

Riverfront public space utilization patterns: Models and policies based on social and ecological resilience

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Abstract

Studies on the utilization patterns of public spaces, particularly city parks, town squares, sidewalks, highways, malls, and coffee shops in urban areas, have been a topic of considerable interest among researchers. However, riverbank areas are often overlooked as opportunities for public space utilization. This study examines the strategic potential of riverbank areas, which have so far been considered merely ecological infrastructure, but which, if optimally managed through good spatial planning, can strengthen a city's identity. The research method used is a study of relevant literature and a policy review to assess the utilization model for ecological, recreational, economic, and community-based participatory aspects. The results show that the success of a city government in developing public spaces is determined by adaptive, participatory, and ecologically sustainable policies.

Abstrak

Studi tentang pola pemanfaatan ruang publik khususnya taman kota, alun-alun, trotoar, jalan raya, mall, dan warung-warung kopi di wilayah perkotaan, sejauh ini telah menjadi topik studi yang banyak diminati oleh para peneliti. Meskipun demikian, kawasan tepi sungai masih sering diabaikan sebagai peluang pemanfaatan ruang publik. Studi ini membahas tentang potensi strategis kawasan tepi sungai yang sejauh ini hanya dianggap sebagai infrastruktur ekologis, padahal jika dikelola secara optimal melalui penataan ruang yang baik maka dapat memperkuat identitas kota. Metode penelitian yang digunakan adalah studi literatur relevan serta tinjauan kebijakan untuk menilai model pemanfaatan aspek ekologis, rekreatif, ekonomis, dan partisipatif berbasis komunitas. Hasil penelitian menunjukkan bahwa keberhasilan suatu pemerintah kota dalam pengembangan ruang publik ditentukan oleh faktor kebijakan yang adaptif, partisipatif, serta berkelanjutan dari aspek ekologis.

Keywords

public space; riverbank; utilization pattern; public space model; policy

1. Introduction

The existence of public space within the urban spatial structure (A. Ahmadin et al., 2025) is crucial, particularly as a platform for various social, economic, and recreational activities, as well as the dissemination of socio-cultural values. Based on this assumption, the quality of an urban public space (A. Ahmadin, 2023) is not only considered a reflection of a comfortable atmosphere and the availability of open areas, but also oriented towards its role in social sustainability and the ecological future (Sanur, 2025). The current diversity of public space categories, in terms of form and purpose, demonstrates that awareness of the function of public space has become part of the daily practices of city dwellers. One type of public space used as the unit of analysis in this study is the riverbank, perceived as a strategic area that, throughout history, has served as a residential center, a commercial area, and a hub for citizen mobility (Wang et al., 2020).

The study of this topic is crucial, particularly in relation to the development of contemporary cities, some of which have utilized riverbank public space in response to increasing urbanization and economic pressures (Medeiros et al., 2021). Furthermore, global research trends on waterfront and riverfront public space indicate a shift from a technical-functional approach to a socio-ecological approach based on urban resilience (Castel-Branco & Ishikawa, 2016). From an urban development program perspective, this trend is relevant to the Sustainable Development Goals (SDGs), particularly SDG 11, which focuses on sustainable cities and human settlements. SDG 11, point 7, emphasizes the importance of providing safe, inclusive, and accessible open public spaces (Monaco, 2024). The relationship to the development of riverside public spaces can be seen in SDG 6 on clean water and sanitation, and Target 6.6, which mandates the protection and restoration of aquatic ecosystems, including rivers (Arora & Mishra, 2022).

However, the implementation of riverside areas as public spaces (Silva-Sánchez & Jacobi, 2016) still faces various challenges, particularly uncontrolled urban growth, rapid population growth, and weak urban spatial planning oversight (Bengston et al., 2004). These conditions often lead to poorly planned land conversion practices, resulting in environmental degradation, limiting public access to these locations. Addressing these challenges, various research findings have focused on the technical, ecological, and social dimensions of riverside public spaces. However, gaps remain, with the literature tending to be separate from one discipline to another in providing solutions to these issues. Similarly, studies on riverside public space utilization patterns within the framework of integrated management models and policy concepts are still rare. Therefore, the urgency of this study lies in the need for a more comprehensive understanding of how social, economic, and policy dimensions can work together to design riverside space utilization patterns. The goal is to create physical spaces or public spaces that support urban social and ecological resilience.

