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Article

The Changing Nature of *In-Between* Spaces in the Transformation Process of Cities

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Abstract

In the *in-between* spaces of cities, there are many problems of various nature and scale: functional, spatial, economic, environmental, visual, and social. There are also some hidden potentials that can be activated. The aim of the article is to explore the possibilities of solving existing problems and to show the possibilities of using the potentials of *in-between* spaces with regard to the changing nature of a city. The article, of a discursive character, aims to answer the questions of whether connecting a city with public spaces can be a catalyst of changes, and what tools should be used to facilitate the flux of material factors (like goods or natural resources) and immaterial matter (e.g., ideas or cultural patterns). The new approach is based on the assumption that this would be most effective when using landscape architecture, green/blue infrastructure, artistic strategies, and universal design in public spaces. The expected result of the research is to show the purposefulness and possibilities in creating attractive and safe public areas of *in-between* spaces as an on-going micro- or macro-process of urban change on a wider scale. It was recognised that integrated actions combining the humanistic, ecological, and technical approaches could bring significant benefits to society, preventing existing problems, not only spatial and visual (changing the city directly), but above all social and environmental, having an impact on the functioning of the city from a much longer perspective. The results of the research show how the transformation process of public spaces may change the nature of the cities, improve the compactness of existing cities, and increase the quality of life. Selected case studies are presented to show the scale, scope, and benefits of possible actions.

Keywords

connecting urban structure; in-between spaces; public space; urban transformation

Issue

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1. Introduction

1.1. Background

Contemporary cities are cut by numerous barriers, forming a “no man’s land” at the borders of various urban structures. They destroy the compactness of an urban tissue, the functional, environmental, and social unity, and reduce the landscape values. Uncoordinated fragmentation lowers the quality of urban space, deforming the image of the city, and has negative environmental

and social effects. No satisfactory solutions and mechanisms to stop urban disintegration have been discovered so far. Therefore, a discussion of preventing such problems is necessary.

The state of art of the nature and scale of the problems in *in-between* spaces and the possibilities of connecting fragmented urban structures by using public spaces is insufficient. This article aims to answer the following questions:

- How can we connect fragmented urban structures?

- How can this transformation change the nature of neighbouring urban structures (especially disadvantaged ones) and whole cities?
- Does mitigating the effects of barriers through the creation of friendly, safe, and attractive *in-between* spaces, using public spaces, facilitate the flow of public goods, people, and ideas between fragmented parts, changing the image of the city?

The concept of “connecting” may be understood differently, depending on the studied aspects: functional, visual, or social. In each of these cases, connecting will be something non-identical. A connection that works well for environmental purposes may be less suitable for other connecting purposes, like infrastructural and vice-versa.

Another important issue when developing *in-between* spaces is the relationship between material and immaterial aspects. Creating only physical structures is not enough. Genius loci and “a sense of being in unity, expressed in sharing ideas, demonstrating similar sentiments and living in similar ways” (Dymnicka, 2017, p. 29) is no less important than the spatial framework. Dymnicka (2013) emphasizes that not only functions of *in-between* spaces are important, but also the importance of public space for shaping local identities. Löw (2018) emphasizes that the material dimension covers only what we see, but ignores such important aspects of space as atmosphere, smells, sounds, and other sensations. According to Löw, all spaces have a symbolic and material component which together will decide the possibilities of creating space. Therefore, in order to understand space, cooperation with sociologists is important in the transformation of *in-between* areas.

1.2. Objectives and Expected Results

The problems related to the fragmentation of cities are most visible in the *in-between* spaces that divide urban structures, being barriers to city flows. The objective of the article is to identify the nature and scale of these problems and to examine the possibilities of solving them by connecting fragmented structures.

The expected result of the research is to present possibilities and effects of implementing tools from a variety of fields: technical (transportation/civil engineers), humanistic (sociologists, psychologists), environmental (geographers, biologists, ecologists, hydro geologists, climate experts), and interdisciplinary approaches (architects, landscape architects, and urban/spatial planners), when shaping public spaces in *in-between* spaces to connect fragmented urban structures. The article presents selected tools which may be successfully used to improve the ecological and social security of abandoned spaces.

The originality of research is based on the broad approach, combining the spatial, functional, sociological, technical, and economic aspects, and the choice of var-

ious, carefully selected case studies. Moreover, the article gives some implications for practice, highlighting the possibilities for transforming the *in-between* spaces into attractive, vivid, and multifunctional public spaces, connecting the cities and changing their image.

2. Theoretical Framework

A starting point was the identification of the research problem, defining the *in-between* spaces, determining the scope of research, and collecting literature and research materials. The term *in-between*, to describe spaces, was first used by Loukaitou-Sideris in 1996 to explain the concept of *cracks* as “*in-between* spaces, residual, under-utilised and often deteriorating,” and as abandoned, vacant, and poorly managed spaces (Loukaitou-Sideris, 1996, as cited in Carmona, 2010, p. 125). In 2001, Hajer and Reijndorp stated that the *in-between* spaces have the character of “liminal spaces,” which are border crossings (Hajer & Reijndorp, 2001, as cited in Carmona, 2010, p. 126).

