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# Can Micro-Housing Policies Enable Higher Liveability Standard in Urban Areas? Case Study of Cascais Historical Centre, Lisbon, Portugal

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**Keywords**

Housing space standards, liveability, micro-housing policies, urban planning.

**Abstract**

**Liveability within urban planning is a necessary prerequisite to the development of micro-housing. Liveability may contribute to improvement of urban environments where micro-homes are prevalent, notably, in highly populated urban areas. After a brief review of the concept, discussion is focused on whether the historic centre of Cascais has liveability standards to facilitate micro housing. The key metrics highlight if such metrics perform the role of determining whether Cascais fulfils the set liveability criteria.**

## Introduction

Micro-homes may provide solutions to high-density communities and cities by promoting access to housing for a large number of inhabitants in addition to facilitating proximity to high quality urban infrastructure (Fig. 1). The adequacy of urban policies and regulations for the implementation of use of micro-homes is essential to guarantee that the minimum living conditions are reached. High demand for housing in urban centres contributes to high housing costs, including proportionally the houses considered to be micro-homes. Lack of housing regulations relating to micro-homes often lead to inadequate urban housing with poor planning.

As a result, inhabitants are often left with the worst of two options: reduced housing space, as well as not having an environment where they may access and benefit from a full range of opportunities and key services available to members of society, which are key to the concept of liveability. The concept of liveability, in summary defined as "a healthy environment that promotes general wellbeing", is relevant for this article. Wellbeing includes leisure, culture, and sport, as well as public transport and work opportunities. "Criteria for livability include safety, income possibilities, living options, climate, culture, private and public transportation, equality and inclusion, medical care, and city governance" [1]. A fundamental condition to achieve liveability is fostering sets of urban strategies that support the inhabitants of micro-homes and allow them to enjoy quality of life in their urban core. The challenge of regulating micro-homes is the fact that the real estate market does not use it as a tool to further reduce the size of housing in areas that do not justify micro-homes. Historical centres, as an example of consolidated zones, have housing and architectural environments generally protected from changes in their dimensions. These restrictions may lead to housing that is far below the minimum standards set by urban regulations. However, the privileged location of housing represents an important factor in terms of achieving liveability. In summary, "a liveable city is one where people like and can afford to live" [1].

## I. Scopes and Methods

This article has been structured in order to explain how liveability policies are correlated with urban and housing policies or vice versa. Cities with high rates of livability generally have land management strategies and urban policies integrated with other initiatives. These

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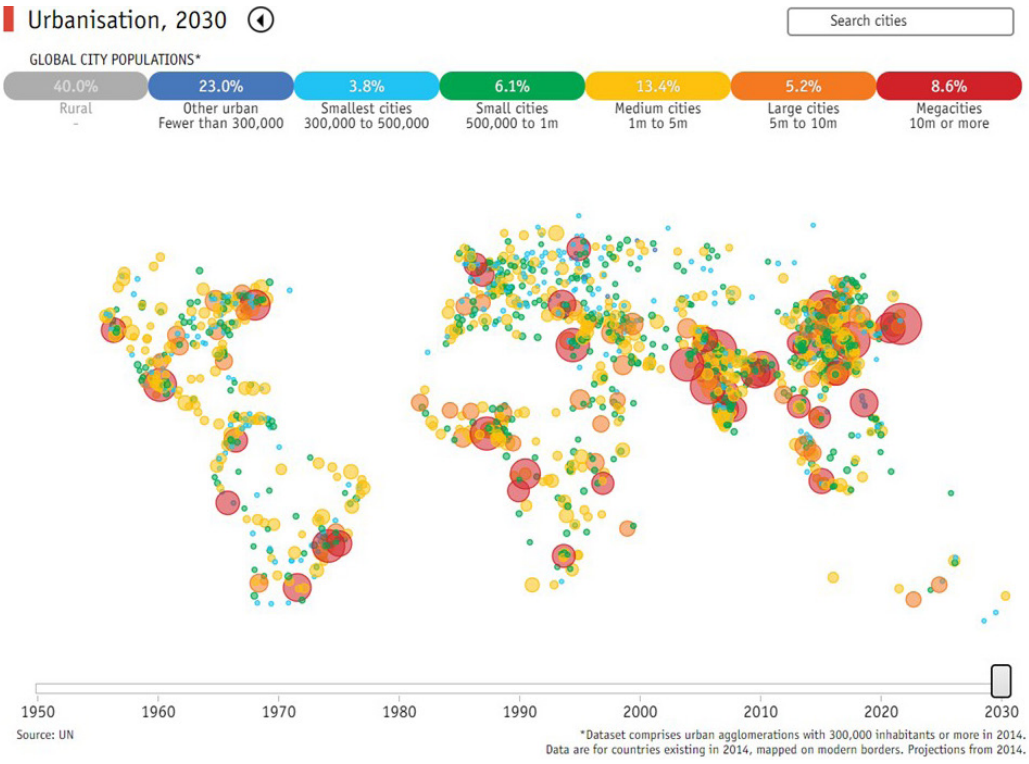



Fig. 1. Estimative of the Urbanisation and the rise of the megacity in 2030 (2014) [2].

include access to employment opportunities, urban mobility, healthcare and educational opportunities, leisure, parks/green areas. Firstly, the definition of livability, as well as the requirements for becoming liveable cities, are briefly covered in this article. The housing and urban policies of Cascais, Lisbon, Portugal, are presented in order to contextualize the analysis of the concept of liveability under these conditions. This information is used to analyse the urban conditions of the historic centre of the village of Cascais, Portugal, as a case study. The analysis verifies if the village of Cascais contains the prerequisites to provide its inhabitants with conditions for a liveable city. Case studies are analysed to illustrate the housing area restrictions and classify them within the context of micro-homes. Therefore, within these conditions of reduced housing space, would the historic centre of the village of Cascais be suitable to provide an environment that supports community life with high level of liveability.

## II. Liveability

Liveability is a summary of factors that simply make life more enjoyable for a reasonable person. A liveable city is where there is equality in access to housing, employment opportunities, good quality health and education, leisure, and cultural activities [3]. Factors such as security, political stability and good adaptation to climate are also factors in the perception of liveability. Although liveability is the result of a natural process, public policy strategies and community councils can contribute significantly to achieving the noble goal of a liveable city.

The definition of liveability is not consensual, which makes it difficult to understand the concept and also to apply it contextually. A search on Google Scholar for the word liveability/livability reveals the use of the term over the years. For instance, in 1927, a text prepared for the Regional Planning Federation of The Philadelphia Tri-State District used the term to speak of urban planning and the problems arising from the growth of the city. "Will the manner of living compelled by such concentration be conducive to highest degree of liveability or fruitfulness of life?" [4, *50*]. The other references found in the use of the term refer to the internal space of housing, or even areas not related to architecture or urban planning, but from other sciences, mainly biology. Another relevant text, published in 1937, connects the term "liveability" with job opportunities, access to education as a way of preparing young people for better opportunities in the future, and the provision of low-cost housing, as well as emphasizes the government's responsibility to act to improve the community's living conditions [5].

The National Association of Regional Councils (NARC) conducted analyses in order to find a common definition for the term "liveability", which concluded that most definitions include transport, community, and quality, and also obtained a list of the most commonly used descriptors

**TABLE I**

**Most *Recurrent* Strategies to Achieve Liveability [6]**

| Strategies | Definitions |
|---|---|
| Smart growth | List of principles to be adopted: "Mix land use; take advantage of compact building design; create a range of housing opportunities and choices; create walkable neighbourhoods; foster distinctive, attractive communities with a strong sense of place; preserve open space, farmland, natural beauty and critical environmental areas; strengthen and direct development towards existing communities; provide a variety of transportation choices; make development decisions predictable, fair and cost effective; and encourage community and stakeholder collaboration in development decisions" [6, *11*]. |
| Complete streets | Multimodal transports, safe routes for pedestrians, "safe access for all users: pedestrians, bicyclists, motorists and transit riders of all ages and abilities" [6, *13*]. |
| Lifelong communities | Communities that are designed to support the inhabitants throughout their life cycle – population aging. |
| Safe routes to schools | It allows children and young people to go to school by bicycle or walk. |
| Context sensitive solutions/design | Reinforce the sense of community and the identity of the place, with a local and multidisciplinary approach in order to identify the main needs of the community. |
| New urbanism | "Creation of liveable streets through compact, walkable design, housing choices for all ages and income levels, destinations reachable by walking, bicycling or transit, and creating human scaled environments and public spaces" [6, *17*]. |
| Transit-oriented development | Develop easy access to transportation systems for high density communities. Facilitating access to jobs, connecting affordable housing with affordable public transport. |
| Placemaking | It deals with interventions from a local perspective, meeting the specific needs of the community where it operates and, therefore, being a unique and particular interpretation. Creating spaces for creativity for community use. |

used in academic research: urban planning; cities and towns; policy; housing; urban growth; transportation; social life; quality of life; community development; and sustainable development [6]. The Partners for Liveable Communities (PLC) founded in 1977, drew up a list of six principles for achieving liveability: "(1) Provide more transportation choices; (2) Promote equitable, affordable housing; (3) Enhance economic competitiveness; (4) Support existing communities; (5) Coordinate and leverage federal policies and investment; (6) Value communities and neighbourhoods" [6, *7*]. Among the main strategies identified to achieve liveability are the following ones: smart growth (SG), complete streets (CS), lifelong communities, safe routes to schools (SRTS), context sensitive solutions/design (CSS), new urbanism (NU),

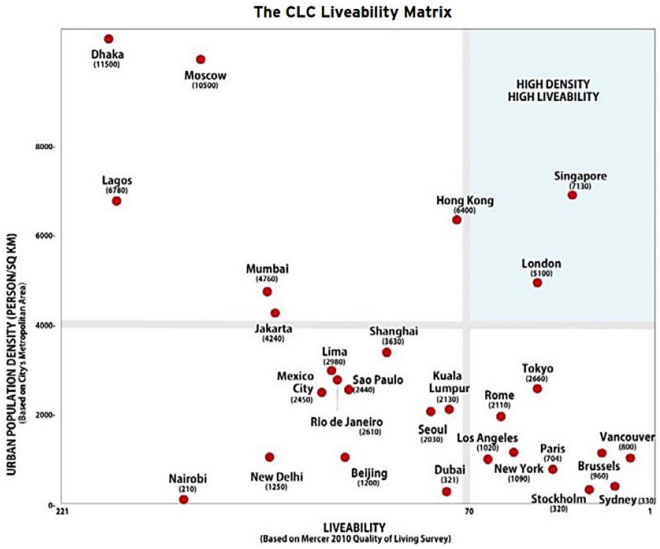



Fig. 2. Liveability matrix diagram [8].

transit-oriented development (TOD), and placemaking (Table I).

One of the main contributions of the literature review carried out by NARC was identifying that although the concept of liveability is not fully framed and defined, this makes its application more flexible and adaptable to the community context in which it will be inserted, "the flexibility of this relationship may help practitioners adapt these concepts to their unique circumstances" [6, *13*]. And even if there is no definitive agreement, liveability implementation strategies and mechanisms are similar, being fully adaptable to the communities where they are programmed to be implemented [6]. Another interesting text about liveability is the guide called 10 Principles for Liveable High-Density Cities: Lessons from Singapore, Prepared Jointly by the Urban Land Institute (ULI) and Centre for Liveable Cities (CLC) (Table II) [7].

For example, for Singapore, the principles for reaching a high-density habitable city have been positive (Fig. 2). As the fourth richest city-state in the world, the plan initiated in the late 1960s placed the city as a global financial centre in the late 1990s. Strong investments in housing, health, education, the almost complete absence of corruption, sound institutions and proper planning contribute to Singapore's current status.

In the liveability review carried out by NARC and the principles used in Singapore, we can observe several points in common that underscore the NARC conclusions of the most used strategies as well as the application and adaptations made locally to meet the specific needs of each community to improve the quality of life of its inhabitants.

**TABLE II**

**10 Principles for Liveable High-Density Cities. Source: ULI & CLC [6]**

| Principle | Policies | Strategy/Actions |
|---|---|---|
| Plan for long-term growth and renewal | Concept plan, master plan, and development guide plans to guide long-, medium- and short-term growth and development. | "Safeguard certain parcels of land for future developments; identify existing developments that can be upgraded or redeveloped; review the long-term land use plan regularly." |
| Embrace diversity, foster inclusiveness | "Ethnic Integration Policy by the Housing Development Board ensures a balanced ethnic mix in public housing estates; Conservation Plans of the Urban Redevelopment Authority have restored and preserved the built heritage." | "Develop policies to intervene and create opportunities for diverse groups to live close to each other in the dense city environment; introduce design elements and features, which enable private and public space to blend seamlessly with each other." |
| Draw nature closer to people | Landscaping for urban space and high rises encourages the provision of greenery; various plans help guide nature development and integration projects. | Identification of feasible vertical green space; develop policies and incentive schemes to encourage introduction of green space; create recreational space in parks and along water bodies; integrate water into the urban environment. |
| Develop affordable mixed-use neighbourhoods | "Housing Development Board's guidelines and planning standards ensure equitable and adequate distribution of amenities at the town, neighbourhood, and precinct levels; Central Provident Fund's Public Housing helps make homeownership more affordable and accessible." | Develop compact, affordable, and self-sufficient districts; develop "mixed-use living in existing neighbourhoods and supplement them with common amenities; connect neighbourhoods and amenities with pedestrian walkways and nearby public transport nodes." |
| Make public spaces work harder | Multiple uses of spaces with bonus gross floor area, temporary occupation licenses, skyrise greenery incentive; development sites replaced by green areas either at ground level or vertically. | "Encourage multiple use of land by equipping parcels with features; get addition and alteration (A&A) approvals for buildings so they open up to / connect underground; introduce flexible spaces in the city for people to host and enjoy." |
| Prioritize green transport and building options | Land Transport Master Plan provides strategies to encourage the use of public transport and green transport; 150 km of cycling routes; cash incentives for energy efficiency of buildings and retrofit. | Improve connectivity of the public transport systems; create energy-performance standards and incentives for green buildings; identify green districts for development. |
| Relieve density with variety and add green boundaries | Guidelines for new town/estate structural model guides the layout and pattern of development; green spaces and water bodies are guided to promote integration with all other urban developments in the city. | "Height variation in the planning of high-density cities; create pockets of low density to space out high density; introduce features which lend specific identity and character to individual neighbourhoods and estates; develop and position relief spaces to create places of relaxation and recreational use." |
| Activate spaces for greater safety | Use of the "precinct" as a basic unit of town planning to local scale; design features and guidelines ensure the safety in uses of public spaces and waterfront; community-level interventions help increase the safety of residential spaces. | Develop design guidelines to improve visual access; "identify spaces that become 'dead' during the weekends or at day or night, and redesign and redevelop them to accommodate multiple uses." |
| Promote innovative and nonconventional solutions | Funding and strategic direction for city's research and development (R&D) efforts. | "Invest time and money in developing or customizing urban systems to suit the needs and geography of the city and allow for greater density; put in place policies and incentives which allow for more land uses to coexist." |
| Forge 3P partnerships | Partnerships between the public and private sectors and with the community. | Actively seek to form 3P partnerships to obtain good ideas, manage tensions and build stakeholder support. |

## III. Cascais, Portugal

Located 30 km from Lisbon, on the Atlantic Coast, Cascais earned its status as a city in 1364. Originally, Cascais was an agricultural and fishing centre that provided products to Lisbon. In 1755, the earthquake that struck Lisbon also affected Cascais, destroying most of its buildings. From 1870, the Portuguese Royalty often visited Cascais to enjoy its beautiful surroundings and warm climate [9].

The historic centre of the Cascais village belongs to the Township of Cascais and Estoril (Fig. 3). With a population density of 1 761.64 inhabitants per sq. km in Cascais according to the 2011 census carried out by the *Instituto Nacional de Estatística* (Table III).

### A. Housing Policies in Portugal

Portugal has a long history of housing policies, despite having achieved the desired success [10], [11]. As part of the strategies to resolve this issue, in May 2018, the New Generation of Housing Policies (NGPH) was approved. Among the NGPH guidelines, one of the main success factors is the realization of Local Housing Strategies (ELH) [13]. The main objectives are to guarantee the access of all to adequate housing and to establish that the predominant interventions have as a rule the rehabilitation of buildings and urban areas. In the objectives of the NGPH, housing access is primary. Within the objective of the NGPH, two programs were superseded into a single initiative entitled

**TABLE III**

**Residents, Households, Housing, and Buildings [12]**

| Geographical region | Resident population | Household units | Family houses | Shared housing | Conventional buildings |
|---|---|---|---|---|---|
| | Total | Total | Total | Total | Total |
| Cascais | 35 409 | 10 567 | 22 734 | 36 | 8777 |
| Estoril | 26 399 | 7650 | 16 027 | 45 | 5597 |

**TABLE IV**

**Objectives and Progr ams of the New Gener ation of Housing Policies [13]**

| Objectives | | Program |
|---|---|---|
| Objective 1 | Responding to the needs of families living in situations of severe housing shortages | Law 1 – Housing Access Support Program<br>Porta de Entrada – Urgent Accommodation Support Program |
| Objective 2 | Guarantee access to housing for all who have no options through the market | Affordable Lease Program<br>Porta 65 Jovem – financial support system for leasing by young people<br>FNRE – National Building Rehabilitation Fund |
| Objective 3 | Create the conditions for rehabilitation to be the main form of intervention at the level of buildings and urban development | Rehabilitate to Rent Program<br>IFRRU 2020 – financial instrument for urban rehabilitation and revitalization<br>Efficient House 2020 |
| Objective 4 | Promote social and territorial inclusion and housing choice opportunities | Chave na Mão – housing mobility program for territorial cohesion<br>From Housing to Habitat – socio-territorial cohesion and integration program for publicly rented neighbourhoods<br>Porta ao Lado – information, routing, and proximity monitoring program for access to housing |

Support Program for Urgent Accommodation – *Porta de Entrada* – Gateway [13]. The first program was the Local Resettlement Program (PER) formed in 1993 to serve the metropolitan areas of Lisbon and Porto to provide accommodation for the inhabitants in an unhealthy situation, as well as promoting the eradication of tent accommodations. This was followed by the Financing Program for Access to Housing (PROHABITA) in 2004, which is a collaboration between municipalities and the Institute of Housing and Urban Rehabilitation (IHRU) to provide housing through the rehabilitation of buildings.

The NGPH acts through governance, with the involvement of several agents in order to promote an intervention through a proactive policy, based on knowledge and information sharing. With the main participation of IHRU and municipal councils, being, firstly, responsible for the management of funds and secondly, for "local governance" with the development of Local Housing Strategies (ELH). ELH provides the opportunity to obtain relevant information through the collection, analysis, and dissemination, allowing the integration of housing policies with urban and sector policies (Table IV) [13].

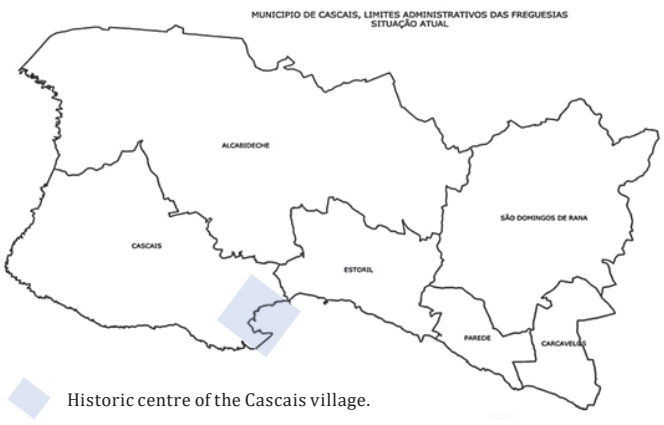



Fig. 3. Administrative borders in the Township of Cascais [12].

Still at the national level, we have the regulation of "Urban Rehabilitation Areas" (ARU) and the "Urban Rehabilitation Operation" (ORU). These instruments are fundamental to delimit the urban areas that need intervention and fit in with the NGPH objectives of promoting rehabilitation as the main form of intervention. Both instruments were instituted by the Urban Regeneration Legal Regime (RJRU), approved by Decree-Law 307/2009 and amended by Law 32/2012. RJRU defines ARUs as "the territorially delimited area that, due to the insufficiency, degradation or obsolescence of buildings, infrastructure, equipment for collective use and urban and green spaces for collective use, namely, with regard to their conditions of use, solidity, safety, aesthetics or wholesomeness, justify an integrated intervention, through an urban rehabilitation operation approved in its own instrument or in a detailed urban rehabilitation plan", and ORUs as "the set of interventions aimed, in an integrated manner, the urban rehabilitation of a certain area" [14].

### B. Housing Standards in Portugal

The General Building Regulations (RGEU) approved by Decree-Law No. 38 382 of 7 August 1951 work together with other specific instruments to regulate buildings in Portugal [15]. One of these instruments is Ordinance No. 304/2019, which in its article 1 "Defines the functional requirements of housing and building together, applicable to rehabilitation operations in buildings or fractions with a construction license issued until 1 January 1977, whenever these are intended to be wholly or predominantly allocated to housing use" [16, *1*]. The RGEU establishes minimum requirements for housing, and for this context the most important to illustrate are the minimum gross areas allowed. The typology of units is defined by T plus number of bedrooms: T0 is a studio, T1 is a one-bedroom unit (Table V) [15].

The time interval between the approval of the RGEU and the present day amounts to more than half a century, making several of the regulation's requirements obsolete. The various instruments developed over the years as a complement to the RGEU are often not sufficient to predict changes in family structures and in urban, economic and cultural developments. Current policies address many points related to urban rehabilitation in conjunction with the rehabilitation of buildings. The Cascais ARU states that "Urban renewal is one of the priorities of the municipality's policies" [17]. In order to achieve this rehabilitation of buildings within the urban pressure zone of urban areas, especially in historic areas, it is necessary to find solutions for housing with lower area standards than those mentioned in the RGEU. In this article, dwellings equal to or above type T1 with areas below 40 m$^2$ will be considered as micro-houses.

**TABLE V**

**Minimum Gross Area Unit Established by RGEU, Portugal [15]**

| **Unit Type** | | | | |
|---|---|---|---|---|
| Gross area, square meters (m$^2$) | T0 | T1 | T2 | T3 |
| | 35.0 | 52.0 | 72.0 | 91.0 |

### C. Panoramic View of Housing Situation in Cascais

The average size of families in the parish of Cascais is 2.4 persons. Population growth in 2011 was 255.1 % against 15.8 % in Portugal (Fig. 4). Regarding the occupation of housing units, it is important to note that the number of elderly people living alone has increased significantly (Fig. 5). Cascais is the territorial unit where single-person families have increased the most, including families composed (only) of one elderly person, presenting a rate of growth between 2001 and 2011 of 65 % [18, *75*]. Another highlight is the high cost of rent. "In 2017, of the set of comparable municipalities, Cascais

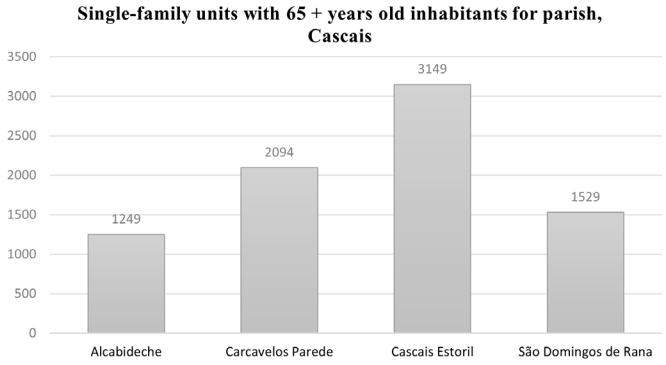



Fig. 4. Evolution of population in the Cascais parish [18, *12*].

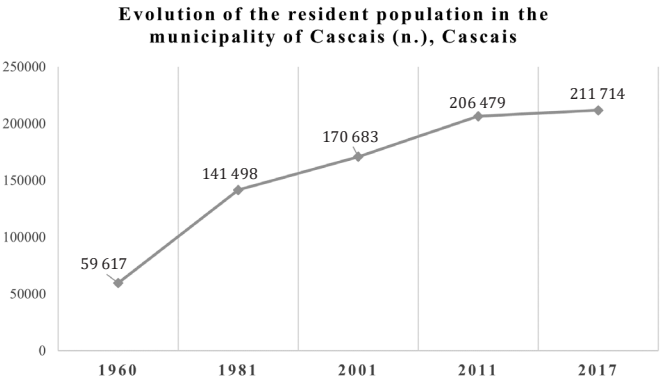



Fig. 5. Single-family units with 65+ years old inhabitants in parish, Cascais [18].

stood out with the highest median value of rents per m$^2$ of new family housing lease contracts (8.1 EUR): about double the value in the country (4.4 EUR) and 2 EUR more than in AML" [18, *183*].

### D. Policies and Urban Strategies in Cascais

The municipality of Cascais is part of ARU 9 and its strategy is to consolidate the existing urban network and the priority is the rehabilitation of building areas. Urban rehabilitation aims to promote the living conditions of the population of Cascais, spatial planning and the environment, as well as the economic and social dynamism of the municipality of Cascais. The master development plan (PDM) of the municipality of Cascais establishes as a strategic vector the containment of urban perimeters as a model of sustainable city, promoting urban quality with the regeneration of vacant industrial areas and the revitalization of historic centres [19]. Among the criteria for the promotion of ARUs are public areas that must be inclusive and accessible to all, as well as the priority of walking routes and resting places. Other objectives established by the ARUs include qualifying and integrating vulnerable urban areas, promoting social inclusion and

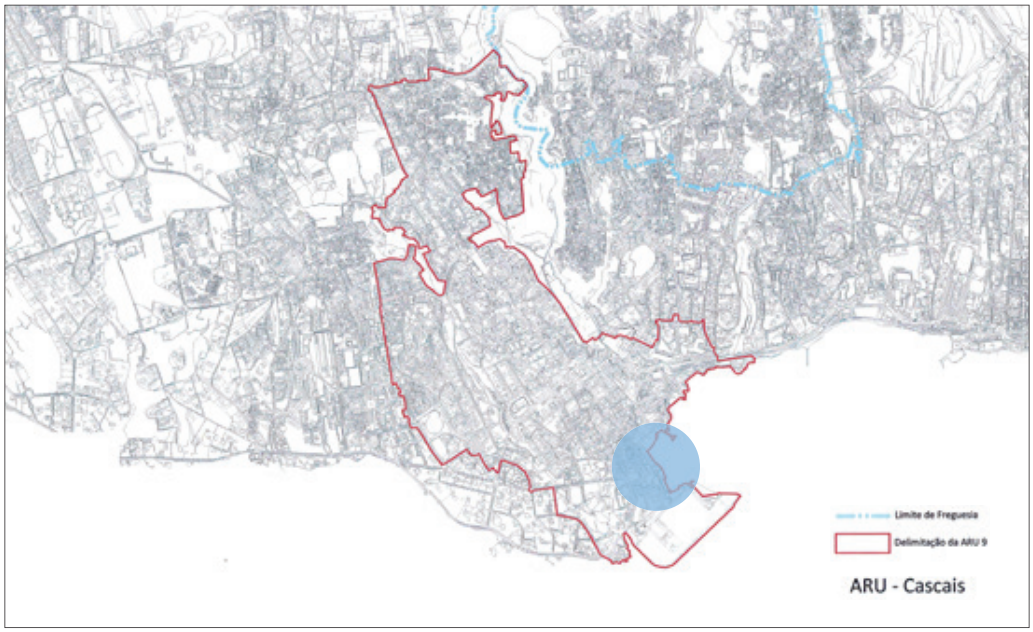



Fig. 6. Location of case studies in ARU 9 boundaries [Figure: Authors of the Article using [21]].

territorial cohesion, encouraging alternatives for an energy solution, enhancing the natural and cultural heritage as a reinforcement of local identity, promoting the age and social diversity of the population living in urban centres (Fig. 6) [17].

*"A Rede Social* is a local governance structure that integrates organizations from the social and health sectors with the aim of ensuring the integrated and systematic planning of the social development of the municipality of Cascais" [20, *4*]. In the context of social housing, it promotes initiatives to promote access to information about housing programs to its inhabitants, as well as foresees in its planning the creation of programs that facilitate access to housing in addition to the creation of transitional housing solutions to serve homeless shelters, places of refuge to victims of domestic violence and alternative housing for the elderly. The *Plano de Iniciativas de Desenvolvimento Social (PDS)* developed by *Rede Social* for the decades of 2020 and 2030 contain 212 social development initiatives with a first-year budget of 6 million Euros. The workflow of the social development plan is divided in two main subjects. One of the established strategies for the social program fulfils the requirements to achieve liveability. The objectives of the social development are as follows.

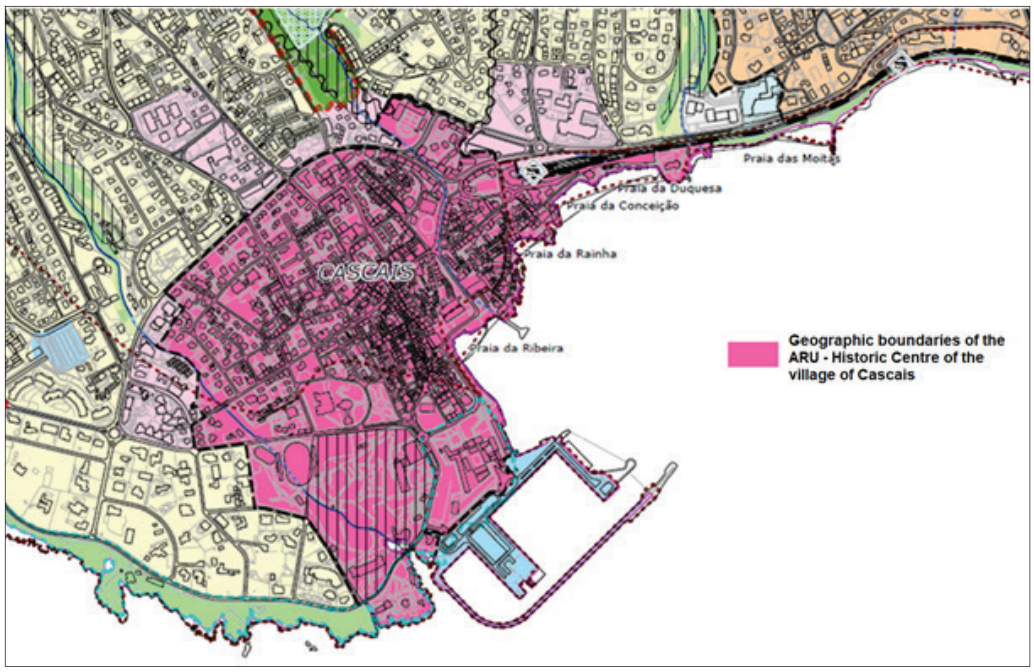



Fig. 7. ARU zoning within the historic centre of the Cascais village [25].

- Objective 1. Understand the local demographics, including the ageing population and longevity, and birth rate (16 targets).
- Objective 2. Promote the social protection inclusion of socially vulnerable groups (15 targets).
- Objective 3. Ensure the rights and promote equality/ diversity of opportunities of different groups (18 targets).
- Objective 4. Strengthen socio-territorial cohesion (14 targets).

Planning targets related to economic growth of the population, access to the transport network, conditions that contribute to equality, promotion of culture and leisure are part of the scope of Objective 3. The scope of Objectives 1 and 4 comprise initiatives to improve the population's access to health and wellness activities as well as initiatives in the socio-economic context in minority groups to promote economic autonomy.

The City Hall of Cascais indicated territorial boundaries segregated for *Áreas de Reabilitação Urbana (ARU)* according with the policy set by Decree-Law 307/2009 and amended by Law 32/2012 that stipulates the legal framework for urban rehabilitation (Fig. 7). "The creation of ARUs within the historic centre of the Cascais village is developed from a strategy of the creation of public spaces that are more humanist and accessible to all" [14]. The ARU determines the milestones such as use of public space, healthy growth, active ageing, inclusion of citizens with disabilities, priority to pedestrians, green spaces, maintenance of building facades and cultural characteristics, cosmopolitanism and urban art, harmonization of the use of public space. In summary, the strategies to be implemented within the historic centre of the village of Cascais are as follows.

- Cascais, territory with urban liveability.
- Cascais, territory that is inclusive and cohesive.
- Cascais, territory with active social democracy.

## E. Case Studies

Positive community-life is a requirement to support the prevalence of micro-homes. Accessibility to public spaces and public services, both by foot or bicycle by inhabitants of micro-homes results in a higher quality of life [22]. The projects used as references in this report are housing rehabilitation units in the historic centre of the Cascais village. The report focuses on the local government policies and initiatives to promote the quality of life for the inhabitants of the Cascais village. The choice of case studies was to illustrate the diversity of area patterns existing in the historic area of the village of Cascais, even though some of the projects are not characterized as micro-dwellings (Figs. 8–12).

Fig. 8. Square of Cascais historical centre [Photo: Alexandre Rotenberg].

Fig. 9. Typical narrow cobblestones street in the Cascais historical centre [Photo: Alexandre Rotenberg].

Fig. 10. Typical commercial street of Cascais historical centre [Photo: Alexandre Rotenberg].

Fig. 11. Cascais historical centre [Photo: Alexandre Rotenberg].


Fig. 12. Case studies location in a typical street of Cascais historical centre [Figure: Authors of the Article using [24]].

**CASE STUDY A: Buildings at *Rua dos Navegantes*, *n. 3–5* (Fig. 13).**

The property is covered by the urban rehabilitation and regeneration policy of the region and resumes the primary housing function of the building, forming three distinct dwellings within the property. The building's total area is 83.07 m$^2$.

The approach used in rehabilitation of the building permitted the creation of three independent homes. Home 1 is on the ground-floor with direct access from the street. Home 2 comprises two floors: ground floor and the first floor. Home 3 is also a two-storey home, which includes the first floor and attic (Fig. 14). The building is in compliance with the guidelines for preserving the architectural and cultural heritage of Cascais.

The areas of Home 1 and Home 2 are less than 40 m$^2$ and may be considered micro-homes for the purposes of this report.

**TABLE VI**

**Net Internal Area [Authors of the Article]**

| Home 1 | Home 2 | Home 3 |
|---|---|---|
| 36.31 m$^2$ | 35.20 m$^2$ | 82.43 m$^2$ |


Fig. 13. *Rua dos Navegantes*, *3–5*, Cascais [Photo: Alexandre Rotenberg].


Fig. 14. Layout Plans of the building in *Rua dos Navegantes*, *3–5*, a) ground floor layout, b) first floor layout, c) attic layout, d) roof. Source: RRA Project.

**CASE STUDY B: *Rua dos Navegantes, n. 48–50*, Cascais (Fig. 15).**

This building rehabilitation project made it possible to create two independent housing units with areas larger than that considered for micro-homes (Table VII). Home 1 has two floors on the ground and the first floors. Home 2 occupies the 2nd and 3rd floors, which fits into the local legislation as an attic (Figs. 16, 17).

Situated in the heart of the historic centre of the village of Cascais, the building has access to various public services, public transport connections and is close to leisure zones for the enjoyment of its inhabitants.

**TABLE VII**

**Net Internal Area [Authors of the Article]**

| Home 1 | Home 2 |
|---|---|
| 54.21 m² | 48.87 m² |

Fig. 15. *Rua dos Navegantes, 48–50*, Cascais [Photo: Alexandre Rotenberg].

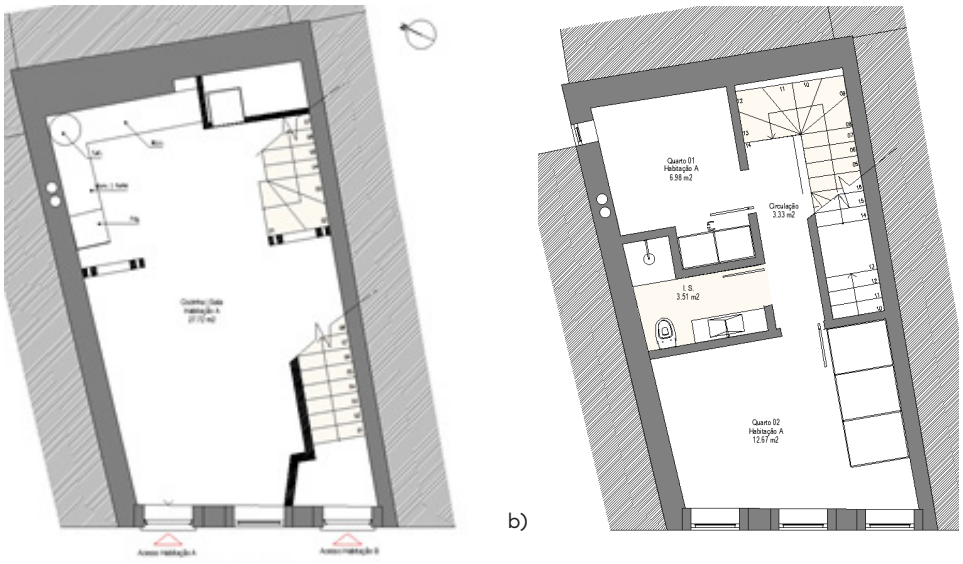



Fig. 16. *Rua dos Navegantes, 48–50*, Cascais, a) ground floor home 1, b) first floor Home 1. Source: RRA Project.

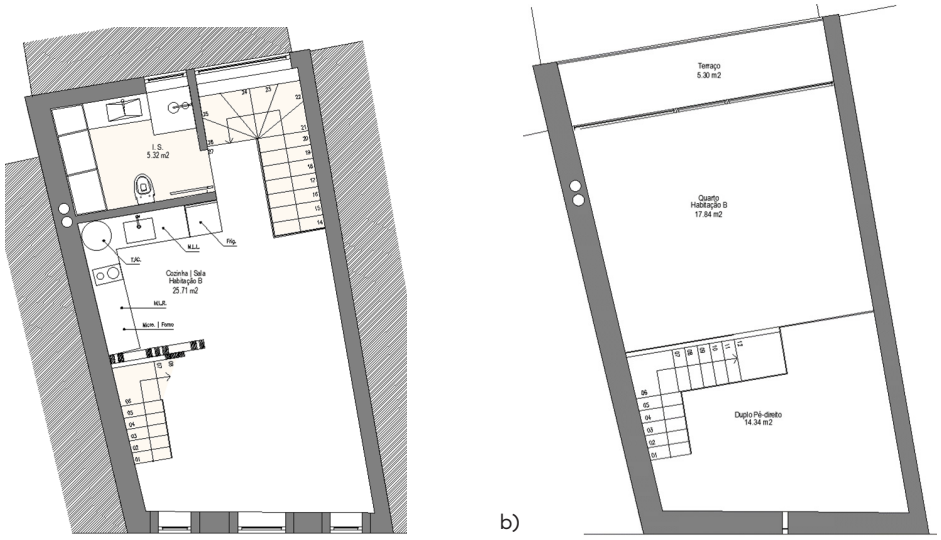



Fig. 17. *Rua dos Navegantes, 48–50*, Cascais, a) ground floor home 2, b) first floor Home 2. Source: RRA Project.

**CASE STUDY C: *Rua Santa Vitoria*, *n. 4*, *4A* and *4B* (Fig. 18).**

The rehabilitation of the building located at *Rua Santa Vitoria, 4–4A* and *4B* permitted the creation of two distinct homes (Figs. 19, 20). The single-storey home with an area of less than 40 m$^2$ fits within the concept established for this report as a micro-home (Table VIII). The second dwelling occupies the 1st and 2nd floors of the building.

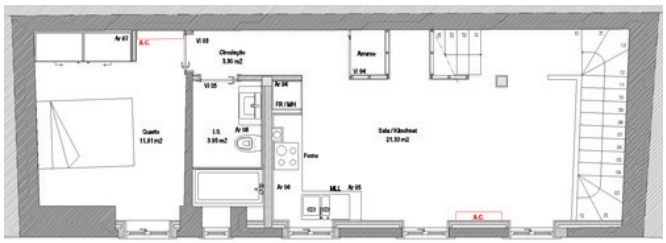
**TABLE VIII**

**Net Internal Area [Authors of the Article]**

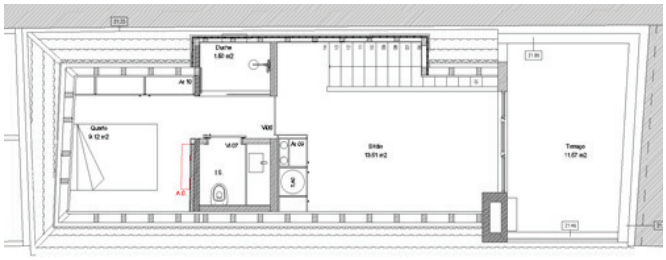
| Home 1 | Home 2 |
|---|---|
| 36.55 m$^2$ | 64.62 m$^2$ |

Fig. 18. *Rua Santa Vitoria*, *4–4ª* and *4B*, Cascais [Photo: Alexandre Rotenberg].

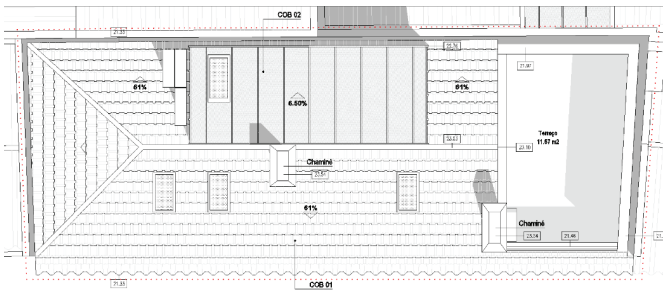
Fig. 19. Ground floor – Home 1. Source: RRA Project.



a)



b)



c)

Fig. 20. Home – 2. a) first floor, b) second floor, c) roof. Source: RRA Project.

## IV. Liveable Cascais

The objects of case studies are located in the urban rehabilitation areas, which are defined by the Cascais regulations as areas with historically valuable buildings and urban context, that meet the criteria of historic interest and, in addition, are part of the "Urban Pressure Zone". Cascais is one of the Portuguese cities that has the highest population growth. In an assessment carried out in 2018, 507 degraded buildings were identified in the parish of Cascais, in a total of 1,146 buildings in the municipality of Cascais [23]. A housing shortage of 550 households was identified only for Cascais/Estoril, with a total of 1862 households requesting housing from the municipality [23]. The growth of the village of Cascais highlights its natural attractiveness as a place where people want to live,

**TABLE IX**

**Liveability Strategies Identified in Cascais Urban and Housing Policies [Authors of the Article]**

| | Strategies | Cascais |
|---|---|---|
| 10 Principles – Singapore | Plan for long-term growth and renewal | Mid- to long-term growth plan |
| | Embrace diversity, foster inclusiveness | Initiatives for inclusion of the whole population, with focus on minorities |
| | Draw nature closer to people | Preservation and demarcation of natural reserves of green areas |
| | Develop affordable mixed-use neighbourhoods | Creation of inclusive streets, with commerce, leisure, and housing |
| | Make public spaces work harder | – |
| | Prioritize green transport and building options | Free recharging points for electric vehicles |
| | Relieve density with variety and add green boundaries | – |
| | Activate spaces for greater safety | Streets with mixed uses and very calm village |
| | Promote innovative and nonconventional solutions | – |
| | Forge 3P partnerships | Partnerships between the community, public and private sectors gain evidence with PDS initiatives |
| Most recurrent Strategies – NARC | Smart growth | "Rehabilitate as a rule" – rehabilitate a diversity of approaches for different housing needs, from young people and the elderly to people in need of housing. |
| | Complete streets | Multi-modal transportation options, shared streets with pedestrians, cars, and bicycles |
| | Lifelong communities | Focus on accessibility, promotion of inclusive areas, promotion of age diversity |
| | Safe routes to schools | Priority of footpaths |
| | Context of sensitive solutions/design | Preservation of local culture, with recovery of important areas and their use by the community |
| | New urbanism | Territorial cohesion, rehabilitate as a rule, valuing natural heritage |
| | Transit-oriented development | Age and social diversity in the centres, containment of urban perimeters, and integrated public means of transport. |
| | Placemaking | Strengthening cultural identity, appreciation of cultural heritage |

invest and visit, where people have a strong sense of local identity, are employed in fishing, agriculture and enjoy proximity to the sea (Table IX).

Due to its natural liveability qualities Cascais has been a place of leisure for both vacationers and pensioners, despite no specific liveability policies before, unlike the case of Singapore, where authorities undertook liveability planning during decades to achieve a more liveable city for its inhabitants. The natural liveability qualities include close proximity to the sea, a variety of leisure options, culture, strong roots in fishing heritage and traditional resort for the upper classes. In addition, political stability is an important factor to ensure that high standards of living are maintained. These qualities have attracted tourists, both local and foreign, which contribute to the local economy.

## Conclusions

Despite Cascais quoting liveability indirectly in its regulations and initiatives promoted by the government and local actions, the existence of the Social Development Plan and others like NGPH covers most of the factors that lead to an increase in the quality-of-life indexes of the population. Most of the analysed documentation regarding Cascais-directed policies includes items of liveability reviewed by NARC or the Singapore Guide. Among these items we can identify various local housing strategies, which include: insuring connection between individual building and urban environment rehabilitation, actions which promote the natural heritage of the village, and other local initiatives. All these initiatives are introduced at the level of the City Council, ARU, NGPH, ELH and are part of the "Rede Social" program. The "Rede Social" can contribute to the increase in liveability in Cascais, allowing residents of micro-homes located in the historical centres to have access to a cohesive and organized city. The geographic location of the historic centre of the village of Cascais contributes to a high level of quality of life to its inhabitants as a result to its proximity to the ocean and the mild climate all year round, which make it possible to enjoy the outdoors most of the year. The City Hall incentivizes programs for its citizens to practice outdoor sports and other physical activities as part of the services available. Other factors with greater economic impact require joint initiatives with the Portuguese government to impact more places beyond the historic centre of the village. In summary, when comparing the local policies related to liveability of Cascais and Singapore, an important consideration is that in the case of Cascais, there are many restrictions on the local land use and building regulations due to its cultural heritage. This is in stark contrast with Singapore that has greater flexibility in legislation, which is regularly reviewed. Therefore, there has to be a balance between preserving the heritage of historic centres and ensuring enough flexibility to contribute to increased liveability for inhabitants.

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# Cultural Urban Catalysts as Meaning of the City

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**Keywords**

Catalytic processes, creativity, cultural node, identity, perception, place-making, senses.

**Abstract**

City is a network with clear organization and architecture. It also has permanent connections. Human senses, perception and cognition are the base points while understanding these connections. Hypothesis of this article proposes that concentration of creativity potential in strategically placed junctions (cultural nodes) would catalyse people flow between them naturally. Three main features of the cultural node are distinguished, and possible identification methodology is being proposed. This strategy leads to more extensive methodology research and appliance analysing city structure.

## Introduction

People see cities as always moving and transforming organisms which seem to be vivid and alive. Street life is one of the best ways to recognize if city seems vibrant and living or rather dull and stiff. This mostly visibly dissociates the city centre from suburbs or the main street from secondary. Night life, street culture and underground city are the three features of a city formulated by Lewis Mumford, where space and place are only different because of people actions, while they transform physical spaces into places with function and identity [1], [2]. Movement, caused by people in all these city levels and spaces, is what makes the difference. Urban theoretic, philosopher and photographer Walter Benjamin in one of his many thoughts about urban fabric imagined city life through a photo-camera lens. As a photographer he noticed one thing in street photography: once you take a picture of a busy street with long shutter speed, only those steady objects remain visible in it. But what if there would be a possibility to take a picture where its outcome would be inverted – steady objects would disappear, while moving objects would remain visible? This, in Benjamin's words, would be showing the real city [3].

City is a conjunction of physical structure and happening, which could also be called vitality or, in Benjamin's words, movement. If it is the necessity, which has to be fulfilled to create a city, there should be a way to grope and analyze what evokes this motion and how strongly it depends on people. People have influence on cities as they create them, destroy them and live in them making micro and macro changes to the environment not only as planners but also as everyday users. Cities are the result of people's creation process and later on are perceived by people. This process may be called the closed creation – perception cycle as people once create cities, then understand them and finally continue this creation process according to their perception, which is also affected by many external and internal factors, such as senses, human psychology and identity which has formed through a long time (Fig. 1).

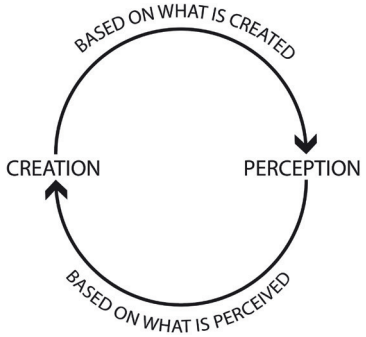


Fig. 1. Creation – perception cycle [Figure: V. Balvočienė].

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Linguistically meaning is the thoughts or ideas that are intended to be expressed by something. Identity is defined as feeling of belonging to a particular group. It is part of a person's self-conception and self-perception and is based on nationality, ethnicity, religion, social class, generation, locality, which is closely related to people's dwelling-places as well as cities they live in. Creating city structure and its particular identity in this case is called creating the **meaning of a city**.

Urban theoretician L. Mumford described the city as "a special framework directed toward the creation of differentiated opportunities for a common life and significant drama" [4]. As city grows and becomes more complex, it more and more differs from something called "bare life". In Benjamin's words – it is a completely sheer life. Real as it can be. It is not only standing structures and functions making people live, people make city more than that, they actually make cities alive, also transforming them into a collective space of dreams and ideologies – space of our identity. In a city people are given the opportunity to be creative, which is the last and highest need in the pyramid of needs, according to well-known theory of psychologist A. Maslow [5, *370–396*]. This highest need is fulfilled, cultural life or previously mentioned movement is brought to the cities through people being creative. In this case ***cultural life*** is seen through the prism of creativity. If there is a possibility to be creative, it brings cultural life to the city. Thus, ***creativity*** is strongly connected to ***cultural life*** as well as ***cultural nodes*** which represent the concentration of cultural life.

In order to understand how meaningful places in the city are created, the term cultural node is being introduced in this text. This term represents a place of concentrated potential for creativity, different functions, meaning and attraction, which also has a possibility to generate flow of people's moving to it. In this case cultural node would create the attraction field around it. Two nodes could create "magnetic" movement between each other, while the whole network of cultural nodes would stimulate even bigger movement in the city. It is the connection between cultural life, creativity and meaning, and the task is – to make people move. This concept would supplement the idea of city as a network and would later help to connect this idea with graph and network urbanism theories and image for later research possibilities.

The main question of this article is based on Walter Benjamin's idea about movement in the city and tries to clarify if creativity is able to stimulate movement. Therefore, the aim of this article is to demonstrate how cultural nodes might stimulate movement in the city and how it is connected to the creation – perception cycle. This research has the following objectives describe what kind of influence human senses have on architecture;

- to analyse how city and architecture is affected by people's perception;
- to analyse what makes places meaningful in the city;
- to describe the creation – perception cycle, and to analyse how it is connected to movement;
- to describe what is cultural node and how strategically settled network of them might catalyse movement in the city;
- to suggest methodology for identifying the existing cultural nodes and develop new ones.

Common expressions in this text are as follows:

**Meaning** is a particular identity of exact city or place based on structural and perceptual relations.

**Identity** is defined as feeling of belonging to a particular group closely connected to the dwelling-place.

**Creativity** is a process of developing new objects in the city, such as buildings, places or events, as well as perceiving, understanding and interpreting them. Creativity, as a manner of bonding with surroundings, in this case is not only possible as a material outcome but also as state of mind and way of thinking, interpreting and receiving information.

**Perception** is the way people understand and interpret their surroundings based on their senses, temperament and identity. Perception might be very different for every human being.

**Movement** is people's flow in the city caused by different attractions.

**Cultural node** is a public space and place of concentrated functions; it is meaningful and attracts people.

The used research methodology is literature review based on deduction principles and statistics analysis using multi-dimensional scaling analysis method.

## I. Subject – Human. Senses and Meaning

### A. Senses and Architecture

Before discussing the meaning of the city and creativity, it is important to understand how people perceive cities and architecture. Our mind is the only tool of perceiving surroundings. That is why it is important to understand how it works and what kind of impact it has when analysing city structure and its culture. City's culture is represented by many manners of expression. One of them is art and also architecture, since it sometimes is called art too. Architecture shapes our surroundings making difference to the city's identity [6]–[9]. There are limited number of ways to understand our surroundings. First, we receive information and only then can transform it in our minds (relation of emitter and interpreter) [10]. That is why it is important to introduce human perception in the context of senses, since it is our tool to receive a lot of external information. There are 5 basic human senses: touch, sight, hearing, smell and taste. The next section is dedicated to them.

Many studies, related to architecture or city structure, are concentrated on analysing urbanism through the spectrum of its visual properties and visibility [8], [11]–[15]. Architecture, as well as urban structures, is most of the time primarily seen and only then experienced in other ways. When we first approach a new place, we see the proportions, size, colours, material, shadows, and light falling on the buildings creating the very first impression. Vision is the first sense we use while experiencing architecture. This is how it is possible to understand the building or place as a whole object. Furthermore, it is noticed and described by urbanist Jan Gehl that visibility qualities are not only important while perceiving the image of a building or some other structure, but some properties of human vision are also used almost unconsciously in city planning too. For example, most of the Medieval European squares are designed by the principle of visibility – are no wider than 80 meters, the distance when it is still possible to see someone's face. Many theatres have stages no further than 35 meters from the audience because in this distance it is still possible to distinguish an emotion. Vision is also very closely connected to what we perceive boring and is basically reliant on how fast we move in the street. If there is enough visual information around, people get more interested and tend to move slower, if the street profile is blank, people try to move faster. This works the other way too: the amount of information can be reduced or increased based on how fast people are moving in a particular part of the city [2]. In this case, visibility can not only be described as something we see and then understand but also how other things depend on how our vision is constructed, speed of movement and urban distances are dependent on our vision.

Looking through visibility aspect, city planning and architecture are based on rhythm, symmetry, contrast and other compositional principles. Sight can be called the main approach to architecture. However, such initiatives as "Invisible architecture" suggest looking at architecture from the other angle. Not only visual properties make architecture recognizable and meaningful. Architect and architecture theorist J. Pallasmaa in his book "Eyes of the Skin" mentions that people once experienced a transition "from oral to written culture" and it was a huge shift in people's consciousness and perception at the time. Just before learning how to read, hearing was the main method of receiving information. "However, this does not mean that other senses must be rejected while experiencing architecture," Pallasmaa says [17]. Thus, a person can only become involved into architecture when vision is not the only tool used to understand it.

Certain buildings as theatres, opera houses, temples, and auditoriums are designed to fulfil acoustic needs, and the term soundscape represents how people understand cities in terms of sound [18], [19]. Composition of space, the scale, the materials used, and function of the place impacts the way how sounds are spread in particular places, and it affects how we understand the soundscape and perceive the place we are at. In the project "Soundscape Architecture" by University of Virginia, architecture professor Karen Van Lengen analyses 13 well known buildings, such as libraries, museums, pavilions, even iconic buildings like Reichstag and Taj Mahal, to see how they work acoustically and what the core or best building describing sounds are. The author's recorded sounds in all these buildings and created 60 seconds clips for each of them that in his opinion best described the background aura of the exact building. These background sounds were used to create a 3D representation – animated interpretation of each place. The author claims, that yet it is difficult to measure the properties of aura at the place, this is a significant part of design and perception process and it must be used as a method of analysis and design [20]. Thus, not only buildings are shaped to fulfil acoustic needs, but acoustics and sound are connected to our perception and identity of the exact place or building and can make it recognizable.

People are surrounded by natural and human-made smells every day and perceive only some of them consciously. Since the vision is very closely connected to our thoughts, smell affects the emotions. It is quite easy to explain how something looks like but difficult to explain how something smells, as there are no such obvious language-like expressions. Psychologist R. Arnheim wrote: "One can indulge in smells and tastes, but one can hardly think in them". Smells are perceived the best when they are in the expected environment and go together with other stimuli, such as vision [2], [21]. Smell is strongly connected to taste, since it is almost impossible to understand one without experiencing another. In his book Juhani Pallasmaa describes how he needed to touch a door of white marble with his tongue while visiting DL James residence in California. "The sensuous materials and skilfully crafted details <...> as well as the sensuous colours <...> evoke oral experiences", he says [17]. Thus, visual information of architecture was needed to evoke this kind of sensation of taste and stimulate the move. Therefore, smell and taste are more like supplementary senses in architecture, since they only affect our perception together with other senses or are induced by them.

Hands are the eyes of those who cannot see, as by touching the object it is possible to distinguish its shape, proportion, material it is made of and understand it as a whole. Touch is being more and more involved into the surroundings by all the touch devices, such as cell phones, computers and other interactive inventions. 3D printers are being used to make tactile models for those, who cannot see. These inventions also supplement architecture, making it easier not only to communicate, but also to understand surroundings. Our hands and our skin read the texture of everything it touches, measures the temperature and movement of air around us. It sort of involves us into the

surroundings [17]. Thus, tactile sensation, just like smell and taste, might be invitation evoked by other senses, such as vision, when something beautiful is tempting to touch it, or in deeper level might create the feeling of cozy or unpleasant place by involving into the place by our whole body. Touch as the secondary, by other senses provoked sensation, or touch as aura creating and involving feeling affects the perception of a place.

Vision rules make surroundings recognizable and readable, visually attractive or not. Shops and restaurants use smells, taste, or music to attract people; new technologies bring touch to museums by making possible to be involved through screens and other tactile interactions; these are examples of senses being used in architecture. The whole human body can become a tool to perceive surroundings. It is noticed that some places tend to press us down, the others make feel vulnerable or uplifted. It is all connected to the scale of human body. As Vitruvian man represents perfect human body proportions, centuries later Le Corbusier's Modulor is created to represent how human body proportions influence the creation of surroundings. Human proportion in this case not only connected inch and metric measure systems but represented the idea of ergonomics [23]. Ergonomics and scale is a foundation of creating habitable environment. Scale, as one of the main compositional properties, shapes architecture as well as our perception. Therefore, instead of tuning 5 senses, architecture lets us to experience the surroundings by the synergy of them. Architecture has power to make our perception polyphonic, connecting and layering our senses, connecting it through 5 basic senses and completing it by using our body as a scale measure [17]. Just like a *flâneur* in Walter Benjamin's writings, he walks from one place to another and makes the whole city his interior through interaction [24].

### B. Perceiving Surroundings

Architecture is able to provoke or provide response [25]. This response can be described by people's behaviour in the city. Space and place concepts are based on differences which people make to spaces to make them into places. Space is what can be determined by physical spatial and compositional objects, such as ground, buildings, and nature. It defines *x*, *y*, *z* space, where changes can be made. Places are more than spaces and are changed by people [26]. They have power to evoke emotions: calm one down, make peaceful or irritated, even bore or bring such feelings as anxiety. It is noticed that shape, distances, openness, or closeness make people perceive places differently, move slower or faster, stay or leave [2], [27]–[29]. There is connection between urban life and Freud's theory of consciousness and unconsciousness, when it is not actually known why one or other place brings exactly these memories or feelings [30]. Yet human perception is paradoxical because of our individual differences. Identity and perception differ based on different societies. That is why different schemes are being used to describe human behaviour. All agent-based theories are checked by generalizing and proving that it works statistically. People tend to simplify situation in their head, by that it is easier to understand the whole picture [31]. That is why it is crucial not to oversimplify the picture while analysing human behaviour. Therefore, any method is only the scheme responding to discussed perception points to city and human.

People tend to perceive things happening around them symbolically and in terms of causality. They use symbols determined through a long time to speak their minds and understand what others are willing to say. Language and text is an example of arbitrary meaning. Readability or legibility of a city is an idea of K. Lynch, and it determines how our minds tend to remember its surroundings to find a way in environment. Lynch examined people and asked them to draw a map of their well-known place and in that way explain how to get from one point to another. He called it mental mapping and as a result determined five basic symbolic objects used by respondents: paths, edges, districts, nodes and landmarks. These five elements make our image of the city and makes it possible to determine the way and explain it to others [32]. This could be called language of the city or legibility, in this case architecture can be easily regarded as system of signs [10].

## II. Object – City. Creating City

### A. Genius Loci and Memory of the City

Every cognition requires object as well as subject. As it was discussed about the subject – the person, next question is about the object we perceive – city and what makes it THE city. "Architecture has its own realm. It has a special physical relationship with life". Our world is full of symbolic information and most of it has many different meanings and purposes [16]. Architecture is one of these symbols and cultural expressions. "It is meaningless to imagine anything happening without reference to locality". Therefore, people not only imagine things referring to locality, but locality can be analysed to understand how people make places their habitats, what kind of tools are being used to make it meaningful. Kojin Karatani mentions *"THIS"-ness* of the city as a premise that a particular place or city might even become a metaphor. *"THIS"-ness* could be the core of the city, making it easier to distinguish a particular place from another, it could also be called the city identity [33].

Identity can be characterized by the term *genius loci.* It is a Roman concept and a common phrase in writings about architecture and city. It mainly means that every

place has its particular atmosphere which has an impact on our perception and feelings while being there or trying to distinguish that place from others. It expresses how people occupy the ***space*** and transform it into a ***place*** with identity. Word "place" is significant in this context, as it stresses how people make difference in the existing situation which is given to them. People, their behaviour and what is left from other generations is the memory of the city. Memory of the city is layered and in most cases those layers are hard to distinguish as clearly as in the case of ancient Pompeii, where everything got covered under hardened lava and remained as it was almost 2000 years ago until these days. In ordinary case all these layers are given to modern-day inhabitants and make them feel miscellaneous spirit of the city. Previously existing layers frame laws by which all new layers must be covered. What architecture should do in the city is to embrace the old structures by adding new [16].

B. Tools of Meaning in City Creation Process

People as city creators and users have all the possibilities to create something that later shows to other generations how they lived. In this paper it is called meaning of the city, since it gets the observer closer to understanding not only the city structure but also its *"THIS"-ness* or identity. Cityscape is a system of signs very similar to a text which people read to understand the identity of the city. Semiotics states that all our environment is readable one way or another. Based on this all our surroundings are the system of signs perceived by people. According to psychologists M. Wertheimer, Wolfgang Köhler and Kurt Koffka, there are some universal signs which make our perception into particular code system [34]. There are many different tools to create meaning in the city. But the objective of this article is to describe how architecture becomes a semiotic metaphor through which it is possible to better understand the city. Psychologists have noticed that people always tend to assign meaning to what they see. Belgian psychologist Albert Michotte demonstrated this through a simple experiment: he showed a film where a red dot was moving towards a green dot. When the red dot touched the green one, the green dot moved away. People were asked to explain what they saw. It was realized that the participants were unable to describe what they saw without explaining that a red dot somehow caused the movement of a green dot [27]. Based on our nature it seems that we cannot do anything but make architecture into a metaphor while creating it, even more, observed architecture also tends to be always meaningful for the one observing it.

One of the first tools in cities is not even created by people and it is natural environment. Karatani mentions that nature itself creates such places where people choose to settle. People choose particular places over others to settle based on their needs: safety, distance from particular places, etc. Other projections of differences are religion, historical events, etc. Complexity of these memories of the exact place shapes perception and identity. Expressive and emotional nations living in the South obviously differ from the ones living in the North. The purpose of architecture is helping people to dwell under the conditions which are given to them by nature [33].

It is recognized that nature conditions, as well as other before given cultural differences, affect people's lifestyle and behaviour. But our living environment is weaved out of natural and human-made objects. Human-made parts of environment are important not only in the way they might affect us but also because it might be used to send a special meaning about people living there. This phenomenon can be noticed in cities, even in the structure of ancient ones. One of the tools to create meaning is to use symbols in architecture, such as light, path, centre, boundaries [27]. Juan Pablo Bonta in his book "Architecture and its Interpretation" distinguishes two different kinds of signs which could make architecture meaningful: ***signals*** and ***indicators***. The latter are directly perceivable signs and reasons to learn information about directly not perceived events. *Signals,* on the other hand, are fulfilling two conditions: they are *intentionally shown* to the observer, and the observer *perceives them as intentional.* Thus "every signal is an indicator, but not every indicator is a signal". Trying to see meaning in their surroundings people most of the time come to pseudo-signals – they believe that the meaning they see is intentional, but it is not. And conversely – the intentional meaning is sometimes skipped by the same observer as not important or not intentional (intentional indexes). This most of the time becomes our method to interpret the architecture and other pieces of art made in the past as well as the city and its structure [10]. This makes our surroundings symbolically perceivable as a language of signs. City as a combination of signs is also made from signals and indicators, and it does not matter if they were intentional or not, it still forms the image of the city.

