

## THE CONCEPT OF MULTIFUNCTIONAL OPEN PUBLIC SPACES IN THE CONTEXT OF DIFFERENT USER GROUPS

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### ABSTRACT

Amid contemporary trends in urban space transformation, a noticeable need has emerged for the reconceptualization of public space in a more flexible and inclusive manner. While the concept of multifunctionality is not new, it is inherently complex, and its interpretation varies across different spatial disciplines. Moreover, the concept of multifunctional space is increasingly being linked to the concept of sustainable development, assuming that such spaces can contribute to achieving a wide range of ecological, social, and economic benefits for the sustainability of urban environments. The focus of this work is multifunctionality as a concept in relation to its effects on different categories of users. Given that the application of multifunctionality in architecture and urbanism is multi-dimensional and open to numerous interpretations, this paper aims to provide a closer insight into the different characteristics of multifunctional public spaces in relation to various user groups, using the example of the "Lazaro Cardenas" promenade in Block 45. In this regard, the paper seeks to identify the different multifunctional segments of the space and the effects these spaces produce on various user categories by conducting spatial analysis, mapping, observations, initial interviews, and an online survey. Furthermore, with the aim of determining the different dimensions of multifunctionality through the use of this promenade by various user groups, as well as its functional, aesthetic, and ecological characteristics of equipment, the research established indicators and sub-indicators through which the space was evaluated. The research findings suggest that the concept of multifunctionality and hybridity are important for the creation of vital public urban spaces. Such spaces meet diverse needs, promote inclusivity, enhance social interaction and physical health, and create dynamic environments through services like connectivity, recreation, community development, and ecological functions.

**KEYWORDS** \_ *Multifunctionality, Open public space, User diversity, Public space transformation, Urban vitality*

## INTRODUCTION

The concept of multifunctionality is complex and can be understood and applied through different dimensions, some of them are: spatial, temporal, use and service. This concept is fundamental for sustainable urban development. However, its interpretation varies across spatial disciplines, complicating its analysis and evaluation (Živković et al. 2019). In addition, in the modern theory of planning and design, new approaches recognize new dimensions of functionality and confirm the broader meaning of this term. In her theory of integral urbanism, Nan Ellin introduces new urban space functions, explaining that functionality extends beyond traditional urban roles—such as activities and spatial use—to include ecological, emotional, symbolic, and spiritual dimensions (Ellin, 2006).

Since the application of multifunctionality in architecture and urbanism is inherently ambiguous and subject to multiple interpretations, this work seeks to provide a closer insight into the different aspects of multifunctional public spaces, in relation to different user groups, using the example of the 'Lázaro Cárdenas' promenade in Block 45. The aim of the research is to identify different multifunctional segments of space and the effects these spaces have on various categories of users. The characteristics of multifunctionality and its manifestations in public space are examined, along with the activities of different user groups within these spaces.

In the first part of the paper, the concept of multifunctionality is discussed in relation to the process of space hybridization, then the research methods, techniques and tools that will be applied in the further research process are defined. Then the collected research data, through spatial analysis, mapping, observation, initial interviews and an online survey, were presented through the results. The results are analyzed and evaluated based on predefined indicators across four categories: functional characteristics (use and users), equipment characteristics, aesthetic qualities, and ecological/landscape aspects.

## THEORETICAL APPROACH: MULTIFUNCTIONALITY AND HYBRIDITY

Contemporary trends in urban space transformation highlight the need to reconceptualise public space in a more flexible and inclusive manner. In addition, the concept of public spaces as it is today is more open and susceptible to the creation of new, hybrid urban models. (Choe et al., 2016). Multifunctionality and flexibility are often linked to hybridity in architecture and urban planning. The integration of diverse functions and activities within the same physical framework, allowing adaptability and flexible use based on user needs is an inevitable outcome of globalization and socio-economic transformations. The multifunctional use of urban spaces can reduce the need to create new spatial capacities in order to meet the needs arising from population growth and urban density, at the same time improving the quality of urban life. (Ghafouri & Weber, 2020).

Some authors believe that hybridization in the field of architecture and urbanism is a combination of spatial-functional and social interactions in buildings and urban spaces. The concept of hybridization, applied to public spaces, changes the ways in which their functionality is conceived. Therefore it devises a program for users, redefines their design and connections with the environment, also affects how they are managed, and establishes new social meanings and boundaries (Cho et al., 2016, 2017; Migliore et al., 2021 from Di Marino et al., 2023).