For a broader understanding of the notion of *in-between* spaces, it is also worth quoting another perspective from the field of social geography introduced by Entrikin (1991): “the betweenness of space.” According to him, place is the context of our actions and the source of our identity and exists always on the border between “an objective and a subjective reality” (Entrikin, 1991, p. 5). Moreover, “to ignore either aspect of this dualism is to misunderstand the modern experience of place” (p. 134). This divide between the existential and naturalistic conceptions of place is an unbridgeable one.

The concept of *in-between* spaces can also be combined with the concept of porosity that identifies qualities and architectural attributes that seem indispensable for the complexity and adaptability of urban spaces: “The layering and mélange of spaces, the perforation of borders, and the ambiguity of thresholds are perceived as specific urban qualities”; “porosity in its programmatic turn addresses both physical and social space” (Wolfrum, 2018, pp. 9–10).

However, in this research, *in-between* spaces are defined as a border between different urban structures of various forms of use and development, dividing the city, forming negative barriers of a broad spatial scope at city scale. Referring to the spatial classification proposed by Azhar and Gjerde (2016), *in-between* spaces are discontinuous spaces (the opposite of continuous spaces in transition), interzone, temporal, not well related to the setting. The same classification was proposed by Piccinno and Lega (2012, p. 6), who stressed the potential of *in-between* spaces to become cities’ “new meaningful places,” of cultural meaning “with specific meanings for specific groups,” and with a spatial relationship with their surroundings.

The term “space” in this research is being understood according to the theory proposed by Löw (2018), which in her considerations emphasizes the dynamics

of space creation processes. Space includes living organisms and social goods (which include things and symbols) that exist in relation to each other. To understand space, you need to know not only its elements, but also the relationships between them. According to Löw (2018), the constitution of space is never static, but processual. Spaces can be more or less stable, temporary, or permanent. Such thinking corresponds to the concept of transforming an *in-between* space into a public space presented in the article. Löw (2018) places particular emphasis on the changes in the constitution of space as a result of human action, which, according to her, allows the study of changes in spatial phenomena. According to Löw (2018), the formation of space is a reflection of social processes, and space is constituted by creating connections. For her, the important questions are: What is transformed—things or events? Who transforms them? How do spaces change? How do they influence social structures? People play two roles here: they are both creators of space and its elements.

The next step was to determine the typology of *in-between* spaces in the physical sense, different to those quoted above, due to: (a) origins, i.e., natural (the edges of the sea, riverbanks, hills, forests) or anthropogenic (roads, railways, tram lines, embankments, water channels); (b) shape and size; (c) the neighbourhood, its functions, and usage; (d) the attractiveness for other potential functions (such as industry, trade, recreation); and (e) social problems and danger, i.e., the stigmatisation of a space.

The next phase was to identify, analyse, and systemise the negative effects of the cities' fragmentation of different natures and scales. They have been generally divided into: (a) functional (city's fragmentation, functional disconnections, wrong functioning of neighbouring areas); (b) spatial (huge demand for land, reduction of the density and compactness of cities, lack of continuity of public spaces); (c) economic (difficulties in access to jobs, vandalism generating repair costs); (d) environmental (interruption of natural links, destruction of natural values, occupying valuable undeveloped areas of cities); (e) visual and compositional (disconnection of compositional links and relations, chaos, transformation of an urban landscape into a technical one); (f) social (social problems, lack of security in *in-between* spaces and surroundings); and (g) prestigious (lowering the quality of urban space).

The following causes of urban fragmentation were identified: (a) dynamic and uncontrolled spatial development in incidental places, not connected with city structure; (b) growing and often unjustified transportation network development (size and technical parameters of roads, car domination); (c) shifts in the economy and macro-level influences; (d) lack of a hierarchy of priorities in spatial policies; (e) low effectiveness of existing legislation, planning and design tools, and administrative structures, especially in relation to *in-between* spaces; (f) low awareness of the consequences of cutting up

urban structures among policymakers; (g) lack of policy co-operation between specialists from different disciplines, sectoral thinking, lack of adequate public participation; and (h) missing funding, inadequate priorities in the distribution of public funds, dispersed land ownership.

The next step was to develop basic criteria for the selection of case studies, to verify the validity of the approach taken: (a) location in the city (whole/part of the city, edge of the city); (b) functional criteria (the function of the barrier and its surroundings); (c) spatial scale (length, size); (d) level of interventions (regional/city/district/local); (e) scope of aspects (landscaping, ecology, engineering, social, visual); (f) urban tissue (natural/anthropogenic); and (g) scope of work (vision, preliminary studies, alternatives, masterplan, guidelines, concept, agreements and arrangements, project design, construction, operation).

