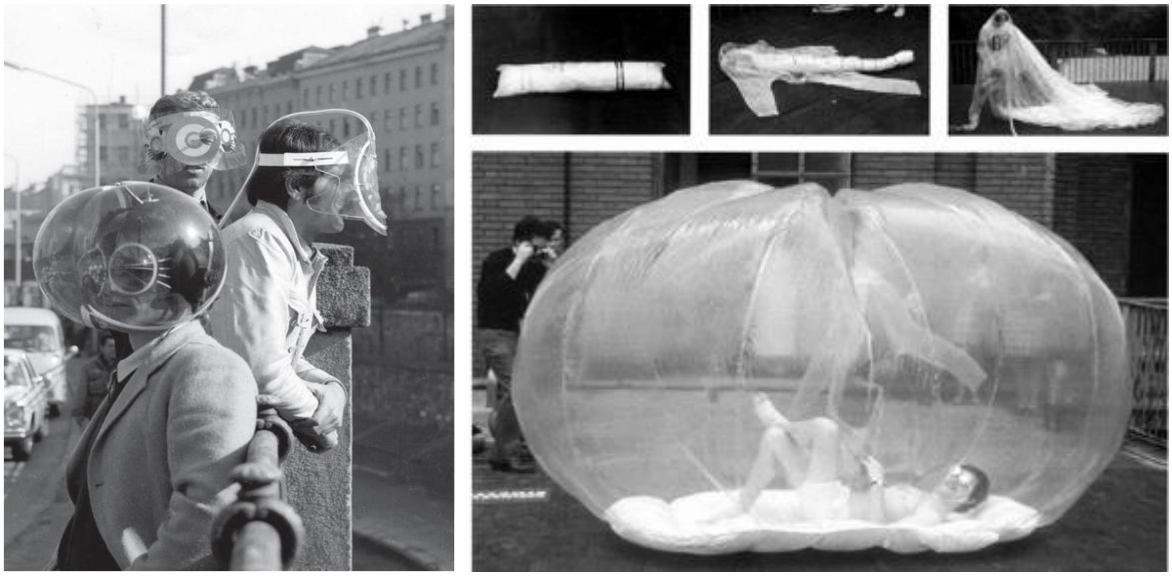

Figure 7. The Mind Expander / Flyhead Helmet, Haus-Rucker-Co, 1968. Constructed Suitaloon, Michael Webb, 1967.

Federal, state, and local government health authorities, essentially learning on the job, issued protocols to help prevent the spread of disease which included face coverings and physical distancing from one another with a 6-foot minimum. Remaining indoors and isolating oneself and one’s family was initially recommended, only to be reversed, that it was proven to be safer in the open outdoors, distancing from each other in fresher air. Concerns of indoor air quality (IAQ) became of utmost importance forcing assessments of existing conditions, mechanical equipment systems and their efficacy and upgrades. The great outdoors was once again having a field day, as the world was becoming physically conscious, ultra-aware of their position and actual standing in the built and social environment. Acronyms formed and flourished: PPE (personal protective equipment) for general daily use and JEDI (justice equity diversity inclusion) became mantras amidst protests and riots. Conformity, patience, and kindness were part of the sought after daily new-normal. Virtual tele-conferencing for remote work, school or socializing was the alternative, like it or not. Dining shacks, sheds and bubbles began to pop up across the city, encouraging diners to eat outside where the air is good. The great outdoors has its moment, once again.[11]

NYC identified and declared certain residential streets as “Open Streets”, streets which were closed to through traffic, but open and useable to and by local residents. Movable barricades were provided to stand at the street entrance to reduce traffic flow and allow for more outdoor space in the streets for the community. This allowed and encouraged communities to engage, help protect and make safer their immediate outdoor environments, strengthening a sense of ownership and self-responsibility. Successful initiatives like this are strongly encouraged to take on a more formal implementation.

We Innovate

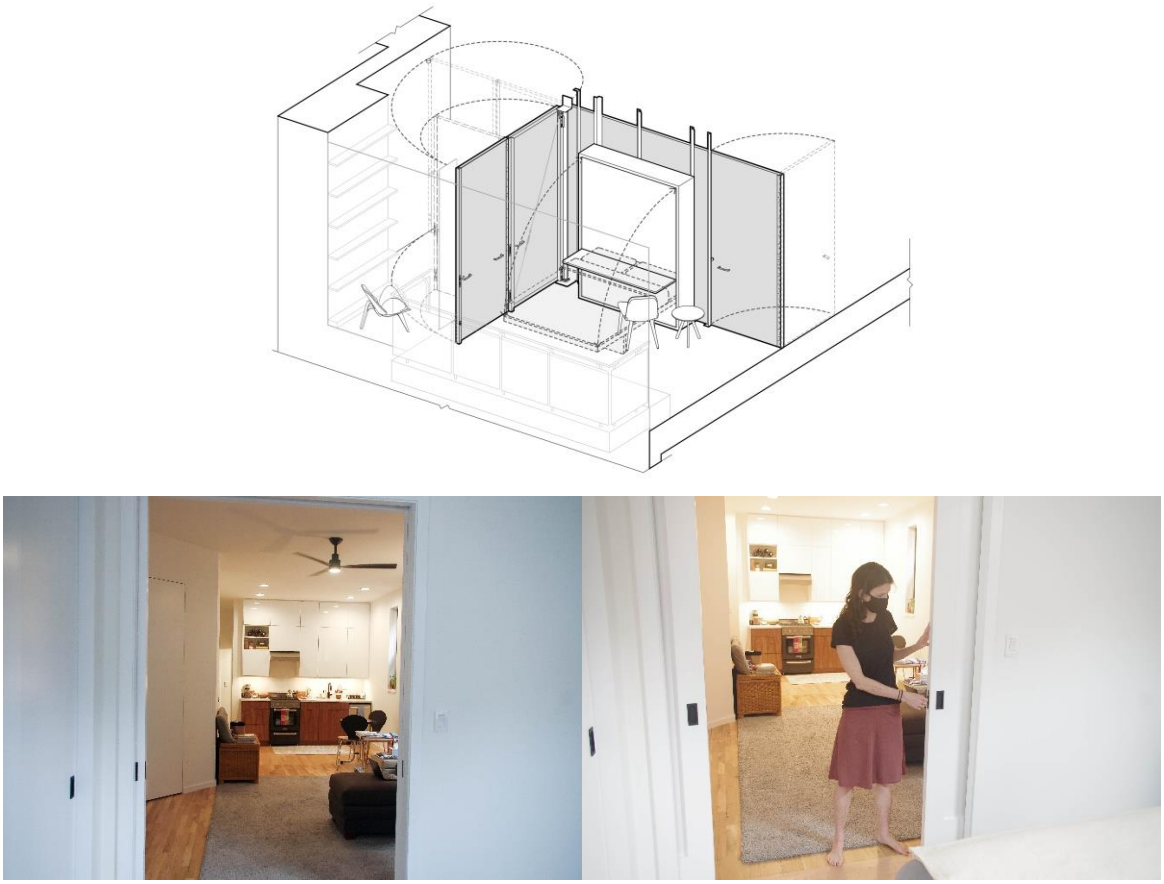

Figure 8. The flexible / adaptable home. top: Christian Camacho of System Architects. bottom: K. Conzelmann and OWO Architects.

So, the question becomes, how does a physical space or place, form, inspire, and influence our mental, emotional, and psychological "posturing"? Can the qualities and conditions of a physical space encourage a mind-set framing to best approach specific chores, decision making and creative endeavors? How does putting on a necktie or a pearl necklace, walking around the block and returning to the bedroom to video conference call meet with a client, or to teach a class, help to conjure this psychological transformation in one's own mind, as designing and implementing a physical transformation for a "designed work from home space" can help accomplish?[12]

The pandemic has affected the way we experience things. For example, the ways in which we experience our homes has changed. It has forced architects to become innovative with their designs. The operable wall partition depicted in this image is one that divides a living room and a small bedroom/conference room. It can fold itself into various positions, allowing for private and semi-private conditions depending on what is needed throughout the day.

Another consequence of the pandemic is the "collapse of space" between our homes and the outside world. Museums, galleries, zoos, parks have been brought into our living rooms via innovative virtual methods, supporting an engagement and continuation of the cultural discourse. The Digital Immersive Experience, DIE; Virtual Reality, VR; Virtual Augmented Reality, VAR: these have become commonplace for many. Thus, via perception manipulation and controlled environment, the way we interact with the world, and ultimately perceive ourselves, is changing. And that our physical

infrastructures, the servers, the cables, the power sources, and the energy grid, have become the essential nervous system driving our cities and world.
On-line virtuality transports the world, bringing people together from around the world, into one world, in one room.
At this point, we can introduce the notion of The Fourth Place, a dimension enabled by a device in nearly everyone's pocket, with the power to collapse all spaces and places into one, virtually.

We Envision: The Big Picture

Figure 9

With a renewed and charged awareness of what makes for a healthy and smart city, we prepare for an estimated 68% of the world's population to be living in urban centers by 2050, compared with 54% in 2016, which translates into an approximate increase of some 2.6 billion people expected to join our urban centers.[13]
Our cites are considered the best form of human civilization development: compact, dense, sharing essential resources in close proximity. But in order for these creations to succeed, the infrastructures and technologies must be clean, sound, resilient, and environmentally, economically, and socially compatible, and flexible, and at the ready to adapt and evolve as needed.
In addition, allowing the "wild" to re-enter our cities is crucial in helping to maintain a healthier biodiversity. Currently our way of developing cities, especially NYC, disregards the possibility of its multitudes of species to begin co-inhabiting the environment with us. What if we implement E.O. Wilson's Half-Earth Theory to the way that we build cities? He states:
"A biogeographic scan of Earth's principal habitat shows that a full representation of its ecosystems and the vast majority of its species can be saved within half the planet's surface. At one-half and above, life on Earth enters the safe zone. Within half, existing calculations from existing ecosystems indicate that more than 80 percent of the species would be stabilized."
Interesting to note, according to Hannah Ritchie's 2019 article for Our World in Data, humans make up only .01% of earth's life.

Our ENVISION “To Do” list sampling:

1. Eliminate use of all fossil fuels (coal, oil, natural gas) for buildings, manufacturing, transportation, food trucks etc. We work to develop, install, and utilize 100% renewable energies.
2. Reduce vehicular infrastructure/roads and paved surfaces etc. We work to build more bicycle lanes and infrastructure and pedestrian-friendly, communal, green natural environments with-in dense urban settings.[14]
3. Combat urban heat island effect, improve water management, air quality, and accommodate more wildlife. We work to install green roofs.
4. Eliminate noise pollution from harmful distressing shrill of siren alert sources (ambulance, fire, rescue, police) and construction and maintenance practices (jackhammers, trash trucks etc). We work to develop alternative alert systems and drone technology for ambulance, fire, rescue, and police, and construction and maintenance practices.[15]
5. Empower our cities to empower its people, at Home, Work and In-Between.

CONCLUSION: We Act

Figure 10. The DIA Chelsea, NYC.

We continue to observe, identify, and align with earth's own essential orders and systems and respect the ways of nature and its absolute efficiencies, emulating its processes, and allowing in our own minds and psyche the notion and understanding of deep, geologic time. The essential adage "change is the only constant", this we can take to heart and respect this approach as it holds great wisdom and opportunities for betterment, where nothing is taken for granted.

NOTES

[1] Adam Sharr. *Heidegger for Architects.* London: Routledge, 2010, 36-37.
[2] Paul Goodman, *Communitas,* New York : Columbia University Press, 1990, 162-163.
[3] Barbara Lane, *Housing and Dwelling,* New York, Routledge, 2006, 62.
[4] "Daily Life in Ancient Mesopotamia" *World History Encyclopedia*, accessed August 10, 2021, https://www.worldhistory.org/article/680/daily-life-in-ancient-mesopotamia/
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THE RECONSTRUCTION OF AL NURI MOSQUE IN MOSUL: STRATEGIES AND TOOLS FOR REINVENTING THE MEANING OF PLACES

Author:
TOMMASO LOLLI

Affiliation:
UNIVERSITÀ DI ROMA, ITALY

INTRODUCTION

The city of Mosul, the second largest in terms of population in Iraq, has recently become known in the news as the last stronghold of ISIS in the battle against the Iraqi regular army. The conflict, which (apparently) ended with the battle of Mosul in 2017, has, however, left extremely significant wounds in the fabric of the city: firstly, in fact, ISIS had as a programmatic objective the destruction, almost iconoclastic, of the monuments – a dystopian interpretation of Rossi's intuition[1] that identified precisely in the monuments and in the city the locus of collective memory is not remote, and that the monuments were destroyed precisely to eliminate the memory of the city. This cancellation of memory has involved extremely important monuments, such as the central mosque of Al Nuri, the minaret of Al Hadba, the mosque of Nabi Djirdjis, but also monuments outside the perimeter of the Old City, such as the temple of Imam Yaya, Nabi Yunis (where the prophet Jonah is believed to be buried) and the entire city of Nineveh, the ancient Assyrian capital and Mosul's true urban counterpoint on the opposite bank of the Tigris River. Secondly, the armed conflict has also caused less monumental and surgical damage, but of similar impact: since the small streets, often *cul de sacs*, of the Old City offered easy shelter to ISIS militiamen, the regular army has resorted to an almost "Haussmannian" strategy, bombing from the opposite bank of the Tigris without a specific target, causing, in fact, a *tabula rasa* of the portions of the city facing the river.

The state of destruction can be clearly seen in the survey produced by UNESCO in 2018 (fig. 1), in the document Revive the spirit of Mosul[2], which, for the first time, attempts to take stock of the consequences of the conflict and provide operational tools for a revival of the Iraqi city, elaborating an interpretative framework of the situation.

This paper takes as its theme the call of the competition, also announced by UNESCO, for the reconstruction of the Al Nuri Mosque, the city's main mosque, to be held in 2021, in which we participated with a group of students from the Politecnico di Milano, in the broader context of a Thematic Studio (a design workshop during the final year) themed on reconstruction in Mosul.

Figure 1. UNESCO's report upon destruction in Mosul Old City [V. Dogari – N.Bello Melo]

Although belonging to different worlds (the university as an experimental field, and the competition as a concrete solution), the decision was to proceed with a verification of the knowledge developed during the academic year, in accordance with the functional requirements of the competition notice, while always trying to have a demonstrative attitude – which will be described in more detail in the following paragraphs – considering the case of the Al Nuri mosque as emblematic for the reasoning on the reconstruction of certain monuments in the city of Mosul. As stated in the competition documentation, "the reconstruction of this important landmark is of utmost importance to send a strong signal of resilience and hope, as a first step towards social cohesion and reconciliation in post-conflict Iraq. Indeed, historical sites and monuments are not only a scientific tool of knowledge, but they also represent a powerful symbol of belonging, community, and identity, whose rehabilitation will facilitate recovering the memory of the Moslawis that once felt part of a vibrant and emerging city".[3] Just to give a brief indication of the requirements of the functional envelope foreseen, the competition provides: the reconstruction of the Prayer Hall with the same volume and figure as before; the insertion of an educational complex composed by a secondary high school and an advanced center for Islamic studies; the recovery of the Al Nuri Sahn (courtyard); the addition of a Festival hall for 200/300 people; the prevision of administration facilities for the whole complex.

THE MOSQUE OF AL NURI

Historically, the construction of the Al Nuri mosque coincides with the consolidation of Mosul's urban structure: the city, of Islamic foundation and therefore started out as a military camp (a garrison town), took its final form under the Zengid dynasty (1127-1259 AD) with the construction of some fundamental elements in the definition of an Islamic settlement: the walls, the Souq, the citadel and, indeed, the central mosque, which was placed in the new center of gravity of the city, on the road linking the main gate of *Bab Sindjar* to the bridge over the Tigris. Regarding the Mosque – although

this precaution could be extended to the entire city of Mosul – there are few certain sources: the most important is the volume by the German archaeologist Ernst Hertzfeld[4], which indicates as the period of completion the years 1170-1172 AD, thus under the reign of Nur al-Din[5]. While the authenticity of some things is not in doubt in a strictly material sense – such as the *mihrab* – for other components one can only be certain of their positional role: the historical fabric of Islamic cities is often an extremely modifiable component[6], and sometimes so are the monuments themselves. Hertzfeld speculates that at some point the Mosque building was so large that it also included the entire courtyard, being able to accommodate the entire population of Mosul inside it, but there are no traces of this. The situation described – and noted – by the archaeologist corresponds to the first cartographic restitution (1906) of the building, and is configured as a basilica body – horizontal, as opposed to the verticality of Christian basilicas – composed of two naves, one of chapels and a main one, onto which the dome is grafted at the level of the *mihrab*. There are also many structures built around the perimeter of the enclosure: from residential superfetations to monumental elements such as the Al Hadba minaret (the "hunchback") and the tomb of Al Nuri. Between 1945 and 1950 the complex was profoundly modified: the mosque loses its marked horizontality, it is shortened on its sides and a porticoed volume is added overlooking the courtyard; the perimeter of the courtyard is cleaned of its previous volumes, leaving only the highly monumental emergencies such as the minaret and Al Nuri's tomb; the entrances are redesigned, no longer on the sides but facing south; etc... In essence, the mosque loses its component of urban fabric, to become to all intents and purposes a monumental emergence (this historical phase is also the one to which refer to the UNESCO competition for the reconstruction of the original volume and figure). In 2017 – after Abu Bakr al-Baghdadi decreed the birth of the Islamic State from here in 2014 and later ordered its destruction – only a few fragments remain: a few columns, fortunately the dome, but only the memory of the overall structure and the minaret.

Figure 2. Aero photo in 2017. The mosque and minaret (in black), and the three courtyards proposed (in white)

OBJECTIVES AND STRATEGIES

The violent and authoritarian breaking of the connection between collective memory and its symbols cannot but require a further effort from the discipline of architecture, which must abstract and determine a conceptual plan of action that holds together various instances: from the ability to

emotionally recall belonging to a place, making certain mnemonic and perhaps unconscious links resonate, to the ability to design (in latin languages there is a common etymological derivation from the verb to project, *progettare* and *proiettare*) new scenarios for the future. In this limbic condition, we considered useful to bear in mind Carlo Aymonino's definition of the project-program, as an intermediate design device between the project, in the concrete sense, and regulation: one of the objectives of our response to this competition is identifiable in the desire to explore a design field by delimiting its conceptual margins (a sort of operational perimeter) without remaining on the regulatory plane: instead highlighting and carrying certain volumetric, spatial and, above all, figurative issues that can be a tangible response to specific questions. "The possibility therefore of reversing the current practice between project and regulation should be extended to the point of reversing the current relationship of cause and effect: it is the project-program that no longer determines a regulation but a 'rule'. [...] It makes it possible to accept multiple hypotheses of development and to determine within these hypotheses one particular development, which becomes a 'mandatory forecast'. [...] It is a question of developing a series of concepts and relations that are reversed in partial and differentiated solutions precisely through the project".[7] If on the one hand it is legitimate to note the uniqueness and specificity of the physical damage to the Al Nuri Mosque, on the other hand it is necessary to know how to contextualize this situation in a more general panorama: Aleppo, Raqqa, Baghdad, Erbil... the fragility of the heritage of humanity is an unfortunately widespread condition, and the occasion of a reconstructive project must be seen as a synthesis of a methodological reflection on the processes and priorities in these contexts. In this sense, the design solution becomes the representation of more general settlement and regulatory intentions, aspiring to be understood as a sort of methodological *manifesto* of an approach that can plausibly be generalized to other situations, in act or in potential, as a gesture of disciplinary responsibility.

THE PROJECT

The entire Old City of Mosul, and in particular its central part, offers a certain promiscuity in the contamination between neutral and monumental elements, and this is also the case for the area in which the Al Nuri Mosque is located. Prior to the project, therefore, a reconnaissance phase was initiated to understand the entities involved in this area, with a conceptual division between monumental pre-existences, non-monumental permanences and invariant type-morphological elements. The monumental pre-existences can certainly be traced back to the remains (but also to the volumetric absence) of the mosque, the absence of the minaret (of which, however, the large base remains – and of which UNESCO will conduct a reconstruction “as it was”), the presence of the tomb of Al Nuri; in addition to these, there are other artefacts which, although built with the modernizations carried out between 1945 and 1950 – and therefore lacking a strictly archaeological/monumental value – participate in equal measure in the overall idea of the pre-war mosque: the corner entrance, formed by three pointed portals, and the ablution pavilion in the courtyard. The non-monumental permanences refer instead to the residential fabric, substantially filling in the unbuilt spaces around the mosque over time: for example, the group of houses in the north-east part and the entire western block. Of the latter, only three residences have remained partially standing, preserving their perimeter footprint, typological layout and, rarely, their distributional systems.

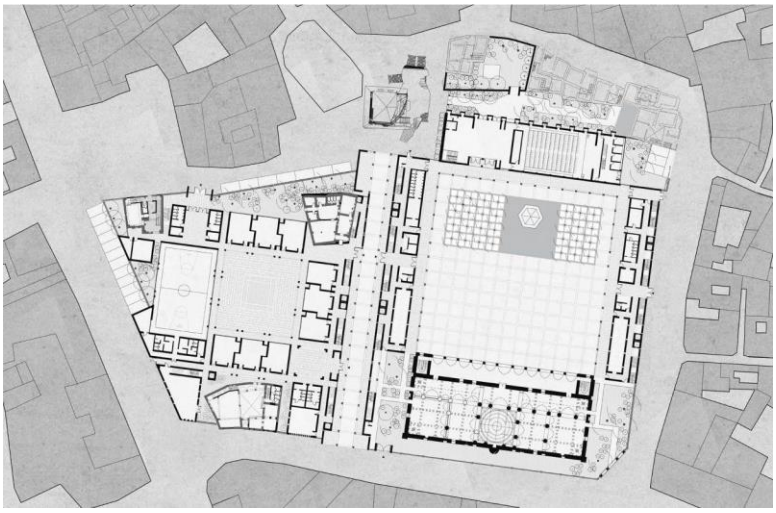

*Figure 3. *Plan for the competition call. In the left part the school complex, in the center the void related to the minaret, in the right the mosque's complex and courtyard.*

The type-morphological invariant is, however, the enclosed settlement structure – as is evident from the non-monumental remains themselves. Both the western block and the mosque clearly present this characteristic, which becomes a relevant element in the interpretation of the built space. In the economy of this reconnaissance phase, the only element that is poised between various historical-spatial justifications is the minaret, straddling the two areas but without a space of its own – as evidenced by the irregular course that the mosque's boundary wall makes to incorporate it. With this pretext, it was thought possible to insert another linear void in correspondence with it. (fig.2)

The design

The project, therefore, starting from the first layouts identified during a montage phase, adapts the planimetric intuitions to the actual conformations of the area and with the quantities indicated in the call. The west side hosts the two planned schools, united in a single architectural organism that identifies its unitary matrix in the courtyard, around which the classrooms are arranged on two floors. In the accidental areas created by the non-monumental structures, collective services such as the library, individual study rooms and the complex's cafeteria are located. In the center of the building is a transitional volume with a dual role: on the one hand it is a hinge-empty to allow a passage of meaning between the school complex and the mosque complex[8], and on the other it creates a respectful space to frame the minaret in perspective (figg. 3-4). The mosque complex is developed in the entire right-hand portion of the intervention, around a square-shaped courtyard whose sides echo the dimensions of the mosque building, thus relying on the identity of the building to determine its representative role. On either side are two linear elements enclosing the courtyard, below which are the new ablution rooms which act as a filter for the entrance to the mosque. On the north side, the complex's auditorium, the festivity hall, is located, and a garden is developed around Al Nuri's tomb, as a reworking of an Islamic Garden.

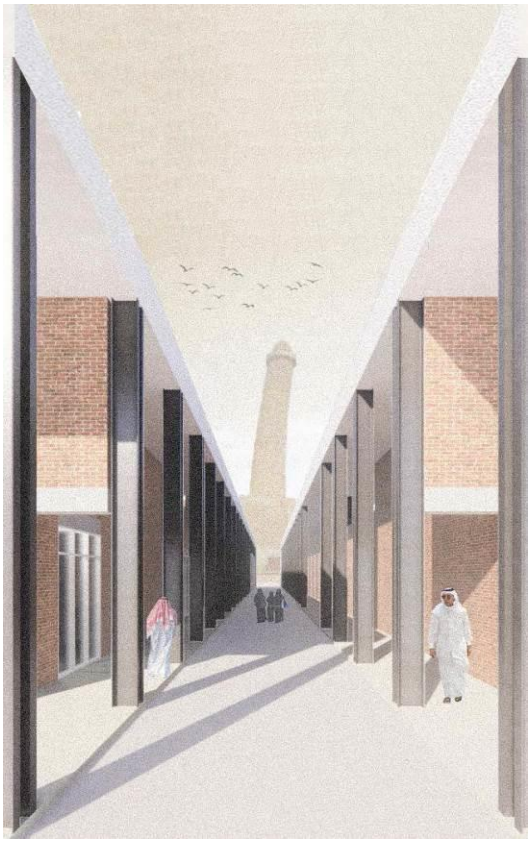

*Figure 4. *The view of the Minaret.*

The building of the Mosque is based on the desire to maintain the proportions and volume of the destroyed building, assimilating its original distribution logic, and incorporating its lasting remains. In order not to risk a mimetic reconstruction, the balance between continuity and discontinuity (which is necessary, as the preservation of memory also requires emphasis on certain scars) is entrusted to the new roof and the development of the façades. The roof is slightly detached from the wall perimeter, emphasizing the structural support system, a frame of beams that absorbs the rhythm of the pillars of the mosque. The façades, on the other hand, reinterpret the scanning of the destroyed masonry (fig. 5), maintaining its image but altering its substance: some openings are closed and extruded beyond the line of the masonry; the pilasters, instead of extruding, dig into the façade.[9]

The result is an architectural complex that articulates structures with different functions – educational, public or religious – around a hierarchical system of courtyards, in which the orthogonality of the newly designed volumes mediates between a refined contrast with the pre-existing buildings and the morphology of the urban fabric; moreover, it attempts to confirm, in an interpretative key, the typical density that structures the relationship between full and empty spaces, a frequent feature of cities of Islamic foundation. Interpretation, re-elaboration and restitution, also by means of formal contrast, is however responsible for elaborating a strategy in balance between continuity and discontinuity, articulating a series of questions, including:

- Identification of the maintenance value of the architectures, i.e. the will to preserve what maintains the possibility of having not only a memorial but also an operational role in the social patterns of a community, without having excessive reverential/archaeological fear at the expense of the experimentality of a vital design solution.

- Insertion of a conceptual and physical gap between the new and the old. The project promotes the clear recognition of the parts that make up the building: in the plan respectful

*Figure 5. *View of the façade from the street and section on the courtyards.*

gap is maintained between the orthogonality of the new volumes and the pre-existing buildings, monumental or not. This void makes it possible to clearly recognize the matrices of origin of the parts of the building. But just as constants are "absorbed" at the settlement level (alignments, typological structures, settlement mechanisms), so too, at the figurative level, elements are taken up and re-elaborated that allow the operation of summation of the parts into a single reference whole.

- Balance between autonomy and heteronomy in accepting the morphological structure of the city: given the centrality of the project area, it was considered necessary to identify a link with the form of the city, an elaboration of the project alignments to favor a harmonious relationship with the context. On the other hand, the project itself is characterized by a marked orthogonality and parallelism according to the layout of the mosque building. The result, poised between respect for urban layouts and an autonomous geometric rule, recalls a settlement mechanism typical of Islamic contexts: think of some of the most famous structures in the history of Islamic collective architecture (the great mosque of Isfahan in Iran, the madrasa of Sultan Hassan in Cairo, Egypt, etc.): the rule is set by the internal courtyard, which respects determined proportions – which in turn carry an iconographic and iconological value – while on the perimeter are positioned service and/or accessory volumes, which have the architectural task of mediating from the regularity and representativeness of the center and to weld with the randomness and irregularity of the surrounding urban margins.[10]
- Monumental remains as compositional fulcrums: the pre-existing monuments become central points for reconstruction, not only in their rehabilitation as closed buildings, but also and above all as reference elements in the articulation of a public and collective space around them. Thus, the mosque building dictates the side of its own afferent courtyard, as much as the presence/absence of the minaret becomes the inhabitable margin that unites and separates the two east and west wings of the entire complex.
- The functional adaptation and rehabilitation of buildings become not only technical interventions, but figurative expedients: like the best Italian post-war tradition (Carlo Scarpa's Castelvecchio, BBPR's Castello Sforzesco, etc.)[11], the structural and technological additions maintain a linguistic register different from the original building, but not completely autonomous: the same technical structure (be it a structural or distributive apparatus) interprets some characteristics of the building of origin, but it self-denounces itself as an "addition" without disappearing into the host structure.

*Figure 6. *Bird-eye view of the all complex.*

CONCLUSION

The response to the call was an opportunity to conceptually measure some of the tools related to architectural operations in contexts that have suffered a high level of monumental destruction; the case of Mosul requires a considerable design effort, as well as an emotional one, in order to hold together all the instances involved in the reconstruction. On the one hand, the need for the place emerges, to recognize its deepest meaning and to manifest it through the enhancement of what makes up the architectural space. On the other, the desire to convert memory into a narrative mechanism that represents absence, a conceptual and practical operation that restores a value of livability alongside the maintenance of collective and historical memory.

From this point of view, the process that guided the development of the project, although often icastic, has the value of wanting to set itself up as a tool for reflection on an architectural process and experimentation with a method, rather than on the project as a response to an individual need, so as to tickle and stimulate operational reflection on events, unfortunately, central to the recent past and to the current civil and social tasks of the discipline of architecture.

* The groupwork was composed by D. Chizzoniti (team leader), H. Pessoa Pereira Alves, Q. Wang, T. Lolli, F. Menici, A. Salihbegovich, A. Abdelhafez, N. Bello Melo, V. Dogari, R. Khatibani, R. Lallemant, Z. Ma, R. Mishieva, S. Qiu, G. Scotto, Y. Shi

NOTES

[1] Aldo Rossi, *L'architettura della Città [The Architecture of the City]* (Milano: il Saggiatore, 2018), 170-172.
[2] UNESCO, *Revive the Spirit of Mosul* (2018).
[3] UNESCO, *Reconstruction & Rehabilitation of the Al Nouri Complex in Mosul* (2020), 8.
[4] Ernst Hertzfeld and Friedrich Sarre, *Archäologische Reise im Euphrat – und Tigris – Gebeit*. (Berlin: Verlag Von Dietrich Reimer).
[5] Theories confirmed by more recent studies as: Yasser Tabbaa, "The Mosque of Nur al-Din in Mosul", *Annales Islamologiques* 36, no. 1 (2002): 339–360.
[6] Stefano Bianca, *Urban form in the Arab World* (London: Thames&Hudson, 2000).
[7] Carlo Aymonino, *Il Significato della città [The meaning of the city]* (Venezia: Marsilio, 2000), 46-48.
[8] Franco Purini, *Comporre l'architettura [How to compose architecture]* (Roma-Bari: Laterza, 2009)
[9] This process of iconographic reworking is similar to the one used by Robert Venturi and Denise Scott Brown for the Sainsbury Wing in London, is part of a transformation that keeps the data of the original organism legible. cfr: Robert Venturi and Denise Scott Brown, "The Sainsbury Wing of the National Gallery, London", *Zodiac* 6 (1991): 90–115.
[10] It is interesting to confront this idea with: Colin Rowe, "Program vs. Paradigm: Otherwise Casual Notes on the Pragmatic, the Typical, and the Possible", in *As I Was Saying Vol. 2*. (Cambridge: MIT Press, 1999), 7-41.
[11] But also, in the whole European context of the post WWII (for example, the Koldinghus Castle by Johannes Exner), cfr. Guido Canella, "Conservazione, Restauro, Rivitalizzazione, Reversibilità" [Conservation, Restoration, Revitalization, Reversibility], *Ananke* 38 (March 2003): 101-104.

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CHANGING THE CITY, KEEPING THE CONTEXT

Author:
LINEU CASTELLO

Affiliation:
FEDERAL UNIVERSITY OF RIO GRANDE DO SUL, BRAZIL

INTRODUCTION

It is rather disconcerting to follow the extraordinary growth of urban populations across the planet, accompanied by a strong tendency of such populations choosing *cities* as their preferred *habitat*. Scholars seem to agree that planet Earth already has more than seventy percent of its inhabitants represented by *urbanites*, that is, by humans who live in urban environments. They also claim we have arrived at an anthropocene period in Earth's history, when human activity started to have a significant impact on the planet's climate and ecosystems – predisposing an ill-fated period of human-caused environmental impairment. Conspicuous problems of the Anthropocene are particularly intense in cities, in which billions of urban people aim at reaching harmonious conviviality through the use of urban *places* – which, sadly, are getting progressively scarcer.

This single paragraph exposes two of the most dreaded questions involving *cities in a changing world*: continual urbanization growth; its consequences upon the design of urban environments (or, more rightly, upon their required re-design).

The paragraph also sets a path for fixing the major objectives of this paper, namely, to proceed a selective revision on the following items:

(i) to collect elaborations on urban-architectural theoretical current themes;
(ii) to review formerly known city-design principles, relating them to altered urban situations;
(iii) to consider innovative practices, tailoring them to new urban circumstances.

Modern urbanization takes place on a world so technologically advanced that urban societies now are beginning to experience their everyday practices in new *behavioural* spaces. Chances are that they will produce their new material needs in new *spatial* arrangements. Hence, it is within the professional responsibilities of urban designers, planners, and architects to deepen on investigating which are those new behavioural spaces, and which will be their newer spatial arrangements. This is what this paper is about.

SEARCHING FOR NEW DIRECTIONS

Given that urban places are favourably located in *cities*, it seems only logical to realize that our area of urbanism faces a shortage in options to deal with the severe dearth on the creation and distribution of new urban *places*. *Place*, on the one hand, is a central topic in which to fix the major contents of the paper, observing it also intends to add the innovative plus of incorporating statements typical of the *sustainability* agenda, an aspiration not sufficiently highlighted in most contemporary studies of

cities. Changing cities, on the other hand, involves two instances focussed on two simple basic actions: *to invent* and/or *to-reinvent places*.

Accordingly, recent literature in urbanism seems prodigal to offer practical examples of these two actions, investigating them under two of their most visibly urbanistic facets, i.e., 'placemaking' in the first case, and 'resilience' of disused spaces in the second. In my personal writings I have observed the presence of both facets and assessed them under two of the major spatial configurations they eventually determine: the production of newly invented places; or the reuse of renovated resiliencies.

Actually, the overall picture stirred by this idea is not difficult to envisage. It suffices to recall the 'imaginary' of well-known urban-architectural symbols, such as, for example, Disneyworld at Orlando (USA) or Pudong at Shanghai (China), in the first case; and NY-High Line or London-Tate Modern, in the second (Figures 1 and 2).

Figure 11. Production of newly invented places. Shanghai, Pudong, a view from the Bund. Photo: Author

Figure 12. Reuse of renovated resiliencies. London, Tate Modern. Photo: Author

A quick recall on such images brings to mind interesting morphological features of contemporary urban design, one implying the introduction of new fragments to a consolidated urban fabric (though managing to keep under control any ensuing disorganized sprawl); and other of reusing urban land turned vacant by the obsolescence of certain uses (though adjusting the land as newly integrated functional fragments).

All in all, the focus of the paper concentrates on examining human performances materialized through the physical pattern of places – a typical phenomenological view to interpreting urban forms[1]. Places are indicators of quality in public spaces, seen as intangible metrics that give a public space a sense of place[2]. Indeed, it is the view of many that places are the *salt and pepper* of a city, pleading for the production of cities well-seasoned with places morphed through experiences motivated by perceptual stimuli.

Now, all of this deserve further investigation because *sustainability* and *resilience* are intricately intermixed in all discussions – and both play crucial roles calling for deeper examination in contemporary urbanism theory – hence, they make an interesting goal to be added to this paper commitments.

The central assumptions of the paper will consider latent urban innovations, observing their presence both in global cities (such as London) as well as in global south cities (such as Porto Alegre, south Brazil).

FROM URBAN-ARCHITECTURAL THEORY

Evidently, the paper will necessarily need to rely on some selected feedback extracted from the core of urban-architectural theoretical principles. As far as urban sustainability is concerned, two of the discipline's classic urban-architectural research directions will monitor the debates – urban development and environmental sustainability. How to cope with urban development whereas keeping effective environmental sustainability? Certainly, attention with this key-question is greatly needed within the Anthropocene city affairs. Also, a subject to be seriously examined in this paper. Furthermore, independently from development and sustainability, the paper also intends to highlight a rather overlooked preoccupation: the idea that there is a strong influence of human behaviour upon environmental issues. This brings a significant point to be added to the city's contemporaneity list of questions, i.e., the need to incorporate some psychological filtering to the discussions of the city's overall intrinsic contents. Now, it is more than evident that a bridge between the two areas – urbanism and psychology – must be attempted to arrive at a novel paradigm of environmental sustainability, capable to bring together the physical and psychological characteristics so closely inherent to the urban-architecture field. Ultimately, it should be remembered that urban development is not just about ensuring the permanence of the *physical* environmental conditions; in the discussions about environmental 'problems', the arguments should also include a joint concern with eventual psychological and environmental dissimilarities. To 'sustain' the elements responsible for assigning meanings to a certain urban space – especially in areas where identity is so consolidated that people perceive them as *places* - it is essential to weigh them in contrast against sustainability goals. Rapid consultations to my bibliographical readings allow me to speculate on three classic assumptions for the enhancement of the environmental quality of urban life: technical; political; and humanistic.

Technically, the focus implies a quest for spatial planning alternatives believed to best add to the built environmental features. This will surely encompass a re-examination of key actions typical of the *theory of place*.

Politically, the focus stresses on how urban design has been managing with the creation of urban places, and to accommodating global strategies within local realities. This apparently also sets a direct

call for actions from the *theory of place*, an area solidly rooted upon the public perception of environmental qualities, as experienced by their users. Moreover, in our area it is fundamental to discern the distinctive role played by the political segment, as far as electoral policies are concerned: in reality, certain urbanism proposals have proved to be more concerned with electoral triumphs than with communitarian achievements.

The *Humanistic* dimension, conversely, adds up some difficulties, since the dimension is strongly affected by a complex phenomenological susceptibility, hence requiring more sophisticated paths to become more satisfactorily interpreted. One fundamental directive, however, suggests the establishment of a comprehensive citywide network of public spaces, though this would encompass the difficult mission of 'creating' places, i.e., to detect urban spaces believed as capable to offer qualified opportunities for life experiences. Once more, strategies of the *theory of place* seem right to be called into scene since they perform quite positively towards obtaining this sort of goal.

Ultimately, all three variables unquestionably converge to a single direction: *the convenience to make use of references from the theory of place*. Therefore, from a rapid consultation to a list of classic urban-architectural beliefs, the supportive role forwarded by the theory of place gains more relevance.

FROM CITY-DESIGN PRINCIPLES

As mentioned earlier, one of the purposes of this paper is to re-examine leading city-design principles, relating them to some new morphological urban situations presently experienced in contemporary cities. Having in view the innumerable changes that are currently entering into the area of urbanism, it is possible to distinguish a considerable flux of incoming methods, with some of them consistent enough so as to establish new ordinary routines. One of such methods includes the use of recent achievements in the area of *placemaking*. Ideally, the making of a place merges design and management, both crucial factors for the efficient planning of today's urban features. Notwithstanding the sheer physicality of a place, the concept itself irrevocably entails one deep philosophical connotation, as observed by prominent authors of the field, like, just to mention a few, Edward Relph, Edward Casey, David Canter, David Seamon, Yi-Fu Tuan, Christian Norberg-Schulz, David Grahame Shane, Françoise Choay, Matthew Carmona.

Indeed, in the last 100 years or so pundits of the area have intensively theorised about the possibilities of urban design for the creation of new places for purposes of facilitating communities' benefits. Some, like Shane, have restrained their views solely to the years post 1945, due to the harsh destructions inflicted during war times. Others, like Françoise Choay, have dedicated their reflexions to freely elaborate on conceptual paradigms, deepening debates on the roles of *rationality* versus *culturalism* in urban design issues. Lately, rapturing innovations were progressively introjected into the area by postmodernism thinking, like the ones keenly compiled by Nan Ellin in her specific collection of texts (1999).

Still under the heading of city-design principles, some essential manifestos taking place between the Modernism and Postmodernism movements must also be mentioned, one technical and one conceptual. Among the technical ones, the considerable amplitude in the size of the various design schemes receives more attention, in view of the scale variations that involve dimensions, since those comprising an entire city (as it was common in Modernist times) to the layout of smaller districts (like the Postmodern comprehensive projects designed to create new urban places, as previously outlined). Besides, on the conceptual side, new tendencies such as the employment of *invented places*[3] end up by bringing considerable changes to the overall conditions of the built environment, a trend intensively approached by postmodernist authors notably, Rem Koolhaas, a real champion of creating iconic environmental landmarks.

Also in the conceptual side, it is also important to remark the revived concern towards supporting the maintenance of *contextual* features that characterize the urban fabric. This is yet seen as an innovative practice, and as so, it will be addressed more properly in the following section.

FROM INNOVATIVE URBAN PRACTICES

Nowadays - times when many communications take place in the instant formats of 'streaming media' - it would not be surprising that the stimuli emitted by the energy of a place could somehow 'leak' into its adjacent spaces, thus opening opportunities for the creation of a *new* 'place'. I usually illustrate this phenomenon by showing a photograph I have taken while visiting Tate's Modern, in London, displaying an undeniable 'creation' of a *new place* just beside the neighbouring edge of the gallery (Figure 3).

Figure 13. London. Leakage of the 'place' Tate Modern to its surroundings. Photo: Author

Slowly, but with persistent regularity, the first decades of the 21st century have already accumulated a collection of stimulating innovative urbanism and planning schemes. Fortunately, contemporary literature has already dealt with at least a few of them, managing to gather some interesting propositions giving way to new revolutionary concepts. The present section will focus on a selection of a small number of promising ground-breaking new methods, among which I will give prominence to a threesome that captured more attentively my considerations. They are all representative of the environment-psychological bias I am used to follow in my research works and have been identified in the literature through denominations such as 'loose space'[4]; and 'tactical urbanism'[5]; to which I include certain new phenomena I personally call 'placeLeaks'[6]. Essentially, they all aim at focusing upon *attitudinal urbanistic operations*, manoeuvres that can enhance the pragmatic possibilities of designing in a 'place-friendly' mode, envisioning a sort of, say, 'placification' in the urbanism schemes.

A good hint for acquiring a deeper knowledge about those novelties is to follow the perception of how the experiences of everyday life happen (i.e., *take place*) in today's cities[7]. This encourages me to continuing with my particular 'method' of observing and annotating innovative schemes that call my attention (i.e., that stimulate my perception mechanisms) as I visit new contemporary urban environments, seeking to explore *how* and *where* do the schemes happen (and rather more boldly, *why*

they do happen). This has been proving quite acceptable for my understanding of the revamping of some monotonous urban sites thoroughly revitalized in cities I have been visiting in my research works, a tactic proving recurrent to operations envisaging to adjust the grain of the design of cities to the *zeitgeist*.

ADDITIONAL COMMENTS

Ultimately, two predominant factors governing present-day debates on cities' contemporary forms should be recognized, namely, *sustainability* and *resilience*, both very much correlated to the conceptual understanding of *place* postulated here. At the end of the day, sustainability also has to do with controlling the outward expansion of the city limits, by smoothly integrating newly designed *places* into the city consolidated fabric, thus regulating the dreaded consequences of unrestrained urban sprawl.

On the one hand, s*ustainability* involves the engagement of sustainable development measures in urban policies. It is, *per se*, a rather complex idea enthusiastically supported by many professionals, though only fully understood by a few. It has to do with the 'Sustainable Development Goals' (SDGs) born at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012, in which "the objective was to produce a set of universal goals that meet the urgent environmental, political and economic challenges facing our world"[8].

On the other hand, *resilience* implies the preventable disposal of constructed resources. In other words, it aims at preventing the premature discarding of unnecessary dysfunctions brought about by causes associated to functional decaying. Resilience offers the possibility to introduce new fragments to an already established urban fabric, by reusing obsolescent spaces and buildings, a practice of urbanism becoming more and more popular under the aegis of *placemaking* (complemented by intelligent schemes of *placemarketing*).

In addition, resilience also offers possibilities for the revival of urban celebrated elements, which contributes enormously to the preservation of the urban fabric's *contextual sustainability*, a practice recently reintroduced in the professional works of certain firms[9], a view increasingly supported by important urban thinkers, like Michael Sorkin[10].

Within this reasoning it becomes possible, then, to conjecture that by 'radiating' ('streaming') the energy from a place to its interface, chances are that this 'energy' may help to generate a *new* place.

To this end, I will keep up with my local observations of innovative initiatives that I have been annotating when I examine their appearance in contemporary urban environments and proceed with an investigation of their causes. This refers to the perception of contemporary manifestations displayed by cities, which, under the phenomenological perspective, help to explore the innate ability of a consolidated 'place' to generate, in its own interfaces, the conception of new other places emulated by their nearby neighbour. In present times - times when many communications take place in the instant formats of 'streaming media' - it would not be surprising that stimuli emitted by the energy of a place could somehow 'leak' into their adjacent spaces, thus forwarding opportunities for the creation of a new 'place'. This opens the possibility to conjecture that by streaming the energy from a place to its interface, chances are that this energy may generate a *new* place.

The present section intends to register contemporary visions about places in my way of understanding places, i.e., as "(…) a created environmental form, imbued with symbolic significance for its users"[11]. Therefore, now seems a timely occasion for transcribing citations that refer to the growing importance of the topic in significant literature titles. A few of them seen as important for linking places to changing cities, will be listed below.

- Maarten and Dassen offer an important contribution. “In the following decades, we will need to strongly ‘decouple’ the prosperity of the city from the use of resources. By and large, we need to find ways to create the same sort of wealth and welfare with only a tenth of global greenhouse gas emissions”[12]
- Franck and Stevens in their Loose Space advance the ever-greater prominence on methodological guidelines for progresses in the study of placemaking-cum-city design[13].
- Hambleton, of the University of Bristol, encourages an approach called place-based urbanism, a theoretical breakthrough that strongly supports the meaning of place He stresses: "(...) the general point I wish to draw out is that, in line with other studies, like the ones by Tuan (1977) and Castello (2010) mentioned earlier, places have significant meanings for people"[14].
- Washington Fajardo, curator of Brazil at the 2016 Venice Biennale, registers the growing appreciation the theme of place is receiving in my country and in the world, saying: “There is no more depreciated wealth and resource less used in Brazil than place. Good places are foundations for small and medium businesses, for the proximity trade, for supply network of public services, for the real estate market, for generating jobs, for cultural development, for the environment, for people's quality of life”[15].
- Thomsen[16] transcribes an interview with the sociologist Zygmunt Bauman and his daughter, the architect Irena Bauman, who note that for planners there is much to learn from the new behaviours of today's urbanized society, unveiling good methodological alternatives. They speak with some optimism about the notion of 'collaborative consumption', which they attribute to the prodigious possibility of spreading, in the contemporary city, the idea of sharing responsibilities.
- Kevin Thwaites et al, a team of researchers dedicate their efforts towards investigating what they call Experiemics. An interesting remark here is the register of a new analytical category, which I call ‘placeLeaks’, meaning the spatial overlap of a ‘loose space’ with the more established places at its interface. Implied in this thought there are at least two curious theoretical assumptions, suggesting that a substantial reasoning can be learned from the everyday life experienced at the edges of places. Thwaites et al. quote: "Castello calls this property placeLeaks, a kind of energized catalytic characteristic possessed by some edge settings …”[17]. Another assumption would be that proactive urbanistic actions should endorse the opportunities of ‘morphologically designing’ the transitional edges established at the interface, turning them likely to absorb change.
- Lerner[18] supports that changes to a community do not need to be large-scale and expensive to have a transformative impact and celebrates urbanism initiatives that flow through a community to uplift city life.
- Wolfe[19], in his well-known book, offers a colourful display of interesting images of a phenomenon he calls ‘urbanism without effort’, which I tentatively visualize as Figures 4 and 5.

Figure 14. Sometimes even a simple glance at a townscape is enough to reveal the potent presence of the local 'genius loci', as in these photographs of a region called '5 Terre' in Italy. Photo: Author

Figure 15. Urbanism without effort in Vernazza, Cinque Terre, Italy. Photo: Author.

Finally, to conclude, an anecdotical but thoughtful remark reasoned by Andrés Duany, signalling to the contemporary practice of a so-called *tactical urbanism* (Foreword).

Two wholly new urbanisms have emerged to engage the circumstances of the twenty-first century: Tactical and XL (or Extra Large). This pairing shows that Rem Koolhaas's prescient formulation of S, M, L, and XL projects is incomplete. It is missing the XS: the Extra Small category represented by Tactical Urbanism (. . .) decentralized, bottom-up, extraordinarily agile, networked, low-cost, and low-tech[20].

NOTES

[1] David Seamon, *Life Takes Place: Phenomenology, Lifeworlds, and Place Making* (London: Routledge, 2018).
[2] As interpreted by Fred Kent, long time responsible for the American institution PPS-Project for Public Spaces,
[3] In the words of Jan Sircus,"Invented Places", in *Urban Design Reader*, ed. M. Carmona et al. (Oxford: Architectural Press, 2007) 126-129.
[4] Karen Franck and Quentin Stevens, *Loose Space. Possibility and diversity in urban life* (London/New York: Routledge, 2007).
[5] Mike Lydon and Anthony Garcia, *Tactical Urbanism*. (Washington: Island Press, 2015).
[6] As explained by Kevin Thwaites, Alice Mathers and Ian Simkins, *Socially Restorative Urbanism. The Theory, Process and Practice of Experiemics*. (London/New York: Routledge, 2013).
[7] A methodology largely employed in the works of authors such as Kevin Lynch and Gordon Cullen, recognized for having pioneered on more humanitarian views to urban planning.
[8] United Nations Conference on Sustainable Development, Rio de Janeiro, 2012, accessed January 2021. https://sustainabledevelopment.un.org/rio20.
[9] Like the office of Allies and Morrison (2014), in London, in whose terms: "(. . .) every building has a context that it both depends on and contributes to. That context isn't just a physical framework. It can be historical. It can be legal. And it can be strategic". Accordingly, one must "Never look at a building as a singular object" as expressed by Graham Morrison in his speech at the awards ceremony of the Urban Design (won by his firm), reinforcing the conceptual view of the firm's attitudes about contextual sustainability in urbanism.
[10] Michael Sorkin, who championed social justice through architecture, died at 71 from coronavirus. https://www.washingtonpost.com 2020/03/30. Sorkin disclosed that cities, as unfolding terrain of invention, are also a means of accommodating disparity, of contextualizing sometimes startling juxtapositions.
[11] Lineu Castello, "Place". in *Encyclopaedia of the City,* ed. Roger Caves et al. (London: Routledge, 2005) 350-351.
[12] Maarten Hajer and Ton Dassen, *Smart About Cities* (Rotterdam, 2014) 29.
[13] Franck and Stevens, 2007.
[14] Robin Hambleton, *Leading the Inclusive City. Place-based Innovation for a Bounded Planet* (Bristol: Policy Press, 2015), 84.
[15] Washington Fajardo, "Lugar é Recurso" (Place is Resource). Newspaper El País, January 11, 2016. http://brasil.elpais.com/brasil/2016/01/11/opinion/1452541540-276196.html.
[16] Henning Thomsen, "Planning Must Help Us Change Our Lifestyle" (Interview with Zygmunt Bauman & Irena Bauman). In *Conversations on Housing & Planning*. *IFHP-International Federation of Housing and Planning Centenary Congress London.* Arkitektur DK, Kopenhagen, 18-23. Special Edition (limited circulation), 2013.
[17] Thwaites et al, 21.
[18] Jaime Lerner, *Urban Acupuncture, Celebrating Pinpricks of Change that Enrich City Life*. (Washington, Island Press. 2014).
[19] Charles Wolfe, *Urbanism Without Effort*. (Washington: Island Press, 2019).
[20] Lydon and Garcia, *Foreword by Andrés Duany,* 2015, xi-xii.