Multifunctionality, through programmatic or functional mixing, is a key aspect of hybridization in architecture and urbanism, evident in urban spaces. The elements of multifunctionality and flexibility, through which we most easily identify programmatic hybridization, contribute not only to rich and diverse content, but above all to the connection of people, objects and functions. Nan Elin discusses this concept through the relationship between hybridity and connectivity. These two concepts create a symbiosis of people and nature, buildings and landscapes, there is a program, then urban hybridization, and finally, as a result, new typologies emerge. Programmatic integration can be realized

through deliberate decisions of designers and planners or spontaneously by different actors. (Ellin, 2006). Flexible and multifunctional design are some of the mechanisms used to enable maximum utilization of space and meet the needs of all user groups (Choe et al., 2016).

In addition, multifunctionality can be characterized as one of the characteristics of hybrid spaces, which can realize a wide range of contributions to the quality of public spaces. By redefining relationships between spatial elements and content, multifunctionality and flexibility are enhanced, fostering greater engagement across different user groups. Therefore, in urban theory and practice, the creation of multifunctional and adaptable spaces is recognized as one of the possible catalysts for the creation of sustainable urban environments. Conceptualized as a feature of space, multifunctionality refers to “the possibility of having more than one activity or function in the same space and/or at the same time” (Batty M. et al., 2003 from Živković et al., 2016). In this context, multifunctionality can be understood as a characteristic of space that enables the realization of various economic, social and ecological benefits (Živković et al., 2016).

## **RESEARCH METHODOLOGY : MAPPING, OBSERVATION AND SURVEY**

On the example of the “Lazaro Cardenas” promenade, post-occupancy evaluation was used as a method of determining the satisfaction or dissatisfaction of different user groups with their environment. Post-Occupancy Evaluation Assesses spaces that have been fully designed, constructed and used over an extended period. The vitality and quality of the space depend on its characteristics in relation to the needs and demands of the users. The concept of characteristics (concepts of performance) is also called the measurable behaviour of the space, it indicates the degree to which the needs and demands of the users are satisfied. In urban design, this concept is directly related to the quality of space. The value of those characteristics of the space reflects the quality of the space, and therefore the satisfaction of the users (Preisner, 1988; Zhang et al., 2023).

Three dimensions are examined: features of space equipment (paving, equipment/urban furniture, seating elements, lighting elements, garbage disposal elements, water elements, maintenance, cleanliness), functional characteristics (adequacy of space for carrying out activities, diversity of space for activities, access to activities, conformity of space to their purpose) and aesthetic characteristics (concept of harmony of elements of space and urban equipment, green areas in terms of pattern, texture and colour). The research methodology combines both analog and digital tools to evaluate spatial transformations. Initial analysis involved documenting and mapping the physical characteristics, primarily of the current state, and then comparing it with the state before the reconstruction. The goal of this phase includes the classification of possible differences. In accordance with these objectives, the AutoCAD was used for the analysis.

The intensity, diversity, and patterns of use are analyzed through observation. The observation included a tour of defined spatial segments and a ten-minute recording, in three time periods: in the morning, from 10:30 a.m., 6:00 p.m. and 8:00 p.m., on weekdays and weekends. The SmartCounter application was used to digitally record user counts, disaggregated by age group, across defined spatial units. Additionally, behaviour mapping was carried out by documenting different types of activities (linear movement, zoned engagement, and stationary behaviour) across various times of day and week. The diary also includes photo documentation.

To gain deeper insight into users' experiences and emotional responses to the space, on-site interviews with a small, age-diverse sample informed the development of an online survey. The digital survey, administered via Google Forms using a Likert scale, gathered data from 104 participants over ten days. It aimed to collect data on the length of stay, frequency and preferences in using the space, as well as the degree of satisfaction/dissatisfaction with the space. Collectively, these methods demonstrate how digital tools can facilitate inclusive, user-informed evaluations of public space.