It was also necessary for further research to define revitalisation, inherently connected with the transformation of the *in-between* spaces. Revitalisation is one of the ways to overcome the city's crisis. The term "revitalisation" is justified in the New Charter of Athens (The European Council of Town Planners, 1998), which raises the issue of renewing the city's structure and its urban form. Revitalisation consists of planned activities aimed at changing the functional and spatial structure of degraded city areas and, consequently, their economic and social recovery (Billert, 2004). The concept of revitalisation refers to activities that are carried out on the existing, degraded urban spaces, including both the city center and downtown districts, as well as former residential districts, located outside the city center (Skalski, 1996).

Afterwards, the best tools for connecting urban tissue were analyzed. Then, three different examples, regarding above mentioned criteria, were examined and compared, referring to the obtained results and guidelines of the most important EU planning documents.

3. Tools for Public Space Transformation

There are a lot of planning and design tools which can be used to transform public spaces in order to connect a city: state policy, spatial/urban planning, architecture, landscape architecture (LA), green/blue infrastructure (GBI), metropolitan plans, local zoning plans, and complementary methods such as artistic strategies (AS) in public spaces and universal design (UD). Four of them have been chosen as the most effective in shaping *in-between* spaces. These four can relatively easily change the functions and image of *in-between* spaces and their surroundings, reflecting the changing nature of urban transformations.

3.1. Landscape Architecture

LA is a well-known field with a long history and great potential to support spatial planning (Dramstad et al., 1996). Despite the rich scientific achievements of LA, the

landscape is often marginalised by investors, policymakers, the local communities, and society. That is most evident in abandoned *in-between* spaces. In order to achieve effective protection and creation of landscape, the landscape should be given appropriate status in spatial planning. Cooperation between the interdisciplinary teams, representing the environmental and technical sciences and the humanities, should be guaranteed, preventing the creation of barriers. In the case of existing barriers, LA should be used to create well-functioning and attractive public spaces connecting the city in poorly developed *in-between* spaces.

Examples of using LA to transform neglected spaces in order to merge urban tissue include projects such as: Green Axis 13 in Munich, Germany; Kiel Triangle Plaza in St. Louis, Missouri, USA; Piccadilly Gardens, Manchester, UK; Parque de la Ereta, Alicante, Spain; MFO Park, Zurich, Switzerland; Park One North, Singapore; Sungang Central Plaza and Diwang Park B, Shenzhen, China; Hai He River Embankments, Tianjin, China; and Welland Canal, Welland, and HTO, Toronto, Canada (Vidella, 2009).

3.2. Green/Blue Infrastructure

Properly designed GBI as a continuous system of urban green and water areas, allows, e.g., sustainable stormwater management through increasing rainwater retention, reduces flood risk, supports biological processes, improves humidity and air quality, mitigates extreme weather phenomena, and reduces climate change. Green infrastructure (GI) produces not only ecological, but also economic and social benefits, creating healthier urban environments (United States Environmental Protection Agency, 2021). It reduces energy consumption for cooling and heating, reduces costs in the conventional treatment of stormwater, mitigates negative health impacts caused by urban heat islands, and provides recreation values (Wise et al., 2010).

There is a wide spectrum of possibilities to use GBI when creating public spaces in *in-between* spaces, with benefits for both systems. The public space will be attractive and biologically active when accompanied by greenery and water. Thanks to public space created as a continuous system in the city, GBI will also achieve continuity, better fulfilling its role: natural and utilitarian, such as recreational, aesthetic, didactic, and cultural. An example are the barriers formed by road systems. Road infrastructure is always accompanied by engineering infrastructure. It has been proven that the most effective water management strategies in cities are based on technical infrastructure going hand in hand with GBI, complementing each other and creating a coherent system (Alves et al., 2019). This shows that engineering infrastructure can be used when designing *in-between* spaces as attractive public spaces with GBI, creating natural corridors.

It is therefore justified to combine GBI with a system of various types of public spaces, which are still being created in cities as a continuous system (streets, water-

fronts, boulevards). When creating and modernising public spaces, it is necessary to rebuild outdated infrastructure systems, creating GBI systems. Hardened public surfaces should be converted into biologically active ones, combined with GBI, improving the attractiveness of these spaces.

Examples of GBI projects in city central public spaces include: Praça das Águas, Campinas, Brazil; Place Aristide Briand, Valence, France; Place de François Mitterrand, Creusot, France (Vidella, 2009); B01 Malmö, Sweden; and Brooklyn Bridge Park, New York City, USA. Another example, Landesgartenschau Wernigerode 2006, in Germany (Vidella, 2009), is located in an open landscape (recultivated landfill).

3.3. Artistic Strategies in Public Space

Art influences the diversity of a space and enhances its identity by introducing new forms, various textures and materials, and carefully selected colours. Artistic installations in a public space facilitate the transformation of a non-place into a place. The essence of reviving a public space with art is, among others, that it draws people to the space, adds attractiveness, and brings another dimension to everyday life. A kind of attraction effect is also noticeable: The introduction of art into a space increases the interest of artists and the development of subsequent projects. Therefore, the role of art in the city is not limited only to aestheticizing spaces.