Symbolic approach to city planning is visible through the whole history. In West Africa and in Mali, traditional homes are designed in such a way that the layout of those looks like a female body, and the main living space is where a womb would be [27]. Ancient Muslim cities tend to have no windows to the street, which represents religious beliefs that almost everything happens inside the family and cannot be exposed to strangers [35]. In Hellenistic Greece, relief and nature made cities to adapt and dwell in more complex conditions. Therefore, Greek cities look more irregular and natural. Democratic lifestyle reflects in the structure of the city, while there is no big difference in scale. Agora is the junction of many functions and is the centre of democracy. Differently from the Arab countries, the street facades are more open, the first streets with representational facades oriented to the street originate

in Antique Greece [36]. Egyptians believed that the world is divided in two parts: cities of the dead and the living. This division is also reflected in morphology of their cities. Every city was divided into an open city of the living and secretive city of the dead [37]. Not all of these structural differences can be called signals because not all of them are intentionally sent to observer, but the combination of all these signals and indicators forms the *"THIS"-ness* making cities more recognizable and unique for exact culture, forms a particular language of the exact city. Composition and space geometry and their symbolic meaning is widely analysed by D. Chandler. He describes how simple geometrical changes can influence the comprehension andntions such compositional principles as proximity, similarity, continuation, closure, smallness, surroundings, symmetry and *prägnanz.* These mentioned qualities are more of the compositional principles. Though vertical and horizontal objects, lines and planes, and their position are compositional objects creating the meaning of the place [34]. Karatani agrees with Chandler mentioning openness and closeness [33]. Differences in scale and material, even the fact that there is only one or more objects, might affect our perception. Most cities use these simple principles creating open or closed, transitional or cozy places. These compositional principles are strongly connected to the feeling which is being created in a particular place. One example of feeling creation would be architecture and interior of churches and other temples, where vertical composition and space arrangement creates the feeling of someone bigger, however people, on the other hand, tend to feel small and fragile while standing there. All these architectural signals and indicators are created by a human and are perceived and understood by the same human as a metaphor. Hence the creation and understanding process is severely related and are dependent from one-another. These and many other factors describe how people may react to their surroundings and what message surroundings bring us. But city is a complicated organism where everything is connected. Not only structure or people's activity change our cities but the synergy of them. In his book "Miestas kaip įvykis" ("City as a Happening") Tomas S. Butkus speaks about 3 functions of the city: structure and physical environment, events and happenings, and a third one – which represents the connection between the previous two and is only possible when the structure and event are connected meaningfully. For example, riots next to the parliament or network of radio and telecommunication and independence events in Lithuania on 13 January 1991 [38]. Therefore, we create places based on our perception and use the same minds to perceive our surroundings. This makes city a closed circle of human-created meaningful culture. Almost identical idea is represented by A. Bakshi in her book "Topographies of Memories". The author collected a variety of memories by interviewing the residents of Nicosia and layering their memories with city map, creating the map of memories. In this case it is shown that memory is inseparable from the place to which it relates [39]. These places are known not because of structural properties or events but by connection between these two. It is impossible to separate city structure from creativity and other cultural or historical processes happening inside it. All processes happening in the city are inseparable from its structure and change its identity.

Analysing all ways of expression in a city one main property appears to combine all the mentioned things: it is human creativity and how it dwells in the city structure. Place memory is one of the recent ideas representing how people are able to change cities through their engagement of pathways, markets, etc. [40]. Thus, creativity is a process when something new is being made, yet it is also our interpretation which could be called creation process too. People participate in creation of the city both ways – as builders and as users. This explains the whole cycle of creation and perception once again, but it uncovers the new aspect – the whole cycle is a creation process. We build, read and understand the city. Legibility, a tool for way finding, is described mainly by physical properties and is created by a human, but even more it is received and understood by the human too. Metaphor of language explains how physical environment is perceived and is the *text of the city.* Culture, creativity and its expression through architecture and urbanism could be called *text of meaning,* as it represents how people change the identity of the place by changing its surroundings.

## III. Creativity. Urban Catalysts

Being creative is one of the highest needs a person can have, not only based on Maslow's pyramid of needs, but also because it is related to economic growth. David Emanuel Andersson and Charlotta Mellander use the term "creative cities" and "creative class" and define what makes cities creative. It has to be diverse and have constant income of ideas and innovations from the outside [41]. Cities, especially big ones, have potential to attract creative people and encourage creativity [42]. City, as a place of memory and meaning, can fulfil the need of being creative and stimulate it. Like a *flâneur* in Benjamin's texts, a person makes the whole city into his environment and interior through his imagination and creativity.

Urban catalyst idea is being used since the end of the 20th century, when it was detected that urban environment has an impact on communities living there [43]. One of the first to mention the urban catalyst idea in Europe was Polish writer Kazimierz Wejchert [44]. There raises the question about creativity as probable urban catalyst. As there is potential for creativity in the city, how does it respond to potential of movement? What if a city were be perceived as a network, where particular places would

concentrate greater potential of creativity? Based on the system theory a city is seen as a network with a self-organization function [45]. This means that once one node in the network changes or is changed, it affects the others, but the whole network adjusts under these new terms so it could work properly again. All nodes are connected not only by physical connections, such as roads and paths, but there are implicit connections, such as information flow, same function or attraction to go from one node to another. Following this it is possible to make small change or impulse to one or more separate nodes to catalyse changes in the whole network.

In our minds, city is a network made of more or less similar components letting us to better understand and identify different places. Junction or node is one of the mental map components suggested by K. Lynch. They fix in our minds as a place where there is more than one function or where it is possible to choose which direction to go (street junctions). Talking about meaningful places or synergy of place and happening, this junction is an information accumulating place or cultural node. First cities were junctions of roads or junctions of 3 main functions – church, market and a monarch's palace [1], [32]. Something about this node transformed a simple place into the first city. This place was not only a connection, it became an aggregate of three cultural functions, place of memory, accumulating potential and spreading it around. Junctions tended to attract different functions and cultural expressions becoming an attraction point. According to this, it is certain that a junction accumulates two things – function and potential energy which stimulates people's movement between them (Fig. 2). This very well corresponds to the theory of city as a network.

To create movement in a city, in this case, it is suggested to create *cultural nodes* stimulating creativity. When these nodes collect enough information or attract different functions, movement between them will be induced naturally and this movement might be called a catalytic process. Cultural nodes would increase creativity in three ways: **creative use** of the place, **understanding and re-imagining** the identity of the place, and **stimulating to move and find** another such place in the city. In this case cultural nodes could be called urban catalysts generating the bottom-up changes in the city. The concept of urban catalyst requires that only minor changes, made in a particular strategically picked place, would be needed to catalyse movement (Fig. 3). Therefore, it is not only crucial to know how to create a cultural node but also to recognize the existing ones or those where only minor changes should be made, so that ideally only one point would be placed to complete the network.

It is crucial to recognize the qualities of places, which define a place as a cultural node or approximate to it. The place-making concept, based on W. H. Whyte ideas, represents the idea of how to make living and attractive public spaces and what induces cultural life inside them. It started in 1970 with a study about small public spaces trying to understand why some of them are filled with people while the others seem to be forgotten and empty [46]. One of the books about place-making suggests that in order to make creative places, three things are needed: creative workers, cultural industries and creative communities. Even more – it suggests how to make these places creative, and one of the suggestions is architecture [47]. Basic place-making concept shows 4 main points: ***sociability, uses and activities, comfort and image, access and linkage***; as well as represents the qualitative and quantitative measurements for each of the four points (Fig. 4). Taking place-making concept as basis for place evaluation, it would be possible to recognize places with creativity potential – *cultural nodes*. One of the main aspects of analysis in this article suggests looking for meaning in such places, as meaning corresponds to creativity and creativity through cultural nodes catalyses movement. Original evaluation of place-making concept measurements comprises four sections, but keeping in mind the meaning and creativity aspect these groups might change. Based on the ideas of

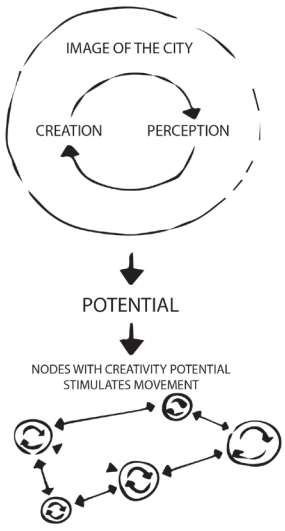


Fig. 2. Cultural nodes and movement [Figure: V. Balvočienė].

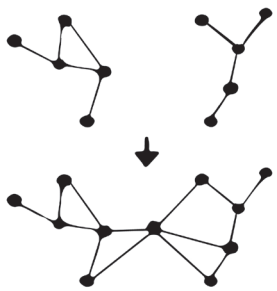

Fig. 3. Movement between cultural nodes [Figure: V. Balvočienė].

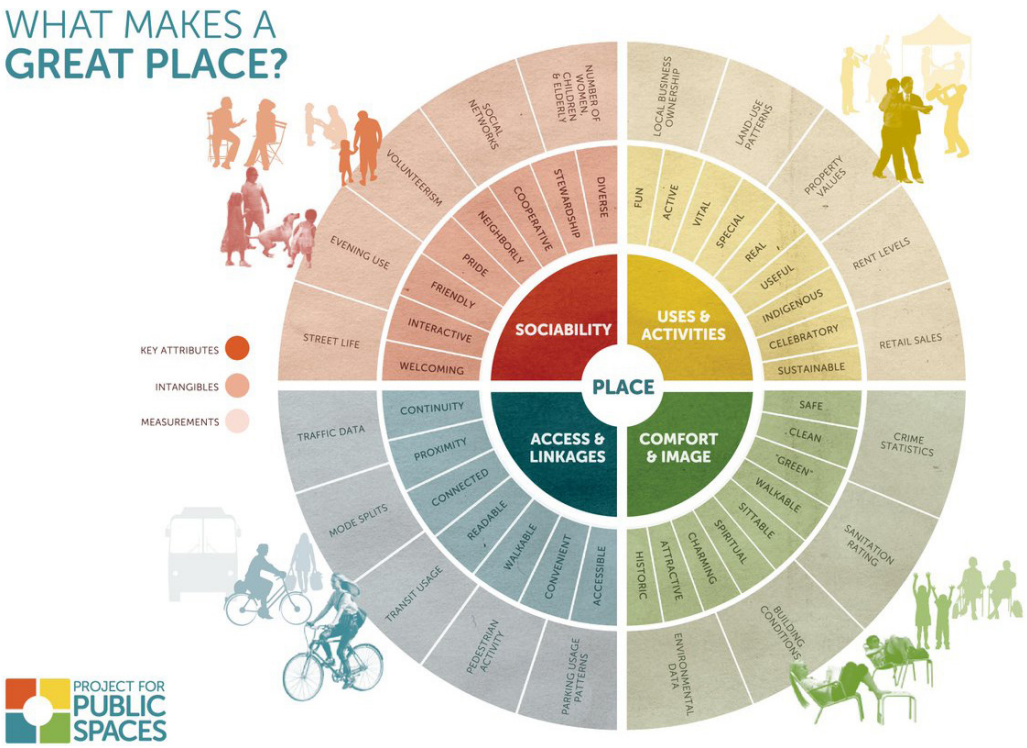


Fig. 4. Place-making concept diagram [http://rescue.earth/people-and-placemaking/].

this article, the following 6 qualities were chosen to analyse and evaluate the place-making measurements:

- affects **speed** of **movement** through the place;
- corresponds to one's **senses**;
- could be called **signal** or **indicator**;
- is **non dissociative from exact place** (as memory of the city);
- affects **composition** of the place;
- affects **scale** of the place.

This evaluation is needed to achieve new groups of place-making measurements, distributing them based on introduced terms. This distribution allows to suggest different research methods for each group and leads to deeper investigation, further allowing creation of a new methodology to understand public spaces. Table I represents the existing evaluation of place-making measurements with unchanged groups: sociability, uses and activities, access and linkages and comfort and image. Measurements in these groups differ from one another. Based on the introduced terms, there is no integral way to find common methodology while using 4 place-making groups of measurements (Table I).

To transform these groups, simple multi-dimensional scaling procedure was performed in statistics program IBM SPSS 23 to understand which of the measurements were similar based on chosen properties representing meaning and creativity. Result of the statistics procedure is shown in Fig. 5.

Smaller distance between two points shows greater correlation (or similarity) between variables. Based on the

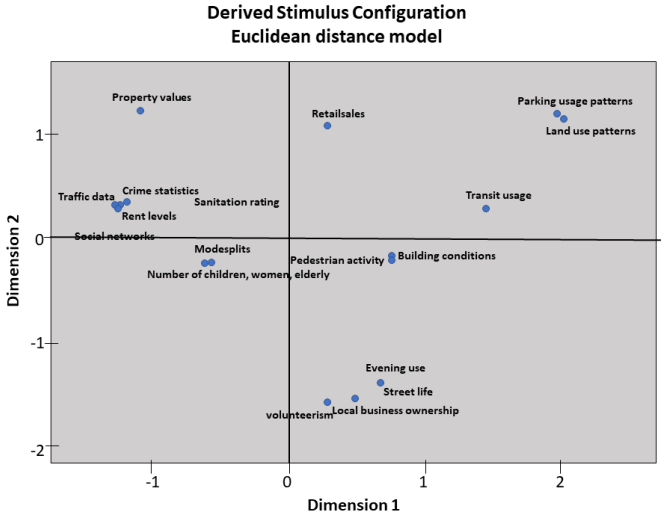


Fig. 5. Multi-dimensional scaling table of place-making variables [Figure: V. Balvočienė].

chosen qualities great similarity can be spotted in these groups of measurements:

- patterns of parking- and land use;
- building conditions and pedestrian activity;
- evening use, street life, volunteerism and local business ownership;
- mode splits and number of children and elderly in public space;
- crime statistics, traffic data, sanitation rating, rent levels and social networks.

**TABLE I**

**Evaluation of Place-Making Measurements**
**[Developed by Balvočienė]**

| | SOCIABILITY | | | | | USES AND ACTIVITIES | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Measurement** | **Street life** | **Evening use** | **Volunteerism** | **Social networks** | **Number of children, women, elderly** | **Local business ownership** | **Land use patterns** | **Property values** | **Rent levels** | **Retail sales** |
| Qualitative/ quantitative | | | | | | | | | | |
| Affects speed of movement (yes/no) | | | | | | | | | | |
| Corresponds to senses (yes/no) | | | | | | | | | | |
| Signal/ indicator | | | | | | | | | | |
| Non-dissociative from the exact place (yes/no) | | | | | | | | | | |
| Affects composition of place (yes/no) | | | | | | | | | | |
| Affects scale of place (yes/no) | | | | | | | | | | |

| | ACCESS AND LINKAGES | | | | | COMFORT AND IMAGE | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Measurement** | **Traffic data** | **Mode splits** | **Transit usage** | **Pedestrian activity** | **Parking usage patterns** | **Crime statistics** | **Building conditions** | **Sanitation rating** | **Environmental data** |
| Qualitative/ quantitative | | | | | | | | | |
| Affects speed of movement (yes/no) | | | | | | | | | |
| Corresponds to senses (yes/no) | | | | | | | | | |
| Signal/ indicator | | | | | | | | | |
| Non-dissociative from the exact place (yes/no) | | | | | | | | | |
| Affects composition of place (yes/no) | | | | | | | | | |
| Affects scale of place (yes/no) | | | | | | | | | |

There are some variables which are not similar and harder stick to these five groups: retail sales, transit usage and property values. These measurements are further from others and cannot be attached to one group or another visually, but calculations suggest that the quarters of mostly correlative variables and the groups are:

1. property values, crime statistics, traffic data, sanitation rating, rent levels, social networks;
2. mode splits, number of children and elderly;
3. retail sales, parking use and land use patterns, transit usage;
4. pedestrian activity, building conditions, evening use, street life, local business ownership, volunteerism.

**TABLE II**

**Evaluation of Place-Making Measurements Based on the Terms of Meaning in the Place [Developed by V. Balvočienė]**

| | NON-PHYSICAL DATA | | | | | | | USAGE DATA | |
|---|---|---|---|---|---|---|---|---|---|
| **Measurement** | **Property values** | **Crime statistics** | **Traffic data** | **Sanitation rating** | **Rent levels** | **Social networks** | **Social networks** | **Mode splits** | **Number of children and elderly** |
| Qualitative/ quantitative | | | | | | | | | |
| Affects speed of movement (yes/no) | | | | | | | | | |
| Corresponds to senses (yes/no) | | | | | | | | | |
| Signal/ indicator | | | | | | | | | |
| Non-dissociative from the exact place (yes/no) | | | | | | | | | |
| Affects composition of place (yes/no) | | | | | | | | | |
| Affects scale of place (yes/no) | | | | | | | | | |

| | URBAN PATTERNS AND MOVEMENT | | | | SOCIAL LIFE AND VARIABILITY | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Measurement** | **Retail sales** | **Parking use patterns** | **Land use patterns** | **Transit usage** | **Pedestrian activity** | **Building conditions** | **Evening use** | **Street life** | **Local business ownership** | **Volunteerism** |
| Qualitative/ quantitative | | | | | | | | | | |
| Affects speed of movement (yes/no) | | | | | | | | | | |
| Corresponds to senses (yes/no) | | | | | | | | | | |
| Signal/ indicator | | | | | | | | | | |
| Non-dissociative from the exact place (yes/no) | | | | | | | | | | |
| Affects composition of place (yes/no) | | | | | | | | | | |
| Affects scale of place (yes/no) | | | | | | | | | | |

The first group represents economic and social data qualities which are not physical. The second group represents usage of public space. The third shows urban pattern and movement. The fourth – social life and variability of the place. In order to better understand how these four groups represent the terms of meaning the table with evaluation is presented (Table II). This evaluation suggests arrangement of later research for each group.

The first group is numerous and could be analysed through GIS data. The second can be analysed while observing and describing exact nodes, the third could be understood through city plans and regulation documents, while the fourth through observation and social surveys of public space users.

## Conclusions

- People create cities and interpret them through their perception. This shapes the closed creation-perception cycle, which means that people can be creative not only by creating but also by perceiving what is around them. A person is being creative in all stages of the cycle: creating something new, perceiving, imagining, and creating something new again.
- Meaning needs emitter and receiver, in this case – city and person. People tend to see meaning in almost everything they perceive. Messages which are received might be intentional or accidental but meaning will still be sensed. What is perceived can still have different meaning to each person due to personal identity differences. Cities collect this information in layers, which is later understood as memory of the city, *genius loci* or its identity. What people perceive in the surroundings and what kind of message it brings to them is called the meaning of the city.
- Creativity is an engine of constant reconstruction and reinterpretation of cities. It does not only mean the creation of something new (object, place, event) but also encourages to be creative through re-imagining the city. This forms a constant creation-perception cycle.
- People's way of thinking changes the way surroundings are perceived. Different culture, religion, climate, ruling method and other disparities of nations are visible in differences of a city plan and architecture. Later generations create their layers of the city based on what has been given before, so the creation-perception cycle is visible in this case too. The identity of our cities is directly shaped by creativity process.
- Human senses admit the great part of received external information which is later processed by our minds. Ordinarily a person uses 5 senses to perceive the surroundings. Some of them have greater impact than others – vision and hearing might be called main senses. Other senses such as smell, touch and taste are more complementary in architecture and can be provoked by other senses. Architecture allows to connect them all supplementing it by another sense – the scale of human body. Measuring cities and buildings with a scale of human body does not only give rules for ergonomics but allows getting deeper sensual experience in the city.
- Cultural nodes are collective places of function, meaning and attraction. Based on these three qualities, it is proposed that it has a potential to induce creativity in making people use the surroundings (function), re-imagine and understand identity of the place (meaning) and stimulates finding another such place in the city (attraction). While attracting people and inducing creativity, this would also induce movement between cultural nodes. Well picked existing and strategically placed new cultural nodes would catalyse movement between them naturally. In later investigation stages of this theory there is a possibility to distinguish the typology of cultural nodes and determine suitable distances between them. This allows suggesting base points for creating a mathematic network model for further research.
- The place-making theory suggests the measurements to recognize viable public places. This theory can be used to evaluate cultural nodes too. From the first sight, meaning is what is missing in this theory. In four new groups rearranged measurements of the place-making theory shown a new approach to investigate potential cultural nodes in the city, suggesting the possible research methodology for each of them. This methodology allows to recognize the existing cultural nodes in the city and see the gaps which are needed to complete the network and catalyse movement.

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# Large-Scale Buildings of the Resort Establishments of the Soviet Period and their Present State in Jūrmala City, Latvia

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**Keywords**

Jūrmala, resort architecture, Soviet architecture, post-war modernism, sanatoriums, guest houses, large-scale resort buildings.

**Abstract**

The paper presents a summary of large-scale buildings of resort establishments of Soviet period in Jūrmala, by analysing their typology, physical parameters, scenarios of the development, architectural stylistic and the present state of physical condition and authentic substance. The research reveals that half of the large-scale resort buildings are already irreversibly lost and the rest of buildings are seriously endangered due to the tendency of extensive rebuilding.

## Introduction

Jūrmala is one of the largest sea resorts in the Baltic Sea region. The resort was established at the beginning of the 19th century and up to now is mostly famous for its wooden architecture from the end 19th century tilt the beginning of the 20th century, however, in the Soviet period (1945–1991, when Latvia was incorporated into the Soviet Union), the city experienced intensive construction of various resort buildings due to ambitious tourism increment. Up to now, the comprehensive investigation and evaluation of this architectural contribution have not yet been elaborated and the architectural value, present state and preservation level of these buildings is uncertain. The city is losing the buildings of high architectural value before this value has been officially assigned.

The aim of this article is to highlight the large-scale resort buildings of the Soviet period that in our days still have authentic substance might have cultural value and require institutional protection. To achieve the goal, a complete list of relevant buildings with basic attribution was created, the main planning and design aspects explored and the present state of buildings was examined. In terms of this research, the resort building is a building of a resort establishment and deals with health care, short-term accommodation or recreation; large-scale building is accepted as building with a total room area of more than 1000 $m^2$.

In our days, the information on several buildings of the Soviet period is provided in a few studies and publications mostly regarding the architecture in Latvia, but no one of them is giving a full picture about Jūrmala. One of the most significant issues on architecture in Latvia of Soviet period, including some objects of Jūrmala, is catalogue "Unwritten" [1] that was published for the Latvian exposition at the Venice Architectural Biennale in 2014. The article "Architecture of Soviet times" from book "Jūrmala. Nature and Cultural Heritage" in 2004 ends with a sentence: "When analysing the architecture of the Soviet period we need to take into account that for the objective evaluation of the objects, longer time and bigger emotional distance should be given between the evaluator and the subject of evaluation" [2]. Nevertheless, this is the most detailed article of Soviet period architecture in Jūrmala, and up to now most of the large-scare buildings do not have open-source basic attribution about architects, design and opening year, etc.

An official evaluation of the cultural value of buildings in Jūrmala is available in the legislative instrument of Jūrmala city "Rules on the Use of Territory and Construction" [3] and its Annex 7 "Evaluation of Buildings". The graphical

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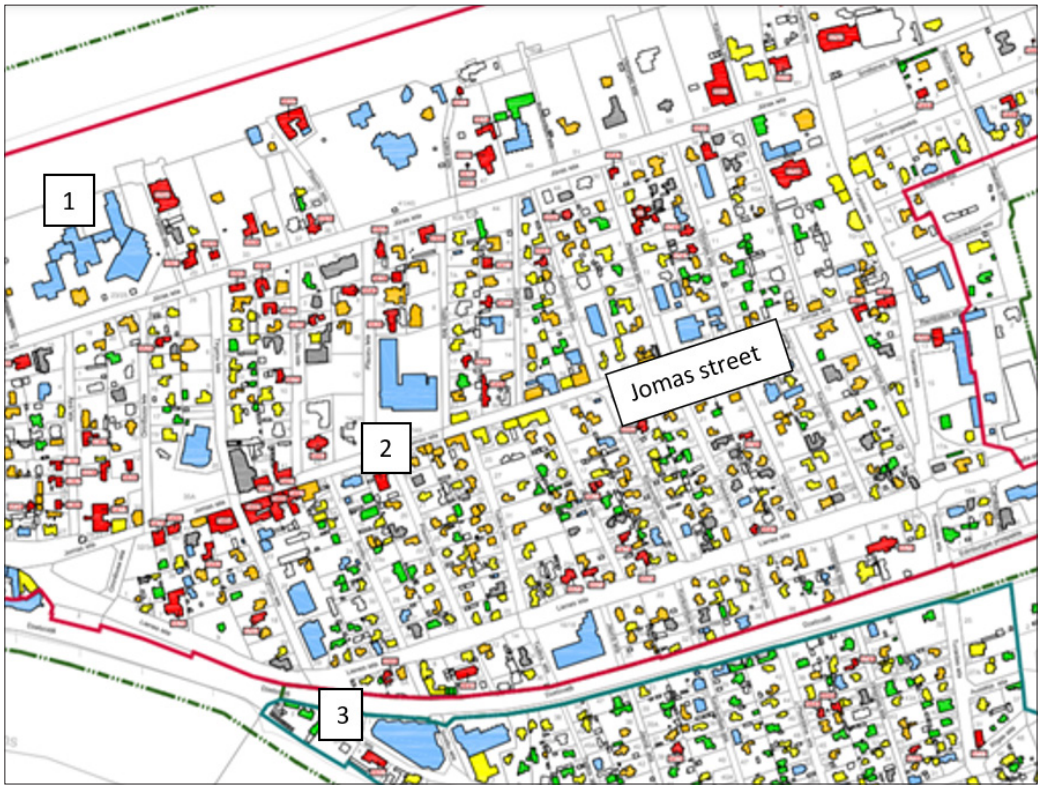


Fig. 1. [3] Annex 7. Fragment of the scheme of the central part of Jūrmala – Jomas Street. Building categories: red – architectural monuments; orange – culturally valuable, preservable buildings; yellow – background construction; green – buildings without cultural value; blue – buildings with no cultural value, built after 1940; no color – buildings that have not been evaluated or auxiliary buildings with no cultural value. Buildings marked 1 – former sanatorium "Rīgas Jūrmala", presently hotel "Baltic Beach Hotel & SPA" (built in 1981); 2 – hotel "Jūrmala" (built in 1970); 3 – sports centre in Majori (built in 2008).

schemes of [3] Annex 7 show the cultural value of buildings by using different colours (Fig. 1). It gives insight into historic environment of the city and the level of awareness of architectural values. The analysis of this evaluation was crucial for the motivation to elaborate this research. It is obvious that only the buildings that were built before World War II are sufficiently evaluated (in Fig. 1 buildings marked red, orange, yellow, and green), but almost all buildings that were built after 1940, including large-scale resort buildings of Soviet period and new building of the 21st century (Fig. 1, numbers 1, 2, 3) are put in one category and marked blue: "Building with no cultural value, built after 1940". This definition itself is rather incorrect because one qualitative characteristic should not include two mutually incompatible criteria. The exceptions are two objects of the Soviet period in the list of national cultural monuments – the roof construction for the outdoor auditorium of the Dzintari Concert Hall [4] and interior mural painting in sanatorium "Marienbāde" [5]. Annex 5 "Surveys" [3] gives the conditions for each evaluation category, and for the "blue" buildings the conditions are as follows: "The buildings are permitted to be rebuilt by improving the quality of their architecture, to be demolished; new buildings that are environmentally suitable objects may be built in their place. At least 20 % of the historical substance shall be preserved when rebuilding. Before the demolition of buildings that are older than 50 years the architectural artistic inventory and the resolution of the National Cultural Heritage Authority is required. Demolition of buildings under 50 years is permitted without additional research." This statement is focused mostly on the demolition process and is rather provocative. During the last 30 years most of buildings of the Soviet period have not reached the age of 50 years, which means that their destruction was easy in terms of legal procedure. The architectural and artistic surveys were not elaborated, and the society was not informed about the architectural substance that had been rebuilt or lost and could have high architectural and artistic value. Due to this legal condition Jūrmala has already lost one of the most recognized building of the Soviet period in Jūrmala – the seaside restaurant "Jūras pērle" – and the exact amount of loss is yet uncertain. Currently the local municipality has again been reevaluating only the historic buildings that are built before World War II. The authorities of the Jūrmala City Department of Urban Planning state that the city is not planning to rework [3] Annex 7 regarding the buildings of Soviet period [6], which means that the architectural legacy of Soviet period will continue to be officially ignored.

## I. Methodology

Quantitative and statistic research methods were used in combination with field studies, historic investigations and inductive analysis. The main sources of information are the resort planning concepts of the Soviet period and design projects of buildings. The original design projects are examined for most of the buildings, but some

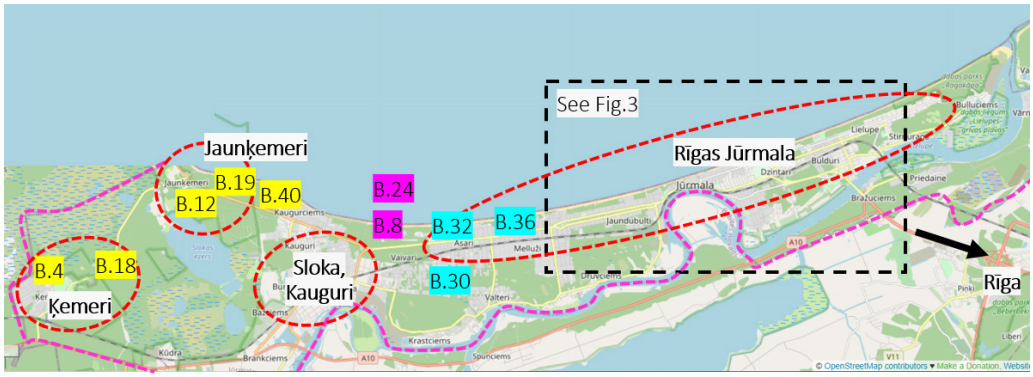


Fig. 2. Schematic depiction of the building location on the city map. Building numbers according to Appendix A1 [Figure: Author of the Article].

projects cannot be found in archives and have not yet been discovered in alternative depositories. The missing information is not the reason to postpone or put aside the research, but rather to interpret this shortage as the historic evidence. Some of project documentation was secret, even with marks on the sheets "Secret", that is why not all information was stored in regular way. Some projects could be lost or treated unproperly during the unstable period just after the collapse of the Soviet Union. The repository of Jūrmala City History and Art museum has a collection of photos and some other historic materials. Valuable source of information is the cadastral survey of a building and periodicals. The present state of the buildings was examined by field studies and selective investigation on latest architectural projects.

## II. Legacy of the Period

The large-scale buildings of resort establishments are summarized in Table A1 (A1, Appendix) that includes photos of buildings and their attribution. Each building is marked by letter B and a sequence number, and marked in colour indicating the initial function: yellow – sanatorium, cyan – guest house, red – hotel, green – creative house, magenta – tourist centre, dark green – resort healthcare. Each building has the following information: 1) initial name and function of the building; 2) address; 3) architects; 4) design year, design place / building completion year; 5) some initial building parameters (if available, number of building floors, approximate area, $m^2$, and building volume, $m^3$, number of guests); 6) present function and physical state; 7) depository of original design project (reference), No. / depository of project after 1991 (reference), No. of the project, if significant; 8) photo reference (photo in grayscale – of Soviet period (preferable), in colour – after 1991).

There are several considerations used for the arrangement of the database. In order to trace the architectural stylistic development, the buildings are listed by their design year, starting with earlier years. As the construction of some buildings took more than 10 years, during that period the stylistic approach could change and evaluation of the building's stylistic evolution by the year when the building was completed may not be precise. In case the design year is not known, the building is listed assuming that the design year is five years before the construction completion year, and it is additionally marked with "*". If the information of the design year is

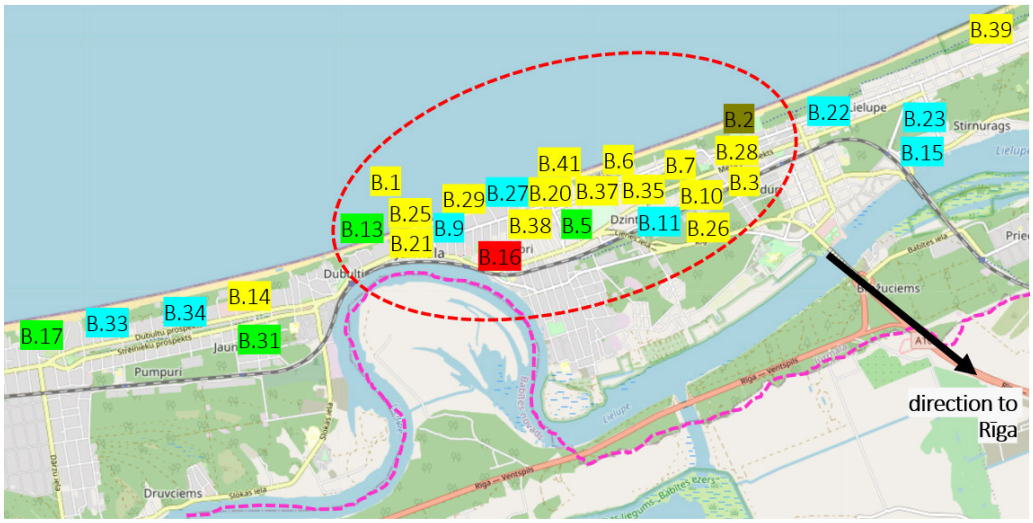


Fig. 3. Schematic depiction of the building location on the Jūrmala city map of central part. Building numbers according to Appendix A1 [Figure: Author of the Article].

not extracted from the initial design project, the additional reference is added. The information about the construction completion year, number of floors, approximate total floor area and building volume (round up by 50 units) come from the cadastral survey of a building. If the information is not discovered during this research or has not yet been examined, it is marked with "-". Accordingly, the schematic depiction of the building location on the city map is given in Figs. 2 and 3.

The filter of selecting the buildings with more than 1000 m$^2$ of total floor area shows that only some of the types of resort establishments reached the floor area of 1000 m$^2$, among them are sanatoriums, guest houses, hotels, creative houses, tourist centres and resort healthcare buildings. It leaves behind the smaller establishments – camping houses, rental cottages, luxury summer houses for the government representatives and some smaller accommodation buildings, which are also represented by quite a big number of objects but have minor visual and economic impact on the city. The terminology of these resort establishments is taken from the explanatory note of the Jūrmala City Plan 1971 [33] and the documentation of architectural projects, which in our days require some detailed explanation. Sanatoriums were associated with health treatment. Guest houses (in Latvian: *pansionāts*) were more for health prophylaxes and recreation, most of them equal to today`s SPA centres, commissioned by state or industry authorities and were meant for the personnel of these authorities. So-called creative houses were designed for recreation of creative professionals with some rooms for the workshops, concert-, or exhibition halls. These resort establishments were available for specially invited guests from Latvia and other countries of the Soviet Union. Tourist centres and hotels were for short term recreation, available by prebooking. The most common resort establishment type with large-scale buildings were sanatoriums. They comprised more than a half of all buildings, whereas one third of all buildings were guest houses, and there was only one big hotel in Jūrmala (Fig. 4).

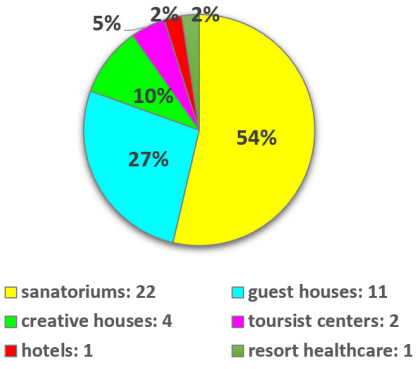


Fig. 4. Types of resort establishments with large-scale buildings, quantity and percentage [Figure: Author of the Article].

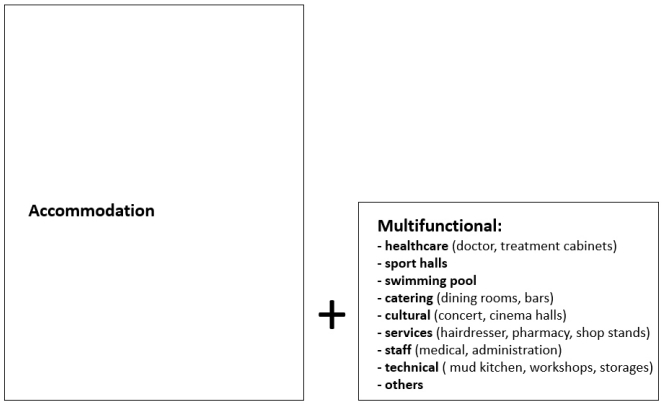


Fig. 5. Functional groups of resort establishments in Jūrmala [Figure: Author of the Article].

The research shows that there were certain similarities in functionality of the resort establishments. All of them contained two main functional groups – the accommodation and multifunctional group (Fig. 5). The accommodation was the main function. The design and organization of accommodation rooms was similar for all types of resort establishments, but the multifunctional group was more dependent on the required room usage that was individual for each establishment and could contain premises for: healthcare (treatment cabinets, fitness halls), swimming pool, cultural program (concert halls, cinema rooms, reading rooms), catering (dining rooms, bars), services (hairdresser, pharmacy, shop stands, press, phone), staff (medical, administration), technical rooms and others (Fig. 5). Many of the resort establishments were like self-sufficient structures that provided guests with everything necessary. It explains the relatively little number of catering, cultural and entertainment service establishments in other places outside these structures.

The total room area of more than 1000 m$^2$ highlights the structures that caused the biggest impact on the historic environment of the city, especially regarding the building

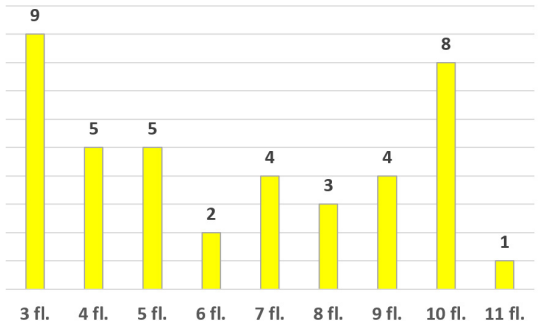


Fig. 6. Number of storeys of large-scale resort buildings and number of buildings [Figure: Author of the Article].

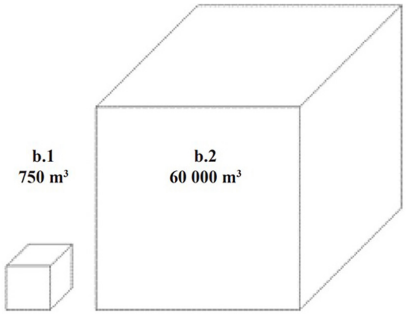


Fig.7. Schematic depiction of the volume of a typical-size historic wooden house (b. 1) and of an average 10-storey resort building of the Soviet period (b. 2) [Figure: Author of the Article].

size and number of stories. In Latvia, all aboveground stories are included in the number of storeys. The data shows that these buildings are much bigger than the average size of historic 2–3-storey wooden buildings. For insight, only 9 out of 41 observed buildings are 3-storey buildings, that is relevant to historic building environment. Others are 4 to 11 storey buildings. Among them the most common height of buildings was 10 storeys (Fig. 6). The average total floor area of a 10-storey resort building in Jūrmala is around 17 000 $m^2$ with building volume of 60 000 $m^3$. Meanwhile, a typical summer cottage, for instance, at *Bulduru prospekts 1* of the beginning of the 20$^{th}$ century has 2 storeys, approximately 200 $m^2$ and is 750 $m^3$ big. Accordingly, a typical large-scale resort building is about 80 times bigger than a historic wooden house. A visual comparison of the building volumes is given in Fig. 7.

The analysis of implementation of new large-scale buildings in the historic environment of Jūrmala reveals that there are certain scenarios of the development of resort establishment: first, the Soviet system got the building legacy from the previous periods – wooden buildings of summer cottages and hostels (Fig. 8, s.1), at the beginning the resort establishments were deployed in the existing buildings, adapting them to the necessary function, taking as many plots as necessary (Fig. 8, s.2), then some modifications of the existing buildings were caried out (Fig. 8, s.3), or some existing buildings were replaced by new and bigger ones (Fig. 8, s.4), or all historic building were pulled down and one big and complex building was built (Fig. 8, s.5). Scenarios s.2 – s.5 were common for the historic part of the city "Rīgas Jūrmala" and "Ķemeri" (see their location in the city map in Fig. 2). There was a different and simpler scenario for untouched natural areas – only big, complex buildings were built (Fig. 8, s.6. and s.7) that was typical for the Jaunķemeri part of the Jūrmala city (see the location in the city map in Fig. 2).

In s.4, s.5 and s.7 the large-scale structures appeared and demonstrated more advanced phases of the resort development strategy of the Soviet period and its intolerant approach towards the historic environment. The construction of large-scale resort buildings according to scenario s.5 always came together with the extensive destruction of the historic buildings, alteration of historic plot shapes and tremendous increase of scale of the structures. The case of hotel "Jūrmala" (A1, B.16) shows how it practically happened – at first there were 6 plots with historical housing (Fig. 9, p.1), then the buildings were pulled down, the plots were merged (Fig. 9, p.2), and the hotel was built (Fig. 9, p.3). All development scenarios of the resort establishments were present in the city by the end of Soviet period and determined the broad variety of architectural expression and scale of construction.

Regarding the location of the large-scale buildings in Jūrmala city, they are located randomly as it mainly was determined by the location of the initial resort establishments in scenarios s.2 and s.3 and their development in further scenarios s.4 or s.5. The biggest congestion of the buildings – more than a half of all buildings – is in the central part of the city between the sea and the railway and the narrowest part of the peninsula (Fig. 3, red dashed line). This part of the city also is one of the most historic, architecturally valuable and most oriented towards Riga – the capital city of Latvia. It means that the character of the historic built environment of this part of the city is altered the most.

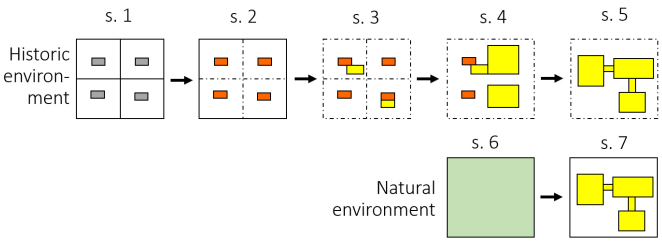


Fig. 8. Schematic depiction of scenarios of the development of resort establishments in Jūrmala in the Soviet period. Grey – historic buildings; orange – resort establishment in existing buildings; yellow – new constructions of resort buildings; green – untouched natural area [Figure: Author of the Article].


Fig. 9. Replacement of a historic building with a large-scale resort building in the Soviet period. The case of hotel "Jūrmala" on Jomas Street [Figure: Author of the Article].

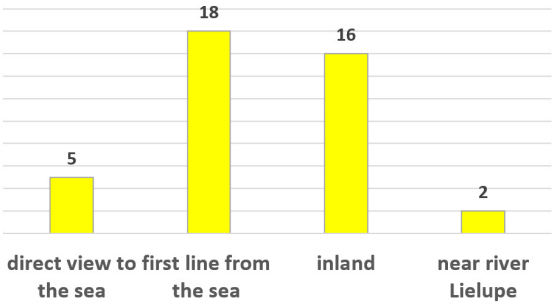


Fig. 10. The location of the buildings in the city, number of buildings [Figure: Author of the Article].

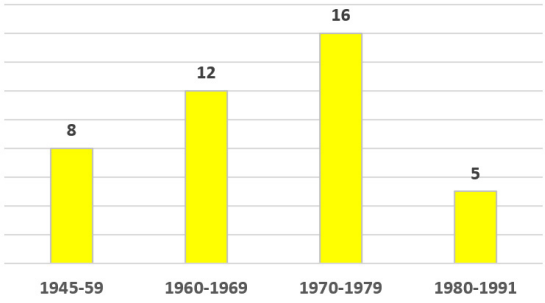


Fig. 11. The design years of buildings, number of buildings [Figure: Author of the Article].

The biggest number of buildings is located between the seaside dunes and both sides of the first parallel street to the dunes but they do not have a direct view to the sea (in this research called "the first line from the sea". Similar amount of the buildings is located inland, between the first line from the sea and the railway, only with one exception – guest house "Vaivari" (A1, B.30) that is located between the railway and the Lielupe river. The nearness to the river was used only for location of 2 buildings but the direct view to the sea is provided only to 5 buildings or 12 % of all large-scale buildings that can be considered as environmentally friendly (Fig. 10). In general, the dune vegetation in Jūrmala during Soviet period was relatively well preserved and the provision of the direct view to the sea for the large-scale resort buildings was not a priority.

## III. Architecture of Large-Scale Resort Buildings

The architecture of resort establishments historically over the world tended to be attractive and exclusive, and the architecture of Soviet period was not an exception. One of the statements of the Council of Ministers of Soviet Latvia in 1971 was: "*It is necessary to build sanatoriums and other healing establishments, guest houses and recreational centres, mainly in large complexes, the construction and operation of which is economically beneficial. Designing and building complex resort sites must consider the best experience of our country and abroad, ensure a high architectural level, the quality of construction, engineering equipment and wellbeing, and use modern construction and finishing materials*" [34]. These guidelines determined the intention to create modern, high quality architecture.

Elaboration of large-scale resort buildings was happening all the time, reaching its peak in the 1970s and decreasing only at the end of the regime (Fig. 11). According to comparative analysis of the architectural stylistics of buildings three architectural styles were represented in Jūrmala – Stalinist style, postwar modernism and postmodernism, but they also may be called differently. In general, these were typical and main architectural styles of the Soviet period also with typical periodization. Additionally, the custom designs that often were elaborated by the architectural institutions in Moscow or other places of the Soviet Union assigned to the buildings personalized and international vibes.

A. Stalinist Style (A1, B.1–B.8).

The architecture of the 1940–1950s in Jūrmala represents the Stalinist style. Most of the buildings of this time were not large, of simple rectangle shape, demonstrating the urgent necessity of providing basic functional needs for the resort establishments, mostly solved according to scenario s.3 or s.4 (Fig. 8). The building technologies were rather conventional, materials were brick masonry, prefabricated reinforced concrete covering slabs, plaster finish. Many of the buildings were built according to pattern designs. One building design could be used for single function buildings – accommodation, health treatment – or mixed-function buildings, accordingly, different functions were not specifically emphasized in architecture (Fig. 12).

Some buildings were designed with stronger stylistic expression, the façades had ornamental decorations, motives of classical orders or columns, as it is seen in the project of sanatorium for factory "ZIS" (Fig. 13, B.1, B.4,). The most prominent was the building for sanatorium "Majori" with its monumental shape, classical elements, and roof accent (A1, B.1). The bright mix of Stalinist style and local traditions was the wooden climatotherapy pavilion (A1, B.2); its location and composition resembled the historic sea pavilion of Jūrmala, and the wooden finish

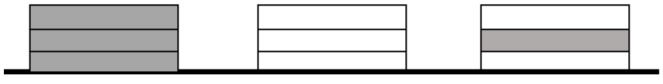

Fig. 12. Schematic depiction of functional organization and visual solution for typical resort buildings in the 1940–1950s in Jūrmala. Grey – accommodation, white – multifunctional.

Fig. 13. Project drawing of the main façade for the sanatorium for factory "ZIS", [11] No. 1454.

Fig. 14. Project visualization of the complex rebuilding of the bath establishment in Ķemeri, not realized, [11] No. 813.

contained some traditional motives in decorations. The most impressive building and park complex of Stalinist style in Jūrmala would be the bath establishment in Ķemeri after the rebuilding project of 1954, but it was not realized (Fig. 14).

B. Postwar Modernism (A1, B.9–B.33)

In architecture in Jūrmala, the principles of international modern movement were used in designs of 1960–70s, often called as Soviet modernisms when referring to post-Soviet countries. The development of the establishments was carried out by scenario s.4 or s.5 (Fig. 8) insulting much of the historic building environment, by their over-scaled volumes, meanwhile new buildings were in line with the actual style, modern and ambitious. The industry of resort establishments rapidly increased and was reinforced by different planning decisions, most significant of them were the administrative reform of the territory of Jūrmala city in 1959 and The Project of the General Plan of the Jūrmala City of 1970. Significant contribution to the architectural expression was the modernized building technologies – implementation of large-scale pre-cast and cast in-situ reinforced concrete structures. Considering the number of the buildings designed in this time (Fig. 11), the postwar modernism among all styles of the Soviet period was dominating in architecture of large-scale resort buildings in Jūrmala.

Crucial for the architecture of postwar modernism was the complexity of the resort establishment – whether it was one building complex of scenario s.5 or s.7, or it consisted of a group of separate buildings with different functions of scenario s.4. If the resort establishment consisted of several separate buildings, often they were built in different years, had different appearance and were located on separated plots that did not ensure high spatial quality (A1, B.15 together with B.23 and B.6 together with B.35). In this period, complex buildings were more preferred (A1, B.12, B.14, B.16, B.17, B.18, B.19, B.20, B.22, B.27, B.28, B.29, B.31, B.32, B.33). They were designed according to individual projects of complete architectural composition and diverse architectural expression, meanwhile having a rather common spatial organization. Usually, building complexes consisted of two functional parts (Fig. 5) strongly emphasizing their differences.

- For the accommodation purposes there were one or two multistorey, buildings that always was the dominant part of the architectural composition, defined the identity and recognition of the establishment; in most of the cases they were of rectangular shape with the ribbon fenestration and balconies, built of reinforced concrete elements; in some cases, there were modifications of shape – expressive stepped silhouette (A1, B. 29, B.32), vertical accents (A1, B.27) etc.
- For multifunctional needs there were one or more 1–2-storey high buildings, sometimes with inner courtyard. There were two main ways how the multifunctional buildings were joint with the accommodation buildings – they intersected (Fig. 15, t.1, t.2), or they were separate buildings with the functional connection via galleries on the first-floor level (Fig. 15, t.3). The multifunctional buildings usually had different visual and finishing solutions, for instance, brick clad, limestone tiles or plaster finish, and various sizes of windows, depending on a particular function. In a complex building, the multifunctional parts were weather neutral (A1, B.29) or reinforced the expression of the accommodation parts (A1, B.32).

The comparative analysis shows that there was no obvious semantic difference between the building complexes of resort establishments. For instance, sanatorium "Baltija" (A1, B.20), guest house "Lielupe" (A1, B.22) and hotel "Jūrmala" (A1, B.16) had one spatial concept. That means that the difference of establishments was more of organizational, not visual, aspect.

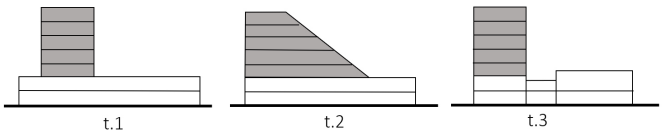


Fig. 15. Schematic depiction of the combination of vertical and horizontal building parts, functional organization, and visual solution for complex resort buildings of the Soviet modernism period of the functional organization and visual solution for complex resort buildings of the postwar modernism in Jūrmala. Grey – accommodation, white – multifunctional.

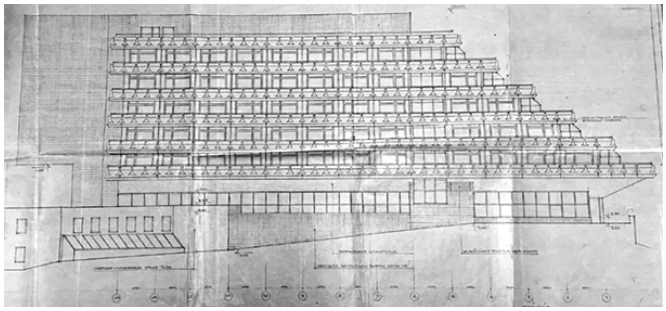

Fig. 16. Project drawing of the façade for the accommodation building for sanatorium "Rīgas Jūrmala", [11] No. 7695.

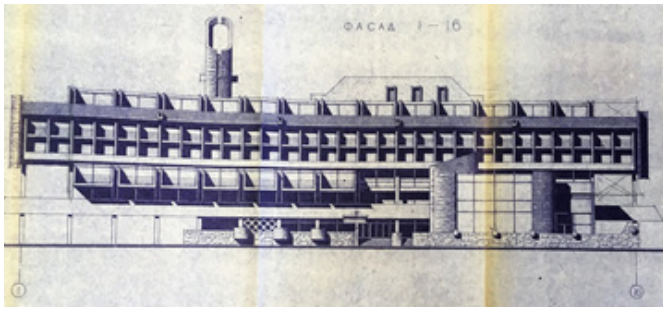

Fig. 18. Project drawing of the façade for guest house "Himik", [9] No. 81/7.

According to some sources, by the moment of the final completion in 1984, sanatorium "Latvija" (A1, B.18) was the biggest sanatorium building in the Baltic states [16]. One of the most landscaping and contextual was the shape of the accommodation building for sanatorium "Rīgas Jūrmala" with its stepped, ferry-like façade towards the sea and rather delicate incorporation in the dune vegetation (Fig. 16), guest house "Starts" had one of the most sculptural and artistic composition of the complex (A1, B.32). Extraordinary fine modernism solutions were used in guest house "8 Luksi" (A1, B.27), creative house for composers (A1, B.17) and one of the first buildings of Soviet modernism in Jūrmala – the guest house for sanatorium "Rīgas Jūrmala" (see A1, B.9). One of the most iconic resort complexes in Jūrmala was sanatorium "Jaunķemeri" (A1, B.12).

C. Postmodernism (A1, B.34–B.41)

In the late 1970s and 1980s, postwar modernism stepped back and gave way to a postmodernism idea that in case of Jūrmala was more tolerant. Most of the buildings became smaller and lost the strict accommodation-multifunctional building composition, instead, the shapes became more diverse and playful by implementation of triangle, rounded shape, some decorations and remarks on historic architecture (Fig. 17). Common wall material was red or mottled brick masonry. The reduced building volumes were more careful to the character of the urban surrounding and finally approached the optimal size of the resort building complexes in Jūrmala. The most impressive building of this period was guest house "Himik" (A1, B.36) with its dynamic compositional expression (Fig. 18). Some buildings (A1, B.40, B.41) were not finished by the end of the Soviet period.

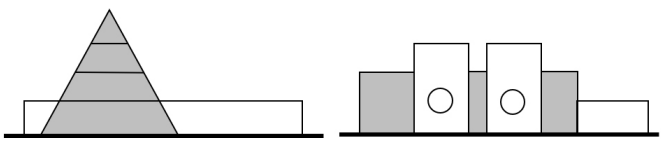

Fig. 17. Schematic depiction of the functional organization and visual solution for the resort buildings of postmodernism in Jūrmala. Grey – accommodation, white – multifunctional [Figure: Author of the Article].

IV. Present physical state of buildings

For the awareness of the general situation with the large-scale resort buildings in Jūrmala in our days and possible revision of current evaluation status of cultural value "blue – building with no cultural value, built after 1940" [3] or relevant evaluations, the studies on present physical state of buildings are held in this research, as the proposal for revision of cultural value is reasonable only for the buildings that still have sufficiently good physical state that goes together with particular presence of authentic substance. For this purpose, considering the situation of Jūrmala, the levels of the present physical state of the buildings is introduced using the criteria described in Table I. There are 6 levels proposed, ranging from a complete pull-down to almost authentic building. Each building listed in Appendix A1 is evaluated according to these levels and depicted in the scheme of the city map (Figs. 19 and 20), the samples of buildings of the levels are given in Table II.

The collapse of the Soviet Union in 1991, regained independence of the Republic of Latvia, new state policy for the resort, free market economy and the business intentions of the new owners of buildings in the following 30 years have put strong and obvious impact on physical state of the buildings. Currently, the most common physical state of buildings is extensive rebuilding and basic maintenance (Fig. 21). In general, 20 out of 41 buildings or 49 % (levels: destroyed, irreversible slum, and extensive rebuilding) have lost their authentic substance (Fig. 22).

The biggest loss in direct and indirect meaning is the pulling down of the building complex of former sanatorium "Latvija" (A1, B.18). 56 % of the buildings still have sufficient level of authenticity, good chance for their physical preservation, and they can be potentially valuable buildings. The sanatorium "Jantarnij bereg" (A1, B.19) is an excellent sample of authentic preservation in both external appearance and interiors. In 2019, the complete interior of the inhouse concert hall, even chairs, still were

**TABLE I (TI)**

**Levels of Present Physical State of Large-scale Resort Buildings of the Soviet period in Jūrmala [Author of the Article]**

| Level of physical state of building, No. / colour | | Name | Criteria | Condition of authentic substance of building, preservation possibilities |
|---|---|---|---|---|
| 1 | | Destroyed | Building is pulled down. Empty space is left, or the authentic construction is pulled down and replaced by a new structure during the rebuilding project. | Authentic substance is lost. |
| 2 | | Irreversible slum | Building is not in operation; it is visually heavily damaged. | Authentic substance is lost; little chance to preserve construction and architectural values. |
| 3 | | Reversible slum | Building is not in operation, with or without conservation; the structure is not visually much damaged. | Sufficient level of authenticity; may be valid for preservation of construction and architectural values. |
| 4 | | Extensive rebuilding | The building is used as a frame for the new project – load bearing structures of the building are preserved, but other elements – façade, interior, etc. – are replanned and rebuild according to one common rebuilding project; from outside the authentic appearance cannot be recognized. | Authentic substance is lost. |
| 5 | | Slight rebuilding | Facades are refurbished keeping the previous expression and composition of the building, interiors are improved with or without replanning according to one or several different rebuilding or refurbishment projects. | Sufficient level of authenticity; good chance to preserve construction and architectural values. |
| 6 | | Basic maintenance | Some maintenance works at different times and in different parts of the building, façade and / or interior refurbishment and some energy efficient and engineering and technological solutions are implemented according to many different projects, authentic appearance from outside, some interior designs are preserved. | Sufficient level of authenticity; excellent chance to preserve construction and architectural values. |

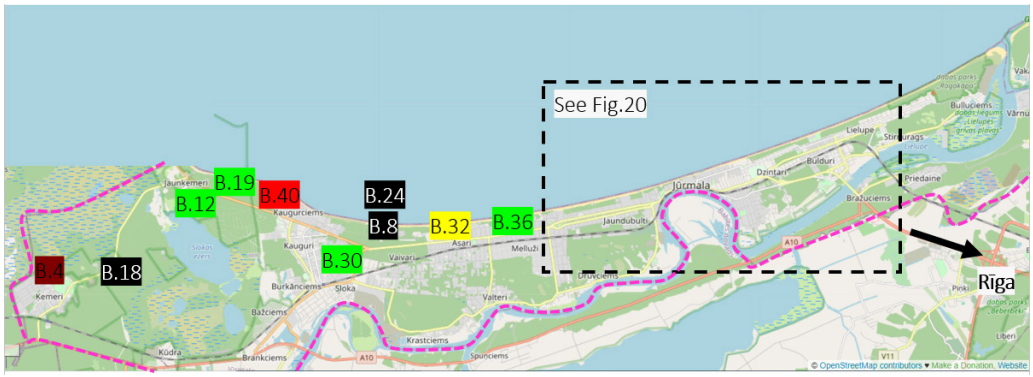


Fig. 19. Schematic depiction of the present physical state of buildings on the city map. Building numbers according to Appendix A1 [Figure: Author of the Article].

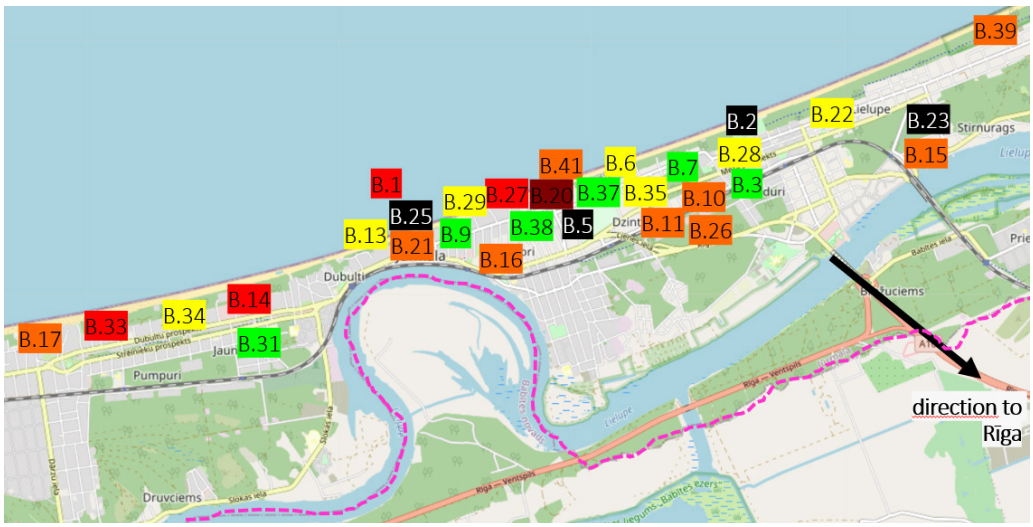


Fig. 20. Schematic depiction of the present physical state of buildings on the map of the central part of the city. Building numbers according to Appendix A1 [Figure: Author of the Article].

**TABLE II (TII)**

**Samples of the Present Physical State of Buildings According to Levels of TI. Building Numbers According to A1, photo: [10], 2020**

| | | |
|---|---|---|
|  |  |  |
| Level 1, B.2 | Level 2, B.20 | Level 3, B.27 |
|  |  |  |
| Level 4, B.21 | Level 5, B.22 | Level 6, B.19 |

Fig. 21. Present physical state of buildings, number of buildings [Figure: Author of the Article].

in function (Fig. 23). However, the building development tendencies and latest building intentions show that the buildings of basic maintenance or reversible slums in nearest future will undergo extensive rebuilding or will be destroyed, which means that a significant proportion of potentially valuable buildings have already reached their critical moment and are endangered. The studies of general situation of the resort industry in Jūrmala revel that in our days resort, tourist accommodation and healthcare sector still is using almost only the buildings of the Soviet period and some buildings built before World War II. Since 1991, almost no new large-scale buildings have been built that practically operate as tourism establishments. Therefore, intensive use of aging resort buildings that are in operation requires regular improvements, that means the preservation and protection of architectural values is getting ever actual.

There is no visible regularity between the architectural quality of buildings and their preservation level, that is, the buildings of high architectural quality are not necessarily better preserved, whereas there is a particular correlation between the building preservation level and their function. The best-preserved buildings (T II, Level 6) are the ones that maintain the initial or similar functions of tourist accommodation or health treatment, whereas buildings with bigger physical changes (T II, Levels 1 and 4) undergo also the change of actual function (Fig. 24).

When analysing the functionality, most common is conversion of resort buildings into the apartment houses. As the main part of resort establishments consisted of

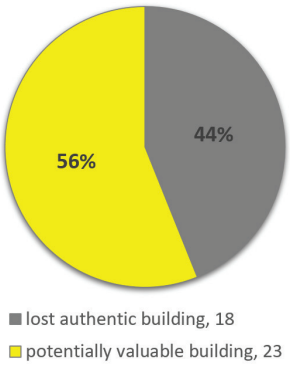


Fig. 22. Lost authentic buildings and potentially valuable buildings, percentage [Figure: Author of the Article].

Fig. 23. Concert hall in sanatorium "Jantarnij bereg". Photo: [10], 2019.

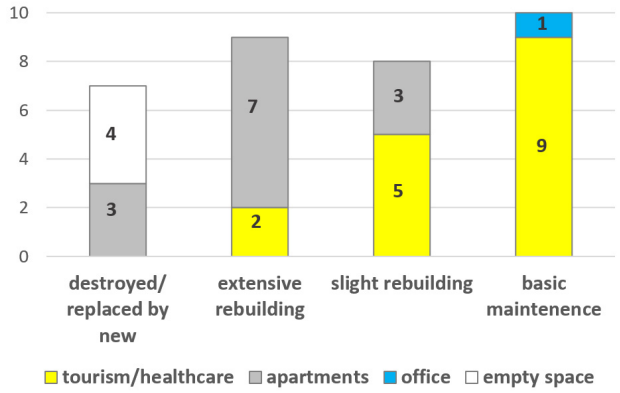


Fig. 24. Functionality of buildings after physical changes [Figure: Author of the Article].

premises for short-term accommodation and were of big size, these buildings are rather suitable for adaption to permanent living, most often using extensive rebuilding, but by doing that the authentic substance of the buildings is damaged. Also, the buildings that were completely pulled down and replaced by new structures during the rebuilding process (TII, part of the buildings of Level 1) now operate as apartment houses, but resort and tourism function is not maintained. This approach reduces overall tourism infrastructure in Jūrmala. Replaced buildings together with buildings after extensive rebuilding now represent the contemporary architecture (TIII, Level 1 and 4). Also, after pulling down the buildings where there are empty plots now, contemporary architecture will appear.