## RESULTS/DISCUSSION: IDENTIFYING MULTIFUNCTIONAL ASPECTS OF THE “LAZARO CARDENAS” PROMENADE IN RELATION TO DIFFERENT USER GROUPS

The promenade “Lazaro Cardenas” is located in the municipality of New Belgrade and passes through New Belgrade blocks (70, 45 and 44) in a length of 4.5 km, it is considered the largest promenade in Belgrade. The promenade was built shortly after the foundation of Block 45, in the 1970s. The reconstruction of the Block 45 promenade (2020-2021), included the renovation and creation of new playgrounds and parks in its surroundings, as well as new urban furniture and variety of plants and trees. Additionally, three children’s playgrounds, as well as a basketball court, were renovated. Currently, within Block 45, along the promenade, there are five zones with children’s play equipment (children’s playgrounds, including a traffic polygon-playground), three sports field areas (tennis court, two basketball courts, a field for indoor soccer, volleyball, table tennis), and an area with exercise equipment (outdoor gym). Green space makes up about 26.5% of the Block 45 promenade.

**Table 1:** Recognizing the multifunctional characteristics of the promenade “Lazaro Cardenas” through functions and services

|                       | The original condition                                                                                                                                                                                                                                                                                                                    | Reconstruction plan                                                                                                                             | Current condition                                                                  |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>Photo overview</b> |                                                                                                                                                                                                                                                          |                                                                |  |
| <b>Functions</b>      | movement (connecting neighboring blocks), recreation, ecological function, community development                                                                                                                                                                                                                                          | recreation/play (restoration of sports fields and children’s playgrounds), ecological function (formation of green areas and planting of trees) | recreation/play, community development, ecological function, movement              |
| <b>Services</b>       | <b>Recreation and free time</b> (possibility of performing various activities)<br><b>Health</b> (mental and physical health, aspect of social interaction, engaging in physical activity, staying in a green space)<br><b>Character of the landscape</b> (unique urban intra-block landscape as a symbol of the socialist building model) |                                                                                                                                                 |                                                                                    |

There is growing evidence that natural elements within the built environment can counteract the negative psychological effects of city life and even promote mental wellbeing (Neuner, et al., 2025). The World Health Organization also highlights mental well-being as a crucial component of overall well-being (WHO, 2021). Accordingly, attention could be turned towards evaluating the positive influence of multifunctional public spaces.

During the analysis of the promenade “Lazaro Cardenas” in Block 45, the area was divided into three spatial segments (MF1, MF2 and MF3). Each segment was evaluated for its multifunctionality—both in terms of how it is used by resident groups and the range of services it provides to users.

The collected data on the use of the promenade “Lazaro Cardenas” indicate the diversity of user groups, and therefore the multifunctionality of this public space. Through observation and the previously explained counting technique, it was established that the most numerous users are children aged 6-13, followed by children 0-5 and adults (parents).

Through the mapping of user behavior, the activities that are represented within the promenade are

divided into three structural groups of activities:

- Dynamic use - **linear activities** (walking, running, rollerblading, riding a bicycle/scooter);
- Dynamic use - **activities in the zones** (playing on the children's playground, Exercising in open gyms, playing on sports fields) and
- Static use - **stationary activities** (sitting, standing)

**Table 2:** Spatial multifunctional segments of the promenade "Lazaro Cardenas" Block 45 – facilities and user groups

| Segments of the promenade | Spatial framework                                                                   | Facilities                                                                                                                                                                                                                                          | Dominant mode of use / group of users                                                                                                      |
|---------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| MF segment 1              |    | <b>Public facilities/education facilities:</b> Branko Radicevic Primary School, Sunce Kindergarten, Zvoncici Kindergarten<br><b>Recreational content:</b> Small children playground with equipment                                                  | Transit space, dynamic use of space<br><b>Dominant users:</b> Pet owners, cyclists                                                         |
| MF segment 2              |   | <b>Commercial facilities:</b> Restaurants, cafes, fast food kiosks, hairdressers, pet groomer<br><b>Recreational facilities:</b> 1 court, outdoor gym                                                                                               | Gathering space and transit area<br><b>Dominant users:</b> People with small children, children 6-13, adults, elderly people               |
| MF segment 3              |  | <b>Commercial facilities:</b> Fast food, boutique, hairdresser, patisserie, children's play area with outdoor equipment and seating area<br><b>Recreational facilities:</b> training ground, 3 children's playgrounds, 3 sports fields, outdoor gym | Gathering space and transit area / connection with the river<br><b>Dominant users:</b> Children 6-13, people with small children, cyclists |

Through observation, it was noted that Segment 2 is utilized consistently throughout the day, primarily due to its commercial offerings and good natural shade. However, Segment 3 serves a dual function, both as a transit corridor linking to the Sava riverbank and as a space for leisure and commercial activities, located along the edge of this zone. In contrast, Segment 1 is characterized by a lower level of dynamic use. This area is primarily used by residents of the surrounding buildings, often for walking pets or as a connecting route between blocks.