Currently, the meaning and role of art is changing significantly. Artistic and cultural activities are treated above all as catalysts for changes introduced in degraded areas, as the creative creation of places. According to Miles (1997), art in public space can humanize it and engage people with each other and their city and encourage ownership of the city by its people. The role of art in the revitalisation process becomes a measurable factor. AS increase the value of real estate in revitalised areas as people are more likely to visit a given part of the city. Art stimulates creativity and allows to build interpersonal bonds. According to Markusen and Gadwa (2010), creative placemaking partners from public, private, non-profit, and community sectors strategically shape the physical and social character of a neighbourhood, town, city, or region around arts and cultural activities. Thus, as in public spaces, it provides a new perspective connected with stimulating community involvement and influencing the vitality of space, as a process of permanent transformation, changing the nature of cities from local to regional scales.

There are numerous high-quality and long-lasting revitalisation projects based on art to be found in American cities, such as New York City (High Line project), Philadelphia (The Mural Arts Program of Philadelphia), and Boston (Public Art on the Greenway), and in European cities, like Copenhagen, Denmark (Superkilen project), Folkstone, UK (Other People's Photographs), and Bilbao, Spain (Ribera Park), among others.

3.4. Universal Design

UD is a term that was first interpreted by Mace in 1970 (Connell et al., 1997). UD can be accessed and used to the greatest extent possible by all people regardless of their age, size, ability, or disability. An environment should be designed to meet the needs of all people who wish to use it. If an environment is accessible, usable, and convenient, everyone benefits. The seven principles of UD are equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, comfortable use without effort (low physical effort), and size and space for approach and use (Connell et al., 1997).

A space that meets the needs of people with disabilities actually becomes a more friendly and safer space for other members of society. This change of philosophy in shaping public space should now be aimed at meeting the needs of all users, regardless of their capabilities in terms of mobility and perception, both physically and psychologically. This is the basis of the idea of equal access to the physical environment and universal services (United Nations Convention on the Rights of Persons with Disabilities, 2006). The concept of UD is an approach that paves new thought paths in design.

Moreover, UD can be successfully used as a tool for merging the city, especially in its social aspect, with the priority of shaping the city accessible to everyone and enabling the open flow of people and ideas. UD is targeted at and brings benefits not only for the disabled, but also for the residents, e.g., children using scooters, roller skates or skateboards, adults using shopping trolleys, cyclists, tourists with wheeled suitcases, and visitors, especially regarding an aging population (Stiles, 2009). One example is Festplassen, Bergen, Norway (Vidella, 2009), which is a recreation area. Another example is the cities of Gdynia and Gdańsk, Poland, which have prepared accessibility standards.

3.5. Comparison of Design Tools Connecting Urban Tissue

There are many tools that can contribute to the consolidation of a city. They are usually used fragmentarily, in various time and spatial ranges, which makes the activities ineffective. Below is a comparison of four tools considered by the authors to be effective in integrating urban tissue and responsive to constantly changing social, ecological, and economic needs (Table 1).

LA, GBI, AS, and UD can be used at many scales, are dependent to a small extent on infrastructure systems, are relatively inexpensive, and, in return, may improve the functioning, image, and ecological values of *in-between* spaces through the humanisation of the design process. However, they depend greatly on external factors and systems, such as public fundings and politics. They help implement the use of social sciences into urban planning, increase the meaning of landscape values in urban planning practice, and support the concept of Azhar and Gjerde (2016), promoting the modification and transformation of urban landscapes, considered not as a static, but as a vital phenomenon.

It is essential that the implementation of LA, GBI, AS, and UD strategies depend on a full array of other parallel processes, like change of ownership, funding, or political will. Therefore, it should be emphasized that, without orchestrated interaction, design tools are relatively powerless.

Of course, in our considerations there is no difference between the use of described tools as design tools and their use as a real space intervention. We assume that all stages of planning and implementing these tools are necessary.

4. Case Studies

Below, three examples implementing the idea of building a compact city and facilitating flows between

Table 1. Comparison of design tools in the context of the city's transformation process.

Tools	Primary Types of Intervention	Scale of Intervention	Dependence on Other Systems/Difficulties	Expected Dominant Results
LA	Small- and large-scale projects	Region, city, a city fragment	Lack of dependence/few difficulties	Improving the visual quality, humanisation of the space
GBI	Green walls/roofs/areas Small and large retention, drainage, renaturalisation of watercourses/reservoirs	Region, city, a city fragment	Technical infrastructure/land use/difficulties	Improving the quality of the environment and urban climate
AS	Small scale projects	City, a city fragment	Lack of dependence/few difficulties	Increased social interest, art education, aesthetic improvement
UD	Projects adapted to the needs of the disabled	City, a city fragment	Architecture and small architecture/few difficulties	Improving functionality, preventing exclusions

fragmented parts by shaping public spaces are discussed. The main criterion for selecting them was the richness of circumstances and the opportunities to bring the cities together.