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URBAN (E)QUALITY: PERCEIVED URBAN QUALITY AND NEIGHBORHOOD SOCIOECONOMIC STATUS

Author:
ROSENGREN, KATRIINA

Affiliation:
AALTO UNIVERSITY, FINLAND; FINNISH INSTITUTE OF HEALTH AND WELLBEING, FINLAND; UNIVERSITY OF TURKU, FINLAND

INTRODUCTION

Neighborhoods are the stages of our everyday lives. Homes fulfill our most primitive needs for shelter, safety, and family relationships, and our immediate environment also has an impact on how we feel, act, and relate to others. The role of the home and immediate neighborhood has been magnified during the pandemic, during times of restricted mobility.

Neighborhood satisfaction, often used as a synonym of residential satisfaction, has been a research topic in disciplines as sociology, psychology, planning, and geography.[1] [2] Considerable scholarship has focused on the determinants of greater neighborhood satisfaction reported by residents.[3] [4] [5] [6] In these studies, the physical and social aspects of the neighborhood are often intertwined. Theories of neighborhood satisfaction often hinge on the notion that satisfaction measures the difference between households' actual and desired housing and neighborhood situations.[7] When residents' needs are not fulfilled by their living environment due to changes in either personal or neighborhood circumstances, 'lack of fit' may create dissatisfaction or stress.[8] [9] Thus, residential satisfaction can become a key determinant of mobility decisions: whether a person moves or stays in the area.[10] Mobility decisions by those with better resources, often referred to as self-selection or sorting can, in turn, contribute to segregation: certain areas are more attractive to households with better economic resources, and conversely, residents' ethnicity and socioeconomic status affect their satisfaction by limiting access to the most desirable neighborhoods.[11] [12] While the Chicago School of 'urban ecology' in the 1920s saw sorting as a natural process where the urban environment develops towards equilibrium, Harvey, a few decades later, disagreed: urban politics had a role in regulating internal mobility and stratification, and sorting was a characteristic of a capitalist city, not a natural phenomenon.[13] In this paper, residential satisfaction and perceived urban quality in the Helsinki metropolitan area (HMA) are analyzed against the backdrop of neighborhood socioeconomic status, and the role of government as a regulator of deprivation related to both socioeconomic status and urban quality is discussed.

In Finland, income differences were still uncommon in the 1970s, but growing concerns in Europe over social differentiation in the 1980s and 1990s became apparent in Helsinki in the early 2000s, with growing differences in income, ethnic segregation, and education in the 2010s.[14] [15] [16] [17] While segregation is yet modest on a European scale, it can be said that Helsinki in the 2020s is stratified both socioeconomically and ethnically. Segregation is stronger at a micro-scale due to a consistent policy of tenure mixing in Helsinki since the 1970s, where the state has subsidized housing

construction on a block or building level, rather than concentrating subsidized housing in certain neighborhoods.[18] This policy has softened the accumulation of deprivation in certain postcodes, but at the same time made segregation harder to spot.[19] In both American and European policy and research, neighborhood effects is a widely applied theory, assuming that spatial concentrations of lower-income or ethnic minority households would have a negative effect on individuals living in the area.[20] For instance, in the United States, the 'Moving to Opportunity' experiment offered families housing vouchers to move from high-poverty housing projects to lower-poverty neighborhoods, showing that the length of exposure to 'better' environments during childhood was a determinant in children's long-term socioeconomic outcomes.[21] In Europe, neighborhood income has been found to affect individual's employment, with under-employed males in Sweden being the most vulnerable to neighborhood effects.[22] Andersson found that among several community-level factors, the socioeconomic composition was the most important factor in resident's income level.[23] The adverse effects of socioeconomic segregation in Finnish research are well-documented,[24] [25] but the role of perceived satisfaction as an amplifying factor in disadvantage has been studied to a smaller extent. In literature, neighborhood quality is poorly defined and more often than not, equates to objective socioeconomic status: a high-quality neighborhood is a neighborhood with high income, education level, or employment rate. In this study, an additional dimension is added: the physical environment. This study also adds a subjective component: perceived satisfaction in the physical and social environment.

This study looks at the links between socioeconomic status of postcodes and perceived satisfaction, with the hypothesis that satisfied residents generally reside in neighborhoods of higher socioeconomic status. In earlier literature, a positive relationship has been found between neighborhood satisfaction and the average socioeconomic level[26] and the average income level[27] of the population. More affluent and educated people tend to like their neighborhood more than their less affluent and educated counterparts.[28] [29] [30] Residents in less affluent areas, on the other hand, have been found to be more sensitive to unfriendliness and crime.[31] Poor access has also been found to be burden low-income residents of subsidized housing in the US more than wealthier residents: locational inefficiency creates additional costs for people who are already struggling to make ends meet.[32] As for the relationship between perceived urban quality and socioeconomic status, residents from high-income neighborhoods have reported more favorable esthetics, pedestrian/biking facilities, safety from traffic, safety from crime, and access to recreation facilities than residents of low-income areas,[33] and perceived neighborhood quality has been found to improve with age solely for highly educated residents.[34] Perceived neighborhood quality has also been found to predict both life satisfaction and long-term mood.[35] While poverty rate has been shown to be linked to self-esteem, perceptions of neighborhood physical disorder have been shown to have an even larger impact on individual's self-esteem.[36]

These studies support the neighborhood effects theory, shedding light on the effect of neighborhood-level deprivation on individual-level outcomes. Perceived satisfaction, however, is a far more ambiguous measure than objectively measurable income or health outcomes. The full scope of intervening variables is difficult to capture in a survey setting: the outcome relies on both the perceptive and evaluative capabilities of the respondent at a particular point in time. In a recent meta-study of dozens of neighborhood satisfaction studies, for instance, Neal found that neighborhoods themselves account for only a small percentage of the variation in residents' neighborhood satisfaction, while the majority of variation in neighborhood satisfaction is, instead, associated with individual-level characteristics and perceptions.[37] The path taken in this paper is, therefore, a far more indirect one than that of neighborhood effects studies, where the direct effect of objectively measured

neighborhood deprivation has been studied on objectively measured individual income or health. It is also a path more prone to intervening variables, and therefore direct causal links cannot be made. The study setting illustrates, however, the relationship between the socioeconomic status of neighborhoods in the HMA and the perceived quality of the urban environment, against a backdrop of growing inequality and a shortage of urban planning interventions to combat shortages in urban quality in deprived areas.

FOCUS AREA, MATERIALS AND METHODS

In this study, the Adults' Health and Wellbeing Survey (ATH) is used to map residential satisfaction in the Helsinki metropolitan area (HMA). The survey was completed by the Finnish Institute for Health and Welfare in 2012-2015, with over 21000 respondents aged over 20 years old in the HMA. The survey features questions on a Likert scale focusing on perceived health and wellbeing, with questions on background factors such as living and working status. The data has been linked with population register data, which provides more insight into the sociodemographic attributes of the respondent, as well as housing attributes. This paper uses variables of the survey including global satisfaction with the area, satisfaction with safety, and physical neighborhood quality.

As the survey data is coordinate-based, it can be combined with other types of spatial data, including urban structure data from the Finnish Environment Institute and postcode data from Statistics Finland. Postcode data on income, education level, and employment rates from the corresponding timeframe were used to form a composite index for postcodes' socioeconomic status (SES). The survey responses were aggregated from a coordinate level to a postcode level in SPSS, and divided into the low (below 25 percentile), average (25-75 percentile), and high categories (above 75 percentile) for simplification purposes.

This study divides the urban structure of the HMA into three belts: the center, with a younger population, more renters, and a denser urban fabric; the subcenter belt around the center, consisting of higher-density service concentrations; and the suburban outer area, with a large share of families with children and generally more homeownership in a low-density setting. Because of the different social structures of these zones and a backdrop of deprivation concentrating in the subcenter zone, particularly in the northern and eastern areas, [38] this study separates these zones to study whether urban structure plays a part in the relationship between SES and perceived satisfaction (Figure 1).

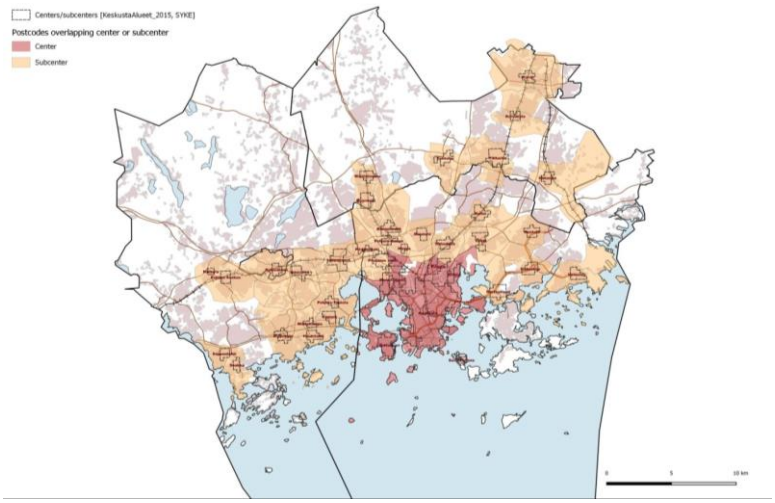

Figure 1. The urban zones of the Helsinki metropolitan area by postcode.

RESULTS: SOCIOECONOMIC STATUS AND PERCEIVED SATISFACTION ARE LINKED AT A POSTCODE LEVEL

The results of the survey show that residents in the HMA are, in general, very satisfied with their living environment, with an average of 4.04 out of 5 in the region. This result was expected, as it is in line with earlier studies on the subject.[39] Respondents were, in general, also highly satisfied with the physical quality of the area (building condition, aesthetics, and tidiness) and social quality (safety). Large geographic variation occurs, however, with those growth directions with lower SES (eastern and northern Helsinki municipality subcenters) showing lower-than-average satisfaction with area, neighborhood quality, and safety. Satisfaction is linked positively to postcodes with larger household sizes, more children, and more dwelling area per resident, a demographic profile more common in the lower-density suburban zone, and less common in the center and subcenter zone. Neighborhood satisfaction was, however, above average in the central zone, particularly in postcodes on the Helsinki peninsula with both high average income and high property prices.

The link between neighborhood satisfaction and SES was apparent across location types, and the underlying factor behind geographic clustering is SES. The positive link between satisfaction variables and SES was seen in every zone (Figure 2). The number of postcodes with lower than average SES varied greatly by zone, however, with hardly any deprived areas in the center zone and a large number of low SES postcodes in the subcenter zone.

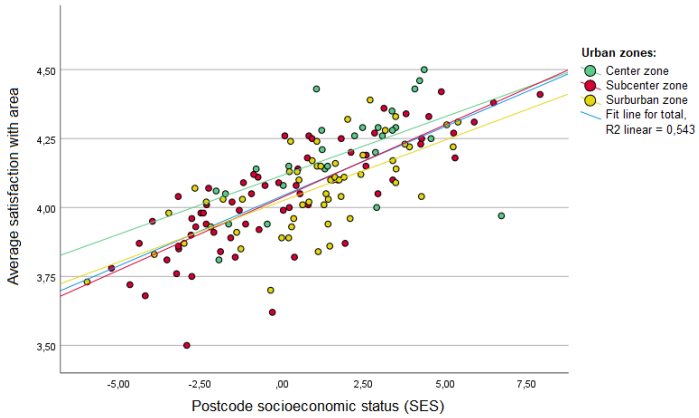

Figure 2. Socioeconomic status and neighborhood satisfaction by postcodes according to urban zones category.

When looking at the physical and social components of neighborhood satisfaction and postcode SES more closely, the results show that they are also closely correlated (Figure 3), showing a similar pattern to that of global satisfaction and SES (Figure 2). Areas with lower SES indexes are perceived as less aesthetic, with more untidiness and buildings in poor condition. Residents in areas with lower SES are not only generally less satisfied with their neighborhoods, but also experience more unsafety. When looking at satisfaction with both building conditions and tidiness and postcode SES, dissatisfaction rises steeply as median income decreases, unemployment increases, education level decreases, and share of rented housing increases. Satisfaction with urban quality rises as household size and living space per person rises, pointing to more satisfaction in areas with more households with children and generally low-density development.

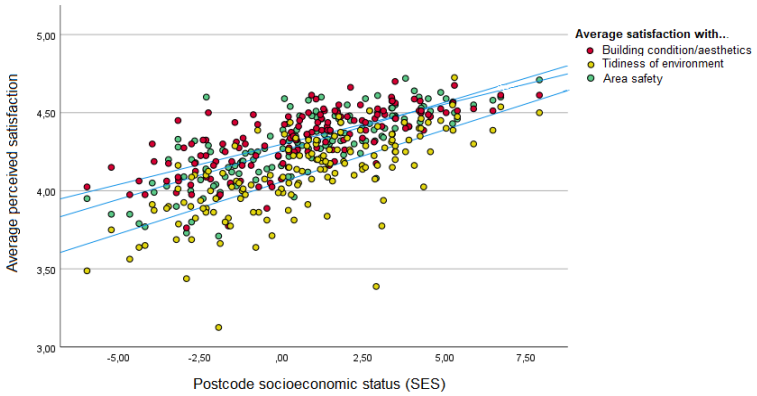

Figure 3. Socioeconomic status and perceived satisfaction with building conditions/aesthetics, tidiness, safety by postcode.

A well-documented factor in neighborhood satisfaction is the effect of perceived safety on satisfaction: perceived safety has been found to have a strong relationship with both satisfaction and SES.[40] [41] [42] The results of this study show a similar pattern: high-income neighborhoods experience significantly higher perceived safety than lower-income neighborhoods. There was, however, variation by neighborhood and growth direction, as was the case with neighborhood satisfaction: neighborhoods with higher than average perceived safety are most common in the center and the western municipality of Espoo, and unsurprisingly, these areas also fared best in average satisfaction scores.

DISCUSSION

The findings show that in the Helsinki metropolitan area, the postcode's SES does indeed translate into a more unequal experience of one's living environment, confirming the findings of earlier studies on the positive relationship between neighborhood satisfaction and the average SES level.[43] [44] [45] [46] [47] All of the studied variables (global neighborhood satisfaction, satisfaction with building condition/ aesthetics, tidiness, and safety) show a positive linear correlation with the postcode SES index. Further, very few postcodes exist showing a lower than average SES, but a higher than average score for satisfaction or perceived urban quality. Despite being less satisfied with their conditions, residents in disadvantaged neighborhoods generally spend more time in their neighborhoods and have fewer resources to counteract negative spatial effects: it can be said that urban quality matters more in areas of lower SES. In addition, it is known that in Finland, a large share of residents in socioeconomically disadvantaged neighborhoods are involuntary stayers, and cannot counteract dissatisfaction by moving out of their neighborhood. [48]

Meanwhile, studies on segregation in the HMA point to growing disparities in SES, ethnicity, school performance, and wellbeing,[49] [50] raising the question of whether differences in perceived satisfaction are growing simultaneously as well. This study has linked SES to satisfaction at a particular point of time in the HMA, raising the question of whether these two factors can amplify each other's effect, leading to social deterioration patterns described by segregation researchers in Northern Europe earlier. [51] [52]

There are some limitations to the study setup. Firstly, a survey is not always representative of the general population. Survey respondents in tend to be skewed towards older, more educated population groups. Responses of those in the most deprived groups are likely to be fewer, and this can present a

problem in the representation of the more vulnerable groups. It is therefore likely that perceived satisfaction in deprived areas is worse than these results show. Therefore, while satisfaction, in general, tends to be high in the region, less satisfied areas with a lower SES status should be analyzed with care, as this end of the scale is likely to be under-represented.

Secondly, measuring subjective wellbeing has its limitations, as discussed earlier. Answers are dependent on not only the questions asked, but on the respondent's general wellbeing, circumstances during the survey, understanding of the questions, and capability to evaluate the social and physical environment. When asking questions such as 'how satisfied are you, in general, with your area', the term 'area' was not defined, leading to ambiguity in the spatial borders. The postcode, used as a proxy of 'area' in this study, can contain small neighborhoods with different kinds of residential typologies. This is a situation common in the subcenter zone, where the densely-built subcenter core is typically surrounded by lower-density owner-occupied housing within the same postcode. Therefore, the more granular residential structure occurring within postcodes is not captured in this study. Rather, the postcode scale illuminates regional variation within the HMA. As earlier results on segregation in the HMA point to, stratification is likely to be higher on a block scale than these postcode scale results show, also making it harder to pinpoint[53]. If the regional analysis above shows a constant relationship between postcode SES and satisfaction, it is all the more important to analyze urban quality deprivation on block or sub-neighborhood levels in further studies. It is also at this more granular level that physical and social interventions are possible in urban planning.

CONCLUSION

This study shows that, in general, residents in the Helsinki metropolitan region were highly satisfied with their neighborhoods. Variation by postcode and geographical direction is large, however, and clearly linked to income, employment, and education level, even in a metropolitan area where segregation by income or ethnicity is, by international standards, remarkably low. If perceived satisfaction is linked to postcode socioeconomic status in a Nordic capital, with a history of welfare and social tenure mixing since the 1970s, spatial variation between neighborhood-level SES and perceived satisfaction is likely to magnify in cities with higher degrees of segregation. In short, affluent neighborhoods have a physical and social advantage over deprived areas: even in a relatively unsegregated city, residents of less affluent areas do not experience their neighborhoods at a level equal to their more affluent city-dwellers. This finding, in turn, points to inequalities in urban experience, possibly magnifying the effects of growing inequalities by income, ethnicity, and education in the HMA found in earlier studies.

Nonetheless, equality is a long-standing goal in Finnish urban planning. The Finnish Land use and Building Law indicates the creation of a 'safe, healthy, agreeable, socially functional environment, satisfying the needs of different demographic groups as a goal in planning.[54] While the same law implies that the living environment has a causal relationship with residents' wellbeing, little data is yet available on which factors within the living environment have an impact on residents or specific subgroups of residents, and to what extent. Socioeconomic disadvantage is a quantifiable and objective measure and thus substantially easier to pinpoint geographically than subjective disadvantage. Therefore, SES could act as an accessible indicator for planners in recognizing areas of perceived disadvantage and inequality. In these disadvantaged areas, community or urban planning initiatives could be an effective tool in creating a more equal urban experience, tackling exclusion, and reversing underdevelopment.

Eroding segregation on a neighborhood level is a recent goal in state land use policy.[55] [56] This goal has trickled down to the municipality level, as mutual agreements governing land use, housing

provision and transportation have been implemented in the recent years between the state and the larger city regions[57]. Until 2020, these agreements have mainly governed the provision of subsidized housing, but the newer agreements also include goals such as equality between neighborhoods and diversifying residential structure. To date, the role of planning as a regulator of deprivation in Finland has been limited to tenure mixing in the form of providing subsidized housing, often seen as social policy instead of land use policy, and area-based initiatives, aimed at reactively improving services or housing in neighborhoods where social problems have spiraled. Preventive measures in the form of positive discrimination of deprived neighborhoods are few, and measures aimed at socioeconomic groups such as subsidized housing residents, sprinkled into the urban structure and difficult to pinpoint by spatial analysis[58], even fewer to date. Finnish sociologists Hyötyläinen and Haila have recently criticized the state for taking a backseat role in preventing segregation through land use policies,[59] [60] and Vaattovaara has recently called for the state to take a more active role in the development of urban quality, asking whether, as a push against the current market trend steering the housing sector in Finland, a minimum level of urban quality should be defined.[61] In light of this study, which shows that perceived quality is still strongly linked to socioeconomic status in the HMA, new land use policies aimed at improving urban quality, particularly in socioeconomically weak neighborhoods, would be a welcome intervention.

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THE NEW CITY, THAT WAS BORN TOO OLD

Author:
LUIS MIGUEL GINJA, LEONOR FERRÃO

Affiliation:
UNIVERSIDADE DE LISBOA, PORTUGAL

INTRODUCTION

Quoting Kevin Lynch, "Looking at cities can give a special pleasure, however, commonplace the sight may be." 1 This beautiful aphorism admits today, new readings. Looking at the new (albeit old) European cities, one would think that had been a sudden reversal of time or an abrupt change in the development paradigm. They became quiet, walkable, cyclable, and therefore also much less polluted. The industrial city of the early 20th century was the trigger for the flowering of utopian socialism and visions of the future, though none could have predicted what happened a century later. The pandemic outbreak, March 2020, brought a kind of return to pre-industrial societies. We work from home today, with almost no regulation of labor rights. Our living space became a phalanstery, not by intentional choice but by force to be constituted. Outside, the city awaited, and still awaits, our return. The symbiotic link of city life, the street, became empty. The nightmare of the metaphysical paintings turned out to be accurate, as a general view from our windows. The city now stood outside, unchanging, inaccessible, static like a frame. The city was just an object outside that we look upon from within, unchanging, inaccessible, static as a frame, a memory of our life in society until recently. Our relationship with the city and with others was now in stasis. Perhaps it was never designed for human step, that is too slow for the machine speed. It is impossible to quantify the extent of the global social catastrophe and its consequences on city life and landscape. Almost nothing will ever be the same again because something must change. The new values representing our physical life in society will bring new urban choreographies that we must find out.

I

Like Benjamin Button[2], the industrial city was born old - although this proposition may apply to some cities more than others, depending on the date of their founding, it depends very much on two factors. On the one hand, the state of preservation of its early urban matrix. On the other hand, the impact of industrialization on its core. Even in the 19th century, the dysfunctionalities of the classical city, compared to the contemporary city, seemed minor given the size of contemporary cities - the speed with which they took root in the territory, driven by overpopulation and industrial pollution, are factors we have begun to observe in the last fifty years.

However, industrialization was the trigger for the blossoming of utopian socialism and urbanism theory, probing futures with the passion of romantic thought. None of these futuristic visions could imagine a scenario similar to 2020, when cities were, quite literally, deserted.

Going back to the 19th century, the need to improve living conditions in cities led to the fragmentation of the urban fabric and its functional specialization. The past and the future of cities were the dividing points between the point of consolidation of practical and theoretical urbanism, leaving behind the generalist ideas of pre-urbanism. The difference was on the action or the pretension of its practical application in the territory. In other words, pre-urban theoretical thinking gave way to practical action and what we understand today as urbanism. However, the progressive language of the industrial city did not result from the ideological continuity between pre-urbanism and urbanism. Tony Garnier (1869-1948) provided the first progressive model in *Une cité industrielle* (1917). His thinking was instrumental in chalk out the Athens Charter (1933)[3]. From this, will be deduced the rigid zoning, including green areas, and a regulated architecture in pre-established types, varying in height and density, according to perceived needs.

It is not our aim to point out the mistakes made in the early days of industrialization but to connect those to today's city concept with its genesis. This bridge becomes apparent in the connection between the functional city that gave ballast to urban planning in the 20th century and Tony Garnier's proposal. Today, cities find support in the challenges proposed in the late 19th century. New challenges never the less, admittedly, not only because the city is a living organism but because many old inefficiencies and contradictions remain unresolved. Paradoxically, the signs of progress - determined by the presence of industries and, consequently, a torn skyline by smokestacks spewing black smoke - were matched by the filling of some central urban voids with slums, on the one hand, and the flight of social elites to peripheral areas with better air and views, on the other. Such movements physically degraded the old hulls of the cities, precisely those where elements directly associated with local identity subsisted. Steam, gas, electricity, and oil succeeded each other as energy sources for a model of civilization based on speed, voracity, profit, and lust for power.

We are near a point of no return in climate change of devastating consequences for the survival of all species, including our own. The pandemic outbreak seemed to offer a respite from the unbridled race to this condition. We urgently need to grab and think through this opportunity, making the most of it. There are, however, signs that run in diametrically opposite directions. Despite the intentions of some governments, which, for the most part, are too late or too accommodating to their economic interests, it remains some strength in the public opinion and some small steps given by citizens. The warnings are all too clear, and the date announced (2050, according to a UN report) when it will be impossible to revert this calamitous situation.

As we said in the beginning, the industrial city was born too old. At the Old Continent, the automobile first fitted into the existing city, but progressively it became too invasive and impeded other modes of circulation. It changed the shape of the city and the shape of the peripheries; in extreme cases, as in the United States, urban growth in an "oil slick" made it impossible to distinguish the city from the periphery and the periphery from the agricultural landscape and, after it, the forest. The automobile has made the city a non-walkable place, on the one hand, and impractical for other modes of circulation. Some cities, such as London and Milan, have imposed the crown system to minimize traffic jams arising from the commuting movements of non-residents to their workplaces. However, such measures (unpopular when they first appeared) were not enough. Some central areas were closed off, even removing the circulation of surface public transportation and allowing only pedestrians and or bicycles and other small electric vehicles.

More than a century has passed since Tony Garnier's Industrial City and almost a century since the IV Congrès Internationaux d'Architecture Moderne. The Athens Charter city has not meant to serve a particular purpose, only a generic one. The proposal has intended as a universal and applicable model. This view is, and still is, the breaking point that the New City has harbored since its inception, and

that will eventually polarize positions taken at the center of the Modern Movement in the mid-twentieth century.

Man may readily identify himself with his own hearth, but not easily with the town within which it is placed. "Belonging" is a basic emotional need - its associations are of the most straightforward order. From "belonging" - identify - comes the enriching sense of neighborliness. The short narrow street of the slum succeeds where spacious redevelopment frequently fails.[4]

The text, which dates from the IX CIAM in 1953, is more current today than it was then. It appears, at its base, as a counterproposal to the idealism of the functional city that, even today, is a reflection of the status quo of contemporary cities. More than half a century after the publication of that text, fractures are still visible, and, day after day, they show us that the city that was born old has become infantilized because it is unable to respond to its growth challenges. This infantilization is very much rooted in technology and the inability to deal with it. Let us imagine a single-family residence, in which a garage includes a car. This car adds to the family and adds to the car park of residents and non-residents who enter and leave large urban centers every day, where most jobs are situated. A gas station must have to be involved in this equation - or rather a network of gas stations - we need to add an asphalt landscape specially designed for the speed and quantity of cars circulating, parking on the street, or in purpose-built parks (underground or surface), visual pollution, and pollution from CO2 release[5]. Add to this the vehicles that transport goods to meet consumption needs. This development model only excites those who profit from it.

The city has as a significant objective the aggregation of all human functions.[6] All activities and experiences develop within their limits, although in many cases, it is not possible to see where they are because everything is a built continuum. We should not refer only to metropolises or large urban agglomerations when we talk about cities. The scale matters only in the complexity of their relationships or in the categorization of their morphology. Whenever Man appropriates a place, creating relations with the environment and remaining on it, we can classify this experience as the embryonic concept of a city in terms of space and time. The idea of the city as a large-scale organism leads to two aspects that deserve a comment. The first focuses on the concept of scale, which gives rise to greater segregation between the large urban agglomerations and minor extension and lower density. The second is the need for urban planning according to the scale of intervention. We are confident that there is a need for urban planning. Attention tends to focus on the larger scales. Thus, lower-density settlements continue marginalized by urban government policies. The model that only "sees" the problems of large metropolises denotes an attitude reversal, i.e., it seems to be more flexible than those governing smaller agglomerations close to rural areas. Without falling into inoperative generalizations, let us focus on what is happening to the small towns of Alentejo (Portugal). After having "benefited" from a period of demographic regression, the result of successive waves of emigration and immigration, which maintained their ancestral features, based on frugal habits and behavior, in recent years, some of these towns and small cities have begun to suffer the pressure of tourism, or new population flows. Far from the critical eye of the new emerging premises concerning urban planning, small-scale and low-density cities have suffered the dilapidation of their memory, as if wishing to keep pace with the mischaracterization of larger cities, surrounded by peripheries have conquered the status of cities. In the footsteps of Robert Venturi (1925-2018), in partnership with Denise Scott Brown (b.1931) and Steven Izenour (1940-2001), let us learn from the mistakes made in the small towns like the example of Alentejo[7]. Local memory needs to be preserved, not extinguished in uneducated or naive, interventions: they do not seek to interpret their characteristics, nor understand the relationships they establish between the territory they occupy, in the name of an idea of progress - that was born old.

Figure 1. Estremoz (Alentejo/Portugal) - areal view, present day.[8]

Figure 2. Estremoz (Alentejo/Portugal) – Urban proposal for the city core requalification.[9]

In many European cities, bicycle corridors have sprung up. In some, streets and sidewalks have become almost exclusively cyclable, conflating pedestrians with untrained bicycles. Jan Gehl (b. 1961) succeeded in transforming the city of Copenhagen by adapting the street to the scale of the pedestrian and bicycle. Areas in the city that were previously only used as parking lots by the canal have become a destination, an area of permanence, with no abrupt or life-affirming city design. The changes passed only through subtle suggestions for the requalification of the spaces or their cleanliness. The local commerce, were apprehensive about the prohibition of car parking there, throw out a decisive part of the urban restructuring plan. The merchants placed chairs outside and appropriated the street, thus creating a stable environment to stay in the place, not through the rigid imposition of the plan but suggestion processes.[10] Dutch cities have already made these changes much longer ago, despite the climate and not just because everything is too flat. Electric bicycles have made it practicable to get around in cities with very hilly morphologies.

II

Cities are not just the reflection of the here and now but the result of a temporal process of cultural investment by previous generations. We have the responsibility to keep something of this heritage, material and immaterial, for future generations. In no place in the city can this encounter between past

and future be more effective than the street. This "morphological element of the city's public space (...) linear and continuous, at the same time path and dwelling, itinerary and place" is "the result of the society that recognizes itself in it and also support for displacement. That is a cultural product with meaning for the society that creates and inhabits it, and at the same time physical support of movements and civilizational exchanges".[11] Through the street, all activities are interconnected, in their flows in a continuous bustle or moments of pleasurable contemplation. The text by Jane Jacobs (1916-2006) describing her street comes to mind. From her window, she observes the choreography of the city, the children on their way to school, the people rushing to get to work, or stopping to say hello or chat with someone they know. Through her window, it is possible to imagine the lives of those who pass by, arrive, or depart, from daybreak to nightfall.[12] Jacobs' description is reminiscent of the morning choreographies of Monsieur Hulot's neighbors in Mon Oncle (1958)[13].

However, is it possible to cycle all cities? How can we cycle in cities that have grown up under the automobile empire, cities such as those in the United States? Strictly speaking, they are also very unfriendly to the inhabitants, who have unlearned how to walk. In these cities, it seems that the machines have won. Everything revolves around the automobile. It is an unsustainable way of life. How did it come to this? Perhaps we can blame Le Corbusier for his visionary proposals for a Radiant City. Considering that four of the five most prominent companies globally are oil or gas companies, it is not surprising that the city's prevailing conceptions favor perpetuating the automobile.[14]

Suddenly, the streets and squares of every city became deserted. The declaration of a pandemic state by the World Health Organization on March 11, 2020, showed a reality, only possible throw fiction. We were confined at home, admiring the deserted city from our windows, realizing the nightmare of metaphysical painting. The cityscape became a landscape void of human life. The consequences, from an economic point of view, have been devastating. However, instead of reflecting on the development model based on non-renewable energies, it seems that people rapidly want to return to the previous lifestyle. It figures, therefore, that this period was a missed opportunity.

CONCLUSION

See more, *Listen* more, *Feel* more. *See* not only what is in front of our field of vision. *See*, the environment circularly surrounds us and not only in its frontal relation. *Listen* beyond the frenzy of our daily lives or the news on the TV. *Listen* to the subtle changes in the environment. To *feel*, which is equivalent to forgetting what we think we know. Once we have grasped the skills that enable us to change the world around us, we use our skin as a shield instead of using it as the main instrument to investigate and mediate between us and the world around us.[15] Clothes defend us from contact with others, and buildings keep us away from others. Cities make us (almost) anonymous. It has probably us who born too old and, or become too old, not the cities. They only reflect what we are capable of being.

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SOUTH AFRICAN CITIES REDESIGNED: THE PRODUCTION OF SPACE TO ACHIEVE ENVIRONMENTAL AND MENTAL WELL-BEING

Author:
FRANCINE VAN TONDER, AMIRA OSMAN

Affiliation:
TSHWANE UNIVERSITY OF TECHNOLOGY, SOUTH AFRICA

INTRODUCTION

There is a connection between mental health decline and environmental degradation; parallels may be drawn between the two when considering concepts of scarcity and abundance. A scarcity mentality may generate a drive to consume and degrade. Likewise, an abundance mentality may generate a drive to grow and heal.

The culture of consumerism is environmentally degrading. It is speculated that this drive to consume is driven by a decline in mental health. It could then be argued that reverting to a more environmentally friendly culture and meaningful (spatial) experiences, as opposed to material consumption, may be a way to elevate mental health. To achieve this shift in behavior and practice, the concept of a 'healthy city' may be explored through the lens of the spatial design disciplines.

The impact of the environment may thus be used to understand mental health conditions and psychology. In this paper, the authors discuss how architectural interventions could be conceptualized in a way that helps achieve a mental shift from scarcity to abundance by considering a healthy relationship between people and the production of space.

Connections between mental health, consumption, and environmental degradation: A vicious cycle perpetuated by divisive spatial geographies and economic inequity

No doubt, greater consumption leads to greater production and greater environmental degradation. Why are we driven to consume? How did we shift from being producers to being consumers? Why are we no longer self-sufficient but dependents of economic systems that cannot sustain our needs? In what way was our capacity to control our lives, our means of production, and our livelihoods taken away from us? Or did we give it up?

These questions are critical and have complex responses. Many literary sources speak to these issues and without a doubt there are historical, political, social, and cultural factors at play. Some policy frameworks lead to the perpetuation of these conditions. Colonial histories and exploitation are well-documented with regards to the disruption they cause.

However, this paper puts forward a proposition from a different perspective, without taking away from the complexity of the situation: Are people also driven to consume due to a decline in mental health? And could reverting to a more environmentally friendly culture and meaningful spatial

experiences, as opposed to material consumption, be a way to elevate mental health? Could a shift in behavior and practices, be encouraged through positive spatial design as a result of a circular economy, in the context of a 'healthy city'?
For healthy cities to emerge, the unhealthy past must be acknowledged. We start this conversation through presenting South African cities as sites of physical and psychological trauma.

The Apartheid City

The wounds caused by colonialism and Apartheid manifest in spatial patterns and are contained in peoples' psyches. This paper is premised on the idea that healing may be achieved through spatial configurations. A theoretical premise is thus presented: We discuss how architectural interventions could be conceptualized in such a way to help achieve a shift from a scarcity mentality to an abundance mentality. This is done by considering a healthy relationship between people and production. The South African city is still a segregated Apartheid city. As shown in Figure 1 below.

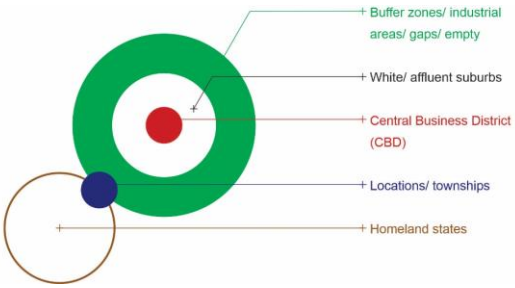

Figure 1. A diagram showing the persistent structure of the Apartheid city indicating how spatial planning is used to segregate communities.

Today human beings act both as consumers and as producers. We, as humans, act as perpetrators as we degrade the environment, and as victims when we are exploited as producers, by capitalist colonialism. This exploitation requires us to surrender our power in exchange for opportunities to be economically active. It is a premise of this study that the result of this situation is detrimental to our mental health.
Political leverage convinces and enforces participation in this exploitation. The Apartheid city was designed to facilitate the politics of the day. In South Africa we are yet to see effective transformation and the subsequent needed change to break the legacy of the Apartheid city. Architecture must provide for, and accommodate, alternative options to participate in. These alternative participation options must aim to oppose the exploitation of natural and human resources. Therefore, this alternative production of space must be designed with the aim to achieve environmental and mental well-being.

ENVIRONMENTAL DEGRADATION

The consumption of consumer goods degrades the environment, which leads to climate change and the subsequent climate ecological breakdown. We will reach human induced global warming of 1,5 degrees above pre-industrial levels by as soon as 2030,[1] that is 9 years' time.
Climate change is an anthropogenic phenomenon and is due to human activity.[234567] At a minimum, 97 per cent of climate scientists have concluded that human-caused climate change is happening.[89] High per-capita metric tons of CO2 emissions lead to a large carbon footprint, which is connected to environmental degradation. It is interesting to note that wealthy nations, often with a large carbon footprint, suffer more from a decline in mental health.[10] The three countries with the highest carbon

emissions are China, The United States, and India.[11] Likewise, the countries with the highest rate per-capita depression are China, The United States, and India.[12] Data from the World Bank indicates that wealthy nations, including China, The United States, and India, lead in terms of per-capita metric tons CO2 emissions.[13] It could therefore be argued that there is a connection between mental health decline and environmental degradation.

It is interesting to note that from available data, South Africa is ranked 13th worldwide in carbon emissions, and is ranked 12th worldwide in per-capita metric tons CO2 emissions.[14] One in six South Africans suffer from anxiety, depression, or substance-use problems.[15]

MENTAL HEALTH DECLINE

Mental illness is a real experience,[16] influenced by both society and culture, and by the stubborn contradictions of colonial and post-colonial societies. Mental illness relates to the relationship between the individual and social structure. The body plays a pivotal role in the expression and structuring of the mind. The impact of the environment or context may thus be used to understand mental health conditions and psychology.

Depression is the most common mental illness worldwide and cases of depression worldwide have increased by 49.86% since 1990.[17] Depression has become an important public health problem. Data shows an increase in depression in regions with a high sociodemographic index, such as high-income North America.[18] Rich nations dominate the list of countries most burdened by the full range of mental illnesses.[19] Furthermore, people in developed countries indicate being totally unable to work on average for 16 more days per year than people in developing countries.[20] When looking at commonly occurring mental health disorders in developed and developing World Health Organization (WHO) World Mental Health (WMH) countries it is interesting to note that developing countries lead in eight out of ten mental disorders.[21]

For this paper, the connection between mental health decline and environmental degradation is noted. Environmental degradation is connected to the consumption of consumer goods. This study therefore infers that those who consume more may suffer from a greater decline in mental health when compared with those who consume less.

With colonization and capitalist exploitation there are no winners; The perpetrator also suffers. Apartheid, being an extreme form of colonization and capitalism, meant that South African cities were, and continue to be, sites of physical and psychological trauma. Likewise, societies in previously colonial powers countries also suffer from physical and psychological trauma. This argument may be seen in the light of male suicide rates in the United Kingdom, where suicide is the greatest killer of men under the age of 50.[22] Suicide, a last fatal symptom of depression, disproportionately affects men in the United Kingdom, when compared to men of the rest of the world. Accidents or unintentional injuries are the most common cause of death in men under 45 years of age, and cancer the most common cause of death for men 45 – 85 years of age.[23] It is noteworthy to add that the United Kingdom is the home of what was the British Empire, a colonial power that once encapsulated 22% of the earth's land mass and more than 20% of the world's population.[24]

Therefore, it is inferred that colonialism is connected to a decline in mental health. The connection between mental health decline and environmental degradation gives opportunity to draw parallels between the two when considering concepts of scarcity and abundance.

The concepts of scarcity and abundance: A discussion on how to improve mental health while also addressing environmental degradation

Scarcity mentality and abundance mentality will be used when considering the redesign of the South African Apartheid city. A scarcity mentality may generate a drive to consume and degrade. In contrast, an abundance mentality may generate a drive to grow and heal.

Colonial capitalism is dependent on the culture of consumerism leading to a cycle of environmental degradation. It is speculated that this drive to consume is driven by a decline in mental health and a scarcity mentality. It could also be argued that reverting to a more environmentally friendly culture with meaningful spatial experiences, that mitigate our dependence on material consumption, may be a way to elevate mental health through an abundance mentality. To achieve this shift in behavior and practice, the concept of a 'healthy city' may be explored through the lens of spatial design.

When redesigning the following questions emerge: How does one redesign for an abundance mentality within the South African Apartheid city, to achieve environmental and mental well-being? What is an environmentally friendly culture? How is it different to the colonial capitalist culture we have now?

A colonial agenda (scarcity mentality)

Colonialism is defined as:[25]

"The claim of a state to sovereignty over new territories. It is characterized by an unequal power relation between the colonists who run the territories and their indigenous population."

For this paper, we amended this definition to read: Colonialism is:

"The unlawful claim of a state to capture by force existing territories. It is characterized by an unequal power relation between the colonists who act as settlers, and the existing indigenous population who cannot, or choose not to, resist."

It is argued by this study that a consumerist culture emerged for the colonial agenda. A colonial agenda, vested in a scarcity mentality, is different from an indigenous agenda, vested in an abundance mentality. When considering the South African government today one may infer that it still acts upon the land and the people in the same way as the settler, colonial, and Apartheid forces acted pre-1994, especially regarding the exploitation of natural and human resources. In current world news the South African government is repeatedly reported to participate in corruption, even when the lives and livelihoods of the people are at stake such as during the Covid-19 pandemic.[26]

An indigenous agenda (abundance mentality)

When considering indigenous culture, where people live in intimate relationships with nature and the land, then it can be observed that such cultures have an active sense of custodianship. Along with the knowledge that the land provides, indigenous people often ask, what does the land need? Another way of phrasing this argument will be: What can be provided, and how can custodianship protect and improve what we have? As opposed to a colonial capitalist mindset of asking: What can be taken, exploited, exported, or imported?

These discussions extend beyond South Africa and across historical eras. As an example, when we look at settler versus indigenous political agendas competing for human participation, we also need not look further than current world news. Indigenous Palestinians are oppressed by settler Israeli forces. The environmentally degrading Keystone XL pipeline project from Canada, has been cancelled[27] largely due to the organizing efforts of indigenous leaders and environmental activists[28] who act as custodians of the land against the forces of colonial capitalism. A discussion on an indigenous versus a colonial mindset may hold more answers.

Competing agendas (a shift from a scarcity mentality to an abundance mentality)

A colonial mindset is often focused on what is your right, what do you deserve, what are you entitled to, as a settler. A good example of this entitlement is the Universal Declaration of Human Rights.[29] This is in contrast with an indigenous mindset where a core principle is to have obligations more so than rights. An indigenous person will say: It is my job to look after this area. It is my job to make sure that the land remains sustained and not depleted, as this will protect my health and prosperity in return.

To have a colonial mindset forced upon oneself requires one to relinquish one's power. As stated previously, a colonial capitalist government, dependent on exploitation, forces citizens to surrender their power in exchange for opportunities to be economically active. This is in contrast with an indigenous mindset, which requires one to use one's power by holding oneself accountable for one's environment and committing to the custodianship of that environment. We therefore need spaces for custodians. Spaces for the regaining of power. Spaces for the retention of power. Spaces for the growth of power. Spaces that enable citizens of a city to act out their obligation to achieve environmental and mental well-being.

It is therefore inferred that a scarcity mentality aligns with a settler or colonial mindset of taking, exploiting, exporting, and importing, justified by a conviction of having a right to do so, whereas an abundance mentality aligns with an indigenous mindset and comes with an obligation to be a custodian within one's environment and city. Therefore, to encourage or establish an abundance mentally is to facilitate and provide spaces for custodianship, spaces within which citizens can act out and express their obligation for their city and its people.

Such a redesigned city will provide the meaningful spatial experiences required. Spatial experiences that will mitigate our dependence on material consumption, elevate our mental health, and help to moderate environmental degradation. This paper argues that to achieve this shift in behavior and practice, the concept of a 'healthy city' is premised on the idea that healing may be achieved through spatial configurations.

SPATIAL CONFIGURATIONS FOR HEALING

There is a perception that abundance deals with monetary wealth. This paper argues that this notion is not the case and that monetary wealth, which often leads to consumerism, and environmental degradation, can also result in a mental health decline. Abundance and abundance mentality requires connection to facilitate the drive to grow and heal. It is a premise of this study that to redesign for an abundance mentality in the South African city, in order to provide for the production of space to achieve environmental and mental well-being, we need to look at linear versus circular economies.

A discussion of linear versus circular economies

A colonial capitalist government is vested in a linear economy that is dependent on the capturing and exploitation of natural and human resources. A linear economy therefore falls into the category of scarcity mentality and exacerbates environmental degradation and mental health decline.

As stated previously, colonial and capitalist powers, depend on exploitation, forcing citizens to surrender their power in exchange for opportunities to be economically active. A contributing factor to break colonial power is for the people to gain back power over their own economic activity. It is the premise of this paper that this can only be achieved by a circular economy.

In relation to economic activity:[30]

"Economic and political control can never be complete or effective without mental control. To control a people's culture is to control their tools and self-definition in relationship to others."

As well as:

"A human community really starts its historical being as a community of co-operation in production through the division of labour."[31]

It is inferred that this community of co-operation in production will be facilitated by a circular economy. In a circular economy humans, who act as consumers and producers, have greater power over how they consume and produce. They therefore have the power to mitigate or change their role as perpetrator in consumption of consumer goods, which degrades the environment, and as victim in their role of being exploited by capitalist or colonial production. A circular economy therefore falls into the category of abundance mentality and aims to achieve environmental and mental well-being.

A circular economy necessitates a systemic shift and is linked to sustainable development[32]. The main aim of a circular economy is to facilitate widespread economic prosperity, alongside environmental quality that will have an impact on social equity. A circular economy will therefore need architectural interventions conceptualized in a way that help to achieve a mental shift from a scarcity mentality to an abundance mentality by considering a healthy relationship between people and their production, as well as the production of space.

CONCLUSION: THE PRODUCTION OF SPACE TO ACHIEVE ENVIRONMENTAL AND MENTAL WELL-BEING

The conceptualization of architectural interventions must help achieve a mental shift from a scarcity mentality to an abundance mentality. The Apartheid city must become unsegregated by integrating many uses and providing spatial configurations for an array of opportunities.

Such spatial configurations with the aim to achieve healing must support a circular economy, as a circular economy results in a healthy relationship between people and production. This creates opportunities for the power previously surrendered within an Apartheid city to be regained by the people. This will happen when the people become custodians of their own opportunities to be economically active, thereby reverting to a more environmentally friendly culture facilitated by meaningful spatial experiences.

These spatial experiences will mitigate our dependence on material consumption and elevate our mental health. The result: A move away from a scarcity mentality towards an abundance mentality and a healthy city, where people will regain, retain, and grow their power for generations to come.

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INHABIT INFRASTRUCTURES: A WAY TO RETHINK THE INFRASTRUCTURES IN THE CONTEMPORARY CITIES

Author:
ALESSANDRA COMO, LUISA SMERAGLIUOLO PERROTTA

Affiliation:
UNIVERSITY OF SALERNO, ITALY

INTRODUCTION

Nowadays an important challenge for cities is to design infrastructures for the new mobility and at the same time to critically reflect on the role of the existing infrastructures in the current condition. The need to mitigate the disruptive effects of the infrastructural presence in urban spaces leads to consider the opportunities that could derive from the infrastructure seen as habitable space.

This research aims at investigating the topic of the infrastructures within urban environments as spaces of interrelated issues which should involve a variety of aspects. Within the complexity of the city, the space of the infrastructure is already in itself a complex space because it is linked to the flows and movements of machines and people and it is composed of spaces and paths, building networks. Networks of roads and also rail networks overlap the city like highways. Often, however, they are hidden at lower levels, such as subways or fast train lines. In any case, infrastructural networks with their systems of spaces and paths are inserted into the city, increasing its complexity.

From the point of view of the infrastructures, however, we look at the city in a different way. Infrastructures allow us to look at the city in layers that overlap and their complexity is broken down into the various levels and points of intersection between them.

At the present time there is the need to adapt the old infrastructures to the new mobility systems in order to build new infrastructures and also to modernize those in use or even to rethink their role in the city by demolishing them or transforming them into new spaces.

The High Line project in New York pioneered the reconversion of old tracks and infrastructural spaces into new paths and new ways of living and crossing urban space, showing that there is an alternative to the demolition and that this alternative leads to the construction of unusual urban spaces for the city, full of opportunities and beauty. The High Line project in New York has also shown that urban choices are linked to the lives of people who live in those spaces and that recognize themselves in the landscape of the infrastructure; it is for this reason they opposed to its demolition promoting in alternative its reuse. Infrastructures are not only a technical or functional element but they are also spaces of life.

This research aims to deconstruct the infrastructure into parts that can find new logic or new uses in the urban space: from the whole mega form into a series conditions observed within new approaches at the engineering, spatial, urban, ecological, sociological, cultural, and policy levels.

From the observation of situations in Southern Italy with practices of appropriation of areas under bridges, the use of interstitial spaces and the occupation of spaces at different levels, this paper then comments on proposals of transformation for specific infrastructures, studied within university design studio courses, specifically in Salerno (Italy) and in New York, around the Bus Terminal by Pier Luigi Nervi and the George Washington Bridge infrastructure.

Figure 1. Atelier Architectural Design: heterotopic collage.

Through design experimentations, it is shown that the infrastructure rather than divide can connect spaces, offer opportunities for new urban spaces at different levels, create new urban layers, propose different logic of use, habitability and trigger a process of urban erosion capable of transforming the city itself. The investigation focuses on the infrastructure and its related spatial categories: the territorial dimension, the narrative character, and the relation with the movement, are some of the commented qualities.

THE "LANDSCAPE" OF THE INFRASTRUCTURE

Infrastructure has changed the face of cities. In Italy, in particular during the Twentieth century, the works of greatest impact on the territory were roads and highways networks. The motorway and rail networks overlapped on the landscape, connecting cities; they also became important opportunities for the construction of new spaces and elements related to the infrastructure such as shelters, bridges, viaducts, motorway toll stations and places like the service areas and the new railway stations. The infrastructure network constituted an important moment for the national culture because through its use people became in contact with the diversity and the richness of the Italian landscape. From North to South, crossing the peninsula, the landscape changes a lot, reflecting morphological and geographic characteristics that change from region to region. The revolution of infrastructural networks and their massive use has been precisely to bring everyone aware of this landscape, previously known through literary descriptions.