2. Method

2.1 Research Type

This research is a literature study using a qualitative approach (M. Ahmadin, 2022) that aims to identify, evaluate, and synthesize available knowledge regarding riverside public space utilization patterns, development models, and the policy basis and implications. This method was chosen based on the assumption that it is relevant to the study's conceptual introductory nature, which requires a strong theoretical foundation and knowledge mapping in similar contexts.

2.2 Research Design

This research design utilizes a systematic literature study complemented by elements of narrative analysis or narrative

synthesis, which allows for the search for relevant sources (A. Ahmadin et al., 2025). Furthermore, it provides flexibility in integrating findings from various disciplines related to urban planning, landscape architecture, geography, public policy, and urban ecology.

2.3 Data Sources

The data for this research was obtained entirely from secondary sources through two main categories: (1) Academic literature, namely scientific articles published in national-scale journals, both indexed and non-indexed by Sinta, as well as international journals indexed by Scopus and Web of Science. In addition, data was obtained from various textbooks and book chapters, conference proceedings, theses, and dissertations; (2) Policy documents and institutional reports, such as laws and regulations on spatial planning, public spaces, and water resource management, regional spatial planning documents and detailed spatial planning plans, and riverbank revitalization master plans; (3) Technical reports from government agencies, international organizations (Asian Development Bank, World Bank, and others), and non-governmental organizations.

2.4 Literature Search Techniques

The data search technique consists of two parts: the database used and the search keywords. The first search technique was conducted through electronic databases, such as: international data (Google Scholar, Scopus, Web of Science, SpringerLink, Taylor & Francis, ScienceDirect, and others), and national data (Garba Rujukan Digital or Garuda, Neliti, Science and Technology Index or Sinta, and others). The search using keywords was conducted using English, such as: riverfront public space, spatial utilization pattern, riverfront model, river revitalization, spatial policy, land use policy, waterfront governance, sustainable public spaces, and sustainable ecology.

2.5 Inclusion and Exclusion Criteria

Data collection for this study used the following criteria: (1) Inclusion: literature discussing the use of public space in riverbank areas, literature explaining models, types, or patterns of space use, literature discussing policies, regulations, or governance of public space in riverbanks, literature published between 2010 and 2025 to ensure topicality, and can also include classic works that are primary and rare documents, and literature in full version; (2) Exclusion: literature that only discusses hydrological techniques or water quality that are not related to the specifics of public space use, literature that only discusses rivers as transportation infrastructure without a social dimension, opinion articles and book reviews without using theory, and literature not available in English.

3. Result and Discussion

Based on the results of searching a number of literature related to the pattern of use of public space on the riverbank, knowledge was obtained about spatial development strategies, especially regarding pattern typology, cross-disciplinary synthesis, category tables, and the results of identifying spatial gaps and inequalities in urban areas. In addition, referring to a literature review of 87 sources relevant to the inclusion criteria, it was possible to identify and map the pattern of use of public space on the riverbank in 5 main aspects, as follows: (1) typology of use patterns based on the orientation of community activities; (2) spatial patterns of use of space by city residents; (3) actors and interests in space use patterns; (4) gaps between planning design and the reality of urban space; and (5) Synthesis across scientific disciplines.

3.1 Typology of Riverbank Public Space Utilization According to Community Activity Orientation

A review of various literature on relevant studies and topics indicates that riverbank public spaces are generally utilized by

the surrounding community for various activities, such as social, economic, and recreational activities. From a spatial typology perspective, this pattern does not demonstrate an exclusive nature, but rather often exhibits conflicting orientations, particularly within the same area or community.

3.1.1 Socially Oriented Utilization Pattern

Socially oriented utilization patterns are evident in the use of riverbank areas as gathering spaces, interaction spaces, and centers of specific community activities (Hermida et al., 2017). This is supported by studies in the literature, which indicate that riverbanks possess a unique appeal and sensation, particularly as social condensers, spaces that bring together various levels of society in a natural setting. A conceptual legitimacy supporting this socially oriented utilization pattern is Lloyd's findings, which envision waterfront public spaces as having a much stronger and more diverse incentive to shape urban social interactions than dry public spaces (Lloyd & Auld, 2003).