It was noticed that in Segments 2 and 3 of the promenade, which are situated along areas with commercial and recreational facilities, there is a mix of stationary activities, activities within the zones themselves, and linear activities (such as walking and cycling), primarily engaged in by parents with children. Conversely, the access zones of each segment and the central section of the promenade are predominantly utilized by older adults, who primarily engage in stationary activities. The way different user groups utilize these spaces enhances the promenade's multifunctional character.

Table 3: Respondents' answers to the question of what the problems or potential areas for improvement are in the 'Lazaro Cardenas' promenade

| Problem                                                                    | Answers                                                                                                                                                                                                  | Number of respondents (%) |
|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| <b>Programs (lack of certain programs, or inadequacy of existing ones)</b> | <i>Lack of:</i> dog park, organized events, more interesting things for children to play<br><i>Inadequacy:</i> equipping the hall of the cultural center, equipping the premises within the craft center | 21,3                      |
| <b>Equipment (lack of, quality, versatility, inadequacy)</b>               | <i>Lack of:</i> water fountain, greenery, trash cans, lighting, smart chargers, shade elements, wooden deckchairs, barriers<br><i>Inadequacy:</i> paving, drainage system                                | 27,8                      |
| <b>Management and maintenance</b>                                          | Regular maintenance and cleaning, emptying of bins, maintenance of greenery                                                                                                                              | 42,6                      |
| <b>No objections</b>                                                       | /                                                                                                                                                                                                        | 9,8                       |

From the conducted online survey, which had a respondent base predominantly consisting of women (79.8%) and primarily age groups between 30-45 years (50%), it was concluded that the main issue highlighted by users regarding the promenade is the level of maintenance and cleaning. The survey results also show that the vast majority of respondents (80.8%) agree that the promenade offers a sufficient number of activities for children. However, this percentage decreases for activities for older users (52.9%) and young people (41.3%), with 39.5% and 27%, disagreeing or strongly disagreeing with the statement that the promenade provides a sufficient number of activities for these age groups.

### Evaluation of the "Lazaro Cardenas" Promenade

To determine various dimensions of multifunctionality in the use of the "Lazaro Cardenas" promenade in Block 45 by different user groups, indicators and sub-indicators were established to evaluate the space. That entails assessing the quality and presence of its functional, aesthetic, and ecological characteristics.

## CONCLUSIONS

The multifunctionality of public spaces is a current topic in urban theory and practice, considered a possible means of achieving sustainable urban environments. Given that it is a complex concept that can be interpreted in numerous ways, the aim of this work is to explore multifunctionality in the context of its different dimensions and manifestations in public space, and in relation to different user groups. Considering the notions of multifunctionality and hybridity in urban and social theory confirms their broad contribution to the quality of public spaces and urban life. Such spaces satisfy various needs and activities, fostering inclusiveness and community engagement among different user groups.

It is important to note that time constraints may have affected the scope of the analysis and the volume of data collected. Overall, the research deepens our understanding of the mutual relationship between the dimensions of multifunctionality and public space users. The results, based on observation and mapping, indicate that spatial segments combining recreational, commercial, and environmental functions attract the most children (6-13 years old) and parents (adult users), who are the most represented on the Lazaro Cardenas promenade in Block 45. In contrast, spaces mixing ecological functions with movement attract older user groups. Segment 1 is a transit space with periodic stays by parents with children and shorter stays by elderly users, while Segments 2 and 3, due to their content, are places for longer stays by adults, parents with children, and, to a lesser extent, the elderly. The digital survey confirmed the observation results, indicating a lower representation of content for

young people, which is also reflected in their presence in this public space. Also, within the conducted interviews and survey, and later in the evaluation process, greater interest and concern was noted, as well as a more positive opinion of users about the aspects of the promenade's equipment and functional characteristics, in relation to its ecological and aesthetic characteristics. Recognizing the various aspects of the multifunctionality of public spaces, in relation to different categories of users, can be instrumental in creating more sustainable and higher-quality public spaces that contribute to the well-being of users and the development of more joyful spaces.