Figure 2. Atelier Architectural Design: heterotopic collage.

Italian cinema of the Twentieth century brought to the big screen this cultural change, mixed with restlessness of the modern life to which the spread of infrastructure contributed[1]. Important films were set on roads, highways, wagons, and train stations. Infrastructures are in fact the places where modern life is spent, where stories are born, places of relationships, sets and real fragments of life.

Roads, freeways and railway networks take on the narrative dimension of a story where each episode is an architectural sign on the landscape. It is not only a matter of connecting points: the same infrastructural networks become devices for crossing and understanding the landscape. Films like *Destination Piovarolo* (1955) by Domenico Paolella, *L'ingorgo* (1978) by Luigi Comencini, *Il vigile* (1961) by Luigi Zampa or *Café Express* (1980) by Nanny Loy were filmed on roads and railway stations.

Figure 3. Frames from the films: above "L'ingorgo" (1978) by Luigi Comencini, in the middle "Il vigile" (1961) by Luigi Zampa and below "Destination Piovarolo" (1955) by Domenico Paolella.

More recent research has shown how infrastructure can become an urban space with an autonomous life as it happens in James Graham Ballard's *Concrete Island*[2]. A further example is the multi-award-winning documentary *Sacro Gra*[3] directed by Gianfranco Rosi and derived from the research of the landscape architect Bassetti around the Gra, the circular motorway which surrounds the city of Rome[4]. The documentary shows the life that unfolds around the ring road, traveling along paths not marked on any map and meeting the people who live in those places, highlighting their life and unexpected beauty. The appropriation of the GRA from the people who live there every day makes it a real piece of the city. Spaces are both the infrastructure and the places that grow around it as autonomous biological organisms, re-designing the landscape of the everyday.

THE "SPACE" OF THE INFRASTRUCTURE

The construction of the great Italian motorway and the interpretation through the cinema of the Roman ring road show how even the great infrastructure can become a place, a space that can be described through perceptions and through the subjective experience of the crossing. This observation invites us to look with new eyes the complex areas of the contemporary cities characterized by the presence of infrastructures – bridges, overpasses, flyovers, underpasses, intersections with high slip lanes, major roads knots, voids, railway bridges and so on.

Although these interventions are generally obtained only through studies of functional and engineering type, which generally build systems that overlap – often violently and in other cases with indifference - on the urban spaces, it is still possible a view from the inside of the specific spatial condition, able to regain the role of the individual users of those spaces, that is an approach which brings back the physical and sensory levels and that could interpret and therefore identify a transformation potential.

It is essentially to shift the view from the condition of being above the city and on the territory to the internal condition of the architectural space, that is from a fixed and abstract vision to an experiential

approach which follow – along De Certeau the trajectories of those who live daily the city. In this sense the infrastructures can be re-appropriated becoming therefore space: «A space exists when one takes into consideration vectors of direction, velocities, and time variables. […] It is in a sense actuated by the ensemble of movements deployed within it. […] In short, space is a practiced place. Thus, the street geometrically defined by urban planning is transformed into a space by walkers»[5].
Designing with the infrastructure leads to anchor the design project on a system of relationships, that is what Alison and Peter Smithson considered as the cornerstone of architecture: «A building today is interesting only if it is more than itself; if it changes the space around it with connective possibilities»[6].

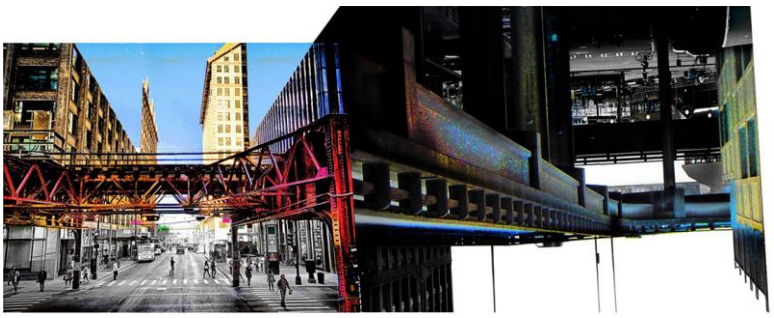

Figure 4. Atelier Architectural Design: heterotopic collage.

Figure 5. Atelier Architectural Design: case studies.

SPATIAL CHARACTERISTICS OF INFRASTRUCTURES

It is therefore from the inside, within the spatial specificities and through a perceptual enquiry, that we intend to investigate and interpret the infrastructures in the city. A design project will have to start from the nature of the infrastructure's spaces which are – for constitution –complex, ambiguous, multi-scale and outside the normative logic of typological or functional classification.
Within these complex spaces it is possible, despite the apparent heterogeneity of solutions and the strong differences of the concrete cases, to recognize common traits.
Among these, a recurring element is the shifting of the urban level of reference from the ground level to underground or elevated levels. This creates a new condition similar to that of archaeological excavations with various overlapping layers, a stratigraphy that effectively constructs a new urban geography.
The rise of level may lead to a more profound understanding of the urban space. One can conquer views that allow visual connections with other parts of the city and the territory, reconfiguring the urban landscape. New relationships can be established, previously inconceivable; from the top of a

viaduct, for example, one can penetrate inside the inhabited spaces at the upper floors of the buildings, watching the roof planes like a new horizon, or skip over parts of the city with our eyes.
It is not about creating panoramas or places for the urban spectacle, rather to understand what is around us, that is the city space. This is specifically the interpretation by Henri Lefebvre of the top view of the city in his text *Seen from the Window*[7]. Being at distance and at a higher level allows a closer look of the city spaces. If below the sounds are like noises, from above you can catch them individually being able to study their rhythm. Although from a greater height, Lefebvre study is still an observation within the spaces, that is from the inside of the city itself.
Lefebvre analysis opens up at an investigation approach which rather than static follows the development of the events along their duration and within movement.
This is another central aspect of the infrastructure space: being inextricably linked to movement and transition. The study of movement can increase the spatial complexity, introducing sequences which would traditionally inconceivable. One could start a path from above instead of below, the outside and the inside could mingle, new relationships could be created passing through or over existing architecture buildings. Like the Donald Appleyard, Kevin Lynch, and John R. Myer's study in *The View from the Road*, a design project on the infrastructure could control the system of views and the perceptions, creating spatial sequences in the movement[8].
Along these lines, design projects around infrastructures can conquer a narrative dimension which we could compare to the cinematic experience. The condition of the infra, which is inherent to the sense and etymology of the infrastructure, can become the spatial conception of a design project, based on establishing and revealing a system of relationships.
A design around infrastructures is therefore essentially a re-design of the territory through routes and views, both in distance and internal to the spaces, that is the conquest of a landscape dimension within the design project. Space, movement and landscape are the essential elements of a design project around infrastructures.

Figure 6. Atelier Architectural Design: heterotopic collage.

INHABIT INFRASTRUCTURE: A SET OF EXPERIMENTAL SOLUTIONS

The topic of the infrastructure was explored within the design atelier at the University of Salerno and on other occasions such as during a summer studio in New York City. The studio works were addressed to different case-studies and sites but they all had the common goal of rethinking the infrastructure as city space.

Starting from the perceptual experience of crossing over the city, the proposals reflected aspirations that hold together qualities of public space and different possible re-uses. The design projects aimed to respond to the complexity of the infrastructural systems within the city, holding together potential and current needs. The design projects were urban solutions to open issues waiting for ideas.

The proposed solutions thus expressed first of all a critical position towards the topic, proposing total or partial transformations and reuses, recognizing the infrastructures potentiality of city space with specific characteristics.

Figure 7. Atelier Architectural Design: case studies selection.

Among the case-studies, one dealt with the transformation of the George Washington Bus Terminal in New York designed by Pier Luigi Nervi during the 1960s. The terminal is recently undergone under a renovation project which, however, has not enhanced its spatial and engineering qualities, being just a sort of restyling. Through the studio work we discovered the complex network of spaces which connect with the city at different levels and the proposals delt with a new use of the various levels – in particular of the roof – a definition of a new system of paths, enhancing pedestrian and bicycle use, discovering the infrastructure potential as a space of the city and not only as technical element.

In a studio work in Salerno, the investigation started from the experience of walking in search of the understanding of the infrastructure space. Among the case-studies one of the most significant was the reuse of the viaduct Gatti in Salerno, which was initially intended for demolition because its use has been replaced by a tunnel. The proposals took advantage of its position and potential of transformation as a pedestrian walkway for its being in close contact with the upper parts of some buildings and connecting at the same time with the ground level, where along the street there are already soccer fields and other public use could be developed, thanks to the proximity with the port and the water.

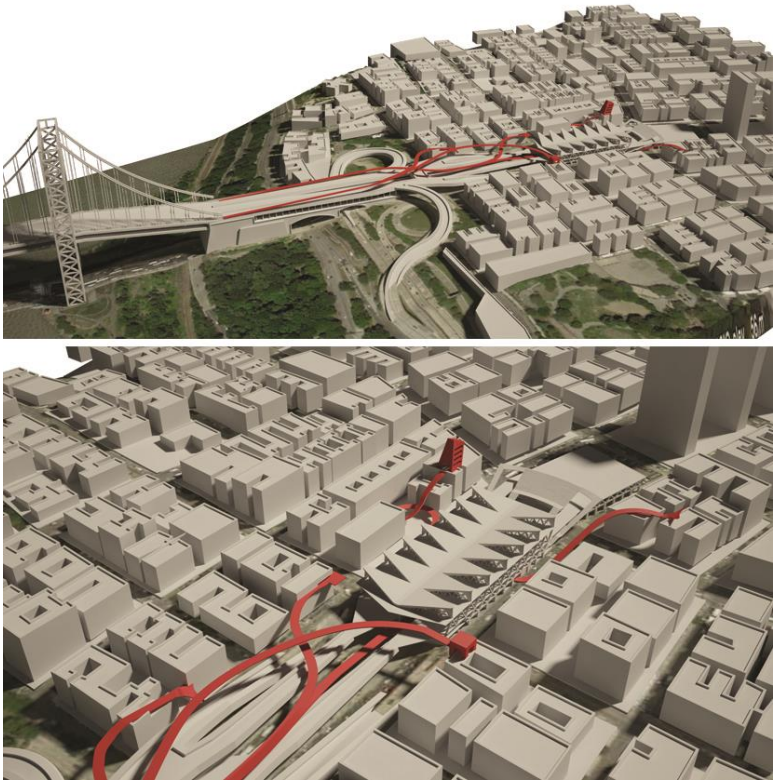

Figure 8. Atelier Architectural Design: proposal solution for the case-study George Washington Bus Terminal in New York.

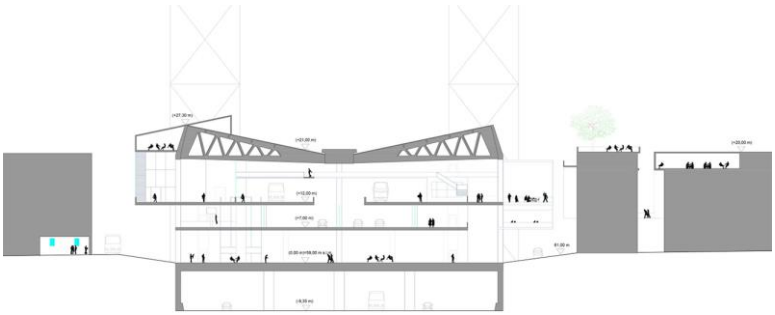

Figure 9. Atelier Architectural Design: proposal solution for the case-study George Washington Bus Terminal in New York.

Street Architecture was the title of a studio on a project competition in Rome, on the east side of the city. We started from studies and investigations on relevant road case studies. The main goal of the studio was to solve the gap among the great scale of the infrastructure and the scale at the urban level, finding in a sense a medium level of contact and relationship within the modern district of the Olympics with the viaduct of Corso Francia, designed by Pier Luigi Nervi.

Finally, another studio work dealt with the topic of minor train stations, within a set of case-studies selected by the students themselves, all aimed at rethinking the train station role as promoters of new developments for small and medium-sized cities and also with the goal of working on the meaning of the station as an infrastructure of the city re-interpreting its uses and needs.

Figure 10. Atelier Architectural Design: case-studies in Salerno.

CONCLUSION

Rethinking infrastructure in cities today means to understand how to interpret them through their spatial qualities and features. If today we look at infrastructures and their reuse within an urban context, it is because they have been interpreted as new possibilities for public space.

The study of infrastructures thus becomes an opportunity to rethink them not only from a functional point of view, but as a prerequisite for any choice that determines their existence, function, and role within the urban fabric. Infrastructures generate opportunities for space within the city characterized by relationships of scale, measure and views that can be enhanced within the design project.

The dichotomy between reuse and demolition cannot be replaced by an idea of modern infrastructure that looks exclusively at functionality and increased consumerism, forgetting the relationships with the city and the landscape. Infrastructures bring with them perceptive and emotional potentialities which become opportunities of space to live the city differently.

NOTES

[1] Gianni Canova, “Rotaie, viadotti, autostrade,” in *L’architettura del mondo. Infrastrutture, mobilità, nuovi paesaggi*, ed. Alberto Ferlenga et al. (Milano: Compositori, 2012), 232–239.
[2] James Graham Ballard, *L’isola di cemento*, trans. Massimo Bocchiola (Milano: Giangiacomo Feltrinelli Editore, 2007).
[3] *Sacro GRA*, directed by Gianfranco Rosi (2013; DocLab, La Femme Endormie, and Rai Cinema, 2013), 1:33, DCP.
[4] Nicolò Bassetti and Sapo Matteucci, *Sacro romano Gra* (Macerata: Quodlibet, 2013).
[5] Michel De Certeau, *The Practice of Everyday Life*. (Berkeley and Los Angeles: University of California Press, 1984), 117.
[6] Alison Smithson and Peter Smithson, *Changing the Art of Inhabitation* (London: Artemis, 1994).
[7] Henri Lefebvre, *Rhythmanalisis. Space, Time and Everyday Life*, trans. Stuart Elden, and Gerald Moore (London - New York: Continuum, 2004), 27–37.
[8] Donald Appleyard, Kevin Lynch, and John R. Myer, *The View from the Road (*Cambridge Mass: MIT Press, 1964).

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URBAN INTERIORITY: ADAPTIVE REUSE AND ENVIRONMENTAL AGENCY

Author:
RANA ABUDAYYEH

Affiliation:
UNIVERSITY OF TENNESSEE, USA

INTRODUCTION

An accelerated rate of development has left our cities cluttered with vacant and deserted structures. These traces of our use sit idle in often contested conditions. Reappropriating spaces within the city is the main focus of this paper, gauging the synthesis and propagation of new strategies to reactivate decommissioned segments of the built environment. Such approaches to design are not new; adaptive reuse has been a dominant mode of producing and reproducing spatial narratives since antiquity. Such modalities issue multifaceted sites and conditions that are often contextual rousers, to say the least. Not only are the politics of adaptive reuse rich, but also the need for such resilience in design is now more urgent than ever due to the increasing scarcity of resources. Additionally, the pressing realities of climate change require a prompt and robust response to how we approach a new era of architectural interventions, positioning interior thinking and design modalities at the center of environmentally responsible practices. Towards that end, the paper features work from an interior architecture upper-level design studio, illustrating the potential of employing adaptive reuse to various urban sites as means to revitalize the city's abandoned sites and structures and mitigate the environmental impact of new construction.

Driving strong, measurable and meaningful action on climate change requires us to think outside the bounds of conventions and employ design in new trajectories. As the era of dependence on fossil fuels comes to an end, replaced by renewable energy sources and virtual connectivity, a paradigm shift in urban thinking must occur. Energy forms fundamentally shape the attributes and capabilities of society. Accordingly, a genuine and comprehensive shift in energy today demands (in addition to the adoption of renewable, ecologically sustainable energy sources) new political structures, social dynamics, educational systems, discursive modes, values, practices, and habits. Undoubtedly, cities in the near future will have to contend with new complexities, whether those stem from the irresponsible approaches of the past era or the ever-changing programmatic needs and narratives of contemporary life.

THE CITY AND TACTICAL INTERVENTION

In 2016 it was widely acknowledged that our human impact has been so substantial on the planet that it warrants a new geological classification known as the Anthropocene. A large part of this impact is linked to cities. By 2050 the UN projects that 68% of the world's population will be living in cities.

Cities contribute almost 70% of the world's carbon emissions.[1] As we consider design narratives for a sustainable and resilient future, the city is the place to start. The city, with its intricate systems and various social implications, offers rich grounds for questioning current design practices and projecting new social, political, and environmental agendas.

Cities have captured designers' imaginations for years. They have stirred rich architectural narratives - such as the Futurist City and Archigram's Plug-in City- that informed trajectories for urban development and planning. Yet more often than none, the imaginative narratives that underlie these design strategies were rooted in utopic visions of the grand metropolis that was built on profligate appetites for the bigger, faster, and taller constructs and their derivative images of control, wealth, and prosperity. As the impact of these habits is manifesting decades after their introduction, calls for a different approach to the city's evolution have emerged, making a case for the city as a responsive organism. Such counter-movements to the megacity focus on sustainable solutions and resilience as opposed to hyper-growth and excessive consumption. In their book, CJ Lim and Ed Liu defined the city as a compact and smart entity that offers synergies supporting interactions and societal cohesion.[2] While the terming of the city has been a hallmark of reimaging its premise, it is its living attributes that have transcended the labels and proved the metropolis' key ingredient for social subsistence.

The city's living attributes are dependent on infrastructural factors that cater to density, mobility, and resource management. While these macro-dynamics inform the city's pragmatic functions, its ethos hinges on the dialectics of outside and inside, directly catering to human-centric occupancy and shared urban commons. Depending on layers of social relations and mutual obligations, urban commons foreground communities and empower localities challenging liberal-economistic notions of property and ownership.[3] With this milieu, distinct challenges and opportunities for intervention within the urban fabric arise. Intervention informs a fluid agenda for resilient future cities that actively responds to the pressing realities of shifting environmental and socioeconomic parameters.

GROWING THE CITY INWARD

Rapid change, higher population density, and limited resources have thrust interior space to the forefront of the negotiations for the value of the city, evaluating the city's longevity in light of its ability to readapt its internal voids and volumes. According to the Global Status Report 2017, published by the UN Environment and the International Energy Agency:

Together, building and construction are responsible for 39% of all carbon emissions in the world, with operational emissions (from energy used to heat, cool, and light buildings) accounting for 28%. The remaining 11% comes from embodied carbon emissions or 'upfront' carbon that is associated with materials and construction processes throughout the whole building lifecycle.[4]

In light of these realities, adapting and altering existing structures presents viable trajectories for the city's growth. Unlike developing vertically or sprawling horizontally, growing inwardly reconfigures interior spaces within the city and accommodates the natural discontinuities and cyclicality of urban development.

Interior architecture's aptitude for reusing space and temporal layering of urbanity is perhaps among its primary agencies. There has never been a time where exercising such agency is more integral. Cities are constructed ecologies,[5] and like any living organism, their structure and stability are dependent on their inner makeup. Fortifying cities from the inside out enables the urban landscape to withstand turbulence, account for fluctuating flows of people and commerce, and support culturally-rooted placemaking.

PARTICIPATORY URBANITY, A RADICAL INVERSION OF THE CITY

Placemaking is fundamentally a participatory endeavor. Future cities involve forming robust collaborations between users, communities, designers, policymakers, and others to explore the spatial consequences of cultural, political and environmental issues that define and impact the city. This notion of a democratic design practice and city planning have early seeds in the teaching and practice of Giancarlo De Carlo, among others. De Carlo advocated for a democratic and participatory design ethos, encouraging diverse collaboration and inventive situated design solutions rooted in citizenry-based design approach to architecture and the city.[6] De Carlo's pluralistic and inclusive design methods are regaining popularity today amidst heightened awareness of the need for adaptive cities and responsive architecture that amplify the voices of users and responds to their needs. De Carlo acknowledged that even when direct participation by the public was not always possible, a contextual understanding of any given architectural act is critical.[7] Superseding past practices of the generic, homogenous city, a flexible mode of urban development caters to the complex layers of the city and its citizenry.[8] Such modalities entail entrepreneurial stances that bring together diverse societal actors, engaging in more localized planning procedures, marking a shift from government to governance.[9] Taking into account the daily use of the city and its architecture, paying homage to the plurality of lives and styles of living of its inhabitants, is a radical act of shifting focus from the city's global image to its local makeup, from its external engagements to internal attributes and management.

INTERIORITY AND CIVIC AGENCY

Linking the city's inertia to interior space holds vast implications for the design field specifically and the built environment at large. This approach requires designing active nodes in the city's complex networks that hinge on understanding new occupancy patterns. Under any assessment, the relationship between the city and its interiors engenders complex overlaps and extensions between its users' narratives (that tend to be internal affairs) and collective policies (which are external matters). It demands well-devised resolutions that actively employ interior spaces in a continuum to the city's ebbs and flows instead of endpoints, warranting new approaches toward design in its various scales.

Urban strategies that embody the qualities of interiority are inherently human-centric. Urban interiority renders visible the collective power of user-led initiatives. It harnesses grassroots interventions that bring communities together, combining resources in order to shape the built environment. Interiors also form personal habits enmeshed with the collective social identity of place. In her article, Toward a Definition of Interiority, Christine McCarthy presents interiority as a broad condition that transcends the restrictive architectural definition. Interiority constructs contextual affiliations and prescribes rules of habitation.[10] Hence, interiority not only reactivates dormant segments of the city but also alters the practices of its residents, a requisite combination for driving climate action.

TOWARDS A NEW PRACTICE AND PEDAGOGY

Pressing realities of climate change require a prompt and robust response to how we approach a new era of architectural interventions, positioning interior thinking and design modalities at the center of environmentally responsible practice. Accordingly, interiority is a concept of increasing importance to architects and urbanists today. The future of professional practice and, by extension, pedagogy will have to address generative climate complexities, remediating the irresponsible approaches of the past era while addressing the ever-changing programmatic needs and narratives of contemporary life.

Situated at the intersection of these realities, an upper-level interior architecture studio intended to engage these complex, multifaceted parameters. The studio set out to reactivate existing segments of

the urban fabric through adaptive reuse to assert an environmentally conscientious design agenda. Cognizant of the overlap between culture, politics, and climate, the studio required critical stances and remarkable resolutions that speculate upon architectural and urban strategies that embody the qualities of interiority. The work assumed a manifesto of sorts that projected innovative responses to immanent climate issues and stirred up new imaginative design schemas. Working in multiple urban settings, each presenting a set of challenges and opportunities, the studio pinpointed certain buildings that have been abandoned or soon to be retired due to contextual shifts such as migration patterns, sobering economies, diminishing resources, and changing occupancy patterns. Collectively, the projects aimed to formulate an interior-focused agenda for future cities through adaptive reuse, using the reactivated interior spaces as catalysts for invigorating the city.

Future cities will depend on joint networks and shared platforms to assert a more collective societal presence. This shift towards civic commons necessitates new urban centers and shared transportation platforms understood in light of an impending fourth industrial revolution characterized by a fusion of technologies that blur the lines between the physical, digital, and biological spheres.[11]10 As such, the studio engaged the design of multimodal drone transportation hubs grafted in the context of existing buildings. It was imperative that students take the primary authorship in deploying a framework for a renewed built environment that works for the collective well-being while harnessing the potential of a brave new world. The reprogramming of the selected buildings was informed by contextual attributes and rooted in a multiplicity of functions that are responsive to the users' needs and supportive of the community's growth. The studio also examined narratives of a near future when drone taxis will be a popular mode of traversing the urban setting and fossil fuel infrastructures will be retired. The following section gives synopses of the sites and interventions the studio addressed. Together the projects formulate a multivalent agenda for cities in a changing world.

URBAN FUTURES: SPECULATIVE NARRATIVES FOR A RESILIENT TOMORROW

Agrarian Interiority | Michigan Central Station, Detroit, MI

Detroit is a city with a rich and complex history. The reshaping of its built environment is a delicate balancing act between the various multifaceted contexts of Detroit's being. The Michigan Central Station is one of Detroit's architectural icons. Vacant since 1988, it offered the studio prime grounds for adaptive reuse. While a multimodal transportation hub was introduced to the design, the primary intervention focused on the design of an energy farm with an incubator green wall system, drone landing pads for human passengers and pollinator systems, and a solar farm, among other spaces. Holistically, the new Michigan Central Station is still a depot- one that invites people for more than one reason. As a "growing machine" of mass proportions, this architecture grows crops, culture, hybrid urban potential, and understanding between Detroit's past, present, and future.

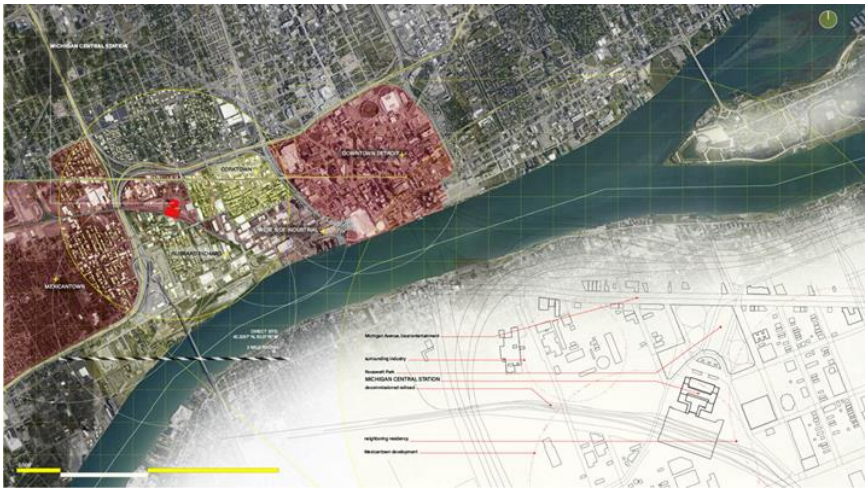

Figure 1. Context Plan, Michigan Central Station Intervention, Detroit. Student work, source by author

Figure 2. Interior atrium perspective showing the growth wall and pollinator drones | Michigan Central Station Intervention, Detroit. Student work, source by author

Dynamic Urbanity | The Lever House, New York City, NY

The Lever House was constructed in 1952 to be the official American headquarters for the Lever Brothers' soap company. It was the first steel and glass structure on Park Avenue, becoming an iconic symbol of the modern office building. The students, while respecting the original form of the building, transformed this rigid structure into a sculptural, dynamic, and responsive mixed-use tower that serves as a transportation hub, workspace, hotel, innovation center, and a future-forward landing spot for drone taxis. The proposal reimagined the work-life dynamic, integrating digital interfaces with physical reality. The design proposed a unique symbol of innovation and advancement, reinventing our engagements with the urban setting.

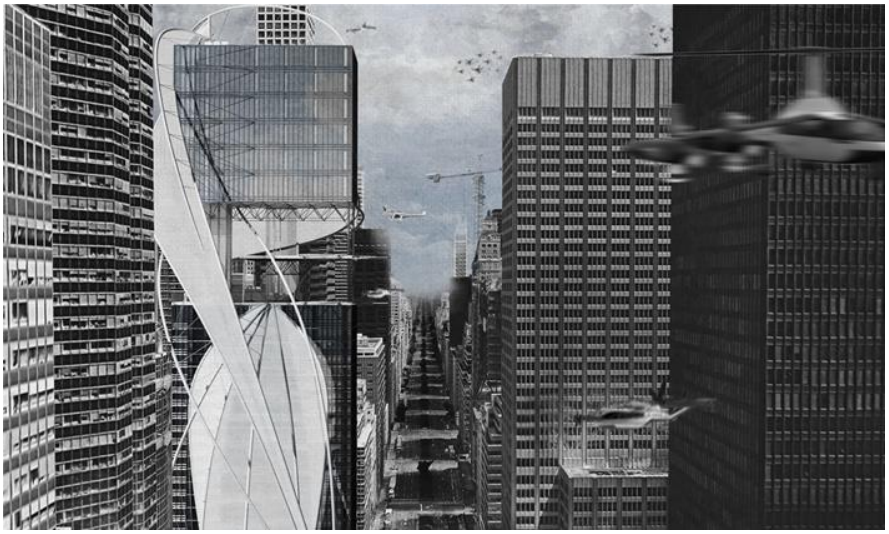

Figure 3. Park Ave. exterior perspective, the Lever House Intervention, NYC. Student work source by author

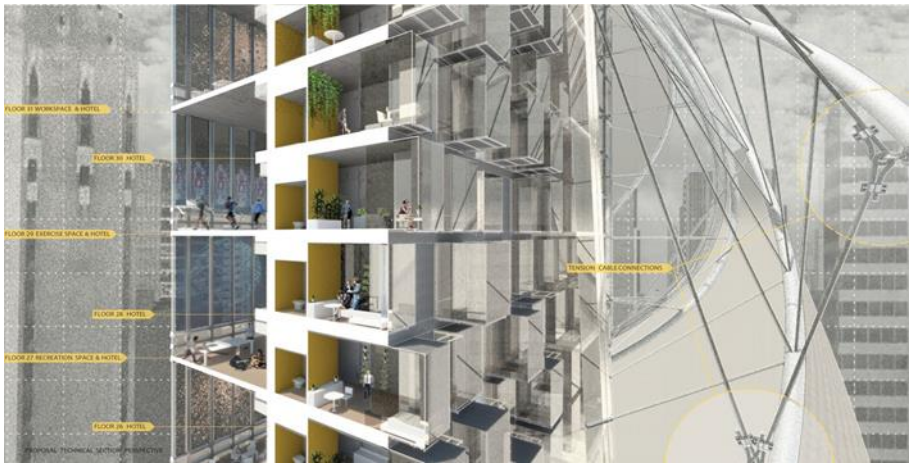

Figure 4. Section-perspective showing shared work area and hotel units,| the Lever House, NYC, student work, source: by author

Adaptive Porosity | 1111 Lincoln Rd. Parking Garage, Miami Beach, FL

Today, 1111 Lincoln Road Parking Garage welcomes tourists and locals to the sprawling pedestrian mall that shares its namesake. Yet, the future narrative of Miami and its built environment is one that is tethered to imminent climate realities. The site is already beginning to experience the impact of rising sea levels. Working within this context, adaptability was a key concept that drove the students' intervention. By building upon the original themes of the garage, the students envisioned a new resilient icon for the city that caters to Miami's rich culture and diverse communities. Bars, lounges, restaurants, and an open-air amphitheater are combined with an urban fishery, bioreactor, and drone landing pads to create a new activity node that reflects the multifaceted context. To ensure the design's

longevity, the design drew inspiration from coral reefs, introducing a high level of formal porosity to the building, enabling it to flourish in water.

Figure 5. Aerial site view, 1111 Lincoln Road Parking Garage addition, Miami Beach. Student work, source: by author

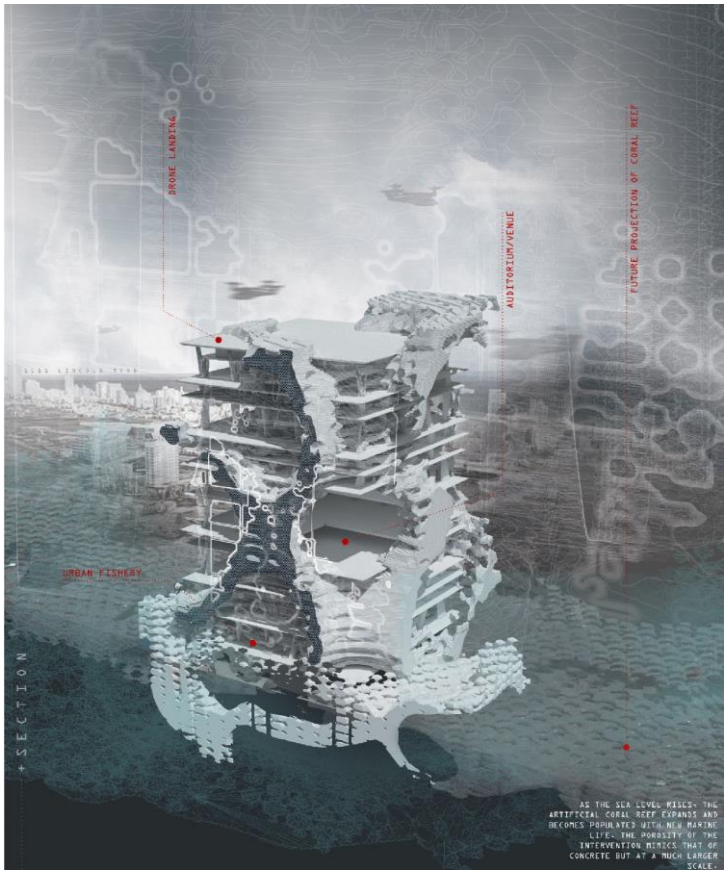

Figure 6. Conceptual section perspective | 1111 Lincoln Road Parking Garage addition, Miami Beach. Student work, source: by author

Urban Commons | Westside Pavilion Mall, Los Angeles, CA

Los Angeles is known for its stubborn car dependence and extensive sprawl, offering a communal transportation hub proved relevant on many levels. The proposal addressed the reinvention of the indoor mall as a vibrant community node encouraging local culture networks to emerge in and around the site. The students transformed the Westside Pavilion Mall into a dynamic mixed-use community hub integrating retail, co-working spaces, test kitchens, a graffiti museum, and a skateboard park with

a taxi-drone station. The proposal is sensitive to the adjacent neighboring residential areas and offers multiple public commons and gardens.

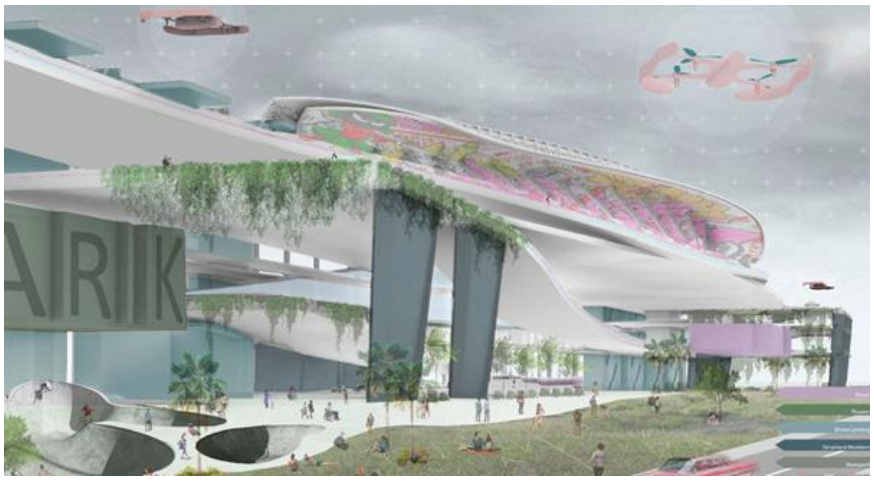

Figure 7. Exploded Axonometric, Westside Pavilion Mall. Student work, Source: by author

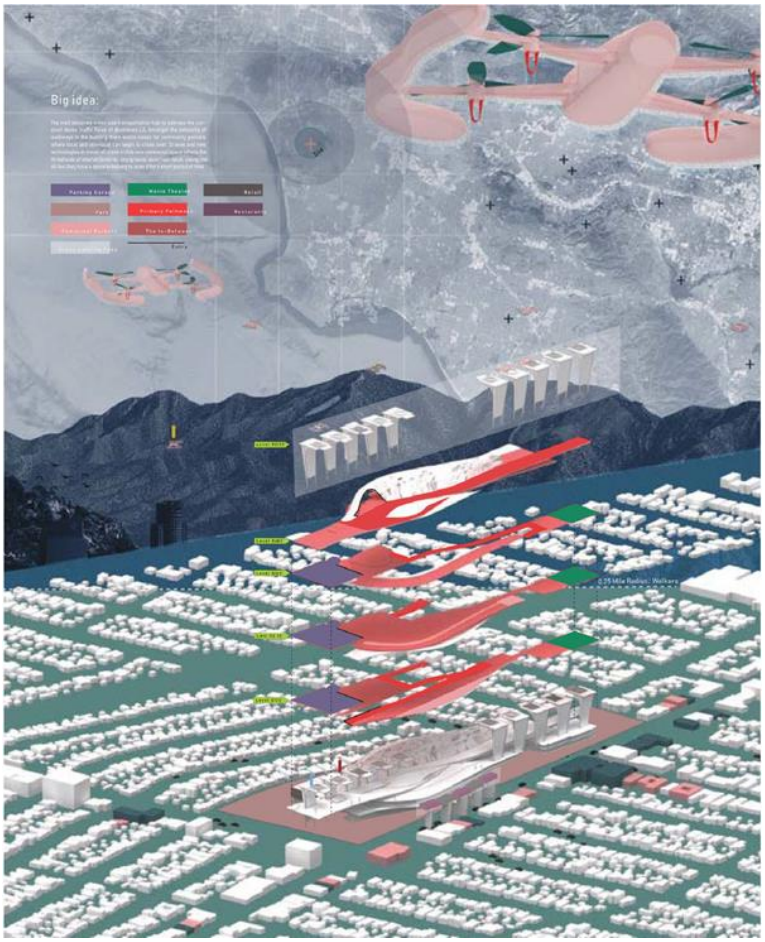

Figure 8. Exterior View, Westside Pavilion Mall. Student work, Source: by author

CONCLUSION

Adaptive reuse has been a prominent way of rethinking spatial narratives, redefining inhabited space and invoking lived-in qualities in the city. Rethinking the city from within is in tune with the rhythms of everyday urban spaces and compatible with the parameters of a changing world. Hence, interiority is emerging as a concept of increasing importance to urban discourse, particularly as cities actively shift to more resilient design agendas and sustainable practices. While the concept of urban interiority has been in circulation for a number of years, linking it directly to a citizen-driven climate action and placemaking engenders considerable impetus for the city's transformation and sustainable evolution.

As cities continue to navigate the complex terrain of climate change, cultural shifts, population displacement, and socioeconomic instability, an approach that focuses on animating the internal cavities of the city (both its public spaces and vacant parcels) is imperative. Inherently predisposed to creating hospitable settings, interior practices are capable of catering to our changing urban landscapes, and can seed inventive solutions to the pressing realities facing our cities today and in the future.[12]11 It is prudent to assume that this decade will witness an acceleration of political and environmental changes, world conflicts and crises, and global market and policy shifts, among other factors. Here therein, the designer's role must undergo yet another evolution, one where mitigating, negotiating, and accommodating space outweigh its demarcation. While such redirection will undoubtedly usher a shift in architectural pedagogy and practice, it will surely deliver a more significant impact and advance progressive agendas geared towards resilient futures.

NOTES

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[9] Growth and Corijn, 504

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TINY LIVING IN DORTMUND: AN EXPERIMENT IN SUSTAINABLE LIVING AND SUFFICIENCY

Author:
KATHARINA WOOD

Affiliation:
TECHNICAL UNIVERSITY OF DORTMUND, GERMANY

INTRODUCTION

In Germany, the average single-family home is 140 m² in size. But is this a viable solution for a climate neutral future? Is the freedom to build large and in a conventional way inhibiting the freedom of others to enjoy green spaces and a healthy planet? The German federal constitutional court ruled in 2021 that Germany has to increase its efforts in the combat of climate change arguing on the basis of future generations' rights to the freedoms of a healthy planet and intergenerational justice. Does this mean the future of the single-family home should be tiny?

The city of Dortmund is planning a 'tiny village' in the suburb of Dortmund-Sölde in Germany. The current plan is to create fifty tiny housing units of which twelve will be part of a modular housing project and thirty to thirty-five conceptualized as free-standing tiny houses. Each tiny house or tiny apartment is projected to encompass a maximum space of forty-five m² for the first person, each additional person adding fifteen m² to the living space. The project is novel in the Ruhr metropolitan area which is trying to find ways to move toward a more sustainable future and move on from its highly pollutive history as a major industrial center. This paper addresses the question of how the prospective tiny village can contribute to urban sustainability and scrutinizes opportunities and limitations. I will argue that especially its culture of sufficiency and connection to the degrowth city can contribute to urban sustainability but that the proliferation of the idea of the single-family home and its creation of urban sprawl is detrimental to it. I therefore analyze the tiny village in planning through the triple bottom line of sustainability. Subsequently, I put its cultural construction and cultural context within the larger tiny house movement into perspective.

TINY HOUSE MOVEMENT

The interest in tiny houses is growing rapidly in the U.S and in Germany. The movement is inspired by the 19th century works of Thoreau and Emerson.[1] Thoreau's retreat to Walden Pond and his criticism of affluence and luxury as well as his immersion into living simply in nature forecast many desires of tiny house occupants. Environmental humanities scholar April Anson states that the origins of the tiny house movement are generally attributed to architectural inspirations in Lloyd Khan's *Shelter* (1973), Lester Walker's *Tiny, Tiny Houses* (1987) or Sarah Susanka's *The Not So Big House* (1997).[2] Since these publications, the tiny house idea has spread globally also to Germany where several cities are enabling and constructing tiny house neighborhoods. Tiny houses are structures

smaller than 75 m² of which some are on wheels.[3] The tiny village in Dortmund will not include tiny houses on wheels but only more permanently fixed small structures. Tiny houses are generally characterized through certain aesthetic qualities that have also made them very popular on social media. The minimalist aesthetic is also tied to inhabitants' cultural models and ideals. Oftentimes the structures are built with wooden exteriors, large windows and multi-functional interiors, where tables and beds can be stowed away or serve another purpose. Tiny houses appearances are generally relatively box-like, but can vary to resemble more traditional houses and roofs or more experimental architecture.

Tiny Village in Dortmund-Sölde

The first Dortmund informational meeting about the prospective tiny house project in Sölde titled "Forum Stadtbaukultur" in 2019 attracted almost one hundred attendees. Gerald Kampert, employee in the urban planning and building regulations office in Dortmund, has since received emails and calls from interested parties on a daily basis. So far, throughout 2021, the urban planning and building regulations office hosts monthly meetings with interested citizens to inform them about the current status of the project and to plan together.

The project is an experiment in participatory planning. Interested parties are consulted about important planning steps such as heating and electricity installment options in the settlement. Currently, a zoning and development plan for the former sports field is being developed. The land has to be turned from a sports field into a building plot. The area where the tiny village will be placed is on the outskirts of Dortmund and almost resembles a rural area. Actual construction is planned to start in 2023 or 2024 depending on the development of the infrastructure (roads, water supply, heating etc.).

The tiny village was envisioned to create more sustainable and affordable living space in the Ruhr region. In order to scrutinize this, the planned tiny village will be viewed through the triple bottom line of sustainability. The triple bottom line of sustainability is a model conceptualizing sustainability as a framework with three dimensions: the ecological, economic, and social perspective.

Ecological sustainability

From an ecological point of view, future builders are encouraged by the city of Dortmund to pursue ecological sustainability in their designs and concepts. The concrete sustainability criteria by which the proposals will be evaluated are still being established and will be announced later this year. Some prospective building groups are envisioning the use of photovoltaic systems as well as the greening of roofs to make them healthy habitats for insects. Other building groups desire to build mainly with wood, clay, and straw. In general, the land will be divided into several spaces for building groups that collectively plan their plot. Each building group will consist of a minimum of four separate parties. The building plots for the free-standing tiny houses include an average space of 100-150 m² and the building groups can decide if they want to buy the land from the city or lease it. Possibly, the heat from the waste canal that runs parallel to the nearby river "Emscher" can be used. Potential solutions for a local heating system are currently under discussion.

The prospective building groups further wish to minimize the ecological footprint of their buildings through a carbon-sensitive selection of their materials. They are also considering concepts related to the idea of the circular economy. Within the circular economy, not only the production costs, but the entire life cycle of a product is evaluated and all products used for building are supposed to be reused, reusable, or recyclable. This sufficient mode of ecological circulation is often termed 'cradle-to-cradle' principle and can run against capitalist principles.[4]

Generally, the question of how ecologically sustainable tiny houses are is an on-going debate. Their relatively large exterior surface lets heat escape fairly easily. In modular multi-party buildings a lot of the heat can be retained by adjacent apartments. In a model calculation conducted by the German engineers Wortmann and Wember, they demonstrate that tiny houses consume seven times the amount of heating needed for a passive house construction per person on a third of the space. Wortmann and Wember therefore argue that tiny houses are not the right solution to combat climate change and build sustainably.[5]

Apart from energy efficiency, there are further aspects to consider in regard to tiny houses' environmentally-friendliness. For instance the amount of building materials used is relatively small compared to other constructions and they often rely on regenerative materials such as wood for the exterior walls or wool as insulation. As done in evaluations according to green building standards, the entire life cycle of a building must be taken into consideration. Unfortunately, at the current moment, there are very few LCAs done for tiny houses. This is due to the fact that there is a lack of green building assessment systems specifically developed for tiny houses. The Öko-Zentrum NRW based in Hamm, Germany, together with plan_lokal, an architecture firm which is based in Dortmund, therefore plan to apply for funding for a research project accompanying the establishment of the tiny village in order to develop green building criteria for tiny villages and tiny houses. This would be an important step in the evaluation of tiny houses and their ecological impact.

Living in a tiny house additionally and importantly affects the life inside of it, where consumption is willingly reduced due to small storage capacities and waste-reducing attitudes. In the tiny house movement there is an awareness for topics such as zero-waste and minimalist lifestyles in order to reduce the individual's ecological footprint. Tiny living can contribute to a culture of 'sufficiency' in a degrowth city.

Social sustainability

Regarding social sustainability, tiny house communities have a lot to offer. The project in Sölde is organized in building groups and includes a housing project with approximately twelve parties ("Wohnprojekt"). The building groups are encouraged to think and plan for communally shared spaces such as piazzas, bike and tool sheds, laundry rooms or gardens. In order to establish a sharing community, interested parties have proposed to design a community app. The community app could be used for food and tool sharing or sports and gardening groups among others. The communal orientation will be relevant for the application process in which the building groups' concepts for social spaces will be compared. The building groups also have to develop a plan for a consistent exterior design which demonstrates their concept of building culture. The general aim is to create an active and lively neighborhood with certain aesthetic qualities as well. The idea to only allow planning in building groups proliferates this social spirit in contrast to allowing single-party applications.

Economic sustainability

Economically, tiny houses are much more affordable than average housing in the Dortmund area. Nevertheless, they cannot be considered to be cheap. Tiny houses in Germany cost on average between 40.000-150.000 Euros from a building kit to a unit ready for occupancy in addition to the cost for the land. The plots in Sölde, which can be bought or leased, are tied to the regional land prices and these have been increasing dramatically over the last years. It can be assumed that the price for 150 m² will be at least 55.000 Euros. Some interested parties have already opted out of the planning for the tiny village because it exceeds their budget. Therefore, an option was created to apply for the

tiny village as a group of renters paired with an investor that is willing to develop a group of tiny houses.

Whereas it might seem as if low-income city dwellers would be especially interested in tiny houses, Gerald Kampert expresses: "I have the feeling that we are appealing less to the socially disadvantaged […], but rather to those who can afford something bigger but don't want to because they want to keep their carbon footprint small or are convinced minimalists"[6] (my translation).[7] This perspective is also voiced by urban sociologist Nik Summers who presents research that many prospective tiny house dwellers are low-income but high cultural capital individuals with higher educations.[8] His research focuses on the tiny house movement in the United States but there are many parallels to German developments. In his analysis, he claims that the middle class has come under pressure by increased costs of living, education, healthcare, and childcare and therefore retreats to cut spending where possible.[9] For some, the solution is to live smaller, because average housing is no longer affordable. The tiny house movement is fueled by an affordable housing crisis in the U.S and Germany in addition to the world-wide ecological crisis. Even though Dortmund, as a post-industrial city, has had to deal with some shrinkage, the average prices for single-family homes have increased by 20% from 2018 to 2019 peaking at an average price of 479.900 Euros for new buildings and 420.000 Euros for the existent building stock.[10] The official housing market report by the city of Dortmund states that the property market is "under pressure"[11] (my translation).[12] It is therefore plausible that in addition to ecological motifs, tiny house seekers are also driven by economic considerations.

URBAN SUSTAINABILITY: SUFFICIENCY AND THE DEGROWTH CITY

What kind of vision of urban sustainability is conveyed through this project? I argue that it is the vision of a degrowth city invested in a culture of sufficiency. Sufficiency is defined as a culture of 'enough,' which is also the Latin meaning of 'sufficere:' 'to be enough.'[13] The degrowth city therefore always asks: "How much is enough?" Sociologists Maike Böcker et al. argue that for contemporary societies this is a severe "provocation."[14] Cities are usually aspiring to grow in various dimensions and follow a logic of expansion.[15] The idea of the degrowth city "rejects the idea of sustainable development as an oxymoron."[16] It is tied to a politics of sufficiency as a theoretical and practical framework. In contrast, efficiency gains alone presumably will not achieve enough ecological sustainability to stay below the threshold of 1.5 degrees Celsius. Their effects are often lost due to rebound effects and ever-increasing consumption. Sufficiency offers an entirely different perspective. Böcker et al. insinuate that one advantage of sufficiency-oriented urban politics is that they do not depend on technological innovations and implementation can be started immediately.[17] In their view, sufficiency is the necessary frame approach within which efficiency and consistency strategies can unfold their ecological potential.[18] Nevertheless, currently, sufficiency and degrowth urban policies remain "marginalized" in the practice of urban sustainability.[19]

Sufficiency is especially important with regard to the use of land. In Germany, everyday an area of 660.000 m² is developed into building plots or actually built on. Böcker et al. constate for the German context that German tax laws and incentive efforts on a national scale have supported resource-intensive lifestyles.[20] Tiny houses with their reduced consumption of land contribute to sufficient land use in comparison to average single-family homes. The plot in Sölde, for example, can accommodate more than twice as many tiny houses than average single-family homes. Nonetheless, modular apartments of course are much more spatially sufficient than any type of free-standing individual house. Tiny houses in this sense still proliferate the ideal of the single-family home but newly coupled with a vision of an ecologically-sensitive lifestyle. Environmental humanities scholar April Anson argues for the American context that the tiny house movement still strongly incorporates "possessive

individualism"[21] and that the culture of "capitalism cultivates individual self-interest."[22] The project in Sölde tries to work against this culture of individualism through its communal approach with the plots that will be given to building groups that have to present a community-oriented concept. The houses will be individually-owned except for the modular house with 12 units. Unfortunately, so far there has been little interest in the modular housing project. The free-standing tiny houses seem to be much more attractive for future residents. The dream of owning a house still persists through the idea that "my home is my castle." And this dream is far from changing. In Germany, driven by the persistence of this dream, a Green Party politician, Anton Hofreiter, has incited a debate to forbid the future construction of single-family homes. So far, this view remains relatively unpopular. And in the U.S. homeownership continues to make up a large part of the "American Dream."[23]

Sufficiency and Economically-Disadvantaged Groups

Böcker et al. argue further that sufficiency-oriented urban policies can be directly beneficial to economically-disadvantaged groups.[24] Is this also the case with the tiny house project in Sölde? Anson strongly asserts that "what distinguished the tiny house on wheels from other mobile structures like a mobile home or recreational vehicle were aesthetic differences based on class associations."[25] Anson situates the tiny house movement in discourses of "elite environmentalism"[26] and tiny house activist Lee Pera further attests the movement with a lack of diversity.[27] According to the cultural studies' and sociological perspectives of Tracey Harris there is a "class and race privilege inherent in the movement—how tiny house inhabitants are celebrated for their lifestyle choice, but people living in trailers or other low-income spaces of comparable size are often treated disparagingly."[28] This perspective was also voiced by Black writer and actor Shantira Jackson who states on twitter: "During quarantine I've been watching a lot of tiny house videos and it's so wild that people living in trailer parks are treated like shit and white people living in literal shipping trailers are seen as brilliant. […] I wish we didn't hate poor people."[29] There are tiny house owners who choose a tiny house from their privileged social position whilst for others a small abode is a pure necessity. This might also be a reason why the modular housing project in Sölde has remained fairly unpopular. Tiny living apart from the idea of the free-standing tiny house has not become a social media trend yet.