In our days, some buildings of resort development scenarios s.3, s.4, s.5 and s.7 (Fig. 8) still have sufficient level of authenticity and are potentially valuable. All scenarios have cultural and historic value, however, architecturally the most valuable might be the building complexes of scenarios s.5 and s.7, as they demonstrate the highest achievements in architecture, construction, and lifestyle in Jūrmala, among them potentially most valuable could be the following buildings: "Jaunķemeri" (A1, B.12), "Jūras līcis" (A1, B.14), "Jantarnij bereg" (A1, B.19), "Lielupe" (A1, B.22), "Belorusija" (A1, B.28), "Rīgas Jūrmala" (A1, B.29), "Starts" (A1, B.32), "Himik" (A1, B.36). Their architectural and cultural value could be of both single object and collection of buildings. Among single buildings the most valuable could be the guest house for sanatorium "Rīgas Jūrmala" (A1, B.9) and guest house "8 Luksi" (A1, B.27). In nearest future, ensuring the sustainability of architectural legacy, at least these buildings deserve appropriate official evaluation of their architectural and cultural value, corresponding recognition, and following protection according to the opportunities provided by the legislation of Republic of Latvia.

## Conclusions

1. The architecture of large-scale resort establishments of the Soviet period in Jūrmala is represented by approximately 41 buildings with three main architectural stylistics – the Stalinist style, postwar modernism, and postmodernism; the most expressive samples of architecture are those of the postwar modernism period.
2. The concept of the development of resort establishments in the Soviet period in Jūrmala was realized according to several scenarios where the most advanced scenario was construction of building complexes that were in average 80 times bigger than the historical wooden buildings; this aspect of violence is one of the main causes why up to now the architectural qualities of the large-scale resort buildings are underestimated.
3. The legacy of the large-scale architecture of the Soviet period in Jūrmala is remarkable and endangered. Almost half of the large-scale resort buildings already have lost their authentic substance, and most of the buildings that still have sufficient level of authenticity and potential cultural value have a risk to lose it in the nearest future.
4. The official reevaluation of the cultural value of buildings of the Soviet period in Jūrmala is necessary but since it has not yet been started, the large-scale resort buildings and any building of the Soviet period that still have sufficient level of authenticity should have the architectural and artistic investigation before any type of construction works in order to be aware of the cultural values; the evaluation of cultural value of building complexes, which still have sufficient level of authenticity, should be a priority.
5. Preservation of the function of buildings is crucial for the preservation of their authentic substance, whereas the practical conversion of the resort buildings into apartment buildings damages not only the authenticity of buildings but also the resort industry in Jūrmala in general.

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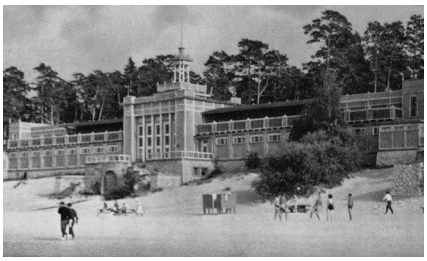
## Appendix

**TABLE A1 (A1)**

**Large-scale Buildings of the Resort Establishments of Soviet Period in Jūrmala (with colours indicating the initial function: yellow – sanatorium, cyan – guest house, red – hotel, green – creative house, magenta – tourist centre, dark green – resort healthcare) [Author of the Article]**

| | | |
|---|---|---|
|  |  |  |
| **B. 1.** 1) sanatorium "Majori"; 2) Zigfrīda Meierovica prospekts 34; 3) -; 4) extensive rebuilding of the historic building in the beginning of the 1950s; 5) 0/ 3 storeys; 6) reversible slum; 7) -/ -; 8) [7]. | **B. 2.** 1) climatotherapy pavilion; 2) 3. Līnija 1a; 3) -; 4) 1952*/ 1957; 5) wooden constructions, wide terrace; 6) destroyed, replaced by private guest house; 7) - / [9]; 8) [8]. | **B. 3.** 1) building for sanatorium "Cīņa"; 2) Edinburgas prospekts 75; 3) -; 4) 1954*/ 1959; 5) 0/ 4 storeys, 1600 m2, 6700 m3; 6) office building, basic maintenance; 7) - / -; 8) [10], 2020. |
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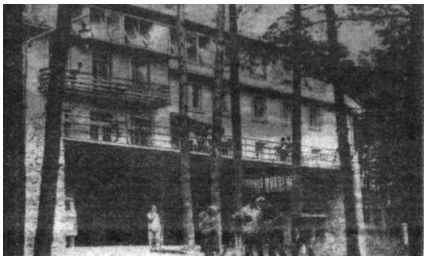
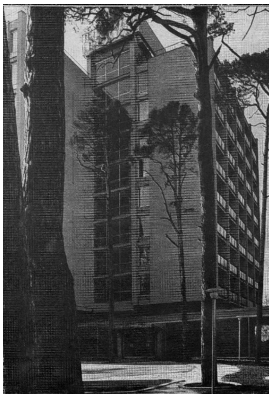
| **B. 4.** 1) accommodation building for the sanatorium of factory "ZIS" ("Zavod imeni Stalina"); 2) Katedrāles iela 7; 3) "Latgiprogorstroi", main arch. M. N. Brodskijs, Rīga; 4) 1955/ 1959; 5) 0/ 3 storeys, 1700 $m^2$, 7800 $m^3$, 100 guests, patern project; 6) irreversible slum; 7) [11] No. 1454/ -; 8) [8]. | **B. 5.** 1) creative house of Art Foundation of the Soviet Union; 2) Turaidas iela 17; 3) The Central Scientifically Experimental Design Institute of the Building and Architecture Academy of Soviet Union, leading arch. N. Šelomovs [12]; 4) 1957*/ 1962; 5) 0/ 5 storeys, functions - accommodation, ceramic workshop, museum, health treatment; 6) destroyed, replaced by guest house complex, later converted into apartment buildings; 7) -/ [9]; 8) [8]. | **B. 6.** 1) building for sanatorium "Dzintari"; 2) Dzintaru prospekts 48; 3) -; 4) 1957*/ 1962; 5) 0/ 3 storeys, 1000 $m^2$, 4900 $m^3$; 6) slight rebuilding as guest house, but is used as apartment house; 7) -/ [9]; 8) [10], 2018. |
|  |  |  |
| **B. 7.** 1) accommodation building for sanatorium "Maxim Gorkiy"; 2) Dzintaru prospekts 52/54; 3) -; 4) 1957*/ 1962; 5) -0/ 3 storeys, 1050 $m^2$, 4350 $m^3$; 6) in operation, basic maintenance; 7) - / -; 8) [10]. | **B. 8.** 1) tourist centre "Vaivari"; 2) Kauguru iela; 3)-; 4) 1959*/ 1964; 5) 0/ 4 storeys, 150 guests; 6) destroyed; 7) -/ -; 8) [13]. | **B. 9.** 1) guest house for sanatorium "Rīgas Jūrmala"; 2) Jūras iela 9/11; 3) arch. M. Ģelzis, V. Savisko, Rīga; 4) 1960*/ 1965; 5) 0/ 5 storeys, 2150 $m^2$, 8950 $m^3$; 6) representation house for the Parliament of Latvia, basic maintenance; 7) - / [9]; 8) [8]. |

**B. 10.** 1) accommodation building for sanatorium "Maxim Gorkiy"; 2) Dzintaru prospekts 68; 3) -; 4) 1960*/ 1965*; 5) -1/ 3 storeys, 2950 $m^2$, 8050 $m^3$; 6) hotel "Amber Sea Hotel & SPA", extensive rebuilding; 7) -/ [9]; 8) [10], 2018.

**B. 11.** 1) guest house for railway workers "Dzintari"; 2) Kalsnavas iela 2; 3) -; 4) 1962*/ 1967; 5) -1/ 5 storeys, 6750 $m^2$, 22 650 $m^3$, building complex; 6) under extensive rebuilding as guest house but will be used as apartment house; 7) -/ [9]; 8) [14].

**B. 12.** 1) sanatorium "Jaunķemeri"; 2) Kolkas iela 20; 3) „Latgiprogorstroi", arch. A. Reinfelds, V. Kadirkovs, V. Maike, B. Ozols, Rīga; 4) 1962/ 1967; 5) -1/ 9 storeys, 14700 $m^2$, 57 250 $m^3$, 500 visitors, accomodation and polyclinic building complex; 6) resort rehabilitation centre "Jaunķemeri", basic maintenance; 7) [9] No.63/36 / [9]; 8) [8].



**B. 13.** 1) creative house of writers named after Jānis Rainis; 2) Z. A. Meierovica prospekts 9; 3) -; 4) 1965*/ 1970; 5) -1/ 10 storeys, 5100 $m^2$, 21 100 $m^3$; 6) apartment house, slight rebuilding; 7) -/ [9]; 8) [15].

**B. 14.** 1) sanatorium "Rīgas jūras līcis"; 2) Dubultu prospekts 51; 3) "Otdel kapitalnogo stroitelstvo hozaistvenogo upravlenie upravlenia delami soveta ministrov SSSR", arch. F. Kazjutin, T. Persijaninova, V. Korokin, Moscow; 4) (design task) 1966/ 1970; 5) 1/ 10 storeys, 17 250 $m^2$, 88 550 $m^3$, 400 visitors, building complex; 6) reversible slum; 7) [9] No.145/67 / [9]; 8) [8].

**B. 15.** 1) guest house for the Academy of Science of Soviet Latvia; 2) Vikingu iela 3; 3) -; 4) 1966*/ 1975; 5) 0/ 5 storeys, 2400 $m^2$, 14 650 $m^3$; 6) currently under extensive rebuilding; 7) - / [9]; 8) [8].

**B. 16.** 1) hotel "Jūrmala"; 2) Jomas iela 47-49; 3) "Latgiprogorstroi", arch. E. Jakobsons, Rīga; 4) 1967/ 1970; 5) -1/ 10 storeys, 360 visitors, building complex; 6) same function, extensive rebuilding; 7) [9] No.118/67 / [9] No. 375, 2004; 8) [8].

**B. 17.** 1) creative house of composers; 2) Mellužu prospekts 19; 3) "Latgiprogorstroi", main project arch.: I. Jakobsons, author V. Savisko, Rīga; 4) 1968/ 1973*; 5) -1/ 6 storeys, 120 guests, concert hall for 200 visitors, building complex; 6) apartment house, extensive rebuilding; 7) [9] No.83/68 / [9] No.14, 2000, No.438, 2001; 8) [8].

**B. 18.** 1) sanatorium "Latvija", later "Līva"; 2) Tūristu iela 12/14; 3) -; 4) 1968/ 1981; 5) 10 storeys, 60 650 $m^2$, 181 200 $m^3$, 1200 visitors, building complex, by the completion time it was the biggest sanatorium in the Baltic states [16]; 6) destroyed in 2015; 7) - / [9]; 8) [16], Photo: L. Gusevs.

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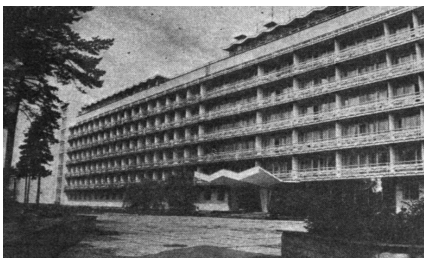
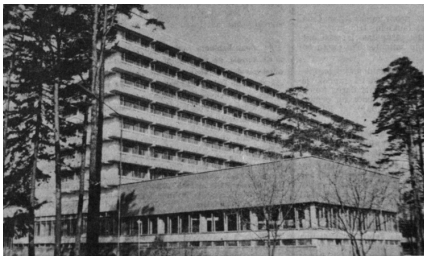
|  |  |  |
| **B. 19.** 1) sanatorium "Jantarnij bereg"; 2) Zvīņu iela 2; 3) arch. S. Kleimenovs; 4) 1969*/ 1974; 5) -1/ 8 storeys, 17 850 $m^2$, 72 900 $m^3$, building complex; 6) same function and name, buildings belong to some institution of Russian Federation, the land is rented out for 49 years [17], basic maintenance; 7) - / [9]; 8) [18]. | **B. 20.** 1) residential building and club of sanatorium "Baltija"; 2) Dzintaru prospekts 11; 3) -; 4) 1969*/ 1974; 5) 0/ 9 storeys, 7850 $m^2$, 44 150 $m^3$, 320 guests, building complex; 6) irreversible slum with approved project for rebuilding where the authentic building will be pulled down; 7) -/ [9] No. 26148; 8) [8]. | **B. 21.** 1) accommodation building of sanatorium "Majori"; 2) Ērgļu iela 4; 3) -; 4) 1970*/ 1975; 5) -1/ 10 storeys, 200 guests; 6) apartment house, extensive rebuilding; 7) -/ [9]; 8) [19]. |
|  |  |  |
| **B. 22.** 1) guest house "Lielupe"; 2) Bulduru prospekts 64/68; 3) "Sojuzkurortprojekt" branch of Latvia, main arch. Nozdračovs, Rīga; 4) 1970/ 1975; 5) -1/ 10 storeys, 18 400 $m^2$, 69 650 $m^3$, 600 visitors, building complex; 6) hotel "Semarah Hotel Lielupe", slight rebuilding; 7) [9] No. 50/72/ [9]; 8) [20]. | **B. 23.** 1) new guest house building for the Academy of Sciences of Soviet Latvia; 2) Vikingu iela 3; 3) -; 4) 1970*/ 1975; 5) 0/ 10 storeys, 220 guests; 6) destroyed; 7) - / [9]; 8) [8]. | **B. 24.** 1) tourist centre "Vaivari"; 2) Kauguru iela; 3) -; 4) 1970*/ 1975; 5) 0/ 3 storeys, 100 guests; 6) destroyed; 7) -/ -; 8) [21]. |
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| **B. 25.** 1) accommodation building for sanatorium "Majori"; 2) Ērgļu iela 2; 3) -; 4) 1970*/ 1975; 5) -1/ 5 storeys, 7400 $m^2$, 25 550 $m^3$; 6) destroyed, replaced by new structures of guest house, but is used as apartment house; 7) - / [9]; 8) [8]. | **B. 26.** 1) accommodation and swimming pool building for sanatorium "Dzintari"; 2) Piestātnes iela 16; 3) -; 4) 1870*/ 1975*; 5) 0/ 7 storeys, 3450 $m^2$, 13 850 $m^3$, building complex; 6) currently under extensive rebuilding; 7) -/ [9]; 8) [22]. | **B. 27.** 1) guest house "8 Luksi"; 2) Jūras iela 41/45; 3) State Committee for Civil Construction and Architecture of the USSR for the Spectator and Sports Constructions", main architect-author: E. Rozanov, Moscow; 4) 1971/ 1978; 5) 1/ 8 storeys, 3100 $m^2$, 14 200 $m^3$, 8 premium quality guest apartments, with additional swimming pool building; 6) reversible slum; 7) [9] No. 82/71 / -; 8) [10], 2020. |

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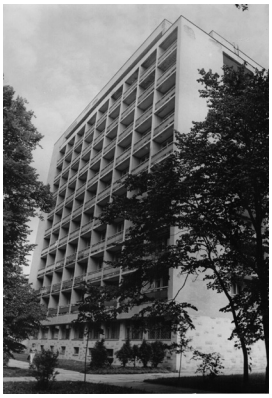
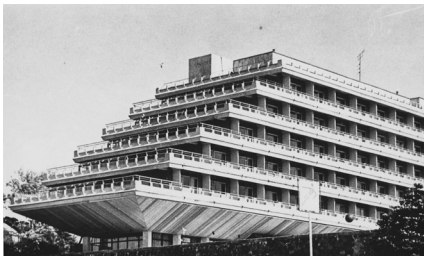
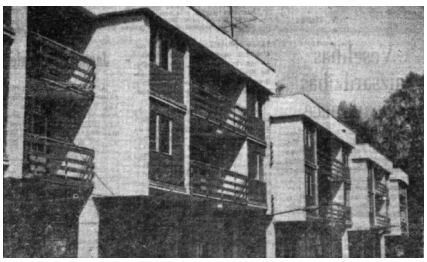
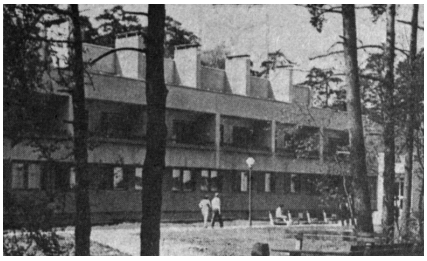
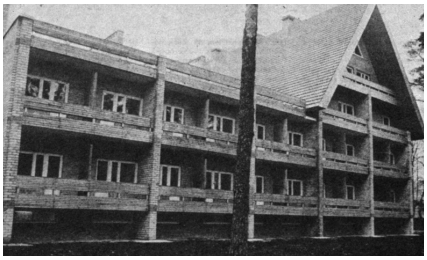
|  |  |  |
| **B. 28.** 1) sanatorium "Belorusija"; 2) Bulduru prospekts 4/8; 3) "Belgosprojekt", workshop AKM-3, leader of the workshop: Baklanov, Minsk; 4) 1971/ 1985; 5) -1/ 11 storeys, 11 120 $m^2$, 50 700 $m^3$, 300 guests, building complex; 6) same function, same name, slight rebuilding; 7) [9] No. 157/ 71 / [9]; 8) [23]. | **B. 29.** 1) accommodation building for sanatorium "Rīgas Jūrmala"; 2) Jūras iela 23/25; 3) "Latgiprogorstroi", arch. V. Valgums, N. Pavārs, M. Ģelzis, Rīga; 4) 1977/ 1982; 5) -1/ 7 storeys, 8050 $m^2$, 26 800 $m^3$, 100 visitors, building complex; 6) hotel "Baltic Beach Hotel & SPA", slight rebuilding; 7) [7] No. 7695 / [9]; 8) [8]. | **B. 30.** building for the guest house "Melluži"; 2) Ģertrūdes prospekts 4; 3) -; 4) 1977*/ 1982; 5) 0/ 3 storeys, 1700 $m^2$, 7100 $m^3$; 6) in operation, basic maintenance; 7) - / -; 8) [24]. |
|  |  |  |
| **B. 31.** Creative house of the State Committee for Television and Radio Broadcasting; 2) Strēlnieku prospekts 38; 3) "Lattgiprogorstroi", arch. supervisor B. P. Kadirkovs, project main arch. E. K. Bušs; 4) 1977/ 1983; 5) 0/ 3 storeys, 6300 $m^2$, 33 300 $m^3$, 190 guests, accommodation building and cottages; 6) municipal authority "Jūrmala Health Promotion and Social Services Centre", basic maintenance; 7) [9] No. 199/ 79 / [9]; 8) [25]. | **B. 32.** 1) guest house "Starts"; 2) Asaru prospekts 61; 3) "Predpriatie M-5835", main proj. arch. Nazarov, Moscow; 4) 1977/ 1985; 5) -1/ 9 storeys, 21400 $m^2$, 74 400 $m^3$, 500 guests, building complex with a medical block; 6) National Rehabilitation Centre "Vaivari", slight rebuilding; 7) [9] No. 3287/ [9] No. 692, 2010; 8) [26]. | **B. 33.** 1) guest house "Enerģētiķis", later "Impulss"; 2) Dubultu prospekts 101; 3) -; 4) around 1977/ 1987; 5) 1/ 10 storeys, 7650 $m^2$, 29 523 $m^3$, 264 guests, building complex; 6) after 1991 hotel "Liesma", now reversible slum; 7) -/ [9]; 8) [27]. |

**B. 34.** 1) guest house for personal pensioners of the Ministry of Welfare of Latvian Soviet Republic; 2) Dubultu prospekts 71; 3) 1st stage: "Kurortprojekt", arch. team leader: Babushkins, 2nd stage: "Latgiprobit", team leader: Barkan, Rīga; 4) 1978/ 1986; 5) 0/ 6 storeys, 11 600 $m^2$, 44 650 $m^3$, building complex; 6) The Social Integration State Agency "SIVA", slight rebuilding; 7) [9] No. 68/ [9] No. 13982; 8) [8].

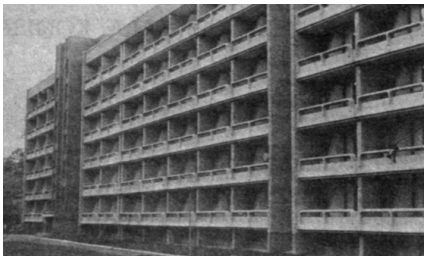
**B. 35.** 1) accommodation building for sanatorium "Dzintari"; 2) Dzintaru prospekts 48; 3) -; 4) 1978*/ 1983; 5) 0/ 3 storeys, 1500 $m^2$, 6250 $m^3$; 6) slight rebuilding, currently used as apartment house; 7) -/ [9]; 8) [10], 2020.

**B. 36.** 1) guest house "Himik", from 1989 "Daina"; 2) Mežsargu street 4/6; 3) "Latgiproprom", leader of arch. group A. Zelle, Rīga; 4) 1979/ 1988; 5) -1/ 7 storeys, 12 900 $m^2$, 48 550 $m^3$, 250 visitors, building complex; 6) hotel "Daina", basic meintenance; 7) [9] No. 81/7 / -; 8) [28].

**B. 37.** 1) accommodation building for sanatorium "Dzintari"; 2) Piestātnes iela 14; 3) "Specialnoe proektno-konstruktornoe buro", arch. Belova, Rīga; 4) 1980/ 1984; 5) -1/ 4 storeys, 2300 $m^2$, 10 250 $m^3$, 120 visitors, building complex; 6) health and sports centre "Dzintari" for the Ministry of the Interior, basic maintenance; 7) [9] No. 80166/ -; 8) [29].

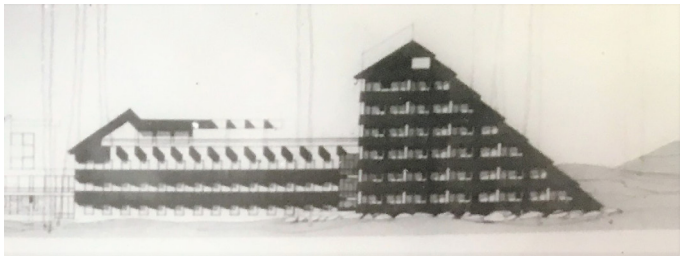


**B. 38.** 1) accommodation building for "Fabricius" sanatorium; 2) Jūras iela 49; 3) "Kurortproekt", arch. V. S. Nozdracevs, Rīga; 4) 1981/ 1989; 5) -1/ 5 storeys, 88 guests; 6) in operation, basic maintenance; 7) [9] No. 16140 /-; 8) [30].



**B. 39.** 1) accommodation building for sanatorium "Rīgas Jūrmala"; 2) 29. Līnija 1; 3) -; 4) 1982*/ 1987; 5) 0/ 7 storeys, 504 visitors; 6) apartment house, extensive rebuilding; 7) -/ [9] No. 198, 2001; 8) [31].

**B. 40.** 1) Sanatorium for the Ministry of Defence and Industry of the USSR; 2) Raga iela 1; 3) arch. O. Krauklis; 4) around 1985/ never finished; 5) -1/ 9 storeys, building complex; 6) reversible slum; 7) -/ -; 8) [32].



**B. 41.** 1) new accommodation building for sanatorium "Baltija"; 2) Dzintaru prospekts 13/15; 3) "Soyuzkurortproekt", arch. Petrov, Zjablickaya, Moscow; 4) 1987, 2004/ 2007; 5) -1/ 7 storeys; 6) guest house used as apartment house, extensive rebuilding; 7) [9] No. Dzintaru11/ [9] No. 536; 8) [9] Dzintaru11.

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# Visual Identity of Riga 21st Century Multi-Apartment Developments

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**Keywords**

Contemporary architecture, Riga, urban housing, visual identity.

**Abstract**

It is claimed that rapid changes, including globalization and urbanization, may lead to uniform urban environment. Therefore, it is crucial to address issues in terms of local architecture. This research particularly focuses on the visual identity of Riga 21st century residential developments. Theoretical studies and empirical research methods were used. According to the research results, the most typical characteristics are linear building blocks, symmetric arraignment of façade elements, polychrome façade colour approach and usage of white/grey/black colour palette. However, considering variety of visual expressions as well as different architectural and spatial situations, there cannot be determined one exact visual identity.

## Introduction

Urban environment is changing over time, including under influence of new construction. It is widely claimed that in times of globalization and urbanization, architecture starts to lose its local character and identity. In Riga, during the past two decades more than 24 thousand new apartments have been constructed [1]–[3]. However, it is not clear, how these developments contribute to visual quality and overall expression of urban environment identity. This paper defines the following research questions: What is the concept of identity in built environment? What is the context of residential environment development? What are the main trends and approaches regarding visual identity of the 21st century new residential developments in Riga?

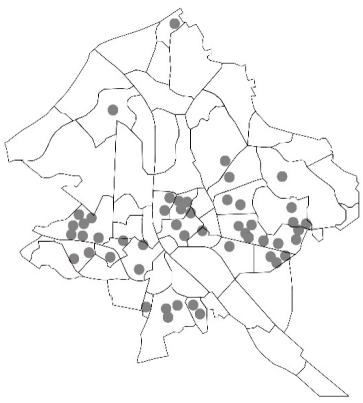

Fig. 1. 50 largest apartment complexes built in Riga from 2000–2019 [4]–[6].

The main research object are developments which were built during 2000–2019. For more detailed research, 50 largest residential projects with at least 2 buildings and completed first construction phase were selected. Review of relevant scientific literature was used to ground the theoretical framework. The analysis of legislation, urban plans and other documented sources was used to explore the Riga city context. Field studies were used to collect and analyse empirical data. Comparative analysis method was used to identify common visual characteristics of Riga contemporary housing developments.

## I. Identity of Built Environment

### A. Place Identity, Sense of Place and Urban Branding

According to K. Lynch, identity can be defined as 'the extent to which a person can recognize or recall a place as being distinct from other places' [cited in 7]. Environmental and social psychologists Harold M. Proshansky, Abbe

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K. Fabian, and Robert Kaminoff, stated that one of a person's self-sub-structures is a place identity, which is based on experiences and feelings of physical environment [8]. As stated by Montgomery, place is a middle point of relationships between activities, form and image. Form depends of such factors as scale, intensity, space to building ratios, etc. Image consists of attributes like symbolism, receptivity, psychological access and others. In turn, activities include vitality, street life, events, flow, etc. [9]. Sense of place has been widely discussed and investigated across many disciplines, including human geography, psychology and others. As stated by Tuan, the sense of place is 'the meanings and attachment to a setting held by an individual or group' [cited in 10]. For effective sense of place, it is necessary to achieve diversity and place identity, thus forming imageability, visual enclosure and other perceptual qualities. In contrary, homogeneity can lead to weak sense of place. However, also less pleasing architecture in some cases may have high artistic value by local inhabitants due to the impact of culture, social interactions, meanings and other aspects [11]. Urban branding is a new concept which is implemented to achieve certain sustainability goals and promote the city's image. To achieve effective image, there are used two types of elements. Firstly, those which create every urban structure, such as described in K. Lynch's theory: paths, edges, districts, nodes, and landmarks, and secondly, unique characteristics, such as colours, skyline, cultural activity, etc. which are specific to the particular place. Urban branding can help to elevate city image, achieve competitive advantages and strengthen economic performance [12].

### B. Physical Features

Although theories of place identity, sense of place and urban branding emphasize the role of culture, psychology and other dimensions, they all take place in a built environment. Human brain records and proceeds visual inputs of surroundings, which in real time gives outputs, so people can act accordingly [13]. Therefore, architecture and its physical features play a significant role. These features shape architectonic perspective, connect exterior with interior and provide continuity of development in existing urban structure [14]. One of the main physical features of architecture is a form. As stated in E. N. Bacon's book "The Design of Cities": "Architectural form is the point of contact between mass and space.... Architectural forms, textures, materials, modulation of light and shade, colour, all combine to inject a quality or spirit that articulates space. The quality of the architecture will be determined by the skill of the designer in using and relating these elements, both in the interior spaces and in the spaces around buildings" [cited in 15]. In 1896, in his essay "The Tall office Building Artistically Considered" architect Louis H. Sullivan introduced the phrase "form follows function". According to Sullivan, everything in nature has a form which helps to distinguish that from others. Moreover, the form of a building not only attracts the eye to the exterior and creates the first impression but also may generate an idea of the building function [16].

Character of buildings in the last centuries has been influenced by several ideas and developed variety of discourses. The Adolf Loos essay "Ornament and Crime", the Ludwig Mies van der Rohe's phrase "Less is more" or Robert Venturi's phrase "Less is a bore" – all can be interpreted in terms of architectural identity. In creation of architecture, the mass and spaces are arranged into composition. During the design phase, different elements obtain their own place in accordance with the main concept and approach of the overall composition. This order generates the character and appearance of the final design. To achieve a certain character of the building, specific compositional principles are used in design, such as symmetry, contrast, hierarchy, rhythm and others. For example, symmetry creates the feeling of security, safety and solidity. In turn, contrast creates variety and visual interest [17].

At the beginning of the 20th century, colour usage in built environment has been influenced by Le Corbusier, B. Taut, Rietweld, L. Barragan and others. In 1924, in Utrecht Schröder House designed by Rietweld was completed. It was the first architectural manifesto by the De Stijl group. Each plane was classified by different colour. For surfaces the shades of grey, white and black were used, but for linear elements – red, blue and yellow [18]. This example emphasizes that also colour can be used as an architectural expression attribute. It may create different characteristics, such as harmony, unity or contrast. Moreover, it can affect people's perception, psychological mood and response to their surroundings [19]. Similarly, the director of Haus der Farbe, Steffanie Wettstein, states that "Colour can be used strategically to orchestrate spatial sequences or to visualise tectonics; it can support light and shadow, make surfaces an optical and haptic experience and much more. Colour is one of the oldest architectural design elements – colourless architecture does not exist." [20].

## II. The Riga Context

### A. Historical Evolution

Identity of built environment is a phenomenon created by contextual conditions. In this regard, historical evolution is one of the main aspects. Since the 13th century, a great architectural heritage of Riga has been built, which nowadays is included in UNESCO world heritage list. One of the most famous medieval period architectural masterpieces is residential building ensemble *Trīs brāļi* (Three Brothers). Two of these buildings reflect

medieval layout characteristics, where large entrance halls are located on the ground floor, living rooms on the yard side and storages on upper floors. However, these buildings partially have been modified in the 19th century (Table I a). Baroque style at best can be characterised with richly decorated mansard roofs of rich citizens (Table I b). In the Classicism period, great attention was paid to the clarity of forms and rational expression, modelled on the classically 'pure' architecture of ancient Greece. Timber residential buildings of the Classicism period mostly had a side extension for entrance function, but in the mezzanine were located 3 or 5 windows (Table I c) [21]. As in many other European cities, medieval fortifications were destroyed in the middle of the 19th century and replaced with a unique belt of boulevards [21], [22]. In the second half of the 19th century, during the Eclecticism period, for the artistic decoration of buildings was used as formal means of expression of all styles previously known in history, choosing them according to the building's meaning, location or other circumstances (Table I d). At the beginning of the 20th century Art Nouveau took the lead. The facades of Art Nouveau buildings are decorated with relief lines, circles and plant stylizations incorporated into the architectural design of the building's basic form. Moreover, the complex window layout matches the convenient interior design and overall planning [21] (Table I e). Art Deco was a reflection of Art Nouveau style in the twenties of the 20th century. It is characterized by the use of ornaments inscribed in semicircles or other geometric figures, edged and exalted, but relatively restrained in the decoration of building facades or interiors (Table I f). Modern Movement or Functionalism was the main style in the thirties of the 20th century. It completely abandoned ornamental decorations, thus creating the art of 'clean' planes and volumes. Buildings of this style are distinguished by a strongly articulated, cubic structure of building structures, flat roofs, horizontal window strips and wide glazing (Table I g) [22]. After World War II, it was necessary to manage the damage of the war, including the restoration of housing stock. New political situation and ideology, and prefabrication of construction elements, led to massive standard construction of large-scale housing estates [21], [22] (Table I h). After independence, in 1991, spatial planning of the country experienced a transition to a free-market economy, privatization, and

**TABLE I**

**Evolution of Riga Residential Architecture (Photo: Author, Description [21])**

| **a) Gothic** | **b) Baroque** | **c) Classicism** | **d) Eclecticism** |
|---|---|---|---|
|  |  |  |  |
| *Trīs brāļi*,<br>17, 19, 21 Mazā Pils Street.<br>15th–20th century | *Hartmaņa muižiņa*,<br>28 Kalnciema Street.<br>The end of the 18th century | Residential building,<br>14 Baznīcas Street.<br>19th century | Residential rental building,<br>1 Pulkveža Brieža Street. 1883.<br>Arch. E. fon Trompovskis |
| **e) Art Nouveau** | **f) Art Deco** | **g) Modern movement** | **h) Socialist Realism** |
|  |  |  |  |
| Residential building,<br>4 Alberta Street, 1904.<br>Arch. Mihails Eizenšteins | Residential rental building<br>with shops, 62 Aleksandra Čaka<br>Street, 1926 | Residential rental building with<br>shops, Brīvības street 38, 1934.<br>Arch. A. Klinklāvs | Typical Soviet-era, residential<br>building, Type 602.<br>70s of the 20th century |

the democratization of social and cultural life [21]. The most appropriate examples in Table I, as well as in further tables, are chosen to represent each particular style/ characteristic.

Riga historical residential environment is not only in many cases valuable architectural heritage but also sets the context for further urban developments. The analysis of historical evolution defines three main settings. Firstly, Riga historical centre and its protection zone with rich historical heritage since the 13th century. Secondly, residential neighbourhoods of Soviet era with standard large-scale housing estates. Thirdly, new development areas without direct impact of historical constructions.

### B. Identity Determination

Search for identity is a global issue. At the moment Riga faces a lot of challenges, including weak regulatory framework, ineffective cooperation, poorly developed rental market, urban sprawl and others. One of the Sustainable Development Strategy goals is to ensure "quality living environment and accessible housing" [24]. To achieve this goal, it is planned to renovate existing residential buildings, promoting new construction of different housing forms, thus creating offers for wide range of households, developing appropriate rental market, expanding support regarding housing issues, enlarging social housing stock, etc. [23]. Moreover, According to Sustainable Development Strategy, in 2030 Riga should be an internationally recognized metropolis of Northern Europe [24]. Identity of urban environment is one of the issues arising in this context and global tendencies. As stated by *Rem Koolhaas*, a national identity has been sacrificed to modernity [25]. However, according to the Davos Declaration the central role in the built environment has to be paid to culture: "Culture enables and drives economic, social and environmental sustainability. It shapes our identities and defines our legacies. Therefore, culture must be placed at the centre of development policies, and its contribution to the pursuit of the common good must be emphasised. There can be no democratic, peaceful and sustainable development if culture is not at its heart." The Davos Declaration also stresses the need for a high-quality *Baukultur*, which improves the sense of place, fosters an inclusive society and promotes integration and civic awareness [26].

Latvian architecture is an integral part of national identity. Architecture forms the spatial identity of the region and affirms special qualities in the local context [27]. Although identity in any field is difficult to define precisely, the Nordic sense, as well as influence of Nordic architecture in Latvia can be traced since the beginning of the 20th century as well as the direction of national romanticism. The Nordic mentality, including the related language of form and social ideas, were binding Latvian architects in the wave of post-war modernism in the 20th century. Even now, a Nordic sense of belonging is associated with the future of Latvian architecture [27]. As stated by *Artis Zvirgzdiņš*, an editor of the A4D architectural platform, identity consists of two main aspects. The first one is what we strive for, in other words, an image what we want to achieve. The second aspect is what we are in reality, including our existing spatial environment and everything what is already built. *A. Zvirgzdiņš* points out that it is not worth looking for identity in national forms and clichés, but it has to be found in a deeper meaning of Architecture – its functionality, respect of the place and context and added value to society [28]. As mentioned by architect *Brigita Bula*, Latvian architecture at the moment does not have a stabilized identity, but there is a tendency to look forward to it. However, the search for identity abroad has resulted in repetition of foreign architecture without the context. *B. Bula* states that modern identity should be found by looking around, evaluating the context of the place and interpreting them in a new way with materials and possibilities of nowadays [29].

## III. Visual Identity Assessment

Identity of urban environment is a complex concept and includes a variety of aspects. Some of them such as materiality needs in-depth data about project design and construction. This research is based on field studies, and assessment of visual identity is limited to three attributes which jointly frame the individual characteristic of a building. These attributes are: overall building form, composition of facade elements, and colour approach/palette of facades. This is the first step towards investigation of architectural identity in Latvian contemporary housing architecture. Further studies could explore material usage, including the impact of texture, light and other factors.

### A. Building Form

Building form depends on a wide range of factors such as plot configuration, building regulations, and others. However, the form has a huge impact – it can create interest and sense of belonging, or contrary a monotonous look, difficulties to orient, etc. [13]. The study findings show that mostly linear blocks are used, which in most cases reflects the surrounding building and blends in the context. However, in 28 % of cases tower blocks are used. These cases mostly are height accents of neighbourhood. Remaining projects used shaped, curved blocks, or mixed strategies. In general, it can be concluded that various strategies have been implemented, thus creating overall diverse urban environment expressions (Table II).

**TABLE II**

**Building Forms of Riga Contemporary Urban Housing (Photo, Description: Author, Maps: adapted from [4])**

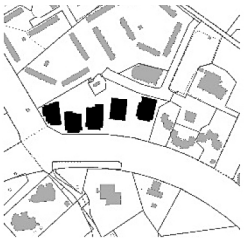
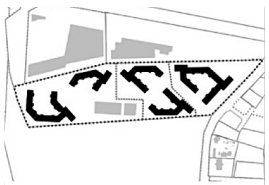
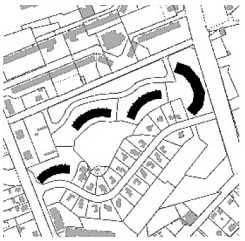
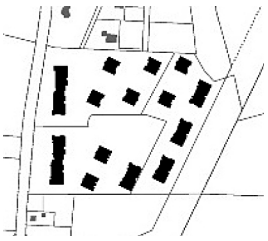
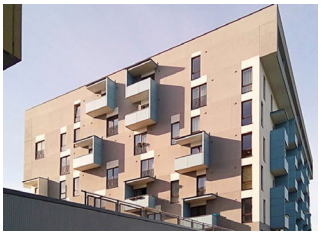
| Tower blocks | Linear blocks | Shaped Blocks such as L-shape, U-shape, etc. | Curve blocks | Mixed type blocks, e.g. linear and point type blocks |
|---|---|---|---|---|
| **28 %** | **40 %** | **10 %** | **6 %** | **16 %** |
| Ussually high rise buildings with a core for vertical and technical communications. Due to relativly small footprint, a free space is saved. However, if proportions are too exaturated, sense of human scale may be lost | Divisions of staircases with apartments, which are alligned in a row. If a linear block is too long, it may have a monotonous look. To avoid that, vertical sections are used, such as lined balconies | Shaped blocks provide moderate complexity of space and creates inner yards and more private spaces. However, too complex configuration can make it difficult to orient | Curves create inner spaces with a milder complexity than shaped blocks. However, if a curve is too long, monotonous look, as in the linear block case, can be generated | Mixing strategies allow to maximize the plot build ability and to achieve moderate complexity. However, if blocks are too different, the integration and united look can be hard to reach |
| **Project Metropolia** | **Project NCC Mājas** | **Project Kaivas iela** | **Project Tobago** | **Project Jaunbiķeri** |
|  |  |  |  |  |
|  |  |  |  |  |

**TABLE III**

**Main Composition Approaches of Riga Contemporary Urban Housing**

| Composition by arraignment | | Composition by axis | |
|---|---|---|---|
| **Symmetric** | **Asymmetric** | **Horizontal** | **Vertical** |
| **40 %** | **16 %** | **16 %** | **28 %** |
| Arraignment in lines creates symmetry and emphasizes monumentality of the building mass | Building elements arraigned in asymmetrcal way create more variation and dynamism | Cascade terrasses visually shorten the building, thus making it more human scale appropriate and lighten the mass of the whole building | Vertical division of a building visually slimms it and gives richness of the form expression |
| **Project *Rembates nami*** | **Project *Ezerparka nami*** | **Project *Vienības nami*** | **Project *Panorama Plaza*** |
|  |  |  |  |

Composition of Facade Elements

The main building mass includes different elements such as windows, balconies, terraces, etc. These elements not only reflect functional aspects of the building by bringing natural light indoor and providing private outdoor spaces but also plays a significant role in the overall characteristic and aesthetics of the building. Therefore, it is important to pay attention to the element arraignment and compositional approach. The study findings show that mainly symmetry and asymmetry and composition by horizontal or vertical axis are used (Table III). Symmetric approach reflects and integrates well in existing surroundings of historical areas of old

**TABLE IV**

**Colour Concepts of Contemporary Urban Housing Developments**

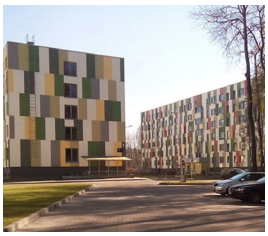
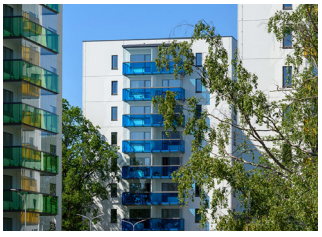
| Monochrome | Polychrome | | | |
|---|---|---|---|---|
| **18 %** | **6 %** | **14 %** | **45 %** | **18 %** |
| | **Vertical section** | **Horizontal section** | **Pop-up accents** | **Throughout pattern** |
| Works as a background for different elements and highlight the building form, thus creating more monumental look | Visually divides the building in smaller segments and slimms it, thus achieving a finer and taller look of a relativly massive block | Visually divides high-rise buildings and shortens them to achieve more appropriate look for human scale | Brigh colours appear on an ordinary and calm facade. Here the colour contrast and random arraignment plays a significant role | By usage of one pattern throughout all facades a united and visually saturated look is created |
| **Project *Stopiņu iela*** | **Project M Park** | **Project *Filozofu rezidences*** | **Project *Ulbrokas iela*** | **Project *Imantas 8. līnija*** |
|  |  |  |  |  |

**TABLE V**

**Colour Pallet of Riga Contemporary Urban Housing (Photos: Author, Description [30], [31])**

| Yellow/Green | Blue/Purple | Red/Orange/Brown | White/Grey/Black |
|---|---|---|---|
| **15 %** | **2 %** | **37 %** | **46 %** |
| **Project *Liepziedi*** | **Project *Akācijas*** | **Project *Biķerziedi*** | **Project *Magdalēnas kvartāls*** |
|  |  |  |  |
| *Yellow*<br>+ cheering, positive, vital, radiant, creates curiosity and a bright atmosphere<br>– egocentric, glaring effect | *Blue*<br>+ relaxing, calm, secure, noble and comfortable<br>– depressive, cold and melancholy | *Red*<br>+ excitement, stimulation, passion, strength, activity<br>– too intense, aggressive | *White*<br>+ cleanliness, brightness, universal<br>– empty, sterile effect |
| *Green*<br>+ refreshing, relaxing retiring colour, evokes serenity, calmness and well-being<br>– tiresome | *Purple*<br>+ soft, calm, creates dignified and exclusive effect;<br>– lonely, pompous and conceited effect | *Orange*<br>+ exciting, cheering, creative, intensive, enthusiastic, euphoric<br>– intrusive and blustering effect | *Grey*<br>+ neutral to calming, background<br>– boring |
| | | *Brown*<br>+ subduing colour, warm, secure and stable effect<br>– oppressive and heavy | *Black*<br>+ ominous colour, deepness and abstraction<br>– night, grief and death |

towns as well as in large-scale housing estates of Soviet era. While asymmetric approach, which creates dynamism, is contrasting with surrounding and works more as an accent. Horizontal and vertical section of buildings helps to divide the building's overall form, thus creating building mass appropriate to human scale and integrating it in the surroundings with smaller and/or lower buildings.

Colour Concept

Facade colour concept also plays an important role in terms of visual identity. Colour approach can create two different outcomes. It can either lead to integration of new construction in existing surroundings or create a contrast of the new and old construction. Results show that monochromatic colour concept is rarely used, whereas polychromatic colour concept is used widely (Table IV). Furthermore, in old town and heritage protective areas, the regulations require integrity, while in new development and periphery areas more contrasting approaches can be observed.

Colour Palette

Regarding visual identity, not only the overall colour concept but also specific colour plays a significant role. Colour palette as colour approach also may create an integrated or contrasting effect in comparison to the surrounding buildings and nature. Moreover, these colours have also a psychological effect. The study shows that wide variety of grey, yellow and red colours are used (Table V).

## IV. Main Results and Discussion

The main results of visual identity assessment are presented in Table VI.

Throughout centuries the main styles of architecture could be determined by visual attributes such as vertical lines in Gothic and ornamentation of Art Nouveau. The most typical characteristics of Riga 21st century residential developments are linear building blocks, symmetric arraignment of facade elements, polychrome facade colour and usage of white/grey and black colour palette. However, it is not possible to identify one exact visual identity for whole Riga, instead we can observe various trends and approaches. This can be explained by a very rich Riga city urban heritage, which leads to the situation where each part of the city has its own uniqueness and forms diverse obstacles for further development and new construction. Furthermore, new residential developments reflect also current building codes, socio-economic situation as well as architectural practices and other dimensions. In this complexity, it may be more appropriate further to focus on architectural grade and *Baukultur* as mentioned in the Davos Declaration [26], which may also frame the new identity of Latvian architecture.

**TABLE VI**

**The Main Visual Identity Assessment Results**

| Visual identity aspects | Characteristic | Incidence share |
|---|---|---|
| Building form | Tower blocks | 28 % |
| | Linear blocks | 40 % |
| | Shaped blocks | 10 % |
| | Curved blocks | 6 % |
| | Mixed type | 16 % |
| Facade element composition | Symmetric arraignment | 40 % |
| | Asymmetric arraignment | 16 % |
| | Horizontal axis | 16 % |
| | Vertical axis | 28 % |
| Facade colour approach and palette | Monochrome | 18 % |
| | Polychrome | |
| | • vertical section | 6 % |
| | • horizontal section | 14 % |
| | • pop-up accents | 45 % |
| | • throughout pattern | 18 % |
| | Yellow/Green | 15 % |
| | Blue/Purple | 2 % |
| | Red/Orange/Brown | 37 % |
| | White/Grey/Black | 46 % |

## Conclusions

Identity of urban environment is a complex concept and has a wide effect on different spheres, including sense of place and human psychology. Due to globalization and urbanization, more and more urgent become issues regarding local context and culture in architecture. Riga has a rich history of architecture which is an important part of new developments. However, identity of 21st century Latvian architecture has not been clarified yet. There are still searches and different discourses, including attempts to identify with Nordic mentality.

Actual physical environment plays a significant role in place identity, sense of place and urban branding. This particular study focuses on three main visual attributes – building form, facade element composition and facade colour. This study provides the first comprehensive assessment of visual identity of Riga contemporary urban housing. The most typical characteristics identified are as follows: linear building blocks, symmetric arraignment of facade elements, polychrome facade colour and usage of white/grey and black colour palette.

In general, this study shows that Riga contemporary urban housing developments have a wide range of visual expressions, thus complementing and enriching urban environment. However, absence of clear Latvian

architecture identity and usage of formal solutions hinders formation of unique local identity. Further studies could focus on two discourses. Firstly, on resident satisfaction, perception and behaviour, to link the knowledge of physical attributes to actual impact on residents. Secondly, on contextual issues, including architectural grade and *Baukultur*, especially in terms of regeneration and renovation projects, to achieve integrated approach for further development.

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# Ability of Architects to See Autopoietic Environmental Features

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**Keywords**

Autopoiesis, autopoietic environmental features.

**Abstract**

**This article discusses the way of rating the competency of architects through their ability to recognize the autopoietic properties of architecture in developed urban projects. The following theoretical methods were used: abstraction, analogy, generalization and reasoning. Metalanguage of consideration (opposite to directive metalanguage) embedded in projects displays the fact, that a person is able to recognize such autopoietic features as connotations, memory traces, that are important for continuity of locus cultural identity.**

## Introduction

The way architects now are considering, seeing the world of architectural problems, is a serious obstacle preventing them from unfolding their creativity in work with the historic urban environment. It is often because of the classical worldview relics still remaining in thinking. An understanding of the autopoietic features of architecture itself related with the rise of non-clasical paradigm may help to get rid of outdated views. In order to perceive autopoietic qualities, a certain level of person's (whether it is an architect, an official, or a member of public) competency is required (competence may be acquired, while the competency may be developed). In order to recognize these qualities, education of architects should be based on non-classic and sinergetic paradigm.

The aim of the article is to present the criteria for assessing the level of cultural and ecological competency of architects considering their ability to recognize the autopoietic properties of architecture. The following tasks were set: 1) to review the idea of autopoiesis; 2) to distinguish and disclose peculiarity of two thinking modes that are based both on classical world view and on the non-classical view; 3) to discuss the autopoietic features of architecture; 4) to propose criteria for evaluating capability to recognise autopoietic features by architects, to discuss examples of competency evaluation.

In elaboration of knowledge presented in this article, the following theoretical methods were used: abstraction, analogy, generalization, reasoning (inductive, deductive, abductive), analysis and synthesis.

## I. The Idea of Autopoiesis

A new approach in cognitive science, developed by Francisco Varela and his colleagues, was called *emergence* or *connectionism* [1], [2]. It was based on a concept that tasks related with seeing and memory are better handled when a system has been set of simple components connected according certain rules. It was found that such system can better generate global behaviour appropriate to the aspired task. This view underlines the network quality of systems and the spontaneous emergence of global patterns – when the states of all engaged components achieve a commonly satisfactory state, without the need for a central processing unit to navigate the entire operation [3, *243, 244*].

Nonetheless, Varela finds the limits of connectionism. It still asserts that cognition is a successful representation of an external world which is *pregiven*. Soon he argumented that external world is "not pre-given, but *enacted* or *brought forth* from a background, and what counts as relevant is what our common-sense sanctions as such, always in a contextual way" [3, *250, 251*]. Varela calls his own approach

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*enactive cognitive science* [1]. This approach arose from the theory of autopoiesis that he developed with H. Maturana [4], [5].

The word *autopoiesis* refers to self-producing or self-making and is used by Maturana and Varela to be attributed to the 'organization of the living' and to the basic definition of what describes a biological entity as being 'alive' [5]. The most compelling feature of an autopoieitic system is that it brings itself up by its own 'bootstraps' (it means – get oneself into or out of a situation using existing resources) and becomes evident from its environment through its own dynamics in such a way that both things are inseparable [6].

According to the concept of autopoiesis living beings are *autonomous* unities [5, *47*]. R. Hallowell, presenting the contribution of Varela and Maturana, explains: "Theory of autopoiesis demonstrates how biological entities, through the organization of their components, self-produce the structures that define them as living beings and how they interact with their environment through, what they call, *structural coupling*" [6, *149*]. According to Maturana and Varela, "Structural coupling <...> is a history of recurrent interactions leading to the structural congruence between two (or more) systems" [5, *75*]. The structural coupling between systems is constrained by the inner structure of the autopoietic entity [6, *149*].

Humberto Maturana and Francisco Varela argue that one of the most crucial features of an autopoietic system is its *operational closure* [5]. The definition of operational closure states that "system maintains its organization, structure and integrity in the face of perturbations from the environment" [6, *149*]. According to Maturana and Varela: "The <...> system's organization is a network of active components in which every change of relations of activity leads to further changes of relations of activity. Some of these relationships remain invariant through continuous perturbation both due to the <...> system's own dynamics and due to the interactions of the organism it integrates. In other words, the <...> system functions as a closed network of changes in relations of activity between its components" [5, *164*].

Ronan Hallowell states: "This does not mean that the <...> system does not have plasticity or that it is not affected by its interaction with the environment. The operational closure of the <...> system preserves the organization of the components that comprise it and allows it to remain intact while it on-goingly interacts with the environment. If it did not maintain this organization and structure, then it would cease to exist as an autopoietic entity that is alive" [6, *150*].

According to N. Katherine Hayles, based on various studies, Maturana concluded that perception is not fundamentally representational [7, *137*]. There must be a clear understanding that the world we perceive is first of all a result of the structure of our brain and nervous system and only then the result of our structural conjunction with other organisms and our environment [6, *151*]. Following this idea Hallovell, Maturana and Varela developed the theory of autopoiesis based on their concept regarding cognition, structural conjunction, language, societies, ethics, and the biology of love [6, *152*]. The capacity of human love allows individuals to collaborate and create a common area of cognition. It all emphasizes the importance of acceptance of other subjectivities with empathy.

## II. The Limitations of Classical Worldview and Useful Peculiarities of the Non-Classical View

The change in the general scientific worldview is usually accompanied by a fundamental change in the normative structures of research. Classical rationality focuses on the object, on a theoretical level seeks to distance itself from everything related to the subject, his means of acting and actions itself. Non-classical and post-non-classical rationality, in its turn, considers the relationship between knowledge of an object and assesses the nature of the means of actions and also their relation with values and goals [8, *32*], [9, *619*].

The known from Ancient Greece idea of separating subject and object has been criticized not only by the creators of the theory of autopoetics but also by the proponents of the non-classical paradigm. M. Mamardasvili was explaining that the object in classical knowledge is understood on the base of the the principle of spatiality, i.e., with the requirement of complete spatial articulation of the object outside of itself (and accessible to external observation) as a condition of what we can know about it scientifically [10]. According to S. Vladiv-Glover, sign in this case is transparent to meaning [11].

According to Mamardashvili, classical ontology does not rely on transformations – classical science does not recognize any discontinuities within the the field of perception [10]. In the classical approach, the observer can only understand things if he knows or remembers something. In reality, understanding is not based on any external causality, it is not fundamentally separated from the object being observed.

Understanding is not based on causality; it emerges as a spark. Mamardashvili explains what is understanding by giving as example a feeling of love. Who has not experienced love cannot understand what it is [10].

Very important in Mamardashvili teaching is the change of a 'physical fact' into an 'event' or 'fact' of consciousness. This process constructs a new kind of knowledge [10]. As Mamardashvili says, while the 'reduction', conceived as a mode of being, is an 'abstract procedure', the phenomenon possesses a definite materiality or 'textuality'. Thus, the phenomenon is a configuration of consciousness that "possesses a sensory texture which emerges as a localized expression of an invisible totality. For example, a 'sound

as a phenomenon of music is not a sound-phenomenon'" (citation from Vladiv-Glover translation [11]).

The phenomenon is, according to Mamardasvili, an index of the 'materiality' of consciousness. Vladiv-Glover writes that Mamardasvili has cited the symptom (of Freudian psychoanalysis) as a good example of a phenomenologically reduced *phenomenon* which demonstrates the 'physical' or 'corporeal' aspect of consciousness. It is very important that the symptom, in fact, is a displaced identity, irreducible and not identical with itself, that points to something else or that gives expression to something that is 'other' [11].

The phenomenological objects of consciousness, in Mamardashvili conception, contrary to the classical external objects of observation, have something 'internal' – 'capacity' to keep local information that can extend to heterogeneous regions of consciousness [10]. Through the exclusion of the sphere of being, the phenomena of the world are decreased to the 'pure' phenomena which Mamardasvili calls 'conscious objects' or 'objects of consciousness' [10]. 'Objects of consciousness' (phenomenologically reduced phenomena) in S. Vladiv-Glover opinion can be assumed as equivalents of the *memory trace* (namely, she offered to use this Freudian concept) [11].

## III. Autopoietic Features of Architecture

P. Shummacher's book "The Autopoiesis of Architecture" [12], [13] testifies the fact that the author understands the idea of autopoiesis too superficially. Both volumes reflect the classical paradigm. Talking about fundamental aspects of autopoietic systems – *autonomy* (*operational closure*) and *structural coupling*, it seems that Schumacher, regarding the first one, is overemphasizing the autonomy of architecture and underestimating the role of socio-cultural memory. Further, regarding the second aspect – *structural coupling* – his concept greatly weakens the focus of the vital relationships with the environment. So, the significance of the wider context in shaping architecture objects is neglected.

Shumacher's proposed style of parametricism, which attempts to be based on the idea of autopoiesis, was rightly criticized. Some critics have explained that this is just a failed attempt to change modernism. "In describing this new kind of recently emerged architectural formalism, Patrik Schumacher went as far as to call it a new epochal style, globally replacing Modernism and its offsprings [14, 358]. According to Samalavičius, "as a discourse and practice, it is an 'avatar' of globalization contributing to the homogenization of urban environments" [14, 355]. G. McKay expressed his opinion about Shumacher's book as follows: "If you do read it, I doubt you'll be convinced Parametricism is the way architecture should be" [15].

Architecture of the whole, also a separate project, certain urbanised places themselves are autopoietic systems. The *memory traces* associated with them can be treated as the nodes of network needed for autopoietic system that make up the system itself.

Recent articles [16] and [17] discuss autopoietic systems while discussing the issues of historical environment management, considering the most appropriate form of structure of the place identity code, in connection with the non-classical paradigm. Namely such elements of code as 'objects of consciousness' (in other words, 'intelligent bodies'), as *shifters* and *connotational semantic units,* are important for orienting creational activity regarding respect to locus cultural identity. Today, notion 'memory traces' has been added as partial synonyme to this collection.

## IV. Evaluation of Architects' Capability to Recognise Autopoietic Features

It is possible to determine whether a person is capable to recognize the features of the autopoietic system by use of criteria of the manifestation of the metalanguage embodied in the text of 'practical considerations'. For this reason, practical considerations need to be analysed – all documents about planned activities regarding the future of object (articles, reports of expertise, reviews, legal documents, also urban and architectural designs) generated by certain person or group.

There is a need to watch what type of metalanguage is embedded in practical considerations on a higher scale. *Metalanguage* is any language or symbolic system used to discuss, describe, or analyze another language or symbolic system *(as language-object*). For example, in the law regulating the protection of cultural heritage, the concept of protection of the historical environment, the interpretation of preservation will be a *language-object*, and the measures conditioning the process of protection presented in legal language will belong to the level of metalanguage.

The possibility to assess a wider context is ensured by the structural features of the text – the type of embedded metalanguage. Metalanguages as a structural element of legal regulations can be of two types. One of them can be called the *directive* metalanguage, and the other – metalanguage of *consideration.*

If metalanguage of consideration is more expressed, there is a possibility for more viable solution. Only in such case we will see items that F. Varela and H. Maturana call the nodes of the network that create the system itself in the process of self-creation. The metalanguage of consideration presenting connotations as memory traces as shifters is open to the context, it gives you possibilities to have insight into the newly emerged, additional information, the results of new research or fresh information about a certain city part. The *memory traces* can be presented only

by this type of metalanguage. The most important here is the information that is carried by *memory traces* as *shifters*. This enables switching the designer's thinking to another mode of life and being that contains memory.

In the directive metalanguage, the requirements are formulated in direct absolute statements, and the depth of knowledge generation is particularly small. Regulation of activities based on this metalanguage does not create conditions for dialogue with the place, with the subjectivity inherent in it.

If someone operates with consideration metalanguage, then it can be stated that this certain person is able to recognize the autopoietic features of architecture. That is, the person has a sufficient level of cultural-ecological competency, he is capable to accept the other subject emphatically.

A description of a cultural identity of locus must be done indirectly – using the metalanguage of consideration. In such case building construction code of certain territory can be understood as the set of determinants of *genius loci*, expressed as a set of *symptoms*, *shifters* (for more detail see [9]). Very important requirement for the description of locus identity – denotative and connotative semantic units – have to be presented together.

The example of detailed plan of Paupys in Vilnius in the territory of former Skaiteks factory (Detailed Project Plan for T-4 Block in the Territory between Maironio, Aukštaičių, Paupio, Zarasų and Polocko Streets in Vilnius; Vilniaus Planas company, 2012, project manager A. Alūzienė, architect M. Pakalnis) shows how activities of authors can be interpreted from the point of view recognising the autopoietic features of a place. The results of evaluation of the detailed plan itself were published in 2013 [18] and 2018.

The detailed plan of Paupys ignored the fact that this place for a long time had industrial character. The authors of the plan limited themselves to such features of blocks as 'structures, similar to circumferential buildings', 'smaller constructions at the embankment', 'clearly expressed public spaces – the street area, embankment, square', 'closed and semi-closed yard spaces', 'closed and semi-closed inner courts', 'yard structure, characteristic of the old-town', 'circumferential and city villa construction principles'. A set of such description units has an exclusively denotative character. Connotative characterisation is absent. The mentioned features are common for many cities. In description there are no signs of characteristic features of place – no symptoms of historically grounded *genius loci* and, thus, no *memory traces*.

So, the metalanguage of the detailed plan of Paupys is a directive metalanguage. Anyway, architects who designed groups of buildings on the basis of a detailed plan created aesthetically valuable compositions, although, unfortunately they reflect the globalist trend. Of course, it conveys the character of a generalized European city architecture, but there is no connection with location. Although the aesthetic quality of architecture cannot be denied, it is pity that the architects did not even try to base it on local memory (Fig. 1).

Paupys is just one case – in Vilnius there are several other such resonant examples criticized in the press. We also see such sort of manifestations of new architecture in Kaunas. For example, the new Bussiness Centre on the embankment of river Nemunas (Fig. 2). In the examples in Vilnius (Paupys) and Kaunas (Bussiness Centre), no memory traces of place were studied before the projects were prepared.

Of course, the Lithuanian legislation acts governing the management of the historic urban environment are also to be blamed for this [19], [20]. An analysis of various legal documents has shown that today urban regulation in Lithuania and also the interpretation of architectural text is based on contextually closed directive metalanguage. Using the criteria of metalanguage type we can conclude that the mentioned legislation acts are not friendly to historic places.

Thus, the several cases presented here (selected as typical) testify that architects do not fully understand

Fig. 1. New architecture of district Paupys, Vilnius (photo taken by Vytautas Petrušonis, 2020).

Fig. 2. New Bussiness Centre on the embankment of river Nemunas, Kaunas (photo taken by Vytautas Petrušonis, 2020).

the role of socio-cultural memory in the creation of new architectural objects. This means that they are looking at the environment without empathy. Because an activity can have empathic character only in the case of operating with metalanguage of consideration, and by no means – of directive metalanguage. Meanwhile, from the point of autopoiesis concept the activities of architects are belonging to active components of environment functioning of which can guarantee the continuity of architecture. And for that, architects must be able to recognize traces of memory and to take them into account in their creative activities.

## Conclusions

1. For a deeper understanding of the creative problems of architecture, it is appropriate to consider the possibilities provided by the theory of autopoiesis. The idea of autopoiesis based on the self-creation of alive systems in more illustrative way presents the essence of the dynamic system whose change is self-managed owing to the features of internal structure and certain autonomy, without some central control unit. Such view underlines the spontaneous nature of autopoietic systems that create themselves through the organization of their components, which in turn produce the structural elements of system itself.
2. Autopoietic systems related with the field of architectural activity are those systems that, as a whole, are determined by the network of that components creating system. The components on a base of the feedback, through interactions (with participation of people – architects, politicians and public in general) generate and implement a network that lets constantly (re)create the architectural environment itself as an autopoietic system. For historic parts of the city memory traces are important parts of such components – as nodes of conceptual network that enable to respect genius loci (cultural identity of locality).
3. At present, although there are attempts in modern architectural theory to take into account the principles of autopoiesis, they are understood too superficially; the principle of autonomy of architecture is overestimated, at the same time in relation with environment the role of socio-cultural context of architecture is rather diminished.
4. The degree of understanding of the mentioned autopoietic aspects is not satisfactory, because the acquiring of 'classic' knowledge prevails in the education of architects and in general. Both external and internal self-control of architects play an important role in developing their ability to recognize the autopoietic properties of architecture. Disclosing of abilities that in a consolidated way exposes the degree of one's own or others' cultural-ecological competency and the depth of strategic thinking is an important step towards appropriate changes in thinking.
5. Method of finding the type of metalanguage embedded in the text (any program, vision or project) is the main point of this article. Metalanguage of consideration contrary to the directive metalanguage can stimulate creative thinking. The results of testing various actual documents allow to show how a paticular architect (or other person) sees and perceives the determinants of identity, the possibilities of change of historical environment; is he able or not to read memory traces. The ability adequately (from practical point of view) cognize relevant architectural issues is inseparable from the ability to recognize the autopoietic features of an architectural object and architectural environment in general.