Research on the utilization patterns of the Brantas Riverbank area in Batu City shows that the surrounding community utilizes the area for various community activities, such as family social gatherings, government meetings, and as a venue for religious rituals (Holt et al., 2012). From a utilization perspective, the process and setting are straightforward, reflecting the organic mobilization of one space's use from one to another. Similar patterns of public space utilization also occur in the Cuenca Riverbank area, Ecuador, except that this area is populated by elderly people and mothers with their toddlers. They enjoy the public space in a shady and tranquil setting, unlike public spaces like city parks, which are often overcrowded (Hermida et al., 2017).

This idyllic narrative of public space utilization patterns is contrasted in some literature, as in Pattacini's (2021) research, which depicts the intensity of social use influenced by the physical condition and security of an area. He cites the example of a riverbank that is dirty, dark, and difficult to access, leading to residents abandoning it (Wallhagen & Rebeggiani, 2024). The results of this study analyze and put forward the thesis that the social potential of riverside public spaces is impossible to realize naturally. Instead, they require minimal infrastructure in the form of adequate lighting, easy and safe access, and maintained cleanliness.

3.1.2 Economically Oriented Public Space Utilization Patterns

Economically oriented public space utilization patterns, based on a review of several literature sources, include activities in the informal sector that utilize riverside areas as business spaces (Attia & Ibrahim, 2018). These activities generally include street vendors, tented stalls, boat rental services, culinary tours, and the sale of local souvenirs. This phenomenon of waterfront-like public spaces can be found along riverbanks in several major cities such as Jakarta, Bangkok, and Manila (Douglass, 2006). There are two main reasons why these riverside spaces are utilized by street vendors: access to water as a cheap transportation route and unclear land ownership status, allowing all business actors to utilize these locations (Lin, 2015). This means that unclear land ownership regulations, on the other hand, provide significant benefits, especially for small business owners, allowing them to develop their businesses without significant capital. However, this economic-oriented spatial use pattern has its drawbacks, especially if not managed properly. A reference to research results in the Martapura River area, Banjarmasin, indicates spatial problems, particularly the narrowing of pedestrian space. This is due to the dominance of vendor stalls, which disrupts public circulation. An interesting comparison of riverside spatial use involves appropriate spatial regulation, such as time zoning, that regulates local economic activities (Usman, 2024), including morning markets, afternoon public spaces, and evening culinary zones. This regulatory policy can accommodate economic interests without sacrificing the social function of public space. This type of activity is implemented on the banks of the Qinhuai River in Nanjing, Jiangsu Province, China (Zhang et al., 2026).

3.1.3 Recreational-Oriented Spatial Use Pattern

The recreational-oriented spatial use pattern is a spatial planning concept (Fung & Wong, 2007) that envisions providing facilities specifically for visitors for leisure activities, light exercise, and interaction with residents. If this model is applied to a riverside public space, the characteristics of the space will automatically change from its traditional function as a river, water transportation route, and drainage to a shaded pre-district area. Furthermore, it will house a boardwalk, bike track, relaxing seating area, playground, entertainment stage, and other public facilities. Within its broader spatial concept, this pattern will create a green corridor connecting specific points in the surrounding area, so that the river no longer serves as a divider but instead becomes a connector.

The implementation of this pattern will have direct implications for the revitalization of areas that previously lacked or ceased function. For example, a previously slum-like space filled with garbage can be transformed into a place with economic, social, and cultural significance. The transformed, beautiful condition of the space, which serves as a city asset, has sparked a growing public awareness of ecological space (Rousseau & Deschacht, 2020), leading to a tendency to maintain river cleanliness, maintain air circulation, and improve water catchment areas. This spatial development pattern is relatively inexpensive, or at least reduces the costs of excessive commercialization.

5. Conclusion

Based on the description of the utilization patterns of riverbank public spaces, the following conclusions can be drawn. Riverbank areas have so far been marginalized, particularly by government policy, resulting in the space being viewed solely as ecological infrastructure. Yet, riverbank public spaces can be a national asset, both as a city landmark and as a center of new economic activity that promises financial benefits. This is where the importance of reorienting spatial planning approaches that integrate the river's ecological functions with mutually supportive socio-cultural and recreational functions lies. The most dominant determinants of the city government's success in managing riverbank areas as public spaces are the physical aspects, namely the aesthetics of the space, along with adaptive, participatory, and sustainable government policies..

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