CONCLUSION

Tiny houses remain very versatile structures and contrary to the ascertained class privilege, they also have been used as tools of indigenous resistance in the "North Dakota Pipeline" protest or to combat homelessness. In Germany, Little Home e.V. is an association that builds 'little homes' with 3,2 m² and gifts them to homeless people. Anson argues that the tiny house movement coupled with degrowth attitudes can spur an "ecological revolution."[30] This view might be overly optimistic, but tiny houses can certainly be one contribution to urban sustainability especially due to their propagation of sufficient and minimalist lifestyles. These lifestyle choices influence consumer behaviors and consumption patterns. The tiny house movement further brings up important discussion points such as the circular use of low-impact and regenerative materials, ecological heating systems or zero-waste lifestyles. On the downside, free-standing tiny houses contribute to urban sprawl and ecologically built multi-party houses are more ecologically sustainable solutions. And its attachment to the single-family home is an improbable solution for urban sustainability in densely populated areas. The classic tiny house lifestyle is more of a rural script for the outskirts of metropolitan areas. The degrowth city and cultures of sufficiency must be included in future urban sustainability efforts.

Finally, the report on limiting global warming to the 1,5 °C target conducted by the German Wuppertal Institute argues that decarbonizing the building stock must answer three questions in

particular: “How much living space is enough?” “How energy-efficient should buildings be?” and “How should buildings be heated?”[31] They further argue that limiting and ideally reversing the trend toward increasing living space per capita would be a powerful lever for emission reductions and this is exactly where tiny houses can provide a powerful contribution and lead by example.

NOTES

[1] April Anson, “Framing Degrowth. The Radical Potential of Tiny House Mobility,” in *Housing for Degrowth. Principles, Models, Challenges and Opportunities*, ed. Anitra Nelson, and Francois Schneider. (New York: Routledge, 2018), 73.
[2] Anson, 72.
[3] Anson, 67.
[4] Mengmeng Cui, “Key Concepts and Terminology,” in *An Introduction to Circular Economy*, ed. by Lerwen Liu, and Seeram Ramakrishna. (Singapore: Springer, 2021), 22.
[5] “Tiny Houses – ein positiver Beitrag zum Klima?” Wortmann & Wember, accessed April 20, 2021, https://blog.wortmann-wember.de/tiny-houses-ein-positiver-beitrag-zum-klimaschutz.
[6] Valentina Resetarits, “Der Hype ums Tiny House ist so groß geworden, dass die ersten deutschen Städte Maßnahmen ergreifen,“ Business Insider, May 28, 2019, https://www.businessinsider.de/leben/der-hype-ums-tiny-house-ist-so-geworden-dass-die-ersten-deutschen-staedte-massnahmen-ergreifen-2019-5/.
[7] German original: “Ich habe das Gefühl, wir sprechen weniger sozial Schwache an, die verzichten müssen, sondern eher jene, die sich schon etwas Größeres leisten können, aber eben nicht wollen, weil sie ihren CO2-Fußabdruck klein halten wollen oder überzeugte Minimalisten sind.”
[8] Nik Summers, “The Socio-Economic Concentration of Intensive Production Interest: Lessons from the Tiny Home Community,” *Journal of Consumer Culture* 0 (2021): 3.
[9] Summers, 1-3.
[10] Stadt Dortmund, *Wohnungsmarktbericht 2020. Ergebnisse des Wohnungsmarktbeobachtungssystems 2019* (Dortmund: Stadt Dortmund, Amt für Wohnen, 2020), 17.
[11] Stadt Dortmund, 17.
[12] German original: “Anspannung auf dem Dortmunder Eigentumsmarkt.”
[13] Uwe Schneidewind and Angelika Zahrnt, *The Politics of Sufficiency. Making it Easier to Live the Good Life,* (München: Oekom, 2014), 13.
[14] Maike Böcker et al., *Wie wird weniger genug? Suffizienz als Strategie für eine nachhaltige Stadtentwicklung*, (München: Oekom, 2020), 6.
[15] Böcker et al., 6.
[16] Anson, “Framing Degrowth,” 75.
[17] Böcker et al., *Wie wird weniger genug?,* 7-15.
[18] Böcker et al., *Wie wird weniger genug?,* 7.
[19] Böcker et al., *Wie wird weniger genug?,* 7.
[20] Böcker et al., *Wie wird weniger genug?,* 15.
[21] Anson, “Framing Degrowth,” 74.
[22] Anson, “Framing Degrowth,” 74.
[23] William Rohe and Harry Watson, *Chasing the Amercian Dream. New Perspectives on Affordable Homeownership,* (Ithaca, NY: Cornell UP, 2007), 3.
[24] Böcker et al., *Wie wird weniger genug?,* 7.
[25] Anson, “Framing Degrowth,” 69.
[26] Anson, “Framing Degrowth,” 73.
[27] Lee Pera, “‘Everyone’s Welcome’: The Façade of the Tiny House Movement,” *Medium*, September 22, 2017, https://medium.com/@leepera.
[28] Daniel Ingram. “Tracey Harris, the Tiny House Movement: Challenging our Consumer Culture.” *Human Ecology* 48 (2020): 640.
[29] Shantira Jackson, (@tira_tira_tira), 2020. “During quarantine I’ve been watching a lot of tiny house videos.” Twitter, June 23, 2020.
[30] Anson, “Framing Degrowth,” 77.

[31] Georg Kobiela et al., *CO2-neutral bis 2035: Eckpunkte eines deutschen Beitrags zur Einhaltung der 1,5-°C-Grenze*, (Wuppertal: Wuppertal Institute, 2020), 93.

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THE MEANING OF HISTORIC CITIES IN THE DIGITAL AGE: GENOVA HISTORIC CENTER REGENERATION

Author:
VITTORIA BONINI, SALVATORE POLVERINO, CLARA VITE, RENATA MORBIDUCCI

Affiliation:
UNIVERSITY OF GENOVA, ITALY

INTRODUCTION

"No doubt there is no architecture without some modification of what already exists", states the Italian architect Vittorio Gregotti (1927-2020) in his famous article published in the architectural magazine Casabella 498/9, in 1984, focusing on the topic of architecture as modification.[1]

In the XXI century, the theme of modification regarding urban design and planning in historic towns assumes a completely new meaning. It is the end of traditional planning.[2] The old conception of masterplan is no longer effective since the project is now approached as an in-progress strategy. Designers are finding themselves performing a new set of actions, starting to design in time and not against time, working with territory without destroying it but with layering on it to renew its roots, in a conscious syntony to improve the city.

Moreover, a further change is underway due to the recent and substantial technological developments connected to the so-called "digital transformation". This change leads to a completely new way of designing. Projects now focus on the concept of sustainability and resilience, not only from an environmental point of view but also from a digital one, intended as the capacity to adapt to the changing needs of citizens, increasingly driven by recent technologies.[3]

The progress of an "experimental" project for the regeneration of Genova's historic centre, developed by the University of Genova in collaboration with the Municipality, is shown. Innovation in urban regeneration solutions, digitalization of services, sharing of choices with residents, users and institutions present in the historic centre are the main paradigm of the project.

The city of Genova is a suitable example to discuss the issues of the complex relationship between the preservation of historical and cultural heritage and today's challenges and requirements.

HISTORIC CENTRE REGENERATION

The regeneration of the historical centre of cities is one of the constants and recurrent themes in Italian urban history. The old town is a subject of extreme complexity that, in this work, must be read as an indispensable context for what will be illustrated.

The history of Genova is linked to seafaring and trade: at the centre of trade between Europe, Africa, and the East, it is historically one of the main ports in the Mediterranean Sea.[4] Heavily expanded over the centuries, the city's port underwent a profound transformation at the end of the 19th century, becoming a driving force behind the industrial development of Northern Italy. Today Genova is an

important cruise hub and one of the most used tourist ports. The tourist vocation of the city is affirmed thanks to the very rich landscape and cultural heritage, located in the medieval Old Town, one of the largest in Europe – Figure 1. The Genoese historic centre is a labyrinth of "Caruggi", small and narrow alleys, which unexpectedly open into small squares, where the architectural styles of the historic buildings overlap. Moreover, the historical centre of Genova has been declared a UNESCO World Heritage Site in 2006, thanks to the presence of the so-called route of the "Rolli", the recently restored Renaissance palaces of Genova.

But Genova is also extremely attractive from a technological point of view since the digital transformation is thriving especially thanks to the Italian Institute of Technology (IIT) and the University of Genova. Today, the city of Genova, given the commitment of the Municipality, in cooperation with the offices of the Urban Centre, Urban Planning and Heritage and the Polytechnic School of the University of Genova, is constantly evolving, thanks to the logic of active participation, with which it is enriched, through improvements that are enlighten during workshops and discussion tables with citizens. But Genova is also very attractive from a technological point of view since the digital transformation is thriving especially thanks to the Italian Institute of Technology (IIT) and the University of Genova. Today, the city of Genova, given the commitment of the Municipality, in synergy with the offices of the Urban Centre, Urban Planning and Heritage and the Polytechnic School of the University of Genova, is constantly evolving, thanks to the logic of active participation, with which it is enriched, through improvements that are enlighten during workshops and discussion tables with citizens.

Figure 1. The city of Genova. Image from buildingtechnology.eu

The historic centre could be divided into three main macro-areas: Prè, Maddalena and Molo – as illustrated in Figure 2. With the University of Genova, since 2017, our research team started working on proposals for digital and social regeneration, working in the areas of Prè and Maddalena, proposing two pilot projects: "Prè. Prè-Visioni" developed with the students of the academic year 2017-2018 and "Maddalena. Quartiere diffuso" with the students of the academic year 2018-2019.

Figure 2. The main districts, called "sestrieri", of the historic urban centre of Genova. Image by Vittoria Bonini

Prè-Visioni

Throughout this large area, the study focuses on the redevelopment and revitalization of the Genoese "sestiere", or district, of Prè, one of the city's oldest parts. It is the area immediately behind the part of the historic centre redeveloped by architect Renzo Piano from the event "Colombiadi" in 1992, now open to the city and the hub of tourism in Genova. In this part, there are important activities for the city, such as the cruise terminal, the University, the route of the "Rolli*"* palaces and a large tourist area with varied places of interest. For the development of the pilot project, it was decided to apply a methodology developed over the years: the codification of what can be defined as "sustainable design choices" can be formulated simply and effectively, applying the principles of sustainable development, universally divided into environmental, economic, and social objectives.[5] The main objective of this collaboration with the Municipality was to develop a pilot project in which innovation, together with the three pillars of sustainability could trigger virtuous processes to regain this part of the historic centre that for too many years has been in a state of abandonment.

The research of the students has shown as the Genova district distinguishes itself for the presence of numerous points of strength, mixed with different points of weakness. So, to facilitate the work, the large area was divided into four sectors (each one studied in particular by a group of students) characterized by the priorities of residence and commerce and differentiated by a peculiarity: coexistence of university activities (Sector A); the presence of important cultural realities (Sector B); the existence of numerous open spaces to be enhanced and exploited (Sector C); the proximity of places of arrival for citizens, but especially for tourists (Sector D) – as illustrated in Figures 3-4.

Sector A - University Residence: the idea is to create a system of services that can make the area attractive for students. It is proposed to create a "diffuse" university campus that provides: (a) university residences and services - municipal buildings have been identified as suitable to house a university residence and a multifunctional centre; (b) static spaces - the demolition of two buildings in ruin, facing Via Prè, is envisaged to create a new open space that, together with two other squares, can

become a meeting place and a passage; (c) dynamic spaces - identifiable and illuminated paths are proposed to make them safe for those who will travel and live the area daily;
Sector B - Vertical corridors: the first objective of the regeneration proposal is to create transversal connections through the neighbourhood able to put in direct communication the three main longitudinal arteries of the area: Via Balbi, where the university buildings are located; Via Prè, the principal narrow of the district; and Via Gramsci, the main vehicular road. This intervention includes the renovation of some buildings, such as the sustainable redesign of the historical "Mercato dello Statuto".

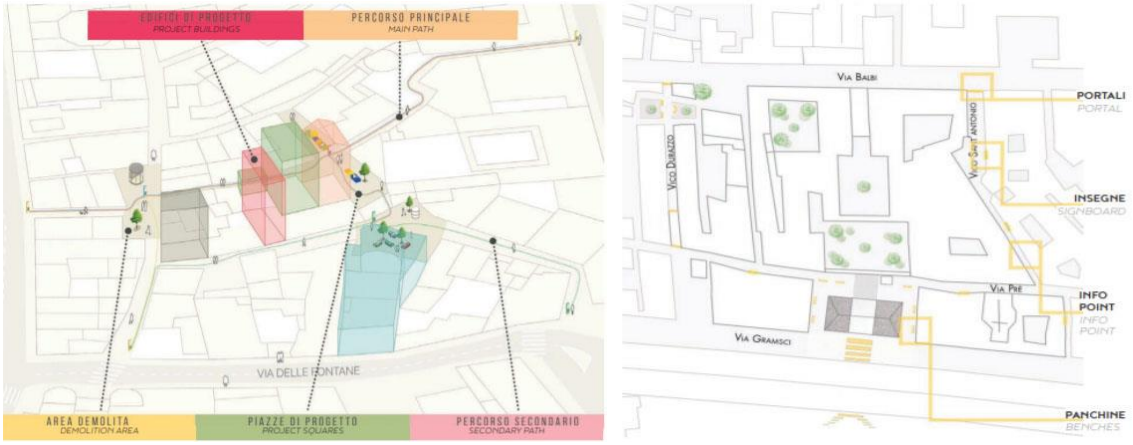

Figure 3. Left: Sector A - UNIVERSITY RESIDENCE. Image by Sara Alfano, Martina Bianchi, Enrico Bruzzone, Sara Corio, Giorgio Falcone, Cecilia Memme, Simona Olcese, Erica Taulaigo. Right: Sector B - VERTICAL CORRIDORS. Image by Alessia Boccalatte, Caterina Battaglieri, Martina Calcagno, Roberta Cambiaso, Ornela Casassa, Elena Musso, Andrea Nigro, Ada Stana

Sector C - Urban voids: the high presence of urban voids within the quadrilateral of relevance is the characterizing element. The projects focus on three different levels of intervention: (a) a necessary level: this first phase of action consists of the implementation of basic actions to ensure a condition of liveability; (b) an accessory level: the second level aims to include and/ or increase the set of regeneration interventions related to the aesthetic and functional qualification of the urban space to make the area more comfortable and welcoming; (c) a social level: the last level of the project has the purpose of revitalizing the area through the inclusion of social activators and commercial activities that aim to involve different types of users.
Sector D - "Commenda" di Prè: the project aims to relaunch the district of Prè by exploiting the potential of its westernmost part. At the crossroads of an important transport network, the area could, following a major redevelopment project, become a real "gateway" to the neighbourhood. The project aims to improve street lighting, redirecting user flows, enhancement of public spaces, reconstructing the urban fabric, economic and commercial revival, enhancement of historical elements.

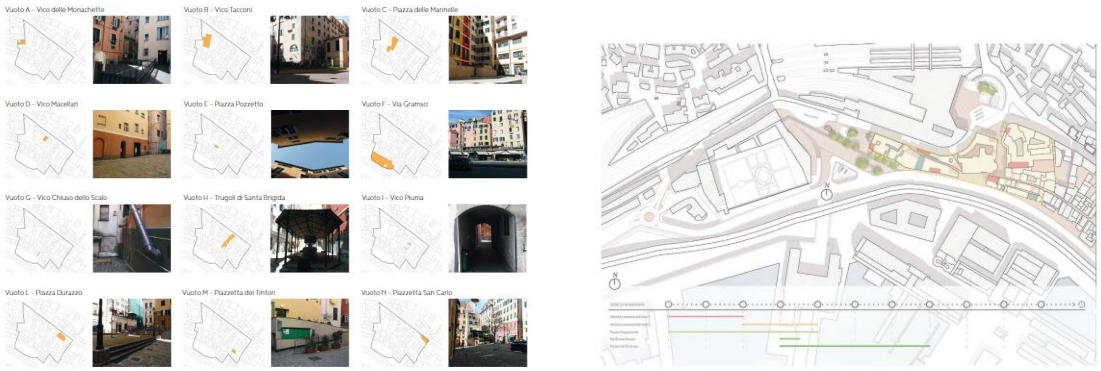

Figure 4. Left: Sector C - URBAN VOIDS. Image by Jacopo Barnini, Deborah Borla, Alessandra Canale, Chiara Cecconi, Pietro Mattioli, Fiorenza Morandi, Anna Saj, Kristian Tota
Right: Sector D - COMMENDA DI PRÈ. Image by Luca Aly - Cristina Benza - Alberto Cirio, Elia Galatolo, Andrea Grassini, Andrea Marcenaro, Giulio Minuto

Another project, linked with these interventions, concerns a new "Smart Lighting" proposal. The idea behind the lighting proposal is based on the concept of urban regeneration throughout the opportunities that technological innovation can give. Therefore, it was decided to propose the transformation from a "standard only" lighting system to an innovative lighting system for the well-being of the external living environment.
Technological innovation allows to transform a light point into an "intelligent pole" where the intensity of the light can be calm and mixed with natural and artificial light, where innovative services can be included for security, for specific categories of citizens (for example blind), for communication, for entertainment, etc... – as illustrated in Figure 5.

Figure 5. Smart lighting project. Images by Vittoria Bonini

At the end of the work – Figure 6, we asked ourselves: is it possible that such an ambitious "forecast" can be transformed into facts? The answer was yes! Many of the proposals contained in this work became and are becoming projects of the local Public Administration and private realities that have understood and shared the visions for a new form of the historical district in the next innovative and sustainable future.[6]

The success of the work was significant since it has been the central topic of the proposal of the Municipality of Genova during the MIPIM 2019, one of the greatest real estate events in Europe.[7]

Figure 6. The four projects developed for the Prè-Visioni project by the students of the course Sustainable Design of Architecture academic year 2017-2018, held by Professor Renata Morbiducci (University of Genoa). Image by Paolo Galelli

Maddalena. Quartiere diffuso

From an academic approach, the scheme adopted for this study was the same used in the previous projects of the Prè district, but this area is to be considered critical due to the significant urban issues involved. Detailed analyses, carried out by the students of the Sustainable Design course of the academic year 2018-19, lead to a primary purpose: to restore a perceptual, functional, and spatial continuity of the Maddalena neighbourhood through precise and strategic interventions able to return it into an incisive network system. A first historical analysis has highlighted how the settlement expansion of the historic districts, as well as economic prosperity, are directly linked to the construction and work of the port, assumed as a primary element of the city itself. A second urban analysis highlighted a fundamental characteristic of the area: the number of urban constraints that transform the size of the largest urban regeneration interventions to those of micro-redevelopment. Other detailed analyses on the urban fabric, such as a solar one, conducted using parametric software, evidenced the scarce irradiation, characteristic of the morphologically narrow and high alleys. Moreover, research conducted on the population of the area highlighted how fundamental is the participatory and proactive role of the community of settled inhabitants.

Even if the redevelopment project of the Maddalena neighbourhood analysed five fabric lots, each studied by a group of students, identifying the strategies to be undertaken for each of them, the vision is based on the creation of a widespread community. The five proposals of the students are profoundly different from each other but common in their action at the level of both urban fabric and empty spaces – Figure 7.

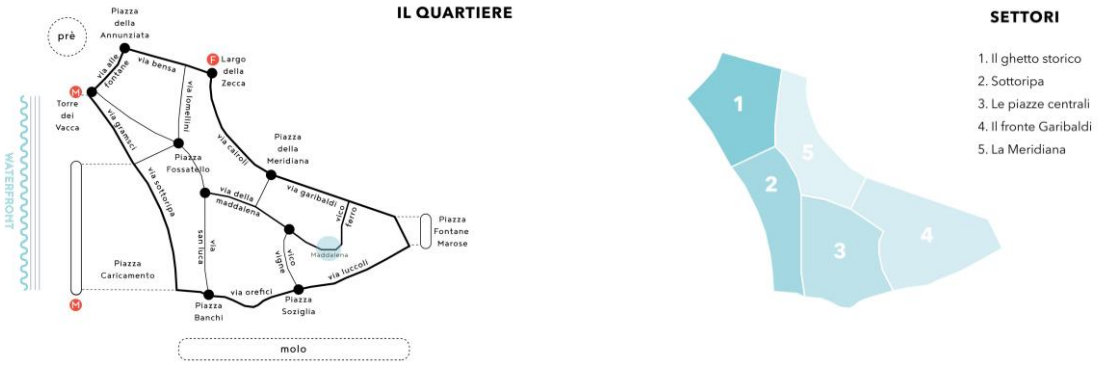

Figure 7. Scheme of the Maddalena district. Images by Vittoria Bonini

Sector 1 - "Historical Ghetto" focuses on the proposal of a widespread student residence in the historic ghetto area, returning the spaces of Palazzo Rebuffo Serra to university students, but also workspaces or new recreational open spaces instead of abandoned construction sites.
Sector 2 - "Sottoripa" focuses on the area distinguished by the historic arcaded road towards the sea, proposing an agora widespread in the Sottoripa area, acting in the different squares, but also redesigning the spaces of historic buildings such as "Loggia Banchi".

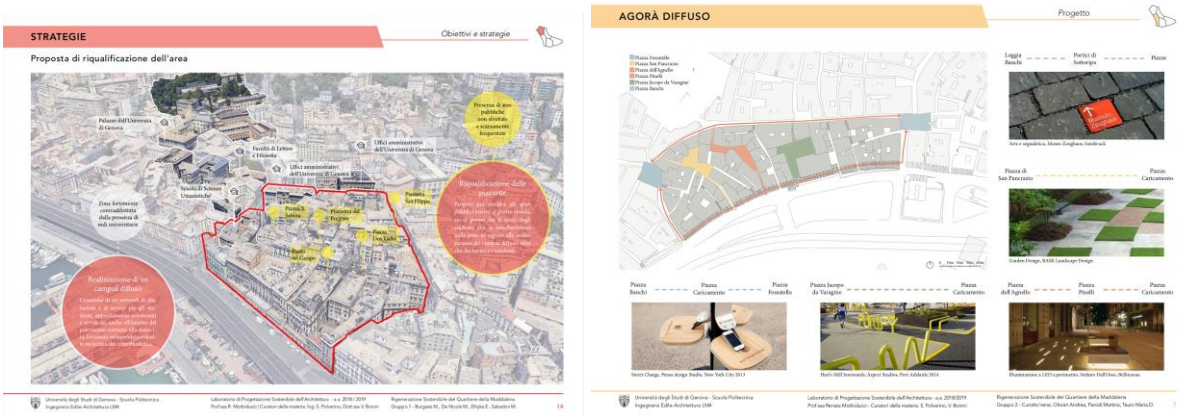

Figure 8. Left: Sector 1 – HISTORICAL GHETTO: university residence. Image by Burgassi M., De Nicola M., Elhyka E., Sabattini M.
Right: Sector 2 – SOTTORIPA: agorà system. Image by Curotto Irene, Olivieri Andrea, Parodi Martina, Tauro Maria D.

Sector 3 - "The system of the squares" proposed cultural and culinary paths, with the introduction of green areas in the squares inside the district.
Sector 4 - "Palazzo della Meridiana" studied a widespread museum, designing both temporary and punctual elements along the narrows and an innovative, sustainable, and permanent pavilion attached to the existing museum of "Palazzo Della Meridiana".
Sector 5 - "Via Garibaldi" proposed a new system of paths, including a gym, spread along the historic streets, with relative indoor spaces, assuming to exploit the assets confiscated from the mafia, and also a new system of smart pavement lighting in the main historical road Via Garibaldi.

Figure 9. Left: Sector 3 – SQUARE SYSTEM: diffuse paths. Image by F. Giangaspero, D. Langella, M. Lasagna, P. Schiappapietra
Right: Sector 4 – PALAZZO DELLA MERIDIANA: a diffuse museum. Image by G. Caviglia, F. Cuneo, M. Gaggero, D. Soraggi

Although extremely varied, these projects as well as being easily replicable and adaptable to different situations throughout the historic centre use some universal urban reactivation tools. Diversified and well-constructed, or better "scattered" urban functions are demanded as to spaces and times of the activity that must be able to serve the dwellers while being attractive on the city scale. Hence, the objective becomes to overcome any breaks and barriers to fixing a dynamic, flexible, and mixed urban fabric. The neighbourhood is thus imagined as an infrastructure, a way of interaction for different flows containing activities, and a direct connection.
As for the project Prè-Visioni, this study has been successfully included in the 2020 Mipim proposal by the Municipality of Genova, through which was shown the development of the Pre project as a new gateway for the old town and the new vision for the Maddalena neighbourhood.[8]

Figure 10. The five projects developed for the Maddalena project by the students of the course Sustainable Design of Architecture academic year 2018-2019, held by Professor Renata Morbiducci (University of Genoa). Image by Vittoria Bonini

CONCLUSION

But it is not finished here. From these efforts, the "Caruggi" project was born.[9] The goal of the project, which saw the commitment of the Municipality of Genoa, is to revitalize the beating heart of the city, improving the quality of life of residents, workers, and the usability by both those who live and visit it even occasionally. The areas of intervention, that are also a consequence of the result of the involvement of trade associations, the third sector and residents of the historic centre, are ten and concern: urban projects, maintenance and technological innovation, socio-educational interventions, commerce plan, new public lighting, safety, cleaning plan, sustainable mobility, tourism, and leisure.

The "Caruggi" project is part of the fundamental new Strategic Plan for Genova 2021.[10] The goal that the administration has set itself is the regeneration of the historic centre through targeted and safe 4.0 technological innovation processes, reducing the impacts of climate change and favouring the intelligent management of tourist flows, according to the Culture 2030 indicators. But also, the use of tangible and intangible heritage through digitalization and sustainable territorial marketing actions to increase the tourist offer at 360°, both physical and virtual.

In conclusion, knowing that the best examples in the world are never top-down planned neighbourhoods, the project will create the conditions to build a community that nurtures bottom-up innovation, with proposed solutions from people, companies, start-ups, academic centres, and local organizations for years to come.

The regeneration of the historic centre and the Pre and Maddalena districts would represent an extraordinary opportunity to shape the future of the city and provide a global model of sustainable urban growth.

NOTES

[1] Vittorio Gregotti, “Modificazione”, Casabella 498/9 (1984): 2.
[2] Carlo Ratti, *Smart City, Smart Citizen* (Milano: Egea, 2013), 82-83.
[3] Carlo Ratti and Matthew Claudel, *La città di domani. Come le reti stanno cambiando il future urbano* (Torino: Einaudi, 2017), 103-104.
[4] Guido Guido, *Viaggio in Italia* (Milano: Bompiani, 2017), 212-229.
[5] Renata Morbiducci, “L’ambiente e il sito”, in *Costruire l’architettura. Tecniche e tecnologie per il progetto.,* ed. Enrico Dassori et al. (Milano: Tecniche Nuove, 2010), 10.
[6] Renata Morbiducci, Prè-Visioni - Una nuova porta per la rigenerazione del centro storico di Genova (Genova: GUP, 2018),
https://gup.unige.it/sites/gup.unige.it/files/pagine/Pre-Visioni_ebook_%20indicizzato.pdf.
[7] “GENOVA MERAVIGLIOSA. rigenerare geNOVA | 2019. Prè-Visioni,” Comune di Genova, accessed July 30, 2021,
http://www.genovameravigliosa.com/sites/default/files/BOOK%20PRE-VISIONI_web.pdf.
[8] “INVEST IN GENOA 3.0,” Comune di Genova, accessed July 30, 2021,
http://www.genovameravigliosa.com/sites/default/files/INVESTinGENOA_3.0.pdf.
[9] “PINQuA (Programma Innovativa Qualità dell'Abitare) Caruggi - Centro Storico,” Comune di Genova, accessed July 30, 2021,
http://www.genovameravigliosa.com/sites/default/files/PINQUA-PRE.pdf.
[10] “Piano di sviluppo strategico della città di Genova,” Comune di Genova, accessed July 30, 2021,
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‘THE RIGHT TO THE CITY’ AND THE PROBLEM OF TEHRAN

Author:
AHMADREZA HAKIMINEJAD

Affiliation:
COVENTRY UNIVERSITY, UK

INTRODUCTION

To set the scene for this essay, I would like to start with the French sociologist and philosopher, Henri Lefebvre’s remarks he made in the preface of his seminal work *Le droit à la ville* (The Right to the City) first published in 1968: “This work will take an offensive form (that some will perhaps find offending).”[1] For Lefebvre, “the right to the city is like a cry and a demand”. In the noted urban scholar Peter Marcuse’s words, Lefebvre’s right is “a cry out of necessity and a demand for something more”.[2] Despite rather astonishing efforts of former IRGC (The Islamic Revolutionary Guard Corps) Commander turned mayor Mohammad Bagher Ghalibaf, to portray a deceptive picture of Tehran on a global stage —either by inviting world-renowned urban thinkers such as David Harvey, or by being invited as a key-note speaker by prestigious institutions such as LSE, the Iranian capital, arguably, fails to respond to the fundamental demand; and the demand, as Marcuse once wrote: “comes from those directly in want, directly oppressed, those for whom even their most immediate needs are not fulfilled: the homeless, the hungry, the imprisoned, the prosecuted on gender, religious, racial [and political] grounds. It is a demand of […] those whose income is below subsistence, those excluded from the benefits of urban life. The aspiration comes rather from those superficially integrated into the system and sharing in its materials benefits, but constrained in their opportunities for creative activity, oppressed in their social relationships, guilty perhaps about an undeserved prosperity, unfulfilled in their lives’ hopes.”[3] In this paper, through a critical reading of Tehran as a socio-political entity, I would argue that what we see today, is, indeed, a city of oppression, discrimination, hypocrisy, despair and of course resistance which predominantly failed to serve its citizenry.

THE LETTER

On December 2, 2016, 206 Iranian scholars, political and social activists wrote an open letter to David Harvey, pre-eminent Marxist thinker and economic geographer who was going to fly to Tehran, being accompanied by other radical urban theorists including Setha Low and Saskia Sassen to attend the ‘Women and Urban Life Conference’ funded and organized by the Municipality of Tehran, asking Harvey to cancel his speech and refuse to attend the event. This open letter titled: “*Stand By the Oppressed & Say “No” to the Oppressors*”, meticulously unmasks the face of Tehran Municipality.[4] The letter reads “We believe that your invitation is part of recent attempts by the Iranian government to co-opt and misuse critical research and activism for its own purposes and legitimation of its

governance institutions and practices, led by different organs of the state, all in order to blunt the trenchancy of critical approaches concerning the status-que power relations. You have been invited by one of the most menacing arms of the oppression of vulnerable urban groups in the heart of the capital city that rendered the overspreading of child labor, homelessness, ghettos, vendors, and the like, and have also deprived from basic services a wide range of elderly, people with health issues, … the disabled, or those with special needs. All of these social groups experience the most atrocious forms of structural suppression in public spaces."[5] The letter tries to warn Harvey of the nature of his host, the Tehran Municipality: "You will be hosted by a governmental organization which implements various fearsome scenarios in favor of neoliberal urbanization: confiscating the vendors' commodities on the streets, attacking, arresting and even killing them […], vendor-cleansing the streets by brutal force and "picking up" the drug addicts by transferring them to government-run rehabilitation centres which are nothing short of torture camps; setting fire to the immigrants' sheds who live in deprived areas on the outskirts of the towns; as well as prosecuting journalists who expose its corruption and so forth."[6] The letter was overlooked by Harvey. As the letter asserts, this invitation in fact was part of a series of efforts made by Tehran Municipality in order to exploit the notion of 'the right to the city'. But the question is, as Marcuse puts it, "whose right(s) to what city?"[7]

THE CONTEXT

While applying a Western notion —here 'the right to the city' which is based on Lefebvre's investigation of urbanisation in France during the 1960s[8]— to the cities of Global South, one needs to be cautious. Perhaps this is why Iranian urban sociologist SadrVaghefi in his doctoral research titled: *The Production of Post-Revolutionary Tehran: A study of transformation of contemporary Tehran through a Lefebvrian perspective,* tries to theorise Tehran, and Iran at large, in order to explain the sociopolitical, historical and economic contexts on which his thesis is based.[9] He elaborates on four specific theories. The first theory is the Iranian scholar and historian, Homa Katouzian's theory of 'arbitrary state'.[10] Katouzian by rejecting the Western conceptions of the state such as Wittfogel's 'oriental despotism' (1957) and Marx's 'Asiatic mode of production' (1971), defines Iranian government as 'arbitrary sate' with tendencies towards a situation in which the state stands above the law.[11] The second theory, is the notion of '*City of Force'* proposed by the Iranian sociologist Parviz Piran. Drawing on a historical narrative, he refers to geographical and geopolitical condition of Iran. Dry climate and periodic drought led to the emergence of both diffused villages and nomadic tribes. Also Iran was a crucial route connecting west and east through the Silk Road. These conditions threatened the security of the territory demanding a forceful territorial power that could provide safety and guarantee the security of towns, villages and caravans.[12] Historically, Iranian urban territories never enjoyed spaces such as an Athenian Agora or Roman Forum which was a locus for social gathering and making collective decision.[13] Piran claims that the notion and reality of *citizenship* never came into existence within Iranian cities.[14] Drawing on Piran's city of force, SadrVaghefi argues that "the separation between public and private space that represents citizenship-based cities cannot be applied to the *city of force* that is under incessant surveillance and often suppression by despotic states."[15] It is in this context of 'city of force' alongside with the 'arbitrary state' in which, one can argue that the traditional dualism of *Arbab* (master) and *Ra'yaat* (peasant) space can be observed in the Iran's contemporary society where the state is *Arbab* and denizens are *Ra'yaat.*[16]

The third, is the theory of "Rentier state" first coined by Hazem El Beblawi and Giacomo Luciani. Rentier state refers to a political economic system which predominantly depends on oil revenues. Mahdavy argues that "this … economic condition in which government became both rich and independent from domestic income had unpleasant micro- and macro-consequences on Iranian

society".[17] In this condition, the nation-state relationship is disrupted and "unequal distribution of external income in rentier states has thus a negative effect on political liberalism and economic development".[18] The forth theory, is Asef Bayat's "Tehran as paradox city".[19] Concentrating on the post-revolutionary Tehran, he suggests a dialectical approach in order to understand the conflicting forces and contradictions within the *urban*. These opposing forces are embedded in the dichotomies of: old authority/new authority; freedom/suppression; populism/neoliberalism; traditionalism/modernism; centre/periphery; and capitalism/Islamification.[20] Against this background, I am going to read the post-revolutionary Tehran through four frames: the body, the poor, the dissenter and the mafia.

THE BODY

In March 2018, a group of Iranian girls – aged under 9 – dance on stage at the Women's Day ceremony held by the Tehran Municipality. Hours after the release of the dance video on social media, the Attorney General of the country ordered to deal with the "norm-breakers and violators".[21] The Attorney General of Iran, expressed regret over the holding of the ceremony and instructed Tehran Prosecutor to prosecute the "perpetrators". Mr. Montazeri said that "acts against public decency were promoted and carried out" during said ceremony. In response to the criticism of the ceremony, the then Tehran Mayor Mohammad Ali Najafi said: "The children who performed at the program were under 9 years old, but it would have been better if they had not."[22] This image precisely depicts what Piran coined as the "city of force".[23] 'The right to the city', according to Schmid[24], "is the right not to be displaced into a space produced for the specific purpose of discrimination". This simple example of exercise of an ideology-driven culture politics, demonstrates that 'the right to the city' is non-existent in Tehran. The fact is, the body, and in particular, female body, in the Iranian sovereignty's theocratic dictionary, is ideo-political; its publicness is dangerous and sexist, and I would argue, its emancipation is, not only the sovereign's nightmare, but also his Achilles heel. This is facilitated by the state-sponsored organisations such as morality police (*Gasht-e Ershad*, literally, 'Guidance Patrol') which are institutionalised and legalised discriminatory machines of body control, with their ambiguously massive public funds, swallowing the country's social and economic resources, let alone its psychological and mental health consequences on society due to a process which predominantly involves humiliation, verbal and physical abuse, prosecution, fines and legal charges. It is worth noting that the morality police's notorious white-and-green vehicles became part and parcel of Iran's urban furniture. It is in this context that most individuals in their presence in urban space, inevitably pretend. Hence, the Iranian city became a space of collective hypocrisy in response to prescriptive culture politics coupled with conservative societal constructs.

Figure 1. "Tehran's Walls, a New Canvas for Protest".[24]

THE POOR

Despite the eight-year Iran-Iraq war, country's ideologically-driven, catastrophic management, and the US sanctions, Iran can be placed among upper middle-income economies[25] thanks to its gigantic fossil fuels resources (Iran ranks second in the world for natural gas reserves and fourth for proven crude oil reserves).[26] However, the reality in the country is not and cannot be reflected in the GDP-based analyses. The Iranian rial disastrous devaluation (depreciated enormously against the US dollar by 1800 percent within the past decade), gruesome inflation rate, failure in providing job opportunities for youth due to "the stifling of the private sector under the combined weight of an interventionist government bureaucracy and omnipresent foundations and state enterprises"[27], with nearly a third of population living under the absolute poverty[28], The Iran's "economy is not in good shape at all".[29]

Figure 2. Kidneys for sale! Mural by Black Hand depicting a catastrophic social phenomenon in Tehran.[30]

Informal settlements and ghettos on the peripheries are rising. Some twenty million people live in the deprived marginalised urban areas.[31] Only in Tehran, the average housing prices per square metre, has been doubled in one year (Feb 2020 to Feb 2021). As Asefi puts it, "recent photographs of homeless people sleeping in empty graves outside Iran's capital is only an indication of the ongoing urban policies in Iran, decades after Ayatollah Khomeini, founder of the Islamic Republic, promised free housing, electricity, and water for all people."[32] The massive increase in rental prices has created a new marginalised stratum. In recent years some became roof sleepers, renting temporary spaces on the roof of dwellings. Some became car sleepers and some ended up sleeping in the graves.

Figure 3. A homeless sleeping inside an empty grave at a cemetery outside Tehran, Iran's capital.[33]

THE DISSENTER

In a cold day in December 2017, on the curbs of Enghelab Street in central Tehran, a defiant woman climbs a utility box and stands on it, takes her hijab off and ties it to a stick and waves it to the crowd, as if she is waving a peace flag. Revisiting images of the event circulated through social networking websites, one may say that this is a piece of performance art; enacted by a female artist whose gender-neutral style of clothing proves that she has no intention to scream out her femininity. Her eyes stared soulless towards her city, waving her white scarf in silence; a silence loud enough to make the city deaf. A sole body of "The Girl of Enghelab Street" became the voice of many women across the country. Now she stands on top so powerful, all the eyes below are at her; the shocked city does not know how to react. The crowed seemed unable to digest it at first, for this was a piece of art reflected in a body; a body versus a numb society. She wisely reclaimed the street to convert it into a theatrical stage of a masterpiece with its astonished audience; audience who were amused by watching a rare scenery on the streets of their city: her bare-head with long, black hair and her white scarf that is not on its place but in front of her. This thoughtful, bodily phenomenon tending to reclaim the street, became a symbolic act of protest against the forceful hijab. It is similar to how Abaza[34] describes Tahrir Square in 2011, as "a novel understanding of public spaces as spaces of contestation, of communication and debate, as well as spaces of the 'spectacle'." Soon after, not only young defiant women, but also the old and the religious, enacted the role of 'The Girl of Enghelab Street', climbing up any utility box or platforms in their cities, and waving a scarf with a piece of wood in order to protest against the compulsory hijab which resulted in an obsession on the part of the authorities with reshaping the flat surfaces of utility boxes with sloping sides that form an upside-down V, and to impose police harassment, fines, and even jail terms in order to oppress the movement. More recently, within the past decade, small and big towns and cities around the country have witnessed a series of nation-wide protests —organised by workers, pensioners, trade unionists, the poor and the dispossessed— faced with the state's iron fists. People have been prosecuted, tortured, forcefully disappeared and killed. The arbitrary state is in full swing.

Figure 4. The Girl of Enghelab Street.[35]

THE MAFIA

The Islamic Revolution of 1979, gave birth to a handful of revolutionary organs including *Sepah*-e *pasdaran* (IRGC: Islamic revolutionary guard corps), the paramilitary *basij* volunteers, *Bonyad-e Mostazafin* (Dispossessed Foundation), *Bonyad-e Shahid* (Martyrs Foundation), *Bonyad-e Maskan* (Housing Foundation), which together moved to fill the power vacuumed.[36] Article 150 of the Iranian constitution defines the role and functions of IRGC: "The IRGC that was formed in the first days of the triumph of the revolution will remain active in order to continue its role as the guardian of the revolution and its offshoots. The scope of the duties of this Corps, and its areas of responsibility, in relation to the duties and areas of responsibility of the other armed forces, are to be determined by law, with emphasis on brotherly cooperation and harmony among them."[37]

The IRGC's heavily involvement in Iran's politics, economy and culture is no longer a mystery. In an interview with Islamic Republic News Agency (IRNA) in August 2007, the then IRGC commander, Major General Rahim Safavi, argued that since the end of the Iran–Iraq War (1988), the IRGC has undertaken three major and two peripheral missions. The major missions of the IRGC include defence, security and cultural matters and its peripheral missions are the development of the country and carrying out relief and rescue operations during natural disasters.[38] Since Islamising the country gave little chance to tourism industry, in the post war period, construction sector emerged as a critical economic engine for Tehran's economic growth. Parastatal foundations, such as the "bonyads" and affiliates of the Iranian IRGC, got involved and became the main beneficiaries of this new wave of construction.[39] Drawing on the performance of parastatal and revolutionary strongholds with their mysterious budgets and extrajudicial power, here I tend to add a fifth theory to SadrVahefi's four ways of theorising Tehran, borrowing from the Frankfurt School's notion of "racket society". It is fair to say that the dominating mafia-like military and security forces, as well as foundations affiliated to the court of the supreme leader, can be defined as "Islamic racketeers".[40]

CONCLUSION

It is clear that in Tehran we are facing what Schmid calls 'the crisis of the city',[41] however it's a crisis of different kind that of European cities. It's a colossal crisis. Apart from urban mismanagement and misgovernment, here we are dealing with basic human rights violations, institutionalised ethnic, gender, and religion discriminations, extrajudicial killings, imprisonment, oppression of dissent, suppressing freedom of expression, and marginalization and poverty across the urban society. Tehran, and Iranian city at large, turns a blind eye to one of Lefebvre's core concepts of the *urban* which conceives city "as a place of difference".[42] Hence, I would argue that there is no such thing as *citizen* in the Iranian city while an institutionalised discriminatory system driven by a theocratic sovereignty dominates not only the urban managerial structures, but also all aspects of city life. We need to talk about a critical or even radical urban theory in response to the problem of Tehran. We may also need "something" beyond theory to understand this phenomenon. Sometimes theory can be incapable of explaining the situation. This is where art can come to rescue. As Schmid puts it: "A lived, practical experience cannot be fully grasped by theoretical analysis. "Something" always remains, an ineffable residue that defies analysis and that can only be experienced by artistic means."[43] In that instance, in recent years, Tehran walls became a means for declaration of opinions expressing alternative, anti-establishment narratives by anonymous artists who risked prosecution. The mural illustrated below reads: "Hello Mr. Mayor! I am Noghteh" ('noghteh' means dot, point, or full stop in Farsi). Referring to the artist's pseudonym, Noghteh is urinating on the official seal of Tehran Municipality denouncing the capital's urban governance.

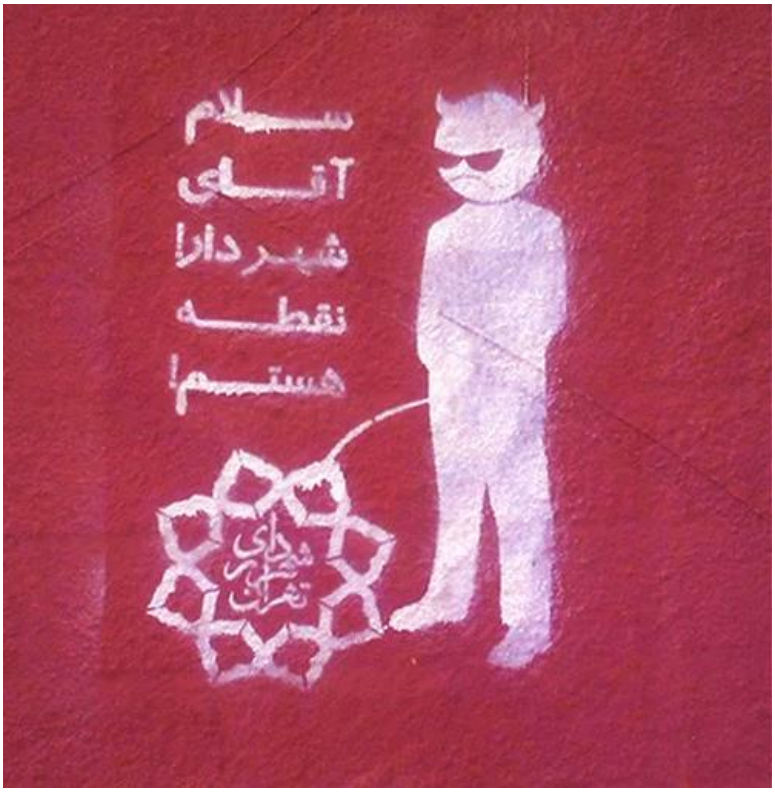

Figure 5. Hello Mr. Mayor. I am Noghteh.[44]

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LANDSCAPE ARCHITECTURE AND THE URBAN RECOVERY

Author:
CARL SMITH

Affiliation:
UNIVERSITY OF ARKANSAS, USA

INTRODUCTION

Post-COVID recovery will largely be an urban phenomenon. Here, I take a critical-look at some interrelated themes to be addressed by landscape architecture, if it is to best-contribute to urban recovery: the need to harness and humanize landscape urbanism; the need to engage cultural ecologies; and the need to foreground green systems over sites.

SOME EMERGING CONTEXTS FOR LANDSCAPE PRACTICE

To begin, I layout some context that introduces how American and British landscape architecture is formulating a position relative to post-COVID recovery. Although I am focusing my attention on the landscape architectural cultures with which I am most familiar, it is important to acknowledge that the post-COVID recovery is a global effort of reforms, policies, action-plans and strategies, looking to stimulate post-Pandemic economies[1]. Although each recovery will necessarily be scoped with its own priorities and timelines, there are some threads of consistency around a shared realization that we must build-back better to address key existential crises and threats of our age: climate change and rising sea-levels; social inequity and gross-injustice; and mass extinction events.

America's Green New Deal, and a Superstudio

The *Climate X Change* article cited above suggests that, as of June 2020, the US had fallen behind in post-COVID planning. However, things have moved quickly since President Biden came into office, with March 2021's climate summit and aggressive emissions pledge, quickly followed by April's $2.3 trillion infrastructure and social justice proposal through the *American Jobs Plan*[2]. These measures chime with an earlier 14-page resolution from February 2019, that laid out a hitherto conceptual vision of economic stimulus within a framework of decarbonization and social equity: the *Green New Deal* (GND)[3]. As well as resonating with the new administration, the GND stimulated a national design initiative across a significant swath of American landscape architectural academia, with partnering landscape practitioners, cross-disciplinary collaborators, and community stakeholders. Under the joint auspices of, among others, the Landscape Architecture Foundation, and the McHarg Center for Urbanism and Ecology (at the University of Pennsylvania), the *Green New Deal*

Superstudio ran from the fall of 2020 through the spring of 2021, with a central charge to speculate on equitable and decarbonized landscapes and cities.

The UK's Green Industrial Revolution, and a Greener Recovery

While, in the US, landscape architecture's recovery response has largely been led by the academy, in the UK, the clearest rejoinder to the Government's *Ten Point Plan for a Green Industrial Revolution* (November 2020), has been from the Landscape Institute (LI), the professional body. Although the UK's recovery plan addresses several landscape and planning-related issues – such as offshore wind planning and special landscape designations – urban greenspace isn't mentioned; a surprise given the rise in public-appreciation of parks and gardens during the pandemic[4]. The LI quickly responded with a policy paper, *Greener Recovery: Delivering a Sustainable Recovery from COVID-19* that "puts landscape at the heart of the UK's recovery"[5], highlighting the critical benefits of urban greenspaces and infrastructure: equitable public health and wellbeing; sense of place and community perception; food production; flood alleviation; biodiversity; and microclimate.

LANDSCAPE AS SUSTAINABLE URBAN PRACTICE

Before discussing what these post-COVID settings might mean for effective landscape architectural speculation and production, I wish to narrow the frame to focus on *urban* practice, as befitting this collection. Post-COVID recovery will largely be concerned with a move towards a resilient and sustainable urbanism: cities are disproportionally voracious consumers of energy, and copious producers of CO_2, while around 90% of the world's urban areas are in vulnerable coastal locations[6]. Recovery frameworks for resilient adaptation and long-term sustainability must allow for our cities to rebound culturally and economically, cognizant of the threat of further acute events (such as COVID), and pernicious challenges that occur irrespective of sustainable development efforts (such as the ongoing threats of climate change and social inequity).

Landscape Architecture as Urbanism

In recent decades, landscape discourse has developed to well-situate it for urban recovery efforts: an rapprochement with the urban milieu; a reconciliation between artistic expression and ecological commitment; and the need to consider resilience as a prerequisite for sustainability. Much of this is embodied within landscape urbanism, a largely North American conception for the arrangement of cities via landscape fabric, underpinned by an understanding of urban processes operating within the broader scale and flux of ecological systems. There is little reason to consider landscape urbanism as a separate discipline, but rather a forum that has helped author a (re)appreciation of landscape architecture as a critical voice in city-shaping.