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# Compactness is Not Enough: Development and Trends of a Sustainable Urban Concept

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**Abstract**

The changing concept of sustainable development is changing the practice of designing sustainable urban forms. The article presents a variety of concepts of a sustainable urban form and their ambiguous assessment – the model of a compact city, if applied in all cases, can cost the quality of one's environment and the quality of life. New bottom-up trends are emerging in theory and in practice of the 21st century, which focus on the urban planning process which is more inclusive in terms of society. The article discusses examples of the creation of a sustainable urban narrative for the development of a relationship with the community.

## Introduction

The desire to steer urban development toward sustainability is particularly relevant in various academic fields and is especially important in the context of today's socio-ecological stress. The idea of sustainable development, derived from the growing awareness of the environmental crisis caused by human activity, was one of the most influential forces in the development of cities at the end of the 20th century. However, these days the term 'sustainability' in scientific literature and practice is becoming a loud, fashionable word that is often used inexpediently and carelessly, concepts are manipulated, some claims are based on assumptions only [1, *209*], with all of this necessitating the rebirth of the idea of sustainability. A New European Bauhaus movement, that started at the end of 2020, also leads us to rethink this concept [2]. The way in which we understand the phenomenon of sustainable urban development and measures that shape a sustainable environment is reflected in cities and in the planning process [3, *5*].

This article presents a study of the 20–21st century literature and reviews the following issues:

- Evolution of the notion of sustainable development and the variety of concepts.
- Contradictory assessment of sustainable development strategies.
- Trends in the 21st century – sustainable urban form and / or sustainable process.
- Principles of designing for sustainable future.

The article seeks answers to the following questions: how models and strategies of a sustainable urban form are considered today? What ideas hide behind the term of sustainable development in the 21st century and how it changes the designing practices of an architect-urbanist?

This article is limited to the most important ideas of the authors considered, which help to reveal the variety of sustainable urban concepts and modelling principles, but a more in-depth study is needed to explore these models in more detail. The aim of the research in this article is to overview the evolution of the notion of sustainable development and then to define the emerging trends in the principles and methods of modelling a sustainable urban form in the 21st century.

## I. Evolution of the Notion of Sustainable Development and the Variety of Concepts

Concerns about the gradual loss of natural resources and the loss of fertile land have been observed since ancient times [4, *85–86*], but it is only in the 18th century, in the face of the effects of the industrial revolution, that the idea of sustainability is considered to be a leap in the human

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morality – the abandonment of the ideology that man is at the top of the pyramid forming the nature's system and nature is only intended for achieving the highest economic success [5, *178–180*]. The emerging local and global environmental problems, the sharp increase in the population at the end of the 18th century and in the 19th century are reacted to in historically important works [4]: in order to eliminate the threat of food shortages, Y. Malthus offers regulation of population numbers; W. S. Jevons urges to reduce wasteful use of coal, not only because this main source of fuel is non-renewable and potentially would be exhausted in 100 years, but also because England may lose its dominant position in industry; in 1864, G. P. March in his study "Man and Nature" expresses concern that the Earth can become no longer suitable for people's normal life. These and other ideas of the 18–19th centuries inspired the contemporary nature preservation movements and had a great impact on the evolution of the notion of sustainable development, but they originated from diplomatic and pragmatic motives rather than from the belief that nature is to be protected *per se* [4, *87*].

In the second half of the 20th century, ideas about progress, population, economy and development were highly controversial. On the one hand, economic development and technological progress after World War II once again became a source of optimism and hope for a brighter future: ecological problems and resource depletion problems have remained in mind, but it was considered that in the future the lack of resources would be solved by new achievements of the humanity [6, *17–18*]. On the other hand, since 1960, humanity has been intimidated by scientific works popularized by various media, which predicted a crisis, often a catastrophe, which gave the shudders and lead one to despair. This ideological conflict derived from the belief that development (increasing use of resources) and preservation (conservation) of nature are mutually contradictory ideas [4, *91*].

It was amid this conflict that a compromise was born – ideas of sustainable, growing society, which is not a threat for future generations, and of alternative development. The definition of sustainable development, officially recorded in the Brundtland Report 1987, describes sustainable development as one that guarantees people's welfare in the present without compromising the possibilities of people's welfare in the future [7]. The emergence of this definition was a push for discussions on the form of cities and encouraged researchers and practitioners in various disciplines to look for ways to improve the usual urban planning practices, which are perceived as the major source of environmental problems [8, *1–4*]. The resolutions of the UN's World Commission on Environment and Development were and continue to be criticized mainly for two loopholes: firstly, the ideology of economic growth is not questioned and consumption culture is not challenged [9, *1741*], [10]; secondly, the sustainability criteria have not been formulated and, as a result, the advocates of economic growth and materialism are able to use ideas of sustainable development for their own purposes [5, *142–155*]. The vague definition makes it possible to sell allegedly 'sustainable' products, services, while at the same time develop territories under the guise of fashionable words [11, *1296–1299*], [12, *73–76*]. This paper raises the question what urban form is really sustainable, in other words, what theoretical principles and tools for urban modelling achieve the lowest energy consumption and reduce pollution levels, as well as solve other sustainability related problems.

Y. Jabareen [13], through thematic analysis, has identified seven principles of urban modelling which are linked to sustainability: (1) compactness; (2) sustainable transport; (3) density; (4) mixed land uses; (5) diversity (in terms of functions, building-up and types of buildings, age, social groups, cultures, etc.); (6) use of systems of renewable energy sources; (7) 'greening' or modelling of green public spaces. Four concepts of sustainable urban form were also distinguished: neo-traditional urban development, policy of containing development, eco-city model, and compact city model which was considered by the author as the most consistent with the idea of sustainable development [13, *47*]. The diversity of concepts of sustainable urban forms is based on various combinations of and causal links among the above principles, which are revealed at different spatial levels: (1) region and city clusters; (2) city; (3) city district, neighbourhood and community; (4) building groups and scales of a building. The four concepts identified by Y. Jabareen are further analysed in this paper as mutually significant different theoretical models that reveal the variety of approaches towards sustainability.

One of the neo-traditional urban development movements – *New Urbanism* – focuses on the scale of the city district, neighbourhood and community [14]. It is argued that the sustainable design of the living environment, abundant greening of narrow and attractive streets, permeability and vitality of urban fabric, i.e., the diversity of functions, types of building-up, social groups and cultures, leads to a sense of community awareness, which encourages active participation in social life and walking [15], [16]. *Sustainable transit-oriented development*, another neo-traditional urban development movement, focuses on the optimal model of the transport system in a city cluster and in a city. It is argued that the development needs to be concentrated and the population density increased around important hubs of transport infrastructure, train stations and public transport routes, which increases the population's tendency to use modes of transport alternative to one's own car [17]. *Development containment strategies* offer efficient use of areas as a basis for sustainable development: setting boundaries of geographical development on the regional, city cluster and city scale, such as: greenbelt or urban growth boundaries

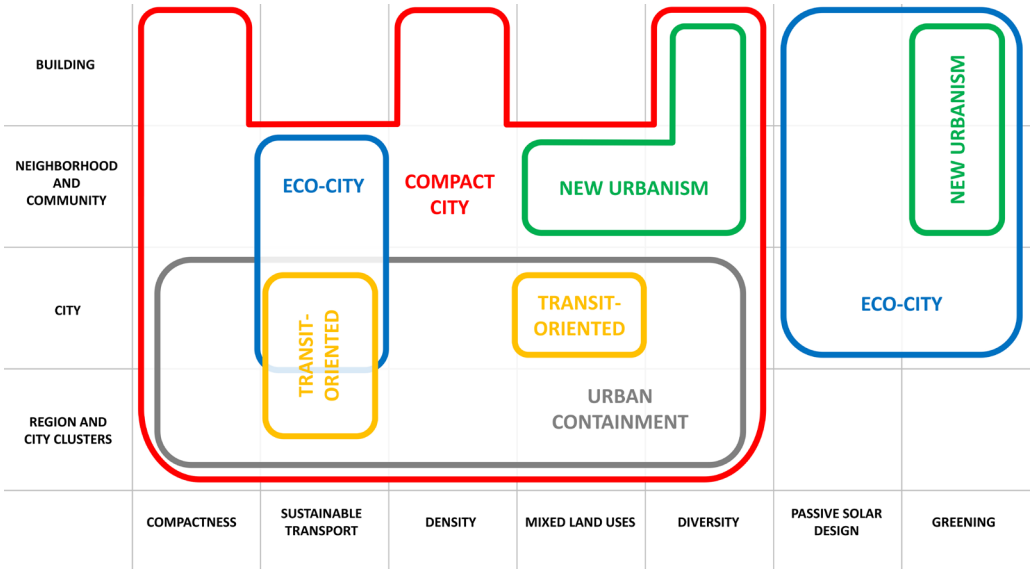


Fig. 1. The variety of concepts of sustainable urban form is created by different combinations of seven sustainability-related urban modelling principles and the application of these principles at different spatial levels (created by Authors, using [13]).

ensure the preservation of agrarian and natural areas, prevent the chaotic expansion of a city, which naturally leads to compactness, density and multifunctionality of areas in the central parts of the city, which allows efficient use of sustainable transport possibilities [18], [19]. The *eco-city* model describes a large group of strategies that focus on the use of renewable energy systems and modelling of green urban spaces, water management. The eco-city does not appear to be a specific urban form, but it stresses the importance of sustainable community: it is argued that the sustainability of a city is achieved through a society-inclusive development process, integrating ecological, social and economic solutions, which promote sustainable behaviour in everyday environments [20], [21], [22]. The *compact city* model suggests that sustainability issues should be addressed by the compactness and density of territories: a concentric city contributes to the preservation of agrarian and natural areas, the efficient organization of public transport, better accessibility of services and institutions increases the attractiveness of cycling and walking [23, *83*]. Concentrated areas also have a variety of functions, cultures, social groups, which is linked to social equality, reduced social segregation, better opportunities for low-skilled workers [24], [25].

The above-discussed concepts of sustainable urban form are summarized graphically in Fig. 1. There is no single model of sustainable urban form yet that would attach equal significance to all sustainability related principles at all spatial levels. It is also significantly important that most of the strategies aim to achieve 'sustainable transport' as a final result, for example: the supporters of neo-traditional urban development and 'eco-city' say that convenient streets, which are safe for walking, and attractive neighbourhoods result in a wish to choose alternatives to a car, but it is expected that using a compact city model or development containment strategies the compactness and intensity of the city will in itself create favourable conditions for sustainable movement because 'everything is nearby'. Various theoretical models attempt to understand and explain how and if urban form can solve environmental issues, but there is no single answer.

## II. Contradictory Assessment of Sustainable Development Strategies

A sustainable city was defined by various scientists until 2000 as a user-friendly city, which is resourceful not only in its form but also in ways of achieving energy efficiency [25, *12*], which ensures social justice [25, *203*] and welfare [26] not only for this generation but also for future generations. But social justice, equality, welfare, and sustainability in cities referred to in the definitions have so far been addressed mainly through the prism of sustainable movement and use of resources and fuel and, therefore, they are directly linked to compactness of a city. Although most of the links between the compact form of a city and sustainability are kind of self-explanatory, their validity has not yet been fully studied, and contrasting consequences have become evident over the past two decades.

First, the compactness achieved through making a city denser in its central part may lead to the loss of green and open areas of the city, the variety of public spaces, the habitat of living organisms, including trees, shrubs, and private gardens, which reduces the tendency to move on foot [27]. It is also argued that the compact form of a city creates favourable conditions for better accessibility of services and institutions, thus increasing the attractiveness of cycling and walking. In dense, multifunctional areas, a decrease in the number of car trips for small purchases is observed, however, the

compactness does not reduce the habit of using a car or other means of transport for leisure and more varied shopping possibilities [28], [29, *41*]. The likelihood of a job being very close to one's place of residence is relatively low; therefore, multifunctional, compact territories do not contribute to better accessibility of specialized work places [29, *40*]. The main criticism is for the assertion that compactness promotes social equality, reduces social segregation, creates better opportunities for low-skilled workers, ensures social protection, and other assertions in connection with fundamental human rights. The consequences of the compact urban form, which are contrary to the 'social' aspect of sustainability [30]: worse health – general, mental and especially of the respiratory tract; tendency towards decreasing inner living space; less affordable housing prices; worse access to green spaces; a new development in the formed historical urban fabric may be taken unfavourably, as it causes noise and traffic, which is considered having a negative impact on the quality of life.

In summary, the compact urban form can achieve the goals associated with sustainability, but compactness is not sustainable *per se* [31, *12*], [32]. The term, which is so often used in the field of architecture and urbanism, describes measures that are necessary but insufficient. Balancing the consequences of sustainable development strategies or identifying which indicators should be prioritized at different urban spatial levels is problematic. The choice of principles and means to achieve the desired result depend on political and professional choice of which concept of sustainability is most in line with the socio-cultural context of the 21st century and on spatial levels at which these means and principles will be applied.

## III. Trends in the 21st Century – Sustainable Urban Form and / or Sustainable Process

The scientific literature of the 21st century already discusses not only the sustainable urban form, the definition of sustainable development encompasses the importance of the process as such and public involvement, as well as education, infrastructure support and encouragement of initiatives [30, *3*]. Sustainability is claimed to be a local, informed, inclusive process, in search of a balance that does not create problems beyond the boundaries of its territory [33, *293*]. A sustainable city is reflective – perfectly aware of the inner dynamics of the city, seeking to reflect its citizens, cultural and natural heritage [34], responsive to the needs of its citizens and flexible [35]. The compact city model, which is heavily criticized for neglecting social aspects of sustainability, can be truly sustainable if combined with a sustainable process that allows communities to be proud of their living environment and build it in dialogue with natural environment, using efforts to create local identity. Trends show that successful sustainability-enhancing strategies foster people's tendency to behave in a nature-friendly way and enable them to respond to socio-ecological change [36].

Sustainable behaviour is defined as voluntary actions which have a positive impact on the natural and general environment of human activity and on the society, groups of people, including oneself [35], and is divided into two categories: (1) environment-friendly behaviour, which is characterized by consumption restraint, resource saving, sustainable movement and recycling; (2) social and moral responsibility, which is characterized by maintaining health and safety, public order, local economy and by social ethics and justice. The behaviour-forming core, due to the limited scope of this paper, is considered to be the streamlined model A-I-D-A (Awareness-Information-Decision-Actions), where behaviour is the result of awareness, information and decision [38]. Awareness, psychological and socio-cultural background, which also includes psychological variables (age, gender, education, etc.), sustainable approach and prevailing norms of conduct are the object of psychological and sociological research, but the influence of providing information on sustainable behaviour can have a significant role in the designing practices of an architect-urbanist. With this in mind, it is concluded that there is no need for rational specialists of one field any more, but for planners who have a deep understanding of the various aspects of urban development and are ready to use various tools of providing information and to work with different stakeholders in collective processes to create sustainable communities that foster nature.

Three main aspects of information reception are pointed out, which have the greatest impact on behaviour and motivation [39]:

- People are motivated to know and understand what is happening; in other words, disorientation and confusion are demotivating.
- People are motivated to learn, discover and explore; they prefer to receive information at their own pace and answering questions they ask themselves.
- People want to participate, play an important role; in other words, incompetence and helplessness are demotivating.

On the basis of these aspects, new bottom-up trends focusing on people are emerging in practice [40]: involvement-based planning procedures, e.g., creation of a narrative, community surveys, study of local feeling, creation of public spaces of 'human scale'.

The next chapter of the article reviews a number of approaches that through involvement of the public contribute to the formulation of the objectives of a sustainable development strategy and to foreseeing consequences in advance.

## IV. Principles of Designing for Sustainable Future

One of effective ways to bring about changes in urban form is to generate a narrative of a sustainable city – to simulate a concept of the future orally, in writing or visually [41]. This gives rise to several directions of research: research that develops the textual methodology of simulation and research that checks the application of visual and virtual simulation in architecture.

### A. Textual simulation

One of the methods for developing a scenario for urban development is a *strategic conversation,* effectiveness of which was demonstrated by Australian scientists who have accumulated and described a wide range of experiences of creative workshops [34]. About 30–40 experts from various fields (environmental engineering, energy efficiency, transport engineering, urban design and planning), together with academics, consultants, entrepreneurs, regional and governmental representatives, water and energy service providers, and students were involved in the creative workshops. The conversation was centred around one question: "How could a city evolve and remain resilient to a variety of desirable and adverse developments in different future scenarios?" The main purpose of the workshops is to identify opportunities and risks, emphasizing the resistance of the urban structure to change, i.e., realizing that the future of cities cannot be fully predictable but can be steered toward the desired direction.

A difficult task in practice is to document the workshop process, systematize and make conclusions-results which would be counterbalanced in the academic field. It is proposed to coordinate workshops in the following stages [34, *224*]:

1) to identify the main question around which the entire workshop process would be centred;
2) to examine trends and events related to this question;
3) to define critical challenges' that are likely to make the greatest change in development of cities;
4) to examine how these challenges can affect urban development in different future scenarios;
5) to examine what short, medium and long-term solutions need to be adopted for achieving each of the future scenarios.

The result of the workshops is narratives, which are proposed to be treated as qualitative data for further inductive research [42] in three stages:

1. Coding and theory making: to identify key phrases, words and highlight concepts within the narratives. One of ways to do this is Nvivo software.
2. Memoing and theory making: to include notes, literature, accumulated knowledge and other sources of information in the analysis with the purpose to correctly interpret encoded concepts.
3. Integration, improvement and writing down theories: all codes and their interpreted meaning are combined into a coherent whole. It is recommended to include other stakeholders in this step to review and evaluate theories [34, *225*].

The results of the structured discussions-workshops can be used in various ways as a strategic document identifying risks and growing problems, indicating site-specific rather than general guidelines for combating climate change, changes and actions that should be implemented at certain stages at different scales of a city.

### B. Visual simulation

Another method to involve city population into the decision-making process interactively is to visually demonstrate possible changes within the city, having the purpose to understand the effect of such changes beforehand [43, *349*]. Demonstrating these changes can have a number of benefits [44]: reduce use of resources due to perceived understanding of urban processes, increase productivity, improve quality; increase social capital and public involvement; highlight gaps in territory management documents and regulations. Drawings, photographs, collages, architectural models, and 3D virtual reality can be used for simulation. Unlike other research methods, simulation helps to predict both the physical and social impact of architecture, to anticipate new modes of behaviour in space, which can be steered in a sustainable direction [41, *19*]. Models processed with various analytical programs can also provide information on microclimate, energy efficiency, indoor and outdoor temperature comfort and air quality, wind and noise protection [45, *4*]. The 21st century technologies and various ways to simulate reality allow informed decisions to be made.

Denmark is considered to be one of the most advanced countries in demonstration practice for discussing a large number of pilot projects with the public, not only introducing it to potential urban development but also informing it about the applicable sustainability principles and the ecological, economic and social benefits of each project. One of the successful examples is Egebjerggård, a 38-hectare territory intensification project in the Danish city of Ballerup, publicising process of which, construction and results were studied by researcher D. R. van Vliet and described in his dissertation "Sustainable community planning and design: A demonstration project as a pathway" in 2000. In this case, the 1:1 scale model can be considered as simulation – a pilot, experimental project, the success of which is evaluated after the completion of construction: analysis is made of performance of set objectives, effectiveness of applied innovations, new, desirable and undesirable behavioural patterns and habits,

and general welfare. The benefits of such experiments can be manifold:

- a tool for public education and awareness-raising, as well as an opportunity for experts in various fields to evaluate projects and studies;
- an exemplary model of a medium-high density residential community;
- an effective form of technology transfer – giving experience and creative inspiration;
- a complex communication medium for the dissemination of novelties;
- creating a strong interest in the architectural community and the construction industry, gaining new practices, the results of which can persuade sceptical designers, land managers and users;
- testing of innovative designs and possibility of improvement before wider use;
- developing project efficiency standards and identifying sustainability components that may be considered for use in future projects;
- various information can be seen and easily accessed;
- testing platform;
- accelerating the processes of uptake of sustainable technology;
- helping to spread knowledge about new design practices.

Public response to dynamic urban systems can provide real-time insights into changes ongoing in it and emerging threats. The changing socio-ecological situation requires constant monitoring and the development of strategies not only to eliminate today's consequences but to regulate long-term processes in the changing socio-cultural context [46]. In other words, the development of a strategy for responding to socio-ecological stress considers not only available information but also unknowns, so strategies are flexible, their results can be predicted and, if necessary, suspended [47]. In summary, simulation and demonstration projects can be more effective than writing and speaking about improving standards and public attitudes because they act as a practical example [24, *204*] which generates new ideas and acts as an illustration that things may be different, preferably – better.

## Conclusions

The study of the literature on the concept of sustainability and its reflections in the urban development concepts can be summarized as follows.

- Concerns about the gradual loss of natural resources and the loss of fertile land have been evidenced since ancient times, but it was only in the 18$^{th}$ century, with the realisation of the effects of the industrial revolution, that the idea of sustainability was recognised as a leap in the human morality leading to the abandonment of the ideology claiming that man is at the top of the pyramid forming the nature's system and that nature is meant only for achieving the maximum economic success. The 20$^{th}$ century was marked by a variety of concepts of sustainable urban forms. Seven principles of urban modelling linked to sustainability are identified in the analysed literature: (1) compactness; (2) sustainable transport; (3) density; (4) multifunctional use of land; (5) diversity (in terms of functions, building-up and types of buildings, age, social groups, cultures, etc.); (6) use of systems of renewable energy sources; (7) 'greening' or modelling of green public spaces.
- A compact city is one of the leading paradigms of sustainable urbanism. While the compact form of the city can achieve goals related to sustainability, compactness is not sustainable in itself. Over the past decades, testing the effectiveness of different models and strategies of sustainable urban form makes it clear that the links between urban form and sustainability indicators are indirect, heterogeneous and depend on the socio-economic context. A 'high intensity' and 'multi-purpose' sustainable urban model, if introduced in all cases, can cost the quality of the environment and, in extreme cases, the quality of life. Research of sustainable urban form tends not to focus on the search for a single universal and optimal model but on adequate ways to form a sustainable city and society at various spatial scales and taking into consideration the socio-cultural environment – the influence of the urban form on ecology, flora and fauna, favourable social environment, behaviour and welfare can have a much greater ecological impact than hopes that people will give up travelling by a private car.
- Balancing the consequences of sustainable development strategies or identifying which indicators should be prioritized at different urban spatial levels is problematic. The choice of principles and means to achieve the desired result depend on political and professional choice of which concept of sustainability is most in line with the socio-cultural context of the 21$^{st}$ century and on spatial levels at which these means and principles will be applied.
- The article reviews both research that develops the textual methodology of simulation and research that verifies the application of visual and virtual simulation in architecture. The reviewed research emphasizes an inclusive, adaptive urban planning process that is attractive to urban residents and focuses on the formation of sustainable habits. The above-discussed practical examples and methods to build this relationship with the community can improve conventional planning practices in the following aspects: to provide a new approach to territory planning, housing, streets, public spaces, energy and water use; to gather information on existing social

interactions and functions that can be steered towards more sustainable practices; knowing the real situation and trends, to avoid unintended consequences of development. Public involvement in urban planning is only successful when the specific context is considered and the data collected are carefully and systematically researched, monitored and evaluated.

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# Approaches to Modernizing the Architectural and Planning Structure of Maternity Institutions in the Context of a Pandemic and a New Social Distance

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Adaptive therapeutic environment, maternity facility, modernization, social distance, space boundaries.

**Abstract**

The article discusses individual approaches to the formation of the architectural and spatial environment of maternity hospitals and perinatal centres contributing to social distancing. A 'functional-spatial' approach is proposed, in which the boundaries of spaces in the most active functional areas of the maternity hospital are changed: entrance area, reception of women in labour, area for relatives and visitors of the hospital, delivery of newborns, consultations in the polyclinic department of the maternity hospital. As a planning technique for distancing is proposed the formation of a system of space 'soft borders' using flexible, inclined, semi-cylindrical and 'flowing' translucent partitions. The second, 'environmental approach', is based on changing the scheme of communication and environmental situations in the internal environment of the maternity hospital due to the thoughtful arrangement of furniture and interior equipment, as well as due to light, colour and graphic navigation. Such a reorganization of the architectural and spatial structure of the maternity hospitals, based on the requirements of social distancing, preserves the value characteristics of the therapeutic environment.

## Introduction

The circumstances that the world is facing today in the form of a new global threat to human health – a pandemic, radically change the approaches to the formation of the architectural space of medical institutions which have a large flow of visitors. This situation is most acute in the field of medical institutions for women during childbirth. New rules of social distancing change habitual behavioural situations, rules of visiting and serving patients. Uncomfortable stress situations arise in institutions set up in old buildings with a lack of space. This affects the emotional state of women and partly poses a threat to the therapeutic environment of institutions. Therefore, it becomes urgent to search for methods of modernizing the planning of architectural, spatial and infrastructure systems taking into consideration the new way of life in which architecture will respond to the prevailing circumstances due to the 'flexibility' of internal spaces.

The object of this research is maternity hospitals. This term is adopted in Russia, as well as in some European countries: England, France. A maternity hospital (abbreviated in Russian as *роддом*) is a medical institution that provides qualified medical care for women during pregnancy, during childbirth and in the postpartum period, as well as medical care for the new-borns.

For women in Germany, there are three options of obstetrics: a clinic, maternity homes (for a relaxing

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atmosphere) or a midwife's home visit. There are no maternity hospitals in the United States in the Russian sense. There are hospitals that have special departments for childbirth. In general, a maternity hospital refers to a medical facility in which women carry out 'natural childbirth' or aggravated childbirth with surgical intervention. Institutions in which a woman is during childbirth and during pregnancy receive a range of additional services: antenatal and postnatal consultations, examination, preparation for childbirth and postnatal medical care, as a rule, are called clinics, medical centres. In Russia these are called perinatal centres. The conditions of the pandemic partly change the usual environment of maternity hospitals and require to search for new methods of their spatial organization.

The subject of the research is the architectural and spatial solutions of individual functional areas of these institutions in the context of a pandemic and social distancing. At the same time, it is taken into consideration that one of the important qualities of architectural and spatial environment of maternity hospitals is its therapeutic and relaxing effect on women in labour, which contributes to their positive emotional state.

The purpose of this study is to develop effective methods of architectural and spatial transformation and transformation of the internal and external environment of maternity hospitals, taking into consideration the provision of social distancing and the maximum possible preservation of the qualities of therapeutic environment.

The tasks that are solved to achieve this goal include:

- identification of the main qualities of therapeutic environment in relation to maternity hospitals, taking into consideration the positive experience of different countries;
- determination of the most relevant functional zones (spaces) of maternity hospitals with a large flow of visitors in need of social distancing and architectural and spatial transformation;
- the choice of effective methods of possible spatial transformation of these functional zones, taking into account the rules of behaviour, the technology of staff work and the characteristics of maintaining the therapeutic qualities of the architectural environment.

## I. Methods and Approaches

The concept of therapeutic environment is a promising direction for the modernization and improvement of the architectural and spatial structure of medical institutions, including maternity hospitals. An analysis of the best practices in the functioning of maternity hospitals shows that the main factors in creating such a therapeutic environment that have a positive therapeutic effect on patients are: a) use of modern equipment and treatment technologies; b) polite, caring and professional medical staff; c) architectural and artistic qualities of the interior and exterior environment of a medical institution (for example, Pilates and fascia, Marie-José Blom, in Fascia: The Tensional Network of the Human Body, 2012).

Maternity hospitals and clinics in many foreign countries are characterized by significant success in the formation of such a positive therapeutic environment: much attention is paid to this in the network of maternity hospitals in Australia [1] and in a number of European countries [2], [3], [4]. In obstetrics institutions in Edinburgh, Great Britain, an emphasis is placed on the spiritual state of women in labour, purposefully shaping the interior as a continuation of spiritual practices that improve the mind, body, spirit, and feelings of women [5], [6]. At the Ronald Reagan Medical Center, the emphasis is placed on the use of light 'positive' tones of colour and contrasts in the interiors, green recreation, magnificent views of the bay opening from the birth wards, which forms a positive emotional background for the patients.

In Russian practice, maternity hospitals can be conditionally divided into two types: conservative and progressive. The conservative hospitals have inherited working methods, equipment and buildings from the USSR, while the progressive ones (more often paid for) try to work according to European principles with modern equipment and an adaptive architectural environment, which is typical for large cities. Most provincial towns and settlements are characterized by low quality of interior and external appearance of maternity hospitals; there is a lack of green recreation, spaces for rest, relaxation, which evokes a negative reaction from patients [7]. For this purpose, separate areas of improvement and modernization of such facilities are being developed [8]. At the same time, no relevant research has yet been conducted on the new rules of social distancing affecting the already established therapeutic environment in the maternity hospitals. Analysis and comparison of the functional planning structure of maternity hospitals in a number of foreign countries and in Russia made it possible to identify characteristic functional zones and premises, the 'thought out' interior environment of which can have a therapeutic and positive emotional and psychological effect on women in labour. These include: a) the entrance area of the maternity hospital (clinic); b) the area for reception and registration of women in labour (admission department); c) a meeting area for relatives with women in labour and hospital visitors (for transmissions and communication); d) zone of discharge of women in labour and delivery of newborns; e) zone of consultation and medical care in the polyclinic department.

It is proposed to have two approaches as the basis for a possible modernization of the planning structure of the maternity hospitals, contributing to social distancing: a) functional-spatial and b) environmental approach. For illustration, typical planning schemes of the maternity

hospitals in Krasnodar and in Rostov-on-Don (Russia) were taken to demonstrate the principal architectural and spatial solutions. One of them is the Regional Perinatal Centre that was opened on 11 April 2011.

The functional-spatial approach allows to change and optimize the boundaries of spaces within individual functional areas using buffer and empty areas. Several methods can be considered within this approach to modernize individual functional areas of the maternity hospitals.

## Methods of entrance area transformation

In a number of institutions, this room is combined with a polyclinic, a department for receiving women in labour, or exists as an independent zone. In this case it includes space for hospital visitors, pharmacy, cloakroom, reception, restrooms, security post, and cafeteria. Depending on the area and set of functions, advantage should be taken of one of the possibilities of space transformation due to conditional 'soft' borders, which are a light-transparent fabric structure stretched over the frame in smooth and flexible forms (see Fig. 1).

The outline of the partition in plan and silhouette creates comfortable visual boundaries for patients, forming their positive psycho-emotional state. The collapsible design of the partitions makes it possible to quickly respond to the flow of visitors through a system of modular fasteners in the floor (Fig. 1). This makes it possible to separate the flow of incoming and outgoing visitors, as well as to zone the reception area with soft and smooth lines, since this place usually has a large crowd of people. There should be a separate reception window for those who just entered, as well as 1–2 windows for those who have already been to the reception and want to make an appointment again. But the key task is to ensure that these flows are separated and cannot cross.

The scenario of movement of visitors is a starting point where it must be noted that spatial boundaries are defined and the condition of 'physical volume' of women with regard to their belly without causing them discomfort and tightness conditions is taken into consideration.

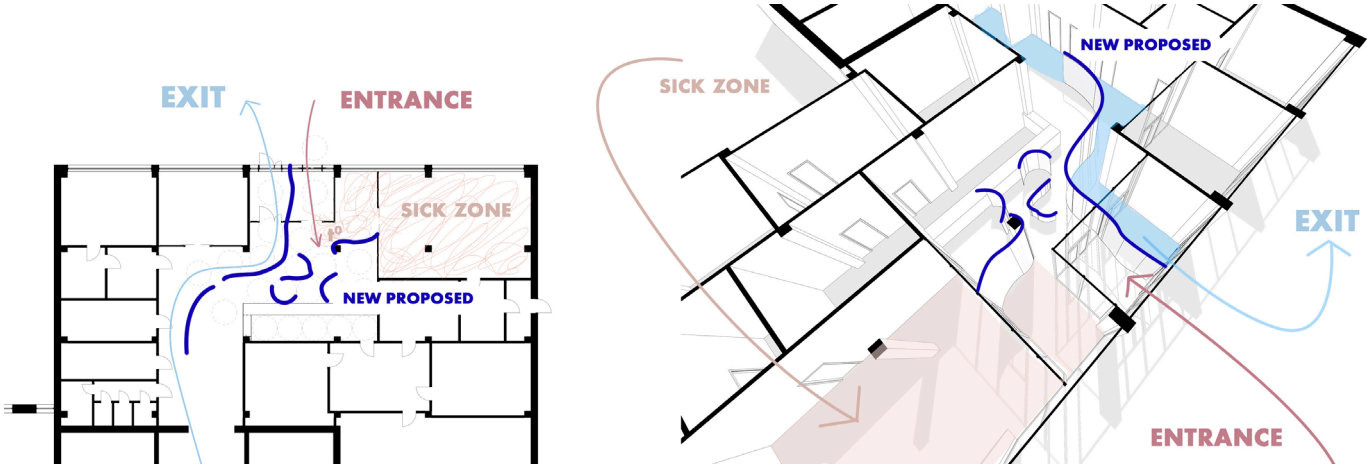


Fig. 1. Example of entrance zone modernization using 'soft' borders-partitions [authors].

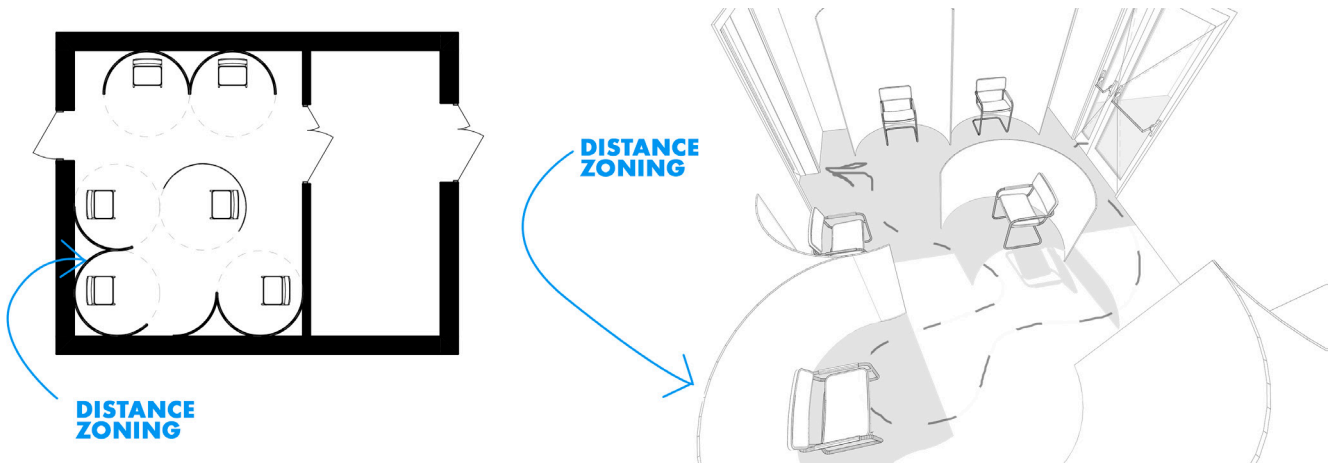


Fig. 2. Modular transformation of the reception room space with autonomous half-cylindrical partitions [authors].

### Modernization of the reception area for women in labour

It is a distribution node that includes a vestibule, waiting area, reception rooms, observation rooms, bathrooms, shower and staircase and elevator block. It is most difficult to keep a distance in the waiting area, since there are several women in labour with relatives who could have arrived by ambulance or independently, and emergency hospitalization may be necessary. Often, visitors are in a panic and keeping the distance goes by the wayside. To simplify the process and insure the distance is kept, the same system of translucent partitions-borders but in a different configuration must be introduced. It is worth starting from the radial half-cylinders, which will create their own autonomous safe zone for everyone. Depending on the room area, these partitions can be transformed, shifted or moved apart, forming new borders (Fig. 2). The system of autonomous individual spaces with semi-cylindrical borders in the plan creates a relaxing environment for women in labour and visitors with the necessary social distance.

### Conversion methods of the area for relatives and hospital visitors

The area for relatives and hospital visitors is one of those places where women exchange their emotions. To date, due to the epidemiological situation, many institutions have a restricted access to it. This problem can be solved by creating translucent structures, placing them in a 'buffer space', which to date has proved ineffective due to the extreme measures taken. To maintain a safe distance, it is necessary to place the structure at an angle, due to which it will not be possible to get closer than 1.5–2.0 m (Fig. 3).

Inclined transparent partitions also 'help' paths of movement inside the maternity facility, regulate the intensity and 'smoothness' of movement of people with the maximum use of each room capacity (Fig. 4).

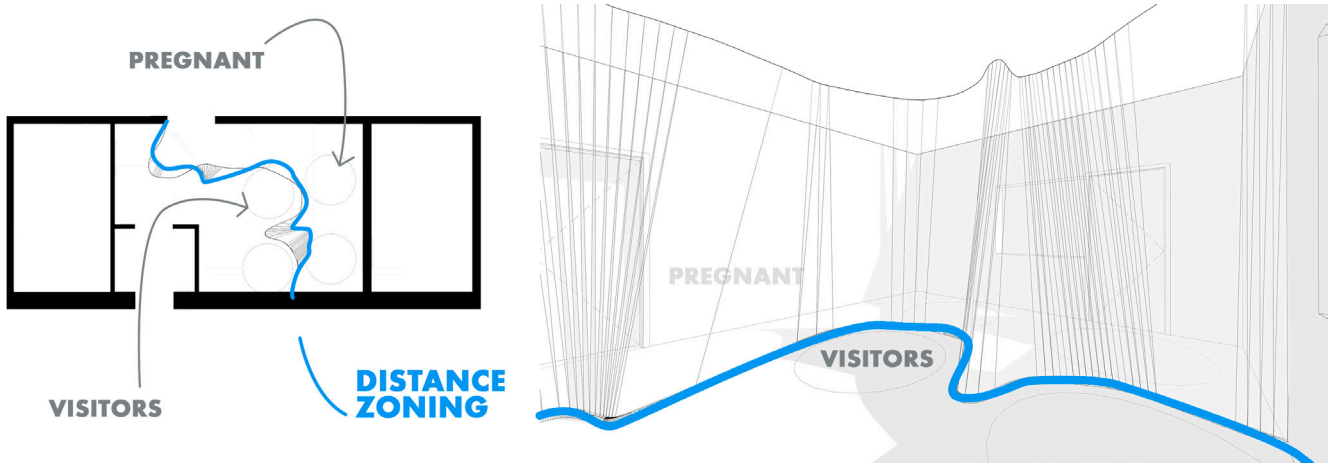


Fig. 3. Techniques for creating 'symbolic' safe borders in the family visiting area [authors].

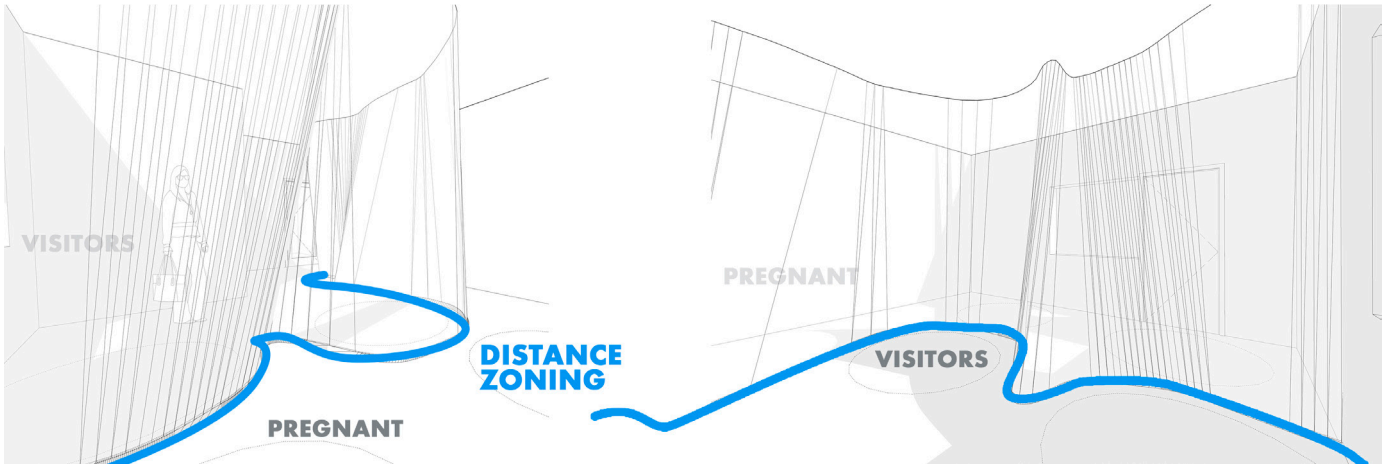


Fig. 4. Example of using inclined translucent structures to maintain social distance and form a new design of the communication zone of patients with visitors [authors].

### Methods and techniques for modernizing the space of discharge zone (delivery of newborns)

At present, this space of the solemn meeting of mother and child can be organized as a conditional 'flow' from the inside out (Fig. 5). This creates an opportunity not to let a large number of people into the room, but when the mother and child leave, form the symbolic 'spatial path' in which relatives would meet at certain distances maintaining the necessary social distance.

The linear environment of such a translucent communication can be supplemented with a festive functional-spatial scenario using lighting and play equipment, forming a new scenography of the architectural space of the newborn delivery department (Fig. 6).

A spectacular technique can be a composition of festive balloons over the discharge area, flexibly reacting to the situation. Using balls in the form of plastic lamps with a diameter of 1.0 metre, a light-dynamic scenario can be created in which the balls will change the light when a boy or girl is discharged and then switch to warm light mode.

### Ways of possible transformation of consultation area in a polyclinic department

The department of consulting reception, which is part of the maternity hospital structure, can be combined with a common lobby with a hospital or be a separate planning block. To date, it is difficult to control the maintenance of social distancing in such zones, since with the restriction of landing places, the remaining group of people will stand at the offices and wait for their turn. It is proposed to solve this problem in several ways:

a) by functionally separating the incoming and outgoing flows by a system of previously described flexible partitions;
b) maximum use of the reserve area in the registration zone, taking into consideration its zoning by transparent walls with semi-cylindrical forms, and the creation of autonomous micro-spaces for waiting for the reception (Fig. 7);
c) colour-functional layout and visual spots can be used to designate areas where people should be placed in a queue.

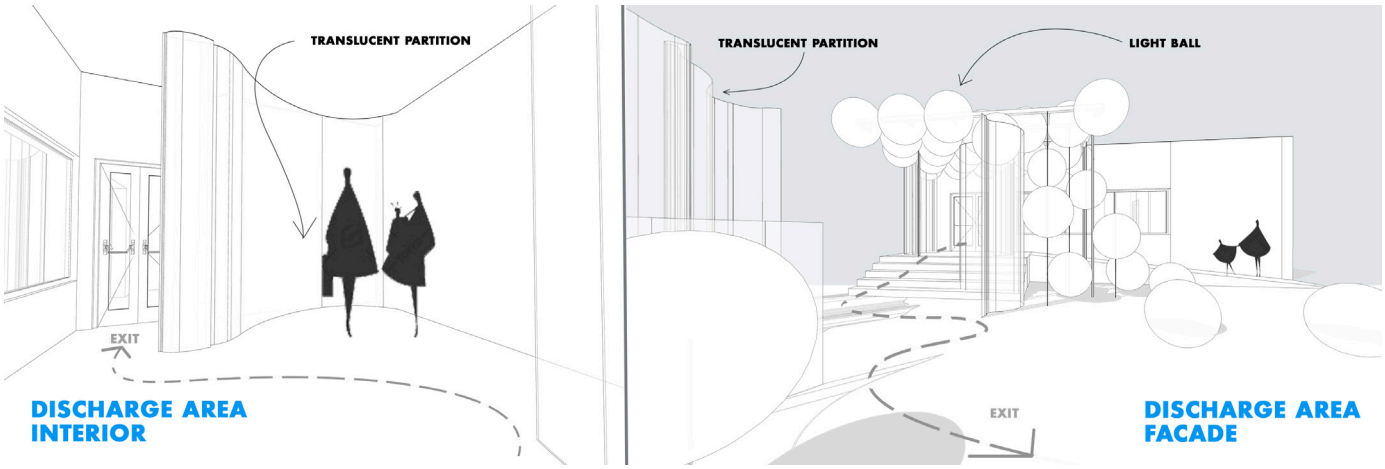


Fig. 5. Method of organizing the space for 'flowing from inside out' in the area of discharge and delivery of newborns [authors].

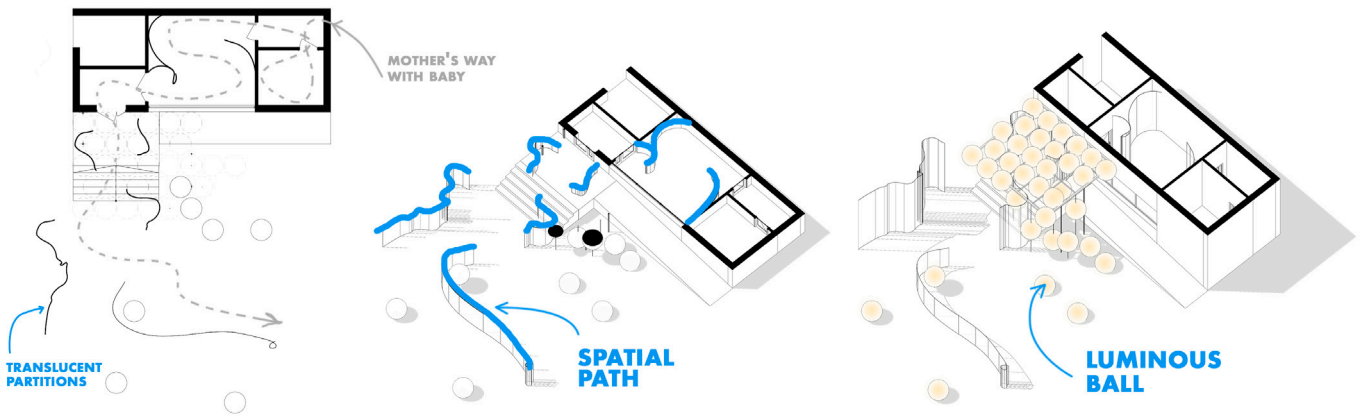


Fig. 6. Method of organizing the zone of discharge of newborns maintaining the social distancing conditions [authors].

In the case of little space in the reception and waiting areas, it is suggested to use another technique instead of partition walls – visual border with light. This distinction is more like a 'game' of light spots, in which a kind of 'laser maze' indicate the areas for sitting or standing. In these areas, there may be a stationary chair / arm chair and a place for things that women bring with them when coming to the hospital (Fig. 7).

This study suggests to use the functional-spatial approach along with environmental approach in order to create a comfortable therapeutic environment in maternity hospitals in the context of a pandemic. The environmental approach is based on transformation of the communication scheme and communication situations in connection with the current pandemic situation.

The following methods of transformation of recreational and communication zones in the interior of maternity hospitals in conditions of distancing are proposed:

1) formation of communication system and environment boundaries by placing furniture;
2) regulation of environmental situations and movement using graphical navigation.

In a maternity hospital, architectural environment and graphical navigation should assist in shaping the paths of movement and maintaining the distance. Options for implementing such a system are the main points of distribution that are responsible for distancing; a path is a thin solid line on the floor or in the lighting system – transparent structures to be built (Fig. 8).

Maintaining a distance on the path of movement should be done with accent spots, not zones. It is possible to disperse geometric shapes at a certain distance and thus create a 'field of motion'. Also, working with large-scale relationships, you can distribute figures of different diameters by creating a new system of visual communication in the environment with them.

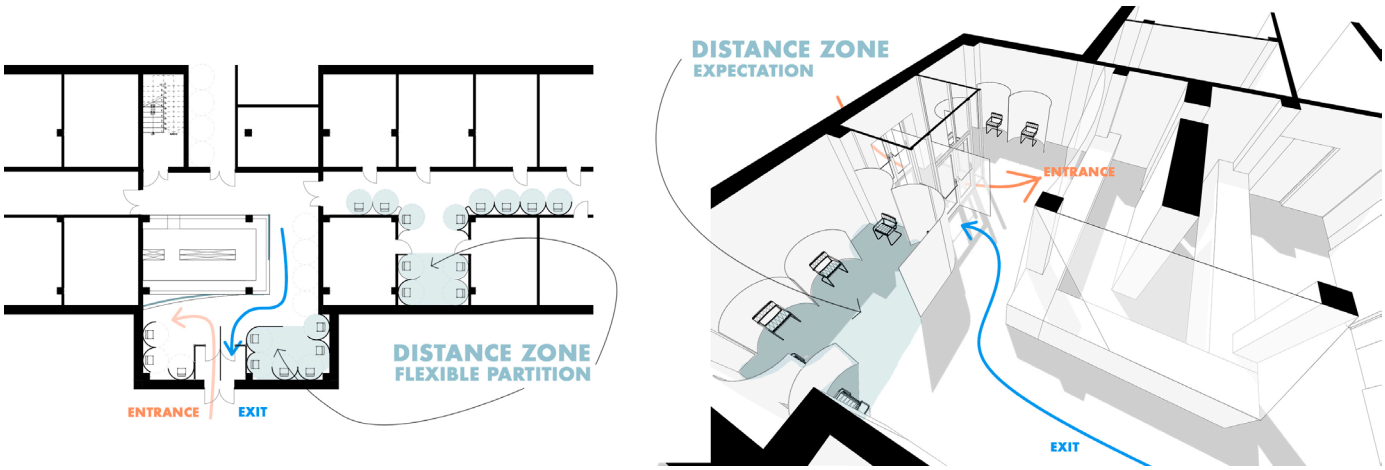


Fig. 7. Method of functional zoning of spaces of the reception and halls with semi-cylindrical partitions for distancing conditions [authors].

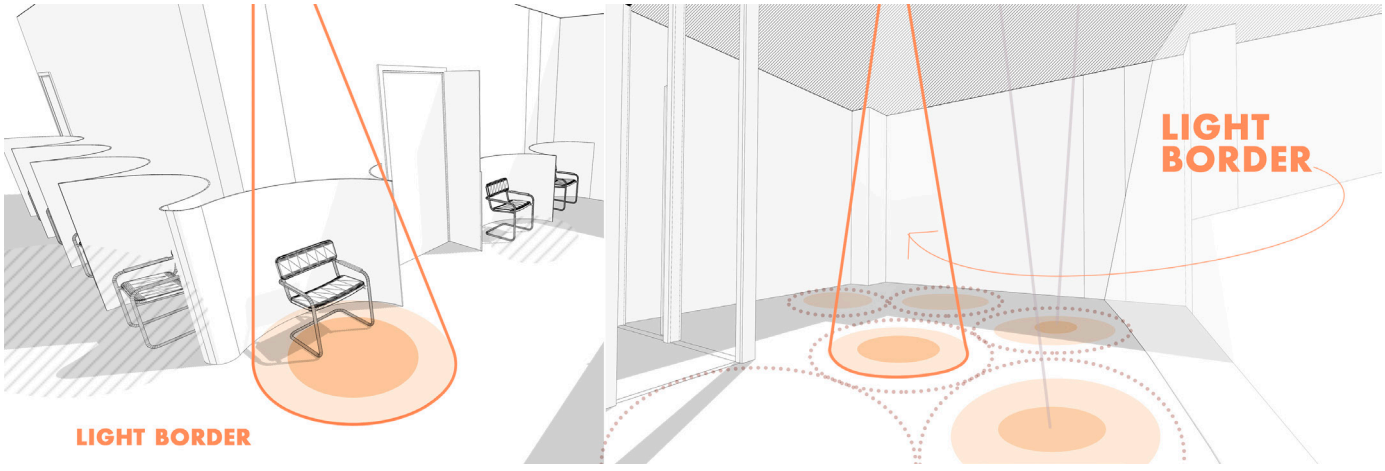


Fig. 8. Social distancing method in the polyclinic department of maternity hospital using light spots as interactive borders [authors].

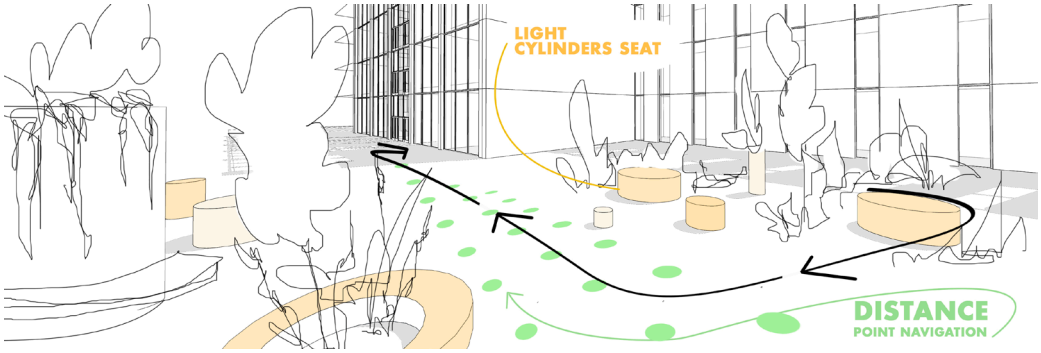


Fig. 9. Method of forming safe distances and movement routes using graphical navigation [authors].

## II. Discussion and Results

This study proposes a number of fundamental approaches and methods aimed at improving the architectural and spatial solutions of maternity hospitals taking into consideration their adaptation to the conditions of the pandemic.

An analysis of scientific works on this issue shows the importance of preserving a special therapeutic environment of these institutions as an additional therapeutic factor that affects the emotional state of patients [9], [10], [11]. Using examples of advanced experience, the author considers the characteristic qualities of this environment associated with the formation of large-scale and comfortable spaces and care for the psycho-emotional state of women in labour [2], [3], [4], [5], [6], [7].

At the same time, the issue of maintaining such a therapeutic environment in maternity hospitals in the face of a pandemic and social distancing have not yet been studied in detail. The methods proposed in this study partly contribute to achieving this goal.

Indirectly, the prospects of the proposed methods are indicated in the studies of the problems of planning preparedness for pandemic influenza of large maternity hospitals in the United States [12] as well as in studying the problems of designing future hospitals and the peculiarities of their functioning in the context of a pandemic and quarantine [13], [14].

Specific methods of transformation and transformation of space with the help of translucent 'soft' partitions and means of light and graphic communication have found their confirmation in the advanced design experience. Such experiments include the use of 'colour-spotted' design in New York City parks to highlight safe distances and spacing in public spaces as well as symbolic white circles on the grass that promote social distancing [15], [16].

## Conclusions

1. Analysis of the positive experience of different countries made it possible to establish that the main qualities of the healing environment of maternity hospitals are technological equipment and caring medical personnel, as well as the architectural and artistic qualities of the interior, including proportionate and visually comfortable spaces, 'green' recreation areas ensuring relaxation contributing to the spiritual, physical and psycho-emotional recovery of patients.
2. Based on the generalization of planning solutions, the most relevant functional and architectural-spatial zones of maternity hospitals have been identified, which form a therapeutic environment and have a large flow of visitors in need of social distancing.
3. A number of fundamental approaches to adapting the therapeutic environment of the maternity hospitals to the conditions of social distancing are proposed: architectural-spatial approach – in which the boundaries of the spaces of individual functional zones and premises change; environmental approach – in which the communication scheme changes, the environment becomes autonomous, there is a transition from the public to the individual environment.
4. Effective methods of spatial modernization of the functional zones of maternity hospitals are proposed, taking into account the requirements of social distancing and maintaining the therapeutic environment: a) the most effective method is construction of translucent, flexible boundaries-partitions of various configurations; b) for communicative spaces, waiting areas of the polyclinic department, recreation and recreation areas, the most effective methods are light-coloured, graphic navigation, modelling the environment by placing equipment, furniture, container gardening; c) for ceremonial spaces (zones of unloading and delivery of newborns), the method of 'scenography of space' is optimal using visual communication tools, infographics, as well as 'smooth' boundaries-partitions.

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# A Comprehensive Review on the Effects of COVID-19 Pandemic on Public Urban Spaces

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**Keywords**

COVID-19, functional cities, pandemics, smart cities, third places, urban design.

**Abstract**

**COVID-19, evidently the world's worst pandemic during the last two centuries, has predicated several challenges for urban designers, especially in their bid to find appropriate designing strategies. Even though there are umpteenth studies in the literature that have focused on the different aspects of COVID-19 related pandemics, very scant studies sought to find appropriate mitigating strategies in designing pandemic friendly urban spaces. Thus, through qualitative grounded theory as a main methodological approach, this study hypothesized that the COVID-19 induced pandemic has direct effects on the liveability of public spaces. Accordingly, by developing a comprehensive review of the literature on the environmental and socio-economic effects of the pandemic, this study proposed a comprehensive framework for understanding its side effects and a comprehensive mitigating strategy to deal with it in the short and long term of designing a healthy urban environment.**

## Introduction

December 2019 was the onset of COVID-19 from Wuhan City of China, which was later confirmed as an international public health emergency by the World Health Organization [1]. This event, from a bird's eye perspective, displays enormous global set-back stemming from huge socio-economic disruption induced by the pandemic. This has also affected the public urban spaces either directly or indirectly [2].

Alarmingly, despite historical records of pandemics, only a modicum number of literature sources have examined the import of pandemics on cities before the outbreak of COVID-19 [3]. Indeed, erstwhile studies bordering on pandemics are mainly related to urban inequalities and how it impinges on pandemics [4]. The sudden emergence of the COVID-19 and its related issues highlighted the discussion on urban vulnerability and pandemics thusly awakening interest in the subject. The chances for higher occurrences of pandemics are umpteenth in the future, especially with the current wave in the encroachment of natural wildlife habitats and climate change. In the light of this, studies on the dynamics, underpinnings and underlying patterns of pandemics, their impacts, and corresponding mitigating response have suddenly become imperative [5]. Stemming from these, the current wave of pandemics offers opportunities for exploring and understanding how cities respond to pandemics and necessary actions to promote pandemic resilient cities.

Studies that constantly seek to unravel the underlying patterns of the COVID-19 pandemic in urban spaces by shedding more light on the different aspects of this pandemic are the highlights of published research in recent times [6]. Indeed, since the nascent stages of the pandemic, its impact on cities and the awareness it commands have received significant attention. Without a doubt, the pandemic has revived the concerns about cities and their potential vulnerabilities to infectious diseases and pandemics [3].

In this regard, this study by using qualitative grounded theory focuses on the different environmental, social and economic consequences of the pandemic to develop a comprehensive framework that will help urban designers and architects to have an overall understanding of its side effects on people's public life. Qualitative assessment of the related literature will be considered to reach the main

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objectives of the study. Accordingly, the possibility of using smart city technologies to create pandemic resilient and functional cities will be discussed in this article.

## I. Material and Methods

Stemming from the epistemology of this subject, the qualitative grounded theory approach is considered appropriate for this study. In this regard, qualitative assessment of the related literature has been considered carefully to reach the main objectives of this research. This is to develop the overall framework of understanding the different aspects of the pandemic on people's lives in public urban spaces. Hence, it is considered appropriate to collect related literature on Covid-19 related pandemics on public urban spaces. The study also took a chronological view of pandemics through history to highlight the rapid expansion of diseases in the last two centuries. In this regard, available published literature, reports of governmental and non-governmental organizations and case studies have been qualitatively evaluated to assess the different aspects of the COVID-19 related pandemic on public urban spaces in order to be able to develop design recommendations for the short term and long-term pandemic resilient urban environment.

## II. Cities and the History of Pandemics

The city and its experiences of pandemics succinctly show that its history is connected with each other. Cities as an arena of disease contagion and a high possibility for disease expansion have led to deaths in millions through history. Following this, to be able to understand the necessity of studies on pandemics in designing a healthy city, Fig. 1 illustrates the deadliest pandemics through history. It reveals that the number of pandemics sharply increased during the last two centuries. This might be a caveat particularly to urban designers to awake their responsibility in designing pandemic resilient public urban space.

The emergence of epidemics, particularly those that precipitate respiratory disorders, necessitate the closure of public spaces and the isolation of those affected. More often than not, it also impinges on the image of public spaces and cities and transforms them into empty environments. A change in the design approach that integrates environmental health and the form of cities into social thinking is therefore required. With historicists review of pandemics as of the 'Athenian plague' in 430 BC till the 'Black Death' in the 14th century in Europe, insights into the effects and consequences of pandemics on changing designs of cities, the concept of quarantining and zoning laws becomes clearer [7]. Offshoots of these include transformations that result in expanded cities to prevent overcrowding and the radical urban renaissance [8], [9]. Highpoints regarding this include the formation of public squares, parks and walkways in European cities which were early challenges at providing benign public urban spaces [10]. Arguably, the most pronounced implication of the offshoots was the birth of the 'public health' initiatives in the 20th and 19th centuries [11], [7], which took the position that cities are 'unhealthy places' filled with transmittable diseases [12].

A retrospective look at historical developments in the 19th century highlights the wave of unprecedented urbanization that characterize the era as a precipitate of the second industrial revolution. Then, chaos, which was a fall-out of a dense population of humans, interweaved with non-biological but active urban spaces, ambitiously tall buildings, entertainment and developments in railways transport were features that manifested in cities [13]. Thus, lessons from the past have become inevitable in

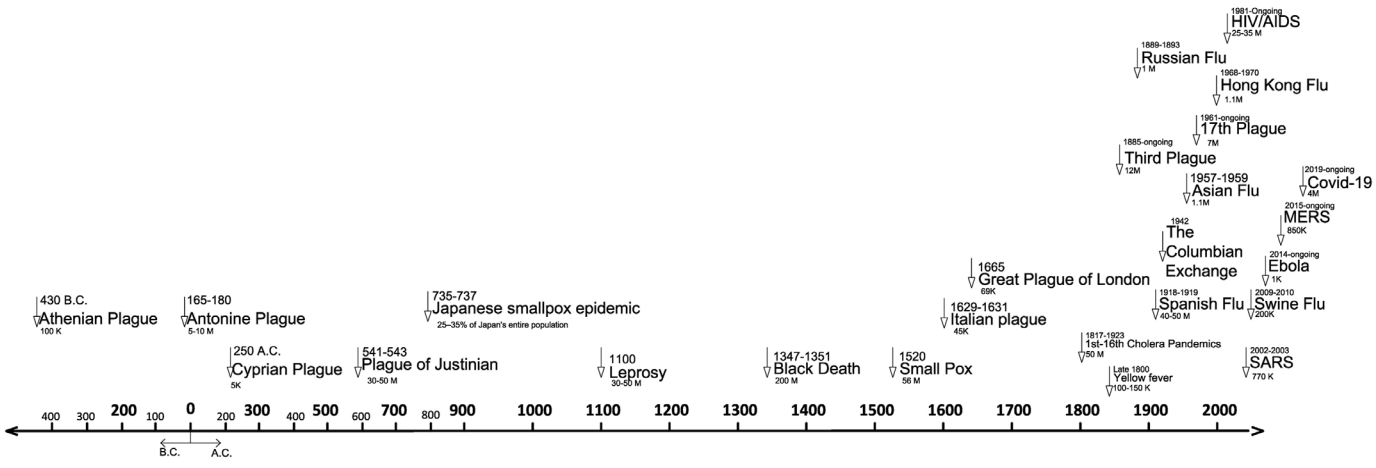


Fig. 1. Pandemics throughout history [Developed by the author].

confronting a global epidemic of city origins [14]. As an illustration, it is noteworthy that the spread of cholera was prevented in the 1850s in Paris by controlling population densities in some cities. This was by the establishment of the sewage system and widening the streets and parks [15], [16]. As stated above, cities have been affected by pandemics throughout history; it is noteworthy that each pandemic provided opportunities for urban designers to acquire new skills. In this regard, understanding the socio-cultural and economic consequences of the COVID-19 pandemic will also shed light on designing more functional cities.