4.1. Turia Gardens in Valencia, Spain

The Turia Gardens is the biggest urban park in all of Spain, used by a population of 1.5 million people, and it counts almost seven million visitors every year. Crossed by 17 old and new bridges full of history, divided in 18 sectors, built in different phases, it passes through the city's main museums and monuments on both banks. The vast gardens are built on the former riverbed of the Turia, whose course was diverted south of the city to prevent constant flooding in the city, leaving a huge tract of land that crosses the whole city. Initially, the old riverbed was supposed to become an urban highway, but the intervention of the inhabitants transformed the empty space into a park. The gardens were inaugurated in 1986. There are numerous activities that take place along the area of Turia Park. The most attractive are Cabecera Park, Bioparc with an African savannah, an underwater world and ecosystems in the Oceanogràfic, an opera auditorium, and Palau de les Arts housed in the futuristic City of Arts and Sciences. They are supported by facilities such as bicycle lanes, running tracks, soccer fields, roller-skating areas, a giant chessboard, a skateboarding zone, and a rugby field.

The Turia Park River plays an essential role in the regional GI system that links the main natural, rural, and urban open spaces of the whole region, facilitating their public use (Galan Vivas, 2011a, 2011b). The Turia Park River is "a unique example of transformation of an obsolete hydraulic infrastructure into an open public space" (Galan Vivas, 2011b, p. 50). By implementing this project, the city created new, important, and living public spaces merging the city.

The project of Turia Park is a great modern example of the transformative effect of landscape infrastructure on a city's identity and well-being. Valencia has managed to integrate a recreational and transportation infrastructure network with its historic center and surrounding neighborhoods. It is hard to now imagine the city without its green river. The Turia Park is a space that brings together both its residents and visitors from around the world. At the same time, the park's accessibility and economic impact are enhanced by its linear form (Phelps, 2012).

4.2. Vistula River Boulevards in Warsaw, Poland

The Vistula River Boulevards in Warsaw are one of the most attractive and most frequented public spaces in the city, buzzing with life on summer evenings and weekends thanks to the growing entertainment and cultural offering. This area was a neglected river waterfront without access for the public, separated from the city by a mul-

tilane road. The first efforts with the aim of "orienting the front of the city towards the river" (Bednarz, 2018, p. 6) took place in the 1990s when the building of the Warsaw University Library was fluidly composed into greenery and the Copernicus Science Centre along with the Discovery Park were constructed on the western bank. The Vistula River Boulevards located near these projects have three levels, built in the form of terraces. In 2010, a new recreation path in the green zone was implemented on the eastern side of the river, significantly stimulating the activation of this area. It also provided proof that it is not only large-scale projects that are able to revitalize a public space.

The design concept of the Vistula River Boulevards brings the city closer to the riverfront by creating varied-function facilities and a green belt between the Copernicus Science Centre and the rail cross-city bridge. The particular zones of the garden—an urban spot for sports, a clearing for the arts, and the Discovery Park—are an extension of the functions of the buildings surrounding it—the Copernicus Science Museum, the Academy of Fine Arts, and the University Library—and the planned sports facilities located at the southern end of the facilities on the western bank. The most essential factor in the regeneration of the waterfront areas was approaching the river in a comprehensive manner and treating it as an integral part of the city (Bednarz, 2018). A connection was created between four bridges, creating a kind of pedestrian loop, facilitating communication with eastern bank Warsaw. The connection with the other bank of the river was strengthened thanks to a small ferry and marinas. The Vistula Boulevards won the Grand Prix Award for the best public space in Poland in 2018. The architectural design of the reconstruction of the boulevards is certainly one of the most important implementations after 1989. The renovation of the riverside promenade turned the city towards the river, provoking meaningful urban change.

4.3. Brooklyn Bridge Park, New York City, USA

Brooklyn Bridge Park is located on the south side of Long Island, New York City, in the Brooklyn borough, on a post-industrial waterfront. It covers 85 acres and stretches 1.3 miles along Brooklyn's East River. It is connected to Manhattan by the Williamsburg, Manhattan, and Brooklyn bridges, and the Brooklyn-Battery Tunnel. The Port Authority of New York City and New Jersey considered it as an ideal location for high-rise building or commercial development. However, the idea to build Brooklyn Bridge Park came from local residents and neighborhood leaders looking for less intensive uses of this area (Witty & Krogious, 2016).

The history of the project dates back to 1984, when the cargo port was closed. Construction work began in 2008 and ended in 2015. The Park is financially self-sufficient, thanks to the implementation of commercial housing, financing ongoing maintenance of the park.