An Historic Lineage

As noted elsewhere, landscape urbanism (whether it always fully acknowledges its antecedents or not) is part of a lineage that can be traced back to pioneering theorists such as Patrick Geddes in the UK, and American Lewis Mumford[7]. Notably, Geddes has been cited as the first European to use the term 'landscape architect' as a professional title, taking his cue from the American, Frederick Law Olmsted[8]. In early American landscape practice, urban fabric occupied early pioneers such as Olmsted, Warren Manning, George Kessler, John Nolen, and Elbert Peets and, slightly later, their British counterparts Patrick Abercrombie, Frederick Gibberd, Geoffrey Jellicoe, and Peter Shepheard[9]. The corpus of resulting work provides a series of strategies for the reconciliation of urban expansion with ecological systems, and attention to the lived experiences of the industrial and

growing city. In the quest for urban harmony, these works foreshadowed the emergence of "sustainable urbanism" by several decades.

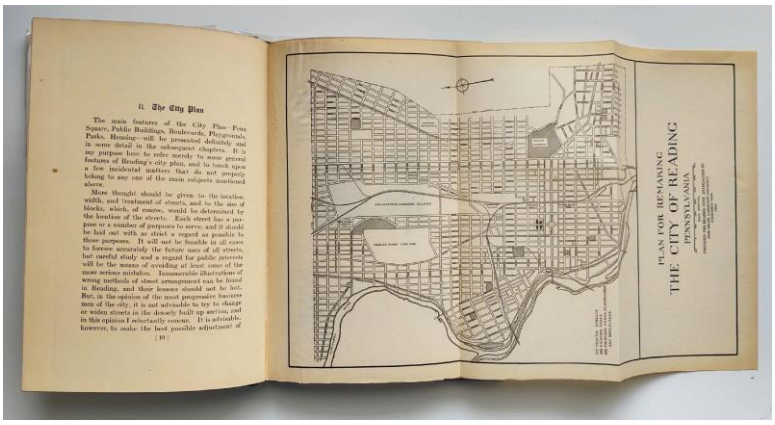

Figure 1. Replanning Reading, PA, "An Industrial City of a Hundred Thousand" by John Nolen (1909): the landscape architect as urbanist

As sustainable development eventually emerged onto the international agenda in the late 1980s, scholars and practitioners across disciplines looked to ascribe operational meanings, with the architectural fields echoing and contributing to the broader conversation, ostensibly around harmony and balance between socio-economic and natural forces. Landscape architecture was able to make a meaningful contribution to the discourse, drawing from the early pioneers, as well as Ian McHarg's environmental planning innovations from the 1960s, and a subsequent, significant body of scholarship and critical self-reflection that ran through the latter part of the Twentieth Century.

THOUGHTS ON AN EFFECTIVE LANDSCAPE ARCHITECTURE FOR URBAN RECOVERY

Having established the legitimacy of landscape architecture as urbanism, we return to what post-COVID settings in the US and UK might mean for effective practice. While the landscape urbanism evokes a foundational role of landscape architecture as city-shaping, its potential as a source of methods for urban recovery might seem a little unlikely. Firstly, the landscape urbanists' reputation for impenetrable jargonizing[10] hardly chimes with the democratic spirit of build-back-better initiatives. Secondly, the term itself seems to have fallen out of fashion over the past decade, even among some of its key proponents. Nevertheless, whether formulated as landscape urbanism, ecological urbanism, or any other variant, it is a discourse that has done much useful work in the conceptualization and communication of movement of matter, nutrients, and energy invisibly across jurisdictional boundaries: an interconnectedness of things over time and geography that are key positions within an era of global green recovery.

We need to harness (and humanize) the Landscape Urbanism

Despite notable, if still limited, forays into implementation, landscape urbanism has arguably retained its strongest resonances within (mainly American) academic discourse and its sometimes-complex extant terminology could be problematic in the translation of recovery strategies and tactics, and especially in attracting and facilitating public support. Nevertheless, a growing number of designers

who align their work with ideas of landscape urbanism can also reflect on the implementation of their ideas, and a growing catalogue of projects – drawn and built – of undeniable beauty that resonates with the public at large.

Figure 2. Student's drawing to communicate a spatial understanding of an ecotone (Hagen Rushing, University of Arkansas, 2021)

Figure 3. Scholarly work to communicate both spatial and temporal dynamics of an ecosystem (Bernard Tschumi et al. after Reed and Lister, 2014[11])

A further step is taking the valid ideas, approaches and sensibilities of the landscape urbanism, and applying them to post-COVID urban recovery with clear commitments to community buy-in. Not least in this, is the possibility for a more human and democratic graphical approach.

Within the context of America's recovery discourse, and its evocation of the original *New Deal* of the 1930s, the framing of difficult and uncomfortable ideas for (and of) public consumption is an important point for consideration. In handling public concern over the ethics of eminent domain, Federal over-reach and so on, the Roosevelt administration was able to lean upon a consistent and evocative way with messaging and framing. The famous posters for the *New Deal* used an appealing visual language to help translate broad rhetoric into local, relatable action.

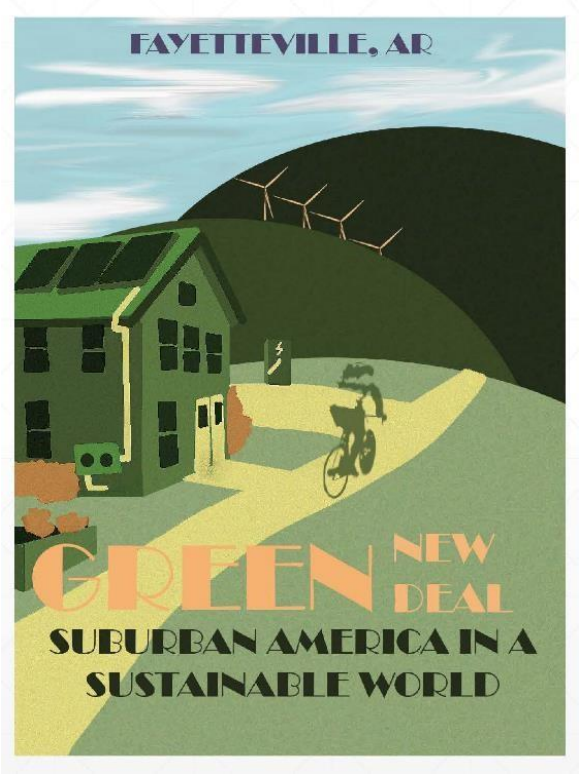

Figure 4. Drawing the Green New Deal as nostalgia (Jessica Shearman, University of Arkansas, 2021)

Figure 5. Drawing the Green New Deal as an exercise in whimsy and vitality (Casey Breen and Tucker Schnaars, Courtesy of Spitzer School of Architecture, The City College of New York)

At this time, we do not have anything like that kind of language for a *Green New Deal*, and it is unlikely that nostalgia for the New Deal alone will be sufficiently persuasive in the Twenty-first Century. As I have written elsewhere, this is an area where the *Green New Deal Superstudio* could further contribute to the recovery design discourse[12].

We need to engage cultural ecologies

To navigate this trajectory, we might look to the emergence of democratization of architectural production via theories and practices of cultural ecology; the dynamic relationships that allow

ideation, and exchange of creative ideas across cultures, societies, and communities[13]. Consider, for example, landscape production that not only requires the address of intermediacy and inter-scalar systems, but also the ideas and thoughts of affected communities. In this sense, we begin to see the possibility of authentic community ideas of place, layered into the mapping and expression of data as baseline conditions. Community aspirations and memories, captured through drawing and storytelling, could become part of the modelling for appropriate landscape change, along with resource and resiliency planning, population forecasting and so on.

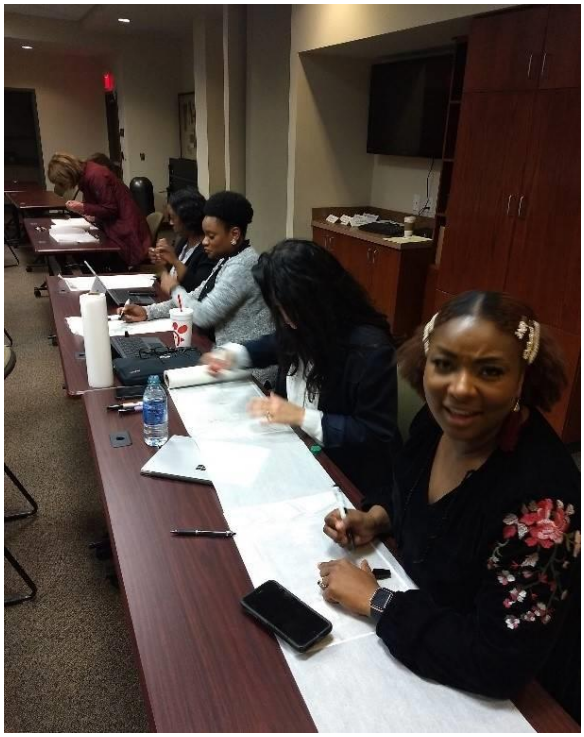

Figure 6. Community storytelling through guided place-drawing

In short, landscape architectural practices in aide of the urban recovery might harness the scope and manner of landscape urbanism process, while humanizing and democratizing the same through community engagement. Theories of cultural ecology can help improve praxis, whereby ethnographic scholarship forms a symbiotic pair with public-engagement through actual projects. This further enriches landscape urbanism's potential as a recovery-ready ecotone or hybrid of theory and practice and, again, this may simply be a continuation of the disciplinary lineage I spoke of earlier: several of landscape urbanism's forebears – Olmsted, Nolen, Peets, Abercrombie, Jellicoe, Shepheard – wove strands of teaching, scholarship, and criticism, with practice through design, planning, policy and public-service. Furthermore, the *Green New Deal Superstudio* is also a cultural ecology: a rich mosaic of students, scholars, practitioners, and stakeholders.

It is not simply *what* is practiced through modes of landscape architectural enquiry such as landscape urbanism and the superstudio that is relevant to recovery discourse, but also *how* it is practiced: the straddling of theory and practice; the critical and the instrumental; the speculative and the practical. While the complexities of interwoven climate and community challenges are well-suited to academic discourse, the design academy rarely touches upon the wrangling of ideas onto the ground. Meanwhile, recovery rhetoric (such as the *Green New Deal*) is *quickly* crystalizing into action (such

as the *American Jobs Plan*), and the critical role of practice in helping the shift from speculation to implementation, is clear.

We Need to Emphasize Green Systems Over Sites

While landscape architecture's potential for strategic scales and agendas is evident[14], the character and scope of most contemporary practice is discreet, isolated and incremental; the antithesis of a recovery resonant approach[15]. Hence my suggestion for the embrace (with conditions) of landscape urbanism principles as a possible way to frame a much more telling influence. This is especially the case in the US where landscape urbanism has greater currency as an idea in the academy; has delivered high-profile built works; and resonates with emerging recovery conversations of collaboration across disciplines and across theory and practice.

As for the UK, earlier this year I wrote a piece for the Royal Geographical Society in London, arguing that we must free individual spaces from being panaceas for recovery and, rather, see them as contributing pieces of a broader system[16]. While the Institute's *Greener Recovery* plan is commendable, my unease stems from the lack of overall strategic framework that previously bedeviled sustainable landscape architecture efforts. To that end, the LI's recommendation for a landscape-led approach to infrastructure and housing; consideration of revenue as well as capital investment; and steering green infrastructure towards underserved communities, speak to appropriate scale, time, adaptability, and equity. On the other hand, my concerns regarding the presumptive, indiscriminate championing of certain types of design response – green roofs and walls, sustainable drainage features and so on – remain.

Roughly concurrent to *Greener Recovery*, the Landscape Institute also published a special edition of its professional journal, focusing on aspects of post-COVID recovery and climate action[17]. Among the projects by British practitioners, two stand-out as exemplars of future recovery practice, with both personifying cultural ecologies of practice working within creative community engagement (see pp 26-28), and practice working with academia to encourage a holistic and systematic approach to city planning and ecological conservation (see pp 38-41).

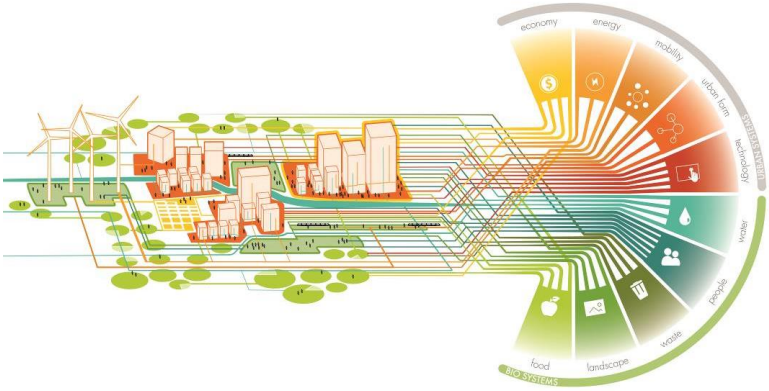

Figure 7. Bio Urbanism system diagram where the biotic and cultural are held in synergy (Courtesy of McGregor Coxall)

CONCLUSION

Cities will be an inevitable focus for international post-COVID recovery, and resilient and sustainable urbanism correlate-well with the disciplinary scope of landscape architecture. The recovery-response from the landscape architectural communities in the US and UK has been divergent, with the academy seeming to take a more prominent role in the US. Furthermore, recent US landscape discourse is likely to have included rather stronger reaffirmations of landscape architect as urbanist, through the efforts of landscape urbanism and its foregrounding of landscape material and ecological systems as organizing priorities for cities. Both the academically-led *Green New Deal Superstudio* and landscape urbanism can be seen as examples of cultural ecology – collaborative, cross-disciplinary, and transformational – as opposed to the relatively transactional nature of much site-by-site landscape practice. I suggest that this provides American landscape architecture with a relatively strong starting-point for contributing to green recovery. In the UK, the Landscape Institute has responded quickly to the governmental 10-point *Green Industrial Revolution* plan, highlighting the role of urban greenspace in post-pandemic recovery. The Institute's *Greener Recovery* rightly touches upon the need for planning reform, as well as project-specific strategies, but might also be deficient as a roadmap in three important ways: little explicit advocacy for the landscape architect as urbanist and strategist; its presumptive case for certain "green" project-tactics that are reminiscent of previous sustainability check-box approaches; and its failure to recognize the landscape academy as a key ally and resource for the urban recovery.

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FROM THE NORTH COUNTRY: THE CITIZEN CENTERED JOURNEY TOWARDS SUSTAINABLE SMART CITIES IN THE NORWEGIAN CONTEXT

Author:
DAVE COLLINS, COLINE SENIOR, MINA JOWKAR, ALENKA TEMELJOTOV-SALAJ AND AGNAR JOHANSEN

Affiliation:
NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY, NORWAY

INTRODUCTION

PUBLIC PARTICIPATION IN SUSTAINABLE URBAN DEVELOPMENT - A "*NORWEGIAN APPROACH*"

In a world where sustainable considerations are becoming increasingly important in many sectors, the buildings and planning industries are no more exempt than any others. This 'call to arms' by the building and planning sectors can find its roots in one of the most commonly cited definitions of sustainability, which states that "*sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs*"[1]. Before a more sustainable approach to development thinking, urban development has since its beginning already focused on many principles that would come represent sustainable development. A good urban project should be resource-efficient, meet the needs of its residents and of course be resilient in the long term. Where sustainable urban development is different, however, is that it considers these qualities not just in the context of the community itself, but that communities place in a wider sustainable context.

In terms of sustainable urban development, Norway has had this as a part of its embedded culture for the past three decades. Along with the agenda promoted by the Paris Agreement, Norway is working towards the '*Green Shift*'. The Green Shift is a government-endorsed proposal that is moving the country towards a form of environmentally friendly restructuring that will reorientate all industries to a more environmentally considerate operational paradigm [2].

In this paper, we will present two urban development projects in Norway based in the municipalities of Lier and Oslo. The paper will look into how it is contributing to the Green Shift by using citizen participation as an important mechanism, and how this human-centered approach is very much characteristic of Norwegian sustainable Urban development projects. This will be achieved by looking at each project individually in terms of how they approached citizen participation, and how this is representative of the Norwegian approach more specifically. Whilst this study does not define a 'Norwegian Approach' that could be considered standardized for the whole country, it does show how it is representative of the human-centered approach of two Norwegian Municipalities.

For the paper to achieve its objectives, we will endeavor to answer the following research questions:

RQ1. How are these projects being conducted from a citizen participation perspective?
RQ2. What are the challenges and opportunities of each from a participatory perspective?
RQ3. What is the value of the Norwegian approach?
These questions will be answered through a combination of literature from theory and the projects, as well as data collected from Lier and Oslo.

METHODOLOGICAL APPROACH TO THE STUDY

This section will detail how the literature for this paper was sourced as well as the primary data and other related sources and inputs.
The data for this paper is collected through a combination of desk research as well as a degree of data from the surveys and mind mapping from each respective project. To address the theoretical framework, journal articles were sourced from Google Scholar using keywords such as '*participation theory*' and '*citizen participation theory*'. The resulting citations were from journals from urban planning, city planning, and participation focused aspects of the social sciences. In terms of practice literature, this primarily comes from council and planning documentation available on the Oslo and Lier projects websites, as well documentation forwarded to the researchers from their respective municipalities. The researchers then extracted the information relevant for this publication through an in-depth desk reading.
In terms of primary data, this comes from surveys and mind mapping documentation that is publicly available for analysis. The analytical framework for this project will consist of a cross-sectional look at the survey and mind mapping data to find information that is relevant to answer the research questions featured earlier in this paper.

THEORETICAL FRAMEWORKS AND METHODOLOGICAL CONSIDERATIONS

This section will outline the theoretical approach to this paper as well as some brief theoretical considerations on the methods employed in the analysis.

Norwegian Cultural Context

The Norwegian approach to citizen participation can be in part explained by many of Norway's cultural norms. In a more general context, culture can be considered to a paradigm that reinforces holistic and (relatively) stable behavioral traits in citizens, as well as explain past and current behavior of these groups. They are however not always ideal mechanisms for predicting future behavior[3].
In terms of Norwegian culture, the citizen centered approach to sustainable urban development can be explained in part due to its intrinsic cultural norms. Norway prides itself on a strong democratic tradition, a large and well-funded welfare state with universal healthcare, and powerful local municipalities that focus on public-private-people-partnerships (PPPP). These qualities don't just make citizen participatory processes essential, but a natural way of running a business. This however is also supported by the financial possibilities offered by a profitable and heavily taxed national oil industry, successful fish industry and a high education level in the population. Oil and gas were discovered near the coast of Norway in 1969, smart public governances established from the beginning that these resources belong to citizens of Norway, and this has made people from Norway become one of the richest nations per capita in the world.

Citizen Participation

In terms of what constitutes a 'citizen', this can be broadly defined as "*citizens are viewed as empowered actors with resources with which they can contribute to the resilience of their communities*"[4]. This can be developed to state that Citizen participation is the "*participation of citizens in the planning and administrative processes of government*"[5].

In terms of theoretical frameworks that support many of these ideas, one of the most widely cited is Arnstein's (1969) model called '*The Ladder of Citizen Participation*.

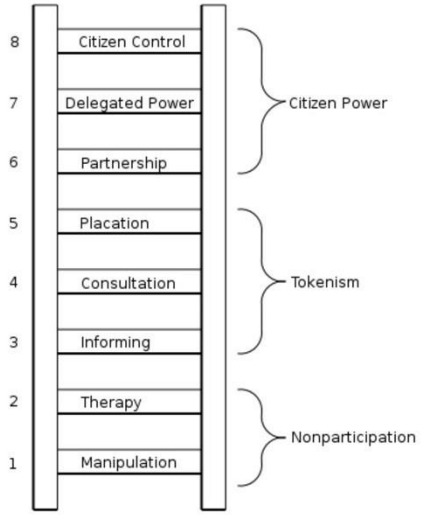


Figure 1. Arnstein (1969) Ladder of Citizen Participation

As Figure 1 shows, 'Citizen Power' rests very much in the qualities of 'partnership', 'citizen control' and 'delegated power' at its most empowering, with many of the other thematic results falling into the less empowering categories of 'Tokenism' and 'Non-Participation'. In essence, this framework illustrates the extent of citizens and the types of end products this power will result in. This however isn't a linear '*power = result*' framework which has challenges to this power resting within its perceived simplicity. For example, citizen access to power can be considered as a major depicter of success, it is important to know who has this power, and also how and whether the community will get access to it. Secondly, this power comes in 'grades' not all of it being empowering[6].

OUTLINE OF THE CASES AND FINDINGS OF THE PARTICIPATORY PROCESSES

In section, the paper will look into the Lier and Oslo cases separately. This will involve a short overview of the cities and municipalities themselves, the type of citizen participation that will be addressed, as well as outlining the relevant results and their uniqueness. An overview of these qualities are displayed in Table 1 and explained in more detail in the sections that follow.

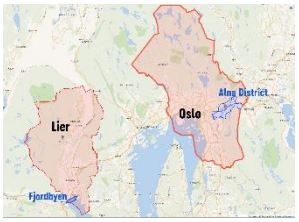
	Location	Case	Participation Method	Number of participants/ respondents	Municipal stakeholders' goal	Main highlights from the citizens' perspective
 **Location of the cases, *Wikimedia maps* | Map data © OpenStreetMap (edited by authors)**	**Fjordbyen - Lier**	**Urban redevelopment project. Transforming an industrial area into a sustainable mixed-use neighborhood to attract capital and citizens**	**Citizen Surveys (a. on youth aged 13-19; b. general population)**	**Sample a. 233 Sample b. 2407**	**Unveil local citizens' expectations for the new development area**	**A strong focus on wellbeing, better connection to and easy access to municipal services such as Kindergartens**
	Furuset - Oslo	**Design and implementation of a Library and Cultural house for the neighborhood revitalization**	**Mental Mapping**	**70 people between 10-28 years old**	**Engage local citizens to co-create a community house and Library**	**The area around the future community house was pinned with "great need for improvement" Mainly visited by younger people**

Table 1. Characteristics of the Norwegian cases

Urban transformation in Fjordbyen-Lier

The municipality of Lier is approximately 187 square miles with a population of just over 27,000 people[7]. Located approximately a 30-minute drive from the Norwegian Capital of Oslo, Lier is situated economically as a part of the greater Oslo areas (as is the case with its neighbor municipality Drammen, in which a small part of the Fjordbyen project is also located) however it is administered and governed as its municipality. The Fjordbyen project is located on the shoreline in the Oslo Fjord and represents in effect the development of a new small city within the boundaries of both the Lier and Drammen municipal authorities. This new development aims to settle at least 16,000 new residents and 16,00 jobs in a zero-emissions urban area that is green and future-oriented[8]. Whilst more than 15 years in the planning, the project in its current form began in 2011 with construction beginning in 2019 with the groundwork for the new Drammen Hospital. Fjordbyen will also feature a small artificial island, a marina, parks for recreation and a maritime center. The company Eidos serve as the leader of the project. This company is owned by Lier and Drammen municipalities and a conglomerate of the biggest landowners in the area. Their work is supported by consulting companies to which they outsourced parts of the participatory process' implementation and analysis. While Eidos has been in charge of proposing a preliminary plan to Lier municipality, the final word of the planning process will be under the responsibility of Lier.

Citizen Participation processes in Lier

For the project leaders from Eidos, it was important for citizens' views not just to be considered, but to form a core part of the development of this new town from as early in the concept phase as was feasible. In 2020, two surveys were conducted with residents of Lier about what qualities they would consider being most important in a future town or city development. The surveys were mostly using quantitative indicators combined with qualitative elements and were conducted online by general invitation via the local school network for the first survey on youth and by text message to all citizens with a registered address in Lier for the second, wider survey.

The first survey was conducted in April 2020 with "young people "(age between13-19 years old) and received 233 responses. Whilst the project leaders in Lier understood the challenges that speaking to this demographic would face, they were interested in knowing the views of young people to make sure that the project was planning not just for the needs of its population for the next decade, but for the next several decades to come. The survey was widely advertised on Facebook and Instagram for two weeks in 2020, using short videos that presented the possibility for young people to participate in the development of Fjordbyen and ending with the link to the online survey. 372 people clicked on that link and 233 of those completed the survey. Most of the respondents were aged 16-19 years old with a majority of female students and claimed that they would consider living in Fjordbyen for 5-7 years[9]. The survey also showed that young people wanted access to restaurants, school cycle routes and festivals, as well as easy access from Fjordbyen to Oslo and Drammen[10].

The second survey consisted of 2407 respondents with half of them being between 46-65 years of age and spread mostly equal in terms of gender balance. The older demographic could also see themselves living in Fjordbyen for 5-7 years. They were interested in the possibilities for hiking and green areas. There was also considerable emphasis placed on the importance of having neighborhoods designed to be safe for families and the elderly. The proximity of schools, childcare and healthcare services were also of paramount importance.

The results of these surveys were summarized by one of the projects partners, Link Architecture, and then fed into the next planning stage of the project as part of the design and development considerations.

Urban revitalization in Furuset-Oslo

Furuset, located in the eastern part of Oslo, is a multi-functional neighborhood accommodating residents with diverse backgrounds (around 140 nationalities). This area is chosen as a sustainable revitalizing neighborhood to facilitate the geographical and demographical growth of Oslo[11]. It is also selected as the Oslo municipality's role model area in the FutureBuilt program, which is a 10-year program (2010-2020) to show the possibility of developing climate-neutral urban areas and high-quality architecture. The plan for FutureBuilt program (governed by a broad partnership including Oslo municipality) is to create a total of 50 role models projects by 2020, with at least 50% reduced greenhouse gas emissions. In other words, it is going to show how to build a modern urban area that combines considerations for the environment with good architecture[12]. Furuset incorporates about 3 800 residential units (90% apartment blocks) and 1 500 workplaces. This area also has good transport connections with two metro stations, four bus lines offering a broad range of shopping and service facilities. An ice stadium, a school, a library, and a kindergarten complement the social infrastructure in the neighborhood[13].

The main goal for revitalizing this area is to combine the physical upgrading of the neighborhood that consists of a large part of buildings built in the 1970s, to a new and more modern area with high environmental ambitions. This revitalization also incorporates several sub-goals such as the creation of attractive urban spaces, strengthening of the green infrastructure with blue-green connections, a broad and varied supply of residential units, and a well-functioning traffic hub[14].

Given these redevelopment plans, the Planning and Building Agency (PBA), Oslo municipality, started its planning work at Furuset in 2009, since when various public participation schemes were conducted as a basis for a draft planning[15].

Citizen Participation processes in Oslo

Public participation in Furuset has been carried out in different methods for different phases of the project. PBA has normally emphasized participation from the very beginning phases to understand the local challenges. As a starting point, a mental mapping process has been conducted to understand the experience of the residents in terms of well-being and sense of security in the area[16]. The individual maps were combined and provided an overview of how the area is perceived by its residents. As the next step, a two-day working seminar at Furuset was organized. The neighbourhood residents and some representatives from the district and municipal agencies, local business actors, housing associations, youth, sports associations, churches, etc. were invited to group work under the professional management of hired consultants. The task was to collect the attendee's inputs (and own sketches) about the area development. This was followed by a series of workshops and exhibitions with the neighborhood residents, where mainly the younger group were targeted for participation[17], Figure 2. In such workshops in addition to some public meetings, the area development plan and proposal were discussed step by step, attendees' comments on each part were collected and took into considerations by the local authorities.

Figure 2. Public meeting in Furset

DISCUSSION AND CONCLUSION

This paper aimed to illustrate the citizen participation processes of two urban development projects in Norway and to highlight what makes the "Norwegian approach" unique.

How are these projects being conducted from a citizen participation perspective*?*

These projects do not just simply conduct citizen participatory processes but are essentially entrenched in them. It is important to recognize that both of these case examples attempted different approaches to citizen participation, but had similar intentions regarding their outcomes.

The project in Fjordbyen intended to use their citizen surveys to gauge the planning success of their project up to that point, as well as ensure that the project moving forward met the needs of future residents. The Furuset mind mapping project in Oslo was conducted to also ensure that their planning processes met the project goals, but with more immediate tangible outcomes such as the new library.

It can be concluded that whilst both projects employed different strategies and had tangible outcomes, the citizen optimized broader outcomes were very much identical. Indeed, in both cases, results of the participation process were analyzed by the decision-makers and served as a basis to develop the projects further. In Lier, results of the surveys resulted not just in a confirmation that existing plans were mostly correct in their approach, but also allowed some planning reevaluations. For example,

surveyed residents were not as keen to live by the water as the planners originally thought. In Oslo, the mental mapping method, as part of a wider participatory process allowed the district authorities to pinpoint areas in need of improvement as well as lacking cultural infrastructures which were addressed in the implementation of the Library and Culture house.

The challenges and opportunities of the cases from a participatory perspective

As seen in Table 2, the barriers and drivers for each project are as diverse as they are numerous. Whilst each project has its unique aspects, they also share commonalities such as demographic disenfranchisement and human-centred utility.

Case	Type of participation	Social and Urban context	Challenges of the participatory method	Opportunities of the participatory process
Citizen Surveys for a New Urban area in Fjordbyen - Lier	- Digital (online surveys)	- Growing commuting population - New super hospital with consequent staff to accommodate - Aiming to attract economic and intellectual capital from Oslo	- Demographic Disenfranchisement - Data reliability - Hawthorne effect - Digital literacy	- Community Ownership - Human-Centred Utility - Optimised space and Buildings for Citizens needs
Mental mapping for a Library and Culture House in Furuset-Oslo	- Mixed Analog and Digital (in-person meetings with citizens and online platform open for comments)	- Multicultural community (140+ Nationalities) - Majority of young people - Low-income population - Higher criminality rate	- Language Barriers - Cultural Barriers - Demographic Disenfranchisement - Replicability Challenges - Physical attendance	- Community Ownership - Human-Centred Utility - Bridging cultural barriers

Table 2. Overview of the cases' context, challenges, and opportunities

The value of the Norwegian approach

In terms of the value of the "Norwegian approach", these cases highlighted that a citizen-centred approach to Sustainable Urban Development projects is an essential component in creating cities and communities that are optimized for quality of life and wellbeing, as well as meet the needs of these project areas more broadly.

By considering the citizens early in the project it can create a greater sense of ownership among citizens in their communities. Whilst aspects such as disenfranchisement risk excluding vital demographics, overcoming these challenges can lead to finding further utility for the human-centred approach.

Further Work

Further work is needed to find ways of better involving disenfranchised demographics to improve the reliability of the data and ultimately achieve more representative and inclusive forms of sustainable urban development.

A second point for further research is to see how generalizable the citizen-centred approach can be. This paper has illustrated the positive scope that exists to not only offer an interesting example of how these cases are represented in Norway, but also how the lessons learned from these two cases can reflect a more generalizable Norwegian approach in certain circumstances, and then be generalized to work with the project around the world.

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TEMPORARY URBAN PRACTICES OF CO-PRODUCTION. INCLUDING UNREPRESENTED VOICES IN THE MAKING OF THE CITY

Author:
GUIDO ROBAZZA, ALESSANDRO MELIS

Affiliation:
UNIVERSITY OF PORTSMOUTH, UK; NEW YORK INSTITUTE OF TECHNOLOGY, USA

INTRODUCTION

Temporary urbanism initiatives have become an increasingly widespread practice amongst activists and practitioners aiming to trigger grass-roots processes of urban regeneration and social innovation[1]. This paper presents the process and findings of '*Temporary urbanism as a tactic to co-produce community resilience'*, a five-year project to empower various local communities groups to take ownership of urban spaces through the collective creation of temporary installations. Drawing on David Harvey's notion of the 'Right to the City'[2], the freedom to make and remake our cities as an essential human right, the project instigated a series of tactical, small-sized, co-created, temporary interventions in public spaces in Portsmouth, UK, involving unrepresented voices in urban decision-making processes. Prompted by the research question; "How can temporary urban practices become effective tools to include unrepresented voices in the city-making and to generate community resilience?" the authors identified a series of guidelines for improving temporary co-creation practices to foster community resilience. Temporary urban space initiatives can play a vital role in creating opportunities for grassroots direct democracy[3], but if these experiences are not followed by institutional learning and changes to planning policies, their outcomes will remain limited in time and space.

CITIES, PUBLIC SPACE AND TEMPORARY URBANISM

Public space has been gaining increasing attention from political, academic and social perspectives alike, with social and economic inequalities emerging as one of the key issues in planning future cities[4,5].

Cities have traditionally been tasked with a role as 'growth machines' and are planned top-down primarily following profit-oriented forces[6,7]. This process of urbanisation often generates exclusive environments, as planning processes redistribute resources, concentrating them in costly, prestigious and marketable interventions, which see deprived neighbourhoods neglected, since they are deemed of little economic relevance. Equally, public spaces which have potential to be the most lively and truest expressions of the desires of the citizenry are overlooked and underutilised. In conventional urban planning, the common citizen, who uses such spaces regularly, is mostly excluded from the city-making process, their opinions and their rights to shape their shared environment ignored[8]. Even

further, enforced by the privatisations of spaces and a language of prohibition and discouragement, public spaces are often, by law, actively excluded from citizen appropriation[9]. These forms of appropriation of the public space are "Temporary acts in which people use public spaces to carry out individual or collective activities other than the purpose for which space was originally designed for"[10] and include commercial, ritual and leisure activities, such as children's ball games (No Ball Games), and community initiatives.

Within the complexity of the making of the city, and possibly in response to this exclusion, initiatives to impact public perceptions and use of urban spaces have significantly increased during the last two decades and even more over the last few years[11]. An extensive proliferation of temporary initiatives in urban spaces can be witnessed worldwide, transforming temporary urbanism in a truly global phenomenon[12]. The promotors of these initiatives are usually architecture groups, artists, practitioners, university researchers, and activists who, with a multidisciplinary team, aim to promote change in their local environments. Although drawing a comprehensive list or interventions, which would be a titanic task, is not the scope of the present paper, few examples can help to contextualise the theoretical framework which includes the temporary installations described in the next paragraphs. These examples include a variety of initiatives. Many of these aim to re-activate neglected urban spaces through for example temporary cinemas and agora that transform them into permanently active public space *(Folly for a Flyover*[13]*, Autobarrios Sancristobal*[14]*)*, or spreading around the city a series of temporary hotel rooms that people can inhabit (*Hotel Shabby Shabby*[15]). Other projects aim to directly raise awareness on how the public space in cities is designed and the need for more active and shared use. They promote pop-up/mobile community installations that engage people concerned with their living environment (*Union Press*[16]*, Street interrupted*[17]), or organise global events or art initiatives that claim back urban space (*Park(ing) Day*[18]*, I Wish This Was*[19]) or also, mobilise people globally to seed flowers around cemented areas (*Guerrilla Gardening*[20]). Other types of project more radically attempt to implement the creation of alternative modes of living within urban environments, promoting urban gardening as a different agricultural production system (*R-Urban*[21]) and the temporary occupation of wide urban areas to provide continuous spatial experimentation on alternative modes of being together (*Yes We Camp*[22]). A myriad of temporal initiatives are attempting to change the status quo and to use cities' shared spaces as environments to incubate social innovation.

But it is not just individual activists or groups pushing in this direction. The European Union has been increasingly supporting temporary uses as part of the design of urban regeneration policies, initially promoted through the project URBAN CATALYSTS: Strategies for Temporary Uses – Potential for Development of Urban Residual Areas in European Metropolises, led by TU Berlin[23]. This was followed by the Dutch project OLE (Open Lab Ebbinge)[24]. Alongside many other EU funded projects that could be cited, TUTUR (Temporary Use as a Tool of Urban Regeneration)[25], started in 2013, has been investigating how the temporary use of public space and informal practices can be mainstreamed and become a government tool for urban regeneration.

The importance of temporary urbanism has also been recognised by the UN. The Global Public Space Toolkit[26] released by UN Habitat in 2015, praised temporary interventions for their ability to: "confer meaning and urban quality to 'waiting spaces' rapidly, at low cost and with a strong involvement of the community." In fact, the United Nations' shared goals to make cities and human settlements inclusive, safe, resilient and sustainable would seem to support the underlying principles of democratization inherent to temporary urbanism. Sustainable Development Goal #11[27] and the Article 13 of Habitat III New Urban Agenda[28], released in 2016, aims for all cities to be 'participatory' and

"promote civic engagement, engender a sense of belonging and ownership among all their inhabitants."[29]

THE CO-CREATION OF TEMPORARY INTERVENTIONS

The research '*Temporary urbanism as a tactic to co-produce community resilience'* is a practice-based investigation designed to promote and develop a series of small tactical interventions in the public space, each to be designed and built in collaboration with Portsmouth local communities[30] (Figure 1).

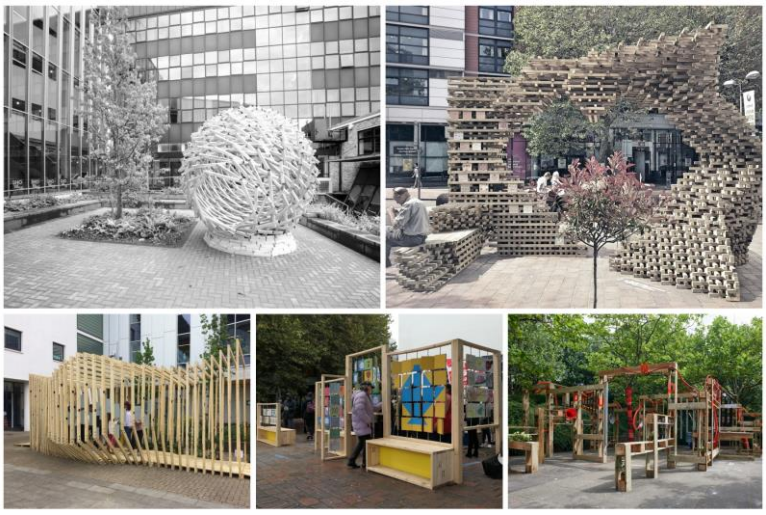

Figure 16. Temporary installations in the public space. From left to right. Top: I Don't Roll; #IHeartPompey. Bottom: Edge Pavilion; Multicultural City Chatterbox; Secret Garden

Whilst developing a body of temporary interventions, the project offered the opportunity to reflect on what was being learnt from these while simultaneously studying the impact of the activities, and the degree of engagement with them, on and by the community of participants. As such, the practice continuously adjusted to the changing context, iteratively improving the methods of work and the level of inclusivity of the different community groups. The research used social sciences methods of observation such as field notes, focus groups, and interviews, subsequently analysing them via coding and thematic analysis.

Four community groups, each local to Somerstown, that according to the 2015 Index of Multiple Deprivation[31] is in the top 11% most socioeconomically deprived areas in England, were brought into a discursive process at the heart of the co-creation of a series of 'waiting' urban spaces. At different stages this included a BAMER group, a primary school and a group of vulnerable, marginalised young people from a local youth club. Participants were involved in a series of workshops to initially identify a site then co-design and co-create uses for the chosen space, leading to a collaborative building process (Figure 2).

Figure 17. Co-design workshop, engaging community in decision-making and creative activities

During the workshop phases, creative co-design conversations, model and clay making, junk playing activities, painting and timber construction sessions were used to enable the groups to think about public space design. The activities were designed accordingly to the Double Diamond Innovation Framework[32] process accommodating convergent and divergent thinking, allowing a creative, non-linear development of the ideas and remaining open to change whilst works in progress.

Each practice would always start from an 'Approach' phase where the researcher would explain to the community what the purpose of the project was, engage them and understand their willingness to participate in the project. In this phase, the researchers investigated the relationship of the participants with the surrounding public spaces through images, exploring their desires and opinions. The information collected in this phase became the basis of the brief for a 'Concept Design' competition, open to architecture students. The design outcomes of this competition were then submitted to and discussed with the participants and, at a 'Jury Meeting', one proposal was selected to be co-developed. The students who elaborated the chosen proposal were actively managing a process of 'Design Development' with the participants, engaging them in design decisions, from concept to buildable structure. An iterative process based on the feedback-amendment-validation sequence allowed the participants to propose and take the decisions, with the students acting as the technical extension of their design ideas. Once the design was settled, the researchers managed the process of construction management, planning permission and health and safety and risk assessment procedures in preparation for the construction.

Next, when the weather conditions allowed, came the 'Residency Week' (Figure 3), a five day on-site fabrication and construction process, bringing together the community, students and researchers in an intensive, creative week where all people involved enjoyed the shared endeavour.

Figure 18. Community and students engaging in the making activities during the 'Residency Weeks'

At the end of the week, an 'Unveiling Event' (Figure 4) allowed for a celebration of the achievement with families, friends and representatives of the university and the council. In the following days, debriefing meetings were held, attempting to understand how the activity had affected the participants. Methodologically rigorous sociological observation accompanied the process throughout, with field notes, observations, camera filming, audio recording, feedback forms and semi-structured interviews. The observational process used the interventions as case studies, following consolidated architectural research methods[33] and ultimately produced a robust database of information analysed through thematic analysis methods[34].

Figure 19. Unveiling celebratory events at the end of the construction process

MAPPING THEMES AND THREADS

Several themes, methodologically distilled through the urban living lab approach[35], emerged throughout the development of the project activities, cutting across many iterations of each process (Figure 5).

Social justice

Urban regeneration and social innovation
City-making and urban governance
Protocols and guidelines for temporary action
Wider-public impacts (How to study public life)
Exploring community impacts
Community capacities for resilience
Creative methods of collaboration (co-design, co-creation)
Digital participatory platform
Mapping public space opportunities and needs
Public-private-third sector co-production
Institutional learning

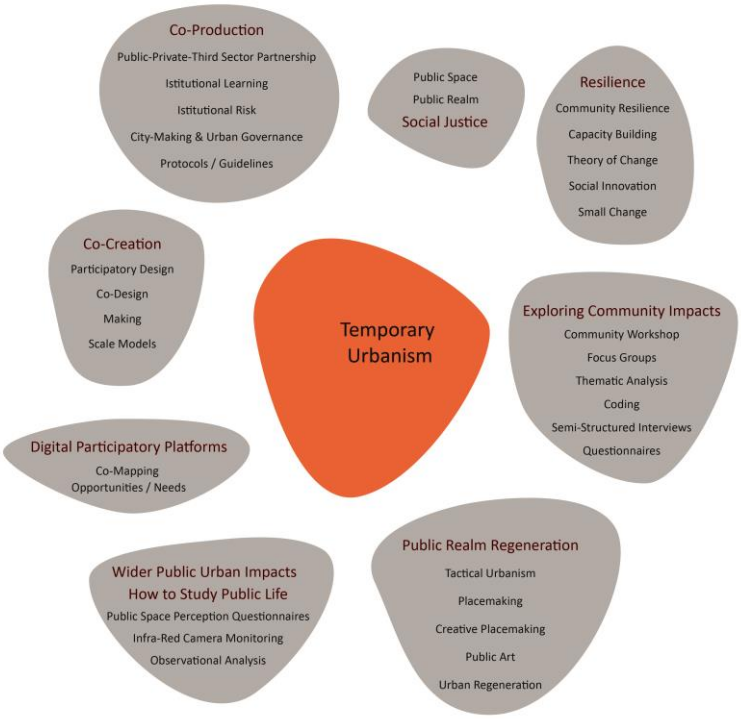

Figure 20. Visual mapping of the themes and threads related to temporary urbanism activities, emerged along the research process

To understand the efficacy of the process the participants (those who design and create the project) and the wider public (citizens who only experience the space) were both monitored. This was targeted to produce an insight – data and information- on the significance and reach of the project and to produce evidence, demonstrating how important it could be in terms of *urban regeneration and social innovation.* This insight will serve as a basis for an argument on the importance of integrating such temporary urban actions as *city-making* processes and ultimately as official tools in the *governance of the city*. It would also serve for the definition of a series of *protocols and guidelines for temporary actions* in the city useful to practitioners and transferrable.
The methodology was intended to promote *social justice* benchmarking in the city, and integrate usually overlooked voices in the making of the city, suggesting an alternative or complementary method to the traditional non-participatory practice of public spaces design. The investigation of the

impacts on the *wider public* was deemed secondary, as opposed to the importance of *exploring community impacts*, understanding the social values generated with the community of participants.
The feedback revealed how a series of social impacts is generated by the making of temporary urban projects, particularly networks among different social groups, the creation of knowledge and learning of new skills, the pushing of individuals' existing boundaries and the tightening of their relationship with the space[36]. The literature demonstrates how these capacities can contribute effectively to community building; ultimately, they are the key capacities that are needed by a community to reinforce their resilience to withstand future hardship[37]. Temporary urbanism is able to put in place processes that nurture and reinforce *community capacities for resilience* and could be considered grounds for playful community training, fostering learning that will become useful to react to possible adversities. Institutions should adopt these types of activities and learn from them, officially and methodologically implementing these environments within the city to produce consistent societal benefits.
Along the process, it became paramount to develop bespoke and tailored *creative methods of collaboration* between the different actors. Whether they were young adults or pupils from deprived backgrounds or BAMER groups, finding creative ways to interact with each other and engage them in the project, playing with junk materials rather than mocking-up scale simulations, was key to meaningful empowerment and creating social impact.
The feedback also highlighted the need to further expand the scale and reach of the project, and develop an effective method to include more citizens in the public space decision-making process, delegating to them more influencing powers in the identification and response to a site/needs relationship.
The idea of creating a *digital participatory platform* for the *mapping of public space opportunities and needs* therefore emerged, a tool that would allow matching of the opportunities available in the public space and the needs of the citizens, possibly via by a mobile application that includes a crowdsourced map.
The process proved to be an excellent way to bring together many different agents in the city and create opportunities for collaboration and *co-production* partnerships between key local institutions, such as universities, local councils and the third sector. This enabled the creation of a dynamically evolving synergic relationship and mutual interests, while generating a combination of positive outcomes for all the parties involved.
The entire process demonstrated how a simple 'collaborative making' process can build a unique synergy between several actors that come together, creating a strong mutual and reciprocal benefit. From this partnership system, the importance to encourage a bidirectional learning process was clear: not only was the community learning something new, but it also gave scope for *institutional learning*, with administrations learning important lessons from the process and the community.

LESSONS LEARNT

Although clearly beneficial, the impacts of such urban interventions are initially small scale, but they have the potential to catalyse bigger and long lasting change[38]. Although making bespoke and tailored approaches is necessary, due to possible diverse contexts and situations, thanks to the case studies considered at least four lessons have been learnt, showing a potential for the transferability of the present research.
The four main lessons constituting as many toolbox recommendation are:

- The community should participate as early as possible in the process and decide where and what installation they wish to develop.

- Focus on the quality of the process, not the quality of the final design outputs.
- Carefully design the methods of co-creation.
- Focus on institutional learning for long lasting change.

Early community engagement

Social inequalities and power-relations in the urban spaces can significantly affect the degree of appropriation of the public realm[39]. Social groups colonise different socio-spatial territories in the city and the power-relations between socioeconomic groups can determine the likeliness of each group to explore and develop a sense of belonging to specific spaces in the city. The physical proximity between a group and a space is not sufficient to describe the group-space relationship and determine a meaningful appropriation of the space as a result of the activity. The choice of a space in the city needs to be negotiated up-front in the process, to establish if that space is meaningful for the group. On the other hand, the 'need of a need' is also fundamental in determining the level of appropriation of the temporary project. The plan for any public space intervention has to emerge from and address a specific socio-spatial community need, to specifically resolve and respond to that need. The lack of a need can result in a potential lack of engagement and consequent failure of the community project. The need provides the base-motivation and ensures that the community remains committed to the development of the project. Because of this, it is essential to involve the community from the very beginning. Institutions should avoid taking any decision prior to the engagement with the community group. It is equally important to engage and deal with active and dynamic existing communities in the city, as this will provide an already cohesive group of people. Temporary urban projects, in fact, even if initiated by an institution, have to grow out of the choices of the community. The community has to be fully involved in the definition of the 'what' and 'where', at the very beginning or earliest stage of the process. This is the stage when everyone understands what their role in the project is; it is a key step for an effective transfer of responsibility and ownership to the community. Offering them the role of those who have the power to decide what to do, and giving the students/researchers the role of technical support and facilitators can create a good power balance between the two groups where everyone is aware of their role.

Process versus design output

The practitioner's approach needs to be focused on the process itself, rather than the design output. "Design may follow; however, it should be only stem from the need of community; it is never a goal on its own"[40]. The co-creation process can generate opportunities for the community to reinforce their networks with new collaborations, to foster the connection to a place and a sense of belonging, to learn new skills and build knowledge, to push and define new boundaries and nurture new aspirations and perspectives. These processes can expose local groups publicly, bringing social visibility and highlighting their social role in the community. To un-tap all these potential social impacts, it is fundamental to focus not only on the final outputs generated by these initiatives, but rather on the process itself. It is the process that, if well-structured and based on clear objectives, can encourage substantial social innovation and bring along meaningful change.

Methods of co-creation

A careful orchestration and design of the co-creation methods is, therefore, a fundamental ingredient to enable innovation. Community participants are not expert designers and may not be familiar with spatial ideas or engineering issues. Open ended questions such us "what would you like in this place?"

are likely to produce abstract answers, so offering visual alternatives can enable more relevant discussion through a validation principle. Similarly, the use of scale models has proven a very effective tool to engage participants and getting them right into developing spatial reflections, considering and exploring different spatial solutions[41]. Once the project has been initiated it becomes very important to make sure everyone has a space and a role proportionate to their abilities. Adjusting the design so that it can offer many different and complementary craftsmanship skills is essential to provide opportunities of engagement for everyone, whether they are working on clay artefacts, painting or sawing, drilling or more complex activities involving carpentry skills. Construction workshops need to be designed with multiple parallel activities corresponding to the skills of the group too, making sure everyone is constantly active and occupied, while ideally also collaborating with other participants.

Institutional learning

Participatory design processes that enable participants to express their own voices involve some 'institutional' risks, such as reputational risks. Institutions may thus try to steer the process and decide upfront key parameters that ultimately affect the potential for community empowerment. The more pressure local council and university put in expecting a 'good quality' final result for the installation, the more the co-creation process is at risk. The aesthetic quality as outcome should not be a primary concern, unless this becomes a requirement of the community. Rather than expecting some tangible result from temporary urbanism, institutions should engage with the experimental nature of these activities, be open to failure as a learning opportunity, and, most importantly, engage with a listening approach and be willing to learn from the process.

CONCLUSION

Bringing ordinary citizens into the decision-making process of space curation and creation can be an effective method of raising awareness amongst the citizenry and turning individuals into change makers in urban transformation. Temporary urban space initiatives can play a vital role in creating opportunities for this involvement, as well as taking back control of the public realm. Through such projects, participants will experience a grassroots direct democracy, which enables the inclusion of traditionally underrepresented voices. By listening to and involving such voices, approaches to tackling inequalities and social divisions can be fostered, aside from the fact that this is a right to choose their own lived environments that all individuals should have. One other positive outcome is the strengthening of community resilience created by having all members gaining a say and a stake in the use and appearance of their own urban spaces.