## III. Impacts of the Recent COVID-19 on Public Urban Spaces

In reality, lifestyles, habitats and the use of cities have become convoluted owing to the COVID-19 pandemic emergency. The transformation of private spaces into public because users fled the public domain from fear of infection was instructive. Houses and balconies became offices for work and study providing a lee-way that substitute public for private life. Indeed, the children-teacher relationships which were normally in the physical manifestations have turned virtual through the use of the internet. Adults also started to use the smartphone and smart technologies.

The closure of urban public spaces was one of the more dramatic responses to COVID-19 which impacts the 'third spaces' such as gyms, restaurants, barbershops, bars and cafes [17]. Their closure recalls the social imperatives of these 'third spaces'. Even considering that the lockdown decimates and these places now reopen, the challenges of 'social distancing' steel persist [18]. Thus, the risk of business failure is more domiciled in the third place of cities [19], [20]. Within these limits, it can be projected that the after-effect of the COVID-19 will lead to stricter measures against human-to-human contact between strangers and the idea of social distancing will be more vigorously pursued and intensified. Following these precautions, it is evident that the third places will witness a decline in proportion and number leading to an upsurge in 'safety' but at the expense of 'social intimacy' and therefore be counterproductive. Arguably, left-wing optimists posit otherwise and assert that the developments will give rise to the liberation of more street space for cyclists and pedestrians which are the underpinnings of low carbon economies and green cities [21]. As a matter of fact, at the nascent stage of the epidemic, there was a substantial argument on the need to re-design public spaces and create boulevards to meet up the social distancing criteria.

From the current circumstances, it appears that the norms even after the stay home restrictions have been lifted will not immediately revert to the status quo but to a less rigorous phase of social distancing. During this phase, cities may be required to implement make-shift pedestrianization and street calming projects, following the tenets of tactical urbanism [22]. This suggests that to avoid after-thought and to meet other emerging needs the streets should be re-designed. The take-off of home food delivery and online shopping have lent credence to this suggestion by creating an enormous request for delivery and drop-off space. Street re-designs that are pedestrian-friendly and that enhance active mobility can inevitably reduce physical activity and carbon emission thereby serving to meet up the public health requirements. Overall, the authors believe that the current pandemic is instructive and will motivate urban designers to reconsider the importance of health issues in designing urban spaces. Thus, this study assessed the social, economic and environmental consequences of COVID-19 on urban public space.

## IV. COVID-19 Pandemic in Urban Life

### A. Economic Dimensions

The extant pandemic has inflected our overall understanding of the economic consequences of disasters on cities. As a matter of fact, owing to these lockdowns, many people became jobless. And because of government restrictions on the flow of people in public urban spaces in their bid to control the pandemic, the economic vitality of the urban spaces became endangered. The third places such as the stores, shops and restaurants dis-allowed serving customers. It has also affected the tourism sector and many hotel and shop owners who relied solely on this sector for sustenance became bankrupt. Thus, the professional service sector could not afford to pay their workers' salaries. Likewise, the wholesale and retail sectors faced economic problems and street vendors lost their opportunities at contributing to the economic vitality of cities.

In the majority of the countries such as the USA, UK and India we witnessed that pandemic destroying the traditional use of their urban spaces to generate vitality and economic benevolence. Despite this, it is fair to mention here that each country had its strategy to support its citizens, particularly the vulnerable ones, but because of the extensiveness of the disaster, these supports were inadequate. Conditions in informal settlements and slums were also worsened by the lack of basic infrastructures and medical care such as hospitals and clean water to comply with the handwashing regulations [23].

Overall, reports received from the governments on the effects of the COVID-19 pandemic revealed its impact on the informal and urban sectors with copious reverberations on their welfare, public finance, and inequality. This will strengthen already marked economic and social inequalities as well as increase 'urban poverty', especially on a global

scale. Nonetheless, it represents a chance to rethink the city, the infrastructures, public services, and other governance structures [24]. Put succinctly, COVID-19 has forced the re-thinking of city living. Urban designers should take the opportunity to reimagine more lively, equitable and interesting post-pandemic cities. In this regard, Chakraborty and Maity (2020) believe that COVID-19 is therapeutic, as it can assist in environmental recovery by reverting damages already incurred through environmental abuse [25].

### B. Social Dimensions

Considering the viral nature of COVID-19, it is imperative to mandate social distancing. Indeed, social distancing became trending and remained a norm in most world countries almost immediately after WHO declared COVID-19 as an epidemic. Social distancing, quarantining or lockdown nourishes anxiety in unhealthy as well as healthy people living in pandemic infested areas [26]. It should be recalled that the social impact of the pandemic impinges on both developed and developing countries. Primarily, the focus of this impact is negative, notwithstanding that there are shreds of evidence that support crisis-induced positive social activities. Most studies have discountenanced this and focused on issues bordering on protracted structural inequalities of societies. From the benefits of hindsight, the impacts of pandemics have been disproportionate with the socioeconomically disadvantaged people and minorities affected the most [27]. They often suffer more as a result of their rather intensive economic difficulties, poor risk management and access to services [4]. In addition, COVID-19 has affected other 'vulnerable' people in urban spaces. This and other inequality concerns question the effectiveness of social distancing by implication of the orders of staying at home for curtailing the feast of the disease.

Eventually, COVID-19 will inflect spatial planning laws and behaviour in public spaces. Social distancing rules and regulations will become more stringent. Eventually, park benches will be marked for appropriate distancing, chairs will be further displaced in cafés, boulevards will be encouraged and streets will transform as pedestrian alleys. Despite these, unneighbourly bonds, as well as family bonds, will be strengthened. More people will likely cycle and walk. The worth of properties and private spaces will rise and inequalities stemming from socioeconomic stratification will deepen. The value of public spaces will decimate and this will be accompanied by the concurrent atrophy of public spaces. Digital technologies for entertainment, shopping and online works will grow rapidly.

### C. Environmental Dimensions

COVID-19 had many negative and positive effects on cities. On the one hand, it precipitated into a surge of waste. In this regard, copious examples include certain big companies such as McDonald's and Starbucks that have turned away from the more economical water bottles and shopping bags to temporary 'plastic' items such as water bottles, gloves, face masks and cups in their attempt to prevent the spread of the virus. However, there is a wave of scientific belief that the current lockdown increases air quality [28].

In line with this, Zambrano-Monserrate et al. [29] echoed the beneficent consequence of the 'lockdown' on the cities stating that it enhances air quality and reduces sound pollution. It is worthy of note that sound pollution is the outcome of extensive industrial activities which can be counter-productive and damaging to the natural order [30].

Although the fact that the current pandemic leads to some positive environmental effects, urban designers must evaluate its environmental consequences on urban spaces. Sadly, owing to the lockdown, urban space transformed as lost or dead spaces inasmuch as the city without its people are dead spaces. As stated in Table I, urban congestion, high density, long-distance travelling, social gathering, shared vehicles, homelessness and inadequate housing, elevators, public transportation, stores and restaurants are the most obvious environmental factors with a high propensity for transmitting the disease during pandemic. However, these can be abridged with frequent cleaning, appropriate design, sanitizing and proper physical distancing. In this regard, Table I provides a checklist for citizens to upsurge their pliability to the pandemics and other environmental, social and economic consequences of pandemics. It also proposes mitigating strategies to tackle the pandemic in the short and long term.

## V. Functional Cities as a Proposal for the Post-Pandemic Era

Hitherto, some cities have proved to be quite successful at managing crises such as the COVID-19 pandemic. These cities are referred to in this study as 'functional cities'. These are cities that highlight planning as a functional tool to achieve its optimal capabilities and to create the best conditions for the urban life and the abundant living of its residents. In this scenario, the government has gained the respect of people and the people they trust of the government. This moiety makes crisis management easier and more effective for the government to achieve. The smart city approach of employing modern technology enhances efficient access to services. Moreover, in functional cities governments need to develop a strategy that enables mutual trust between the citizens and the system. For example, in the case of Turkey, all the instructions given by the government have been respected by its citizens and

implemented successfully [43]. These strategies are important in minimizing the negative effects of COVID-19 on the economic and environmental aspects of public spaces. Aside from these, it is expedient that structures that promote short- and long-term interventions in the bid to control the pandemic should be enacted.

### A. Smart Cities

The transition of communal interactions from the physical manifestations to digitally simulated cyber communities is a spectacle that has received acknowledgements from notable scholars over the years. A typical example was cited by Ewa Rewers, implying in her publication in 2005 that during the advent of the industrial revolution, the agora was transformed into electronic media [31].

Smart cities worldwide are taking advantage of the endless possibilities that can be achieved by the utilization of information and communication technologies (ICTs) to tackle challenges brought on by the COVID-19 pandemic. During the COVID-19 pandemic, the internet, among other ICT applications, gave several people across the globe the opportunity to communicate irrespective of distance, receive necessary information updates frequently and study from the comfort of their home, without being denied access to essential amenities. They also made available a platform that aided the supply of crucial health intelligence, tracking new developments concerning the virus and discovering critical health assets.

Hence, smart cities can play critical and germane roles during the pandemic. Thus, some governments have harnessed smart city hi-tech and other digital data-like mobile devices to track and trace persons infected with COVID-19. One of the countries that has so far achieved control over the spread of the virus is Turkey [43]. Some of the reasons for this are that they were able to come up with a COVID-19 testing kit in less than no time using a smart isolation system. This was achieved by collecting patients' data and then using the QR Video technologies which inform on the status of each registered person. China's success also shows that they rely on technology / hi-tech companies to track the spread of the virus. From these reviews, it is evident that smart cities are better and safer [44].

With the rise in the number of cities and residents, it is only rational to alter the way we design cities to make them safer and better and be ready to face other upcoming challenges. Whereas most of the places around the world make use of social distancing methods to help curb the spread of the disease, it is important to concentrate on the strategies used by successful countries. Their approaches may become necessary in developing post-pandemic functional cities.

### B. Street Design Proposals

Due to major challenges faced in the public health sector in recent years, there have been questions raised on disease prevention mechanisms. There have been various remedies put in place that aim to foster a more desirable public health system. A major remedy is street redesigning which entails providing alternatives for other uses aside the vehicular movement. This includes pedestrians and cyclists in alleys aiming to create more socially sustainable and healthier cities in times of pandemic [32]. It is also imperative to highlight the use of sidewalks in street re-designing. The thrust of this strategy is to provide appropriate setbacks that foster environmental hedonism and pleasure [33]. Using green and natural areas together with smart city strategies in streets of the post-pandemic era will reduce the chances of contamination.

### C. Population Density

The population density in the cities has been one of the primary issues that affect the spread of viruses. In other words, infection risks apply to the population [34]. In this regard, urban designers need to consider proper planning strategies to face epidemics in a sustained way.

### D. Social Segregation and Physical Distancing

In his book "The Hidden Dimension" Edward Hall stated that social distance completely depends on behavioural patterns. He identified social distance, personal distance, intimate distance and public distance, then suggested logical spatial measures to each indicator [35]. Throughout literature, it appears that there would be distancing in human interpersonal space at the stretch of 1.5 m as a result of the outbreak of pandemics. As a result of the extension in social proximity, changes in human behaviour relating to space-use will likely occur. The reverberation effects will modify the use of public benches, promote an emphasis on the interpersonal space and as a result encourage independent social existence.

### E. Hygiene, Sanitization, and Ventilation

COVID-19 affected surfaces is a major means of contracting the virus. This is an environmental health issue of immense concern. This calls for precautionary action like cleaning surfaces such as buses and stations that could be constantly exposed. This level of sanitation has been solely embraced by different nations in varying moods and approaches. Indeed, public transportation staffs are no exception. The mode of their activities in enclosures and administrative buildings is very significant in the control of COVID-19. The potency of this approach is rarely accessed amongst us. This is why

users should always be informed on safety practices like regular hand sanitizing and avoiding individuals that show possible symptoms during transit.

### F. Sustainable Mobility

The current pandemic revealed strong correlations between urban spaces, mobility, and health [36], [37], thus lending evidence that supports the transport models of cities as a way forward. Strategic planning and detailing are required for pandemic-resilient cities which can successfully combat the risk of infections. This requires the provision of basic access that minimizes infection risk and delivery services during periods of restricted mobility and provides affordable mobility for marginalized households. Walking and bicycling are commonly the most affordable and safest modes. Moreover, this assists in the reduction of social isolation and also improves physical and mental health, so improving walking and bicycling conditions tends to increase resilience.

Measures taken towards sustainable mobility can be very benevolent and lead to a cleaner urban environment [38]. Policies towards advanced land-use planning and sustainable mobility can likewise contribute to an increase in the use of public transit, walking and cycling. Overall, addressing urban mobility is, therefore, an essential issue for post-COVID cities [39].

Moreover, the requirements for social distancing show that public transits cannot perform optimally. Depending on the history, culture and background of societies, this implementation may require more time. Overall, the objective of any program for the post-pandemic mobility era should be to enhance non-motorized mobility.

## VI. Integration of the Health Perspective in Designing Cities

Results of this study reveal that the post-pandemic era should re-think the social-economic and environmental dimensions of functional urban spaces. Hence, this study suggests biological considerations of pandemics in functional cities. Therefore, smart cities approaches should evolve in such a way as to protect urban dwellers from the negative effects of pandemics.

In view of the possibility of transferring the disease via contact with material surfaces already contaminated by an 'infected person', 'touchless technologies' should be advocated [40]. In this regard, voice control, key card swiping and 'face recognition technologies' can be annexed for this purpose [41]. Indeed, the use of alternative control such as smartphones for touch devices such as blinds and elevators or motion sensors for doors should be encouraged [42]. Self-cleaning spaces, especially in commercial restrooms and domestic bathrooms, are an effective means of controlling the virus.

In addition, cities and municipalities can better combat the pernicious effects of pandemics by enhanced transportation sanitation services. Further extension of outdoor sidewalks spaces and more tolerance for restaurant or business owners to use promenades or open spaces not under 'strictly designated' is encouraged. This could ease densification and prove an effective planning solace. All of these can be corroborated by thought-out planning and green landscaping.

Overall, the consideration of social, economic and environmental impacts of the pandemic on urban spaces in view of the suggested theoretical framework reveals

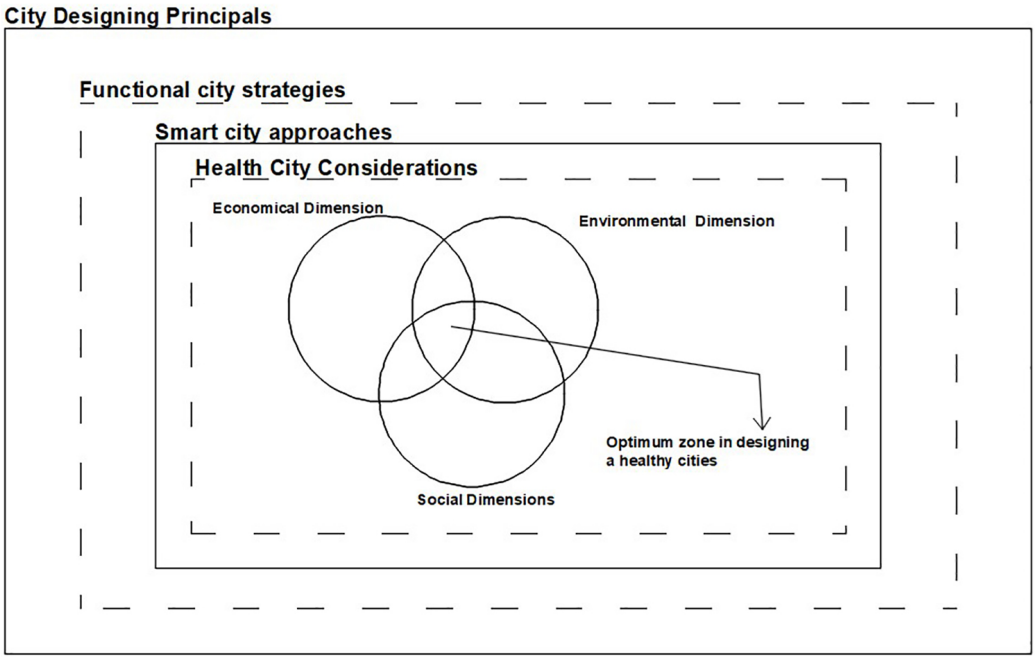


Fig. 2. Optimum zone in designing a functional city [Developed by the author].

the blueprint for urban designers in the pursuance of a pandemic resilient environment. City designing strategy is imperative in designing functional cities. In addition, smart city technologies are also germane in designing healthy cities. Figure 2 illustrates that the optimum zone in designing pandemic resilient functional cities is one that simultaneously considers all social, economic and environmental dimensions of urban spaces.

## Conclusions

Cities are shaped by the socio-economic and environmental impacts of pandemics. Chronological analysis of the pandemics through history reveals that during the last 200 years the number of pandemics has increased dramatically. The finding warns urban designers of a high possibility of facing another pandemic in the near future. Accordingly, the study suggested strategies for long- and short-term interventions that foster the development of pandemic resilient urban spaces.

The study showed the strong departure between pandemic disasters and other forms of disaster. This is because pandemics threaten the users of public spaces while the other forms affect infrastructures. Moreover, pandemic induced disasters are usually protracted with huge economic consequences, thus mitigation should be mainly concerned with providing economic security. The short-term securities include social distancing while the long term embraces the provision of infrastructures. This is an essential step in the development of functional cities. The pandemic will create the novel framework to re-think the public space, thereby providing a new design vocabulary for re-structuring our public spaces to design pandemic appropriate cities. This study developed the COVID-19 environmental risk factors and mitigating strategies in urban spaces based on its short-term and long-term approaches using the qualitative assessment of the related literature. The following table illustrates the contribution of this study.

As illustrated in Table I, by adopting a methodical and user-friendly layout, functional urban areas become more distinct, efficient and pleasant to live in. It also revealed that the current idea of smart cities might be a reasonable approach to the objectives of functional cities, especially from the post-pandemic design perspectives.

The study also showed that the dense concentration of people in cities provides the ideal condition for the spread of transmissible diseases. It also revealed that the design of pandemic resilient cities requires the simultaneous consideration of socio-economic and environmental imperatives of cities. As a result, smart cities technologies have proved to be an appropriate strategy in the development of functional cities. This

**TABLE I**

**COVID-19 Environmental Risk Factors and Mitigating Strategies in Urban Spaces [Developed by the author]**

| Environmental risk factors | Mitigating strategies | |
|---|---|---|
| • Crowded buildings and sidewalks<br>• Crowded spaces<br>• Elevators and public utilities<br>• Long-distance travelling<br>• Narrow sidewalks and paths<br>• Public facilities<br>• Public transit<br>• Public vehicle travel<br>• Social and cultural gatherings<br>• Stores and restaurants<br>• Street vendors and homeless people<br>• Third places | Short-term approaches | • Practicing social distancing<br>• Business closing and lockdowns<br>• Citizens respect the hygienic rules<br>• Contact tracing<br>• Decreasing unnecessary social and cultural activities<br>• Increasing the walkability<br>• Passenger illness check using QR code<br>• Passenger temperature check<br>• Regularly sanitation of public spaces and targeted cleaning<br>• Surface touchless technologies<br>• Temporary bike lanes<br>• Using face masks<br>• Using handwashing and sanitation tools in public urban spaces<br>• Smart city technology<br>• Self-cleaning spaces, UV light |
| | Long-term approaches | • Developing smart city strategies<br>• Enhancing sanitation of public vehicles<br>• Slow street program<br>• Increasing green spaces and pedestrian walkways in cities<br>• Smart community, industry, homes<br>• Smart mobility<br>• Improve walking and bicycling<br>• Green spaces<br>• Subsidized bike-sharing program<br>• Functional urban spaces<br>• Educating people to trust the system in case of natural disasters<br>• Promoting hygienic rules<br>• Face recognition technologies and voice control |

research recommends further studies on the psychological effects of pandemic related lockdowns and the application of green cities in designing pandemic resilient urban spaces. A historical survey of pandemics and how this has impacted cities through history is also suggested for further research.

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# Analysis of Earthquake Park Design Criteria: Cases in Ataşehir and Topkapı Parks, Istanbul

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**Abstract**

**Earthquake parks are open spaces where sustenance, shelter and security needs required by people to sustain their daily lives after a disaster may be addressed. In this study, the use of Ataşehir and Topkapı earthquake parks as recreation areas before an earthquake and as a post-disaster park were examined from a space design aspect using on-site observations. Standards required for earthquake parks were determined, such as land location and suitability, transportation, size and function, infrastructure systems, structural and vegetative designs, whereas evaluations of these criteria were conducted at two parks. As a result of this study, it was identified that unlike traditional parks, designing earthquake parks according to site location and suitability, transportation, size and function, infrastructure systems, structural and planting design is important for post-disaster use.**

## Introduction

Public areas can serve as basic life support, as they can be used for emergency evacuation and rescue in the event of a possible disaster. Jayakody, Amaratunga, and Heigh (2018) emphasized the need to consider disaster management strategies along with sustainable development strategies while planning and designing public urban spaces [1]. The evacuation, medical aid, communication, shelter and food needs arising after a disaster can be met with the establishment of networks and social links in urban open areas [2].

In considering available literary studies, improvements in public spaces can have positive effects on disaster resistance [3]. It has been ascertained that interaction with vegetation, such as parks, gardens, tree planting, etc., helps individuals' resilience and resilience during disaster periods, not only through the therapeutic effects associated with psychology, but also by reviving memories [4]. Open spaces shall also be vitally important in addressing post-disaster security and housing needs [5], [6], [7]. While they enable people to come together safely after a disaster, assembly areas also meet their sustenance needs [8]. Open spaces assume the role of a 'second city' after a possible earthquake. A second city refers to an inactive open area network that becomes active after a disaster, providing areas for evacuees to assemble and seek temporary shelter [9]. As the initial evacuation point during and after urban disasters, it is vitally necessary to provide open spaces that are easily accessible from all units. Parks scattered all over the vicinity provide more opportunities as evacuation sites than a centrally located park [10]. According to a similar view in Japan, the larger the open area, the more important its perceived value for disaster prevention. For this reason, the contribution of small public areas in regards to disaster prevention is viewed as negligible [11].

According to the results of a survey published in the International Journal of Disaster Risk Reduction, it was determined that parks, plazas and good street design can improve a community's ability to survive an earthquake [12]. Not only green spaces, but also built up and undeveloped open spaces play an important role in urban seismic resilience [13].

In their 2016 study regarding how the city of Christchurch, New Zealand, recovered after the

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earthquakes of 2010 and 2011, Brand and Nicholson emphasized that the public space becomes larger, greener, more creatively flexible and transformative which is determined by its inclusion of public private boundaries [14]. Chan, DuBois, and Tidball (2015) argued that earthquake parks in New York City were important resources that bolstered neighbourhoods in their effort to avoid the adverse effects of Hurricane Sandy in 2012 [15]. Dionísio (2016) stated that even places with small open spaces would be crucial during a disaster [16].

## Problems in Urban Open and Green Spaces Before and After Earthquakes

An earthquake is an unavoidable natural phenomenon that poses a great threat with the uncertainty of when it is going to strike. However, with planning measures in place, the effects of disaster-destruction can be kept to a minimum and the effects of destruction can be limited, whereby emergency response and rescue efforts can be made more effective during the aftermath with a combination of aid facilities, public spaces and shelters.

Despite being an industrialized country, Japan suffered great losses with acute evacuation and housing problems as a result of the 1995 Great Hanshin-Awaji earthquake. There were 6433 lives lost, 250 000 structures demolished, with property damage of around ¥10 trillion. The earthquake victims who inhabited evacuation centres for a long time due to a disruption in their flow of daily life experienced confusion due to the lack of an organized emergency evacuation system after the earthquake, the lack of concrete information about evacuation routes and areas, direction signboards. This situation suggests that it is necessary to develop evacuation routing systems and evacuation plans, prepare guidebooks that clearly indicate evacuation routes and who is responsible for evacuation. Due to the extent of damage inflicted upon infrastructure utility plants, there was a heavy demand for assembly areas where the needs of people could be addressed. Having sought asylum in private centres called 'evacuation centres,' earthquake victims were rejected by administrators in some state-managed facilities, including sanatoriums [17]. The continuation of aftershocks after the 1999 Marmara earthquake created fear in people, and people who could not enter their homes remained in undeveloped land, parks, roadsides and some green areas. The first urgent demand after the earthquake was the need for shelter. Due to insufficient open spaces, the use of rubble piles for storage at the same time has adversely affected the psychology of people. Again, the location, quantity and size of green and open areas were insufficient in the face of fire and similar problems that occurred after the earthquake, and a safe environment could not be provided.

## The Need for Assembling After an Earthquake

During an earthquake, people tend to instinctively flee the building, head for open spaces in order to feel safe, to overcome the impact of the initial shock, and get together with their relatives and communicate. There should be an area near each individual's home or workplace as a precaution for safety matters such as damaged buildings after a natural disaster, continuation of aftershocks or gas leaks [18].

Emergency assembly areas constitute the assembly point in a situation that requires individuals to flee their homes. These serve as pre-evacuation areas where rescue teams are also present and information is exchanged until the temporary shelter centres are ready. The assembly areas should be a minimum 1.5 $m^2$ per person. Open spaces, neighbourhood parks, mosques and schools are examples of emergency assembly areas [19].

Tent areas are spaces where portable tents are located in order to prevent earthquake victims from being adversely affected by weather conditions. The climate and soil structure of these areas need to be suitable for use. Since families who lost their homes after a disaster may have to remain in tents for a long-term, it is important that the tents are suitably durable for natural conditions as much as possible.

In residential areas damaged and destroyed due to the severity of the earthquake, the aim of temporary residential areas is to address the shelter needs and minimum living conditions of homeless individuals. In particular, temporary lodging areas offer basic elements such as electricity, water, food, communications and sewerage. The distances of the previously designed temporary settlement areas to health care institutions, markets and warehouses need to also be taken into consideration.

Site selection of earthquake parks in Istanbul, 859 assembly areas with a capacity of 21 million people, with a total size of 32 million square meters, was done in 39 districts. A total of 1170 open and 2662 closed temporary accommodation areas were determined, and in site selection attention was paid to ensure that the size of the open area was at least 10 thousand square metres. The areas are planned in a way that will provide short or medium-term shelter for the citizens after the disaster and support the rescue efforts.

Earthquake gathering areas are the areas where basic needs such as shelter, nutrition and health are met in order to be protected from the negative effects of a possible disaster during and after the disaster. After the earthquakes of 17 August and 12 November 1999, 470 gathering areas were determined in Istanbul within the framework of the "Disaster Emergency Action Plan"; however, according to the report of the Istanbul Metropolitan Municipality Earthquake and Natural Disaster Commission, only 77 of these areas have survived. There are objections to this

determination from Istanbul district municipalities and various authorities, and different numbers are suggested regarding tent and container cities and other temporary accommodation areas to be established in Istanbul in case of a possible disaster.

To be more specific, earthquake gathering areas are defined as large and wide areas with infrastructure on which temporary cities can be built and where basic needs such as electricity, water, heating, shower and toilet can be met. Therefore, the determination of school gardens, parks and vacant lands, which district municipalities show as earthquake assembly areas is not significant. In addition, considering the urban texture, building quality and population factors of Istanbul, the adequacy of the gathering areas becomes more controversial. According to TUIK 2020 data, in Istanbul, which has a population of 15, 519, 267 people, there are not enough areas of sufficient size and quality to meet the needs of gathering and shelter after the earthquake.

## Earthquake Parks

While they meet the recreational needs of the community in daily use, these are parks which address its needs for assembly and shelter in cases when earthquake victims cannot use their houses and, unlike other assembly areas, should be set up in the city centre after a possible disaster. Easy to access and evacuate, earthquake parks should be able to be quickly organized in the event of a possible disaster by expert personnel or groups of local officials trained before the disaster. Concurrently, the fact that the business departments are planned in advance ensures the systems that need to be operated urgently are made in a timely manner [20]. The open urban areas and particularly the *Monumento de la Revolucion Square* and its vicinity played a key role in the rescue operations of the 1985 Mexico earthquake, one of the biggest earthquakes in the world with a magnitude of 8.4 [21]. Again, with the 7.2 magnitude Japan / Hanshin Awai Earthquake which struck in 1995, parks became a central area used for disaster recovery and reconstruction task [22].

In the aftermath of the 17 August 1999 Marmara Earthquake, it was understood that urban landscape planning and urban planning should reconsider the planning of outdoor urban green areas prior to and after the earthquake [23]. Scientists have warned that there is pent up energy along the North Anatolian Faultline in Istanbul and a +7 earthquake is inevitable. In line with lessons learned from previous earthquakes, a number of changes have been made over the past 20 years. Legislation regarding construction has been ratified, earthquake containers have been positioned at certain points in Istanbul, but no information about how many of them are active is made available. While parks or vacant lands are determined as assembly areas in Istanbul, they are classified as evacuation routes on the main arteries. On the other hand, some NGOs claim that the designated assembly areas do not meet the necessary criteria and that only ¾ of the designated areas have been opened for development since the 1999 Marmara Earthquake. According to AFAD, there are 2864 assembly areas in Istanbul, whereas according to TMMOB and the Chamber of Civil Engineers, there are just 77 assembly areas that meet the necessary criteria [24].

## The Importance of City Parks in the Aftermath of Earthquakes

Compared to the rigidity of building and park infrastructures, parks sustain less damage and are frequently used by residents before any disaster has allowed them to become evacuation points. After the devastating impact of the Great Hanshin-Awaji Earthquake (GHAE), it was observed that many parks sustained less damage than other infrastructure. For local residents, these parks became centres where they were able to rebuild their lives. For this reason, parks act as catalysts by achieving a new norm after a disaster as well as preserving a city's culture, ecosystem and social order. Brown argued that urgent needs such as evacuation, medical aid, communications, social assembly, housing, food and water distribution are often planned in the open space of a city, and landscape architects need additional design guidelines to better support open spaces after such disasters. In the event of an earthquake parks can also prevent possible risks and liquefaction as well as fire prevention by hindering the development of unstable geological formations. The Japanese Institute for Landscape Architecture has categorized parks into six uses: (1) short-term shelter; (2) distribution of medical and other supplies; (3) a combination of (1) and (2); (4) temporary housing; (5) storage of debris, garbage and cars; (6) less intensive use, including temporary evacuation [25].

## Earthquake Park Landscape Design Standards

### Site Location and Suitability

In 2014, León and March drew attention to features of an earthquake park, such as site size, slope, soil type of the land and the capacity of the site to support emergency services and infrastructure [26]. As short-term needs for housing and services expand in the days and months following a disaster, guidelines for such needs pertaining to the size of open spaces also change. For instance, at least 45 $m^2$ per person will be needed for long-term shelter needs [27]. Another important issue in the design of earthquake

parks is to take the climatic characteristics of the location of the land into account. The duration of hot and cold weather conditions plays a crucial role in determining indoor and outdoor designs [28].

In their 2016 study, Xu, et al. laid down seven principles regarding the location of earthquake evacuation shelters, including security, land use, nearest evacuation location, economy, appropriate transportation distance, coverage, and population capacity [29]. Shelters should be located away from potentially risky areas such as fault lines, liquefaction risk, any nearby structures that might collapse, and chemical depots. The park to be used in case of a possible earthquake should be situated near residential areas, whereas spatial distribution should be planned according to population density and the importance of the region's inhabitants to easily find their shelter. Earthquake victims should be able to reach their shelter within a short time. In a study regarding earthquake parks that was conducted by the Directorate of Earthquake Risk Management and Urban Improvement for Istanbul, there needs to be at least 250 m or a 15-minute walk between the buildings to the assembly area, in line with assembly and accommodation site standards. While Masuda calculated the area to be 2 $m^2$ / PAX in general in his 2014 study, he said that the assembly and accommodations space in Istanbul should be 1.5 $m^2$ / PAX, and assembly and emergency accommodations space should be 3.5 $m^2$ / PAX.

### Transportation

In the aftermath of an earthquake, it is critically important to make transportation available to and from shelters and aid distribution. Damage to aid networks results in poor healthcare and serious disruption of operations during disasters. Demolished roads, buildings and bridges sever transportation routes and cause traffic congestion in densely populated cities. Earthquakes wreak havoc on residential areas, destroying buildings, structures, infrastructure, bridges, roads, and utility lines, having a detrimental impact on access networks. Thereby, the transportation duration is as important as the number and capacity of demand realized for an earthquake park [30]. It should be comfortable and easy for pedestrians to reach the park grounds via various means such as on foot, by car, bike or bus. Another important issue regarding transportation is the relationship between the park and its environs.

- Entry: Park entrances need to be visible and defined and wide enough not to interfere with the entry of emergency vehicles, such as ambulances, fire trucks.
- Roads: The presence of traffic lights along park roads to direct traffic jams and speed limits also ensures pedestrian safety. Moreover, road connections inside and outside the park need to be well-designed in order to properly direct individuals. According to the Disaster Reduction and Human Renovation Institution (1997), avenues facing the park should be 6-m wide [25].
- Parking Lot: The parking lot where evacuees who reach the park via motor vehicle should be of sufficient size and offer easy access to the park after an earthquake. Moreover, this sufficiency is valid for vehicles transporting aid such as parking lot tools, equipment and foodstuffs as well [31].
- Helipad: Due to transportation difficulties and time limitations experienced during the disaster aftermath, aircraft such as helicopters can be utilized for long-distance transportation of casualties and medical supplies by putting into place their particular landing conditions during the disaster response phase [32].

### Size and Function

For the initial 72 hours after disaster strikes, shelters are up in the air until emergency management agencies erect tents or temporary structures. Thus, many spatial structures such as gazebos, seating elements, picnic shelters can be designed to serve as emergency shelters [3]. In his research conducted in 2014, Masuda suggested that the larger the open areas, the greater the level of disaster prevention. However, he also observed that small areas were also heavily used where there was a lack of open space. Masuda also stated that small green areas of 1000–2000 $m^2$ in size used as outdoor aftermath shelters and neighbourhood parks of 1000–3000 $m^2$ in size would suffice as temporary shelters for up to a week. The multi-functionality of public spaces creates resilient societies by creating a culture of flexibility. The more multi-functional or hybrid parks are available in daily life, the more they will play a key role in aftermath emergency responses [33].

### Infrastructure Systems

Infrastructure systems include equipment such as roads, utilities and sewage and waste management. Accordingly, the most vital equipment that should be available in an earthquake park in line with landscape standards are a generator, an audio system, hazard warning lights, a water tank and solar energy panels.

While the electricity grid was restored four days after the Chile Earthquake, interruptions continued in some areas [9]. In the cases when electrical energy is unavailable or interrupted, generators that convert energy into electrical energy create a life-saving effect [34]. That is because many headaches are encountered where there is no energy production. Solar energy production and solar-powered illumination constitute the standards of Japan DPP in reducing these problems [35].

It is important to set up centralized audio systems to communicate with evacuees and coordinate emergency responses as well as to broadcast announcements. Hazard

warning lights placed at high points will assist earthquake victims in finding their way in case of crisis. Downed utility lines are factors that direct people to shelters. The need for water tanks is inevitable in addressing basic necessities and cleansing needs such as bathing, laundry and dishwashing and potable water [31].

### Structural Designs

Structural designs refer to conducting static calculations and designing in line with structural design principles for the proper use of buildings, spaces, roads, furniture and even roadside ground cover and tree.

*Water.* Manually operated water pumps in case water lines are cut off, water tanks for filling and emergency water supply tanks, firefighting and water supply pools are an important structural design in making the lives of the displaced easier and address their needs [3]. The presence of water in parks, supply tanks and pumps are critical features as indicators of post-disaster open space utilization. The availability of water is also important for extinguishing fires.

*Food.* In Tokyo and Kôbe, both large DPPs and municipal parks have benches or seating that is designed to convert into wood-burning stoves or cooking pits whenever the seat tops are removed. Chileans suffered food and water shortages after the temblor that struck the country in 2010. Vegetable gardens have been an important source of food, especially for those who managed to escape from urban to rural areas. Rokko Kaze No Sate Koen selected edible tree species in the Kôbe design, whereby attempting to address sustenance needs after the disaster [9].

*Lighting.* León and March (2014) defined three types of lighting that play a role in guiding people to safety in an emergency: lights which are found in safe open areas, solar-powered street lighting, and auxiliary ground lighting which directs people to open spaces [26]. In structural design, the lighting layout is used for night security, function and requirement purposes, and it should be positioned in a way that does not restrict the movement area and hinder passage in designs [36].

*Finding Direction and Communications.* Signs and street furniture are used as visual points of bearing to ensure evacuees' access to the area they wish to go after an earthquake. In the aftermath of the 1995 Great Hanshin-Awaji Earthquake, victims experienced confusion due to the lack of direction signs and placards [17]. The Massachusetts Institute of Technology designed a network of illuminated landmarks to be distributed throughout the city for post-disaster use. While this structural design is an interactive piece of furniture in daily use, it is used for finding direction and communications during evacuation [33].

*Seating Ensembles.* It is possible to encounter seating ensembles in various manners in downtowns, parks and walkways. The usefulness of a sitting unit is positively related to its size. Seating units in the earthquake park should be ergonomically functional [37]. While seating arrangements made of shaded and soft surface material provide comfort, multi-functional seating elements that can be turned into tents and ovens for cooking by covering them with tarps can be used according to the need in the earthquake aftermath [38].

*Trash Receptacles.* Trash receptacles of different sizes and structures can be used to prevent pollution of outdoor spaces.

*Management and Computer Centre.* A management and computer centre is established to ensure the recording of all kinds of information, communications and internet access during a crisis [39].

*Playfields.* While the amphitheatre which is used for entertainment, sports and a playground prior to the disaster can be used as a place to assemble and make announcements after the earthquake, paten skate park ramps can be used as an auxiliary element in offloading the necessary equipment and materials from vehicles. As was seen in the Gölcük Earthquake example, an ice-skating rink was used as a temporary morgue. Basketball courts, on the other hand, can be used as emergency hospitals, a meeting spot for a portable kitchen, or as a tent-erecting area [39].

*Children's playgrounds.* Playgrounds are important in terms of both reverting back from the abnormal situation experienced during the aftermath recovery phase to normal daily lives as well as mental health [40]. In their 2015 study, Kinoshita and Woolley found that adventure playgrounds helped to relieve mental stress, particularly in overcoming shocking natural events such as earthquakes and tsunamis. This is because children are not the same as adults in expressing their emotions, and their mental health care should not be ensured with just a counsellor, but also through play environments as well [41].

*Restrooms:* In case of disasters, 'manhole toilets,' which are used in earthquake parks and do not have any utilization problem even if utility infrastructure lines are severed, are turned into a toilet, by removing the manhole and covering them up with a tarp.

### Planting Designs

The presence of low-canopy trees and shrubs which hinder access and the setting up of shelters may have an adverse effect on the land use in the aftermath of an earthquake [3]. Refractory vegetation with high water retention, such as sedum should be used around park areas instead of flammable species such as J*uniperus spp.* and *Taxus spp.* [42].

Whether their buildings are damaged or not, evacuees still seek shelter and protection in outdoor green spaces due to the deep psychological effects of the earthquake [43]. Thus, it is very crucial to design outdoor green areas

such as sports halls of various sizes, earthquake parks, squares, which include healthcare services, emergency transportation and strategic plans, to be used for the benefit of society in case of a possible disaster. These areas should be handled as a design input, considering the many functions they take on before and after the earthquake.

When looking at the aftermath functions of each area and their earthquake park components which meet recreational needs in daily life and constitute welfare and lifestyle standards, they indicate how important it is to plan and design such parks before a possible earthquake, their compliance with the criteria, and the forms of organization after the earthquake. Many functions of earthquake parks such as assembly, food and temporary shelter needs which bear vital importance for earthquake victims, first aid, temporary storage, collection and distribution play a key role during and after the disaster.

The aim of this study is to determine the design criteria for earthquake parks by examining in terms of space design the use of earthquake parks in Istanbul's Ataşehir and Topkapı districts which are located in the 1st degree earthquake zone, as pre-earthquake recreation areas as well as disaster parks after the earthquake.

## I. Materials and Method

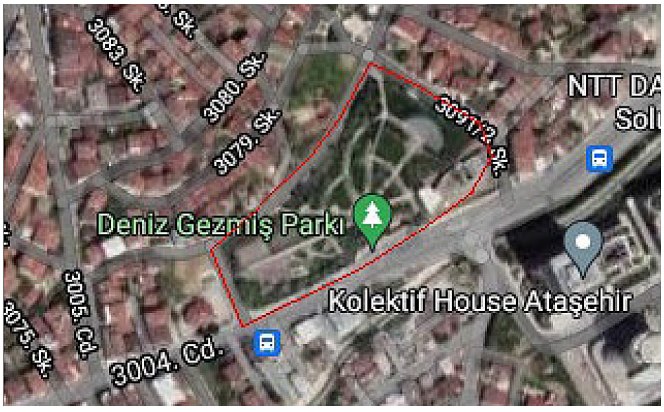
### A. Purpose of the Study and Defining the Problem

According to the report of the World Cities Culture Forum (2018), while Oslo (68 %), Singapore (47 %), Sydney (46 %), Vienna (45 %) and Zurich (41 %) constitute the top five among 38 metropolises with the greatest proportion of green space, Istanbul has the last place with just 2.2 % of green space. Due to insufficient open-green areas in Turkey, high land values in its metropolises and the desire for them to provide income, a growing population due to migration to cities and the organizational legislative structure, the decreased use of outdoor and green areas has deviated from recreational purposes. Parks, squares, sports fields, parking lots, open and green areas should be adequate, accessible and large enough for the population in line with the recreational service they provide to the public before a disaster and after the disaster, whereas these areas should be kept separated and vacant in the zoning plans [44].

The objectives of this study are to find and consolidate existing research regarding the planning and design for seismic resilience from the discipline of landscape architecture and related professions, to make on-site observations at Ataşehir and Topkapı Parks and subsequent assessments of their properties, and come up with suggestions for landscape architects and related vocations to better incorporate seismic resilience into the planning and design of earthquake park areas.

First, within the scope of this study the concept of natural disaster, urban outdoor, green areas and earthquake parks were examined in detail, then standard features that should be readily available at such parks were examined separately as infrastructure space design. In the conclusion section, an assessment is made of the standard features that should be readily available at such parks and recommendations for their implementation are provided. During the literature research and data collection phase, important elements regarding the infrastructure and spatial design of the earthquake parks forming the basis of the study were examined separately. An assessment of emergency use component functions in earthquake parks to be designed for post-earthquake utilization has also been conducted.

a




b

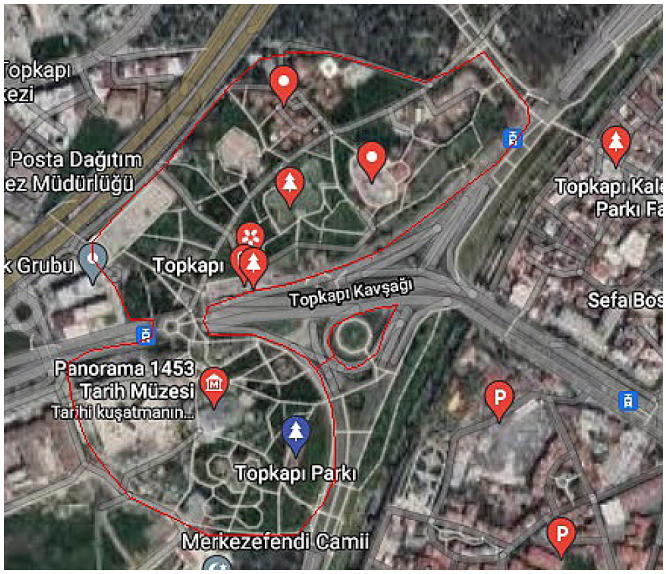
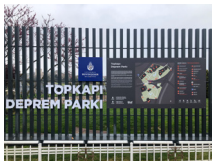
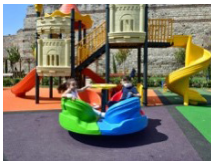



Fig. 1. Earthquake park locations: a – Ataşehir; b – Topkapı (Source: print screen from Google maps).

**TABLE I**

**Visual Analysis of Ataşehir and Topkapı Parks (Photos by authors)**

| | ATAŞEHIR PARK | TOPKAPI PARK | | ATAŞEHIR PARK | TOPKAPI PARK |
|---|---|---|---|---|---|
| Entry Gate |   |   | Playgrounds |  |  |
| Pedestrian ways |  |  | Awareness and Instruction Point |  |  |
| Parking Areas/ Open Parking | UNAVAIBLE |  | Bicyle rental station | UNAVAIBLE |  |
| Parking Areas/ Enclosed Parking | UNAVAIBLE |  | Child psychosocial center | UNAVAIBLE |  |
| Seating Group Gazebo and Benches |  |  | Child Psycho-Social Centre | UNAVAIBLE |   |
| Amphi |  |  | Power substation |  |  |
| Water |  |  | Sport activity areas |  |  |
| Restrooms |  |  | Trash receptacles |   |  |

Ataşehir Deniz Gezmiş on the Anatolian side of Istanbul and Topkapı Earthquake Parks on the European side were opened on August 17, 2020. It is planned that both earthquake parks will function as a pre-disaster education and cultural centre, and after the disaster, they will function as in-park furniture, tents and food distribution areas and temporary shelter areas.

The size of Ataşehir Earthquake Park is 19 000 $m^2$, it is located in Ataşehir District's Mustafa Kemal neighbourhood and is very important as a single earthquake park with emergency usage functions. The Ataşehir Earthquake Park features a 700 $m^2$ amphitheatre, a 500-m long running track, a soccer pitch, a basketball court, jogging areas, children's playgrounds,

sports fields, landscaped recreation and green areas, electricity and lighting systems, as well as automatic sprinkler systems [45]. Located in Mustafa Topkapı neighborhood of Fatih district, the Topkapı Earthquake Park measures 21 500 m$^2$. While the Ataşehir Earthquake Park can handle average 500–700 people after a disaster, Topkapı Earthquake Park can accommodate 5000 people (Table I) [46].

B. Method

Before deciding on the parks and design issues to be selected within the scope of the study, the analyses of the important earthquake parks from the world and Turkey were made (Table II). Then field analyses were conducted at selected earthquake parks with on-site determinations by applying data collection, analysis, synthesis and evaluation processes. In determining the park's current general condition, shortcomings in existing facilities and parking maintenance problems were defined; whereby an attempt was made to suggest ways to make the existing earthquake parks more compatible with the principles of landscape design (Fig. 2).

## II. Research Findings

Considering the land location and suitability criteria of both parks, it has been determined that the green area

**TABLE II**

**Earthquake Park Design Issues [47]**

| | **Tokyo Rinkai Earthquake Park** | **Miki Disaster Management Earthquake Park** | **Anchorage Earthquake Park** | **Keçiören Municipality E.P.** | **Sultan gazi E.P.** | **Aykut Barka E.P.** | **Eyüp Municipality E.P.** | **Bağcılar Municipality E.P.** | **Küçükçekmece E.P** | **Van E.P** | **Topkapı E.P.** | **Ataşehir E.P.** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total area (decare) | 132 | 742 | 134 | | 2.5 | | | | | 10 | 10 | 19 |
| Construction stage | After the earthquake | After the earthquake | After the earthquake | After the earthquake | After the earthquake | After the earthquake | *planned* | *planned* | *planned* | *planned* | After the earthquake | After the earthquake |
| Earthquake simulation area | + | | | + | + | + | + | + | + | + | + | + |
| Cafeteria and buffet | + | | + | + | + | + | + | + | + | + | + | + |
| Parking | + | + | + | + | + | + | + | + | + | + | + | + |
| Heliport | + | + | | | + | + | + | | + | | + | |
| Picnic area | + | | + | + | + | | + | + | + | + | + | + |
| WC and sink | + | + | + | + | + | + | + | + | + | + | + | + |
| Shower | + | + | + | + | + | + | + | + | + | + | + | + |
| Garbage collection area (trash bins) | + | + | + | + | + | + | + | + | + | + | + | + |
| Gathering area/concert/ festival area/ amphitheatre | + | | | + | + | + | + | + | + | | + | + |
| Sport areas | | + | | + | | + | | | | | | |
| Walking path | | | + | | | | | | | | | |
| Bicycle path | | | + | | | | | | | | | |
| Fountain | + | | + | + | + | + | + | + | + | + | + | + |
| Changing room | | | | | + | | | | | | | |
| Playground | | | | + | | + | + | + | + | + | + | + |
| Water tank | + | | | | | | + | | + | | | |
| Medical room | + | + | | | | | | | + | | | |
| Solar energy/ generator room/solar | | + | | + | + | + | + | + | + | + | | |
| Communication system (central) | + | | | | | | | | | | | |

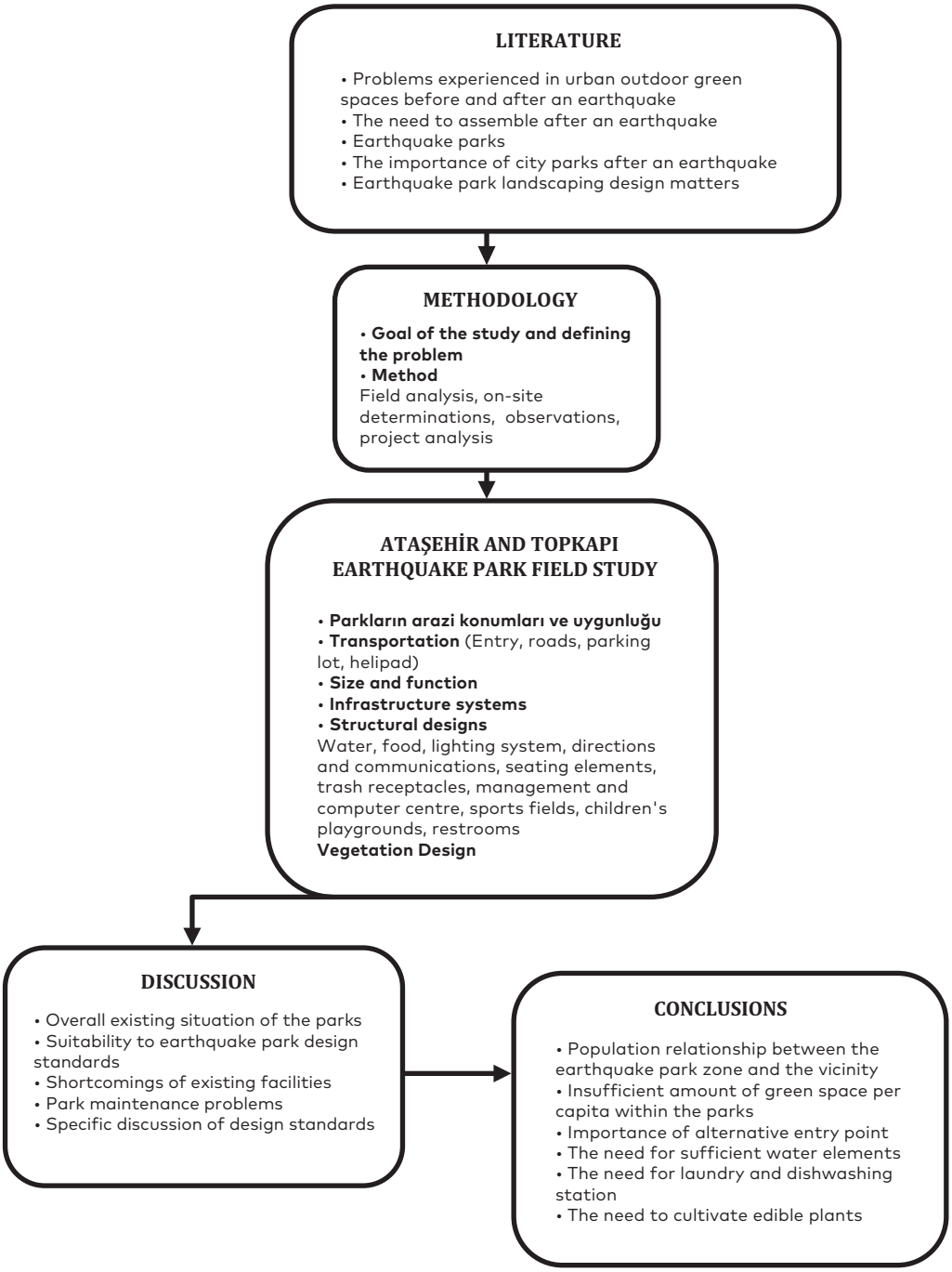



Fig. 2. Flow-chart of analysis (improved by authors).

per capita for both parks is insufficient and there is neither any risk of falling buildings nor secondary hazards around the parks (Table III).

In terms of transportation, it is determined that both park entrances are obstacle-free, that there is an entrance from the non-entry area at Ataşehir Park, that vehicles can reach a certain spot from there, that emergency vehicles do not have trouble-free access, that there was an insufficient parking lot and no helipad.

Neither of the parks has a wastewater system although there are smart benches and lighting arrangements with charge points, there is a lack of solar panels.

It was determined that the use of water elements in different ways and rainwater collection systems were not incorporated at Ataşehir Park. There are four mosques in the immediate vicinity of Topkapı Park. There are fountains and common area ornamental pools which are deemed suitable for potable water use.

While there are sufficient places to sit at Ataşehir Park, the same cannot be said for Topkapı Park. In particular, it was observed that Topkapı Park lacked sufficient protection from the sun and wind.

Entrances are evident at both parks for those using the park for the first time. Signs with information

**TABLE III**

**Results of Control List Application on the Earthquake Parks (improved by authors)**

| DESING STANDARDS | ATAŞEHİR PARK | TOPKAPI PARK |
|---|---|---|
| | YES/NO | YES/NO |
| SITE LOCATION AND SUITABILITY | | |
| At least 200 m or 15 minutes walking distance from the buildings to the assembly area | YES | YES |
| 6 m wide street facing the park (Disaster Reduction and Human Renovation Institution (1997) | YES | YES |
| Risk of falling buildings | NO | NO |
| Possibility of secondary danger | NO | NO |
| Any security zone, including fire alarms, surrounding the park | NO | NO |
| Shelter or building that can be used for an emergency | YES | YES |
| Ground slope suitability | YES | YES |
| Floor that can lift heavy vehicles such as fire brigade, ambulance, aid vehicles | YES | YES |
| Proximity to basic facilities such as hospitals | YES | YES |
| TRANSPORTATION | | |
| Entrance door prominence | YES | YES |
| Appropriateness of entrance door width | YES | YES |
| Entrance affected by barriers | NO | NO |
| Possibility to enter the park from the non-entry area | NO | YES |
| Another barrier-free entry | NO | YES |
| Possibility of using ambulances and fire trucks | NO | YES |
| Separated pedestrian and bicycle paths | NO | NO |
| Transportation options such as bus, train, car, bicycle to reach the park | YES | YES |
| Bus stop near the park | YES | YES |
| Traffic lights to guide traffic density and speed limits on park roads | YES | YES |
| Well-designed footpath connections to ensure pedestrian safety | YES | YES |
| Sufficient parking space | NO | YES |
| Helipad 8 for multi-use park 330′ x 330′) | NO | YES |
| SIZE AND FUNCTION | | |
| Area per person 2 m2 area (JICA, 2002) | NO | NO |
| Hybrid parking feature | YES | YES |
| Shelter or building that can be used for an emergency | YES | YES |
| INFRASTRUCTURE SYSTEMS | | |
| Flashers to assist in finding directions at high points | YES | YES |
| Water tank | YES | YES |
| Wastewater systems | NO | NO |
| Wastewater systems A solar panel or other backup for power | NO | NO |
| STRUCTURAL DESIGNS | | |
| The feature of having any water in the entrance | YES | YES |
| Different uses of the water element in the parking lot | NO | NO |
| Rainwater collection barrel or other facility to provide water supply | NO | NO |
| A bucket or pump to extinguish fires and convey water | NO | NO |
| Fire extinguisher | NO | NO |
| Any office to transmit and manage information | YES | YES |
| Enough places to sit | YES | NO |
| properly placed seating | YES | NO |
| Sun, shade and wind protection possibilities | YES | NO |
| Light system at the entrance of the park | YES | YES |

| | | |
|---|---|---|
| Light system up to the end of the open area | YES | YES |
| Parking plan for first time users | YES | YES |
| A well-marked guidance system within the park | YES | YES |
| Benches that can turn into grills that allow evacuees to cook | YES | NO |
| Management and Computer center | YES | YES |
| Sports halls or similar space that can be used as a place to set up large tents, a meeting point for a portable kitchen or an emergency hospital | YES | YES |
| Children's playgrounds | YES | YES |
| Manhole toilets | YES | YES |
| Garbage Collection Area | YES | YES |
| Lost & Found assembly area | YES | YES |
| Laundry and dishwashing | NO | NO |
| Health Room | NO | NO |
| PLANTING DESIGNS | | |
| Combinations of short and tall trees | YES | YES |
| Edible plants | NO | NO |
| Arrangement and care of trees and shrubs | YES | YES |

and directions and signboards with plans are clearly visible.

Benches that can be converted into hearths are found at Ataşehir Park, but not at Topkapı Park. It was also determined that there are sports halls which may be used as a large tent assembly point, a portable kitchen or emergency hospital at Ataşehir Park, but not at Topkapı Park. There are healthcare wards at Ataşehir Park under the name 'Family Healthcare Centre', while there are plans underway for a section of the parking lot to be used as an infirmary at Topkapı Park.

In case of disaster, the Erdal Eren Cultural Centre at Ataşehir Park will be used as an 'Awareness and Instruction Point,' whereby the amphitheatre will be used as an 'Applied Training Point.' Again, in case of a disaster, the Turkish World Culture District at Topkapi Park will be converted into a 'Disaster Management Campus,' and the amphitheatre will be utilized as an 'Aftermath Reorientation Zone'. The Istanbul City Museum will be turned into a Communications Coordination Centre; the IMM Child Traffic Education Park will be turned into a Child Psychosocial Centre, the area of IMM European Side Parks and Gardens Directorate of the Fatih Regional Supervisory Office is planned to be used as an 'Aftermath Logistics Centre'. In the light of this data, it was seen that the conditions at Topkapı Earthquake Park were more suitable for implementing the 's disaster management plans.

Both parks have enclosed areas to address the heating needs of earthquake victims taking shelter during the aftermath. In particular, there are four mosques in the immediate vicinity of Topkapı Earthquake Park which may be used to address heating and shelter needs.

It has been determined that the cultivation of edible plants is insufficient in both parks, whereas the use of different plant species and their care is sufficient.

The designs of the garbage collection zones and garbage trash receptacles at both parks were observed to be suitable and of sufficient numbers.

## III. Discussions and Recommendations

Due to the limitation of research conditions and the difficulty of obtaining some of the data, just two city earthquake parks in Istanbul could be studied during the research phase. For future research, relevant information needs to be collected, the number of examples should be increased and more earthquake park areas should be applied to the assessment system of this study.

With Ataşehir Park, which was visited at irregular intervals, it was observed during the first visit that the urban furniture was worn down due to usage and inclement weather, while during subsequent visits it was noticed that they had either been repaired or replaced. While the seating elements are used in different ways in the city, pedestrian areas, and parks, they need to be functional for earthquake parks. While the seating elements at Ataşehir Earthquake Park are of a design suitable for use in the aftermath of a disaster, it has been observed that the seats at Topkapı Park are neither functional nor aesthetic. Both parks feature recreational areas such as sports activity areas, cultural centres, libraries and mosques to address needs such as erecting tents, portable kitchens, and emergency hospitals. Nevertheless, considering the population density and traffic problems of Istanbul, it is also a serious problem that there is no helipad at Ataşehir Park, which is important for earthquake parks in emergencies that require short travel time. Again, it is observed that children's playgrounds, which are effective during aftermath psychological recovery, are insufficient

in both parks. However, there are plans to turn the İBB Children's Traffic Education Park at Topkapı Earthquake Park into a Child Psychosocial Centre, which is bound to play an important role in terms of psychological support for children after an earthquake.

While observations regarding the Ataşehir Earthquake Park include a lack of space per capita, inadequate parking lot, inadequacy of vegetation designs, ill-designed playgrounds from the standpoint of use and quality, obstacles at the entrance preventing air and land emergency vehicles from entering the area, shortcomings pertaining to the Topkapı Earthquake Park include space per capita, vegetation designs and seating elements. Finally, the fact that both parks are near residential areas, education facility areas, business centres, and healthcare centres may cause more demand than their pre-earthquake utilization. Based on the research observations, it is forecast that both the infrastructure systems and structural designs will remain inadequate, depending on the density of the population to be served. Thus, the importance of building areas suitable for these features is comprehended once more during the process of designing earthquake parks by considering the standard features that need to be incorporated. As a result of the study, it was ascertained that unlike traditional parks, designing earthquake parks according to determined criteria is important for post-disaster use.

According to the research findings, there are inequalities in the number and size of the earthquake parks versus the population to be served. As for location assessment, the majority of neighbourhoods are within walking distance. Parking areas are used on a daily basis. There is a need for studies on portable or multi-functional urban furniture, potable water resources, and sanitary and renewable energy sources in the existing assembly areas. VD Shrestha in his investigative study regarding open spaces and seismic risk perception through the analysis of people's reactions during and after the 2015 Nepal Earthquake argued that open spaces have a direct or indirect impact on people's perception of seismic risk. He indicated that medium-sized common areas of about 200 m are preferred as safe havens and that, while the availability of necessary infrastructure and services affects the preferred situation, it is an important component of disaster response.

As is the case throughout Istanbul, the lack of green space per capita at both parks was an expected result. The matter of increasing green areas inside the parks is particularly vital considering the countless studies that emphasize the importance of their use in the aftermath of an earthquake [48]. It is important to plan a 'second city' that offers diverse uses and experiences, so professionals involved in the design of these areas may design multi-functional landscapes for both recreational activities and dealing with natural disasters.

According to Akdur (2001), it should be taken into consideration that the post-earthquake shelter area may bear other disaster risks caused by the earthquake and it should be a safe zone [28]. Areas with a safe morphological structure and bearing the risk of landslides, floods, tsunamis and swamps should not be preferred as an earthquake park zone. The absence of the risk of buildings falling around either park or other earthquake caused risks is important for the safe usage of the parks during the disaster aftermath. Fatih and Ataşehir districts are indicated as first-degree risk districts when looking at the map showing the fault lines in Istanbul. Although Ataşehir earthquake park has a functional transformation in terms of equipment and elements, and Topkapı has a functional transformation in terms of equipment, elements and area, from a geomorphological, geological and geotechnical point of view. Being on fault lines does not show the characteristics of a safe place.

The absence of an alternative entry point at the Ataşehir Park may have negative consequences for aftermath use of the park. In this context, there is a need to provide entry alternatives. Once again, the restricted use of emergency vehicles at Ataşehir Park is a very significant handicap. Roads in the vicinity of earthquake parks, emergency rescue, evacuation, medical aid, information assembly, etc. after an earthquake are primary influential factors in their matters. Considering the problems in traffic management and administrative structuring throughout Istanbul, vehicle parking on the roads poses a major problem. Entry and exit manoeuvres to the parking lot greatly reduce the usage capacity of roads and emergency access roads [49]. Having insufficient parking spaces at Ataşehir Park will become a bigger headache with unplanned parking hassles. Moreover, another serious problem is the lack of a helipad, which is vital for earthquake parks in emergencies that require short travel time.

The existence of wastewater systems and alternative energy sources on demand is important in both parks. The shortage of water elements around both parks is detrimental in terms of both sustenance and responding to fires that may occur after the earthquake.

The low number of seats at Topkapı Park will inevitably have a negative effect on usage during the aftermath of the earthquake. The number of seats needs to be increased urgently. The lack of benches that can be converted into cooking spaces at the Topkapı Earthquake Park, like the ones in many earthquake parks in Japan, will pose a problem in addressing food needs during the aftermath of an earthquake.

Again, neither park offers any effective laundry and dishwashing services that would be beneficial in returning to normal life after the earthquake. There is an urgent need to tackle these needs for both parks. Suitable places for such needs are found particularly at Topkapı Park. While the areas to address restroom needs are available in both parks, planning should be made that would address the heavy traffic during the aftermath of the disaster.

Finally, considering the topic of vegetation, the need to cultivate edible plants was seen at both parks. Additions to planting designs will be important in terms of addressing nutritional needs of disaster victims during the earthquake aftermath. In the Rokko Kaze No Sate Koen Park, by estimating the needs during the aftermath, edible fruit tree species were selected in plant designs [50].