The creation of Brooklyn Bridge Park has completely changed the image of the aquatic areas of an important part of New York City. It enriched the functional program and attractiveness not only of Brooklyn, but also of nearby Manhattan. Many recreational and sporting attractions were created there (playgrounds for children, places for launching boats, bicycle rental, basketball courts, handball, ice rink, swings, picnic tables, and fitness equipment), introducing a new quality to the once-degraded areas. Many free events and public programs are organized in the open space designed for relaxing on the lawn. A variety of solutions have been used to imitate the natural aquatic environment, aimed at increasing biodiversity, while also creating a buffer zone to reduce the effects of storms and floods. Ecological education is an important effect. The main effect of the revitalisation of the *in-between* areas separating the city from the river was the introduction of a rich functional program and connection of Brooklyn with the water. It is also a kind of functional extension of the Brooklyn Bridge, one of the main tourist attractions of New York City. It connects the city in two directions: along Brooklyn's East River and transversely between the river and Brooklyn.

4.4. Case Study Comparison

The analysis of the three selected case studies shows how the tissue of the city can be combined in a desirable and effective way by transforming *in-between* spaces into public space. The use of GBI, LA, AS, and UD as catalysts of revitalisation were examined. This provided the opportunity to determine the circumstances of their design and implementation (Table 2).

The described examples indicate that simultaneous and comprehensively applied tools can constantly and positively change *in-between* spaces, and, therefore, whole cities. In all cases, a combination of various aspects and types of activities was used to revitalise the devastated areas. Accessible, safe, functional, and attractive public spaces, thanks to the use of LA, GBI, UD, and AS, enabled the open flow of people and ideas between neglected *in-between* spaces and the city (Figure 1).

Analysing the cases above in the context of spatial circumstances, it appears that the length of revitalised area and the connection with surrounding public space system has significant impact on the city flow. In each case, benefits were obtained for the entire city, but the revitalisation of the Turia Gardens, cutting almost the whole city, has the strongest influence on connecting structures in city scale. New areas in all cases became a scene of urban life, but the Turia Gardens enable the connection with a bigger amount of important public objects and spaces. Although it is obvious that even local actions that make good use of a place potential can bring supra-local benefits, the truth is that the complex system of public spaces connecting the city brings more fundamental benefits. Thus, in the transformation process of a city it

is important to increase the quality of the public space system, creating a sort of urban core and revitalising the neglected public spaces to maintain the continuity of the system and in the same way the city flow.

5. Discussion

Cities are changeable by nature and always have been, based on the flow of goods, people, and ideas between their parts. It is important that these parts should be connected so that this flow is not impeded. Cities are always changing, and it has to be this way in order to meet the changing needs of their inhabitants. Different land uses appear and change, some functions replace others—this is how it should be. Sometimes, however, an area remains empty, unused, becomes devastated, should be developed, and barriers overcome. The easiest way to do this is by shaping accessible public spaces of various character. Such spaces bring many benefits to the cities. In the examined cases, important general goals were achieved, referring to the postulates of some of the most important EU documents in the context of our study:

- Compactness of cities (*The New Charter of Athens*): *The New Charter of Athens* (The European Council of Town Planners, 2003) calls for the functional, spatial, economic, social, and environmental integration of cities, underlying that a connected city needs the diversity of connective mechanisms used at different scales. A new arrangement of *in-between* spaces should be considered as a mechanism helping to create a compact city, not only in the physical sense, protecting the surrounding rural and natural areas, but also in other contexts, such as facilitating the open flow of people, better access to work, education, health, and other services, as well as improving biodiversity.
- Limiting land take (*Roadmap to a Resource Efficient Europe*): In relation to cities, it was recognised that land is a non-renewable and valuable resource and saving land limits suburbanisation. This, in turn, reduces adverse environmental effects. The strategy of “no land take” to be achieved by 2050 has been established by the European Commission in *Roadmap to a Resource Efficient Europe* (Cortinovis et al., 2019). The space is considered to be a major non-renewable natural resource (The European Council of Town Planners, 2003), thus renewal of degraded and abandoned *in-between* city spaces limits land take in other areas.
- Limiting climate change (Paris Agreement): Better land use of *in-between* spaces, especially thanks to GI, fits into the ecosystem service approach, recognised as an effective method of implementing sustainable development through practical applications in real world problems (Rozas-Vásquez,