Hamdi's Small Change approach[42] shows that even slight and temporary changes can feed into substantial long-term transformation through incremental and small-scale actions. Initiatives such as the interventions in Portsmouth can be catalysts for bigger, long-lasting change, providing they are well and thoughtfully managed. This ongoing management is key; temporary urbanism offers first of all an example and allows for experimentation and opportunities to foster both institutional change and new policy implementation. But, if these experiences are not listened to and institutions do not learn from them and seek changes to planning policies, they cannot be used as a functional mechanism to implement more significant change, and their outcomes remain limited in time and space. Therefore involving the community, listening to them and learning from them has to be at the heart of every intervention if real and lasting change is to be achieved.

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DESIGN PARADIGMS FOR A CHANGING ARCHITECTURE

Author:
KEVIN SANTUS

Affiliation:
POLITECNICO DI MILANO, ITALY

INTRODUCTION

The global changes, together with the residues from the urban development, require a reflection upon the strategies that we could apply to regeneration processes. To do so it is necessary to frame the key themes that intersect design disciplines, to understand which could be the values of the contemporary design perspective.

Thomas L. Friedman highlights in his book *Thank you for being in late* the convergence of changes – climatic, social, economic, and technological – and the increasing speed of the transformations taking place, referring to the emerge of an incremental "Great Acceleration"[1] in which human action influences structural changes of spaces and relationships. The effects of this ongoing and accelerated transformation sharpen in urban areas, where the stratification of social, environmental, and economic factors is producing fragile contexts. Within these, climate-related hazards are increasingly frequent and require a design action to produce a more prepared society and space, to adapt and make resilient these unstable contexts. Due to the modified balance between human and environment,[2] architecture and urban design had to introduce emerging strategies in which Circular Economy and Nature-based Solutions acquired centrality. These approaches are producing an alteration of the architectural form and concepts, pushing for an analysis of the theoretical implication of this design climate transition. Consequentially, the aim of the paper is to connect the current resilient perspective with the Critical Regionalism by Kenneth Frampton, revising it and, through a critical reflection, try to identify a list of contemporary paradigms that can define an interpretative framework through which analyze the current design transition.

Method

The contribution starts from framing the general context of the urban and architectural fields, where global changes are directly interfering with the built environment, requiring new tools and approaches to design practice, so provoking a transition of the design practice. In this perspective Nature-based design and Circular Economy are considered necessary approaches to contemporary architecture and urban design.

From this background, the paper will analyze three design paradigms – scale, resources, and time – that, reconsidering the Critical Regionalism by Kenneth Frampton, could play a central role both for the interpretation of future perspective of urban transition and for re-framing the role of the resilient project.

The three paradigms derive from a revisitation of some statements present within the text *Towards a Critical Regionalism: Six Points for an Architecture of Resistance*, by Kenneth Frampton, and from a literature review related to the application of Nature-based design and Circular Economy. Specifically, these features try to read the relation between climate change and critical regionalism, defining the latter as a necessity for contemporary design.
Finally, to clarify the design perspective of these renewed paradigms for a resilient design, the paper presents two Dutch urban projects: the De Ceuvel by Space&Matter and the Luchtsingel by ZUS. Both the projects present a declination of the exposed paradigms, showing a design outcome that explains through the practice strength and weaknesses of current resilient projects. Moreover, these projects underline the connections between the paradigms and the usage of circularity and nature, attempting to critically interpret the common resilient strategies.
The article's scope is to understand how a revisitation of critical regionalism could be used to define a balance between global challenges related to climate change and local solutions, reflecting on some features that were not considered by Frampton in his original text. This perspective takes parts within the contemporary debate about how we are designing our cities, and how to apply resilient approaches to architecture.

THE CRITICAL REGIONALISM AS A TOOL FOR CONTEMPORARY DESIGN

The *Fifth Assessment Report of the Intragovernmental Panel on Climate Change (IPCC)* pointed out how human influences on climate have a crucial role.[3] It is indeed decisive to consider climate change risk into urban and architectural design to contrast the rise of temperature, the depletion of resources, and the energy crisis. Considering these conditions implies a shifting panorama of the design of public spaces and buildings that could transform the traditional practice.
Nowadays, these needs made emerge new strategies able to produce resilient spaces toward a sustainable idea of urban space. Indeed, the core of many world agendas refers to a safer and more prepared society/environment, as reported by the *2030 Agenda for sustainable development goals*[4] by the United Nations General Assembly, and the *European Green New Deals*[5] by the European Commission.
These programs are making clear the rise of new urban and design perspectives, that should assume the relation between economic, environmental, and social factors, to achieve a more sustainable, circular, and responsive city. The long-term aim seems to recall the Bruntland report that calls for a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs"[6]. In this direction, to structure a spatial response, we can observe the application of approaches such as the aforementioned Circular Economy and Nature-based design. These are necessary for adaptive and integral solutions to build up resilient cities and to adapt and mitigate the effect of climate change, thus fostering the preparedness of our cities.
Hence, a revisitation of the Critical Regionalism by Kenneth Frampton is considered by the author an opportunity to identify a tool of analysis and interpretation for contemporary projects. Indeed, even if the need for a sustainable approach is widespread clear, we could face a problem of generic solutions, applied all over the world, without considering the specificity of the site, just to achieve and produce a pre-required image of a resilient and ecological city.[7]
In this context, the usage of some paradigms derived from Frampton's essay could help in identifying a contemporary "Architecture of Resistance"[8] that faces the climatic issue with a pro-active perspective.

An architectural alteration: a critical perspective for the project of transition

In 2019, the Dutch journal OASE published a volume titled *Critical regionalism revisited* curated by Tom Avermaete, Veronique Patteeuw, Hans Teerds, and Lea-Catherine Szacka. The journal spotlighted how "Critical Regionalism provided theoreticians with a lens to conceptualise the current architectural production […]. In other words, it provided architects in various cultural and political geographies with the intellectual tools to situate and understand their own practice within the scope of more global tendencies and approaches"[9].

Among the various contribution that highlighted the necessity of a contemporary understanding of critical regionalism, Ken De Cooman, co-founder of the Belgian architecture studio BC Architects, in his text *Beyond Critical Regionalism of Grey Zones and Radicality in Contemporary Practice* portrayed the possible relation between the interpretation of Frampton's text and the current global climate crisis: "Looking at Kenneth Frampton's text 'Critical Regionalism' today immediately reveals a series of omissions […]. A first path is the difficult state of our ecosystem, such as climate change and the depletion of resources. These are the main reasons why currently we should focus on climate, context and tectonics. Bioclimatic design, the use of local materials for construction, the low-carbon or bio-based production of materials – these are all strategies that inevitably lead to an approach informed by local knowledge and engagement."[10].

Considering this, interpreting the critical regionalism with a contemporary lens could lead to defining a set of paradigms that could help in reading and construing the current architectural production that needs to apply solutions to increase the sustainability of human actions.

Measuring with the climate, and therefore structuring a spatial project capable of responding to specific critical issues, is closely related to the context in which the project is rooted. Because of this, the design answer to the global peril of climate change should not go in the direction of a globalized solution, rather in the implementation of specific answers derived from a general approach. Indeed, it is embedded in the concept of climate change, that even if it is a global phenomenon, the vector of the catastrophes derives from the climate which is peculiar and different place to place.

In this sense, critical regionalism could be useful not only as a statement against the global culture but to strengthen the designer's capacity to foster resilience within cities, reinforcing the capacity of interpreting and relating with the specificity of the site.

Three paradigms: scale, resources, time

The project for a resilient transition is an echo of a generic concept of sustainability. Starting from this vague notion, the scope of nowadays projects goes in the precise direction of adaptation of urban areas and mitigation of carbon emissions. Thus, the purpose is to make the space capable to curb climate-related hazards and conceive low-carbon projects.

This design production is increasingly spreading worldwide, also due to the growing threats raised with climate change. Consequentially, it is necessary to understand the paradigms that we could use to frame the contemporary architecture of Resistance.

A first reflection that we could do is about the scale of projects. Working toward the adaptation of the urban space, making it able to resist floods, or contrasting the heat island effects, means to address a specific action scale of the project. In this perspective, the neighborhood scale is recognized as a possible working context, to deal with climate-related hazards, acting where the scales interact between territory/environment and architecture. The built fabric could be framed as an urban fact, ultimately also architectural, revealing sensitivity towards the territorial resources and identifying the neighborhood as a point of inflection between plan and project.[11] In this perspective, the ability and possibility of the project to answer climate-related risks must move the focus from single objects to

fabric systems, to actively interact with local metabolisms. As Ashley Dawson wrote: "The horizon of urban survival is transforming the field of architecture, pushing it, to jump scale from isolated architectural objects to thinking on far broader planes."[12].

A second important topic regards the resources. In a world where the depletion of resources is a thread not only for the building sector but also for the balance of the world ecosystem, it is essential to relate the practice with this paradigm. The necessity to think about the practice in relation to the usage of local resources is nowadays not only a cultural will, but also an environmental demand. This involves not only a technical reflection but highlights the centrality of a revisitation of critical regionalism. Indeed, an increasing attention is rising upon the role of local materials which have a direct impact on the design results, characterizing the architectural language, and determining the reduction of the environmental impacts. This horizon is also highlighted by the widespread question for a circular society, which is pointing to the necessity to reflect upon the materials cycles, also with approaches more open to reuse and recycle.

The last paradigm that should be considered dealing with design transition, and the strategies implied, is the theme of time. Specifically, time can be framed with the opposition between durability and impermanence.[13]

Looking at contemporary architecture, we can see an increasing reduction of the life cycle of buildings, that are losing the idea of the permanence of architecture. Nevertheless, considering climate change as a new condition of contemporaneity, it seems evident the need to build a transition that develops a clear vision toward long-term projects, dealing with the concept of duration and permanence. Indeed, "long term resilience […] is of particular importance because challenges from climate change will further impact on urban society during the upcoming decades and require long-term adaptation thinking"[14], so defining a new longue durée of projects, able to produce short-term relapses and structure a long-term permanence. Reflecting on the relationship that Circular Economy and Nature-based design may have with the theme of time, opens unresolved questions that should be further analyzed, to better understand the applications of these tools and their relapses within a longer perspective.

The three presented paradigms delineate a set of features that could interpret the transition framework of design, serving both as theoretical analytic tools and practical issues of reflection. These themes must be seen not as a substitute for Frampton's paradigms, but as contemporary themes to consider when facing climate change. Next to topography, context, climate light, and tectonic, we need to reflect upon the role of scale, resources, and time, questioning how contemporary projects deal with these issues.

DESIGN PERSPECTIVES: UNDERSTANDING FROM THE PRACTICE

Looking at contemporary design practice, it is evident the proliferation of resilient projects. Within these, it is possible to recognize some cases that open to a reflection upon the mentioned paradigms, in which the results define the direction for a contemporary architecture of resistance.

To show this possible design perspective is examined the Dutch architectural environment, where a series of public policies created an intense production of resilient spaces. Among these, the contribution shows two urban projects that aimed to rethink two neighborhoods in neglected urban areas. Both the projects root in marginal and fragile contexts, where through the application of circular principles and Nature-based solutions try to regenerate part of an urban fabric.

The first case study is De Ceuvel by Space&Matter (Figure 1). The project deals with the regeneration of a polluted dock of Amsterdam Noord where, through the phytoremediation, a long-term reclamation process started in 2014. This operation tries to regenerate and restore the natural capital

of the neighborhood, acting on the removal of pollutants from the dock's ground, to make it a renewed common space for the city and decreasing the heat island effect that is present in the area.
At the same time, circularity is applied by sharing and reusing the physical assets of the city. Indeed, the masterplan presets retrofitted houseboats connected through a raised element that configures a promenade that interacts with the neighborhood scale, producing new public spaces.
Integrating circular logics aimed at the effective use of local resources, with systems that consider nature as a project tool, in which the design effects are evidence of the circular idea of reduce, reuse, recycle.

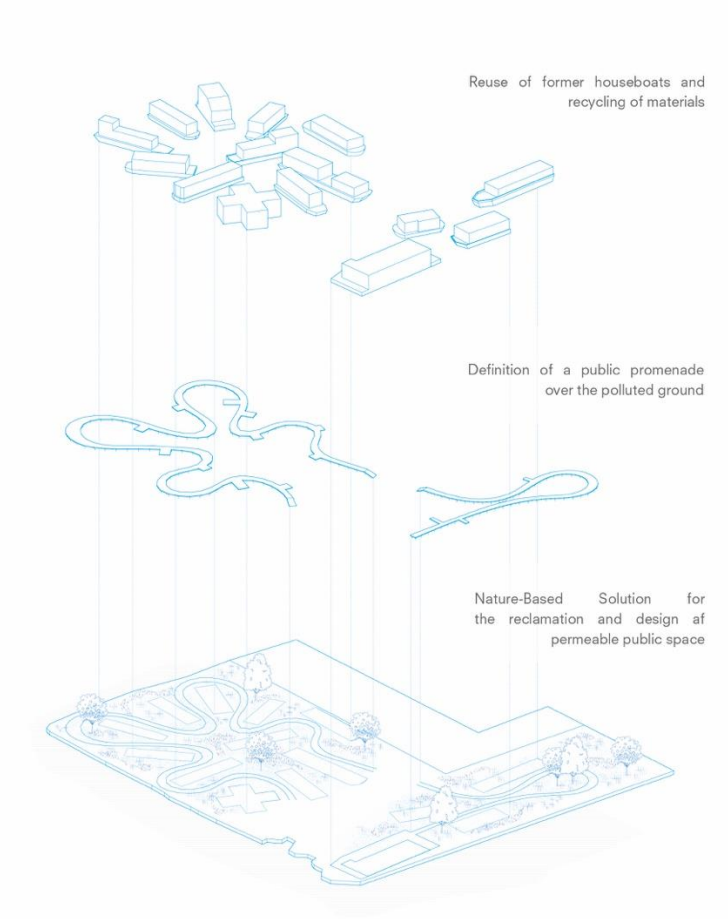

Figure 1. Design Strategy for De Ceuvel, by Space&Matter.

The second project, the Luchtsingel by ZUS ((Figure 2), is settled in Rotterdam and aimed to reconnect three districts of the city through an urban bridge, implementing green public areas to restore the neglected landscape close to the railway.
With this experimentation, it is clear the concept of a design is orientated toward the design of a strategy for the city. The concept of the public infrastructure, the bridge that physically reconnects the districts, is used to interact with the reuse of abandoned spaces, and to activate a ground regeneration with urban community gardens. Here, the scale of the project is essential to stimulate a renewed urban dynamism and to relate a series of punctual solutions.

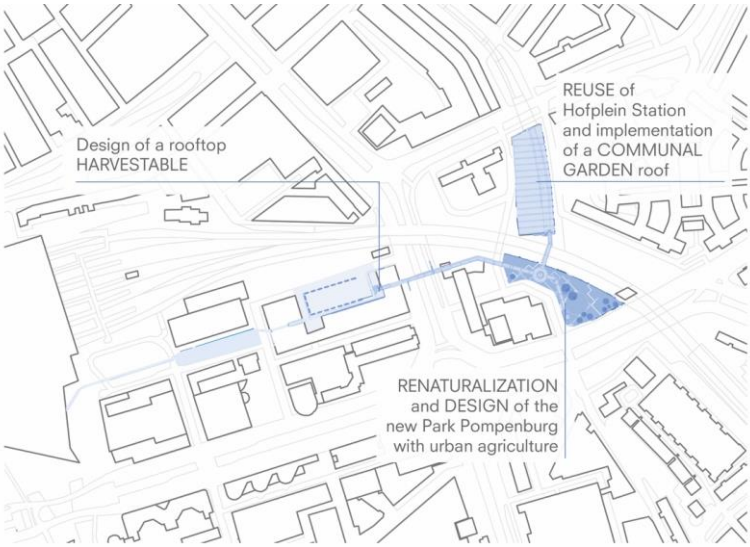

Figure 2. Design Strategy for the Luchtsingel, by ZUS.

Both the case studies display that design for a resilient future means reasoning and interpreting the different life cycles of the place, trying to interact with the inner metabolism of the neighborhood and work with a strategy able to interact both with the adaptation and mitigation actions.
A local sensibility in the usage of resources, the scale of intervention, and the will of constructing for a long-term resilience are core values of these projects that define a design perspective that try to interpret the new needs of the society and, at the same time, react through the spatial design to current fragilities.

CONCLUSION

Even if it is clear the perspective of adaptation of our cities toward a more responsive society and space, it is also necessary a deeper understanding of the theoretical and cultural relapses that resilient approaches like Nature-based design and Circular Economy are producing. The identified paradigms could frame a critical perspective through which read and interpret the contemporary design practice. Consequentially, the final scope of this article could be seen in the necessity of defining a framework that could help in interpreting the current design transition, engaging the current resilient projects not only evaluating their effectiveness but understanding the relationship with the specificity of the site and with the local usage of resources.
In this horizon, resilience, reveals itself as a global challenge provoked by climate change, that needs a design resolution with a local perspective.[15]
The contribution aimed to identify some paradigms that could be useful to interpret the current transition of architecture. To do so, a revisitation of the critical regionalism was done not to oppose the phenomenon of globalization, but with the scope of finding theoretical support for a more local approach that could define sustainable design, specifically addressing a mindset for the application of Nature-based design and Circular Economy.
The compromised ecosystems of contemporaneity need a spatial thought, able to structure the city of the future and understand the threads of a generalized approach against climate change.
Indeed, sustainability and resilience should not be a style to cover a globalize phenomenon toward the definition of a global architectural language, rather a necessity that could bring practitioners to reflect on how to shape a long-term project for better urban areas and territories. Because of this, it is

considered crucial to reflect upon the paradigms related to contemporary design, to interpret the architecture production, and to have the theoretical tools to design this age of transition.

NOTES

[1] The author refers to the text by Will Steffen, Wendy Broadgate, Lisa Deutsch, Owen Gaffney, Cornelia Ludwig, “The trajectory of the Anthropocene: The Great Acceleration.” The Anthropocene Review. 2 (2015): 87–88. This shows a series of graphs which highlight the correlation between anthropogenic action and ecosystem changes.
[2] Lance H. Gunderson, and Craig R. Allen. Introduction to *Foundations of ecological resilience,* by Lance H. Gunderson, Craig R. Allen, and Crawford S. Holling (Washington: Island Press, 2009), XIV.
[3] IPCC, *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, (Geneva: IPCC, 2014), 40.
[4] United Nation, *Transforming our World: The 2030 Agenda For Sustainable Development*, (United Nation General Assembly, 2015).
[5] European Commission, *COM 640 final: The European Green Deal*. (Brussels: European Commission, 2020).
[6] Gro H. Brundtland, *Report of the World Commission on Environment and Development: Our Common Future*, (United Nations General Assembly, 1987), 41.
[7] Haitham Selim, “Future of Sustainable Architecture and its relationship with currents of Globalization”, (paper presented at the World SB14, Barcelona, Spain, October 28-30, 2014).
[8] Kenneth Frampton, “Towards a Critical Regionalism: Six Points for an Architecture of Resistance”, in *The Anti-Aesthetic. Essays on Postmodern Culture*, ed. Hal Foster (Seattle: Bay Press, 1983), 16.
[9] Tom Avermaete, Veronique Patteeuw, Hans Teerds, and Lea-Catherine Szacka, “Revisiting Critical Regionalism”, OASE #103 (2019): 4.
[10] Ken De Cooman “Beyond Critical Regionalism of Grey Zones and Radicality in Contemporary Practice.”, OASE #103 (2019): 137.
[11] Vittorio Gregotti, “Un compito per il disegno urbano”, Casabella 584 (1991): 2-3.
[12] Ashley Dawson, *Extreme Cities. The peril and promise of urban life in the climate change* (Edinburgh: Verso, 2019), 154.
[13] Ilaria Valente, “Durata”, in *Recycled Theory: Dizionario Illustrato/Illustrated Dictionary*, ed. Sara Marini, and Giovanni Corbellini (Macerata: Quodlibet, 2016), 177.
[14] Nadja Kabisch, Horst Korn, Jutta Stadler, and Aletta Bonn, *Nature-based Solutions to Climate Change Adaptation in Urban Areas: Linkages between Science, Policy and Practice*, (Cham: Springer Nature, 2017), 325.
[15] This concept is related to the motto “Think globally, act locally” derived from the inner meaning of the book *Cities in Evolution* (1915) by Patrick Geddes.

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AN INTERDISCIPLINARY TIMELINE: A ROADMAP TO OPERATIONALIZE INTERDISCIPLINARITY

Authors:
LAUREN KATHRYN JOHNSON, SHELBY HAGERMAN, TRISTAN WALKER, DANIEL DICKSON, EMILY STONE, ZACH COLBERT, ALEXANDRA MALLETT, JEAN DUQUETTE

Affiliation:
CARLETON UNIVERSITY, OTTAWA, CANADA

INTRODUCTION

Buildings have the potential to physically manifest interdisciplinarity: many discrete disciplines impact the building design process, the standards for building performance, construction sequencing, operational considerations, the end user experience, and the public policies that influence each of these. However, conventional building design, construction, and use practices often keep these processes separated, therefore neglecting the opportunity for interdisciplinarity.

Yet there is growing acknowledgement that conventional, disciplinary-based problem-solving is ill-suited to address contemporary challenges. Indeed, some scholars suggest that effective cross-disciplinary collaboration is highly valuable[1] and even necessary to solve wicked problems like climate change and global food insecurity.[2] Accordingly, an authentic transition to sustainable practices in the built environment necessitates increasing interdisciplinarity. Yet as with any other intangible concept, such as sustainability or resilience, it is impossible to perform interdisciplinarity without identifying concrete actions to pull this elusive idea out of the mist and into everyday practice.

Drawing on experiences from a collaborative research project between architecture, mechanical engineering, and public policy that examines the potential of a hydro turbine system in tall residential buildings driven by wastewater,[3] this paper proposes a roadmap to operationalize interdisciplinarity in a post-COVID, virtual work environment[4] using novel methodologies. The roadmap is composed of three milestones: 1) illustrate a complex, intangible process, such the building design process, on a virtual collaborative workspace; 2) nurture curiosity by using this visual to immerse the research team in intense, nitty-gritty specificity; and 3) practice an iterative process by continuously revisiting this visual portrayal, even if it is not a final product of the project.

This paper will explain the proposed roadmap by first describing how our research team used a visual representation of the building design process, what we have termed the Timeline, on the virtual workspace, Miro, to learn from each other, expand our understanding of the others' disciplines, and ask more informed and relevant research questions. Next, we will demonstrate our roadmap's repeatability by describing its use within a focus group session for architecture, engineering, and public policy students. These examples demonstrate practical steps that an interdisciplinary team can take to cross disciplinary boundaries and more effectively solve problems by fully capitalizing on the diverse perspectives and methodologies available to them.

INTERDISCIPLINARITY

Fostering interdisciplinarity can be elusive, even when funding is available to include several disciplines on a project.[5] A project that involves more than one discipline can easily practice only *multi*disciplinarity. Choi and Pak conclude from a systematic literature review that while *multi*disciplinarity "draws on knowledge from different disciplines but stays within disciplinary boundaries… *inter*disciplinarity analyzes, synthesizes, and harmonizes links between disciplines into a coordinated and coherent whole."[6] Graphically, *multi*disciplinarity is akin to two separate circles and *inter*disciplinarity a Venn diagram[7]: by overlapping, the disciplines create an interstitial space that only exists when they interact.

For example, conventional building design exemplifies *multi*disciplinarity: architects contract with HVAC, mechanical, and electrical engineers to design their respective systems, yet each discipline can easily do so in isolation, handing their design "over the wall" without collaborating with the others in a way that would meaningfully change the outcome. Alternatively, an integrated design process, in which the design team meets with stakeholders in the beginning and throughout the project to collaboratively develop each stage, exemplifies *inter*disciplinarity.[8] Hence, moving beyond *multi*disciplinarity requires more than simply involving several disciplines in a project.

Accordingly, some scholars have sought to operationalize interdisciplinarity. Tobi and Kampen developed The Methodology for Interdisciplinary Research Framework, a four-step process that clearly delineates which project stages must be carried out collaboratively and which may be carried out in silos.[9] First, a multidisciplinary team comes together to develop the 'why', 'what', and 'how' of the project—respectively, the shared goals, conceptual design, and technical methodologies. Next, each discipline carries out the tasks within their domain. Finally, the team analyses the data together using an interdisciplinary perspective. By allowing each discipline to carry out its part of the shared design within its own silo, Tobi and Kampen's framework abides by an exhortation from Thorén and Persson that interdisciplinarity should not continuously create new disciplines but rather should allow firmly rooted disciplines to interact, influence, and collaborate with each other.[10]

Kluger and Bartzke developed another methodology seeking to operationalize interdisciplinarity. It begins by developing a research question by consensus, moves to creating a common understanding of the concepts of participating disciplines, and finishes by representing the role of each discipline in the research domain in a diagram.[11] In this particular study, the team created a schematic of how the disciplines of geology, biology, and law interact with each other and with society in three different scenarios involving the construction of on- and offshore wind farms.

These frameworks provide useful steps for cross-disciplinary teams to begin breaking down silos. However, the currently proposed roadmap presents a novel methodology that complements the approaches detailed above by emphasizing visualization and reflexivity. Specifically, we purport that operationalizing interdisciplinarity can occur through illustrating and annotating a complex process, nurturing curiosity through intense, nitty-gritty specificity, and finally through continual practice of an iterative process.

MILESTONE I. ILLUSTRATE A COMPLEX PROCESS

To build the structure necessary to encourage earnest interdisciplinarity, we propose that interdisciplinary teams make tangible the formerly *in*tangible by illustrating or diagramming a complex process using a virtual workspace, such as Figma or Miro.[12] In our case, we used Miro to lay out the steps of building design, as detailed in the *Canadian Handbook of Practice for Architects*.[13] Engaging with the *Handbook* allowed us to critically reexamine what constitutes an idealized execution of this process while searching for opportunities within these

guidelines to encourage interdisciplinary interactions. For instance, the decision to integrate a novel energy solution should ideally happen during the pre-design phase. Miro was chosen because of its user-friendly interface, attractive annotation options, and infinite zoomability, allowing us to home-in on minute details and scroll out to absorb the entire picture at once.

For months, our team excavated the intricacies of the building design process through each of our disciplinary lenses. Despite the many rich conversations building design offered, it became clear that expanding our framework to include the other disciplines— engineering and policy— would further uncover the interstitial spaces fertile with potential synergy. Accordingly, our final Timeline includes architecture as represented by the building design process, engineering by the research and development process,[14] and public policy by the policy cycle.[15] The resulting 'Timeline' visual allowed our team to immediately dive into spontaneous conversations that grapple with the foundational questions of the three disciplines. Following those discussions, it provided the scaffolding to organize those messy tangents into a coherent conception of our specific interdisciplinarity.

Spatializing the details of how each discipline is practiced allowed us to pinpoint existing intersections and potential areas for additional exchange that could support the project's overall goal of implementing novel energy solutions into buildings.[16] The result echoes Thorén and Persson's concept of problem feeding: one discipline identifies a problem and presents it to another discipline to address.[17] The arrows in Figure 1 revealed that our disciplinary cycles occur simultaneously yet interdependently, such that a pre-requisite for a step in one cycle can be the key outcome of another cycle. In other words, the Timeline allowed us to identify potential problem feeding within our own project.[18] For example, one such conversation contended with the contradictory role of very tall residential buildings in cities: on one hand, tall buildings reduce urban sprawl, an important step towards urban sustainability because it better enables public and active transit. On the other hand, the COVID-19 pandemic has demonstrated the downsides of living in tall buildings: they reduce access to outdoor space, while their proliferation can decrease the infiltration of natural light to lower levels. Figure 1 diagrams this conversation and how the intersection of the three disciplines can better speak to the seemingly competing objectives of resident wellbeing and overall urban sustainability. In this example, public policy "fed" the need for taller building to architecture; architecture then must endeavor to increase densification while finding creative solutions to provide outdoor space and natural light to residents. This may include "refeeding" a problem back to policy: in order to densify cities while maintaining wellbeing, perhaps parking lots could be converted to public parks, which would provide more access to outdoor space and decrease ambient temperatures for tenants living in the lower floors.

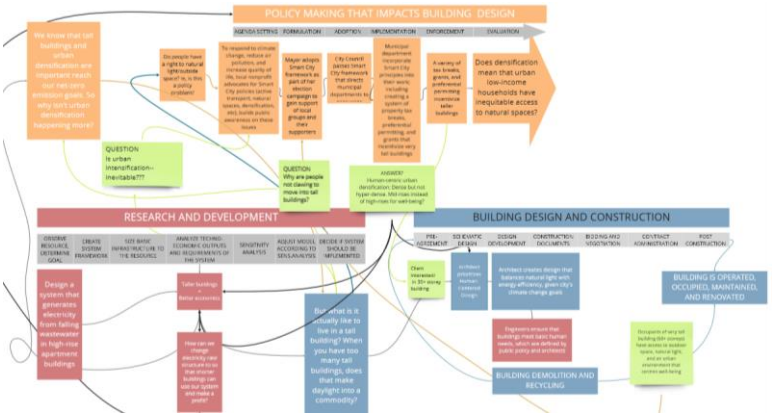

Figure 21. A graphic representation of a team conversation using the Timeline.

MILESTONE II: NURTURE CURIOSITY THROUGH INTENSE, NITTY-GRITTY SPECIFICITY

By illustrating the processes of our three disciplines and annotating them with team conversations, the Timeline provided fertile ground to nurture our curiosity through intense, nitty-gritty specificity. Examining the mundane practices of a discipline—how an architect designs a building, how an engineer develops a technology, or how an idea becomes a policy— our team developed, as per Kluger and Bartzke, "a common understanding" of how each discipline is practiced and views the world.[19] More significantly, we became deeply curious of our colleagues' disciplines.

We cultivated this curiosity by encouraging each research assistant to interact with the Timeline every week individually. We posted questions to raise points of interest, used arrows to reveal intersections, and pinpointed leverage points within each domain to ensure our proposed technology's successful implementation. No detail was too banal to raise for discussion. The architecture professor on the project regularly reviewed the Timeline to answer "factual" questions from his experience as a practicing architect. The research assistants reviewed new annotations together weekly, answering each other's questions and discussing input from the architecture professor. This iterative process developed a firm understanding by each research assistant of how buildings are designed, constructed, and used, highlighting questions to ask in subsequent interviews and focus groups with professionals and residents of high-rise buildings.

Villenueve et al. caution that interdisciplinarity can oversimplify "cutting-edge thinking" within particular fields in the quest to create a common understanding among team members.[20] The Timeline preserved the complexity of each discipline by expressing their nitty-gritty specificity, while literally maintaining the big picture through infinite zoomability, allowing them to remain in "productive tension with each other," in the words of Yeh.[21]

MILESTONE III. PRACTICE AN ITERATIVE PROCESS

The Timeline was a tool for our team to explore and ask questions internally, leading to a visualization so cluttered and chaotic that only those involved could understand it. We excused ourselves early on from the pressure of ensuring that the Timeline was understandable to external audiences, instead focusing on how it could be a tool for our individual and team enrichment. This happened over many sessions, allowing the team to record intricate conversations and track complex ideas. We found that interdisciplinarity has no destination but rather must be practiced continually to avoid reverting to disciplinary comfort zones.

Some scholars essentially suggest that an interdisciplinary research team synthesize their findings through a heuristic model, or a simplified graphic to communicate findings.[22] The final section of our paper explains how we revisited and compiled the messy, annotated Timeline into legible graphics for dissemination to a wide audience. It should be noted, though, that visualizing and annotating a complex process is distinct from synthesizing findings into a simplified graphic: the latter is a product that shares research findings to external audiences. The former fosters a vigorous group process.

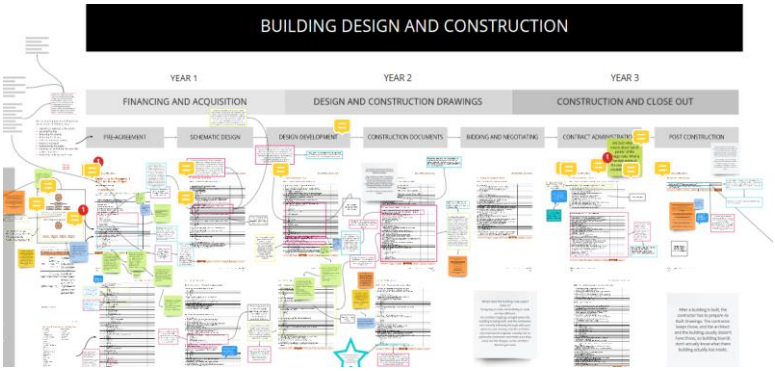

Figure 22. A section of the Timeline fully annotated.

Further, the Timeline was a low-stakes activity for our team to practice interdisciplinarity. Consequently, we developed the muscle memory to practice interdisciplinarity when we were engaged in higher stakes activities, such as co-facilitating a focus group with stakeholders. Indeed, Lefroy found that communication strategies and supportive team climate were two of ten characteristics underpinning effective interdisciplinary teams,[23] while Villeneuve et al. emphasize the importance of sharing a workspace, friendship, and consistent, structured discussions to enhance collaboration and interdisciplinary research.[24] By relieving pressure to create a product and engaging in a forum where each discipline could both share expertise and ask questions freely, the Timeline allowed us to develop an effective, trusting space where each team member felt their knowledge was valued. Remarkably, thisrelationship-building took place almost entirely virtually. We believe that our roadmap provides an important contribution to the literature on interdisciplinary collaboration, given the ubiquity of remote work the COVID-19 Pandemic has presented.

CONDENSED INTERDISCIPLINARITY: FOCUS GROUP CASE STUDY

The process of developing the Timeline took months; we recognize that few research teams are afforded the luxury of time. Accordingly, our team developed a session to execute the proposed milestones in a single, three-hour session for current and recent graduate-level students in the fields of engineering, architecture, and public policy, most with some knowledge of sustainability.[25] This session responded to a call from Buelow et al.,[26] who emphasize the importance of creating interdisciplinary exercises to enhance education. Similarly, McDermott et al. developed short-term design challenges for teams of undergraduates to practice interdisciplinarity,[27] although the process described below was more heavily facilitated by our team than what these researchers describe.

For an introductory exercise, as per our first milestone, participants were asked to work together to visually design a system to recapture energy using wastewater by placing the stickers shown in Figure 3b, representing system components, on the blank image of a building section in Figure 3a. For example, participants could select the turbine sticker, seen in the third column from the left in Figure 3b, and place it somewhere in the building where they believed it would best enhance system

efficiency. These template graphics provided initial structure, operating similarly to our Timeline's *Handbook* headers. Participants quickly delved into highly specific interdisciplinary discussions, resulting in multiple designs, as shown in Figure 4.

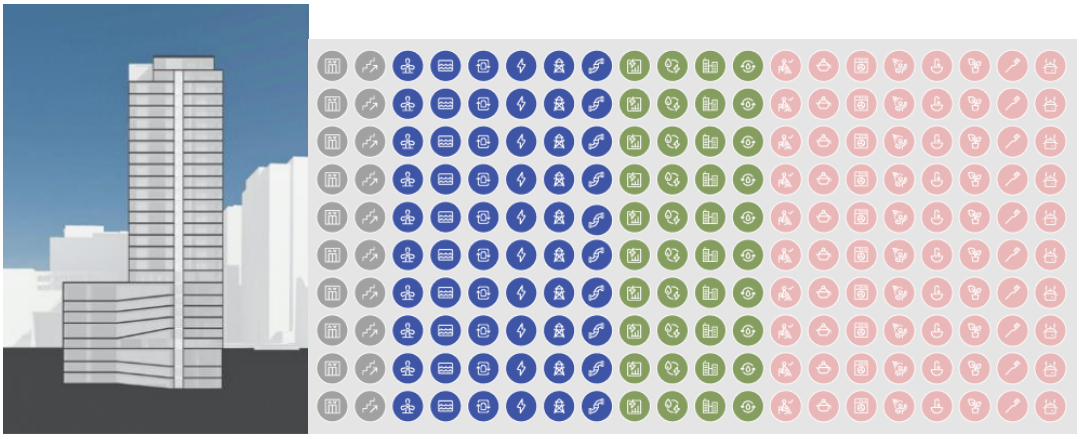

Figure 23. Image of the a) Blank case study building provided to the focus group as a template for the first design exercise, and b) the supplied stickers.

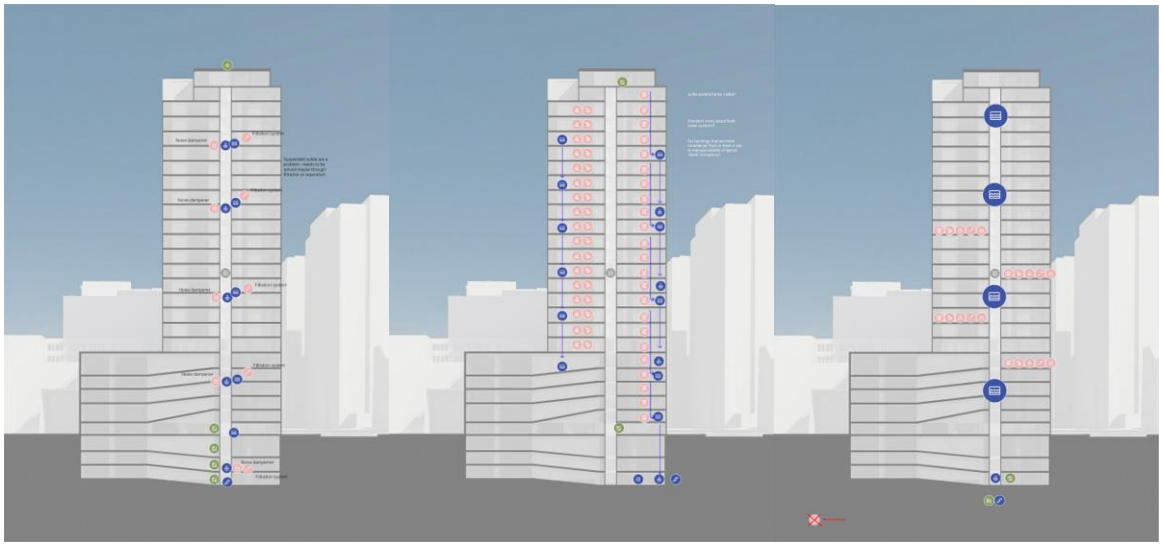

Figure 24. The FES study building populated with stickers representing components that the focus group deemed necessary or important to the wastewater hydroelectric system.

Building on the first exercise, we then asked each person to populate the Venn diagram seen in Figure 5a with the tasks each discipline contributes to the design and construction of buildings. Each member wrote three tasks for every discipline in text color-coded for their own discipline. The representative of each discipline then reviewed their attributed tasks, confirming or denying any biases. Finally, the group as a whole was asked to move each point around the Venn diagram, discussing whether a task was specific to or shared between multiple disciplines. This activity served to break down silos, critically comparing and contrasting the strengths of each discipline. What began as segregated tasks became overlapping collaborations shown in Figure 5b. For example, one group asserted that "accounting for the human/social aspects of a technology" was a task that all three disciplines *should* share.

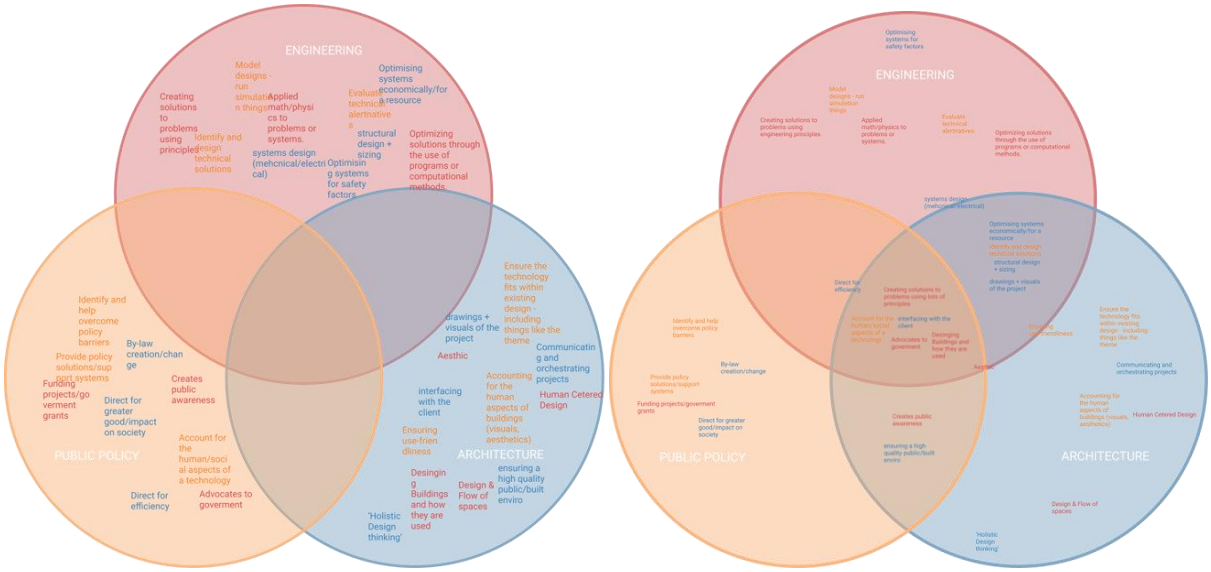

Figure 25. Venn diagram of the tasks each discipline undertakes a) segregated by initial perceptions b) spread across the diagram through discussion of shared tasks.

The final exercise asked participants to transfer the tasks from the Venn diagrams into a simplified version of our Timeline, shown in Figure 6. Asserting a key finding of our work with the Timeline, the group found that depicting the tasks linearly failed to fully represent that they often take place simultaneously and cyclically. To better represent the repetitive and intertwined nature of certain tasks, participants drew arrows and a circle, co-opting the provided graphic to enrich their collaboration and learning. Hence, through our experiences with our own Timeline, we created a platform to bring previously inexperienced participants to a great level of comfort with interdisciplinarity in just one session.

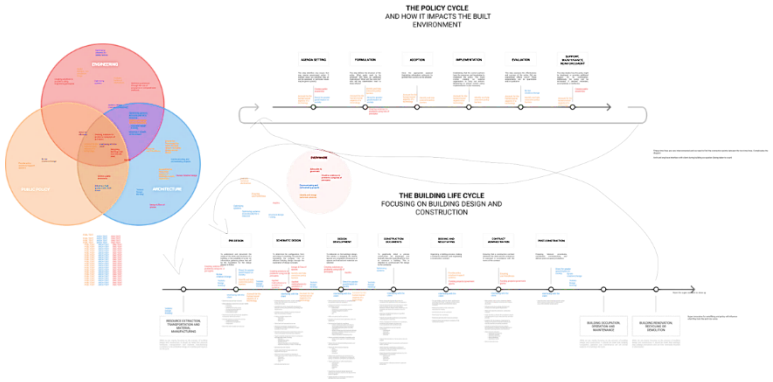

Figure 26. The simplified FES Timeline annotated by focus group participants to show the Timeline in a project of the tasks reported in the Venn diagram

COMMUNICATING THE TIMELINE TO EXTERNAL AUDIENCES

As we reflected on our experience with the Timeline and focus group, it became essential to produce a graphic that further describes the method of discourse and collaboration we have developed for a broader audience.

Accordingly, we created the Timeline re-visualization, shown in Figure 8, to celebrate the density and complexity of our conversations and how they shift between disciplinary perspectives, oscillating between the highly specific and the broader contexts within which our work is situated. We organized the Timeline into a series of columns that detail the lifecycle of a building with an emphasis on the phases of design and construction as described in the *Canadian Handbook of Practice*.[28] We highlighted areas of interest for future research in grey, arranged a series of annotations to discuss them, and labelled them to indicate which of the three disciplines they apply to. This tedious process allowed us to chart these intertwining disciplinary flows across the Timeline as revealed by our discussions. Wrapping forms envelop the comments and questions that are situated in the drawing and encircle the areas of interest they address from the *Handbook*. The semi-opaque colors often overlap, depicting the interplay between disciplines.[29] We consider the Timeline re-visualization an iterative process; moving forward, we aim to explore additional modes of representation that communicate the complex relationships operating within interdisciplinary work and research.

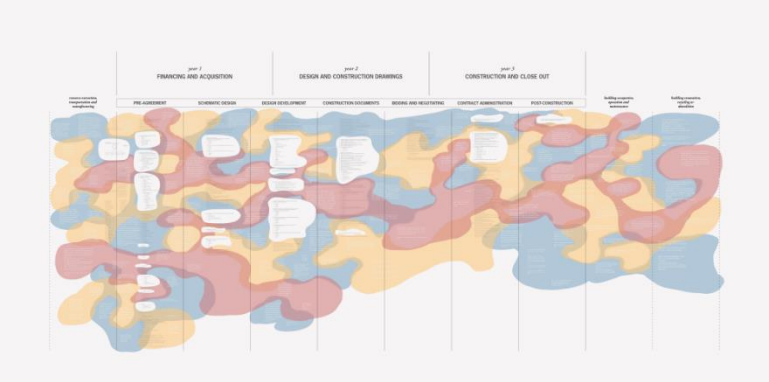

Figure 7. Final Timeline re-visualization.

The evenly spaced columns in figures 7 and 8a offer rhythmic clarity to the graphic. However, we recognize that many other scale factors, such as total cost, professional labor, and project lifetime, invite many lenses through which the width of the columns might be manipulated in future representations, as depicted in Figure 8b.

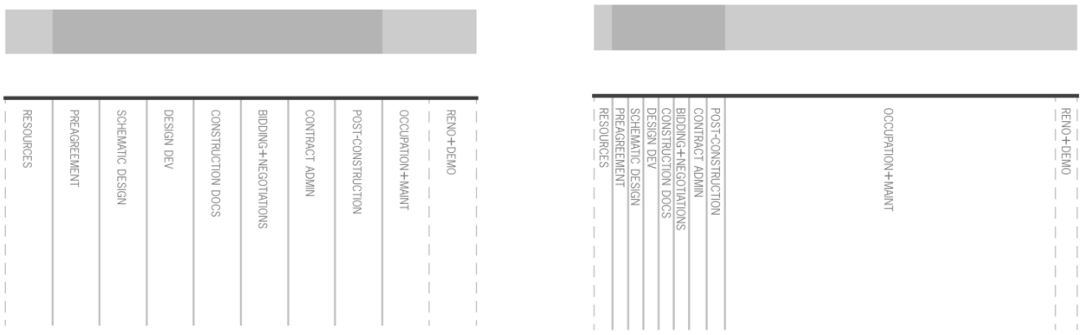

Figure 8. Comparison of weighting the width of timeline columns a) with standardized width, and b) by the length of each stage in proportion to total project life.[30]

To note, while our Timeline was organized into a linear framework, we realize the process of designing and constructing a building is a cycle embedded multidimensionally within the contexts of

research and development and the policy cycle, as depicted in Figure 9. Therein, we also spatialized the relationship between practice and education, understanding that disciplinary training has the potential to foster and shape the skills necessary for interdisciplinary collaboration in practitioners.

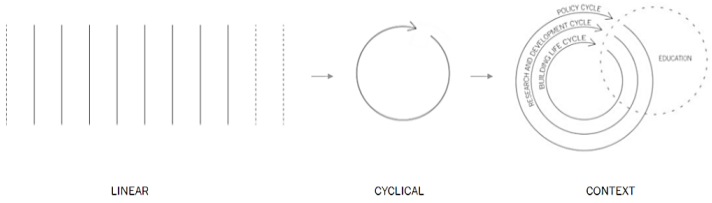

Figure 9. Alternative representation of Timelines within greater cycles of policy and research and development.

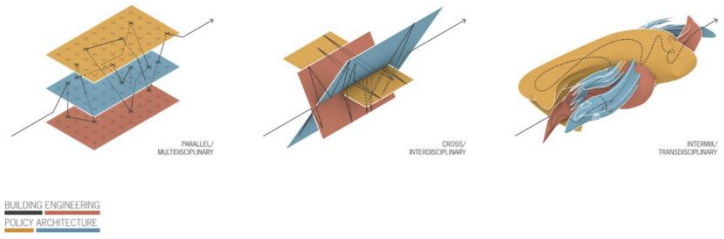

Figure 10. Levels of cross-disciplinarity symbolized by different dimensions.

Further, we recognize the constraints of representing our timeline as a flat image. As remediation, the colored flowing forms shown in Figure 10 reveal how the disciplinary processes intersect through time, their interaction increasing depending on the level of cross-disciplinarity.

CONCLUSION

Building on interdisciplinary scholarship, we developed a roadmap of three milestones that are readily applied in both on- and offline work environments. This roadmap offers a novel method of coming to terms with the increased complexity of contemporary problem-solving. In our experience as a research team, our developed-through-practice methodology has made us comfortable asking questions with no clear answers, employing a newfound trust in a networked approach to innovation. The true value of interdisciplinary research and practice is that it changes the nature of the outcomes and findings that emerge from the work. By shifting out of our professional silos, we have developed a more considerate, holistic understanding of the systems we are affecting with our designs and proposals.

NOTES

[1] Choi and Pak, 'Multidisciplinarity, Interdisciplinarity, and Transdisciplinarity in Health Research, Services, Education and Policy'.
[2] Bærenholdt et al., 'Perspectives on Design Research'; Pedersen, 'Integrating Social Sciences and Humanities in Interdisciplinary Research'; Tobi and Kampen, 'Research Design'.
[3] Future Energy Shift is an interdisciplinary program that aims to explore the feasibility of a wastewater energy recapture system in high-rise multi-unit residential buildings from the disciplinary perspectives of architecture, mechanical engineering, and public policy. The group has spent the last two years gathering experimental and modeling data to analyse potential solutions – one of which includes a tank and turbine combination to hold and release the wastewater to generate electricity on command. The architecture, engineering and policy disciplines have worked together to collect qualitative data through interviews, surveys, and focus groups; water-use data; and architectural drawings from real buildings in Ottawa, Ontario, and Vancouver, British Columbia.
[4] In response to the COVID-19 Pandemic, our team has worked remotely for the majority of this project. Although we have made substantial adjustments to our work arrangements, we have found that working virtually has presented opportunities not always obvious when it is possible to work in person. Assuming that even after the COVID-19 pandemic has passed, there will continue to be a significant portion of remote work, these strategies continue to be applicable. Additionally, they can be leveraged to make in-person work more efficient and increase workplace flexibility.
[5] In Canada, the federal government has traditionally funded research in three silos, making it difficult for government-funded research to engage with problems in a manner that takes advantage of the diversity of perspectives and problem-solving tools that radically different disciplines have to offer. The Government of Canada distributes research funding through three research granting agencies: the Canadian Institutes of Health Research, the Natural Sciences and Engineering Research Council, and the Social Sciences and Humanities Council. In order to encourage interdisciplinarity, the New Frontiers in Research Fund supports interdisciplinary research teams that break down the traditional silos, which is the source of funding for this project.
[6] 'Multidisciplinarity, Interdisciplinarity, and Transdisciplinarity in Health Research, Services, Education and Policy', 351. Emphasis added.
[7] Choi and Pak, 'Multidisciplinarity, Interdisciplinarity, and Transdisciplinarity in Health Research, Services, Education and Policy'.
[8] Bisby Perkines +Will and Stantec Consulting, 'Roadmap for the Integrated Design Process'.
[9] Tobi and Kampen, 'Research Design'.
[10] 'The Philosophy of Interdisciplinarity'.
[11] Kluger and Bartzke, 'A Practical Guideline How to Tackle Interdisciplinarity—A Synthesis from a Post-Graduate Group Project'.
[12] Figma and Miro are online collaborative software that allow multiple users to contribute to the same interface simultaneously. Users can annotate visualizations as a team with questions, research findings, and facts relevant to the project. These platforms are valuable for visual representation of projects with larger groups, where every user can zoom-in to minute details, annotate the diagram, and develop integrated visuals instead of sending hard or digital copies around to multiple groups for multiple reviews. This technology proved invaluable in the shift from in-person to online research that took place after COVID-19 was declared a pandemic.
[13] Donald Ardiel, 'Part 6 : Phases of the Design Project'.
[14] As the early-stage research and development process had not been delineated in the same manner that the policy and the building design processes were, our engineering research assistant described the process based on his own experience on our project. The steps of the process are: 1) Observe resource, determine goal; 2) create system framework; 3) size basic infrastructure to the resource; 4)

analyze techno-economic outputs and requirements of the system; 5) conduct sensitivity analysis; 6) adjust model according to sensitivity analysis; and 7) decide if system should be implemented.