## Conclusions

Due to the fact that people tend to flee their places after an earthquake for open and safe areas amid the possibility of continuing aftershocks, emergency response plans, first aid and temporary shelter areas are of great importance. In this context, earthquake parks take on a key role in mitigating damage caused by the earthquake by addressing the needs of people such as ensuring the safety of their lives and property, sheltering, accommodations, food and beverage. As a result of this study, it was determined that site location and suitability, transportation, size and function, infrastructure systems, structural and planting design issues are important issues to be considered in the design of earthquake parks.

Compliance of urban parks with the principles of landscape architecture plays an important role in improving efficiency of the disaster prevention capability of earthquake parks at an urban level. Analysing and evaluating the suitability of the earthquake park system objectively for disaster prevention and risk avoidance and offering suggestions for solving problems by identifying existing deficiencies is the primary task of earthquake park research. Thereby, this article takes up earthquake parks as a research object and creates a conformity assessment method for earthquake parks and disaster prevention and risk avoidance in particular. Based on previous research, through rigorous logical reasoning and careful choice of indicators, this study creates a framework for the disaster prevention capacity assessment of urban park systems that were applied at earthquake parks found in Istanbul's Ataşehir and Fatih provincial districts.

It should be a priority to evaluate earthquake parks according to the population density, ease of transportation and the quality of the vicinity in terms of housing needs. Although the Ataşehir and Topkapı earthquake parks, which constitute the study specimens, have the quality of the area in terms of ease of transportation and housing needs, they have shortcomings in the face of the population density of these districts. Another important issue is to create the conditions that shall ensure effective disaster management. An 'Applied Training Point' and an 'Awareness and Education Point' were created for post-disaster at the Ataşehir Earthquake Park, whereas in addition to these, the Topkapı Earthquake Park features 'Disaster Management Campus', 'Post-Disaster Reorientation Area', 'Communications Coordination Centre' as well as 'Post-Disaster Logistics Centre.' Accordingly, it is seen that the conditions created for an effective disaster management at the Topkapı Earthquake Park are more comprehensive than those at the Ataşehir Earthquake Park.

The importance and requirements of earthquake park design criteria were emphasized once again as a result of this study. Although both parks are defined as earthquake parks, they do not adequately meet the earthquake park design criteria defined by international standards, but rather are planned mainly for recreation; hence, it has been determined that they meet mostly perceptual expectations. In this context, the secondary result of this study is that parks designed as recreation areas are bound to be insufficient in terms of enabling people to go about their daily lives during the aftermath of an earthquake. As a supportive resource, this study aims to determine the standard features of both the Ataşehir and Topkapı Earthquake Parks, the former of which is located on the Anatolian side, with the latter situated on the European side of Istanbul, a city that straddles our country's earthquake-prone Marmara Region, as well as emphasizing the importance of constructing areas suitable for these features in the design process which might be needed to be utilized in the aftermath of a destructive earthquake.

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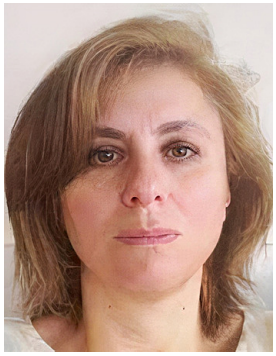

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# The Biophilic Approach to Qualify the Inhabitant-Nature Relationship in the Domestic Space: The Case of the City of El Kala, Algeria

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**Keywords**

Algeria, biophilic design, domestic space, inhabitant, nature.

**Abstract**

**El Kala is a city on the edge of eastern Algeria, located in an exceptional natural landscape, classified as a world biosphere reserve in 1990 by UNESCO. The diversity of nature within the domestic space leads to research and study its place and value for the inhabitants and encourages to think about how to qualify the relationship between inhabitants and nature through the domestic space. This study is based on a biophilic approach, adapted to the architectural scale, based on a landscape and architectural analysis. The results obtained show that the observed biophilic design is only a means to build a relationship with nature by the inhabitants. The objective of this article is to highlight the contribution of the biophilic approach in determining the behaviour of the inhabitants of the city of El Kala.**

## Introduction

There is a close connection between man and nature, often nurtured by the development of human needs in the many facets of life. This relationship that each individual has with nature is transposed to the city. It is created on different scales: the scale of the territory, spatial planning, urban composition and architectural space [1]. The relationship between man and nature is theorised by the biophilic approach and studied on an architectural scale by the presence of natural elements in construction according to three principles: nature in space, natural analogies, the nature of space [2]. Surrounded by forests and lakes, the town of El Kala is an example of the interaction between the urban environment and its natural surroundings. El Kala is located 20 km from the Tunisian border and 77 km from the city of Annaba, one of the main cities of eastern Algeria. Its position at the centre of a national park classified as a natural biosphere reserve in 1990 by UNESCO, gives it a special character in urban and architectural production.

Today, a progression of the city towards the forest area is observed, which results in a mixture of habitat and nature in its residual form (reeds, natural trees, cacti). For example, old trees can be seen in the domestic area, fences made of natural materials, gardens and openings to the surrounding landscape. This highlights the direct relationship of the inhabitant with nature. In this study, the aim is to answer the following question: How can we contribute to the qualification of the relationship between the inhabitant and nature through the design of his domestic space? The hypothesis formulated is that the presence of natural elements in the domestic space explains the inhabitants' attachment to nature in the design of their spaces, by understanding multiple biophilic behaviours. Thus, the aim of this article is to determine whether the biophilic approach can be adopted as an approach in architecture to interpret the relationship between inhabitant and nature through the relationship between domestic space and nature.

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**TABLE I**

**Nature Experiences**
Source: Kellert [9], [17], adapted by the author, 2020.

| Experience | Description |
|---|---|
| Utilitarian | The exploitation of nature's vast resources, including food, clothing, tools, medicine and shelter |
| Naturalist and aesthetic | A contact characterised by fascination, wonder and admiration for the beauty and complexity of nature and its diversity |
| Ecological science | Motivation to study biophysics systematically model, structures and functions of the natural world |
| Symbolic | Refers to the use of nature's symbols to communicate |
| Humanist | A deep emotional connection with the sensitive aspects of nature and its individual elements |
| Moralist | A strong sense of affinity and a sense of ethical responsibility for the natural world |
| Dominionistic | The desire to master and control the natural world, often associated with destructive tendencies |
| Negativistic | The negative affect associated with nature including fear, aversion and disgust |

### Human-Nature Relationship and Biophilia Hypothesis

In the first centuries, humans considered nature as a resource to meet their needs in terms of food, clothing, housing, etc. This vision of resource has evolved in parallel with human thought and needs. According to Scopelliti (2019), contact with nature has a positive impact on human health by reducing, according to the theories of attention restoration [3] and stress reduction [4], stress levels [5]. Nature, especially green nature, can play a key role as an environment that promotes health [6] and protects human life from climate disruption [7].

In 1993, Wilson introduced the theory of biophilia, based on the reality of the existence of genes and a behaviour of attachment to nature and natural processes by human beings [8]. In "The Biophilia Hypothesis" in 1993, Kellert determined human biophilic behaviour through a typology of interactions and experience of nature. The author identifies nine values recognised in Nature [9]. In an evolutionary process of the previous typology, Kellert in 2014 brought together the two experiences: aesthetic and naturalistic in a single heading (Table I).

### Biophilia in Urban Planning and Architecture

Biophilic urban planning seeks to build a relationship between natural elements and the built environment [10]. In addition, it attempts to interpret the understanding of the biophilic approach in urban and architectural planning and design. At the building level, biophilic elements are those that can be integrated on, in and around a building. At street level, these are the elements that can be integrated in and along streets, roads and pavements. At the scale of the village, they are larger in size and probably fewer in number [11]. In architecture, biophilic design serves to balance human needs with the value and considerations of natural environments and processes, and integrates the aspects and qualities of these elements into architectural design [2]. Table II summarises the principles of biophilic design using Kellert's typology.

**TABLE II**

**Principles of Biophilic Design Using Kellert's Typology**

Source: Sevinç-Kayihan; Özçelik; Güney [2], adapted by the author, 2020.

| Principles | Descriptions | Elements |
|---|---|---|
| Nature in space (direct experience of nature) | Real contact with the natural elements of the built environment | Natural light, air, vegetation, animals, water, landscapes, etc. |
| Natural analogues (the indirect experience of nature) | Contact with the representation or image of nature, special processes characteristic of the natural world | Images and works of art, natural materials, ornaments inspired by forms found in nature, etc. |
| The nature of space (the experience of space and place) | Spatial features of the natural environment that have contributed to the advancement of human health and well-being | Prospect and refuge, organised complexity, integration of pieces into sets, etc. |

## I. Biophilia as a Methodological Approach

The biophilic approach has been adopted by researchers such as Simona Totafori (2020), to qualify the human-nature relationship in urban space. The benefits of biophilic design in the urban environment has been achieved using qualitative methodologies, to identify the ways in which the relationship between the built space and the natural landscape is perceived [12]. This paper focuses on the first principle of biophilic design: nature in space. It is defined by its elements: vegetation, water, landscapes, etc. As an architectural space, we have chosen the domestic space "*delimited by the very institution of the morphological container (the dwelling unit such as the house, the apartment)*" [13], [2]. In other words, the relation inhabitant / nature is qualified through the relation domestic space / nature according to the two formulas: use and visual contact [14]. The latter requires an analysis to detect possible views of the natural environment of the city.

### Characterization of the Natural Landscape of El Kala

In this study, the landscape analysis is essentially based on the decomposition of the landscape into entities or units

according to the following criteria: colour and land use (dark green: forest) [15]. The satellite image constituted the main background for this operation. This analysis is complemented by another visual analysis taking views through multiple points in the urban space, to identify the major landscape units visible from the city of El Kala [16].

### Relationship between Domestic Space and Nature

This paper provides an overview of the context of the production of domestic space by professionals in urban space. The aim is to draw conclusions about the reality of the presence of a biophilic design which they have foreseen. The two steps in this process are first of all a determination of the place of nature in the domestic space by the professionals of urban space. It is based on an identification of the place accorded to natural elements in the preparation of subdivision plans, specifications, subdivision permits and architectural dossiers.

The self-built house was chosen, because it can inform us about the biophilic design chosen and conceived by the inhabitant without any influence of the urban and architectural space professionals. Records of 4 cases of self-built houses located in the urban space of the city of El Kala were taken. The second stage is the determination of the relationship between domestic space and nature. Readings of 4 cases of self-built houses were taken to analyse the way in which nature presents itself in the domestic space through the ground plan (use) and the facade (visual contact with the surrounding landscape). The aim was to generalise the cases analysed to those observed. The observed cases correspond to 535 constructions out of a total of 5347 dwellings constituting the housing stock of the city of El Kala according to the last world population and housing census of 2008, i.e., a percentage of 10 %.

### Biophilic Behaviour of the Inhabitant

The biophilic behaviour of the inhabitants of self-built houses was identified, to assess their relationship with the natural elements. The method is based on a comparison between the results obtained from the architectural analysis and Kellert's typology [17].

## II. Results and discussion

### Landscape Entities of the Natural and Urban Environment of El Kala

Figure 1 presents a photo-interpretation of the landscape characteristics of the natural environment of the city of El Kala. It is the result of the landscape analysis adopted as a tool to decompose the natural and urban landscape into entities. It was chosen to show the landscape entities which have a certain peculiarity. The forest entity represents the majority of the surrounding nature, varying according to its plant components: eucalyptus, Zen oak (*boulif*), maritime pine and Aleppo pine. The maquis entity represents bushy areas with a height of 0.4 m to 0.7 m. The agricultural space entity reflects a form of human-made green nature, surrounding the city of El Kala especially in the southern and south-western areas.

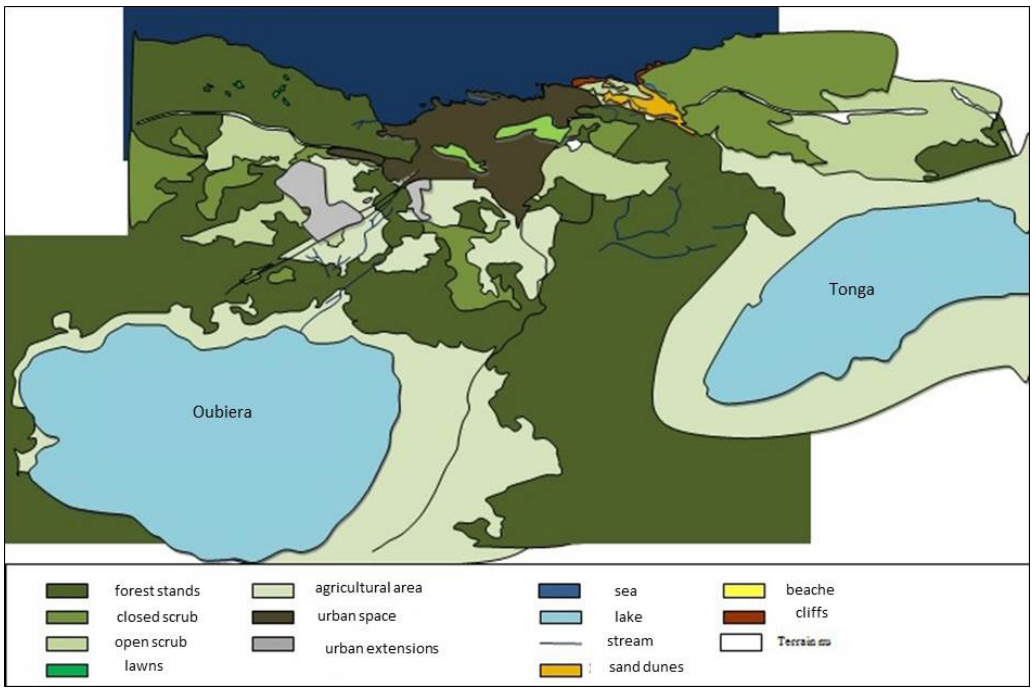


Fig. 1. Landscape features of the natural environment of the city of El Kala. Source: Author, 2020 and [18].

Fig. 2. Urban landscape of El Kala. Source: Author, 2019 and [19].

Then, the sea entity represents the coastline of El Kala, which extends for about 50 km between Cap Segleb (or Cap Roux) and Cap Rosa. It includes coral formations sheltering several species of fish. As far as the lake entity is concerned, it is composed of three large lakes of international importance: Mellah, Tonga, and Oubiera. The sand dune entity is illustrated by a dune barrier which adds another value to this environment, namely the fixation of the coastal dunes. Finally, the seaside entity consists of the beaches of El Kala and its natural creeks of exceptional beauty: Messida and the old Calle.

The rugged site of the town of El Kala offers panoramic views of nature (Fig. 2). The visual openings to the sea rival those to the forest and maquis features. Sometimes, the observer is surprised by the presence of the marine panorama. The blue open space is visible from most of the urban space. There are also several visual escapes to Lake Oubiera, from the housing estates of M'ridima, Boulif and Gelas (to the south at the south-west access to the city).

## The Place of Nature in the Domestic Space in El Kala

A limited place is given to nature in the domestic space by urban space professionals. As the urban development of the city of El Kala is essentially based on the housing estate model. This model is made up of a set of lots resulting from the division of land in order to receive buildings for residential use. The appearance of self-building was the expected result, like all other Algerian cities. The city of self-building is the result of the meeting between public policies and spontaneous urbanisation [20]. Self-built individual housing is the result of a legal vacuum, the building permit is reduced to an administrative authorisation that is rarely respected, the owners proceeding to multiple changes and building finally without reference to the established plans. Consequently, the state promulgated law 08-15 of 20 July 2008, fixing the rules for bringing constructions into conformity and their completion to put an end to this phenomenon [21].

As the urban development of the city of El Kala is mainly based on the housing estate model, it was aimed to highlight the relationship of urban space professionals with the natural elements. To this end, a more detailed study was carried out to examine the Gelass-South residential complex, which is in its realisation phase involving a prescription on an architectural scale. This allotment is intended for a construction project of 150 platforms. The terms of reference for this allotment are summarised by a site coverage of 0.32. The natural elements that make up the allotment are a strip of vegetation, which limits the allotment on the east side. It consists of an assembly of natural and planted trees, covering a green space planted with benches. The low planted vegetation also occupies some voids in the middle of the subdivision, the bare ground is present in the north, forming the empty pockets. The forest remains a natural boundary for this allotment on the west side.

The architectural aspect of the typical construction proposed for this allotment refers to various considerations of nature:

- nature in the unbuilt space of the allotment: it remains empty, the architect did not try to transform it into a natural space, for example into a garden, even for aesthetic reasons;

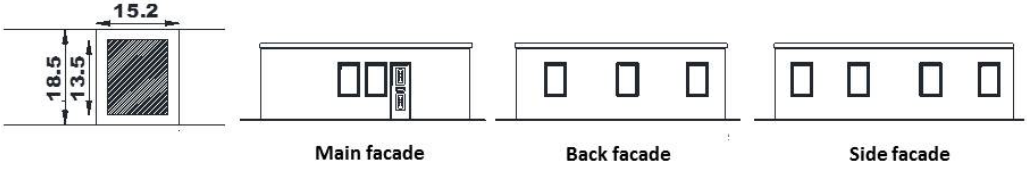


Fig. 3. The architectural design of a typical house in Gelass-South. Source: The architectural file of the 150 platforms in Gelass-South.

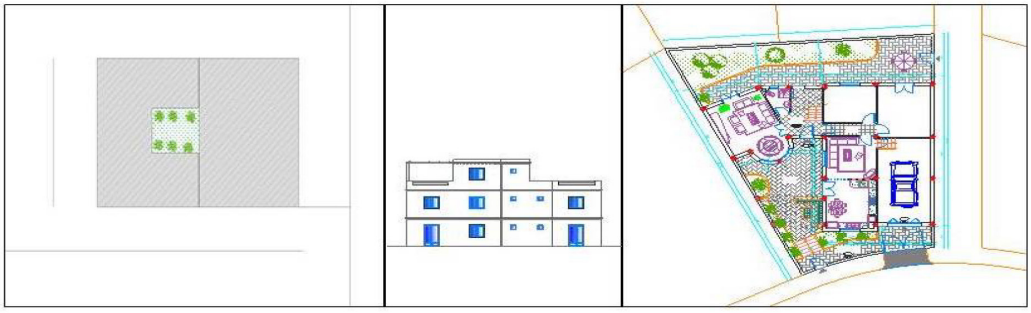

Fig. 4. Examples of biophilc designs by the architect. Source: Salah-Salah Hana, 2013.

- visual contact with the natural environment: the facades are devoid of any landscape or architectural treatment, and they do not take nature as an opening factor (Fig. 3).

At this stage the landscape aspect is no longer present in the building or subdivision planning permission. The unbuilt space remains undefined and is, therefore, left to the initiative of the inhabitants to transform it into gardens, or they add high metal fences, but without using it for construction. Thus, the relationship between the inhabitant and nature occupies a privileged place in the domestic space. When given the opportunity, the inhabitant constructs the domestic space in which he/she lives, usually by himself/herself, according to his/her culture, practices and relationship with the natural environment. In other cases, architects create biophilic designs that are appreciated by the inhabitants who keep them unchanged, such as: gardens, patios, and terraces that overlook the outside environment (Fig. 4).

### The Inhabitant as a User of Nature

When given the opportunity, the inhabitant constructs the domestic space, in which he or she lives, generally by himself or herself according to his or her culture, practices and relationship with the natural environment. Inhabitants integrate nature, more precisely vegetation, around their private spaces [22] with multiple designations (gardens,

Fig. 5. Natural fences. Source: Author, 2019.

Fig. 6. *El Aricha*, and the stone pot. Source: Author, 2019.

Fig. 7. Window decorated with flowers. Source: Author, 2019.

vegetable gardens or orchards) according to the surface area of the non-built space. To protect their properties, the inhabitants build high mineral fences combined with other naturals, such as reeds. They can also be exclusively natural (cactus) (Fig. 5). The non-built space is sometimes covered by a good assemblage of climbing plants: a perfectly organised vineyard surrounding a space laid out with tables and chairs surrounded by flower pots. Some inhabitants use stone in the construction of pots and jugs with a good composition of primary materials (Fig. 6). Inhabitants of collective buildings in the city of El Kala sometimes decorate their windows with pots of flowering plants and sometimes with bird cages (Fig. 7).

With regard to the visual contact of the inhabitant with the natural environment, we analysed several cases (Fig. 8). Case 1 is a visual opening to natural environment. The construction studied overhangs its environment, giving views of a mosaic of natural elements: sea, lake, forest, scrub and agricultural space. Case 2 represents visual contact with a particular natural landscape. In the middle of the Boulif, the case demonstrates how the inhabitant chose the visual contact with the sea over that of a forest remnant. Then, Case 3 shows a situation without visual contact with the natural environment. This case has two sub-cases: with or without choice. For the sub-case with choice, the example is a construction with introverted facades, located on the housing estate on the ridges on a gentle slope, surrounded by other constructions. For the sub-case without choice, the example chosen is a building in the Fernana 1 housing estate, surrounded by several

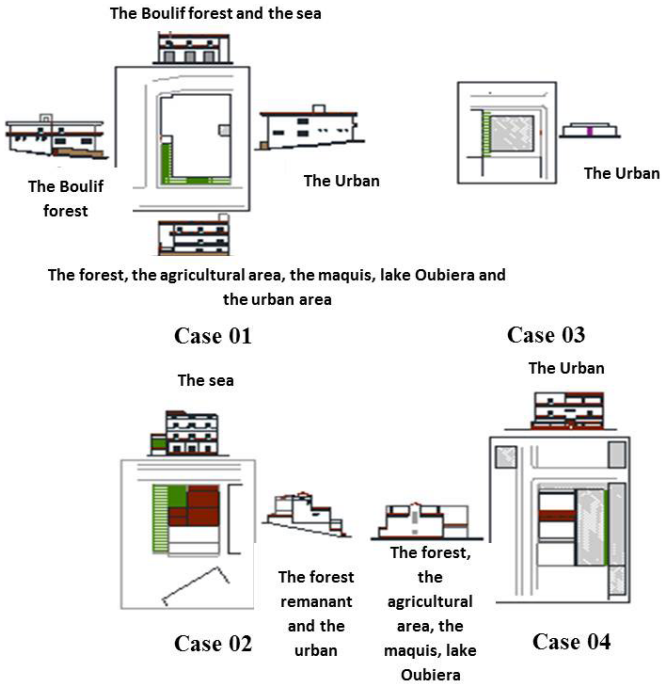


Fig. 8. Cases studied. Source: Author, 2020.

dwellings separated from the north and east by two lanes. This case includes all the constructions that do not have any visual contact with the surrounding landscape due to urban and topographical constraints. Finally, Case 4 shows a choice of visual contact with the urban rather than with nature. The selected construction is located at the western

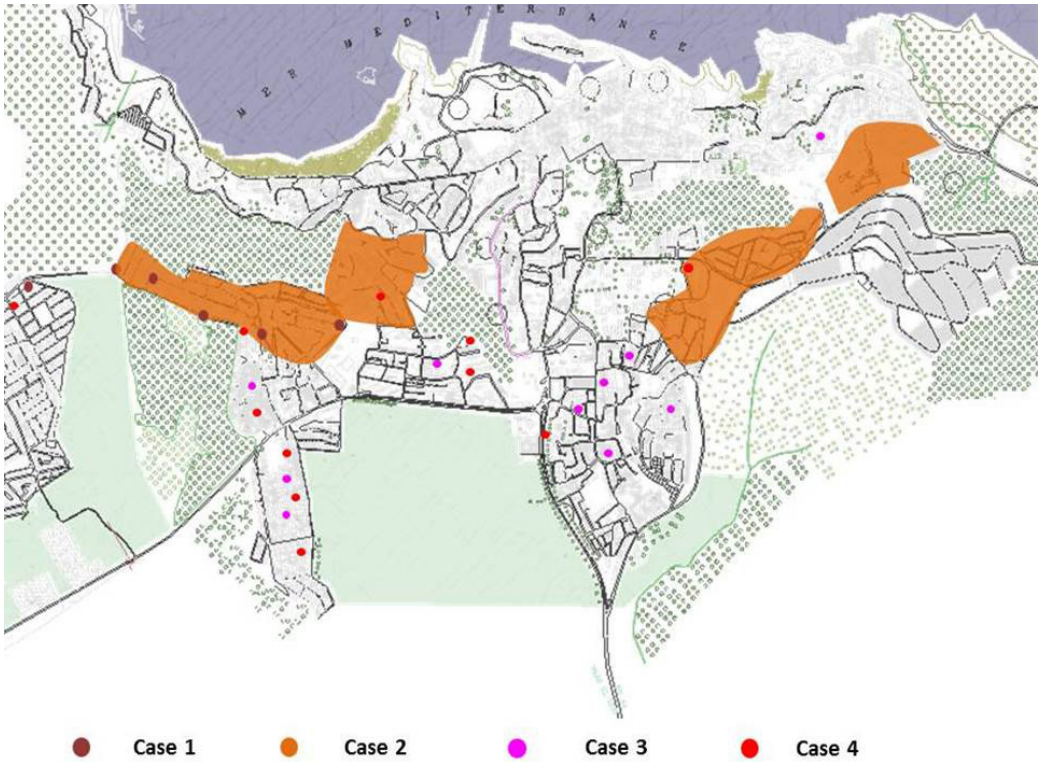


Fig. 9. Cases observed.
Source: Author, 2021.

**TABLE III**

**The Number and Percentage of Each Case**
Source: Author, 2020.

| Case | Number | % |
|---|---|---|
| 1 | 5 | 1.25 |
| 2 | 371 | 93.35 |
| 3 | 10 | 2.51 |
| 4 | 11 | 2.77 |
| Total | 397 | 100 |

**TABLE IV**

**The Biophilic Behaviour of the Inhabitant**
Source: Author, 2020.

| Nature in the domestic space | | Behaviour |
|---|---|---|
| Usage | Garden, vegetable garden, fence, natural cover | Utilitarian, naturalistic and aesthetic |
| Visual contact | Case 1 (1.25 %) | Naturalistic and aesthetic |
| | Case 2 (93.35 %) | Symbolistic |
| | Case 3 (2.51 %) | negativistic |
| | Case 4 (2.77 %) | negativistic |

limit of Gelass-south, in an urban environment, but with a particular quality that the topography offers: visual accessibility to a natural environment with Lake Oubiera appearing as a blue plane on the horizon. Visual contact is concentrated on the urban environment, while visual contact with nature is almost absent.

The generalisation of this typology of the four cases analysed to all the cases observed (535 constructions) made it possible to identify the percentage of each case with an elimination of constructions that cannot connect with the surrounding natural landscape due to urban and topographical constraints: 138 constructions (Table III). It can be noted that constructions that ensure visual contact with a particular natural landscape (sea, forest, lake) represent the highest percentage (93.35 %). While those which are in visual break with the natural environment, by introversion or by choice, indicate a low percentage (2.51 % and 2.77). Buildings that open onto all views without any particularities represent the lowest percentage (1.25 %) (Fig. 9).

## III. The Biophilic Behaviour of the Inhabitant: The Interpretation of the Relationship Between Domestic Space and Nature

According to Tables 1 and 2, the biophilic behaviour of the self-constructing inhabitant is characterised by an approximation of the natural elements, inserting them into his/her domestic space for reasons of consumption, aesthetics and protection. Beyond this, the inhabitant does not hesitate to open his domestic space to natural landscapes, without particularities, for reasons of wonder and admiration in front of the beauty and complexity of nature and its diversity. When the landscape is particular, such as the sea, Lake Oubiera, the forest of Boulif, the biophilic behaviour takes on a new character, much more symbolic than aesthetic. The percentage of the negativistic behaviour of the self-constructing by inhabitant (5.28 %) remains low in relation to the whole; it is perceived by the remoteness of this inhabitant from all the elements of his/her natural environment (Table IV).

## Conclusions and Perspectives

In the case of the city of El Kala, the relationship between man and nature is studied through the insertion of natural elements in the domestic space, one of the principles of biophilic design in architecture. On the one hand, urban space professionals of the city of El Kala do not seek to give a place to nature in the domestic space as an architectural and landscape component. On the other hand, the inhabitants attempt to compensate for the absence of natural elements in the domestic space with their creations in the unbuilt space. Moreover, self-constructors add another way of dealing with nature, where nature is used as a guiding factor in their constructions. The biophilic behaviour of the inhabitants towards nature as a whole is varied between utilitarian, naturalistic, aesthetic, symbolic and even negativistic.

Given this complexity, we can conclude that the biophilic design observed through the presence of natural elements in the domestic space of the city of El Kala, as well as its opening onto the surrounding natural landscape, is the result of an initiative of the self-constructive inhabitant, and not of the will or creativity of the professionals of urban space. Since it places nature at the centre of its preoccupations, the biophilic approach can lead to the highest level of protection of the natural environment of El Kala and human health, by adopting it as a principle and approach in the production of the urban and architectural space.

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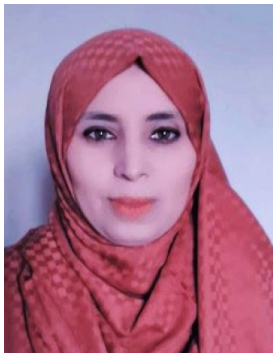

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# Expectations of Persons Accompanying Children for The Physical Environment at Ataköy 5, Kısım Children's Park

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Built environment, children behaviour, design features, neighbourhood park, parental perception, playground.

**Abstract**

**This study aims to research the expectations of users who bring their children to a park of the neighbourhood scale. For this purpose, a survey was conducted randomly with 550 people in 2018. The scope of this task encompassed research entailed questions regarding the occupation, educational status, age of the users, their relation to the children, as well as the age and gender of the children they brought to the park. These research questions were tested with the analyses of the survey questions, which included matters such as security, maintenance, and adequacy of green spaces, all of which are thought to affect park quality and convenient utilization. When viewing the research result, it was concluded that the demand for better security, adequate green area, additional activities, and playgrounds was higher amongst the user group with university education.**

## Introduction

In conjunction with Article 7 of the Decleration of the Rights of the Child of the 1959 United Nations Universal Decleration of Human Rights, the statement, "As with education, children must be given the full opportunity to play, whereas society and public authority must ensure them this right" underscored the necessity of creating livable environments for children [1]. The "Children' Play Rights Malta Decleration" [2] of 1977, which was adopted by the United Nations on 20 November 1989 as Article 31 of Decleration of the Right of the Child [3], states that in addition to proper nutrition and education, children have the right to participate in cultural and artistic activities and spend time, rest and play games with those of their age for social development. The development of playground environments is important for children who have the desire and ability to play anywhere and anytime. Francis' statement that children prefer unstructured natural areas as playgrounds [4] is still valid today. Nevertheless, with the change in living culture, considering the parents' concerns about security the concepts of playground and space also change, and children tend to spend less time outdoors [5]–[7].

Neighbourhood parks provide a venue for physical activity for young people and access to neighbourhood parks can influence children's participation in physical activity [8]. Playgrounds may be used as meeting places and starting points for play [9]. Playgrounds are important local neighbourhood resources, as users as drawn from the immediate neighbourhood in which the playground is located [10]. As indicated in the works of Ulutaş and Şimşek, children's playgrounds should not be arranged aesthetically, but rather for the development and safety of the child [11]. In the study results of Brown and Burger regarding children's playgrounds,

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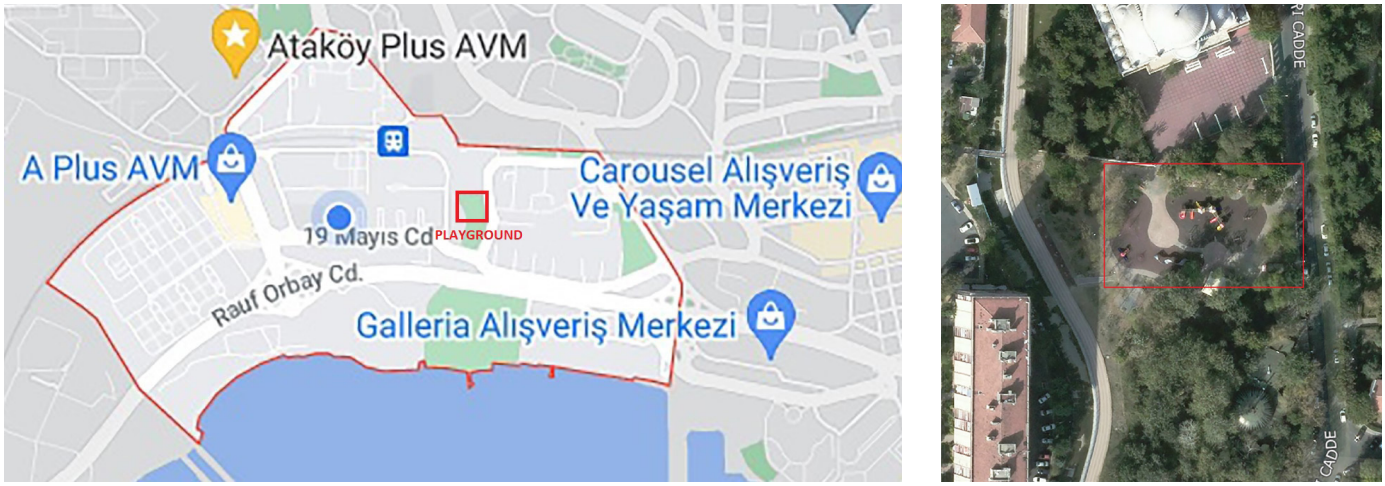


Fig. 1. Ataköy 2.5.6 location and park area [31], [32].

the effects of the playgrounds considered to be highly aesthetic are weak in terms of sociality, language and motor development, whereas those considered to be aesthetically weak increase the development of sociability, language and motor skills [12]. There is a strong relationship between playing and social skills such as cognition, language development, word learning, problem solving, gaining perspective, learning the rules, empathy, self-confidence, motivation and physical health [13]–[18]. Physical diversity in playgrounds is bound to be effective in a child's learning, spiritual and physical development process [14], [17]–[20].

In their study regarding pre-school children, conducted in 2008, Maxwell and his colleagues stated that they prefer areas where children can see easily, where there is enough space for 2–4 children to play, gathering points and multiple access points. It has been emphasized in the studies that the existence of different elements, such as loose parts that can be used as a play tool, has a positive effect on the children who use these areas [21]–[24].

Differences are apparent in how adults and children perceive playgrounds [25]–[27]. Adults perceive the landscape as forms, whereas children will interpret the landscape and terrain as functions [26]. As Jayasuriya and colleagues stated in their research results in 2016, parents considered outdoor games as an important part of their time in the care of their children [28], [29]. Considering small children in particular, parents accompanying them can influence their children's choices. In this study, research was conducted on what factors could be effective to create better quality and more comfortable outdoor play environments by considering the expectations of the people accompanying children to the park.

## I. Methods

### A. Study Setting

Atakoy section 2.5.6 is a neighbourhood of Bakırköy district of Istanbul province. Covering an area of 35 hectares, Section 5 is the centre of the settlement and includes 2993 residences. Its population is 14255. There are 14.255 persons per km$^2$. 21 % of the people living in this section are old, 28 % are young, and 51 % are middle-aged. While the rate of women is 54 %, the rate of men is 46 % [30]. There is Yapı Kredi primary school which is in a walking distance of the residences. There are well organized green spaces between buildings. Street arrangements were made in accordance with the pedestrian movement. The data thought to be obtained as a result of the study was compiled at and around the children's playground of Atilla İlhan Park (Google maps coordinates: 40.97834, 28.85830) (Fig.1) in the Ataköy 2.5.6 neighbourhood. There is a big playground, one small playground, three double swings, a seesaw, climbing equipment and mobile equipment (Figs. 2–4). There are many seating elements around the park, especially around the large playground where parents can observe their children. Rubber material was used in the playground as a floor material, and natural stone material was used around the playground. The fact that it appeals to different age groups and that it is a heavily used park was a factor in the selection of the park. The surveys were compiled randomly by face-to-face interview method between March – May 2018. The interviews were performed on weekdays and at weekends with companions who brought the children to the park at different times of the day. Users who did not bring children to the park were excluded from the analysis.

Fig. 2. Views from the edge of the park by authors.

Fig. 3. The large playground, the small playground, swings, the seesaw and the climbing equipment, photographed by authors.


Fig. 4. Pavement, the trash can, illumination, sign board and sitting elements, photographed by authors.

B. Research Questions

Six research questions have been identified to measure the perceptions of accompanying visitors using the park. The research questions included in the survey are as follows.

Q1: Is there a significant relationship between the occupation of those accompanying children and their perception of the physical environment of the park?

Q2: Is there a meaningful relationship between the educational status of those accompanying children and their perception of the physical environment of the park?

Q3: Is there a meaningful relationship between the age of those accompanying children and their perception of the physical environment of the park?

Q4: Is there a meaningful relationship between the degree of kinship of those accompanying children and their perception of the physical environment of the park?

Q5: Is there a meaningful relationship between the age of the children using the park and their perception of the physical environment of the park?

Q6: Is there a meaningful relationship between the gender of the children using the park and their perception of the physical environment of the park?

C. Data management and analysis

Answers to each question were analyzed using the SPPS program. Pearson's Chi square test was used to find answers to the research questions.

## II. Results

At this stage, socio-demographic characteristics of the users have been primarily defined (Table I), and research questions prepared to measure the satisfaction with park usage have been measured (Table II).

**TABLE I**

**Socio-Demographic Characteristics of Interview Participants (*N* = 550) [by authors]**

| | *N* | % |
|---|---|---|
| **Adults accompanying children** | | |
| Mother/father | 393 | 71.5 |
| Grandmother/grandfather | 111 | 20.2 |
| Caretaker | 46 | 8.4 |
| **Age of adults accompanying children** | | |
| 18–29 | 46 | 8.4 |
| 30–39 | 251 | 45.6 |
| 40–49 | 135 | 24.5 |
| 50-59 | 55 | 10.0 |
| 60 and over | 63 | 11.5 |
| **Level of education of adults accompaning children** | | |
| Elemantary school | 35 | 6.4 |
| Middle school | 56 | 10.2 |
| High School | 173 | 31.5 |
| University | 286 | 52 |
| **Occupation of adults accompanying children** | | |
| Housewife | 195 | 35.5 |
| Retired | 98 | 17.8 |
| Unemployed | 9 | 1.6 |
| Employee | 248 | 45.1 |
| **Age of children** | | |
| < 1 | 9 | 1.6 |
| 1–3 | 175 | 31.8 |
| 4–6 | 210 | 38.2 |
| 7–9 | 102 | 18.5 |
| 10–12 | 43 | 7.8 |
| 13+ | 11 | 2.0 |
| **Gender of children** | | |
| Girl | 287 | 52.2 |
| Boy | 263 | 47.8 |

**TABLE II**

**Park Usage Definitions and Satisfaction of Interview Participants [by authors]**

| | *N* | % | | *N* | % |
|---|---|---|---|---|---|
| **PARK USAGE DEFINITIONS OF INTERVIEW** | | | | | |
| **Which area they came from** | | | **How long they stay in the area** | | |
| • From Ataköy | 411 | 74.7 | • up to1 hour | 90 | 16.4 |
| • Outside Ataköy | 139 | 25.3 | • 1–3 hours | 421 | 76.5 |
| | | | • 3–5 hours | 39 | 7.1 |
| **Purpose of using parks** | | | **Which playground equipment do the children use?** | | |
| • Only for playground area | 432 | 78.5 | • Swing | 234 | 42.5 |
| • Playground and cafe | 94 | 17.1 | • All the equipment | 48 | 8.7 |
| • Playground and dog walking | 24 | 4.4 | • Big multi-play station | 75 | 13.6 |
| | | | • Climbing apparatus | 73 | 13.3 |
| | | | • Seasaw | 29 | 5.3 |
| | | | • Small multi-play station | 61 | 11.1 |
| | | | • Merry-go-round | 30 | 5.5 |
| **Frequency of visiting parks** | | | **What do you think is the most suitable material for playground equipment?** | | |
| • Everyday | 101 | 18.4 | | | |
| • A few times a week | 367 | 66.7 | • Wooden | 298 | 54.2 |
| • Once a month | 64 | 11.6 | • Plastic | 221 | 40.2 |
| • A few times a year | 18 | 3.3 | • Steel | 24 | 4.4 |
| | | | • Rubber | 7 | 1.3 |

| SATISFACTION OF INTERVIEW PARTICIPANTS | | | | | |
|---|---|---|---|---|---|
| **How would you assess the park's green spaces?** | | | **Are there any other activities or play equipment you would like be removed from the playground?** | | |
| • Very nice | 51 | 9.3 | • Yes | 73 | 13.3 |
| • Nice | 338 | 61.5 | • No | 477 | 86.7 |
| • Neither nice nor bad | 109 | 19.8 | | | |
| • Bad | 46 | 8.4 | | | |
| • Very bad | 6 | 1.1 | | | |
| **Are the activities and play equipment on the playground sufficient?** | | | **There is an activity or other play equipment to be removed from the field** | | |
| • Very good | 36 | 6.5 | • Climbing | 39 | 53.4 |
| • Good | 313 | 56.9 | • Merry-go-round | 27 | 37.0 |
| • Neither good nor bad | 146 | 26.5 | • Seesaw | 4 | 5.5 |
| • Bad | 51 | 9.3 | • Swings | 3 | 4.1 |
| • Very bad | 4 | 0.7 | | | |
| **Are there any additional activities or other game elements you would like to see added to the playground?** | | | **Are the game groups safe?** | | |
| | | | • Safe | 491 | 89.3 |
| | | | • Unsafe | 59 | 10.7 |
| • Yes | 133 | 24.2 | **Are the playgrounds safe?** | | |
| • No | 417 | 75.8 | • Safe | 457 | 83.1 |
| | | | • Unsafe | 93 | 16.9 |
| | | | **What are the reasons for calling them unsafe?** | | |
| | | | • No border in the vicinity | 20 | 21.5 |
| | | | • No security | 20 | 21.5 |
| | | | • Close to the avenue | 17 | 18.3 |
| | | | • Undetermined reason | 13 | 14.0 |
| | | | • Too crowded | 4 | 4.3 |
| | | | • Other (stray animals, homeless, the adjacent creek, ground material, beggars, peddlers) | 19 | 20.4 |
| **An additional activity or another play equipment** | | | **Are the playgrounds well maintained?** | | |
| • Trampoline | 18 | 13.5 | • Maintained | 473 | 86.0 |
| • Sports arena | 26 | 19.5 | • Unkempt | 77 | 14.0 |
| • Swings | 11 | 8.3 | • Reasons for unkemptness | | |
| • Sandbox | 35 | 26.3 | • Trash | 37 | 48.7 |
| • Hopscotch | 3 | 2.3 | • Worn out play equipment | 6 | 7.9 |
| • Climbing unit | 12 | 9.0 | • No reason | 24 | 31.6 |
| • Large game group | 6 | 4.5 | • Animal feces | 3 | 3.9 |
| • Small game group | 14 | 10.5 | • Broken play equipment | 3 | 3.9 |
| • Educational games | 4 | 3.0 | • Creek stench | 3 | 3.9 |
| • Tunnel slide | 4 | 3.0 | | | |
| **Your overall appraisal regarding the playground?** | | | | | |
| • Very Good | | | | 432 | 78.5 |
| • Good | | | | 94 | 17.1 |
| • Average | | | | 24 | 4.4 |
| • Bad | | | | 0 | 0 |
| • Very bad | | | | 0 | 0 |

**TABLE III**

**Relationship Between Research Questions and User Perceptions [by authors]**

| | Where they from | Park usage frequency | Reason for coming | Duration of stay | Which play equipment they used | Play equipment material | Green saces adequacy | Activity adequacy | Presence of activity or play equipment you would like to be added | Activity and play equipment you would like added | Presence of activity you would like to be removed | Activitiy you would like to be removed | Game groups safety | Is the playground safe? | Maintainence | Overall appraisal |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S1: Occupation | + | – | – | – | + | – | + | – | – | – | – | – | – | – | – | – |
| S2: Education | + | + | – | + | – | – | + | – | + | – | – | – | + | – | – | – |
| S3: Age | + | – | – | + | – | – | + | – | + | + | + | – | – | – | – | – |
| S4: Relation to the child | + | + | + | – | – | – | – | – | + | – | – | – | – | – | – | – |
| S5: Age of child | + | + | – | + | + | – | – | – | – | + | – | – | – | – | – | – |
| S6: Gender of child | – | – | – | – | + | – | – | – | – | – | – | – | – | – | – | – |

+ = * 0. 05 differences at the significance level are meaningful.

A total of 550 adults who accompanied children were surveyed during the study period (Table I). The majority of respondents were mother/father (71.5 %), aged 30–39 (45.6 %), having university education (52 %), employees (45.1 %), children in the age of 4–6 (38.2%). Adults and children were local and frequent users of the playground. More than three-quarters of adults (74.7 %) lived in the neighbourhood, and most of the users prefer park only for playground (78.5 %). 52.2 % of the children coming to the park were girls and 47.8 % were boys. The majority of users (76.5%) stay in the park 1–3 hours. The majority of the children preferred to use the swings (42.5 %), large game groups (13.6 %), climbing equipment (13.3 %) and small game groups (11.1 %). They wanted wooden and plastic materials (54.2 %, 40.2 %) to be used in the play equipment (Table II).

As expected, the majority of adults had favourable impressions of playground green areas, activities, safety, maintenance and general satisfaction. In addition, 19.8 % of the participants considered the green areas, and 25 % found the activities and play equipment to be of average sufficiency. In addition to the playground, 26.3 % of the users wanted to have a sandbox, 19.5 % a sports arena and 13.5 % a trampoline, respectively. While 53.4 % of the users wanted the removal of the climbing equipment from the playground, 37 % requested the same for the merry-go-round. 21.5 % of those who considered the park unsafe stated there was no defined border in the vicinity (Fig. 1), 21.5 % stated there was no security, while 18.3 % said it was too close to the avenue. 48.7 % of those who found the park unkempt indicated the presence of garbage (Table II).

The following results were obtained from analyzing the research questions (Table III).

Research question 1: Relationship between the occupation of accompanying persons and their use of the park.

It was determined that most of those coming from Ataköy are housewives and employees, while those coming from outside Ataköy are mostly employed, whereas the percentage of retirees and unemployed from beyond Ataköy is low ($p$ = 0.000). The majority of the children they accompany use the swings; it was observed that the majority of children accompanied by housewives use swings, the majority of the children accompanied by retirees use swings, large playgrounds and climbing equipment, and the majority of children accompanied by employees use swings ($p$ = 0.045). In all four groups, the percentage of those who find green areas adequate is high; the percentage of those who found them inadequate was found to be higher in the working group ($p$ = 0.030).

Research question 2: The relationship between the educational status of the accompanying persons and their use of park.

It was observed that while the majority of those coming from outside Ataköy were university graduates, the proportion of primary / secondary school graduates was low in the same group ($p$ = 0.035). While primary and secondary school graduates use the area more frequently, it was determined the percentage of those who came once a year was higher among university graduates ($p$ = 0.001). While all 4 groups stayed mostly in the park area between 1–3 hours, the percentage of those who stayed between 3–5 hours was higher for university graduates compared to other groups, while the percentage of those who stayed less than an hour was quite low for primary school graduates ($p$ = 0.012). The percentage of those who find green areas inadequate compared to other groups was high amongst the university and high school graduates, whereas primary and secondary school graduates tended to find green areas more adequate ($p$ = 0.002). While the percentage of those who did not want new activities and play equipment added in the area was higher among university and high school graduates than other groups ($p$ = 0.027), the percentage of those who found the game groups unsafe for university graduates was high ($p$ = 0.002).

Research question 3: Relationship between the age of accompanying persons and their use of the park

It was observed that while the majority of users coming from Ataköy and the surrounding community were in the 30–49 age group, the proportion in the 50+ age group was low amongst those coming from outside Ataköy ($p$ = 0.005). While the percentage of those who stayed in the park between 1–3 hours was higher in the 30–39 and 40–49 age groups, it was found that the percentage of those who stayed less than 3–5 hours was lower in the 60+ and 18–29 age groups ($p$ = 0.026). The percentage of those who found green spaces inadequate was found to be higher in the 30–39 and 40–49 age groups compared to other groups ($p$ = 0.001). The percentage of those who wanted to see additional activities and play equipment in the park was higher in the 18–29, 50–59 and 60+ groups than the other groups ($p$ = 0.028). It was observed that the 50+ age group wanted less activities and play equipment to be removed from the premises than the other age groups ($p$ = 0.021). While 30–39 and 40–49 age groups in particular wanted a sandbox added, most of the parents of the latter age group also wanted a sports arena added ($p$ = 0.025).

Research question 4: The relationship between parents' kinship to the children and their use of the park

While the percentage of those visiting the park with caretakers from within Ataköy is low, the percentage of

those coming from beyond Ataköy with their parents is high ($p$ = 0.024). It was determined that while caretakers frequented the park more often than the other user groups, the percentage of those who visited the park once a year was very low ($p$ = 0.002). It was determined that while caretakers visited the park more frequently than the other user groups, the percentage of grandparents who visited the park once a year was very low ($p$ = 0.002). While caretakers prefer only the playground, the percentage of those who came with their dogs was higher in parents'group ($p$ = 0.026); it was determined that the percentage of those who did not want additional playground space or equipment was high in all three groups, whereas the percentage of those who wanted additional play equipment in the caretaker group was low ($p$ = 0.002).

Research question 5: The relationship between the age of children and their use of the park

It was determined that children under a year of age visited the park from Ataköy, whereas the percentage of those between 10–12 years of age who came from beyond Ataköy was low ($p$ = 0.013). It was observed that infants under a year and 10 years old + children visited the park at least once a week ($p$ = 0.016). It was determined that while infants under a year old did not stay in the park for more than 3 hours, the percentage of those who stayed for more than 3 hours was higher in the 4–6 age group compared to other age groups, whereas the 10–12 age group mostly spent between 1–3 hours time in the park ($p$ = 0.000). It was observed that infants under a year old used the swings, 1–3 years olds used the swings and climbing equipment, the 4–6 years olds used all equipment, whereas the 7–9 and 10–12 years olds used the swings and big play group ($p$ = 0.000). Caretakers of infants under a year old said they wanted to see a sand box and swing added, those of between 1–3 years old children – sand box and small playground, those of between 4–6 years olds stated that they wanted to see a sand box, sports arena and trampoline, while those of between 7–9 years old said they wanted to see a trampoline and sports arena ($p$ = 0000).

Research question 6: The relationship between the gender of children and their use of the park

Besides the swings, it was determined that girls mostly used the small play group, whereas in addition to the swings, boys used the climbing equipment and the big play group. It was seen that the majority of those using the swings were girls and the majority of those using the climbing equipment were boys ($p$ = 0.002).

## Discussion and Conclusions

As Veitch et al. have said, having good quality public open space was perceived by parents to be an important influence on their child's active free-play. In the study, parents reported that if a good quality park was nearby, they would more likely take their child to that park [33]. Proximity remains an important factor in determining the park use [26], [34], [35]. As a result of the study conducted by Bennet and others supporters, people prefer to use the playgrounds nearby, while people who visited the playground from afar tend to spend more time in the park area [36], [37]. In addition, Bennet et al. found that users who come to the park from far away stay in the park longer. The results of the study support this conclusion. This result can also be interpreted as an indicator of the adequacy of the activities and opportunities offered.

In many studies, it is seen that when children look at the playgrounds, they first come with their parents and then in the example of Ataköy, they also come with grandparents. The reason for this may be the excess of working parents in the example of Ataköy. In addition, it was determined that it was in a low percentage in the caretakers group. It was observed that the users'educational level washigh school and university, whereas the percentage of those who were unemployed was quite low. It was determined that the park was a play medium for different age groups and used mainly by children in the 4–6 age group.

In a study conducted by Deretarla-Gül [38], it was learned that the parents mostly took their children to the playground 1–2 times a week. However, as stated above, children are also restricted from playing in the playground due to their parents' intense work schedules and changing lifestyles [39], [40]. This study featured a group of users who regularly visited the park and stayed in the area for a certain duration, commensurate with the general level of appreciation about the park. It was an expected result that the group, which stayed for more than 3 hours, would come from mostly outside Ataköy. Considering the time, they spend while coming to the area, those who come from far away both use the playground and stay longer in the park and use the area for resting purposes.

The playground is a place where users are satisfied because it is in a well-designed area. The parents of young children of different age groups who wanted two elements in particular to be removed from the playground due to the high climbing equipment and the possibility of falling during their use. On the other hand, the users desired the addition of a sand box and sports arena, both of which are not currently present in the park. While the park is found rather safe in general, it is considered unsafe especially due to the lack of a border around it and its closeness to the avenue. It was observed that while the park is mostly maintained, there was a slight garbage problem.

Meaningful relationships were determined during the test stage of the hypotheses of the study:

- Between the persons who accompanied the children at the park and where they arrived from, which playground the children play in, and whether they found the green areas around the park adequate.
- Between the education levels of those accompanying the children at the park, and where they arrived from, the frequency of their park visits, the length of their stay in the area; whether they find the green areas around the park to be adequate, whether they want an activity to be added at the park, whether they find the playground safe or not,
- Between the age of those accompanying the children at the park, and where they arrived from, the duration of their stay in the playground, whether they find the green areas around the park to be adequate, whether there was any activity and play equipment they want to be added to the playground, as well as the presence of an activity they want to be removed from the playground.
- Between the relation of those accompanying and the children they bring to the park, and where they arrived from, the frequency of their park visits, the duration of their stay in the playground, which equipment they used at the park, and the presence of activities and play equipment they want to be added at the park.
- Between the gender of the children coming to the park and where they arrived from, the frequency of their park visits, the duration of their stay in the playground, which equipment they used at the park, the presence of an activity and play equipment they want to be added at the park.
- Between the gender of the children coming to the park and the play equipment they used in the park.

In examining the analyses of the questions, it is noteworthy that those coming from beyond Ataköy are mostly university graduates who are employed, whereas the group of retirees from Ataköy was larger than those coming from beyond Ataköy. Parental safety concerns have been identified as one of the major reasons why parents restrict their child's independent mobility [33]. As the study results ascertained by Galaviz and colleagues, parents are going to prefer playgrounds they consider safe for their children [41]. Uncleanliness and inadequate equipment were other themes mentioned by parents as a limitation of their neighbourhood outdoor play spaces [42]. In this study, safety, green area adequacy, high level of activity and playground demands of university graduates can be associated with the level of education and awareness of users. The proportion of young children who come from within Ataköy is higher, and they often visit the playground with caretakers at least once a week. Especially for young children, the presence of a sandbox in the playground is again amongst the desires of the parents. It can be envisaged that there will be a sports arena for older children, as per their caretakers' requests. While many other studies indicate that girls use the playgrounds and places less than boys [43], the results of this study do not confirm this situation. It was determined that there was only a difference in the playground equipment that girls and boys chose. The result of girls mostly using the swings supports other study results [44]–[46]. In addition to the swings, boys were determined to use the climbing and game groups. The preference for using wooden materials in play equipment can also be associated with users' concerns regarding health and safety issues.

Children's playgrounds can be considered a means for children to be able to achieve creative and productivity skills during their developmental stages. The results of this study will be important in terms of creating data for designing and organizing more comfortable and lively playgrounds geared towards the future by deducing the use of the park by taking into consideration the expectations and satisfaction of parents for a traditional children's playground.

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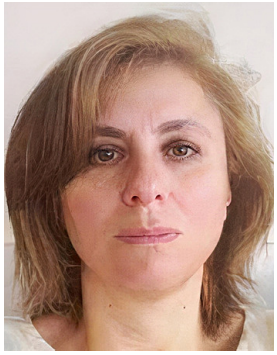

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# Reflection of Paradigm Change in Information Technology to Library Architecture: The Helsinki Oodi Library

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Digital information, Helsinki Oodi Library, information technology, library, paradigm shift in libraries.

**Abstract**

**Since the late-20th century, there has been a transition from an industrial society to an 'information network society'. 'The production, organization and dissemination of knowledge' began to change rapidly at the start of the 21st century, whereas this situation was met by the more effective search, use and evaluation of all kinds of information by library users. This work has focused on how the paradigm shift in information technology differentiates the functions and architecture of the 21st century 'next-gen' libraries from the traditional sort. Constituting the sample area of the study, the Oodi Library and its architectural features was examined within the context of 'new architectural design criteria', such as accessibility, symbolism, spatial organization, access to collections, self-study and integration, both in situ and by means of literature research. In research, it was observed that libraries need to be designed in line with new architectural design criteria, keeping the digitalization of information and integrating new information technologies in the forefront. The paradigm shift in information technology with digitalization has been the catalyst that transforms the libraries of the 21st century into centres of intellectual life, while reinforcing their role as a symbol of education, equality, transparency and civilization.**

## Introduction

Libraries have been institutions that serve the society by outfitting its citizens with the right information since antiquity. In bringing its users together with knowledge and science, the book collection has been the most essential element that defines libraries [1]. Up until the start of the 20th century, printed materials in book format occupied a certain physical space in libraries and librarians provided access to said materials. In these institutions, which may be defined as traditional libraries, the 'paradigm of acquiring knowledge through the librarian' was a matter that had a direct impact on the spatial organization and architectural formation of the library buildings. Until the same period, 'librarian-oriented library buildings' were official venues offering static architectural forms [2]. Having emerged in the early 20th century with the transition to the open shelf system, where users were able to access the books they wanted directly, modern library operations influenced and improved the architectural form of the library buildings of the period. The "production, organization and dissemination of knowledge" began changing rapidly with the transition from the industrial society to the "information network society" since the late-20th century. With rapid progress in information and communication technologies that began to occur at the start of the 21st century, the widespread use of the Internet and the increase in digital resources facilitated more effective search, use and evaluation of all kinds of information for library users. This situation has elevated libraries to a different level with a new mission beyond storing and serving books and documents [3]. As a result of the paradigm shift in information technology, libraries are now obliged to take on new roles and equip themselves with new skills and competencies. The new 'user-oriented' and 'multi-functional' identity has brought with it 'new architectural design criteria' to make libraries

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more pleasant and attractive [1], [4]. 'Next-gen' library buildings began to be built with innovative design criteria that prioritize 'work and learning-centred' spaces for user activities, by reducing the spaces that house physical collections (information materials) [5].

The aim of this study is to evaluate how the paradigm shift in information technology differentiates the functions of the new generation libraries in the 21st century from traditional libraries and how this differentiation is reflected in the new design criteria of the library architecture. In the study, first of all, the concept of paradigm, paradigm shift and the paradigm of acquiring knowledge in libraries are explained methodologically. The change in the paradigm of acquiring knowledge in libraries has been revealed by literature research. Regarding the reflection of the change on the library architecture, on-site observations and investigations were made by the author in five new library buildings built after the 2000.

In this context, the architectural features of the new generation Oodi Library (Helsinki), which was chosen as the sample area of the study, were examined both in situ and through literature research in the context of 'new architectural design criteria'. The contribution of the paradigm shift in information technology to the architectural design has been determined. The important contributions of the development in information and communication technologies, the increase in digital resources and the use of the internet to the 'learning and teaching' mission of the new generation libraries, especially Oodi Library, were discussed. As an important object of the city with the iconic architecture of Oodi Library and other 21st century new generation libraries the vision of adding value to the socio-cultural life of the city, participation, citizenship and environmental awareness has been put forward.

## I. Change in the Acquisition of Knowledge Paradigm at Libraries

The word 'paradigm' is explained in many dictionaries as the generally accepted viewpoint of a particular discipline at a particular time. The paradigm, which sheds light on certain problems and offers suggestions for their solutions, is also expressed as a set of perspectives and values accepted by scientists. Problems that cannot be solved within the framework determined by a presumed paradigm may reveal the search for a new paradigm and solutions suitable for the era in which it is found, in which case a different paradigm, offering a new understanding and perception, emerges. A change in paradigm occurs when the ground for success disappears for the old paradigm [6], [7]. As can be seen, the paradigms which are written or unwritten rules and practices have been a model or solution for a certain period of time in any field (for example, in obtaining information). Paradigms are not fixed values. In the changing world, paradigms can change and be renewed along with changing values. The paradigm shift experienced may also cause differences in current solution proposals and designs. For example, approaches that were valid for a period in the architectural design of library buildings can be planned with new design approaches depending on changing values.

The development of writing throughout the history of humanity has brought with it the opportunity to produce and record (storage) information, thus the accumulation of knowledge has come into question. The storage conditions of text and thus recorded information have also rendered the means and environment of access to said information as determining factors [8]. Since antiquity, library institutions have emerged that collect, preserve and protect recorded information and serve society by equipping people with correct information. Bringing the user together with knowledge and science, the book collection has been the most essential element that defines libraries [1].

Having written the first comprehensive library organization and proposal to establish a library in his book entitled Advice on Establishing a Library in 1627, Gabriel Naudé did a great job not only to organize library collections, but also provided sophisticated instructions to equip library buildings and make them open to the public. Naudé envisioned the rationality of the 'modern library' with his recommendation that emphasized the actual function of the library as a place to read books [4]. Within the process, libraries have become an integral part of societies in the developing world. Libraries that have developed in accordance with the cultural and economic characteristics of societies throughout history have also revealed architectural typologies to respond to functional and symbolic needs with factors such as the size, variety, user characteristics of the collections, the social purpose and mission of the institution [1].

From an historical perspective, objects defining information in libraries until the early-20th century were printed and manuscript materials in book format that existed physically, that could be catalogued, and access was controlled by librarians as they occupied a certain area in libraries [9]. The information paradigm in these institutions, which could be defined as 'traditional library,' is the presentation of printed books (book collection), magazines and reference works (*reference collection): encyclopedias, dictionaries, handbooks, guides, etc.*) to the user through the librarian. This paradigm deemed it necessary for users who wanted to access information (research material) to come to the library, which was a physical space as an information medium [3]. This situation in the information paradigm, which includes the perception of libraries as 'information resource repositories' focused on just books and similar materials, has been a subject that directly affects the spatial organization and architectural

formation of the library buildings. Up until the early-20th century, reading, study halls and large magnificent book warehouses and 'book-oriented library buildings' were official environments/places featuring a static architectural structure [2].

The years around the turn of the 20th century were when libraries took on a steadfast role in education, enlightenment and democracy. Ideally, it was a time when all library materials were made available to the public, regardless of class, race, origin, or language. As with the Roman-era libraries, the aim was to create libraries with the opportunity and comfort where readers could visit at any time, stay as long as they wished, read and take notes [4]. The information paradigm in these institutions, which could be defined as modern libraries in the mid-20th century, was the availability of open shelf or 'open access' systems, where users could directly handle the book material (collection). In the information paradigm of this era, while users who wanted to access information had to personally visit the library, the role of the library staff had been greatly reduced. It was a time when spatial requirements related to factors such as the size of the collection, the purpose and mission of the institution (symbolic representation), and user characteristics affected and developed the architectural form of the library buildings.

Starting from the late-20th century, the industrial society began to transform into an 'information network society.' The growth and development of information technologies began to alter the library concept starting from the early-21st century. The intense social-economic-technological transformations experienced with globalization, widespread use of the Internet and the increase in digital (electronic-digital) resources has also changed the act of reading books [10]. The role of libraries and the profile of users also began to change with the new paradigm in which the concepts of 'information literacy' and 'lifelong learning' gained importance [11]. In beginning, to strain the functioning organization of the library and its physical space, these circumstances led to the transformation of the role of libraries in the network society and the redefinition of its mission. Thus, new library buildings have started to be built in this direction by adopting new user-centred architectural design strategies [1], [4].

What were these new information technologies that caused a paradigm shift in acquiring information in the 21st century libraries and thus changing and transforming the traditional library concept and even its architecture? While the rapid progress in information and communication technology (ICT) affected every aspect of life in the 21st century, including education, training, culture, health, scientific communications, etc., it has also been the main impetus behind the change in libraries. Thanks to the multi-hypermedia system called the 'World Wide Web' – web-based digital services *(analog data / written and printed resources being digitized and made to be processed, stored and managed by computers),* a system has been created which enables us to access data (information) of a multitude of different structures in a compact and interactive manner. The Web is one of the services on the Internet. The Internet is an ever-growing worldwide communications network in which many computer systems are interconnected. It transmits documents consisting of text, graphics, pictures, audio and motion video over the Internet to remote computers. With the help of a user-friendly graphical interface, it presents the right information wherever those seeking the information are located, at the right time, in the right format, and delivers it wherever it is deemed necessary [12]. In this regard, three important processes of the scientific world, 'the production, organization and dissemination of knowledge' have begun to change ICT and the new digital information paradigm rapidly since the 1990s [3]. This change in the knowledge acquisition paradigm, injecting the libraries with a different mission by removing them from being institutions that store and serve books and documents, has also caused major alterations in the architecture of the library buildings.