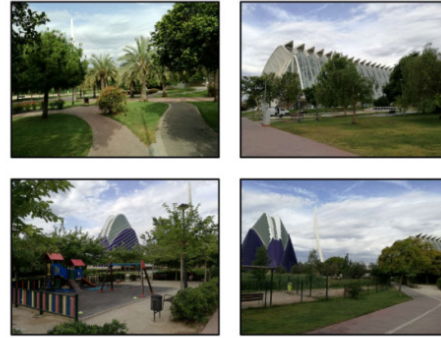
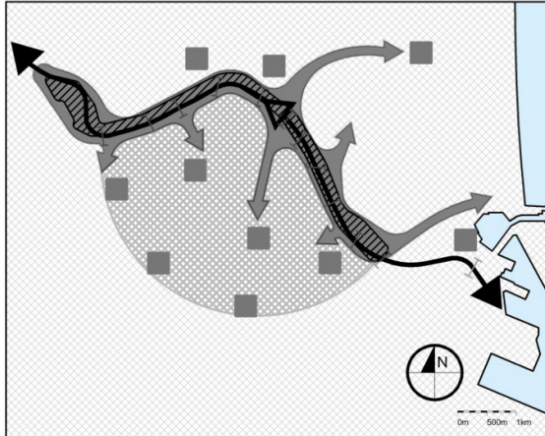
Table 2. Comparison of the selected cases in the context of used tools and effects in the process of city transformation.

Investigated Factors	Turia Gardens	Vistula River Boulevards	Brooklyn Bridge Park
Location in the City (Whole/Part, Edge)	Historical city centre, linear arrangement	City centre, linear arrangement	City centre, linear arrangement
Previous Urban Tissue	Natural: riverbanks, valley	Natural: riverbanks Anthropogenic: roads	Natural: riverbanks Anthropogenic: harbor area, roads
Previous Use	Neglected areas	Transportation	Port and warehouse
Previous Problems	Constant flooding, damages, economic problems	Separation city from river, functional and prestige problems	Spatial, functional, prestige problems
Neighbourhood	City centre, districts	River, city centre	River, city districts
Used Tools	LA, GBI, AS, UD	LA, BI, AS, UD	LA, AS, GBI, UD
Level of Interventions	Local and regional	Local	Local
New Functions	Recreation, leisure, sports, education, and art	Recreation and education	Recreation, sport, team games, and education
Important Public Facilities in Close Proximity	L'Hemisfèric, Museu de les Ciències Príncipe Felipe, L'Umbracle, L'Oceanogràfic, Palau de les Arts Reina Sofia, Assut de l'Or Bridge, L'Àgora, Valencia Towers	Copernicus Science Museum, Academy of Fine Arts, University Library, National Stadium, Monument to the Warsaw Mermaid (the symbol of the city)	Brooklyn Bridge, Manhattan with all its attractions, Brooklyn district
Users	Residents, families, nature enthusiasts, runners, cyclists, and tourists	Residents, families, runners, cyclists, students, and tourists	Residents, families, runners, cyclists, and tourists
Obtained Results	Green and recreational area merging the city, creating the backbone of the urban green system and social effects	Return of the city to the river, new attractive public space, recreation, ecological education, and social integration	Return of the city to the river, new attractive public space for meetings, sport and recreation, ecological education, economic self-sufficiency, and social integration
Rank of Benefits Obtained	Regional/city range, including the space in the regional GI system	City range, raising prestige, a new showcase of the capital, improving the visual quality of downtown	City range, raising prestige, new attractive function, improving the visual quality of downtown

et al., 2019). Such local action, commonly used in large number of towns, may significantly help meeting the goals of the Paris Agreement on climate change mitigation (Paris Agreement, 2015). However, international agreements are not always translated into institutionalised practical actions at the city level, so local actions become important. Sustainable development of abandoned *in-between* spaces, accompanying the continuous

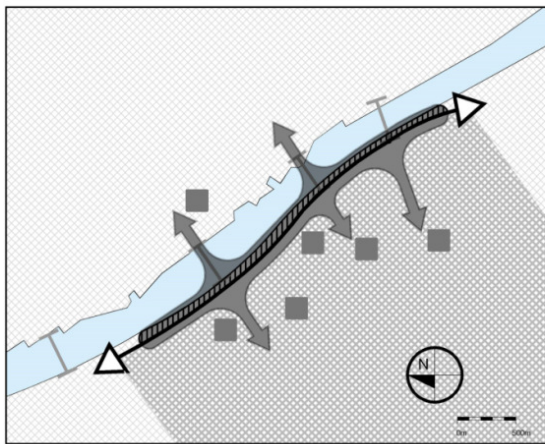
processes of city transformation, is one of the efforts available to mitigate climate change. Such local actions can both mitigate the causes of climate change (e.g., cutting the city by roads which create impermeable surfaces) and adapt cities to deal with the consequences of a changed climate, recommended especially in EU cities by Reckien et al. (2018). Linking the city with GI may help with air purification, moderation of extreme events,

The Turia Gardens, Valencia



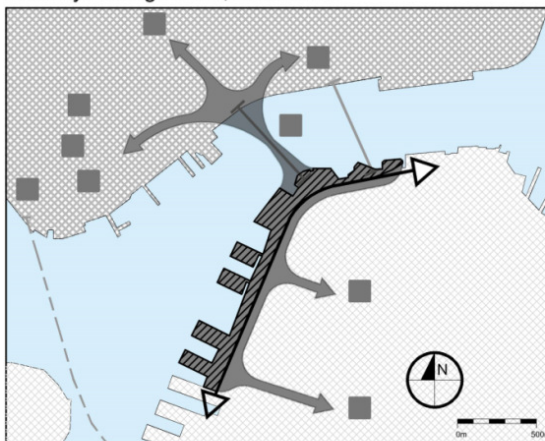
Important public facilities and attractive public spaces in Turia Gardens.