[15] Pal, Graeme, and Mallett, 'Policy Analysis: Concepts and Practice'.

[16] A novel energy solution is an energy technology that either decreases building energy use, or generates electricity onsite, that is not commonly used in the building sector Åkerman, Halonen, and Wessberg, 'Lost in Building Design Practices'. In our project, we include technologies such as heat pumps in this category, despite the fact that they are a proven technology, because they are not the status quo method of heating and cooling buildings, and their successful incorporation requires knowledge, skills, and planning that not all design teams may possess.

[17] Thorén and Persson, 'The Philosophy of Interdisciplinarity'.

[18] Thorén and Persson.

[19] 'A Practical Guideline How to Tackle Interdisciplinarity—A Synthesis from a Post-Graduate Group Project', 2.

[20] 'What Is Interdisciplinarity in Practice?'

[21] Yeh, ''How Can Experience of Local Residents Be "Knowledge"?', 39.

[22] Kluger and Bartzke, 'A Practical Guideline How to Tackle Interdisciplinarity—A Synthesis from a Post-Graduate Group Project'; Power and Handley, 'A Best-Practice Model for Integrating Interdisciplinarity into the Higher Education Student Experience'.

[23] Lefroy, 'Disciplining Interdisciplinarity'.

[24] 'What Is Interdisciplinarity in Practice?'

[25] These disciplines were chosen due to the connection to the project, and access to potential participants in the faculties of each member of our research team. This does not mean the process cannot be adapted to other groups of disciplines for different projects in a similar method with different graphics.

[26] 'Interdisciplinary Teamwork'.

[27] 'Interdisciplinarity in Design Education'.

[28] Donald Ardiel, 'Part 6 : Phases of the Design Project'.

[29] Charles Jencks's "The Century is Over, Evolutionary Tree of Twentieth-Century Architecture" served as the primary graphic precedent for the timeline re-visualization. It encompasses a vast and dense body of knowledge, incorporating layers of text depicted within relational flows that weave along a timeline of the twentieth century Jencks, 'Jencks' Theory of Evolution, an Overview of 20th Century Architecture'.

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GREENWAYS AS URBAN NETWORKS FOR CLIMATE AND GROWTH CHANGE

Author:
MENGYIXIN LI[1], LUCA MARIA FRANCESCO FABRIS[1,2], RICCARDO MARIA BALZAROTTI[2], GERARDO SEMBREBON[2], FEDERICO CAMERIN[3]

Affiliation:
[1] BEIJING UNIVERSITY OF CIVIL ENGINEERING AND ARCHITECTURE, CHINA [2] POLITECNICO DI MILANO, ITALY [3] UNIVERSITÀ IUAV DI VENEZIA, ITALY

INTRODUCTION

Today's global cities are facing increasingly complex problems and challenges. It is necessary to promote the sustainable and healthy development of cities through reasonable planning and design, which could adapt to the adverse impacts and major threats of climate change on urban security and ecological environment and create urban development pattern of symbiosis between man and nature.
This paper explores greenways as dynamic urban networks to adapt to climate and growth change, taking two metropolis of Milan (Italy) and Beijing (China) as references for Europe and Asia.

MILANESE GREENWAYS AT THE END OF XX CENTURY

Since the last '70s, Milan has been starting to face the loss of its green structure overwhelmed by the continuous growing of its urban fabric. The answers were two wide parks devoted to the idea of reforestation: Boscoincittà ('Wood-in-the-town') coming out from the requalification of former agricultural fields and Parco Nord Milano (Northern Milan Park) renovating the brownfields left by heavy industry.
Parco Nord Milano[1] despite is great extension, is a real urban park that connects greenery coming from different heritages. Derelict industrial areas, a former airport area, and country fields combine to create a complex and varied park network connected by a wide series of pedestrian and bicycle paths. Meadows and woods find place together with horticultural gardens, light sport activities services and wildlife sanctuaries over a surface of 680 hectares, surrounded by one of the densest urban fabrics of Europe. Boscoincittà[2] owns a programmatic name: The idea was to offer a few minutes from Milan centre the experience of a real wood, created with the reforestation of former agricultural areas abandoned for years. This very simple brief had a sudden success that brought through the expansion of the initial Boscoincittà a greater complex of parks devoted in giving new life to derelict areas). This system offers different recreation activities, from the most 'urban' as the real vicinity park to the wild emptiness of the prairie, just in a walk of few kilometres.
Starting from the analysis of several international case-studies, in 1996 Fabris[3] proposed for Milan the creation of a green corridor connecting all the brownfields existing in the town's territory, creating a network of cycle-pedestrian paths that converge in the heart of the historic centre. The most relevant

result of this study proved that "light" green corridors built with naturalistic engineering techniques and the participation of residents were possible without great works and costs.
Ten years later, Stefano Boeri, at that time director of Multiplicity Lab at Politecnico di Milano, developed a plan for "Metrobosco" (Metropolis' Forest), an "ecological network that aims to achieve physical, social and cultural connections capable of making our province more liveable"[4], connecting the already existing natural areas, which "represent the ideal integration between environmental protection and productive development"[5] for the realization of a new sustainable metropolitan area model. Another project for a new network of pedestrian and cycle paths enriching urban fabric with greenery has been the 'Raggi Verdi' (Green Rays, 2007) one. The Green Rays was designed to include linear open spaces shaded by thousands of trees "where one can walk, laze, run, ride a bike enjoying the green already present on the Milanese urban territory: a garden, a tree-lined square, a neighbourhood park, a large park urban". [6] In fact, both these projects were completely unattended, but the ideas they proposed were seeds that have remained alive for more than a decade, waiting for the development of other proposals to create a real green corridors' network in Milan.

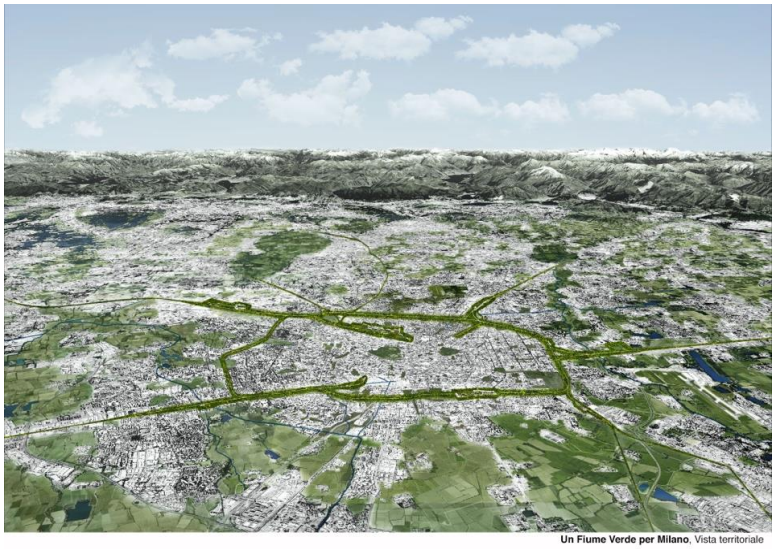

Figure 1. Fiume Verde (Green River) for Milan, a project by Stefano Boeri Architetti (2017, courtesy SBA)

New Urban Greenways in Milan

In 2015 Milan became EXPO City, embracing sustainability, agriculture and food-culture as its credo. These new ingredients modified 'on the rush' the city structure of a town that wanted to change also its lifestyle, not only committed to economics, but also to the quality of untouchables features such as wellness and happiness. This new stream of the Milanese life vision is possible to be seen in the new public green spaces as the CityLife Park[7], the Portello Park[8], and in the 'Library of Trees' Park. [9] All these parks are part of a requalification processes and integrate different district zones in the most valuable parts of Milan, and they are part of the forthcoming greenways network of the Lombard town.
In the last five years, the Administration's policy encouraged the abandoned areas requalification and asked to Italian Railways' Sistemi Territoriali[10] to 'give back' to the town seven unused railways-yards within the city territory. This request endorsed also by the common people –asking more and more for green spaces and slow mobility in the town- became real with the visionary plan "Fiume Verde" (Green River, 2016) (Figure 1) by Stefano Boeri Architetti. This proposal designed a net of

inner green corridors able to increase deeply the city green surface: “The Green River is a project of urban reforestation that aims to achieve on a 90% of these seven former railways-yards a continuous system of parks, woods, oasis, orchards and gardens for public use - linked by the green corridors and cycle paths built on the railroad tracks” says Stefano Boeri, explaining that “The Green River will cross the urban body of Milan … a unique opportunity to rethink Milan, combining urban development with the presence of continuous and accessible green systems, which improve air quality and ensure the protection and multiplication of urban biodiversity”. [11] It is estimated that in one year the Green River will absorb 50 thousand tons of CO_2 and will produce 2 thousand tons of oxygen with total area of 1 million 100 thousand square meters of parks, hills, clearings and meadows.
Moreover, a new series of projects has been presented during the last two years, demonstrating how landscape and environmental design could be valid methods to regenerate a town creating a new kind of territorial matrix where green corridors combine with the existing urban fabric. In early 2019 OMA and Laboratorio Permamente[12] won the international competition of two former railyard sites. The competition brief combined two areas, one in the centre of Milan (Farini Railyard) and the other at the extreme western outskirts of the town (San Cristoforo Railyard). While in Farini there’s the possibility to build till the 40% of the area (the resting part will be maintained as public green), the San Cristoforo area will be transformed in the longest linear park of the city. The two parks will be active part of the greenways system. The Farini plan has been conceived to be resilient to diverse scenarios where the green structure system is the only permanence: a kind of green spine that signs the regeneration program. This intervention will be at low cost and with a sure result and will be flexible while San Cristoforo Area (Figure 2) will become a kind of representation of a Sponge City.[13] Both these projects present a high grade of experimentation, and Milan could prove by doing a new was to implement green surfaces to the build environment.

Figure 2. Former San Cristoforo Railyard Regeneration, a project by OMA + Laboratorio Permanente (2019, courtesy Laboratorio Permanente).

The form of the built city adapts to the green primary structure, introducing that landscape is the novel parameter valid to organize the future of a well performing city. During the Covid-19 pandemic Milan has been ready to react to the various lockdowns both thanks to the inhabitants unexpected reappropriation of the green open spaces and the public administration implementation of several projects basing of the 15-Minute City and the Tactic Urbanism methods approaches. In fact, all these

new projects, redefining a more human scale into the open public spaces by design and use, have been easily and quickly arranged as the greenways' structure was present and vital even if forgotten. The urgence to reuse the town in a new, more liveable way during the days of lockdown (one of the few things possible to be done was the 'personal and distanced walk' in the neighbourhood) has pushed the administration to act promptly by rediscovering studies and proposals that have remained in the drawers for decades as described in Fabris et al. (2020).[14] A new approach to city-making based on the acknowledgement that the town of the future can find its own new dimension only by recognizing the landscape and its open green spaces as the ultimate infrastructure.

BEIJING GREENWAYS AT THE END OF XX CENTURY

With the fragmentation of (relatively) natural patches brought about by urban expansion, the concept of greenway emerged in the United States, and it is essential to establish stable connections between the fragmented patches, which reflects the core functions of greenways, that is, biodiversity conservation and landscape element connection.[15] Since the late 19th century, the theory and practice of greenway planning have developed, based on the consideration and exploration of connecting scattered urban green spaces at the city level.[16] Its development stages have gone through from parkway focusing on social issues and aesthetics, and greenway planning and design led by ecology, to the systematization, networking and diversification of greenway evolution.[17] Yet, based on the knowledge of greenways, how to find a unique development path of Beijing greenways adapted to its changing urban environment?

Beijing Greenways and Urban Growth

Essentially, the planning and construction of greenways in European and American cities have provided a reference for their development in China, since the late XX century. For Beijing city, with the rapid urbanization, the continuous spatial expansion has gradually intensified the encroachment and division of the city's internal and surrounding natural environment. In other word, from the perspective of landscape ecology, the urban growth and the wide distribution of grey infrastructure led to the fragmented ecological network, and the connectivity and resilience of the entire green space system, which is bound up with urban ecological security and low-carbon urban landscape, are consequently reduced.

Therefore, from a holistic view, Beijing city requires multilayered green corridors linked with three levels of region, city and community, which may promote the optimization of urban network and the improvement of its functions. Based on this, the greenways are viewed as a planning tool to cope with the urban growth and unknow challenges in a sustainable way. Meanwhile, it is necessary to implement the planning and construction of greenways, as urban residents have growing demands for the perception and experience of urban nature, as well as recreation and entertainment.

Beijing Greenways and Climate Change

The adverse effects caused by climate change seriously threaten the safety and sustainable development of contemporary cities. According to the Fifth Assessment Report (AR5) about the state of scientific, technical and socio-economic knowledge on climate change formulated by Intergovernmental Panel on Climate Change (IPCC), the continuous population growth in rapidly urbanizing areas has exacerbated the climate vulnerability of cities, weakened the urban resilience to respond to climate disasters, and caused the city to suffer greater climate risks.[18]

In 2020, at the 75th United Nations General Assembly, China clearly stated that it will increase its intended nationally determined contributions to climate change, adopt more powerful policies and

measures to make carbon dioxide emissions reach the peak by 2030, and strive to achieve carbon neutrality by 2060.

Given these, it is indispensable to consider how to adapt to the adverse effects of climate change on urban security and ecological environment, create a dynamic pattern of symbiosis between man and nature, and promote the sustainable development of cities through reasonable planning and design. In this respect, we will focus on landscape architecture, and consider that the greenway as a crucial part of green infrastructure and urban network will play a key role.

In general, the climate change has expanded the connotation and functions of landscape architecture. Accordingly, the functional orientation and countermeasures of landscape architecture in urban development has also been adjusted. Learning the experience from European and American countries, the landscape architecture is regarded as a critical measure for Chinese cities to cope with climate change. Essentially, based on the nature-based solutions, the landscape architecture can play an essential role in adapting to and mitigating climate change, and promoting the construction of low-carbon and resilient cities.[19]

The greenways could be established through the integration of urban fabric and green spaces. The planning and construction of greenway system at the region-city-community level can therefore offer an effective way to form the human settlement suitable for living, health, safety and sustainable development, and effectively improve urban ecological safety.

Beijing Greenways Planning and Construction

Four strategies of greenway spatial layout are put forward based on ‘green’, ‘highlighting characteristics’, ‘connecting regions’, and ‘conducive to integration’, in term of the Masterplan for the Construction of Municipal Beijing Greenways.[20] According to the strategies and the Shan-shui (Mountain-water) spatial conception of urban morphology in the traditional Chinese cultural context, the urban greenway network is constructed in forms of rings and stretches, which are composed of various parkways, such as forest parks, country parks, inner-city parks and riverways at the region-city level.[21] In the masterplan of Beijing greenways, there are four major functional aspects about greenway planning and construction, including ecological conservation, human health and recreation, cultural innovation, and urban-rural integration.

In addition to the above-mentioned strategies and functions, two concepts are reflected in the Beijing greenways perception and development. They are Shan-shui City from the bottom-up planning perspective and Sponge City from the top-down policy. Both have become the essential ideas for the formation of green and resilient urban landscapes. On one hand, the Shan-shui City (Mountain-water City) is an ideal city conception, which is proposed based on the traditional Chinese view of harmonious coexistence between man and nature. It provides a large-scale spatial framework for the greenway planning through absorbing the traditional ‘Feng Shui’ philosophy and wisdom to build Chinese cities. On the other hand, the political idea of Sponge City in the view of landscape ecology means the landscape as green or natural infrastructure, a widely recognized planning tool for natural conservation and urban development. These two ideas about Chinese cities and landscape are considered as a powerful cultural support for the planning and construction of Beijing greenways, through which most of the greenway characteristics could be discovered and explored largely.

New Urban Greenways in Beijing

During the XXI century, Beijing greenways are experiencing a new direction of sustainable development, when the city is transforming from an industrial society to a post-industrial society. Most significantly, the social change could promote the introduction of post-industrial sites as a new

element into the urban greenway system. This process is influenced by the reshaping of greenways as structures for urban changes on derelict industrial sites in Western countries. The huge impact, potential, and value of these abandoned land-regeneration projects are increasingly discovered by professionals.[22] As a result, the greenway as a medium can realize the green and low-carbon regeneration on derelict industrial areas by means of nature-based solutions, and the new green networks for the whole city are therefore established.

Some new attempts have appeared in Beijing city. With the formulation of "Beijing Greenway 2020" program, the Beijing Zhangjiakou Railway Green Corridor within the network of traditional Three Hills and Five Gardens Greenway was deeply probed, taking the 2022 Beijing Winter Olympics as an opportunity. An international design competition was hold in 2019 for the regeneration of this historical and abandoned railway. As the competition unfolded, this new urban landscape project of Beijing Zhangjiakou Railway Heritage Park aroused wide public concern and participation. One of the award-winning schemes with the theme of 'history, life and innovation' was proposed by China Architecture Design & Research Group (Figure 3), which shows the landscape conception of urban greenways in the future.[23]

As a matter of fact, almost each design proposal of the Beijing Zhangjiakou Railway Heritage Park in the competition was conceived as a resilient greenway of pedestrian and bicycle paths, and biological corridors and habitats. This Park is not only emphasized to form more effective connections with the existing Beijing urban networks and green spaces, but also it could enhance the vitality of the whole community and become a place for people to perceive urban nature and experience the integration of industry and community culture. More importantly, the large-scale linear park as green infrastructure will play a key role in climate regulation, rain and flood management in the idea of Sponge City, the construction of biological habitats and migration corridors, and biodiversity conservation.[24]

Figure 3. The greenway of Beijing Zhangjiakou Railway Heritage Park (courtesy of China Architecture Design & Research Group)

CONCLUSION

Milan is now one of the greenest cities in Europe, having transformed all its derelict industrial areas into public parks connecting agriculture, river basins and leisure open spaces. The transformation of the Milanese urban fabric followed economic reasons and market dynamics and were driven by an

abundance of research by the academics. Only recently, with the approval the General Master Plan (2012), most of the ideas and the contributions developed during the last decades have been included in the urban plans.

Compared with Milan, Beijing is still in the process of rapid urban development where industrialization and de-industrialization coexist. Most greenway plans and their implementation reflect the administrative strategy of Sponge City and the traditional philosophy of Shan-shui City for reshaping the city-nature relationship and integrated green network. But, facing the initial stage of green conversion, the fragmented appearance of green open spaces is still worth pondering.

We can observe that the 'immobility' of the governance, as happened in Milan, is better than any wrong choice. In parallel with that, we can also find that the 'ambitiousness' of Beijing municipality for Beijing as green city, manifests an inclusiveness that implies the full acceptance of the Western greenway concept.

But what emerges also is that scientists proposing and disseminating ideas and projects that can really influence both the politicians and the citizens, creating new expectations and high attention on themes such as sustainability and resilience.

NOTES

[1] Parco Nord Milano covers an area of 680 hectares; website: www.parconord.milano.it
[2] Boscoincittà (together with 'Parco dei Sentieri Interrotti) covers an area of 110 hectares; website: www.cfu.it
[3] Fabris LMF, *Il verde postindustriale. Tecnologie ambientali per la riqualificazione (The post-industrial green. Environmental technologies for the requalification)* (Napoli: Liguori, 1999).
[4] Provincia di Milano's press-release for the launch of Metrobosco project (July 13, 2006). Unfortunately, the project evanished and has never been realized.
[5] Ibidem.
[6] Press release, City of Milan and AIM (May 27, 2007). Most part of the project has been unattended.
[7] The CityLife Park (2016-ongoing) will cover when completed an area of 17 hectares. Project by Gustafson Porter.
[8] The Portello Park (completion 2018) covers an area of 7 hectares. Project by Andreas Kipar, Land Milano and Charles Jencks.
[9] The "Library of Trees" Park (opened on Fall, 2018) covers an area of 9 hectares. Project by Inside-Outside (Petra Blaisse).
[10] Sistemi Territoriali (Territorial Systems) is the incorporation. part of the Italian Railways Group, that owns the Italian railways stations' compounds.
[11] Press Release, Stefano Boeri Architetti Associati, April 2017.
[12] OMA and Laboratorio Permanente led a group of international professionals as the landscape office Vogt Landscape Architects and Philippe Rahm architects between others and won the international competition with the entry 'Climatic Agents'. The Farini Area has a surface of 42 hectares and the proposal indicates more than 31 ha for public green areas. The San Cristoforo Area is 14 ha of surface.
[13] Please, refer to the section about Beijing in this paper to read the definition of Sponge City.
[14] Fabris LMF, Camerin F, Semprebon G, Balzarotti RM, "New healthy settlements responding to pandemic outbreaks: approaches from (and for) the global city", *The Plan Journal* 5(2) (2020): 385-406, https://doi.org/10.15274/tpj.2020.05.02.4
[15] Paul C. Hellmund and Daniel S. Smith, *Designing Greenways: Sustainable Landscapes for Nature and People* (Washington, DC: Island Press, 2006), 8.
[16] Charles E. Little, *Greenways for America* (The Hague: Johns Hopkins University of Press, 1995), 16.
[17] Jin Yunfeng and Zhou Conghui, "Research on the Greenway Planning Theory Evolution and its Practice in China: Some New Thoughts to the Greenway Planning Integration into China's Urban Planning System and Context," *Modern Urban Research*, 27(3) (2012): 4.
[18] Intergovernmental Panel on Climate Change, "AR5 Synthesis Report: Climate Change 2014", accessed January 15, 2021, https://www.ipcc.ch/report/ar5/syr/.
[19] Liu Changsong, "Functional Orientation and Countermeasures of Landscape Architecture Under the Background of Climate Change", *Landscape Architecture*, 27(12) (2020): 77.
[20] Beijing Gardening and Greening Bureau, "The Masterplan of Beijing municipal greenway construction (2013-2017)", accessed September 10, 2020, http://yllhj.beijing.gov.cn/sdlh/jkld/ssxxbd.
[21] Hu Jie, *Shan-shui City and Ideal Human Settlements* (Beijing: China Architecture & Building Press, 2020), 15.
[22] Li Mengyixin, "Large Parks as a Concept for Contemporary Urban Landscape Planning - A Cross-cultural Study on Theories and Practices of Large-scale Parks in North America, Germany and China, accessed August 17, 2017, http://mediatum.ub.tum.de/1350789.
[23] Beijing Zhangjiakou Railway Heritage Park, accessed April 16, 2020, https://www.sohu.com/a/387975712_120052779

[24] Yu Kongjian, *Sponge City: Theory and Practice* (Beijing: China Architecture & Building Press, 2016), 20.

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URBAN INFRASTRUCTURE ASSESSMENT

Authors:
RUI SECO, ELSA NEGAS

Affiliation:
LUSÍADA UNIVERSITY, PORTUGAL

INTRODUCTION

The city has experienced a major transformation over the last three centuries, reshaping the spaces inhabited by an ever rising share of mankind. With this global metamorphosis it evolved into what is commonly named as urban space, in fact designating a diverse range of structures and types of urban fabric which support diversified uses and distinct social realities.

The current ambiguity and comprehensiveness of concepts and information regarding the city and urban environment, according to main specialists, hinders the perception of reality and the reasoning on this field of knowledge, blocking efficient planning processes and the development of new design approaches.

This paper addresses this imprecision, developing new information aimed at contributing to a more accurate knowledge on the territory: a measurement tool to assess the level of infrastructure in any location, integrating a number of factors that constitute today the most determinant components of the urban condition. This tool is based in a calculation method which ponders a series of criteria on urban infrastructure, transport, basic urban services and telecommunications, features that constitute today main components to the urban condition.

CITY AND URBAN TERRITORY

The occupation of the territory evolved with man's own development and ways of life. As mankind left nomadism and became settled, it began a transformation of the environment, both through agriculture and by the construction of shelters and other structures, which evolved and played a role in human evolution itself.

The city, an abstract structure that orders constructions of diverse nature in a common organization, constituted a decisive progress in human History, enabling the development of economy, sociability, government and administration, social organization, security and defensibility.

Over time, the city has evolved, adapting to the different conditions and needs, according to the specific societies for which it was conceived, and which it mirrored.

From point of maximum concentration to the urban spread

In 1938, Lewis Mumford described the city, from its role in history, as "the point of maximum concentration for the power and culture of a community". The place where life gathers, gaining social significance, and "the goods of civilization are multiplied and manifolded". To Mumford, the city

transformed human experience into “patterns of conduct and systems of order”, and focused the “issues of civilization” [1].

Since that time, in which the city could be considered as a stable and consolidated form of social and spatial organization, with high vitality and in constant growth, it undergone an intense transformation, even greater than the urban revolution inducted by industrialization in the previous two centuries [2]. The organization of urban space is intertwined with the evolution of social and economic dynamics, and the recent evolution of technology and reorganization of production processes and services has a strong impact in the current transformation of the territory [3].

The development of individual transport and road networks, the creation and intensive use of new technologies of information, the outsourcing of a growing share of production and the rapid economic expansion of less developed areas of the globe have transformed the occupation of the territory and the characteristics of the city in a swift and massive way.

As a word and as a concept, the city has been substituted, firstly by urbanization and then by urbanized territory, suburbanization, urban sprawl, de-urbanization, x-urbanism and other designations, varying according to language and perspective [4]. On the field, this was a real, tangible, transformation. Traditional urban cores, which were based on a millenary morphology and structure, lost the central importance to which Mumford referred, and the economic and administrative functions they performed spread widely across the territory, following new patterns of spatial organization and interconnection.

To address the triumph of vague concepts

According to recent perspectives, such as Alain Bourdin's interpretation of the evolution of the city after the 'Fordist' development crisis, the imprecision and comprehensiveness of terms and concepts are part of the liberal urbanism of the last three decades, which is “characterized by a weakening of the scientific reference and a multiplication of actors involved in the decision-making and implementation” [5]. To the author, this imprecision - with the "triumph of vague concepts" - results in the divergent interpretations and lack of understanding on the problems of today's city, hindering reasoning and blocking the development of effective planning processes.

To address this vagueness and contribute to greater accuracy in the information that supports planning and urban transformation, it is necessary to produce objective data, on which to develop reflection and judgment with reliability.

URBAN INFRASTRUCTURE AND THE TERRITORY

The availability of infrastructure and urban services is not uniform throughout the territory. In the past, they typically concentrated in the most developed large cities, but this has changed significantly with the territorial transformation of the last decades. Many infrastructures are currently dispersed over increasing areas, eroding the role of traditional city cores.

Given our way of life increasingly more based on technology, accessibility and communication, infrastructure has major significance to urban life and to social and economic development. Technologically advanced, but also conventional infrastructure, as well as basic urban services and logistics, are currently required by communities, inhabitants and companies [6]. From sanitation, water supply and public lighting, to roads, accessibility, public transport, to voice and data communications, ideally with the most recent and swift technology, and to advanced services in administration, health or education, a wide spectrum of elements are key in the formation of an urban environment for development and quality of life.

Although many features are encompassed in this understanding of urban infrastructure, there still is not a comprehensive form of tracing and appraising their provision. There is disperse, uncorrelated, information on multiple specific areas, but no systematized overall assessment.

An urban infrastructure assessment tool

From Health to Social Responsibility or Climatology, many different fields of knowledge have already created indicators that measure complex situations, comprising multiple factors pondered with variable relative weights [7].

The urban territory and the different types of infrastructure it comprises can also be amenable to this kind of quantified analysis, informing about its availability in an objective way. This study proposes the creation of such an indicator, integrating the provision of several types of amenities and facilities that are presently central prerequisites of the urban condition.

For this assessment, urban infrastructure is considered in a broad sense, integrating usual urban attributes - roads, pavement, electricity, water supply, sanitation, etc. - but also a set of urban services and equipment traditionally provided by the city and the urban environment - administration, representation, culture, health, education and security, among others - and also other conditions diagnosed in bibliographic review as significant for the current evolutionary trend of extended urbanity, such as mobility - integrating roadways, public transport networks, logistics and also soft mobility devices and infrastructures - and access to and integration in communication and information networks – including media broadcast, voice telecommunications and data connections, fix and mobile.

This set of parameters is organized as an index, calculating through a formula an overall value which represents the global availability of infrastructure and basic urban services in a given geographic point. From there, it will be possible to establish comparative perspectives, calculating the result for different points in the same area, or in distinct regions, and to identify evolutionary trends, applying the calculus to the same point in different moments in time.

Key infrastructure categories

In order to evaluate the degree of infrastructure five key infrastructure categories have been identified:

- Automotive accessibility - roads, traffic, parking;
- Transport systems - subway, train, bus, ‘soft’ mobility, connections;
- ‘Traditional' urban infrastructure - streets, sidewalks, pavement, water supply, sanitation, energy/electricity, public lighting;
- Basic urban services - administration, commerce, culture, health, education;
- Telecommunications - voice and data networks, broadcasting.

Each of these dimensions integrates several components, which themselves comprise a variety of indicators. The model ponders each of these factors, verified whether by isolated operational concept or by systemic concept.

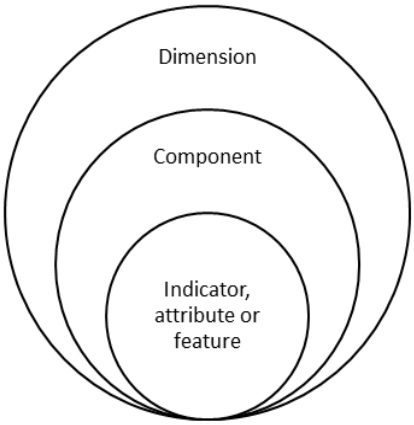

Figure 1. Relation between Categories and its Components and Indicators.

At this stage of the study, the main focus is to establish a methodology and to test it with a view to calibrating the weightings of these multiple factors.

Automotive accessibility

The automobile has increasingly affected the transformation of the territory, with an ever increasing presence, constituting an important factor of territorial differentiation.
Automotive accessibility is a key factor in mobility – a defining aspect of recent urban dynamics and transformation.
To evaluate the quality of automotive accessibility, different aspects are considered. Proximity and the connections to main roads, such as motorways or expressways, is positively valued, and the quality of the road itself is also considered. Other important factors are the existence, ease and safety of parking, safety of circulation for both cars and pedestrians, and the ease of circulation versus traffic.
The assessment is made on a specific point, at the ground level, and three main components are used: Proximity to motorways or parkways, Road quality and Parking.

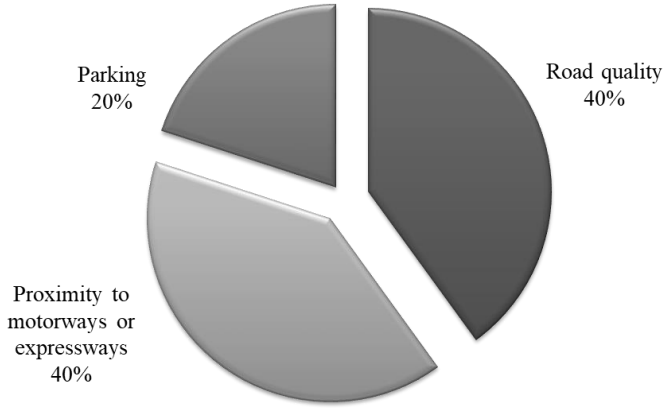

Figure 2. Relative weight of the Components of Automotive Accessibility.

Road quality is classified on a 4 level Likert scale (Q_i, i = 1, 2, 3, 4), which combines the quality of the road surface with driving safety and the existence of a verge (or sidewalk) that minimizes the possibility of accidents.
Proximity to motorways or expressways is classified on a Likert scale with 7 levels (1- very far to 7- very close).
Parking availability is rated on a 4 level Likert scale increasingly valuing both safety and availability.
The Automotive Accessibility category index is calculated integrating these components using the formula:

$$I_1 = \frac{Q_1 - 1}{3} \times p_1 + \frac{Q_2 - 1}{6} \times p_2 + \frac{n_3 - 1}{3} \times p_3$$

In which: I_1 - value of the index representing road accessibility, for the calculation of the infrastructure index (*Inf*)
Items: i=1 road quality; i=2 proximity to motorways or expressways; i=3 parking.

Transport systems

Transports are another important factor in establishing mobility, key to the contemporary urban condition.
For transport classification are considered prevalent the proximity of access, frequency of passage and existence of a network of at least two distinct means of transport [8].
To homogenize the (subjective) notion of proximity, distance is calculated basing on the average duration of a walk, considering that 5 kilometres are travelled in one hour. All accesses at a distance of 200m or less are considered to be very good, corresponding to a 2.4 minute walk [9].

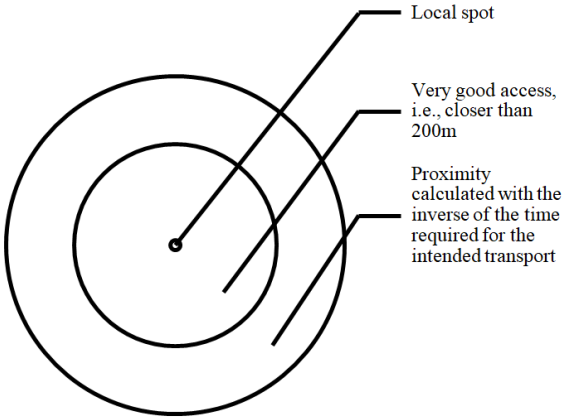

Figure 3. Proximity to transport

The quantification of the frequency of each means of transport is based on a Likert scale with 7 levels, reflecting the time interval between consecutive public transports on working days in the 7h00-22h00 schedule, intended to distinguish the frequency with which the location is served by public transport, either the nearest or the second alternative. To this classification is added the existence or inexistence of night public transport (whatever the frequency). The integration in a transport network is also valued.

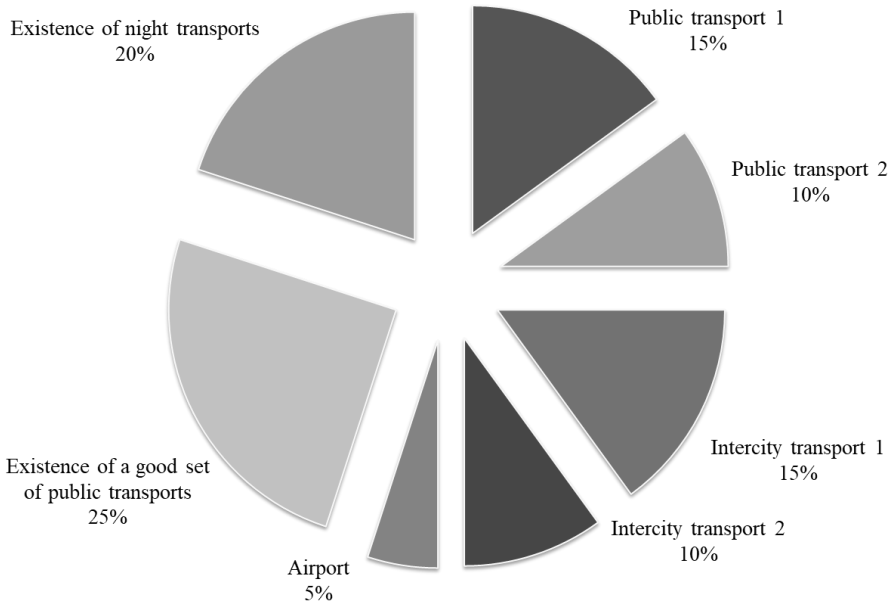

Figure 4. Relative weight of the Components of Transport Systems.

The Transport System category index is then calculated using the formula:

$$I_2 = \sum_{i=1}^{5} \left(\frac{p_i}{t_i}\right) + \left(\frac{n_i - 1}{12} + \frac{n_i - 1}{12}\right) \times p_6 + p_7$$

In which: I_2 - value of the index representing the transport network, for the calculation of the infrastructure index (*Inf*)
p_i - relative weight attributed to factor I; t_i - travel time to factor i
Items: i=1 nearest public transport; i=2 second nearest public transport alternative (for example bus and metro); i=3 nearest intercity transport; i=4 second nearest intercity transport alternative (it has to be different from the first one for example bus and train); i=5 airport; i=6 existence of a good set of public transports; i=7 existence of night transports.

'Traditional' urban infrastructure

In this category are assessed the facilities and infrastructure that cities traditionally provide. Since Classical Antiquity, cities have incorporated public infrastructures, which over time, notably after the major urban reforms that followed the industrial revolution, were multiplied and reorganized.
Here are assessed the following:

- Water supply;
- Sanitation;
- Street lighting;
- Electricity;
- Solid Waste Collection;
- Free collection of large waste items/ junk;
- Recycle bins;
- Sidewalks;
- Handicap accessibility;
- Soft mobility lanes;
- Urban equipment (benches, etc).

It is regarded the existence or inexistence of the item, but also its updating and modernity, and its quality, durability and suitability for the environment, evaluated in different gradations (quality, security, suitability, etc.) in specific Likert scales.
Availability is considered in face of distance: The same 200m radius already applied is considered, except for eco-points, in which 400m were used. A binary value was set to large waste collection.

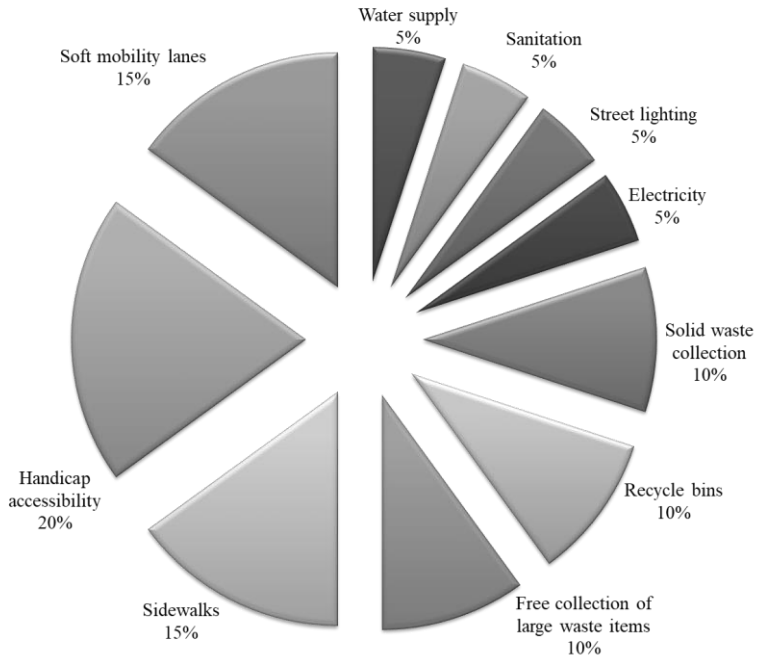

Figure 5. Relative weight of the Components of Traditional Urban Infrastructure.

The Traditional Urban Infrastructure index is then calculated using the formula:

$$I_3 = \sum_{i=1}^{6}\left(\frac{Q_i - 1}{3} \times p_i\right) + p_7 \times b_7 + \sum_{i=8}^{10}\left(\frac{n_i - 1}{3} \times p_i\right)$$

In which: I_3 - value of the index representing traditional urban infrastructure, for the calculation of the infrastructure index (*Inf*)

Items: i=1 water supply; i=2 sanitation; i=3 street lighting; i=4 electricity; i=5 solid waste collection; i=6 recycle bins; i=7 free collection of large waste items; i=8 sidewalks; i=9 handicap accessibility; i=10 soft mobility lanes.

Basic urban services

In the urban environment many services are usually provided, and their availability influences and is influenced by the presence of infrastructure. Culture and leisure, as well as education, health, administration (at different levels) and tertiary services (in this case different levels are also identified) are considered part of the provision of basic urban services.

In this category, the distance from where services are located is relevant and should be discriminatory. In this sense, all services that are more than two and a half kilometers away (corresponding to a 30 minute walk) should be classified as absent. Hence, proximity and accessibility are positively valued in this criterion.

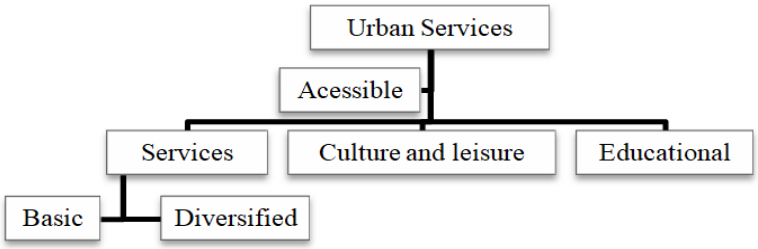

Figure 6. Different urban services

The following urban services are considered fundamental:

- Tax Office;
- Post Office;
- Banking Services;
- Cinema;
- Theatre;
- Congress Center;
- Exhibition Centre;
- Higher Education;
- Tertiary sector levels I, II, III and IV
- Schools levels I, II, III and IV

Among these ten items, two are rated according to a 4 level Likert scale, the Tertiary Sector services (from small and basic to diversified and large) and the Schools (from elementary to high school with diversified vocational provision).

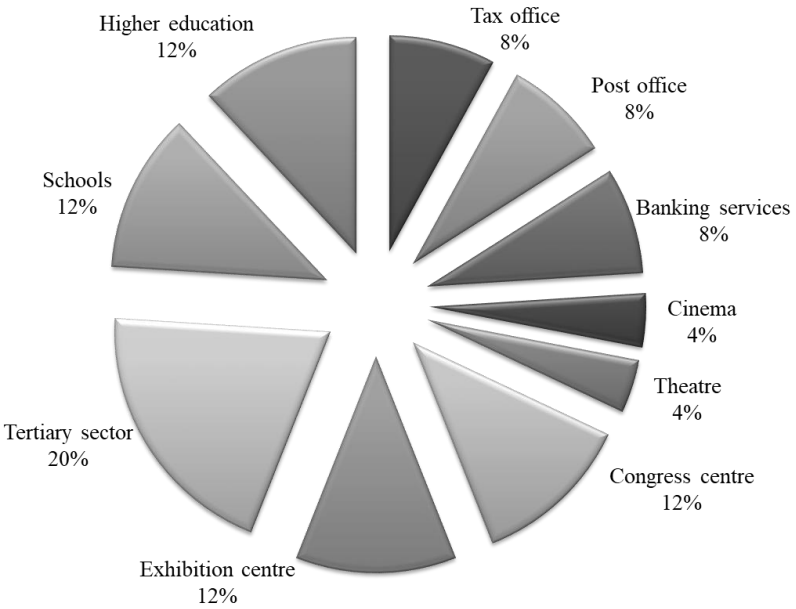

Figure 7. Relative weight of the Components of Basic Urban Services.

The Basic Urban Services category index is calculated using the formula:

$$I_4 = \sum_{i=1}^{7}\left(\frac{p_i}{t_i}\right) + \sum_{i=8}^{9}\left(\frac{n_i - 1}{3} \times p_i\right) + \frac{p_{10}}{t_{10}}$$

In which: I_4 - value of the index representing basic urban services, for the calculation of the infrastructure index (*Inf*)

p_i - relative weight attributed to factor *i* if it exists within a radius of 2.5 Km (a 30 minute walk, as previously considered)

t_i - travel time to factor *i*

Items: i=1 tax office; i=2 post office; i=3 banking services; i=4 cinema; i=5 theatre; i=6 congress centre; i=7 exhibition centre; i=8 tertiary sector; i=9 schools; i=10 higher education.

Telecommunications

Telecommunications are an asset of major importance for urbanity, as they gain complexity and importance for economy, administration and leisure.

The following features are regarded:

- The technology of the connection,
- Availability of fix and mobile data connection;
- Number of available connection providers.

The variations may be significant, from ADSL to fibre optic and 5G. These differences are taken into account and are reflected on the assessment.

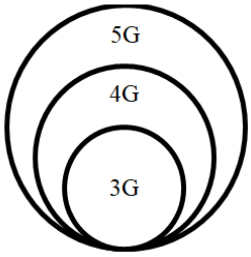

Figure 8. Fiber optics modalities

A binary variable has been created:

$$b_1 = \begin{cases} 1 \text{ if there is phone line on the location} \\ 0 \text{ if otherwise} \end{cases}$$

Thus the entire category takes on the value zero if there is no possibility of installing a landline telephone.

Subsequently and based on the capabilities of the networks, a scale with 7 levels (from ADSL to 5G). The network quality is also analysed, reflecting through a 4 level Likert scale.

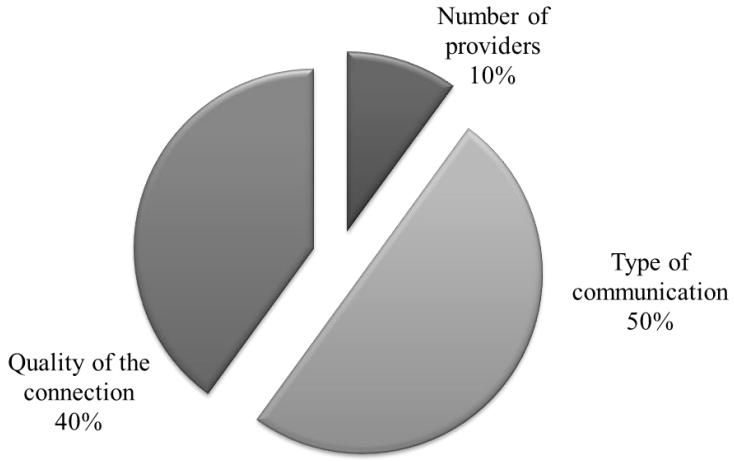

Figure 9. Relative weight of the Components of Telecommunications

The Telecommunications category index is calculated using the formula:

$$I_5 = b_1 \times \left(\frac{Q_1 - 1}{3} \times p_1 + \frac{Q_2 - 1}{6} \times p_2 + \frac{Q_3 - 1}{3} \times p_3 \right)$$

In which: I_5 - value of the index representing telecommunications, for the calculation of the infrastructure index (*Inf*)

$$b_1 = \begin{cases} 1 \text{ if there is phone line on the location} \\ 0 \text{ if otherwise} \end{cases}$$

Items: i=number of providers; i=2 type of communication; i=3 quality of the connection.

Infrastructure index calculation

The overall infrastructure index calculation ponders the values obtained by each category own result, integrating all sub-items contemplated in the components and in the indicators, attributes and features. The sum of all weightings in each category equals the unit, and the overall index also equals the unit, between the addition of all, according to their relative ponderings.

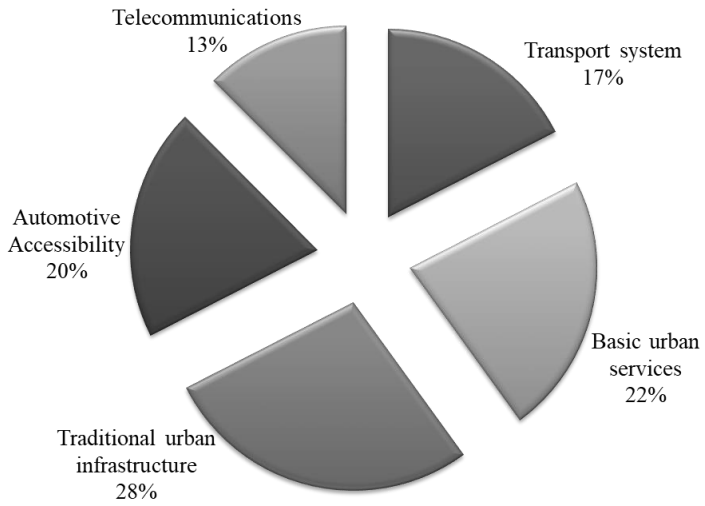

Figure 10. Relative weight of each Category in the Index.

This is expressed in the following comprehensive equation, encompassing the weighting of the five key categories that are contemplated in the survey:

$$Inf = \sum_{i=1}^{5} f_i I_i = 0{,}175 I_1 + 0{,}225 I_2 + 0{,}275 I_3 + 0{,}2 I_4 + 0{,}125 I_5$$

FINAL CONSIDERATIONS

The presented measurement tool to assess the level of urban infrastructure has the goal to provide an aggregate indicator of the overall provision of these determinant components of the urban condition in the territory.

The consideration of such a large number of items requires the quantifiable treatment of each of them and their total and relative weighting.

In the present stage, this relative weight of the components in the calculation is still provisional, and is being tested in the field to fine tune it from the obtained feedback, balancing the global assessment.

When this process is stabilized, the index can be applied to assess the infrastructure in the territory, by the calculation and comparison of multiple points, which will enable the identification and quantification of asymmetries and further interpretation of the territory and its potentialities.

The realization of panel data analysis will permit to calculate the infrastructure index for diverse locations over different time periods, which will make possible (in the medium and long term) to verify trends of evolution and to calculate variations. It will also allow its the use as an evaluation system, producing analytic data that can then be cross-referenced with other indicators, such as the development level, education level, unemployment rate or birth rate. Relative weightings should be periodically reviewed and upgraded in the future.

Designed as an operative tool to the analysis of the territory, the urban infrastructure assessment calculation method is intended as a contribution to produce objective data [10] that can inform urban planning and management. It is a complementary tool for understanding the territory, considering however that it obviously contains other dimensions that also require close reading.

As André Corboz put, in addition to statistics and quantifications, the territory needs to be sought as a "semantized" and "discursible subject" [11].