## II. A Reflection of Change in the Knowledge Paradigm in Library Architecture: The 21st Century Library

Although the role of libraries as the main resource provider in accessing all kinds of information necessary for science and education is ongoing, it has begun to undergo some radical transformations with the change in the information acquisition paradigm. The transformation of traditional libraries, whose main material (collection) is comprised of books and magazines, with their physical environment limited to walls, that operate within certain hours, utilizing card cataloging systems for material search, with silent reading areas, and offering standard reading and research opportunities to their users, into a different world of information has begun [3], [13]. New digital resources, the development of information and communication technologies (ICT) and their integration into libraries and the emergence of Internet have caused the paradigm shift in information acquisition, leading information and documents to be disconnected from the physical space they have previously inhabited. Challenging the importance of the collection (printed information material) as was hitherto understood has altered the role and spatial requirements of the library. The changing perception of libraries and new sources of information, both printed material and digital, has led to the need to redefine and reorganize the architectural design of library buildings [14], [15]. The features and functions of traditional and 21st century academic libraries are provided in comparative fashion in Table I.

**TABLE I**

**Comparison of Traditional and 21st Century Libraries [3]**

| Traditional academic libraries | 21st century academic libraries |
|---|---|
| Selection and acquisition of library information materials (books and journals) was done from the publishers' catalogues | Selection is based on users' demands and deals with such issues journal licensing and publishers' big deal offers for open access journals |
| The main collection included books and journals | Today there are institutional repositories, online databases, multi-media information resources |
| Librarians worked as collection specialists | Librarians work as faculty liaison |
| Management of information systems was limited to a four-walled physical library | In modern age, there are digital libraries, digital repositories and cloud information management system |
| Information model was scarcity and limited access of information | There is information explosion in both quantity and formats of information |
| Manual interlibrary loan system | Electronic interlibrary loan |
| High dependence on print resources | High dependence on e-resources and digital resources |
| Availability of services only during library opening hours | Most services are available 24/7 |
| Use of card catalogues to retrieve information | Use of Online Public Access Catalogue (OPAC) to retrieve information |
| A traditional reference desk service | 24/7 online and virtual reference services |
| Traditional cataloguing | Resource Description and Access (RDA) |
| Library as a quiet reading place | Information/knowledge/digital commons to make learning common |
| Library users had easily identified information needs | Library users have diverse information needs |
| Library budget spent mostly for book purchase | Budget is spent on e-resources, including hardware and software resources |
| Librarian mediated searching | Web-based searching |
| Print journals | e-journals and open access journals |
| Preservation of books (mainly), serie and grey literature | Digital curation |
| Traditional broacher | Media marketing |
| Traditional library users who had no other choice but to come to libraries | Diverse library users and assorted options to access information |
| From MARC and circulation desk | To metadata and web information |
| From book keeping | To support education |

In the enthusiastic early days of the digital information revolution, many people questioned whether we were on the verge of a paperless society and the Internet would replace books and the library buildings would consequently lose their importance. When in fact, debates about the broader cultural and educational role of libraries are compounded by the determination of many librarians to 'get used to the digital program.' Libraries should continue to be valuable and important places for the community, for learning and for teaching. Senior librarian and lecturer Sam Demas noted the importance of libraries saying that they [16]:

- offer security, comfort, and quiet;
- are complimentary and commercial-free;
- provide a place to be with other people in a learning/cultural environment;
- offer opportunities to learn, search, inquire, and recreate;
- afford opportunities for choice and tranquility.

The massive digitization of library material and the integration of new information technology have not diminished library use, but rather have been the catalyst, by providing excellent opportunities to transform libraries into intellectual living spaces. This situation is the focus of library institutions, meaning they have evolved from preserving collections to offering new services in providing users with access to information. The new digital information paradigm has significantly changed the way we acquire knowledge and learn, as well as the way we consume culture and leisure. The creation of audio-visual interaction environments amongst library users has also reflected the importance and new role of libraries as institutions that support access to information. In addition to being an environment for acquiring information and learning, 'next-gen' libraries have also started to function as a 'third place', which is an important concept in the 21st century. Put forward by sociologist Ray Oldenburg in 1999, this concept refers to places outside the home (first space) and workplace (second space) to catch a breather from the routines of daily life and provide social interaction. These spaces are innovative in that they provide an uninterrupted service network, information gathering and study areas, social areas, cafes and even leisure activities [17]. According to this concept, libraries began to function as comfortable venues or 'homes away from home', which are accepted as accessible, neutral, inclusive and easily accessible places for citizens [18]. The 21st century library has become a social community centre, a producer of

collective identity, as well as a producer of new content and information products. Adopting these changes has led to innovative 'user-oriented' library architectural design that prioritizes new 'work and learning-centred' spaces for user activities, reducing the spaces that house physical collections (informational materials) [1].

Also known as lifelonglearning centres, the 21st century library buildings undertake the role of being a socio-cultural meeting place for citizens, changing both their interior design and exterior form. The outer transparent shell (glass surfaces) that separates the interior and exterior of the building is further increased, enabling visual contact both from the exterior and the interior. Vast open spaces with an attractive and comfortable atmosphere inside, interesting structural elements and escalators are perceived from the outside. The building's architecture program features reading halls, workshops, special event areas, rehearsal and recording rooms for musicians, entertainment and cultural venues, such as a concert hall, exhibit hall, bookstore, museum, cinema, cafe and restaurant, and interesting architectural forms, all of which have begun to transform and add value to the city and its immediate surroundings [19]. Thus, many 'next-gen' libraries with unusual architectural forms, as well as protecting, increasing and providing access to their collections that were built in the last two decades, have started to become a centre of attraction that revitalizes the cities in which they are located [4], [20]. By encouraging collaboration and learning for a wide range of users, including diverse working and activity environments and disadvantaged groups, this new vision also represents the 'sustainable architectural product' that starts with the creation of a building requirement program. The use of features such as recycled materials, natural lighting, sun shading, high performance glass, energy efficient interior lighting, low flow plumbing fixtures, etc. throughout the building also constitute the sustainable design principles of 'next-gen' libraries. New contemporary public and university library buildings that were built from the late 1990s onwards, such as The Royal Library / Black Diamond (1999), Sendai Mediatheque (2001), Seattle Central Library (2004), Turku Public Library (2007), Helsinki Kaisa House (2012), National Library of Latvia (2014), Freiburg Library (2015), Oodi Helsinki Central Library (2018), can be specified as examples that reflect the development and architecture of 'library operations' in connection with the modernization of society [21]. Further there are stated new design criteria that provide research and creativity in the architectural design of these 21st century contemporary libraries [5], [22].

Examples of the new design criteria for libraries are as follows:

- Accessibility: In terms of pedestrian and public transportation accessibility in the city, they should be located centrally.
- Visibility, aesthetics and symbolism: With its bold and magnificent architectural form and façade that reflects the value that society attaches to knowledge, education and research it should have a monumental stance at the focal point of the city.
- Spatial Organization: As learning centres, libraries should have flexible, bright and easily perceived spaces for both individual and group work (reading rooms with shelves, resting and comfortable reading-living rooms called 'third place', play and reading for children, workshops, etc.).
- Access to collections: In terms of their functions, libraries are information space that plays an important role in education, enlightenment and democracy with their books and electronic resources. Therefore, all library materials should be organized in such a way that everyone can access them, regardless of class, race, origin, language or education.
- Self-study: Users should be allowed to use libraries at convenient times (in the evenings and weekends).
- Integration: Libraries should be venues and meeting points with ambience and style that motivates the user to go to the world of books, media and research without feeling any obligation (special event spaces, music recording rooms, concert hall, exhibit hall, bookstore, museum, as well as the existence of multi-purpose activity areas such as cinemas and restaurants).
- Sustainability: Libraries should address environmental values by using recyclable materials such as steel, glass and wood, as well as innovative lighting, energy and air conditioning concepts. Indoor and outdoor continuity should be ensured.

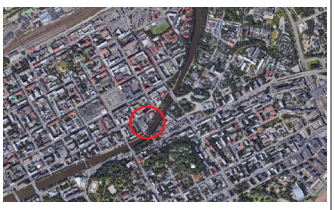
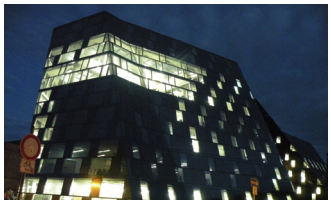
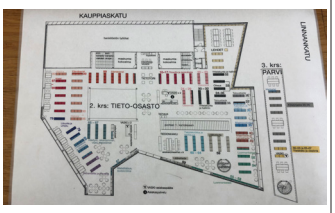
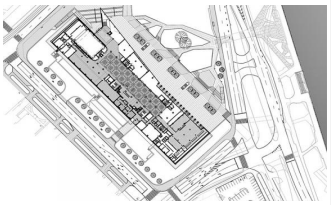
## III. The Helsinki Oodi Library

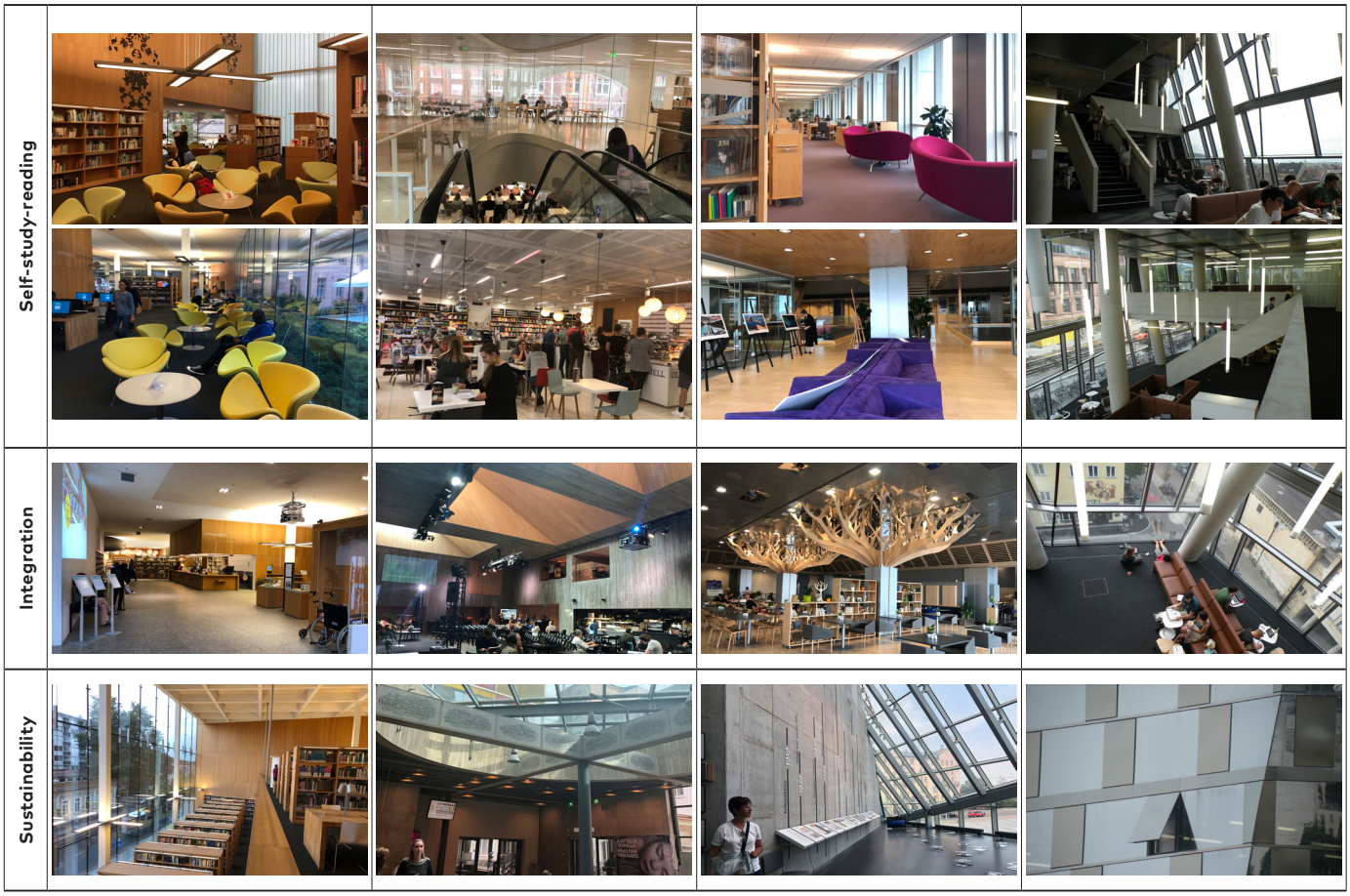
### A. Historical Evolution

Access to libraries is a free and legal right for all citizens in Finland, where libraries have had a very significant place in civic life since the 1800s. When the country gained independence in 1917, libraries were regarded as an investment in human capital, and education was adopted as a tool to promote social and economic development. In the country where the literacy rate is very high, library use is also very high. After World War I and II, and until the 1980s, many new libraries were built and the number of users continued to increase rapidly [24]. The transformation process into 'an information network society', which has been taking place since the 1990s, has also had an impact in Finland. The widespread use of the Internet in the early 2000s, as well as the rapid increase in digital resources has also changed the act of reading books. While the rapid progress in information and communication technologies has affected every aspect of life, it has been the main

**TABLE II**

**Examples of Contemporary Libraries (Kaisa house spatial organisation [23], other images are by the author, 2018–2019)**

| Design criteria | Public Library/2007<br>Turku, Finland | Main Library Kaisa house/2012<br>Helsinki, Finland | National Library/2014<br>Riga, Latvia | University Library Freiburg/2015<br>Freiburg, Germany |
|---|---|---|---|---|
| Urban accessibility |  |  |  |  |
| Visibility, symbolism |  <br>  |  <br>  |  <br>  |  <br>  |
| Spatial organization |  |  |  |  |
| Access to collections |  <br>  |  <br>  |  <br>  |  <br>  |




impetus behind the change in both the functional and architectural form of libraries in Finland. The initiative to build high-tech and multi-functional modern libraries that represent equality, participation, citizenship and freedom of expression according to the conditions of contemporary Finnish culture was put on the public agenda. In 2011, an international architectural project competition was held for the construction of this building, slated to become the centre of the country's library network, as part of the 'World Design Capital of Helsinki 2012 Program'. Of the 544 projects that participated in the competition, the design submitted by the Finnish 'ALA Architects' firm was selected and implemented [19]. It was completed in 2018, the 101st anniversary of the country's independence, and opened its doors to its users the same year.

## B. Contextual Location

Situated in a special area in Helsinki – Kansalaistori Square, the Oodi Library building is surrounded by fine arts and culture buildings designed by many famous architects – The Finnish Parliament Building (Johan Sigfrid Sirén), Congress Hall (Alvar Aalto), Music Centre and Sibelius Academy (Marko Kivistö, Mikko Pulkkinen, and Ola Laiho), and Kiasma Contemporary Art Museum (Steven Holl) (Table III).

## C. Features of the Plan and their Functional Distribution

Led by Architect Alvar Aalto, Finland's strong tradition of modernist architecture, the building with simple forms and wood is one of the key locomotives of the country's modernism. These features are clearly visible in the design of the Oodi Library. With a construction area of 16 000 $m^2$, the architectural program of the building creates meeting and socializing spaces such as reading halls for adults and children, workshops that encourage creativity, special event areas, rehearsal and recording rooms for musicians, cinema, a cafeteria, and a restaurant. The spaces specified in the architectural program are functionally solved in the building's three floors (levels), namely the active ground floor, the social mezzanine floor and the quiet reading hall floor [25], (Figs. 1–3).

With a transparent and curved surface that draws Kansalaistori Square into the building, the ground floor is an active public space open every day of the week for quick visits and excursions and is accessible to all the library's facilities. Complete with a multi-purpose hall, cinema, a restaurant and cafe, its spacious lobby serves as a venue to meet, discuss and present ideas. The library's additional services include photography and video workshops and venues with special functions such as a music studio,

**TABLE III**

**Position of Oodi Library Among Cultural Institutions [by the author, 2018]**

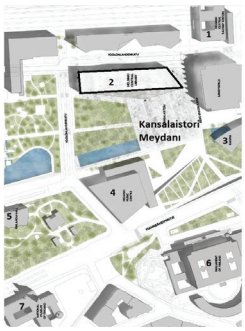
| **Contextual location of Oodi Library** | | |
|---|---|---|
|  Kansalaistori Square |  Oodi Library |  Kiasma Museum of Contemporary Art |
|  Finnish Parliament House |  Finlandia Hall |  Helsinki Music Centre |

Fig. 1. View of the Oodi Library [photographed by the author, 2018].

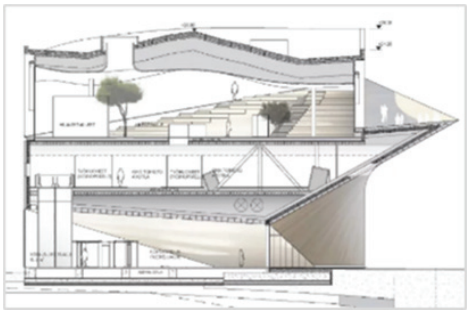


Fig. 2. Cross section of the Oodi Library [26].

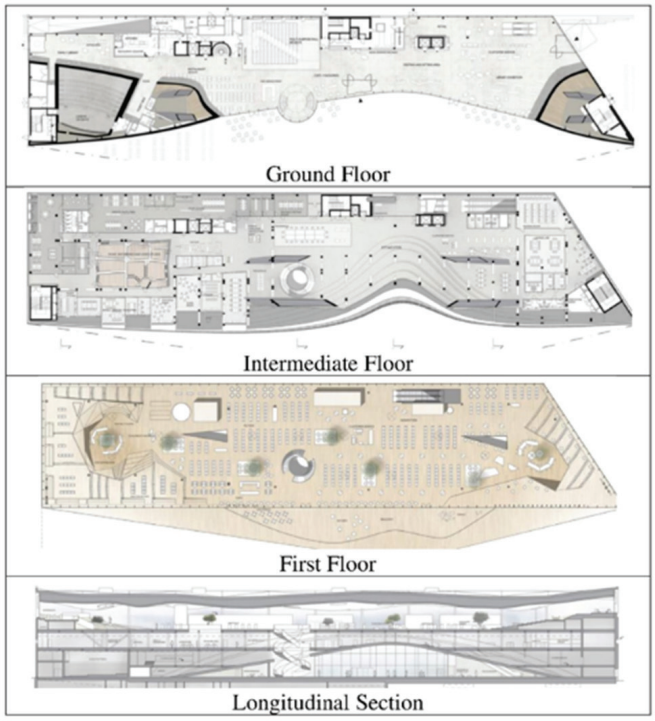
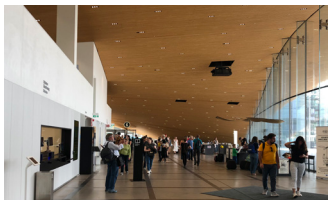



Fig. 3. Layout and longitudinal section of Oodi Library floor plan [26].

**TABLE IV**

**Functional Distribution on Different Floors [developed by the author, 2018]**

| Functional layout of Oodi Library | | | |
|---|---|---|---|
| **Floor plans** | **Images** | | **Functions** |
| **Ground Floor:**<br>Active public space |  |  | **Meeting and discussion:**<br>• lobby,<br>• multipurpose hall,<br>• cinema,<br>• restaurant,<br>• cafes |
| **Middle Floor:**<br>Visual and auditory interaction area |  |  | **Collaboration, and learning:**<br>• Photography and film workshops,<br>• 3D printing workshops,<br>• rehearsal and game rooms,<br>• music recording studio,<br>• model workshops |
| **Upper Floor:**<br>Reading area for adults and children |  |  | **Reading hall:**<br>• adults reading,<br>• adults rest-comfort reading,<br>• games and reading for children,<br>• viewing the city from the 'city balcony' terrace |
| **Architectural form** |  |  | • Simple<br>• Soft<br>• Flexible<br>• Striking<br>• Geometric |

rehearsal and game rooms. Finally, there is a reading hall on the upper floor, which can be only defined as a 'book paradise.' The circular skylights and cloudlike white undulating ceiling of the reading hall provide excellent natural light and appearance to the space. The raised wooden floor areas at either end of the reading room are particularly functional. While one of these areas is designated as play and reading section for children of different age groups, the other is arranged as resting, watching and comfortable reading area for adults. Both areas are arranged in the form of large stepped auditoriums, while accessibility is bolstered via long ramps. Referred to as the 'city balcony', the terrace accessed from this floor, overlooks Kansalaistori Square and provides a panoramic view of the city [25], (Table IV).

## D. Design Criteria

The architecture design criteria of the Oodi Library that enables learning, research and creativity are presented in Table V.

## E. Sustainable Construction Technology

Building Information Modeling (BIM) was used for the structurally sculptural geometric form of the Oodi Library in both the design phase as well as the on-site application and operation-use process (for some on-site modifications). The BIM incorporated in the building's versatile project facilitated close cooperation between the designer and suppliers (steel-concrete-wood-glass), thus structural and mechanical difficulties were solved, and the construction was conducted without compromising architectural integrity from the aspects of function and form (Table VI).

## F. Sustainable Architectural Features

The sustainable architectural features of the Oodi Library, which were revealed by both on-site determinations and literature studies, are listed as follows [21]:

**TABLE V**

**Architectural Features of the Oodi Library in Accordance with the New Design Criteria [developed by the author using [5] and [22]]**

| Design Criteria | Suitability |
|---|---|
| **Urban Accessibility:** | |
| Mass transit accessibility | ✓ |
| Downtown location | ✓ |
| Pedestrian accessibility | ✓ |
| Public transport accessibility | ✓ |
| Handicapped accessibility | ✓ |
| **Visibility-Symbolism-Aesthetics** | |
| Contributes to the Community | ✓ |
| Iconic form | ✓ |
| Iconic facade | ✓ |
| Transition symbol from 'Knowledge' to 'Learning' | ✓ |
| Participatory planning | ✓ |
| Awards (IFLA) | ✓ |
| **Spatial Organization** | |
| Easy perception | ✓ |
| With shelves-open reading | ✓ |
| Comfortable reading atmosphere | ✓ |
| Children's reading section | ✓ |
| Restive – cafe | ✓ |
| Balcony – outdoors reading | ✓ |
| **Access to Collections** | |
| Accessible to everyone | ✓ |
| **Self-study and Reading** | |
| Open at night and on weekends | ✓ |
| **Integration – collaborative learning** | |
| Group study rooms | ✓ |
| Photography and video workshop | ✓ |
| 3D Printing workshop | ✓ |
| Rehearsal and game rooms | ✓ |
| Music recording studio | ✓ |
| Model workshop | ✓ |
| **Sustainability** | |
| Ecological-Economic-Social | ✓ |

- Built with recyclable (environmentally friendly steel-glass-wood) and local building materials.
- Has an energy-conserving building envelope.
- High quality and energy efficient lighting and mechanical systems have been used.
- Energy savings are achieved in areas such as lighting, heating, ventilation.
- Renewable active and passive energy systems have been used.
- Indoor air quality, acoustic and humidity control is ensured.
- Spatial comfort is provided by using materials and products which require a minimum of maintenance and repair.
- Urban residents (users) were included in the design process from the very beginning.
- It has revitalized the urban living environment where it is located.
- Accessible learning-entertainment-socializing activities are provided free-of-charge for users of all ages.
- Emphasis is placed on the concepts of equality, participation and citizenship.

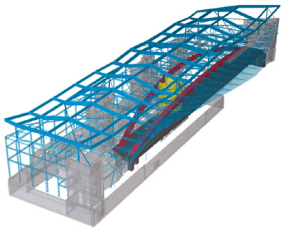
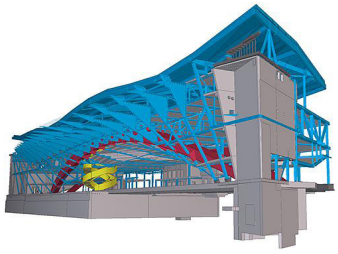
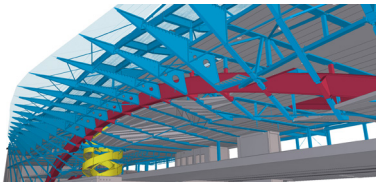
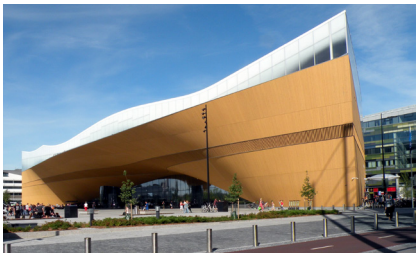
## IV. Discussion

With the integration of information and communication technologies into libraries, the connection of information and documents with the traditional physical space has been partially cut off. This situation has led to questioning whether the Internet will replace books and as a result library buildings will lose their importance. In the changing world, it is clearly seen that paradigms shift with changing values and each new paradigm brings its own solution proposals and designs. The change in the knowledge acquisition paradigm also required the initiation of major changes in the design of library buildings and new architectural solutions. Prior to discussing new architectural solutions, the question shall be asked whether the libraries will continue to play a valuable and important role in learning and teaching or not? [16]. Subsequently, the question of 'as an intellectual living centre, how should it keep up with the changing paradigm?' must be answered. The answer to this question may be that libraries that provide access to information must assume new roles in line with the changing paradigm and be equipped with new skills and competencies in order to survive in the 21st century. The answer to the same question may be redefining and reorganizing of the architectural design of library buildings.

In the 21st century, intellectual life centres are audio-visual interaction environments for consuming culture and leisure as well as information acquisition and learning processes. These environments are innovative environments that provide information gathering and study spaces, social spaces, cafes and even leisure activities [19]. The mentioned environments, the inclusion of the newly constructed library buildings in the architectural needs program can also represent a sustainable architectural product. Urbanek presents in his work such 'new architectural design criteria' as accessibility, symbolism, spatial organization, access to collections, self-study and integration [5], [22] that can provide resources for newly built libraries. Examining the Oodi Library, which constitutes the sampling area of this study, according to the above-mentioned 'new architectural design criteria'

**TABLE VI**

**Sustainable Construction Technology of Oodi Library [21], [27]**

| Sustainable Construction System | | |
|---|---|---|
|  |  |  |
|  |  |  |
|  |  |  |

showed us that libraries will continue to play a valuable and important role in learning and teaching after the paradigm shift in information technology with digitalization.

## Conclusions

The rapid progress in information and communication technology and the massive digitization of library material brought debates to the fore as to whether the importance of libraries would diminish or not. However, many of the libraries use new information technologies, thus acquiring a new vision by combining social, educational learning, teaching and research models with new user-oriented services. Libraries have changed from being a venue to distribute information to one where information will be produced, thereby taking on new roles as a communications space. As it was back in antiquity, this role includes discussion and the exchange of ideas, socialization and cultural enrichment amongst citizens.

In going beyond the pale of being venues that present materials on shelves and in quiet working environments, the 'next-gen' libraries of the 21st century are places that display their materials in different and interesting styles. They have now begun to operate as cultural centres where art, music and cinematic activities are made available and various activities are organized. This situation rendered redefining the architectural design of library buildings, rearranging them with 'new architectural design criteria.' Some researchers have revealed that many library buildings were designed and built with 'new architectural design criteria' such as accessibility, symbolism, spatial organization, access to collections, self-study and integration. Over the past two decades, 'next-gen' libraries incorporating interesting architectural forms have become a centre of attraction that enlivens the cities where they are located. The functions and architecture of one of these libraries, the Oodi Library, has been examined within the scope of new architectural design criteria. With its digital information technology, sustainable construction technique, comfortable-flexible-safe spaces that encourage research and creativity, while offering an exchange of ideas and information, which Oldenburg defines as the 'third place', it is seen that this library successfully reflects the 'urban living room' function while reflecting the new architectural design criteria in superb fashion. In addition to its iconic architecture with high craftsmanship, it has projected a vision of participation, citizenship and environmental awareness, as it makes positive contributions to urban life.

In conclusion, while the paradigm shift in information technology with digitalization was the catalyst that transformed the 21st century libraries into centres of intellectual life, it also reinforced its role as a symbol of education, equality, transparency and civilization.

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# A Quality Assessment Directory for Evaluating Multi-functional Public Spaces

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Comfort, commercial streets, inclusiveness, multi-functional public space, pleasurability, quality assessment, safety.

**Abstract**

**Public spaces facilitate opportunities for social interaction and promote social life. The social-spatial complexity of public spaces can be explored through the relationship between built forms and users' daily social activities. The contemporary needs of users have retrofitted or replaced the controversial public spaces such as streets, depriving the prime function of sustaining and facilitating social life. Thus, any factors influencing users' social/public life impact the quality of public spaces. Also, contextualization and definition of public spaces necessitate an evaluation of their quality. The lack of a quality assessment directory (QAD) for evaluating multi-functional public spaces motivated us to address it. To achieve the aim, this research has conducted a systematic literature review applying the content analysis to explore the principles and indicators influencing and enhancing social interactions in multi-functional public space design and then performed a normalization analysis to measure the weight of each indicator. The QAD constitutes five criteria (C1 – Inclusiveness, C2 – Desirable activities, C3 – Comfort, C4 – Safety, C5 – Pleasurability), and forty-two (42) embedded sub-criteria. The research found that Inclusiveness ($Wn_{C1}$ = 4.38) and Pleasurability ($Wn_{C2}$ = 3.88) have received the highest weights. Also, the research found that the sub-criteria 'Physical/visual connection or openness to adjacent spaces' ($Wn_{Sc.4.1}$ = 1.00), 'Users of diverse ages' and 'Community gathering third places' ($Wn$ = 0.750) have received the highest weights. Using such a QAD, urban professionals can quantify the effectiveness and efficiency of public spaces' environmental and physical qualities in promoting social interactions and sociability.**

## Introduction

Public spaces form an important part of the public realm, which fosters public life through social interaction. Old typologies of public spaces such as streets have been replaced or retrofitted to meet contemporary needs. The recent interest is directed towards urban living and public spaces, as modern societies have shifted their focus from public squares to their users' basic needs [1]. The scholars of urbanism argue that public space functions (through the promotion of public-social life) have diminished. The public spaces act as controlled environments where users and functions are filtered, segregated, and separated, disrupting public life [2]. According to Banerjee [3], privatization of public spaces enhances sociability through interaction between users. Public spaces very from small physical scales (i.e., streets, squares, parks, etc.) to large (i.e., neighborhood, city, and country). Banerjee [3] and Chavoya Gama [4] stress supporting and creating opportunities to enhance/improve public life by improving the quality of

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these urban spaces at the micro-level. Designing public spaces within the city at a macro-scale setting can impact public life at a micro-scale [5]. Cooper et al. [6] suggest that favourable qualities and contextualization of public spaces are necessary to develop these spaces to cater to modern societies' social and psychological health.

A few quality assessment models and tools have been developed to evaluate the public space to date. For instance, the women's safety audit is a tool developed by UN-Habitat for assessing safety in public spaces at local and policy levels by increasing public awareness and commitment [7], [8]. Androulaki et al. [2] have developed a stewardship toolkit for urban policymakers, which provides a management plan, maintenance plan, best practices for community organizations, and guides to funding sources. The scholars have developed similar structures accumulating key common concerns on configuring and operationalizing the public space assessment; for instance, the Systematic Pedestrian and Cycling Environment Scale (SPACES) emerges aesthetics, safety, functional, destination, and subjective elements [9]. As can be understood, the empirical public space assessment tools/models have commonly measured the functionality that aids urban professionals in measuring public spaces' functionality and performance.

To evaluate the functionality and performance of the public space, we need a comprehensive quality directory. To close this knowledge gap, this research has aimed to develop a quality assessment directory that aids urban professionals in measuring the effectiveness and efficiency of the environmental and physical qualities of the public spaces, hence, promoting the public social life.

## I. Methods and Materials

The research methodology was designed in two phases (see Fig. 1). The task of the first phase was to investigate and identify public space quality assessment variables through a systematic literature review and apply the content analysis method. The task of the second phase was to conduct a normalization analysis to indicate the criterion mostly contributing to the public space quality assessment. The following text presents the employed methods in detail.

### A. Systematic Literature Review and Content Analysis Method

Urban professionals have attempted to enhance the quality of the literature review process through employing quality systematic, scientific, and reproducible synthesizing methods. As a result, e systematic literature review is one of the most accurate methods of reviewing literature in the built environment and urban studies.

A systematic literature review is a fundamental scientific activity and an organized literature review method following a systematic process to investigate the variables and categorize them into a series of criteria and embedded sub-criteria [10]. Unlike traditional literature review methods (such as meta-analysis, narrative review, integrative review, etc.), it has prominence by implementing a scientific, replicable, transparent, and comprehensive process [11]–[14]. Systematic literature review has four stages: identification, screening, eligibility, and synthesizing (see Fig. 1).

- *Identification:* The method aids in minimizing review errors and biases through an exhaustive search in available sources (such as Google scholar, Books, journals, proceedings, handbooks, etc.). The relevant references (i.e., literature) will be searched and identified through surfing in Google Scholar, ScienceDirect, Scopus, and journal publishers (such as Taylor and Francis, Emerald, Proquest, Elsevier, SAGE, John Willey, etc.), and top-rated journals (such as Journal of Urban Design, Architecture and Urban Planning, Applied Mobilities, Journal of Environmental Psychology, and so on). Therefore, the systematic literature review provides an audit trail of the review process, achieving valuable outcomes [10].
- *Screening*: In this step, a set of following keywords has been searched within each of the identified sources: included sustainable public space, multi-functional public space, and public space assessment, and so on. Also, the research investigated the functional variables across diverse research fields, including urban design and planning, landscape architecture, transportation planning, public health, and social science. In this step, 38 references have been found, while one reference was dropped due to non-relevancy. By reviewing these references and the cited references, 11 more references were reviewed, while one reference was dropped due to ineligibility. According to Lievense et al. [15], literature should be screened regarding the quality and consistency of the findings.
- *Eligibility*: In the eligibility step, the references need to be evaluated in terms of three relevancies: (1) strong relevancy, (2) limited relevancy, and (3) inconsistent relevancy [16]. We found out that one of 50 references did not consider open spaces, not purely public spaces, so those two referenced were dropped. The rest of the references (i.e., 47 references) were identified for input into the synthesizing process.
- *Synthesizing*: In this step, the 47 references were studied to explore the assessment variables (i.e., sub-criteria) of the multi-functional public spaces while categorizing the variables into clusters (i.e., criteria). The results of the synthesizing step are presented in Table I.

After completing the systematic literature review process, the content analysis method was applied. Content

analysis is a technique to make valid and replicable judgments by exploring the keywords (i.e., codes) from the reviewed literature and documents for finalizing the assessment variables [17]. The method systematically evaluates the contents and texts and converts the qualitative data into quantitative data [18]. In the current research, the content analysis method explored the variables affecting the quality and performances of public spaces, developed a matrix table, and then estimated the frequency (i.e., degree of impact) of each variable in developing a quality multi-functional public space. The method zanalyzed the contents quantitatively using frequency (i.e., degree of depth) to measure the impact value (i.e., weight counts) of every single sub-criterion in the literature.

### B. Normalization Analysis

Indeed, the frequency values of sub-criteria may lead to a dilution in the effectiveness of assessment, which may receive less citation than other criteria. This issue may lead to insufficient data in the process of data mining and data analytics [19]. Hence, this research has conducted the feature scaling method to normalize the independent criteria. Data normalization aided in determining the weight of every single sub-criterion that contributes proportionately approximately to its corresponding criterion and the whole network. In particular, the research has conducted the min-max rescaling normalization method, which performs a linear transformation on the original data. It scales the model's variables in the range of 0 to 1. The min-max rescaling was selected for this research, which can fit the nature of our data, see Equation (1); where $\acute{x}$ is the normalized value, and $x$ is the original value.

$$\acute{x} = \frac{x - \min(x)}{\max(x) - \min(x)}, \tag{1}$$

## II. Research Findings

### C. Typologies and Characteristics of Public Space Assessment Models/Tools

Each model/tool has a specific assessment process/framework for evaluating the public spaces' functionality and features. The literature review determines that the public space assessment models/tools can be clustered into five typologies; 1) Public / Private Partnership Models, 2) Event-Based Models, 3) Self-Governing Special Assessment District Models, 4) maintenance and technical assistance partnership models, and 5) Grassroots Partnership Models. Further, each typology is briefly described:

- *Public / Private Partnership Models:* These models rely on private companies, organizations, government entity leadership, and small businesses for maintaining and activating purposes. The partner is asked to provide a

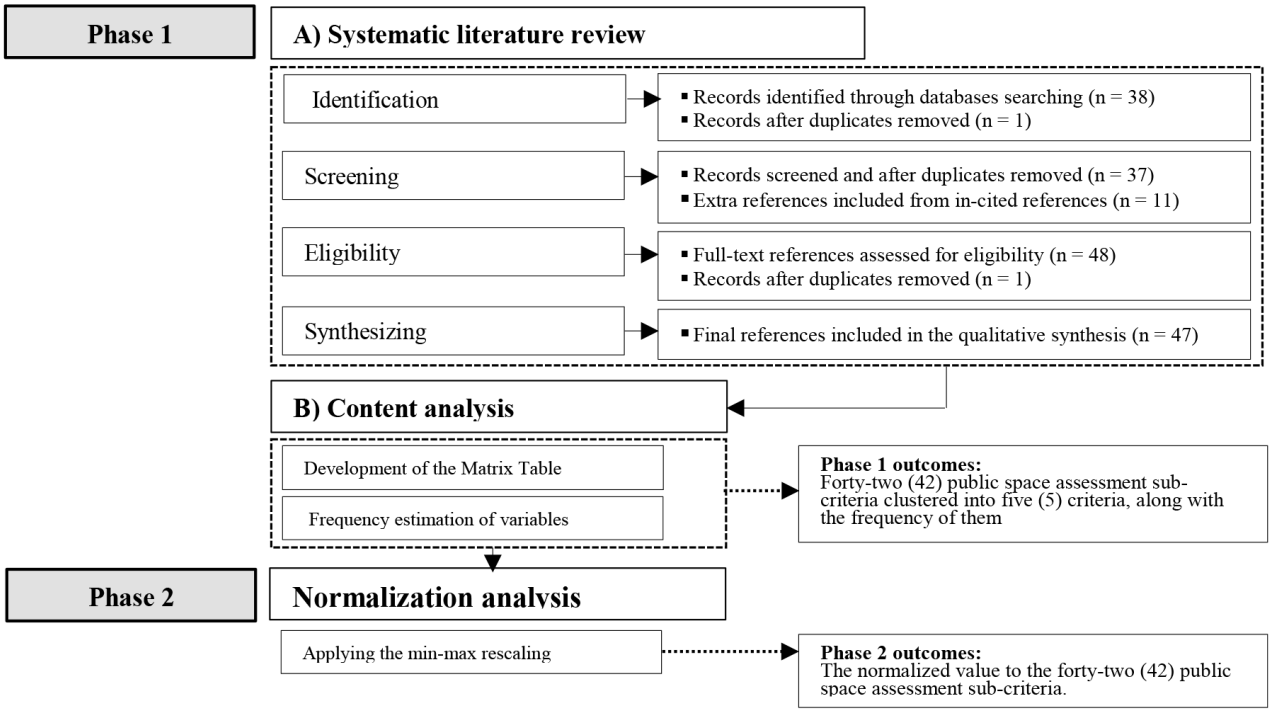


Fig. 1. Research methodology flow [developed by authors].

minimum number of free community programs. It would be equally distributed in the neighborhoods, and the partner is expected to generate revenue in the public spaces through retail, vending, and similar activities.

- *Event-Based Models:* These models make public spaces conducive to a social gathering or activate them for a specific time (evening, season, full-day, etc.). Such public spaces are equipped with a blanket or bundled structure that allows community groups to host small-scale community events.
- *Self-Governing Special Assessment District Models:* The property owners agree to pay for extra services beyond the basic services the local government has already provided using these assessment models. These models provide the guides or open-source toolkits for district formation or support creating an overarching coalition to help assessment districts share resources.
- *Maintenance and Technical Assistance Partnership Models:* Using these models, the organizations, partnerships, and programs can specifically support public space managers through either subsidized direct services or technical assistance. The model users should identify responsible parties and ensure the public space programs and policies focus on maintenance and corrective actions (e.g., New York city's neighborhood Plaza Partnership (NPP) technical assistance model). The partnership engages in advocacy to assist community-based organizations and in-direct services in high-need areas through citywide plaza promotion, marketing assistance, and workforce training.
- *Grassroots Partnership Models*: These models are suitable for small public spaces led by volunteer organizations for improvement, management, and stewardship purposes. These models aim to grow recognition of fiscal sponsorship resources, support grassroots group practices and share organizational knowledge.

Table I shows synthesized characteristics of the different typologies of the public space assessment models/tools. According to Table I, all assessment models/tools emphasize creating social interaction and infrastructure for users, making strong partnerships for maintenance, and providing a safe and lively environment. However, it can also be understood that some characters are specific for an assessment model/tool; for instance, the Event-Based Model only deals with the enticing user to linger among all typologies. On the other hand, maintenance and Technical Assistance Partnership Models is the only typology coping with distributing the management obligations to several organizations.

**TABLE I**

**Public Space Assessment Models/Tools' Typologies and Characteristics with the Perspectives of Strategic Planning and Management [developed by authors]**

| Typology of assessment models | Create users'social interaction and infrastructure | Entice user to linger | Foster positive impacts and experiences | Generate revenue | Support for organizing events and programs | Support small community organizations to lead | Host permanent activities | Facilitate event productions | Contribute to users gather for the social congregation through events | Be strong partners for maintenance | Be strong partners for fundraising | Being flexible and capable in responding to users needs | Keep management costs low | Provide a foundation of community ownership | Secure financial donations | Have high levels of accountability | Manage small local business partners and diverse stakeholders | Provide a safe and lively environment | Neighborhood level application | Has a costly assessment district formation | Distribute the management obligations to several organizations | Address equity issues |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Public / Private Partnership Models | ✓ | | | | ✓ | | ✓ | | ✓ | ✓ | | | | | | ✓ | ✓ | ✓ | ✓ | | | ✓ |
| Event-Based Models | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | ✓ | | | | | | ✓ | | | ✓ | ✓ | ✓ | | ✓ |
| Self-Governing Special Assessment District Models | ✓ | | | | ✓ | | ✓ | | | ✓ | ✓ | | | | | | | ✓ | | | | |
| Maintenance and Technical Assistance Partnership Models | ✓ | | | | | | | | | ✓ | ✓ | | | | | | ✓ | | | | ✓ | ✓ |
| Grassroots Partnership Models | ✓ | | ✓ | | | | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | ✓ | ✓ | | ✓ |

### D. Principles of the Public Space Quality Assessment

A series of principles have been drawn to public space quality assessment from diverse urban disciplines (urban design and planning, landscape architecture, transportation planning, public health, and social science). These principles cover the personal psychology (e.g., linger, meeting, relaxation, etc.), public health purposes (e.g., exercise, recreation, entertainment, etc.), urban context and setting (e.g., pocket park within a dense urban district, loose open space in a sprawling suburban, etc.), and cultural and environmental interventions. The scholars mostly rely on a solid approach in public space performance assessment. For instance, Cervero and Kockelman [20] have initiated 3Ds (Density, Diversity, and Design), which were promoted to 5Ds by Ewing et al. [21], adding Distance to transit, and Destination accessibility. Furthermore, focusing on traffic's impact on public spaces in the policy levels, the researchers have expanded the dimensions to 7Ds by generating the Commitment and Coexistence layers [22]. Finally, focusing on quality assessment of public spaces, the current research has explored the following principles: 1) urban public space values, 2) sociability and 3) street as the primary public space.

### E. Multi-Valued Public Spaces

According to Stevenson [23], the city is a sociological spatial entity providing social life opportunities at micro and macro levels. Therefore, we need to enhance interactions representing social life at a micro-scale in everyday life as a necessity to transform the city into a sociological entity. Rapoport [24] highlighted that the city comprises public spaces encouraging users to communicate and form relations. These spaces represent areas of harmony, bringing vitality and life to the city. Low [25] states that public spaces are at various scales and levels, extending from small-scale physical streets, squares, and parks to large-scale neighborhoods, cities, and countries. Thus, designing public spaces within the city at a macro-scale setting can impact public life at a micro-scale.

Previous discussions on physical public space at various scales have led to different conceptual interpretations among urban designers, sociologists, and political scientists. Urban designers, architects, and planners relate public space to physical space concerned with the interrelation between space and its users. However, sociologists view public space within the context of social dynamics, whereas political scientists and geographers discuss public space within civil society and individual rights. Nevertheless, scholars reveal a general agreement amongst urban geography, planning, and other multi-faceted disciplines that public spaces fall under the public realm's rubrics [1], [26]. Therefore, it is necessary to contextualize and define public space for research and evaluate quality of urban public spaces.

Much of the relevant literature suggests that being a segment of the public realm, public spaces are distinguished by aspects of 'possession of space, control, access, and use' [1]. Based on ownership, Madanipour [27] defines public spaces as those not restricted by private individuals or organizations and open to the general public. Public spaces are those accessible to the public, encouraging involvement in a group or individual activities [28]. Mitchell [29] states that public spaces as arenas encourage social and political movements. Duncan [30] argues that these public spaces often do not completely materialize the above-mentioned public realm's roles. It is due to the filtration of certain user groups or separating them over time and space [1]. Researchers define public spaces as freely accessible spaces and including roofed or unroofed enclosed spaces. Banerjee [3] defines these open public spaces as any urban ground unroofed by an architectural structure regardless of its accessibility to the public. Scholars define public spaces as well-designed spatial environments based on social, economic, aesthetic, and environmental values [26]. Mehta [1] states that public spaces include in-between building spaces and furniture, artifacts, and building edges defining the physical space boundaries. Thus, public space can be summarized as an 'open publicly accessible place' facilitating community interactions and activities [28].

In addition to the above discussion, Banerjee [13] highlights public spaces as major civic resources. Rybczynski [31] stresses public spaces as an attempt to humanize a practical city. He suggests that open public spaces inspire civic pride, social interaction, a sense of freedom and security, highlighting republican values. Thus, public spaces exhibit both republican and democratic values [3]. However, humanizing the environment through social contact between users from diverse backgrounds provides opportunities to ensure democratic values of open public spaces. Hence, the social life created within these public spaces is regarded as one of the most important values forming the core of civil society while maintaining the harmonious built environment-human interaction.

### F. Social Role of Public Spaces

Public spaces' social role is the most important aspect of various values, functions, and symbolisms. Urbanism scholars regard public spaces as arenas enhancing individuals' and society's development [32]. Supporting Berman's [32] view, scholars suggest that political and democratic growth and enhancement of any society depends on the opportunities provided for meetings and interactions, enabling the resolution of differences and inner contradictions. Arendt [33] highlights that public spaces allow people to interact and resolve their contradictions. Such spaces act as crucibles of social life,

enabling discussions and recognition of users. Mehta [1] highlights that public spaces' social role suggests that these spaces are essential for enriching and developing users' lives within the community. Accordingly, the five social roles of public spaces include: a) facilitating public/social life; b) serving as an arena encouraging meeting of different social groups; c) forming a stage displaying the city symbol; e) representing the city image, and f) forming communication link between different urban activities. Thus, public spaces' social role, where users meet their friends and experience/exchange their daily lives, plays a crucial role in enhancing the quality of these spaces [25].

Public spaces facilitate social life, where they serve as platforms for social functions, discussions, planned or unintentional encounters revealing users' attitudes and beliefs [1]. Further, public spaces' social functions include promoting learning, exchanging information and social dialogue, maintaining coherence, fostering social awareness, and integrating various social functions. In addition, public space offers possibilities for such social contact enhancing personal growth [23]. Thus, the quality and meaning of public spaces support, facilitate, and promote social life, enhancing contact and communication outside the home and workplaces [34].

Additionally, public spaces can be categorized as urban squares, cafes, and streets. Public life is promoted within public spaces due to social and environmental characteristics [35]. Putnam [36] suggests that social interactions within these public spaces at the micro-level provide opportunities for specific social activities enhancing/enriching social life. Supporting Putnam's view, Stevenson [23] adds that these public spaces are a product of social interaction and appropriate physical characteristics that introduce quality to urban space. Furthermore, the researchers argue that public squares satisfy only the basic needs and do not encourage modern communities' sociological and psychological development. Jane Jacobs [37] and Lynch [38] suggest that streets serve as areas of incidental social interactions to promote public life among public spaces. Therefore, streets represent primary public spaces serving as the city's main arteries, influencing the quality of urban spaces through social life. To sum up, the five social roles of public spaces are 1) facilitating public/social life; 2) serving as an arena for social groups meetings; 3) forming a stage displaying the city symbol; 4) representing the city image, and 5) creating a communication link between urban activities. Therefore, the degree of socializing in the streets plays an important role in determining the quality.

### G. Streets as Primary Public Spaces

Previous discussions suggest that streets form an important part of the open urban space within the city. Traditional liveable streets are developed due to informal interactions between users engaged in various social activities [38]. Urban sociologists George and Steve [39] highlight that these traditional liveable streets are developed due to users' association within familiar social spaces. Therefore, streets serve as primary public spaces encouraging social interactions.

Literature studies suggest that traditional liveable public spaces have deteriorated due to privatization and increased globalization [3]. However, public life in traditional street spaces still witnesses active social interaction [29]. Social interaction within streets is due to consumer culture exhibited in business varieties like coffee shops, bookstores, civic centers, etc. This develops commercial streets serving as venues for both public and social life. Studies conducted by urban designers and sociologists on behavioural sciences suggest that people and place-based characteristics of commercial streets affect social life by creating informal social interaction places. Mehta [1] suggests that intermixing land uses within commercial streets by introducing different business categories provides desirable physical and social development opportunities. The different business categories develop pocket spaces that further enhance social commune, creating a sense of trust [37]. Hence, commercial streets have formed an important part of social space, performing multiple roles promoting formal and informal social engagement.

### H. Indicators of Public Space Quality Assessment

Scholars concerned with public spaces' quality suggest that users' preference for public space depends on responsiveness, democratic provisions, and the nature of the meaning attached. Thus, for evaluation, we need to define a public space with desirable quality as those spaces are a) easily accessible and open; b) generate and support diverse, social, associated, and meaningful activities; c) ensure a sense of convenience, physical-environmental safety and comfort; d) attain a strong sense of magnetic control; and e) ensure sensory pleasure [16], [26]. By applying the systematic literature review method**,** this research has explored public space quality assessment indicators. By reviewing the literature, we found that these indicators can be clustered into five criteria (C1 – Inclusiveness, C2 – Desirable activities, C3 – Safety; C4 – Comfort, and C5 – Pleasurability), where each criterion constitutes a series of sub-criteria. Table II presents and defines the indicators synthesized through the content analysis matrix.

### I. Criterion 1: Inclusiveness

Urbanism researchers designate public spaces as arenas promoting participation and collective shared interests of users [29]. These spaces at the street level

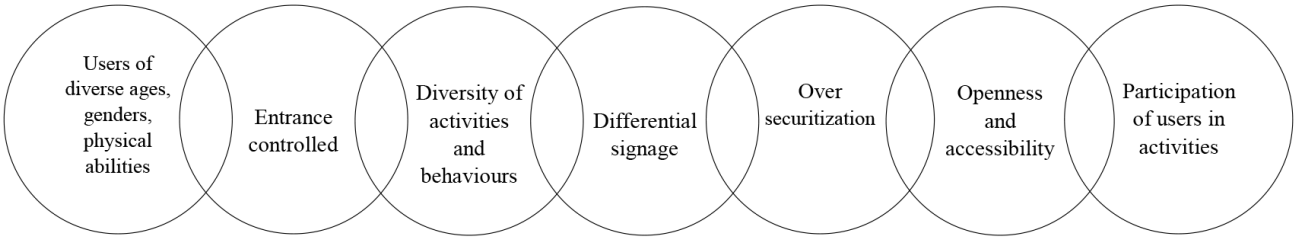


Fig. 2. The sub-criteria for assessing the inclusiveness of the public spaces [developed by authors].

witness the differences and conflict resolution of various groups included within social life. Studies conducted by Mitchell [29] suggest that street publicness determines socializing's inclusiveness. Mehta [1] suggests that the appropriate use of space fulfilling the needs of diverse groups of users makes the space public. Another important aspect is the flexibility and ambiguity of its diverse users in accommodating changes in their behaviours and offered activities. These activities may be due to the users' various needs and behaviours associated with appropriate pockets within public spaces [5]. Thus, the concept of inclusiveness involving overall accessibility can be regarded as an attribute of public space even though all the activities are not supported, or the space is not open to all users.

Extending any public space's inclusiveness depends on the range of activities supported within the public space and the users' engagement. Thus, users' activities and behaviour are important factors in assessing inclusiveness [1]. Indeed, the participants involved, permitted or restricted within the public space, play an active role in supporting daily life and access inclusiveness. Meanwhile, accessibility to the place, entering and using the area identify it as an ideal public space. Thus, inclusiveness criteria measure the accessibility of the space to varying individuals or groups and the development, sustenance, and support of users' various activities and behaviours. Figure 2 presents the indicators that shall be applied for assessing the inclusiveness of the public spaces.

### J. Criterion 2: Desirable Activities

Urban sociologists suggest that constructing place identity depends on its users' influence and collective experiences associated with appropriate activities. Furthermore, the familiarity of its users influences the meaningfulness of a place. Thus, the desirability and meaningfulness of space are determined by its usefulness in satisfying the users' diverse needs in shopping, eating, entertainment, etc. The public spaces also cater to special needs, including gatherings, discussions, debates, and other community activities [1], [5]. However, the presence of goods and services provided by businesses makes the environment useful and designates quality.

Furthermore, phenomenologists suggest that a sense of place and place attachment is created due to familiarity with the environment and repeated and frequent visits [40]. These time-space routine visits are due to the usefulness and satisfaction offered to users. Scholars recognized the sense of belonging and shared symbolic identification as basic needs to achieve a sense of community [41]. Thus, public spaces with provisions of meaningful activities attain a sense of 'collective-symbolic ownership,' 'place identity-attachment', and 'sacredness.'

The desirable activities within public spaces depend on the various activities generated within the stretch, including community gathering areas or third places. Thus, diversity of businesses carried out, availability of eating and drinking establishments (developing sociability), the usefulness of businesses, and flexibility in activities that are carried out in the spaces . Also, the desirable activities measure the social value and meaning of space in terms of symbolic identity and cultural value developed due to diverse activities [42]. Therefore, desirable activities criteria measure small local businesses or informal gathering 'third places,' developing the space as public and desirably privately owned. Figure 3 presents the indicators that shall be employed for assessing the desirable activities of the public spaces.

### K. Criterion 3: Safety

Safety is one of the prime concerns in public spaces. The real and perceived safety of public spaces depends on both social and physical characteristics. Considering social characteristics, Davis [43] suggests that socializing opportunities among users depend on the sense of safety offered by accommodated public spaces. Researchers remark that control, including over-securitization, makes space perceptibly unsafe [1]. As a resort to means of control, Davis [43] highlights the sense of safety attained by just the presence of people and Jacobs' [37] concept of 'eyes on the street,' where the space is self-securitized. Perkins [44] stresses the power of perceptions in making places appear safe or unsafe. In contrast, lack of control and lack of attention to userscreate a perception of low safety.

In support of the above discussions, studies conducted by urbanists regarding physical characteristics relate

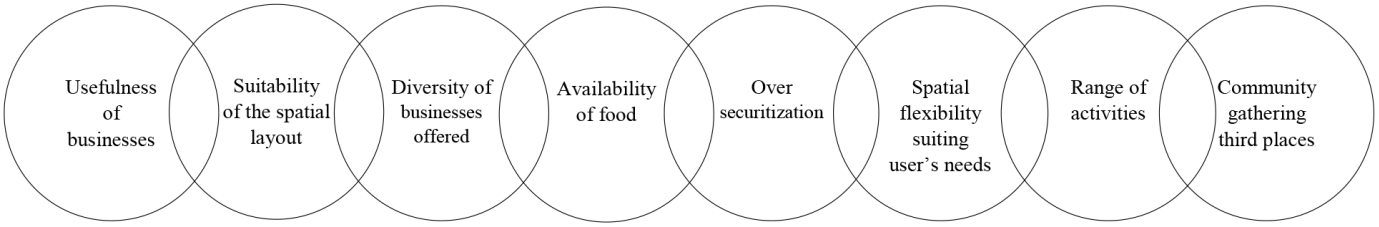


Fig. 3. The sub-criteria for assessing the desirable activities of public spaces [developed by authors].

safety to traffic volume and the maintenance of built environments. Public spaces' safety depends on the inverse relation between street traffic and activity [45]. Scholars stress the presence of businesses and non-residential units within a properly maintained built environment to measure safe public space [44]. Businesses, restaurants, cafes, and third places act as surveillance and safety [45], [46]. Personalization of street fronts, street furniture, and iartifacts adds a sense of safety [44]. Also, a sense of safety perceived within the context of social characteristics is measured in terms of surveillance (security) and the presence or absence of different types of people within certain pockets. Safety measured in physical characteristics includes visual and physical connection with the adjacent built environment, lighting quality, space configuration, diversity of land uses, modifications to the built environment, and traffic volume. Thus, a sense of safety can be regarded as an attribute of public space that invites and determines its users' presence and behaviour. Figure 4 presents the indicators that shall be employed for assessing the safety of the public spaces.

L. Criterion 4: Comfort

Regarding basic physiological needs, the need for environmental comfort and protection from natural elements play a more important role than secondary needs, such as a sense of belonging, functions, and activities in public space. Thus, certain physiological needs such as comfortable micro-climatic conditions, including temperature, sunlight, wind, and shade, influence the sustenance of secondary needs such as functions supported by public space and outdoor activities [47]. Changes in micro-climatic conditions resulting from human-made alterations to the natural environment determine the favourability in hosting outdoor activities in public spaces. The scholars argue that public spaces need to address physiological and culturally driven aspects such as various activities and user behaviour patterns [48]. Thus, it is mandatory to address both anthropometric and ergonomic aspects to ensure a comfortable environment for the users to achieve quality public spaces.

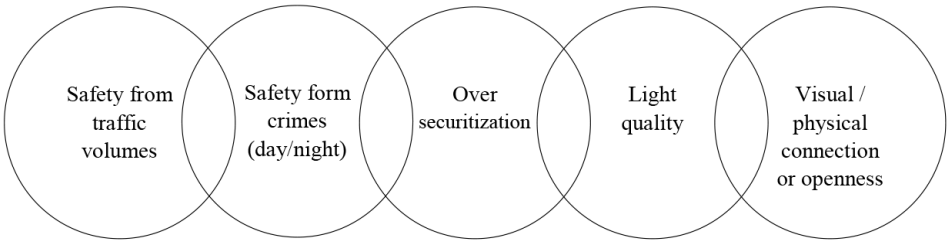


Fig. 4. The sub-criteria for assessing the safety of the public spaces [developed by authors].

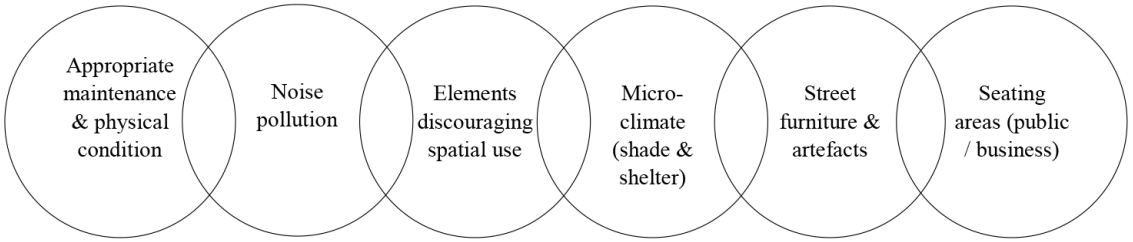


Fig. 5. The sub-criteria for assessing the comfort of the public spaces [developed by authors].

Urbanism scholars highlight that numerous factors, including the perception of safety, familiarity with the setting and other users, physical built environment, desirable activities, conveniences, and so on, influence the users' comfort [1], [5]. Among the above attributes, physical characteristics that contribute to comfort include seating areas, street furniture, artifacts, sidewalks, shade and shelter, articulation of street edges, and modifications such as landscape elements. Thus, users' sense of comfort only in terms of physical and environmental effects is measured. Figure 5 presents the indicators that shall be employed for assessing the comfort of the public spaces.

M. Criterion 5: Pleasurability

According to Lynch [29], 'imageability', 'high spatial quality', and 'sensory complexity' create a pleasurable public space. In support of Lynch's view, Rapoport [24] remarks that several factors coherently contribute to developing a strong image providing comfort and pleasure to users within public spaces. These factors include vividly identified shape, colour, or arrangement of structures built or open spaces [38]. The high spatial quality of public spaces is determined by two important factors-human scales and sense of enclosure. Urban psychologists highlight that users' interacting with physical elements in the body or body parts experience comfort and pleasure through convenience. Physiological and psychological comfort is attained through a sense of enclosure where users distinctly experience being within a space from outside.

Furthermore, sensory complexity creates pleasurable spaces through various environmental stimuli through light, sound, touches, colours, shapes, textures, and so on [49]. Researchers argue that this complexity resulting in pedestrian pleasure can be achieved only through variety, novelty, and coherence at the micro-level [3], [5]. Thus, users prefer those public spaces which are imageable, memorable, physiologically and psychologically comfortable, human-scaled with high spatial quality and portray sensory complexity.

The pleasurability criteria of public spaces are measured in numerous factors, including imageability, spatial quality, and sensory stimuli. Firstly, imageability at the micro-level is measured in the presence of remarkable features, articulation, and variety in architectural features of building facades and density/variety of elements along the street front. Secondly, spatial quality is measured in terms of the perceived attractiveness and interestingness of the space to its users. Finally, visual complexity involves groups of different users and activities performed, permeability and personalization of street fronts, and diversity in size, texture, and colour of different spatial elements. Figure 6 presents the indicators that shall be employed for assessing the pleasurability of public spaces.

## III. Analysis Results

As shown in Table II, the research has found 42 sub-criteria that should be considered in any public space quality assessment. The sub-criteria are grouped in five criteria (C1 – Inclusiveness, C2 – Desirable activities, C3 – Comfort, C4 – Safety, and C5 – Pleasurability). For example, the sub-criterion 'physical/visual connection or openness to adjacent spaces' has received the largest frequency value ($F_{Sc.4.1}$ = 10), followed by 'users' diverse ages' and 'community gathering third places', ($F$ = 8). In contrast, the sub-criterion 'elements discouraging spatial use' has earned the smallest frequency value ($F_{Sc.3.5}$ = 2).

The research has conducted a normalization analysis and measured the weights of indicators. According to Table III, the sub-criterion 'physical/visual connection or openness to adjacent spaces' has received the highest weight ($Wn_{Sc.4.1}$ = 1.00), followed by 'users of diverse ages' and 'community gathering third places' ($Wn$ = 0.750). On the other hand, among all sub-criteria, nine sub-criteria have received the lowest weights ($Wn$ = 0.125), which are: Sc. 1.8. Opening hours; Sc. 1.9. Differential signage; Sc. 2.4. Availability of Foods; Sc. 2.6. Suitability of space layout and design; Sc. 2.7. The usefulness of Businesses; Sc. 3.4. Microclimate comfort (shade and shelter); Sc. 3.5. Elements discouraging spatial use; Sc. 3.6. Appropriate maintenance and physical condition; and Sc. 4.4. Over securitization.

Besides, the research has calculated the cumulative weights for criteria. According to Table III, Inclusiveness has received the highest weight ($Wn_{C1}$ = 4.38), followed by Pleasurability ($Wn_{C2}$ = 3.88). In contrast, Comfort has earned the lowest weight ($Wn_{C3}$ = 1.75).