The Vistula River Boulevards, Warsaw



Elements of water and art, and sandy beach along Vistula Boulevards.

Brooklyn Bridge Park, New York



Attractive public space with various functions overlooking Manhattan along Brooklyn Bridge Park.

KEY:

- | | | |
|------------------|-------------------|----------------------|
| City center | Public facilities | New city connections |
| The city area | Existing bridges | Regional connections |
| Revitalized area | Tunnels | City flow |

Figure 1. Comparison of the selected cases in relation to spatial and functional effects (various scales).

noise reduction, runoff mitigation and flood control, urban temperature regulation, and stormwater treatment, which are six of seven urban regulating ecosystem services (Cortinovis & Geneletti, 2019). Seven similar urban ecosystem services

recognised by the same authors, which relate to the ongoing planning process, are microclimate regulation, habitat provision, nature-based recreation, noise mitigation, air purification, runoff mitigation, and food provision (Cortinovis & Geneletti,

2020). All of them may be recognised as benefits of the process of development of *in-between* spaces, changing the nature of cities towards sustainable development.

- Prevention of social exclusion (*Leipzig Charters*): In the social context, it is important to ensure the implementation of the principle of equal opportunities recommended by the EU by preventing the exclusion of people with disabilities and activating all social groups (European Commission, 2007, 2020). Especially in this context, Gehl's (2009) postulate—cities for people, sustainable, full of life, and safe—is still valid. It will be possible to achieve this when the human dimension is at the centre of urban planning and design. This is why, during a design process, the social functions should be strengthened and urban space as a space for meetings should be created. Mutual interactions between public space and public life, as well as the use of appropriate tools that allow for a better design, are very important from the point of view of a city (Gehl & Svarre, 2013).

6. Conclusions

The article provides selected solutions aiming to connect urban tissue by appropriate use of *in-between* spaces, as areas of open flow of goods, people, and ideas. The presented projects changed the character of the cities in long processes of transformation, with the use of new, safe, well-functioning, and attractive public spaces as catalysts for change. They showed how to prevent existing problems, protect and strengthen the existing values, and create new values in the *in-between* spaces, seen up to today as “no man's land,” with the use of LA, GBI, AS, and UD. Such an approach brought multiple ecological and social benefits. The crucial conclusion is that the bigger the revitalised area is the more the city benefits, because you can approach change in a holistic way.

In contemporary urban planning, major road infrastructure is particularly important due to transportation and the inconveniences associated with it. Transportation turned out to be a real gap in the city and therefore there is an urgent need to reintegrate it into the urban fabric. Actions integrating an urban tissue must be included in the positive-change strategies at various levels of planning (region, city, district), related to different aspects, like spatial, economic, social, and visual, in order to connect an urban tissue and improve the quality of life in the city.

The above examples show that *in-between* spaces become public areas when they are involved in the flow of material and non-material factors in the city, when they become part of a living, functioning, constantly changing city. The sociological factor becomes extremely important in consolidating the city. Public spaces are the areas where one can share their experiences with previous generations through material heritage (such as his-

torical monuments) and symbolic heritage (Dymnicka, 2013). The symbolic heritage of the past, creating the collective identity, consists of many factors, being the product of human imagination (e.g., past events, personalities, memories, mythologies, art, and symbolic places; Dymnicka & Szczepański, 2015).

The physical and mental merging of fragmented structures ensures the continuity of the city in the spatial and social dimension. It is no coincidence that Dymnicka (2017) describes culture as a tool for revitalisation, emphasizing that people find common, local goals extremely important, and that actions should take context and new social needs of users into account. Therefore, the newly created public spaces should comply with bottom-up projects and be supported by public participation, so that people use them in a way that they—users—consider to be the best. This type of projects provides an opportunity to sustain positive changes in the city's space in the long run and have a positive impact on the city's development. A well-designed and functioning public space is the essence of the city and is the centre of urban life. When designing public spaces, many aspects of a city should also be considered, including resilience and sustainable development (Rembeza, 2020).

To sum up, a well-designed public space brings intangible assets to the city. That is why efforts to transform neglected *in-between* spaces into public spaces are becoming so important. At the same time, properly managed *in-between* spaces can become a predominant element of the city's revitalisation, and above all its public space.

The research indicates that combining various aspects and integrating humanistic, technical, and ecological approaches can help improve the compactness of cities and activate hidden potentials. Cities are constantly changing and therefore should be planned not as static objects, but rather as the process of micro- and macro-changes transforming urban structures and *in-between* spaces should play a key role in this process.

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Conflict of Interests

The authors declare no conflict of interests.

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