| Category                                   | Indicators                                           | Sub-indicators                                                                    | score            |                  |                  |
|--------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------------|------------------|------------------|------------------|
|                                            |                                                      |                                                                                   | p<br>o<br>o<br>r | f<br>a<br>i<br>r | g<br>o<br>o<br>d |
| Use and users - functional characteristics | Number and diversity of users                        | Number of users during the day                                                    |                  |                  | x                |
|                                            |                                                      | Number of users at night                                                          |                  | x                |                  |
|                                            |                                                      | Different categories of users (age, gender)                                       |                  |                  | x                |
|                                            | Number and variety of activities on the promenade    | Presence of activities for children                                               |                  |                  | x                |
|                                            |                                                      | Presence of youth activities                                                      |                  | x                |                  |
|                                            |                                                      | Attendance at activities for the elderly                                          |                  | x                |                  |
|                                            |                                                      | Presence of inclusive content                                                     | x                |                  |                  |
|                                            |                                                      | Presence of recreational content                                                  |                  |                  | x                |
|                                            |                                                      | Presence of commercial content                                                    |                  |                  | x                |
|                                            |                                                      | Presence of cultural content                                                      | x                |                  |                  |
|                                            |                                                      | The presence of social interaction                                                |                  |                  | x                |
|                                            | Accessibility for pedestrians                        | The presence of sufficient space for pedestrian walkways                          |                  | x                |                  |
|                                            |                                                      | The quality of the promenade in terms of dimensions, design, location             |                  | x                |                  |
| Equipment characteristics                  | Street lighting                                      | Presence                                                                          | x                |                  |                  |
|                                            |                                                      | Quality                                                                           | x                |                  |                  |
|                                            | Seating elements                                     | Presence                                                                          |                  | x                |                  |
|                                            |                                                      | Quality                                                                           |                  | x                |                  |
|                                            | Elements for recreation                              | Presence                                                                          |                  |                  | x                |
|                                            |                                                      | Quality                                                                           |                  |                  | x                |
|                                            | Waste bins                                           | Presence                                                                          |                  | x                |                  |
|                                            |                                                      | Quality                                                                           |                  | x                |                  |
|                                            | Bike racks                                           | Presence                                                                          | x                |                  |                  |
|                                            |                                                      | Quality                                                                           | x                |                  |                  |
|                                            | Public water fountains/toilets                       | Presence                                                                          |                  | x                |                  |
|                                            |                                                      | Quality                                                                           |                  | x                |                  |
| Aesthetic characteristics                  | Design                                               | The presence of artistic elements (sculptures, fountains, murals)                 | x                |                  |                  |
|                                            |                                                      | Use of colors and textures                                                        |                  | x                |                  |
|                                            | Visual consistency - harmony                         | Harmony of elements of urban equipment in terms of texture and color              |                  | x                |                  |
|                                            |                                                      | Harmony of green elements - landscaping                                           |                  | x                |                  |
|                                            |                                                      | Harmony of the promenade as a whole within the environment (buildings and nature) |                  | x                |                  |
| Ecological characteristics / landscape     | Quality of biodiversity and microclimatic conditions | Degree of greenness                                                               |                  |                  | x                |
|                                            |                                                      | Condition of greenery in terms of maintenance                                     |                  | x                |                  |
|                                            |                                                      | Diversity of plant species                                                        |                  | x                |                  |
|                                            |                                                      | Air quality (measured)                                                            |                  | x                |                  |
|                                            | The presence of elements of energy efficiency        | The presence of solar or sensory elements urb. furniture                          | x                |                  |                  |
|                                            |                                                      | Presence of waste recycling/composting bins                                       | x                |                  |                  |
|                                            |                                                      | Presence of a rainwater collection and/or filtration system                       | x                |                  |                  |

**Figure 1:** Evaluation of the promenade "Lazaro Cardenas" in relation to the defined indicators and sub-indicators

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