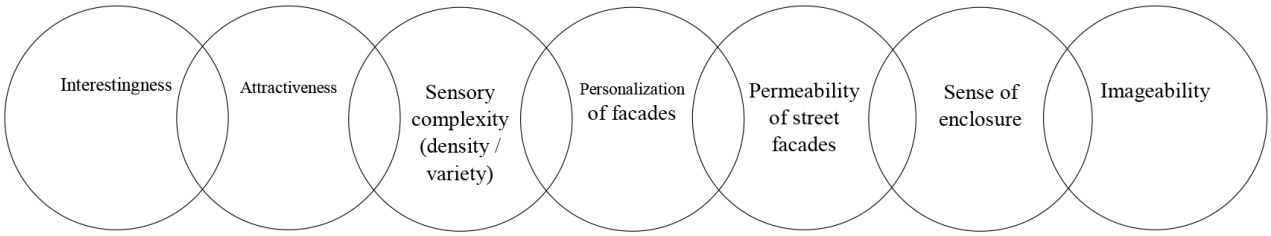


Fig. 6. The sub-criteria for assessing the pleasurability of the public spaces [developed by authors].

**TABLE II**

**The Results of Content Analysis of Indicators (i.e., Criteria and Sub-Criteria) Applied in Quality Assessment of Public Space [developed by authors]**

| Public space design principles: 1) urban public spaces and values; 2) sociability role of public spaces; 3) streets as primary public spaces | | | [1] | [5] | [23] | [26] | [29] | [38] | [40] | [41] | [42] | [43] | [44] | [45] | [48] | [49] | [50] | [51] | [52] | [53] | [54] | [55] | Frequency (degree of depth) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C5. Pleasurability | Sc. 5.9. Interestingness of space | ✓ | | | ✓ | | ✓ | ✓ | | | | | | ✓ | | | | | | | | 5 |
| | | Sc. 5.8. Attractiveness of space | ✓ | | | ✓ | | ✓ | | | | | | | | | ✓ | | | | ✓ | | 5 |
| | | Sc. 5.7. Sensory complexity (variety of sidewalk elements) | | | | ✓ | | ✓ | ✓ | | | | | | ✓ | ✓ | | | | | ✓ | | 6 |
| | | Sc. 5.6. Sensory complexity (density of sidewalk elements) | | | | | | ✓ | ✓ | | | | | | ✓ | ✓ | | | | | ✓ | | 5 |
| | | Sc. 5.5. Articulation and variety of architectural features | | | | | | ✓ | ✓ | | | | | | ✓ | ✓ | | ✓ | | | ✓ | | 6 |
| | | Sc. 5.4. Personalization of street-front buildings front | | | | ✓ | | ✓ | | | | | ✓ | | | ✓ | | | | | ✓ | | 5 |
| | | Sc. 5.3. Permeability of facades to the street front | | | | ✓ | | ✓ | | | | | ✓ | | | ✓ | | | | | ✓ | | 5 |
| | | Sc. 5.2. Sense of enclosure | ✓ | | | | | ✓ | ✓ | | ✓ | | | | ✓ | | | | ✓ | | | | 6 |
| | | Sc. 5.1. Imageability | | | | | | ✓ | ✓ | | | ✓ | | | ✓ | ✓ | | | | | | ✓ | 6 |
| | C4. Safety | Sc. 4.7. Safety from traffic volume | ✓ | | | ✓ | | | | | | ✓ | | ✓ | | | | | | | | ✓ | 5 |
| | | Sc. 4.6. Safety from crimes after dark | | | ✓ | ✓ | | | | | | ✓ | | | | | | | | | | ✓ | 4 |
| | | Sc. 4.5. Safety from crimes during the day | | | ✓ | ✓ | | | | | | ✓ | | | | | | | | | | ✓ | 4 |
| | | Sc. 4.4. Over securitization | | | | ✓ | | | | | | | | | | | | | | | ✓ | ✓ | 3 |
| | | Sc. 4.3. Lighting quality | | | | | | | | | | | ✓ | ✓ | | ✓ | | | | ✓ | | ✓ | 5 |
| | | Sc. 4.2. Appropriate maintenance and physical condition | ✓ | | | ✓ | | | | | | | | | ✓ | | | | | | | ✓ | 4 |
| | | Sc. 4.1. Physical/visual connection or openness to adjacent spaces | ✓ | | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | ✓ | | | | 10 |
| | C3. Comfort | Sc. 3.7. Noise pollution | | | | | | | ✓ | | | | | | ✓ | ✓ | | | | ✓ | | | 4 |
| | | Sc. 3.6. Appropriate maintenance and physical condition | ✓ | | | | | | | | | | | | ✓ | | | | | | | ✓ | 3 |
| | | Sc. 3.5. Elements discouraging spatial use | | | | | | | ✓ | | | | | | | | | | | | | ✓ | 2 |
| | | Sc. 3.4. Microclimate comfort (shade and shelter) | ✓ | | | | | | | | | | | | ✓ | | | | | ✓ | | | 3 |
| | | Sc. 3.3. Street furniture and artefacts | | | | | | | ✓ | | | | | | ✓ | ✓ | | | | ✓ | | | 4 |
| | | Sc. 3.2. Seating areas (by business) | ✓ | | ✓ | | | | | | | | | | | ✓ | | | | ✓ | | ✓ | 5 |
| | | Sc. 3.1. Seating areas (public) | ✓ | | | | | | | | ✓ | | | | | ✓ | | | | ✓ | ✓ | ✓ | 6 |
| | C2. Desirable activities | Sc. 2.7. Usefulness of businesses | ✓ | | | ✓ | | | ✓ | | | | | | | | | | | | | | 3 |
| | | Sc. 2.6. Suitability of space layout and design | | | | | | ✓ | ✓ | | | | | | ✓ | | | | | | | | 3 |
| | | Sc. 2.5. Diversity of businesses offered | ✓ | | ✓ | ✓ | | | ✓ | | | | | | | | | | | | | | 4 |
| | | Sc. 2.4. Availability of foods | ✓ | | | | | | | | ✓ | | | | | | | | ✓ | | | | 3 |
| | | Sc. 2.3. Spatial flexibility suiting user needs | | ✓ | ✓ | | | ✓ | | | | | | | | | | | | | ✓ | | 4 |
| | | Sc. 2.2. Range of activities and behaviours | ✓ | | ✓ | ✓ | | | ✓ | | | | | | | ✓ | | | | | | | 5 |
| | | Sc. 2.1. Community gathering third places | ✓ | ✓ | | ✓ | ✓ | | | ✓ | ✓ | | | | | | | ✓ | ✓ | | | | 8 |
| | C1. Inclusiveness | Sc. 1.12. Users participation in activities within space | | | | | ✓ | | | ✓ | | | | | ✓ | | ✓ | | | ✓ | | ✓ | 6 |
| | | Sc. 1.11. Openness and accessibility | ✓ | | | | | ✓ | | | | | | | ✓ | ✓ | | | | | | ✓ | 5 |
| | | Sc. 1.10. Over securitization | | | ✓ | | | ✓ | | | | | | | | | | | | | ✓ | ✓ | 4 |
| | | Sc. 1.9. Differential signage | | | | | | | | | | ✓ | | | | ✓ | ✓ | | | | | | 3 |
| | | Sc. 1.8. Opening hours | | | ✓ | ✓ | | | | | | ✓ | | | | | | | | | | | 3 |
| | | Sc. 1.7. Diversity of activities and behaviours | | ✓ | ✓ | | | ✓ | | | ✓ | | | | ✓ | | | | ✓ | ✓ | | ✓ | 8 |
| | | Sc. 1.6. Entrance controlled | ✓ | | ✓ | ✓ | | | | | | ✓ | | | | ✓ | | | | | ✓ | ✓ | 7 |
| | | Sc. 1.5. Users with diverse physical abilities | ✓ | | ✓ | ✓ | | | ✓ | | | | | | | ✓ | | | | | | | 5 |
| | | Sc. 1.4. Users of diverse races | ✓ | | ✓ | | | | ✓ | | | | | | | ✓ | | | | | | | 4 |
| | | Sc. 1.3. Users of diverse classes | | | | | ✓ | ✓ | | ✓ | | | | | | | | | | | ✓ | | 4 |
| | | Sc. 1.2. Users of different gender | ✓ | | ✓ | | | | ✓ | | | | | | | ✓ | | | | | | | 4 |
| | | Sc. 1.1. Users of diverse ages | | | | | ✓ | ✓ | | ✓ | | ✓ | | | ✓ | | ✓ | ✓ | ✓ | | | | 8 |

**TABLE III**

**The Results of Frequency Analysis and Normalization of the Public Space Quality Assessment Criteria and Sub-Criteria [developed by authors]**

| Criterion normalized value | Sub-criterion normalization (N) of network | | Sub-criterion Frequency (degree of depth) value | Citation. Sc.1.1. Users of diverse ages |
|---|---|---|---|---|
| | A/(max-min) | x-min = A | | |
| **C1. Inclusiveness** | | | | |
| 4.38 | 0.750 | 6 | 8 | **Sc.1.2. Users of different gender** |
| | 0.250 | 2 | 4 | **Sc.1.3. Users of diverse classes** |
| | 0.250 | 2 | 4 | **Sc.1.4. Users of diverse races** |
| | 0.250 | 2 | 4 | **Sc.1.5. User with diverse physical abilities** |
| | 0.375 | 3 | 5 | **Sc.1.6. Entrance controlled** |
| | 0.500 | 4 | 7 | **Sc.1.7. Diversity of activities and behaviors** |
| | 0.625 | 5 | 8 | **Sc.1.8. Opening hours** |
| | 0.125 | 1 | 3 | **Sc.1.9. Differential signage** |
| | 0.125 | 1 | 3 | **Sc.1.10. Over securitization** |
| | 0.250 | 2 | 4 | **Sc.1.11. Openness and accessibility** |
| | 0.375 | 3 | 5 | **Sc.1.12. Users participation in activities within space** |
| | 0.500 | 4 | 6 | **Sc.2.1. Community gathering third places** |
| **C2. Desirable activities** | | | | |
| 2.00 | 0.750 | 6 | 8 | **Sc.2.2. Range of activities and behaviors** |
| | 0.375 | 3 | 5 | **Sc.2.3. Spatial flexibility suiting user needs** |
| | 0.250 | 2 | 4 | **Sc.2.4. Availability of Foods** |
| | 0.125 | 1 | 3 | **Sc.2.5. Diversity of businesses offered** |
| | 0.250 | 2 | 4 | **Sc.2.6. Suitability of space layout and design** |
| | 0.125 | 1 | 3 | **Sc.2.7. Usefulness of Businesses** |
| | 0.125 | 1 | 3 | **Sc.3.1. Seating areas (public)** |
| **C3. Comfort** | | | | |
| 1.75 | 0.500 | 4 | 6 | **Sc.3.2. Seating areas ( by business)** |
| | 0.375 | 3 | 5 | **Sc.3.3. Street furniture and artefacts** |
| | 0.250 | 2 | 4 | **Sc.3.4. Microclimate comfort (shade and shelter)** |
| | 0.125 | 1 | 3 | **Sc.3.5. Elements discouraging spatial use** |
| | 0.125 | 1 | 2 | **Sc.3.6. Appropriate maintenance and physical condition** |
| | 0.125 | 1 | 3 | **Sc.3.7. Noise pollution** |
| | 0.250 | 2 | 4 | **Sc.4.1. Physical/visual connection or openness to adjacent spaces** |
| **C4. Safety** | | | | |
| 2.63 | 1.000 | 8 | 10 | **Sc.4.2. Appropriate maintenance and physical condition** |
| | 0.250 | 2 | 4 | **Sc.4.3. Lighting quality** |
| | 0.375 | 3 | 5 | **Sc.4.4. Over securitization** |
| | 0.125 | 1 | 3 | **Sc.4.5. Safety from crimes during the day** |
| | 0.250 | 2 | 4 | **Sc.4.6. Safety from crimes after dark** |
| | 0.250 | 2 | 4 | **Sc.4.7. Safety from traffic volume** |
| | 0.375 | 3 | 5 | **Sc.5.1. Imageability** |
| **C5. Pleasurability** | | | | |
| 3.88 | 0.500 | 4 | 6 | **Sc.5.2. Sense of enclosure** |
| | 0.500 | 4 | 6 | **Sc.5.3. Permeability of facades to the street front** |
| | 0.375 | 3 | 5 | **Sc.5.4. Personalization of street-front buildings front** |
| | 0.375 | 3 | 5 | **Sc.5.5. Articulation and variety of architectural features** |
| | 0.500 | 4 | 6 | **Sc.5.6. Sensory complexity (Density of sidewalk elements)** |
| | 0.375 | 3 | 5 | **Sc.5.7. Sensory complexity (Variety of sidewalk elements)** |
| | 0.500 | 4 | 6 | **Sc.5.8. Attractiveness of space** |
| | 0.375 | 3 | 5 | **Sc.5.9. Interestingness of space** |
| | 0.375 | 3 | 5 | |

## IV. Discussion

The urbanism scholars respect public spaces as arenas enhancing sociability development of individuals and society. Any society's political and democratic growth depends on the opportunities provided for meetings and interactions, enabling inner contradictions. Such spaces act as crucibles of social life, enabling discussions and recognizing users to play a crucial role in enhancing functional spaces for the community. Indeed, social life is of the most important factors other than physical infrastructure influencing public spaces' functionality, enabling the city's endowment and quality [35]. The social life of open, publicly accessible spaces is influenced by cultural and socio-cultural values, involves interaction between the built environment and its users [24]. This research has found that this interaction is characterized by human scale, inclusiveness, meaningfulness, safety,

comfort, playfulness, coherence, transparency, and so on at the micro-level. Hence, the urban public spaces representing a multi-dimensional and complex phenomenon provide opportunities for social interaction between the space, activities, and users' social life, influenced by diverse factors.

Figure 7 presents the summary of findings on the quality assessment of public spaces. Accordingly, this research has found that the public spaces can be in-between building spaces where furniture, artifacts, and building edges define physical space boundaries. The current research found that a good public space can offer desirable activities to its users, promoting third places acting as refuge areas outside the home or workplace. It creates familiarity with the environment, creating a sense of place and place attachment, enhancing community sense, and creating a social life. The diverse needs of users in terms of shopping, eating, entertainment, and so on are perceived as unsatisfactory due to the repetition of similar businesses along the stretch. Comfort experienced by users depends on both physical and environmental effects allowing the users to socialize. The users perceive comfort and safety due to familiarity with the setting (human scale) and the desirability of activities promoted within the stretch. The flexibility of seating areas, street furniture, artifacts, and the built-user interface modification make the Corniche Stretch comfortable. The absence of additional shading devices such as canopies, awnings, and so on reduces the sense of micro-climatic comfort in terms of shade and shelter offered, in addition to the discouraging factor of ongoing construction works.

Also, public space is less pleasurable due to lack of imageability in identifiable architectural elements, unsatisfactory sense of enclosure, monotonous nature of covered or exposed street areas, variety, and density of used elements. Thus, the study highlights that the users do not experience being within the stretch as distinctive. On the other hand, the users experience high spatial quality indicating pleasurable experience, permeability, and personalization of the street fronts creates attractive and interesting space, encouraging users' social engagement.

Furthermore, users of diverse ages, classes, genders, and races promoting shared interests make the street-oriented public space inclusive. The fulfilment of a diverse group of users needs enhances the street's appropriateness, making it more inclusive. The stretch promotes diverse businesses fostering various social and behavioural activities, enhancing the inclusiveness of users within the urban space. Additionally, overall accessibility to the users (for certain businesses) and desirable activities encourage social life within the stretch. On the other hand, over-securitization and lower participation of the users in various activities diminish the inclusiveness.

## Conclusions

The quality of public spaces determines the social interaction of users within the area. To create a space of appropriate urban quality, five dimensions of public spaces and assessment factors influencing each dimension should be planned and implemented accordingly. The outcome of the research provides the following recommendations on how to improve and enhance the public spaces by implementing the inclusiveness, desirable activities, comfort, safety, and pleasurability criteria:

- Introduce intermixing and diversity of businesses along the stretch, including supermarkets, antique shops, bookstalls, galleries, heritage exhibition areas at intervals with open community gathering places promoting desirable user activities.
- Create focal points within the stretch in public art, encouraging users to socialize, improve imageability, and enhance pleasurability.
- Utilize existing iartifacts in the area to develop temporary structures generating activities along the

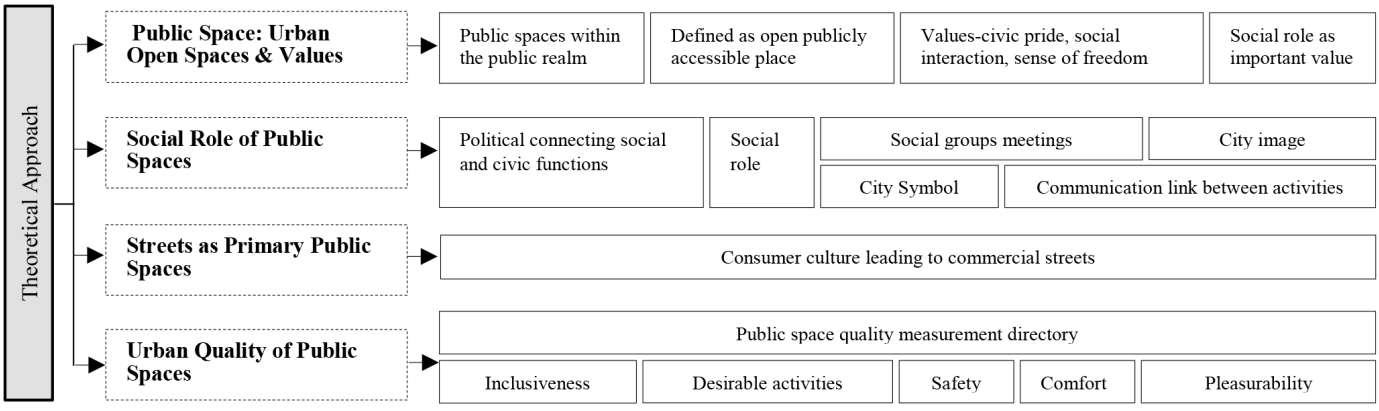


Fig. 7. Summary of findings on quality assessment of public spaces [developed by authors].

beach stretch, ensuring a sense of enclosure and at the same time creating sensory complexity.
- Improve visibility of the built form and sensory complexity by fostering recognition and appreciation of the built environment by introducing visually attractive stimuli including bright coloured displays, signboards, imagery in shop windows, ensuring a pleasurable atmosphere.
- Enhance sensory experience through aroma use in businesses like restaurants, cafes, etc., to draw people engaged in other activities to enhance participation.
- Densify the walking Corniche Stretch with various elements such as street furniture, lampposts, textured floor covering, sculptures, green planter boxes, territory boundaries such as fences, and enhancing pleasurability.
- Enhance the inclusiveness by encouraging users' participation in various activities by combining shopping and business activities to introduce large sociable spaces for community events like games, kiting, TV program shows during special occasions.
- Introduce additional shading devices such as umbrellas and canopies outside every business allowing spatial flexibility in usage, and encouraging users' comfortable social lives.
- Limit the securitization by restricting to any means of surveillance (such as cameras, guards, or guides) in addition to natural surveillance, ensuring inclusiveness of its users.

According to the findings of this research, an assessment model for evaluating multi-functional public spaces can be developed in the future. Meanwhile, complex decision-making methods (such as analytical hierarchy process, analytical network process, social network analysis, etc.) can be applied in weight estimation.

## Acknowledgments

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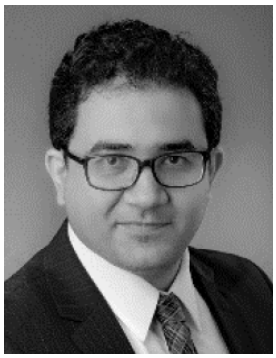

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# Use of Photogrammetry in Documenting Ruins/Traces of Cultural Heritage Not Surviving to the Present Day: A Comparative Case Study

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**Abstract**

**Preservation of cultural heritage is our duty, but there are situations where the heritage cannot be preserved. In this case, if ruins and/or traces of building remain, they should be documented. The aim of this study is to recommend simple, quick and easily-applicable solutions for documentation studies of ruins of cultural heritage that was not preserved. In the extent of this study, a cultural heritage that could not preserve its existence till today but whose place was determined thanks to its traces is dealt with. Iasos Ancient City Theatre, which is the focus of the study, does not exist but its ruins should be documented. For this particular example, photogrammetry was used instead of traditional survey technique that is quite difficult to be applied. As a method, two different photograph-based programs made for photogrammetry were used and after comparing according to 6 criteria, advantages and disadvantages were presented. According to the findings, it can be said that there is no dimensional difference between two programs and both can be applicable.**

## Introduction

Transferring cultural heritage to future generations is a common mission of all humanity. Cultural heritage is not preserved under some conditions such as not having awareness of preservation, disasters like earthquakes, floods, fire, the changing perception of beauty and necessity, being neglected as a result of abandonments, redundancy of maintenance and repair cost, illegal treasure hunting activities or vandalism. In these situations, ruins of cultural heritage should be researched because these ruins are the traces that will connect the building to the past. If documentation studies of the building had not been made before, importance of these ruins/traces is increasing. The ruins/traces give idea about buildings' place, building area, plan, width, height, number of storeys, construction material and so forth. This information changes according to quantity and quality of the ruins/traces.

The ruins/traces will also be destroyed after a while. It carries utmost importance to document ruins/traces before their destruction. Documentation can be made through the measurements with traditional survey, through the levelling instrument and theodolite and through the methods such as total station, GPS and so forth. However, it is quite difficult to document the building which does not exist (only traces exist) via these methods and it has some disadvantages in terms of time, equipment and labour. For these situations, photogrammetric methods can be used. For photogrammetric documentation, a number of software is used such as Agisoft PhotoScan, Photomodeler, ReCap, Reality Capture, Pix4D, 3D Zephyr, Visual SFM, PtGui Panaroma [1]–[3].

The aim of this study is to present methodological recommendations for documenting heritage buildings which cannot be approached because of different reasons (natural vegetation, soil accumulation, excavation trench, building debris, part of the building being into water) and recommendations for documenting ruins/traces of destroyed cultural heritages. These methods can be easily applied and can be seen as a remedial technique.

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## I. History of Study Area

Iasos Ancient City, which is examined in the study, is a port belonging to Karia Region. The ancient city, which is now located in Kıyıkışlacık Village in Milas County, Muğla, was established 87 km west of Muğla.

Most of detailed information about Iasos which dates back to 3000 BC [4, *3–10*] can be accessed as a result of excavation and survey studies [5]–[11]. Some of this information has barely survived in ancient resources. According to Strabon, Iasos which is a port, was an island close to the land [12, *XIV.2, C658, 21*]. However, nowadays its connection to the land.

Strabon mentioned that the city did not have farmlands and livelihood was fishing, so fishing was very important for the people of Iasos [12, *XIV.2, C658, 21*]. From a contrary perspective, Serin suggested that the city was engaged in agriculture, and this can be discovered from rock-cut basin of olive and grapes found as a result of archaeological survey [10].

The city that was established on a peninsula forms a whole with its elements such as agora, bouleuterion, necropolis, acropolis, theatre, churches, castrum, walls, towers, jetties, sacred places, housing areas, entrance gates and so forth (Fig. 1). Outside the peninsula, it is known that there are buildings such as a room and mausoleum belonging to the ancient city in the northwest and northeast. It can be stated that agora, bouleuterion, necropolis and the Artemis Astias sacred place of the ancient city were constructed on a plain area and other buildings were made on a sloping area (Fig. 1). It is observed that terracing was made in necessary places.

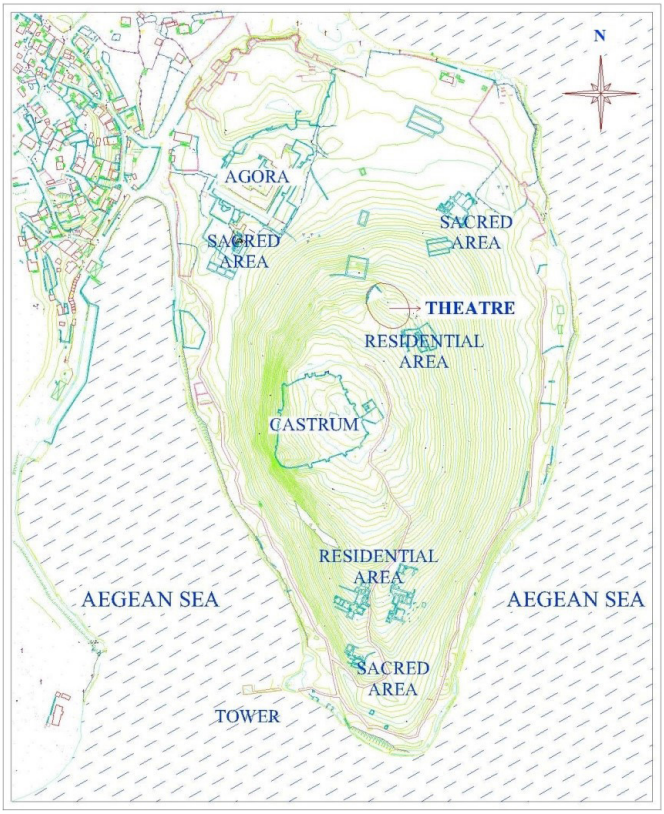


Fig. 1. General settlement plan of Iasos ancient city [15].

Pausanias mentioned that Phocians did not call a settlement as a city if it does not have government offices, gymnasium, theatres, market places and a fountain [13, *X, IV, 1*]. A theatre is accepted as an indispensable part of a city which had a rich architecture. The theatre had also an important place in Iasos. As an evidence to this, the inscription on which there are the names of persons contributing to theatre building can be considered. The building of the theatre is thought to date back to the 4$^{th}$ century BC in the Hellenistic period. According to the inscription that was found in archaeological excavation, it is understood that it was repaired in the 2$^{nd}$ century BC. In addition to this, the existence of spolia materials indicates that the theatre was renovated in the Roman period [6].

If the location of the theatre inside the ancient city is evaluated, it can be seen that natural slopes had been utilized for construction of the Hellenistic period theatres, thus less labour and materials were used. Iasos Ancient City Theatre was also built in accordance with this general practice. However, slope should be suitable for people to use theatre easily. Based on the information on the available map, there are two areas where slope is relatively smaller. The most suitable settlement areas of the peninsula are the south and northeast slopes. On the south slope, housing areas and a sacred area was constructed. As Vitruvius stated, it is not suitable for a theatre to be constructed in the south direction [14, *V, III, 2*]. Especially, if climatic conditions are considered, the south direction is the direction most exposed to sunshine. Therefore, the northeast slope of the peninsula which was the most suitable area was preferred for location of the theatre (Fig. 1).

Stones of the theatre were taken away to be used in the construction of Istanbul Harbour in 1887 [6]. The only element of the theatre surviving till today as a whole is the analemma wall (Figs. 2–3). The ashlars forming cavea and diazoma could not be preserved in their places, but only a few stones forming the filling have survived. Most of scaenae frons and parodos were destructed. It is possible to see that the remaining few stones in cavea had rolled and fallen into the orchestra.

Most of cavea were placed on the natural floor utilizing from slope (Fig. 1). The analemma wall was built for being used as a retaining wall at the end of the slope. A staircase was constructed in order to reach the theatre cavea from the housing area in the south of the theatre (Fig. 3). Examination of the remains of scaena


Fig. 2. The satellite image of traces of Iasos Ancient Theatre in 2019 [16].

Fig. 3. Analemma wall of the theatre and staircase [6].

shows that it had three entrance doors. Moreover, scaena was moved to the front a little and parodoses were stuck because the scaena had been rebuilt in the Roman Period [6, 14, *V, VII, 2*].

## II. Method and Material

In this study the aim of which is to document an unpreserved cultural heritage having ruins, Iasos Ancient City Theatre is examined as a material. Because the obtainable data is insufficient, it can be said that documentation using traditional technique is quite difficult. Therefore, alternative documentation techniques were searched.

Photogrammetry and terrestrial laser techniques have recently had a common place of usage [17]. According to the literature, in documentation studies photogrammetry produces more accurate results in terms of measurement, therefore, aerial photogrammetry was used in this study [18]–[20].

To obtain aerial photogrammetry, unmanned aerial vehicle (UAV) which can get high-resolution and high-quality photographs and has sensors and opportunity of remote control was used [21]–[24]. UAVs that have been commonly used in the last years [21], [25]–[33] are used in archaeological surveys and excavation studies, and in documentation studies of cultural heritage by architects and archaeologists. Depending on the features of UAV, an area of almost 10 km$^2$ can be documented [23]–[34].

Via these methods, unrecorded or hidden archaeological areas/artefacts can be determined. UAVs provide digital elevation model (DEM) analysis because they process images through photograph-based programs. Thanks to these high-quality analyses, even minor details can be defined. Furthermore, in the situation of scanning a whole city, spatial analysis of buildings in the city can be made [35].

To process obtained images from UAVs, a number of software that is mentioned above can be used. Thanks to the software, easier and faster results can be attained than using traditional photogrammetric techniques. With the increase of accessibility and the number of these programs, costs of the programs decrease [3]. The ultimate aim is to enable a 3D documenting of cultural heritage using these programs. Thus, this could be a basis for virtual 3D reconstruction studies and also a database can be formed for searching cultural heritage in a digital environment if a cultural heritage is destructed after a disaster [36]–[38]. In addition, 3D models of cultural heritage can be used as teaching material for improving students' 3D perception or can be utilized as virtual museum applications for the public.

In this study, Dji Mavic 2 Pro UAV and Hasselblad L1D-20C camera compatible with UAV were used. To obtain accurate results in the field study, hours before sunset (19:16–20:26) were preferred in Muğla on 16 July 2020. Thus, sharp shadow was prevented and almost homogeneous light control could be attained on the building.

The air route, departure and landing points, and the height of UAV were determined before the field study. Although the UAV rose to 65 m, the building could not fit within the frame as a single shot because of its big size. For this purpose, many photographs were taken of the theatre at a full 90° angle, that is, parallel to the ground plane, in the northwest-northeast line to scan the building piece by piece. For integrating the recorded image with spatial measurements, WGS 84 (EPSG:4326) was used. In addition to this, perspective photographs of the theatre were taken so that the program could work correctly and the third dimension of the building such as the slope and height could be formed clearly. Shots were taken with F stop: f/4, ISO-100, shutter time 1/100 sec, focal length: 28 mm without flash.

After photo shoots were completed, photographs were processed at the desk. At this stage, two different

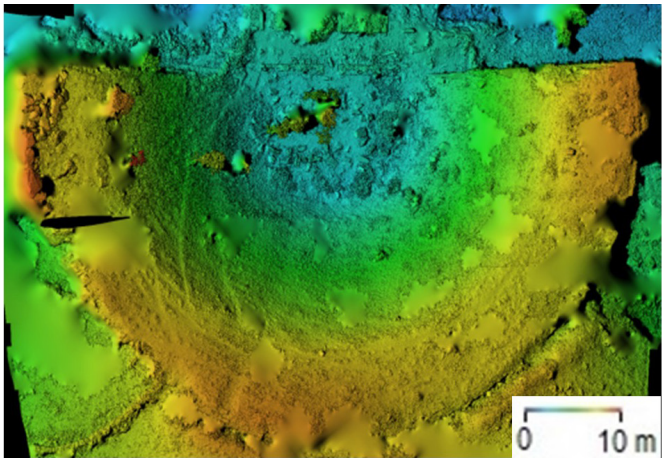


Fig. 4. DEM analysis (Agisoft PhotoScan).

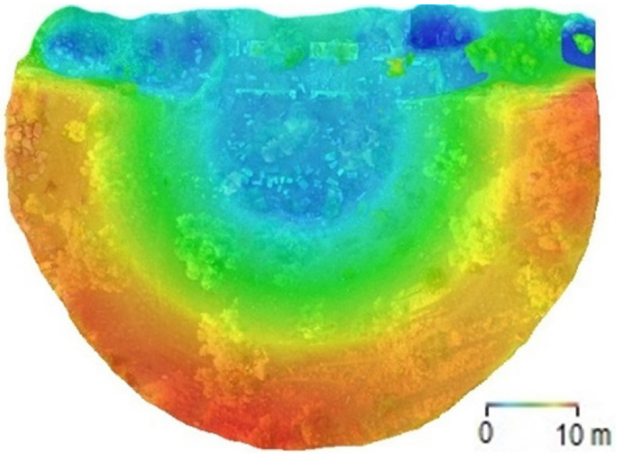


Fig. 5. Integration of DEM analysis and plan orthophotograph (ReCap Autodesk).

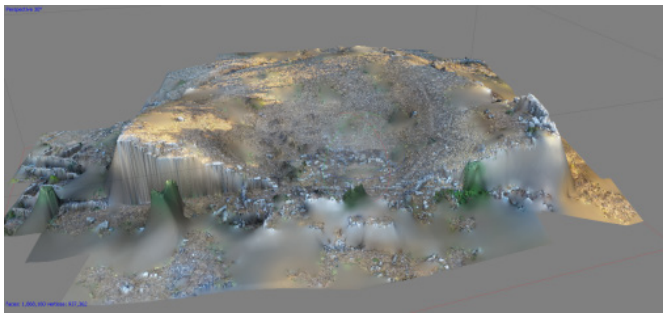

Fig. 6. 3D model (Agisoft PhotoScan).

Fig. 7. 3D model (ReCap Autodesk)


Fig. 8. The theatre plan drawn using photo-based programs (11.01.2021) [by the author].

Fig. 9. Places of measurements obtained for controlling the accuracy of the measurement [developed by the author].

programs, Agisoft PhotoScan and ReCap Autodesk were used. The same photographs were processed with these two programs. Both programs provide a 3D model of the building and DEM analysis. Thanks to the 3D model and DEM analysis, the third dimension can easily be perceived (Figs. 4–7). Besides, the programs provide also orthophotographic data. Utilizing from these programs, building survey of the theatre can be prepared (Fig. 8).

For comparing these two programs, some criteria were determined, such as measurement accuracy, necessity of equipment, necessity of technical knowledge, not being affected by light and shadow, not being affected by trees, clearness and sharpness of external lines of object.

In order to test the measurement accuracy of the programs, the further described method was used. The reference range that The Getty Conservation Institute (Letellier) determined for plans, cross sections and elevations in a project drawing were 1 cm and 2.5 cm and for the construction elements ±2 mm and ±5 mm. [39]. These two reference ranges were used in order to test the accuracy of two programs (Table I). In order to test the accuracy, measurements, at 6 places were taken: a circular hollow on the stone, the length of a fallen column, the wall thickness of the scene, the width of a stone in the

Fig. 10. A sample screen shot showing the measurements obtained from the programs (ReCap above, Agisoft below) [developed by the author].

**TABLE I**

**Comparison of the Measurement Accuracy [39-40]**

| Measured places | Documentation through Agisoft PhotoScan (cm)* | Documentation through ReCap Autodesk (cm)* | Measurement difference between two techniques (cm) | Suitability to tolerance range according to Letellier | Suitability to tolerance range according to CIPA |
|---|---|---|---|---|---|
| a | 14.6 | 14.6 | 0 | ±0.2–0.5 cm, suitable | 0.5–1.0 cm, suitable |
| b | 107 | 106.9 | 0.1 | ±0.2–0.5 cm, suitable | 0.5–1.0 cm, suitable |
| c | 37.5 | 37.9 | 0.4 | ±0.2–0.5 cm, suitable | 0.5–1.0 cm, suitable |
| d | 115.0 | 115.1 | 0.1 | ±0.2–0.5 cm, suitable | 0.5–1.0 cm, suitable |
| e | 37.2 | 37.3 | 0,1 | ±0.2–0.5 cm, suitable | 0.5–1.0 cm, suitable |
| f | 566 | 567 | 1 | ±1–2.5 cm, suitable | 1–2 cm, suitable |

* Measurement was taken from the program for controlling the measurement accuracy

**TABLE II**

**Comparison of Documentation through Agisoft PhotoScan and ReCap Autodesk [developed by the author]**

| Comparison parameters | Documentation through Agisoft | Documentation through ReCap |
|---|---|---|
| Measurement accuracy | + | + |
| Necessity of equipment | • UAV<br>• Agisoft PhotoScan program<br>• Drawing program<br>• Computer (good hardware is needed) | • UAV<br>• ReCap Autodesk program<br>• Drawing program<br>• Computer (average hardware is enough because it works over server) |
| Necessity of technical knowledge | Thanks to feature in the program, 3D model can be transformed into 2D orthophoto; however, knowledge of drawing technique is needed | Thanks to feature in the program, 3D model can be transformed into 2D orthophoto; however, knowledge of drawing technique is needed |
| The feature of not being affected by light and shadow | + | + |
| The feature of not being affected by trees | – | + |
| Clearness and sharpness of external lines of object | + | – |

scene, a smooth-shaped concrete block used for reference, and the length of the south wall (Figs. 9 and 10). The dimensions stated as a, b, c, d, e were accepted as close to the construction elements dimensions, and the dimension f was accepted as close to the plan dimension, and according to this appropriate reference ranges were chosen.

The tolerance rate CIPA (International Committee of Architectural Photogrammetry) accepted in the projects at a scale of 1/50 was accepted for drawing plan, cross section and elevation of the theatre, because these drawings are made at the scale of application project as 1/50. According to this, tolerance rate of 1 or 2 cm is an acceptable reference range. For the small scaled-artefacts, the reference range of 0.5–1 cm was accepted in accordance with the detail scale (Table I), [40].

The necessities of each program were listed in the table for comparing the necessity of equipment and the necessity of technical knowledge. For comparing the features of not being affected by light and shadow, not being affected by trees, clearness and sharpness of external lines of the object, a '+' is used if the program meets the necessity and '–' is used if the program does not meet the necessity (Table II).

## Findings and Conclusions

If Table I is examined, according to CIPA of ICOMOS committee and The Getty Conservation Institute (Letellier), there is no difference between the measurements obtained through the programs of Agisoft PhotoScan and ReCap Autodesk (Table I). According to this, both programs have measurement accuracy.

When the necessity of equipment is compared, the materials necessary in traditional survey such as meter, plumb bob, spirit level, hose, rope, chalk, profile comb, pencil, paper, eraser, scale are not necessary in these two techniques. UAV, drawing program and computer are the equipment which are necessary for both. Whereas Agisoft PhotoScan forms a model using computer hardware, ReCap

Autodesk does the same process through the web and it does not contain any burden for the computer hardware. Furthermore, the computer is available during this process. This provides opportunity for the researcher to work on another stuff and thus it gains time for the researcher. Both programs do not require knowing traditional survey technique. This is not needed thanks to the orthophoto feature of the programs; however, both require technical drawing knowledge (Table II).

Both programs were not affected by the light and shadows in the photograph, but Agisoft PhotoScan is affected by trees. The program created some gaps in the 3D model where the trees exist. These gaps in a 3D model were not completely tolerated (Fig. 8). In the images obtained from Agisoft PhotoScan program, there is clearness/sharpness of the external lines of stones of the theatre wall and the column or cavea. However, this is not the same for the images in ReCap Autodesk (Fig. 10). Both programs had the ease of use. Moreover, Agisoft PhotoScan program provides coordinates.

According to the evaluation of all the comparisons, both programs have advantages and disadvantages. However, considering that this cultural heritage, which does not exist in its place today and has only traces, does not contain sufficient data to document through traditional survey and considering that the documentation of the remaining traces is a must, both recommended techniques are extremely beneficial in terms of time, cost, and ease of application for documentation. Since through traditional survey, it is very difficult to document the structures and large-scale areas which remain in the river because of the change of the river bed or which cannot be reached due to dense vegetation or excavation, it is recommended to use photograph-based programs produced for photogrammetry as an alternative method in such cases. In addition to this, documenting a model as 3D with these programs provides opportunities for students to perceive the cultural heritage in 3D, to shed light to other researchers for further studies and if appropriate presentation techniques are used, it provides opportunities for visitors.

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# Modernism and the Phenomenon of Kaunas

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Heritage, Kaunas,language, modernism, perception.

**Abstract**

**The representation of modernism in architecture was affected by various determinants which were related to the technical, economic, and social circumstances of the period. The decade when modernism began to be seen in the architectural sphere was marked with aims to create new building forms associated with the ambition for a more socially balanced and egalitarian form of society in which the ideals of equal rights and liberation would be realised. However, establishing equality-based communities, adjusting the housing problem, and creating new universal values dismissed the connection with the tradition. This paper aims to analyse the dialect of modernism in Kaunas, Lithuania, and its characteristics by investigating its various physical nuances and invisible social context, which makes it distinguished when compared with the modernist language in the same period. Furthermore, it focuses on the experimental architectural language and the urban planning trends of the interwar period Kaunas through analysis of values in local architecture and urban planning levels to conduct its integrity.**

## Introduction

As architectural theorist Nikos Salingaros states that along with the many other changes that occurred with industrialisation, traditional form languages were lost worldwide in the architecture of the 20th century [1]. Developments in construction technology, engineering and building materials such as steel, iron and plate glass culminated in a functional style, which changed the way people perceive the design. Therefore, the form languages that was used in the previous approaches were subjected to a transformation. However, one of the most important motivations of avant-garde architects of the 1920s was the ambition to establish modern architecture for modern industrialised society. Furthermore, the aim of modernism in architecture was not about establishing an architectural style but more about revitalising the influences in the design itself, and as a result, developing a language that can be implemented universally. However, the most significant intention of modernism was to change society by a social reform that would determine different rules and a lifestyle by offering a secular and progressive approach and a new language both for the society and the architecture.

When buildings began to arise in the cities with the language of modernism, they were not readily accepted or approved right away among the architects and the architectural critics. The buildings were blamed for being austere and identical to each other. Furthermore, the structures and the façades of the time were criticised brutally. According to architect, critic and historian Kenneth Frampton, the cartoon published in 1911 suggested that the façade of Adolf Loos's building in Vienna was not that different from a manhole cover on the street [2]. Furthermore, according to historian Robert Weldon Whalen, the same building, which is an example of Viennese modernism, was accused by the Austrian emperor to have no eyebrows due to not carrying ornamentation on top of its windows, which was common at the time [3]. However, the criticism of the artefacts of the modernist architecture did not only occur when they were first built, it continued until the present day.

According to architect Miriam Gusevich, modernism was based on the elimination from the illiterate society of the bourgeois culture that applied pretentious ornament and kitsch to architecture, which took the form of eclecticism [4]. Therefore, the usage of ornaments from different architectural periods in an eclectic approach motivated the

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architects of the time to work towards a new architectural language. Creating a universal language required changing of the existing language of architecture that had been in use for centuries. As architectural historian Bruno Zevi states, the classical language in architecture contained various invariables such as symmetry, perspective, and proportion [5]. However, the language of modernism was based on variables, and even if the function was the same, it was possible to express the characteristics of the same function in various ways. Therefore, the new architectural language established in this period was formed by creating an inventory that helped to produce free mass, free surface, and free plans. However, the new approach of expression changed all the inheritably tried-and-true solutions which were proven previously.

As German philosopher and sociologist Jürgen Habermas states, modernity and modernism assumed that the present is a new era, therefore, it is not a continuation of the past, and it grows out of the rupture with the past and traditions [6]. However, when modernism is analysed in architecture regarding different cultures, climates, and geographies, it is possible to state that even modernism, in some places, developed and improved individual forms to their ability and cultural memories that they have inherited from earlier generations [7]. Therefore, society can create a direct impact on the expression of architecture and how it represents itself. Nevertheless, it might not always be easy to detect this impact. As a consequence, due to the traditions that arose regarding the vernacular architecture and point of view of the ideal beauty, even the expression of the same architectural style can differ related to the language architects used, which is connected to the traditional patterns and the conditions of the environment. Therefore, the regional, traditional and national influences in the formation of architecture can be expected in different cultures, including in modernism.

Within the 20$^{th}$ century architectural theory, various approaches were shaped due to the distinction between polar opposite ends, such as traditional versus modernity and national versus international styles. According to architects Robert Venturi and Denis Scott Brown, the main aim of modern architects was actually demolishing the historical buildings so that they could replace them with modern ones; therefore, they can adapt them to the rapid technological development [8]. On the other hand, architect Didem Çaylan states that the industrial culture, which is the result of modernism, established an urge to preserve the cultural and local diversities that manifested itself either as a reconsideration of the national, traditional and historical modes of a building or as a critical architectural language formed by sensitivity towards the physical, social and environmental factors of a specific locality at the beginning of the modernist era [9]. When the approach of the early modernist and architectural critics of the time, including Le Corbusier, Sigfried Giedion, and Lewis Mumford, are analysed, it is possible to state that they introduced sensitivity to local and regional context as a particular characteristic of any successful modernist practice. In its heart, modernism was foremost an endeavour to fix the problems caused by massive urbanisation and the outcome of industrialisation. However, it generated alienation for people from their traditional communities as well as their traditional lifestyles, which created a reflection in the sense of identity. The era between two world wars was characterised by the struggle between the camps of radical modernist ideals that did not reflect the local identity, and those whose ideas were modern in many approaches, but tried to find new interpretations of traditional forms of architecture and communities and even integrate some classical tendencies. Therefore, it is possible to trace the regional and national influences in different interpretations of modern phenomena in local urban planning and architectural styles.

In that regard, this paper investigates the evaluation of the dialect of Kaunas modernism in the interwar era from various aspects and focuses of the experimental architectural language and urban planning trends of the period. Furthermore, it emphasises the physical nuances and the invisible social context of modernism in local architecture and urban planning. The paper begins with the definition of modernism and modernity in both social and architectural contexts. This is followed by the definition of the characteristics of modernism in the architectural language of Kaunas and an explanation of the roots of the phenomena of Kaunas modernism and its interpretation.

## I. Modernism and its Reflection in Architecture

Modernism is a reflective and intellectual movement that had a substantial impact on both social and physical life, including art, politics, and philosophy. Modernism is defined as a radical break with the past, which was influenced by the research that was simultaneously taking place worldwide on new forms and expressions, particularly in the years following WWI [10]. Furthermore, according to historian Steven Mansbach, the fixation on modernism was on rationality and economy as a counteracting agent towards spiritually and materially miserable conditions after the war [11]. The terms modernism and modernity mostly describe the changes that establish the clash between modern and traditional values by newly constructed worldviews. The new human form in the society contained artists and philosophers who were rebellious and against the long-accepted doctrines by their strong ambition. Furthermore, in this era, society experienced an advanced human form which was active and exhilarant towards new interventions and changes

while developing the social and physical life by the impact of science and technology.

However, as political scientist and philosopher Stephen Bronner states, in the era of modernism, the process of social and political changes did not involve any practical program, which led to merely conceiving a new community where individualism would develop by itself [12]. Thus, the era of modernism is frequently criticised for being a utopian project rather than being rational; furthermore, it was blamed for shattering the existing values. According to Habermas, "*modernity was a project which included the efforts of developing objective science, universal morality and law, and autonomous art according to the inner logic. Furthermore, it was also intended to release the objective potentials of each of these domains from the esoteric forms*" [13]. However, the approach in this period also tried to establish a universal and rational attitude in people's social lives.

As architects Han Vandevyvere and Hilde Heynen state, focusing on modernism's belief merely in science and technology can disregard the other aspects and its legacy [14]. Modernism was not just a movement influenced by science's changes by a utopic aim but also a social movement and program. According to art historians Christoph Mohr and Michael Müller, Ernest May believed that rationality in the modernist sense referred to the idea of a rationally organised future that involves a conflict-free society of people with equal rights and common interests [15]. Therefore, while constructing the new way of the world, it had a focal point on constructing a different society that emphasised the well-being of every individual. However, urbanisation and industrialisation, which accompany modernism, generated alienation for people from their traditional communities as well as their traditional lifestyles and their environments.

According to architectural historian Sarah Williams Goldhagen, when people define modernism in architecture, the most common keywords recur to them are flat roofs, transparency, reinforced concrete, and lots of glass: glass windows, glass doors and glass partitions [16]. However, most of these elements were not used in the vernacular or traditional architectural forms. Therefore, the changes in the built environment also started to affect the sense of place attachment for the people, since in ordinary circumstances people tend to reflect their identity to the places they inhabit for the feeling of continuity and familiarity.

When modernism started to be seen in the architectural sphere, the approach towards it and the structures which do not contain ornaments were dubious by the critics as it was by the society itself. This sentiment is also true today among the public. As architect Kim Smith states in the documentary "Coast Modern", ninety percent of people do not want to live in or relate themselves to a modernist house [17]. One of the reasons for that can be explained by the fact that people cannot establish the bond they need with modernist buildings or with the environment these buildings are in. Nevertheless, they can be considered as more human-friendly and more closely connected with the outside by design. While traditional houses are more akin to shelters that separate people from the outer world, the primary focus in these structures was expanding the inner space to the outside by large apertures. The aim of the architects was to create a feeling of spacious design for the users. However, this characteristic only establishes an impact on the user of that building, but not on the people who are inhabiting that environment.

However, in the development process of modernism in architecture, it was not expressed or understood the same way all around the world due to traditional roots and continued usage of older trends that were mixed in. As Anne Bony states, modern architecture had been predominantly national initially, but in the late 1920s, primarily with the effect of International Congresses of Modern Architects (CIAM), it became international [18]. However, even though all the different variations of modernism had one common aim, which was establishing an architecture that is functional and away from eclecticism, there were still diverse approaches after this date. Therefore, it might be possible to state that modernism in architecture had multiple characters with their own particular approaches in two main divisions. The first one is modernism which was born as the social reform and aimed at all people universally, and the second one is the dialects that were developed from specific circumstances of the conditions that reflected an existing society. However, the first approach threatened the second approach and the values it represents by the claims of universality and standardisation. As architect and historian Alan Colquhoun states, different approaches are represented by different terms generated from the common claims to restore the core or essence ruined by the increasingly abstract and homogenised world of the post-industrial society aiming to discover how difference and variety could inhabit modern architecture [19]. However, there was also a firm belief that modern architecture is influenced by universalism and rationalism, which is involved in the first approach, totally ignored traditions. Therefore, artefacts that were the product of the first approach were not directly related to the region or the environment they were situated in.

One of the consequences of not significantly being connected with the existing built environment might result in not creating much of an impact on people's lives. Therefore, the buildings designed by modernist criteria might not easily occupy a place in the collective memory of societies. However, this can also be the result of the fact that the extant buildings do not contain age-value, as modernism only started to be seen in architecture in the early 20$^{th}$ century. But, on the other hand, it might be inaccurate to generalise its perception, especially in its

different dialects, and ignore the regional and national influences in its formation. Therefore, it is viable to expect variations due to societal differences and local traditions. In that regard, Kaunas modernism is one of these variations, which is invaluable to analyse due to its distinctive characteristics.

## II. Characteristics of the Phenomenon of Kaunas Modernism

The phenomenon of Kaunas modernism, which created its own language both in architecture and urban planning, started to be seen in the interwar period. At its nature, it was an experimental attempt for the provisional capital of Lithuania, the dialect of which was established and defined by the inherent optimism and civic initiative. Like most similar phenomena in post-imperial Europe, the Lithuanian national revival movement employed a wide variety of nation-building. Likewise, it continued on a larger scale when the goal of creating an independent nation-state was reached in 1918. As one of the most visible material manifestations of culture, architecture was not forgotten. From the early days on, like in many other European countries, the question of the so-called national style was raised. The definition of national style in modernism involved the usage of traditional patterns and forms, including traditional plan schemas, while trying to implement the new ideals to the design in various examples [20]. However, in the case of Kaunas, the subject of employing the traditional elements was problematic to start with, as the historical groundings of the national narrative largely ignored the professional architectural traditions of the period of Polish-Lithuanian commonwealth, with the exception of Vilnius baroque. Apart from that, the idealised forms came from both Lithuanian ethnographic tradition and the heavily romanticised medieval period of Lithuanian Duchy [21]. To various degrees of success, experiments in national style were carried out throughout the 1920s. However, the number of these buildings was small, and their forms were criticised as either too eclectic or oddly trying to appropriate the forms of traditional wooden architecture.

Surviving examples of this peculiar episode in Lithuania are almost entirely concentrated in Kaunas, which became the provisional capital in 1919. The combination of circumstances – mainly, that the city was not ready for its new role, the difficult institutional and economical situation of the new state and the looming lack of architectural specialists meant that the grounds for the birth of national style were not very suitable. Most of the new construction in Kaunas were architecturally utilitarian wooden buildings that were only built for the ever-increasing demand for living space. The brick-constructed buildings were mainly built in the city centre and morphologically continued the tsarist-era practices.

By the beginning of the 1930s, the situation improved in most fields and a significant increase of architecturally valuable buildings appeared in the cityscape. By this time, though, the quest for the national style was almost extinguished due to an emerging new generation of architects who graduated in various parts of Western Europe. These architects started to bring the new forms of modernism and other tendencies from across the borders, furthermore, some of the older generation architects gave in to the new trends too. As a result, new architectural tendencies heavily borrowed from the phenomena like New Objectivity or Italian Rationalism, since a significant share of most successful architects of the new generation were either alumni of German or Italian schools or were greatly influenced by the trends of those spheres.

The architectural forms associated with "modern" became a fashionable statement not only on behalf of the architects but also of their clients. While the two functional types diverged in the stylistic approaches, it became true for both individual housing and administrative buildings. When it is analysed from the perspective of functionalism, most of these buildings from the 1930s partly can be called superficial representations of the contemporary modernist ideals in the usage of some of the characteristic architectural elements that has been associated with the modern and rational, such as the bent corners, simplified shapes, strip and/or corner windows and light façades. However, according to the available means of budget and materials, strip and especially corner windows more often were imitated by a visual representation of the actual detail, simulated by the usage of differentiated colours in the context of the façade (Fig. 1).

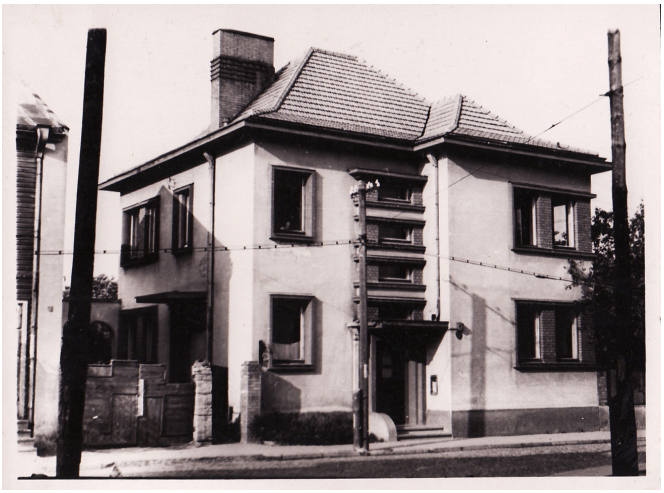

Fig. 1. House in Žaliakalnis district. Archive of the Institute of Architecture and Construction of Kaunas University of Technology [KTU ASI archive, photograph by Stanislovas Lukošius].

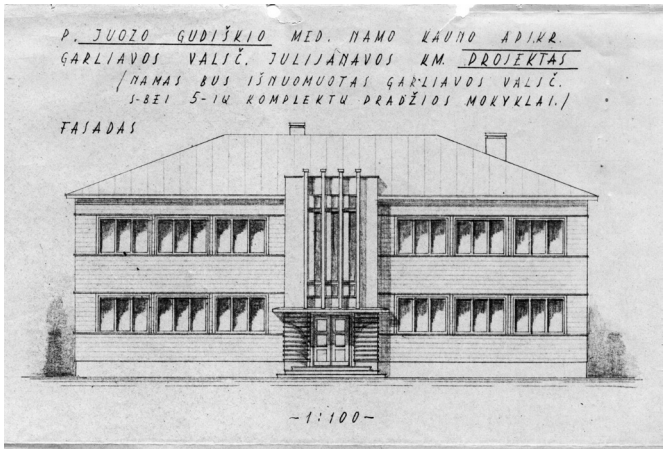


Fig. 2. Wooden primary school in the outskirts of Kaunas [blueprints from Kaunas Regional State Archives].

Furthermore, usage of these elements became so abundant that it was used in buildings that would not be otherwise considered modernist, such as in the wooden schools in the peripheral regions of the city (Fig. 2), that were lacking contemporary amenities.

Most of the buildings considered as examples of Kaunas modernism were built increasingly rational in their inner layouts and perspectives and hygienic standards but were adapted for the local conditions. It is worth emphasising that the owners of higher economic class first employed modernist forms in private constructions, and while adapting new types of floor plans, the most splendid examples of apartment buildings also had elements that were used from the 19th century onwards, such as the separate stairwells for servants (Fig. 3), which is not one of the characteristics of the modernist era.

Regarding urban planning, it is worth mentioning that districts in Kaunas at the time were morphologically divided into closed and open block types, which were common at this period. A large part of the planning in the already existing parts of the city contained the closed blocks, which were constructed organically into the existing street layouts. The open block districts were reserved for detached housing and often had peculiarities owed to the ongoing housing crisis. The ever-increasing population of provisional capital resulted in a lack of apartments and skyrocketing rent prices. This has manifested physically in these residential neighbourhoods through a fact that prevailing types of detached housing were designed to have more than one apartment, and this was often true even in upper-class family villas usually associated with single family use (Fig. 4).

Free-standing individual housing constituted a large part of the newly built housing stock of the time in Kaunas and had considerable variation in volume and architectural style (Fig. 5). The emphasis on individual housing that is seen in official planning documents reflected the ongoing trends that can be detected in the significant part of mainland Europe that derives from the evolution of garden city ideals. At the time, ideological outgrowths of the garden city concept were spreading in Europe, which included romanticised views of semi-rural settlements on the fringe of the cities. In Lithuanian case the heavy emphasis on developing lower-density neighbourhoods came through a big German influence on local urban planning. However, it should be noted that the garden city and following ideals that were developed in Western Europe as means of departing from the problems of the unsanitary and overcrowded industrial city had a peculiar overtone in the case of Lithuania. As the industrial development

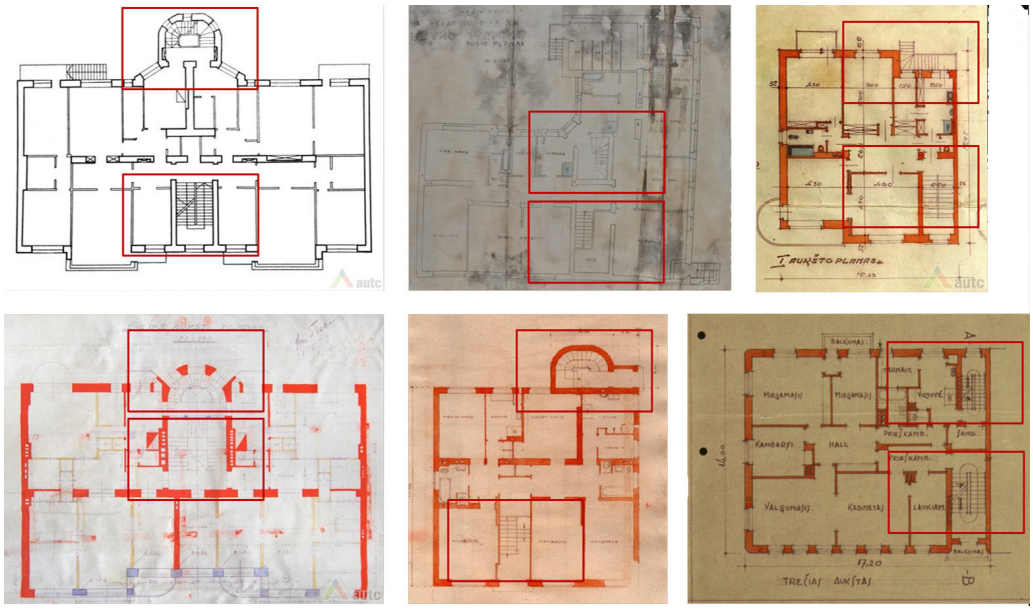

Fig. 3. Apartment houses containing two stairwells [blueprints from Kaunas Regional State Archives].

Fig. 4. House in Žaliakalnis district [KTU ASI archive, photograph by S. Lukošius].

was low and large cities did not exist, the pursuit of low density and emphasized natural context was rather seen as a continuation of then-perceived agricultural character of the state [22].

In the late 1930s, codification towards the maximal height of buildings was regulated and it became even more strict. Buildings of five stories were allowed only in certain parts of the city centre, meanwhile every project with greater height needed to acquire a special permit. This late development in height restrictions did not leave a significant imprint on the cityscape not only because of its late adoption, but because such structures (higher than 5 stories) were already a rare phenomenon. Thus, the new regulations rather codified already existing natural development. Contrary could be seen in another codification from the early part of the same decade: the city council adopted requirement for some parts of the central districts to have new buildings built only with the ceramic tile roofs [23]. While it was one of the traditional materials used in the city, it was rarely used at the time because of the higher prices associated with it. Thus, the regulation was put in place to enforce this kind of construction both on the grounds of fire safety and aesthetics. While this regulation was important in the formation of typical 1930s building look, often it was not enforced strictly and when the owners' financial means did not allow the use of ceramic tiling, the red paint coated tin roofings were allowed to be used. It is worth to note that this requirement, in turn, influenced not only colour (and material, when it was available) of roofs that were most critical to the skyline, but also, indirectly, codified the roof forms. Flat roofs, which are often associated with more radical forms of modernism, were not popular in Kaunas due to their unacceptability for the local climate conditions. However, some of the examples of architecture of the time featured imitated flat roofs, in a form where the shallowly sloped roof is hidden behind (Fig. 6).

While individual private housing was more prone to architectural experiments, representative buildings of various official institutions maintained stronger classical influences, sometimes balancing on between stripped classicism and modernist forms. They also sometimes still carried stylised national elements, especially in interiors – this was especially true towards the second half of the 1930s, which coincided with the growing power of nationalist-oriented main political power at the time. A constant that usually defined the distinction between residential and representational architecture throughout the decade was established by the emphasised verticality in the latter (Fig. 7).

On the other hand, both individual and apartment houses and more utilitarian public buildings, such as

Fig. 5. Individual house in Žaliakalnis district [KTU ASI archive, photograph by S. Lukošius].

Fig. 6. Imitated flat roofed house in Žaliakalnis district [KTU ASI archive, photograph by S. Lukošius].

Fig. 7. Building of National Savings Bank [KTU ASI archive, photograph by S. Lukošius].

schools, in most cases were strongly dominated by horizontal elements (Fig. 8). With some exceptions, these latter buildings also rarely used the universalist, stripped-down ideals as envisioned by CIAM, but can be more attributed to parallel processes of more traditionalist-grounded modernist strains throughout the 1930s, that was, arguably, even more influential back then; those that used the concept of modernity as a tool of technological progress but strayed away from the all-encompassing internationalisation of architecture. As the 1930s progressed, modernist influenced style, the so-called Kaunas modernism became de facto national style in Lithuania.

Even though Kaunas modernism can be recalled as superficial in some ways, it nevertheless used the modernist approaches through which the provisional capital of the time was developing. Furthermore, it managed to establish its own language as a phenomenon, which affected the people's perception when it first occurred, and in the city's contemporary evaluation.

Fig. 8. Apartment buildings in Kaunas city centre [KTU ASI archive, photograph by J. Skeivys].

## Discussion and Conclusions

When modernism is examined in various cultures and geographies, it is possible to identify nuances in their expressions concerning the different conditions. These conditions can be shaped by the political status of the time, as well as by the impact of society. For example, suppose the modernism which started to be seen in Kaunas during the period of its status of provisional capital is analysed. In that case, it is possible to state that the architecture and the functions which were given to the buildings were the direct outcome of the society and their needs in most of the cases. Furthermore, even though there were experimental designs, they were not firmly conflicting with the traditional understanding of housing or lifestyles for the people who lived in Kaunas. Therefore, these characteristics of its dialect give it the chance to be well received and used by society today, which makes it exceptional compared with various other languages of modernism.

The analysis of the architectural language in Kaunas suggests that the dialect of the modernism in Kaunas managed to develop an architectural expression in this era with characteristics of both sensitivity towards the region and the environment it is implemented in. Furthermore, it can be stated that the peculiarity of the modernism in Kaunas with all the implications of the reflection of the society managed to create an impact on their perception of it as a heritage object. Therefore, it is easier for society to evaluate these structures as valuable and at the same time connect with them. As a result, people who are currently living in Kaunas do not alienate themselves from this style which gives a unique character to the city. Although the phenomena of Kaunas had an experimental nature, it managed to balance the equality between tradition and modern lifestyle. In that regard, it is possible to state that the language that emerged in Lithuania's interwar period still has a reflection and a comprehensible interpretation for the people.

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