ACKNOWLEDGMENTS

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NOTES

[1] Lewis Mumford, *The culture of cities* (New York: Harcourt, Brace and Company, 1938), 3.
[2] Three urban revolutions occurred since the industrialization, a process of transformation still in progress over large areas of the globe: François Asher, *Les Nouveaux Principes de l'Urbanisme: La fin des villes n'est pas à l'ordre du jour* (La Tour d'Aigues: Éditions de l'Aube, 2001), 59 [Portuguese edition, Livros Horizonte, 2010].
[3] François Asher, *Les Nouveaux Principes de l'Urbanisme: La fin des villes n'est pas à l'ordre du jour*, 53 [Portuguese edition, 2010].
[4] Mario Gandelsonas. *X-Urbanism: Architecture and the American City* (New York: Princeton Architectural Press, 1999), 15.
[5] According to Alain Bourdin, the whole development of liberal urbanism over the last three to four decades has been based on a compartmental perspective on the city, following a model of intervention focused on the idea of competitiveness, which has spread globally: Alain Bourdin, *L'urbanisme d'après crise* (La Tour d'Aigues, Éditions de l'Aube. 2010), 22.
[6] These conditions are constantly evolving with the continuous transformation of society towards 'modernization': François Asher, *Les Nouveaux Principes de l'Urbanisme: La fin des villes n'est pas à l'ordre du jour*, 103 [Portuguese edition].
[7] Multiple examples of this kind of studies can be named, such as Steven Greer and Maggie Watson in human health – Greer, Steven and Maggie Watson, *Mental adjustment to Cancer: Its measurement and prognostic importance* (*Cancer Surveys*.1987) -, Duygu Turker in the field of social responsibility - Duygu Turker. *Measuring Corporate Social Responsibility: A Scale Development Study* (Journal of Business Ethics #85. 2009) -, or Steven C. Wofsy in climatology – Steven C. Wofsy. *HIAPER Pole-to-Pole Observations (HIPPO): fine-grained, global-scale measurements of climatically important atmospheric gases and aerosols* (Philosophical Transactions of The Royal Society A Mathematical Physical and Engineering Sciences #369. 2011).
[8] Recent examples of information processing and calculation on these issues of public transport provision can be found in studies from many authors, like John Preston and Fiona Rajé, Graham Currie or Eric Boschmann and Mei-Po Kwan: John Preston and Fiona Rajé, *Accessibility, mobility and transport-related social exclusion* (Journal of Transport Geography 15. Amsterdam, Elsevier. 2007), 151-160; Graham Currie, *Quantifying spatial gaps in public transport supply based on social needs (*Journal of Transport Geography 18. Amsterdam, Elsevier. 2010), 31-41; Eric Boschmann and Mei-Po Kwan, *Toward Socially Sustainable Urban Transportation: Progress and Potentials* (International Journal of Sustainable Transportation 2. Oxfordshire, Taylor & Francis Group. March 2008), 138-157.
[9] Lucas Carr, Shira Dunsiger and Besse Marcus, *Walk Score as a global estimate of neighbourhood walkability* (American Journal of Preventive Medicine 39. Amsterdam, Elsevier November 2010), 460-463.
[10] Seeking to respond to the vagueness that Alain Bourdin pointed out: Alain Bourdin, *L'urbanisme d'après crise* (La Tour d'Aigues, Éditions de l'Aube. 2010), 23.
[11] To André Corboz, the territory must be recognised for its own character, which arises from its culture and history, a perspective that complements and ads to more specific and particular approaches: André Corboz, *Le territoire comme palimpseste* (*Diogène* 121. Paris: Gallimard. janvier-mars 1983). 14-35.

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ANALYZING THE IMPACT OF CLIMATE CHANGE ON SOCIAL DWELLINGS IN L'AQUILA: A CASE STUDY

Author:
[1] [2] **KRIZIA BERTI,** [1] **DAVID BIENVENIDO-HUERTAS,** [2] **ALESSANDRA BELLICOSO,** [1] **CARLOS RUBIO BELLIDO**

Affiliation:
[1] UNIVERSIDAD DE SEVILLA, SPAIN [2] UNIVERSITA' DEGLI STUDI DELL'AQUILA, ITALY

INTRODUCTION

The use of environmental and energy resources is one of the main challenges of society. Pollution, environmental disasters, and climatic variations are making society aware of the need to preserve the planet [1] [2].

Currently, the building sector has clear objectives related to energy saving and sustainable development. Buildings are often inefficient and design strategies should be used to resolve this issue. Thus, sustainable architecture and efficient design can be an opportunity to ensure a lower impact of buildings [3] [4] [5].

At this point, climate change can have a major impact on the effectiveness of design strategies. This can become very important in cold areas due to the decrease in effectiveness of heating strategies. For this reason, this study analyses the impact of climate change on social dwellings in a cold zone: the city of L'Aquila.

A case study in the city of L'Aquila was analysed with EnergyPlus with the aim of finding out whether the architectural solutions adopted in 2010 continue to be effective today and especially if they will be effective in the future scenarios that consider climate change.

METODOLOGY

The adopted research methodology is based on the following steps:

- climatic data generation;
- comfort models application;
- generic design passive strategies;
- energy model and simulations of the case study.

ANALYSIS AREA

The city of L'Aquila

L'Aquila is the capital of the Abruzzo region, located in southern Italy in a valley 714 meters above sea level and its climate is slightly continental, with quite cold winters and hot summers.

Climate zoning in Italy

The Italian territory is divided into six climatic zones based on the average daily temperatures, the definition of which is done through the degree days (or "gradi giorno" – GG). (Figure 1) They correspond to the sum, extended to all days of the year, of the difference (only the positive one) between the indoor temperature (fixed by convention at 20°C) and the average daily external temperature. The degree days therefore represent an index of the climate and the higher they are, the more rigid the temperature in that place is: this means that for many days the temperature was below 20°C [6]. The six climatic zones range from A, for those areas characterized by the degree days value below 600, and therefore by higher temperatures, to F, for those areas where the degree days exceed 3000, and therefore by lower temperatures. At this point, even though the city of L'Aquila is located in southern Italy where temperatures are in general higher compared to the rest of the Country, it falls within the range of zone E and in little part in zone F, the coldest two [7].

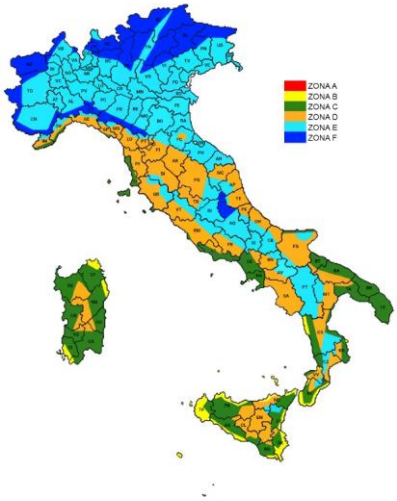

Figure 1. Climatic zones in Italy.

Climate data generation

The first step was to analyze both the actual climate of the city of L'Aquila and the climatic variations forecast for 2050 and 2100 through the use of the ClimateConsultant 6.0 (Energy Design Tool UCLA) program of the University of California Los Angeles UCLA.

The climatic data obtained derive from the EPW files generated for each location using the above-mentioned program. At this point, among all the possible climatic variables, the study focuses on the dry bulb temperature, the relative humidity and the global horizontal radiation for the present, for 2050 and 2100. The analysis of future climate is based on Representative Concentration Pathways (RCPs). A Representative Concentration Pathway is a greenhouse gas concentration (not emissions) trajectory adopted by the IPCC [8]. In this study, only RCP 8.5 is considered. It is the most unfavorable climate change scenario, chosen to understand what would happen if, from now on, no measures of any kind were taken with respect to climate change [9].

The study has shown that in the location of L'Aquila, the average annual temperature increases from the current 16.2°C to 21.8°C in 2100, the relative humidity increases slightly from the current 58.3% to 58.6% in 2050 to remain stationary in 2100 and the horizontal global radiation increases from 319 to 338 Wh/m2. Analyzing the monthly data, they show that the increase in temperatures in summer is between 3.9°C and 8.6°C, depending on the month, for an average of +4.8°C; on the other hand,

during the winter months, the increase in temperatures is lower, between 3.5°C and 7.5°C, for an average of +6.5°C. (Figure 2)

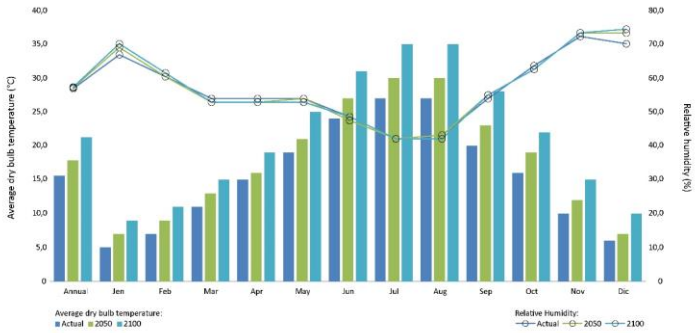

Figure 2. Average monthly and annual temperature and relative humidity of L'Aquila for the present, for 2050 and 2100.

Comfort models application

Regarding the application of the comfort models, the first step was to develop comfort models from the climatic data in the EPW files. However, these models are general representations that do not take into account many factors, such as the orientation or the shape of the building, so when it comes to design strategies these are called "generic".

In these models, different scenarios have been developed in the city of L'Aquila, each one characterized by a combination of factors. The goal was to analyze how climate change could affect the percentage of indoor thermal comfort hours based on the various factors included.

Only natural ventilation has been included in the first combination and thermal comfort would currently be achieved in 21.5% of the hours of the year (Table 1). However, in future scenarios, the study shows how the annual percentage of comfort hours decreases by 5% although. Analyzing, on the other hand, the months from September to February thermal comfort increases due to global warming and also since the climate of L'Aquila is characterized by very cold winters.

All those generic passive design strategies that do not require the use of electricity have been included in the following combination (Table 2): indoor thermal comfort would currently be achieved in 65.1% of the hours of the year, a percentage that would drop to 50.0% in 2100 although, as in the previous case, during the cold months there is an increase in comfort due to the rising temperatures.

In the last combination (Table 3), those design strategies that require the use of electricity have also been included: comfort would currently be achieved in 65.7% of the hours of the year, a percentage that would drop to 50.5% in 2100.

Year	Annual	Jen	Feb	Mar	Apr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic
Current	21,5	0,0	0,0	2,0	10,7	38,4	48,2	47,7	41,8	46,8	19,5	1,4	0,0
2050	20,2	0,0	0,0	4,6	18,3	52,2	41,7	21,2	21,9	46,7	30,9	4,4	0,0
2100	16,4	0,1	1,2	16,8	38,6	45,2	15,0	1,3	1,3	21,5	41,0	13,3	1,2

Table 1. Indoor comfort in L'Aquila in % of hours of the year, for the present, for 2050 and 2100.

Year	Annual	Jen	Feb	Mar	Apr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic
Current	65,1	27,7	35,1	64,0	84,3	95,7	81,3	73,4	64,7	93,8	91,5	48,6	20,3
2050	60,0	31,5	48,2	78,0	88,6	93,1	60,8	36,0	32,5	75,4	86,4	59,2	30,2
2100	50,0	43,1	60,7	88,3	91,4	67,6	20,6	4,3	2,4	29,2	73,3	76,4	44,5

Table 2. Indoor comfort in L'Aquila in % of hours of the year, for the present, for 2050 and 2100.

Year	Annual	Jen	Feb	Mar	Apr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dic
Current	65,7	27,7	35,1	64,0	84,3	95,7	82,8	77,4	65,7	93,8	91,5	48,6	20,3
2050	60,6	31,5	48,2	78,0	88,6	93,1	61,7	39,1	35,3	76,5	86,4	59,2	30,2
2100	50,5	43,1	60,7	88,3	91,7	67,9	23,5	5,0	3,9	30,0	73,3	76,4	44,5

Table 3. Indoor comfort in L'Aquila in % of hours of the year, for the present, for 2050 and 2100.

Generic passive design strategies

The ASHRAE handbook of Fundamentals comfort model is a model that establishes that thermal comfort is based on the dry bulb temperature, on the clothing level, on the metabolic activity, on the air velocity, relative humidity and mean radiant temperature.

All these parameters are used to determine the PMW with which the comfort zone is calculated using ClimateConsultant 6.0. The program generated a psychometric chart of L'Aquila for each climate scenario. A Psychometric chart is a graph which shows all of the hours of a year represented as green points and indicates, in a blue box, which of them are characterized by thermal comfort considering all the factors above-mentioned. (Figure 3)

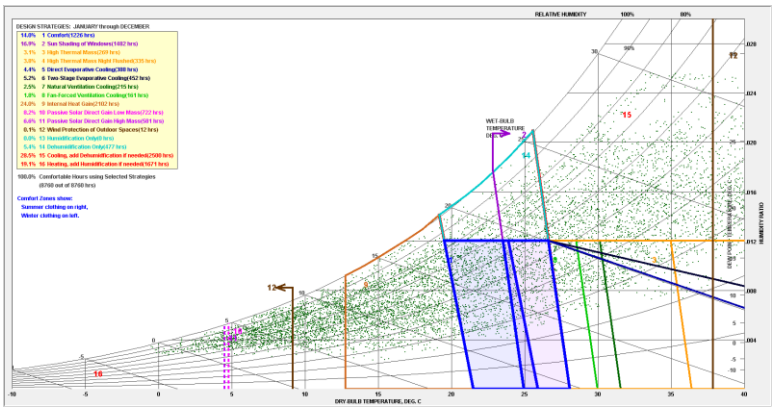

Figure 3. Psychometric Chart of L'Aquila for the year 2100.

Applying this comfort model to the case of L'Aquila, the investigation showed that thermal comfort is currently achieved in 18.2% of the hours of the year, on the other hand this parameter falls to 16.4% in 2050 and to 14.0% in 2100. This depends on the expected increase of temperatures which will make buildings thermal properties insufficient to guarantee indoor thermal comfort. This aspect can be more relevant in a location such as L'Aquila, where it is currently not usual to deal with a hot climate.

At this point, analyzing each of the sixteen generic passive design strategies established by the model for the year in the location of L'Aquila, the study showed which of them are the most influential currently and in future scenarios. The use of natural ventilation cooling decreases from the current 3.3% to 2.5% in 2100, along with the use of fan-forced ventilation cooling which falls from the actual 2.2% to 1.8% of the hours of the year 2100. The investigation also shows how the use of internal heat gain and the use of heating system decreases respectively up to 24.0% (from the current 28.9%) and

up to 15.5% (from the current 27.4%). On the other hand, the use of sun shading of windows achieves more relevance in future scenarios, it increases from the actual 10.8% to 16.9% in 2100; above all, the use of cooling systems increases considerably from the actual 4.4% to 28.5% of the hours of the year 2100. (Figure 4)

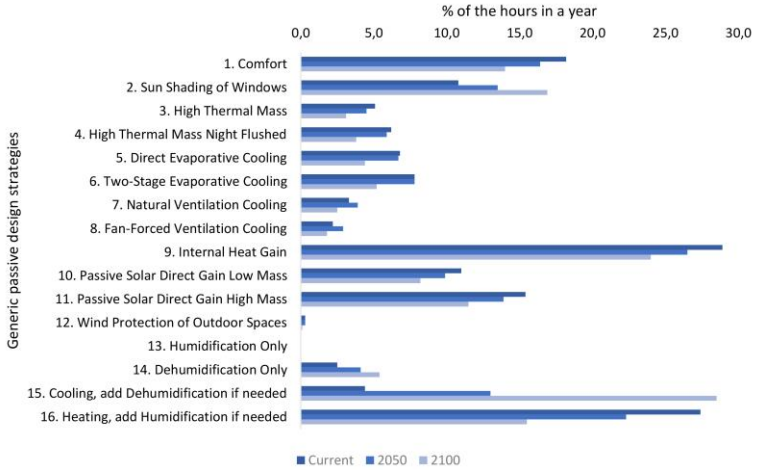

Figure 4. Percentage of hours of generic passive design strategies in L'Aquila.

CASE STUDY

The historical context

The city of L'Aquila, in addition to being in a rather cold area, is also in a highly seismic one: it is in the second band in terms of seismic danger [10].

Throughout history L'Aquila has been the scene of major disasters linked to important seismic events, among many of them there are those of 1315, 1349, 1461 and 1703. Recently however, there has been the earthquake of April 6th, in 2009, which destroyed the city and in which 309 people died and thousands were left homeless.

Social dwellings in L'Aquila: the "Progetto C.A.S.E."

Immediately after the seismic event, tent camps were created to house the homeless but there was a need to find a temporary but lasting solution to cope with the emergency. Thus, the "Progetto C.A.S.E. Complessi Antisismici Sostenibili ed Ecocompatibili" was born: a reconstruction project that allowed to house 15.000 people in just 9 months. It consisted of the construction of 185 buildings according to two macro typologies and sixteen variants of the same, corresponding to a total of 4.449 dwellings including their respective urbanizations.

The first of the objectives to be pursued was that the houses were available within a few months, preferably before winter, to avoid people having to live in tents with cold winter temperatures. Among other objectives were that of guaranteeing maximum anti-seismic safety and high quality of construction.

The philosophy behind the intervention stems from the hypothesis of using seismic isolation on a large scale, so seismic isolators became the common feature of all buildings. By eliminating the seismic action at the base, it was possible to realize multi-storey buildings without resorting to particular structural solutions.

The system had to respond to other needs too: simplicity and repeatability in short times, flexibility to be able to adapt to all the different intervention areas, and feasibility within the pre-established time frame. The fundamental requirement of time containment led to favoring prefabricated construction systems and in particular dry construction systems with the aim of limiting the introduction of humidity in the construction process as much as possible in order to reduce the drying periods [11].

A case study

The typology chosen to analyze is that of Building 4: twenty-eight buildings were built according to this typology (it is the most widespread) of which only ten in the intervention area of Bazzano. The typological choice of using the double pitched roof or the regular shape of the balconies, among others, is deliberately traditional while, on the other hand, the technologies and construction systems used are innovative. The structure is in steel and the perimeter closures are made up of a support frame, internal plasterboard cladding, and external cladding in wooden slats or smooth panels, with multiple layers of thermal and acoustic insulation interposed.

Energy model and simulations

At this point, an energy model was developed with EnergyPlus and in this study only the intermediate floor was analysed.

The aim of this investigation was to find out what the building's response would be to climate change in the coming decades in terms of energy demand [12].

The simulations carried out refer to the current climate (Figure 5) and to different future scenarios, respectively 2050 (Figure 6) and 2100 (Figure 7). They showed that from 2020 to 2100, there would be a gradual decrease in the heating demand, on the other hand they demonstrated that there would be a considerable increase in the cooling demand and obviously in total energy demand.

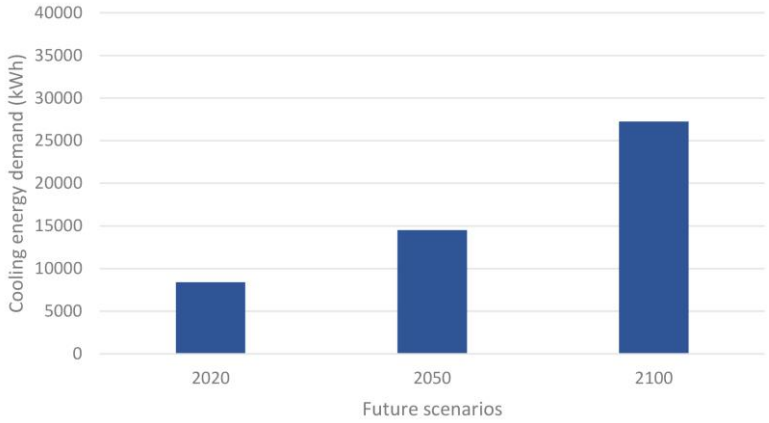

Figure 5. Cooling energy demand in L'Aquila in different future scenarios.

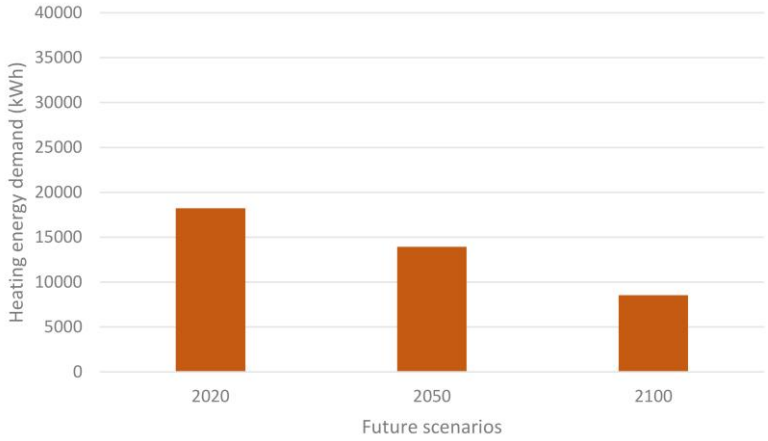

Figure 6. Heating energy demand in L'Aquila in different future scenarios.

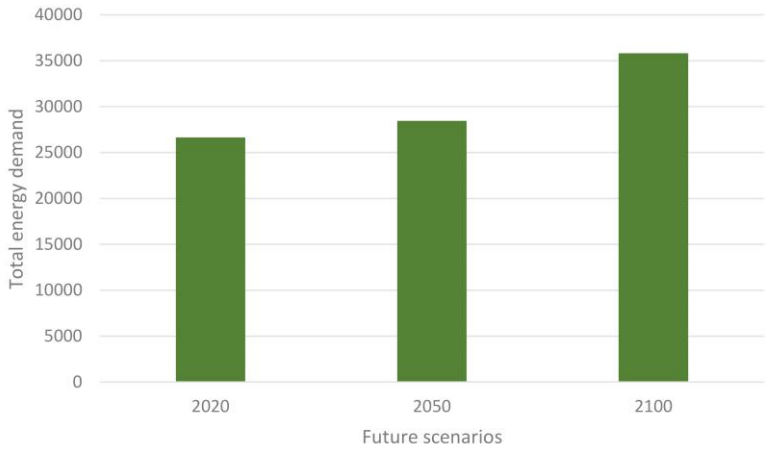

Figure 7. Total energy demand in L'Aquila in different future scenarios.

CONCLUSION

This investigation sets out to analyze the impacts of climate change in Italian residential buildings' performance. At first, the study analyzed the changes in terms of thermal comfort inside the buildings in future scenarios in the city of L'Aquila, in southern Italy; in the second place, a case study in the same location was chosen to analyze the changes in energy need deriving from climate change. A residential building-type belonging to the "Progetto C.A.S.E." was chosen. The results showed the progressive decrease in the heating energy demand and therefore in the use of heating strategies; on the other side they showed a clear need for greater consideration of the increasing cooling energy demand and the use of refrigeration systems.

L'Aquila is a predominantly cold city, therefore global warming would radically transform the performance of the built environment: refrigeration systems, currently not essential, will achieve more importance in the next future. Thus, there is a desperate urgency to improve the current situation and take action regarding the expected effects of climate change for the coming decades. On one side there is a need to adapt buildings' thermal properties to the changing climate and, on another side, there is a need to counteract its consequences in terms of energy demand of buildings. At this point, it is relevant to reduce energy consumption in the residential sector, which is currently one of the sectors

characterized by the highest level of carbon dioxide emissions, with the aim to stop or at least reduce climate change and at the same time minimize related social problems such as energy poverty.

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ACHIEVING NET ZERO ENERGY IN LOW-RISE RESIDENTIAL BUILDINGS: THE CASE OF WARM AND HUMID CLIMATIC CONTEXT OF KERALA

Author:
SERENE MARY J

Affiliation:
TKM COLLEGE OF ENGINEERING, INDIA

INTRODUCTION

The term Net Zero Energy Residential Building is defined as the building with zero net energy consumption i.e., the total amount of energy used by the building on annual basis is generally equal to the amount of renewable energy produced on the site itself. The energy expended by the building sector continues to upsurge, mainly because new buildings are constructed faster than old ones are retired. Currently, there are only a small number of highly efficient buildings that meet the criteria to be called “Net Zero”. As an outcome of developments in construction technology, renewable energy systems, and researches, creating a Net Zero Energy Building is becoming more and more feasible. There are a number of parameters to be taken care of in achieving sustainability in urban level in which the contribution of building fabric is about 13%, water & waste 14% and energy 6%. In this study, the contribution of 33% among total parameters is to be analyzed to understand the optimum level of sustenance that can be achieved. India is facing formidable challenges in meeting its energy needs.

Nowadays, the supporting services in residential sector such as electricity, water, waste treatment, etc. are satisfied with the connection to grid and the impact caused by a building is also transmitted to the surrounding environment. A city can be defined to be sustainable "if its conditions of production do not destroy over time the conditions of its reproduction". The building level indicators can be shortlisted and analysis can be done individually with respect to the climate and context.

DESIGN STRATEGY FOR NET ZERO ENERGY BUILDINGS

The key to designing net zero energy buildings are first reducing energy demand as much as possible, and then choosing good energy sources. Here is a simple order of operations.

Passive Design

Passive design maximizes the use of natural sources of heating, cooling and ventilation to create comfortable conditions inside buildings. It harnesses environmental conditions such as solar radiation, cool night air and air pressure differences to drive the internal environment. A NZEB will only be cost-effective if all the passive strategies like Form & Orientation, Shading, Cool Roofs, Fenestration,

Insulation, Daylighting, Windows, Natural Ventilation, Thermal Mass, Evaporative Cooling, Thermal Comfort and Vegetation are adopted in its design and construction.

Lighting

Lighting energy accounts for more than a quarter of total energy consumption in buildings. It is therefore important to optimize lighting energy used to achieve net zero goals. Energy efficient lighting fixtures like Light Emitting Diodes (LEDs) are now readily available in the market. These must work in conjunction with day lighting. Building form, orientation, and fenestration design must channel daylight into the building. Day lighting controls as well as occupancy sensors could further reduce lighting energy use.

Efficient Appliances

Selecting the right appliances and good usage practices is reducing half energy load. Solar Appliances, Solar Lighting, Tubular Fluorescent Lamps (TFLs), Ceiling Fans, Electric Geysers and colour Television are the right alternative to conventional appliances.

Renewable Energy

Renewable energy systems are the final step to attaining zero energy goals. Once all possible measures to reduce energy demand are deployed, renewable energy systems must step in to balance residual energy demand. Performance of renewable energy systems determines the success of the net-zero buildings.

Heating, Ventilation and Air Conditioning (HVAC)

Design of a building, climatic zone and operational parameters governs the energy requirement for the comfort system. Reducing heating and cooling loads through passive design and enhancing the efficiency of HVAC systems are steps that are imperative for any building energy efficiency policy[1]. Apart from selecting energy efficient equipment, it is important to select the correct system type, size, and design for optimized energy efficiency.

ENERGY EFFICIENCY INITIATIVES AND REGULATIONS FOR RESIDENTIAL BUILDINGS IN INDIA

So as to carry out operative strategy for implementable energy efficiency measures for building regulations in India, it is found that Indian codes only consider only 3 out of 8 indicators under energy efficiency. Heating and cooling, Design guidelines and U-value and SHGC are included among Construction details methodology, Wall and ceiling insulation, Air sealing and ventilation, Lighting efficiency, Windows and Other installations are not considered[2]. There is a critical need to review and summarize net zero energy buildings due to economic development, increase of cooling demands, environment and climate change, cultural characteristics, and geography. These energy measures on energy efficiency in building sector are identified by reviewing initiatives taken in India such as, NBC, ECBC, LEED homes and Small Versatile Affordable GRIHA for residential buildings. The recommendations from this will be useful for similar climate locations in India and worldwide. It is found that embodied, operational and demolition energy needs to be considered and the energy use is dependent on building height in terms of number of floors, lifespan, envelope properties and climatic conditions. Building envelope, climatic and site conditions, building materials, water conservation, waste water recycling, heating, natural day lighting, cooling, ventilation are found to be important parameters for improving energy efficiency in buildings. Identification of design features and

technologies is essential to determining NZEB energy performance in warm and humid climate zones. After reviewing selected NZEB cases, organized their design features and technologies into five groups: architectural design and envelope; heating, ventilation and air-conditioning (HVAC); lighting; plug load equipment; and renewable energy technologies.

BUILDING LEVEL SUSTAINABILITY FRAMEWORKS

The study investigates energy use associated with the building typology, lifestyles and household sizes found in warm and humid climate. Local building styles, climatic and household lifestyles will impact the demand for each energy service to achieve a net zero energy balance. Residential buildings can reach the Net ZEB target by addressing simple corrective solutions, such as: high insulation, use of low-emissive glazing and window shadings, free-cooling through natural ventilation, Renewable energy sources (especially solar energy and wind energy) solar collectors for DHW, etc. The suggested actions which are economically affordable and easy to incorporate may be seen as practical design standards, which are adequate to build residential Net ZEBs in these regions. It would result in improvement in energy efficiency and hence reduction in annual energy consumption, overall reduction in energy cost of at least about 30% and reliable source of power supply if combined with energy storage devices[3]. There are prominently two rating systems working in Indian building sector. Indian green Building Council (IGBC) and The Energy Resource Institute (TERI) are executing number of rating programs throughout India since 2001 aiming at balancing energy and resource efficiency while providing a comfortable, healthy and productive environment. The comparative analysis of these systems reveals the contribution of building level indicators in achieving sustainability (Figure 1).

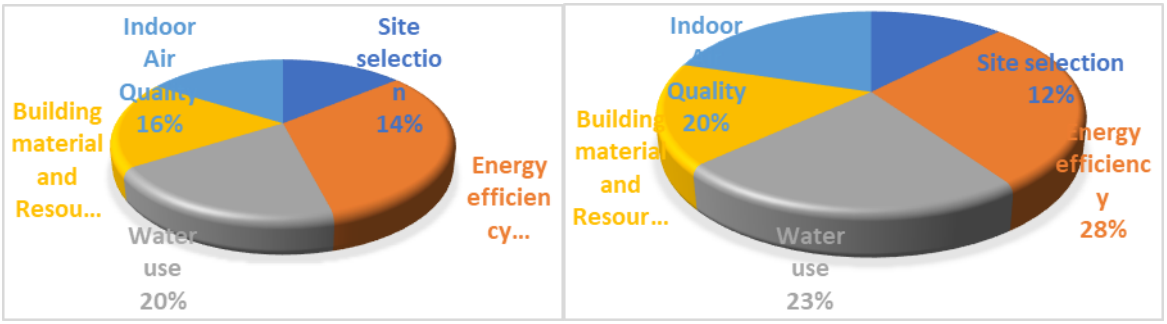

Figure 1. Distribution of indicators under 5 categories: a) LEED India b) GRIHA

In both frameworks, energy efficiency is observed to have highest significance. This is also in relation to national priority. Building material and its effect on environment is given succeeding priority in LEED rating system while water use is subsequent in GRIHA systems. Post occupancy energy analysis is given significance in LEED system while GRIHA demands closer monitoring of occupant's feedback on comfort within built environment. Figure 1 shows the major contribution on energy efficiency, 32% is in LEED and 26% in GRIHA. Water is another important factor by covering 20% and 19% in LEED and GRIHA respectively. Material and resources have more weightage of 23% in GRIHA than LEED's 18%.

Net Zero Energy Building and Climate Consideration

Net zero energy building targets energy balance, reduces site energy use through low-energy technologies, like daylight, natural ventilation, high-efficiency HVAC equipment[4]. Photovoltaic

system and solar hot-water system could supply buildings with clean and renewable-energy sources[5]. After analysis of the integrated performance of the house, a net zero energy building with the best system configuration predicted by hardware and software simulation are validated. Three strategies for the net zero energy renovation of the house have been analysed; high quality of thermal insulation, a passive strategy with an atrium by opening and closing windows, ventilation system with heat recovery to prevent heat loss[6]. Also, energy controlling system has been helpful of monitoring interior energy consumption and indoor thermal condition. For the energy balance scenario photovoltaic and solar thermal collector is used. Material inputs that will be absolutely non-hazardous and available to the nature and encouraging users' energy-conservation as "behavior energy-saving" shall be employed.

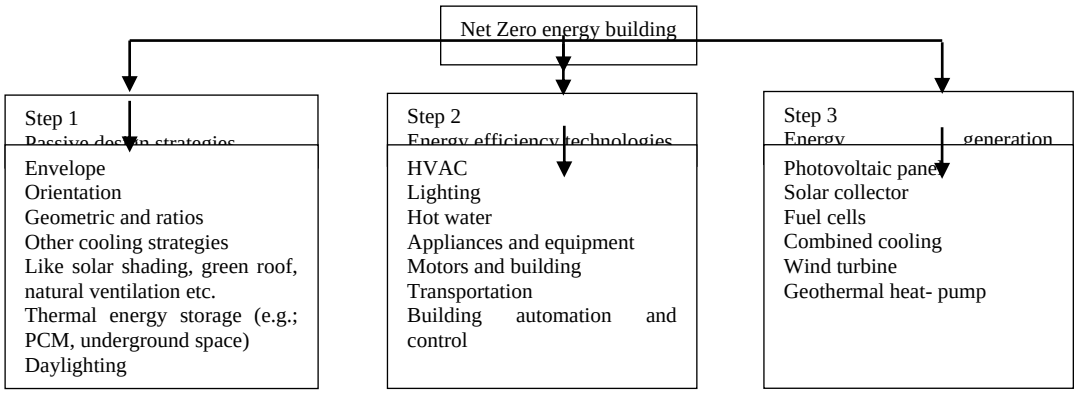

Table 1. The main elements to be designed for nZEB

Although there is no standard approach for designing and realizing a Net Zero Energy Building (there are many different possible combinations of building envelope, utility equipment and on-site energy production equipment able to achieve net-zero energy performance and also the balance boundary, which defines which consumers are included in the balance differs in known approaches) there is some consensus that zero energy buildings design should start from passive sustainable design as this level of performance is achieved as a result of executing two fundamental steps: (a) reduce building energy demand and (b) generate electricity or other energy carriers to get enough credits to achieve the desired energy balance. As one can easily imagine, passive approaches play a crucial role in addressing NZEB design as they directly affect the heating, cooling, ventilation and lighting loads put on the buildings mechanical and electrical systems, and indirectly, the strive for renewable energy generation.

Walling Alternatives: Among the various walling alternatives, laterite wall masonry has the highest value of sustainability. Hence laterite can be suggested as the most sustainable option in places where they are locally available. Hollow and solid concrete block masonries also have fairly good scores next to laterite masonry. This is attributed to their lower scores in socio-cultural factors as compared to other alternatives[7].

Roofing Alternatives: Mangalore pattern roofing tiles with wooden rafters has proved to be the most sustainable roofing option among the prevailing alternatives. The CEEF technology alternatives like filler slab and shell roofing has comparably lower sustainability values against their maximum scores in technological sustainability[8]. This owes to the lower sustainability values in socio-cultural factors (compared to reinforced roofing slab), economic factors and environmental factors (compared to thatch and Mangalore pattern roofing tiles).

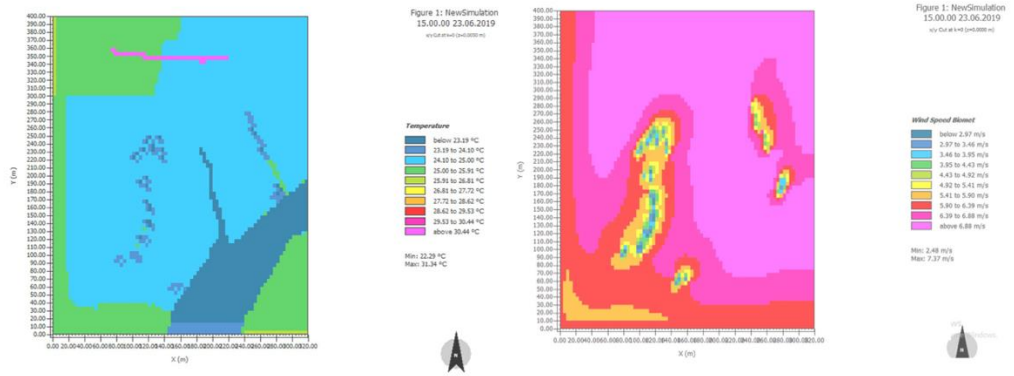

Figure 2. Existing temperature and wind speed readings at various points within the site (readings taken from ENVIMET for the design case at Kochi)

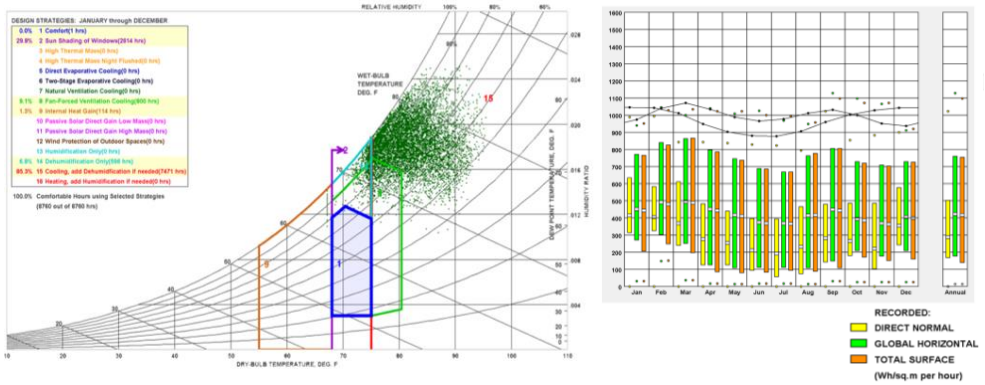

Figure 3. Psychrometric Chart and total radiation levels in Kochi (Annual and monthly readings)

Comparing Conventional Case with the Design Case

Base Case Scenario

The zone in which most people are comfortable is calculated using the PMV (Predicted Mean Vote) model. In warm and humid climatic zone of Kochi, the comfortable range values range between 24 and 29 degree Celsius. Thus, the thermal comfort is considered to choose the suitable model option based on WWR values. WWR of 10%, 20%, 30%, 40% and 50% are considered and taken into consideration for analysis- In the Base Case scenario, the window openings are equally distributed on all sides. The Base Case considered here is of dimensions 15m X 6.6 m with an area of nearly 2200 sq. ft.

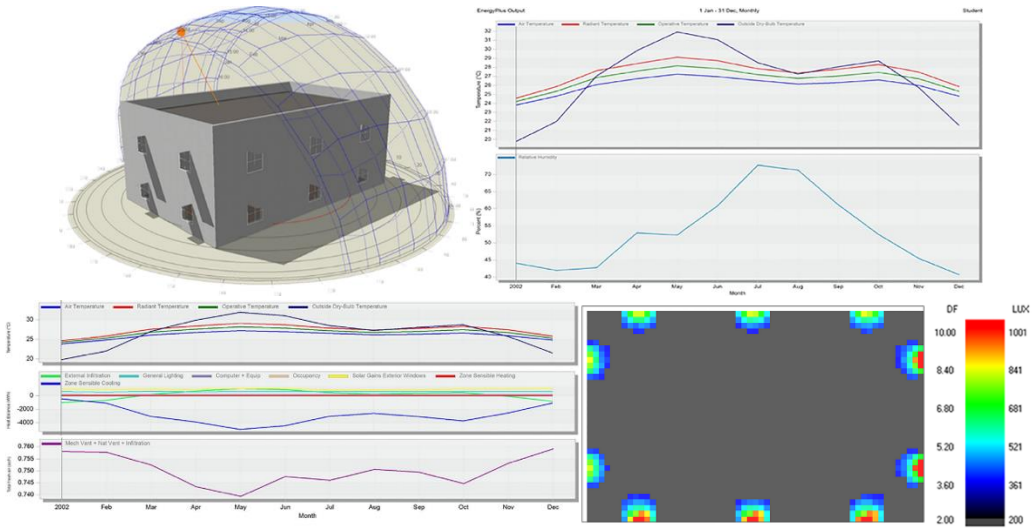

Figure 4. Temperature, humidity levels, energy consumption along with lighting levels in case of 10% WWR base case comparison

The mean radiant temperature, Operative temperature and air temperature in the case of 10% WWR falls between the ranges of 23 degree Celsius and 29 degrees Celsius. Hence, it falls under the comfort values in the case of Kochi's climatic region and scenario.

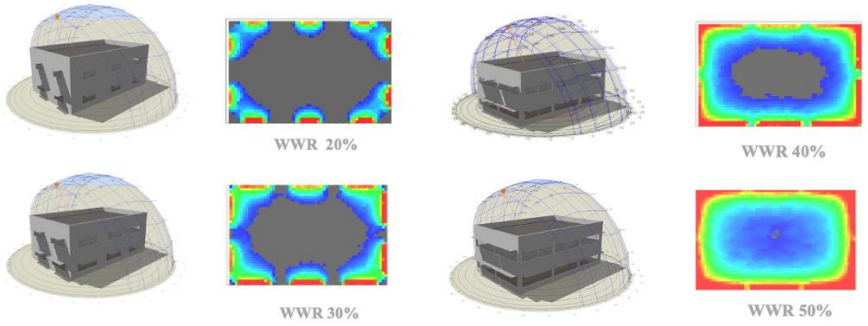

Figure 5. Daylighting analysis in case of 20%, 30%, 40% and 50% WWR base case comparison

Window sizes between 10- 30 % are ideal for residential buildings though 40% is tolerable. The mean radiant temperature, Operative temperature and air temperature in the case of 20% WWR falls between the ranges of 23-degree Celsius and 28 degree Celsius. Hence, it falls under the comfort values in the case of Kochi's climatic region and scenario. The mean radiant temperature, Operative temperature and air temperature in the case of 40% WWR falls between the ranges of 24 degree Celsius and 30 degree Celsius. Hence, it falls under the comfort values in the case of Kochi's climatic region and scenario during most time of the year.

Existing Case Scenario

An existing scenario is studied so as to know the load calculations. The WWR of the existing case falls between the range of 20% and 30%. Area of the project is nearly 2114 sq. ft. In the existing case, except the family living space in the first floor, all other areas are meeting the NBC standards for DF in residential spaces.

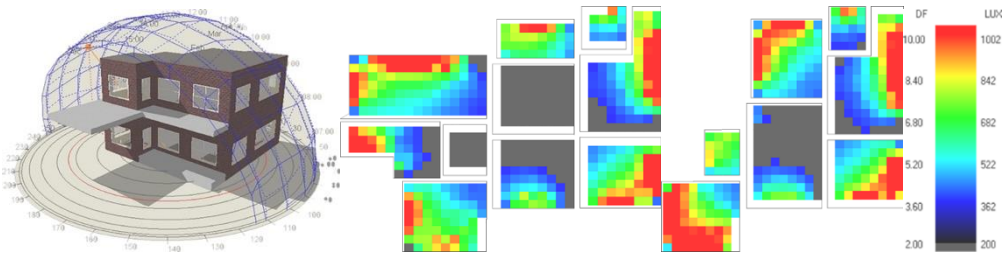

Figure 6. Annual sun shading analysis for the existing case along with the daylighting analysis for Ground floor and First floor

In this case; Gross wall area is 268 m^2, window opening area is nearly 66 m^2 and Gross window- wall ratio is approximately 24.67%. Optimization of the thermal behavior of houses in warm and humid climate was carried out. The criteria considered to maintain thermal comfort in humid conditions are: thermal inertia, shading and air renewal[9]. Electricity Consumption is nearly 12317 kwh/ year. The total electricity consumption intents of EPI for a case of 10 residences in the case of Kochi, Kerala varies from 67.5 KWh/ sq m/ year to 144 KWh/ sq m/ year.

Standard Case

Based upon the results obtained from design builder software after simulating, the total energy consumption throughout the year considering all the building energy loads is nearly 6900 KWh. Average solar irradiation in the state of Kerala is 1266.52 W / sq. 1kWp solar rooftop plant will generate on an average over the year 5.0 kWh of electricity per day (considering 5.5 sunshine hours).
Size of Power Plant: Feasible Plant size as per the Roof Top Area is nearly 13.6kW^2. Cost of the Plant according to the MNRE current benchmark cost is Rs. 55000 Rs. / kW. The total electricity generation from Solar Plant on an annual basis will be nearly 20400kWh. So, Life-Time (25 years) will turn out to be 510000kWh4). The financial Savings here a) Tariff @ Rs.8/ kWh (for top slab of traffic) - No increase assumed over 25 years will be monthly Rs. 13600 and annually Rs. 163200, Life-Time (25 years) will be Rs. 4080000.

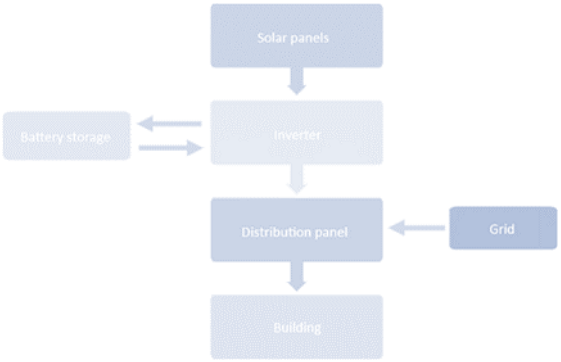

Figure 7. Distribution of the solar panel and grid system at the residential level

DESIGN CASE

Rooftop Rainwater Harvesting

A rainwater harvesting system comprises components of various stages - transporting rainwater through pipes or drains, filtration, and storage in tanks for reuse or recharge.

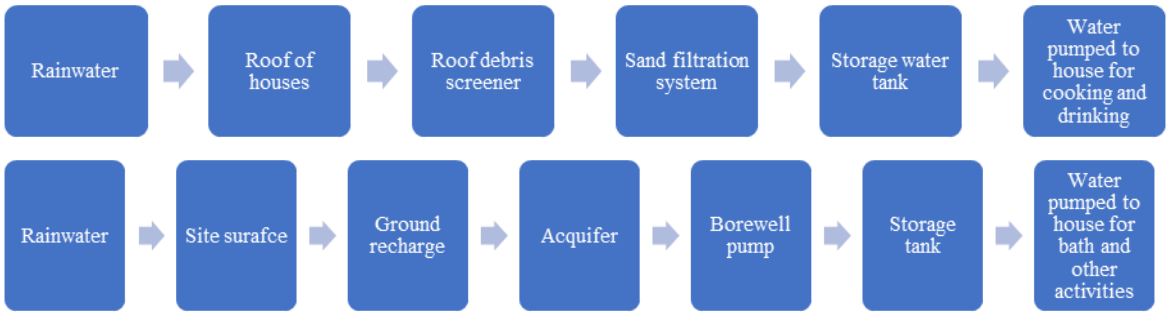

Figure 8. The water management system within the residential unit

Annual Energy Use

Energy consumed in Residential building Construction	Conventional Case		Design Case	
	%	KW/m2	KW/m2	Total
Direct fuel purchases for construction	15	332.18	180.7	570656
Administration and professional services	11	243.6	132.48	418481.08
Transport of materials and equipment	4	88.58	48.18	152174.94
Manufacture of materials and components	70	1550.17	1204.3	3804373.39
Total	100	2214.6	1720.5	5434819.13

Table 2. Conventional case vs Design Case Building energy consumption comparisons

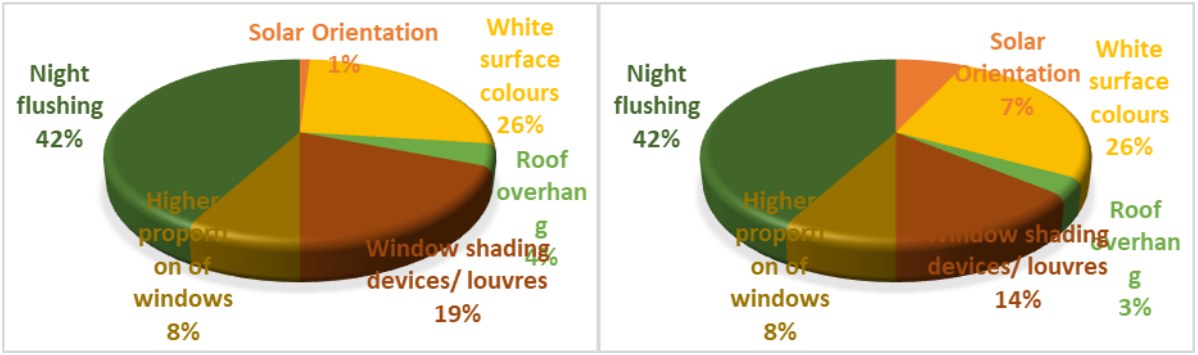

Figure 9. Approximate distribution of the reduction of the indoor temperature, contributed by individual design changes- original reference base case design, Approximate distribution of the reduction of the indoor temperature, contributed by individual design changes- Design case

Baseline Site Energy Use (Total)	6612 kWh
Site energy use reduction	70%
Design or operational site energy use	1392 kWh
Use by energy source	21730 kWh

Table 3. Based upon results obtained from whole building simulation approach in Design builder

RENEWABLE ENERGY

Photovoltaic

First one is, Renewable Energy located within footprint and Renewable Energy located within site. Hence, after computation, the Annual Electricity generation from solar plant is nearly equivalent to 20400kWh in the current scenario.

PV Module Tilt Study

PV module tilt	Number of modules	Annual energy generation (kWh)
0 º	4	1049
20 º	3	925
40º	2	642

Table 4. Annual energy generation from PV modules

Biomass

On an average on daily basis, every person produces 1.8 kg waste every day; ie, 0. 0018 tonnes. So, considering this as the average, per day it produces 1 cubic metre of biogas (Sequencing Batch Reactor)- Portable biogas plants are built using FRP (Fiber reinforced plastic) and it can be fixed in a small area[10].

CONCLUSION

The residential prototype has been created considering the four dimensions of spatial, comfort, consumption and generation. The performance analysis indicates the prototype works better than the conventional cases and net zero balance is achieved up to 100 percentage in terms of energy, water and waste. Effective shading has reduced solar gain to 1320 kWh per year with an average monthly reduction of 100kWh in the final design prototype and 96% of the total occupied hours are found less than 29 degree Celsius. The estimated EPI is 20 kWh/sq. m shows considerable reduction from the contemporary cases with an EPI of 96 kWh/sq. m.

The installation of the various methods initially would be costly, but in the long run the owner of the building would save money on their energy bill. More importantly, in the scarcity of natural resources we would be providing a self-sufficient, energy saving, nonpolluting, Zero Energy building. Based upon the results the residential prototype to be created and the impact they will have on the planet's environment is minimized. Therefore, in this, it is described as an inclusive methodological approach concerning the evaluation of the sustainability of any town or an urban area. Some indexes, suitable for selecting energy efficiency measures to design ZEBs, also by taking into account the minimization of environmental impacts. The proposed 'settlement zero approach' considers three issues: net site energy flux; integration of renewable production; avoided polluting emissions.

Although there is no standard approach for designing a Net Zero-Energy Building (as there are many different possible combinations of passive and efficiency measures, utility equipment and on-site energy generation technologies able to achieve the net-zero energy performance), a close inspection of the strategies and indicators of the relative performance of different cases revealed that it is possible to achieve zero-energy performance using well known strategies, a fact which provides evidence in the support of the theory that zero-energy buildings design is a progression of passive sustainable design.

NOTES

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