

Assessing urban waterfront public space service quality using importance performance analysis (IPA)

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ARTICLE INFO	ABSTRACT
<p><i>Article history:</i> Received December 03, 2023 Received in revised form March 20, 2024 Accepted March 12, 2024 Available online June 10, 2024</p> <p><i>Keywords:</i> Importance performance analysis Public space Urban park Waterfront</p> <p>*Corresponding author: Lintang Suminar Urban and Regional Planning Program, faculty of Engineering, Universitas Sebelas Maret, Indonesia Email: lintangsuminar@staff.uns.ac.id ORCID: https://orcid.org/0000-0002-1587-7417</p>	<p><i>The urge for urban public space evolved in increasingly dense cities. Tirtanadi Dam Park is a waterfront-designed urban park located on Bengawan Solo riverbank area. To support the activities, adequate infrastructure must be provided. The objective of this study was to assess Tirtanadi Dam Park's service quality as an urban public space and suggest methods to improve it to promote local communities' economic development. The variables infrastructure, access & linkage, comfort & images, use & activity were evaluated and compiled into 16 indicators. Based on user perceptions, Importance Performance Analysis (IPA) was employed to determine the performance and importance levels of predetermined variables. The findings demonstrated that vegetation, infrastructure for the disabled, and drainage and water systems all dropped into the "concentrate here" quadrant, necessitating further development to enhance quality and add more supporting facilities. Furthermore, the quality of security, environmental cleanliness, pedestrian paths, recreational facilities, informal sectors, lighting facilities, and transportation lies in the "keep up the good work" quadrant so that they should be maintained. Enhancing waterfront facilities with leisurely and recreational features can increase the number of visitors. Improving urban areas and incorporating the surrounding communities in all phases of development will be crucial, with the potential to enhance their economic circumstances.</i></p>

Introduction

Public spaces in urban areas can function as a place for community social interaction (Liem and Lake 2018; Muljadinata and Widianoro 2023). Public space is more than just a platform and stage for people to connect (Kaliey, Dapas, and Gabriel 2024); it also can connect with people and the structural agency to exert influence through its human agents (Luo 2022). Because the environment can influence criminal behavior,

safety and security in urban public spaces are now regarded as important to support the social dimension of sustainability (Ntakana, Mbanga, and Botha 2022; Lee 2022). The aesthetic quality of the landscape primarily the grace and fertility of the plants is the primary objective in the majority of park designs. Moreover, urban planners and designers ought to be more cognizant of human comfort. (Xi et al. 2023).

Furthermore, green public spaces enhance the city's environmental value. For instance, park

vegetation and water can improve air quality, lower noise levels, increase thermal comfort, and decrease the impact of urban heat islands (UHI) (Xi et al. 2023).

Public areas need to be welcoming to all social classes to fulfill their dual roles as hubs for social interaction and as settings for physical and mental health (Mullenbach 2022). The notion of public spaces ought to be in line with The New Urban Agenda, which emphasizes quality, accessibility, safety, and greenness (Bambó Naya et al. 2023). The special needs person's ability to access public spaces will be impacted by infrastructure quality and safety. Women are more likely to be denied access to public areas and to experience violence there than men are. Due to a lack of appropriate facilities and infrastructure, children and the disabled find it difficult to enter and use public spaces, especially in developing countries (Itair, Shahrour, and Hijazi 2023).

In urban public spaces, management and design are equally crucial (Aly and Dimitrijevic 2022). Infrastructure that satisfies user demands and elevates users' accountability for maintaining public space are essential components of participatory planning (Polina Vietrova, Pavlo Vasyliiev, and Larysa Maksymiv 2023).

People have always desired to be close to nature because they believe it to have positive effects on them. Urban green spaces are a prime example of how important nature is to people and how they interact with the city (Polajnar Horvat and Ribeiro 2023). Humans depend on water to meet their basic needs. Water enhances people's interactions with their surroundings, creating a cozier and more pleasurable atmosphere. Water is the most attractive feature that sets waterfront parks apart from other types of parks. The waterfront green space represents a location of ecological, economic, and social transformation and dispersion and is spatially concretized between land and water (Liu et al. 2023). There should be multiple opportunities in the park for people to engage with the water, from simply admiring it from a distance to actually touching it (Ali and Nawawi 2009).

The idea of a waterfront city is an attempt to make use of the river's potential (Setiadi 2018). Riverfronts are utilized by cities to create a range of urban open spaces. Riverfronts are a type of blue-green space that is ideal for reestablishing a connection between urban residents and nature. It offers numerous advantages and services,

including public exercise, socialization (Chen and Ma 2023), and stress relief (Li et al. 2023),

On the other side, urban coastlines or beach waterfronts are far longer than river waterfronts or lake waterfronts, each with its unique traits shaped by its surroundings. The 'soft' and 'hard' categories apply to these waterfront locations. 'Hard' areas are dominated by man-made structures like ports, roads, and squares, whereas 'soft' areas are defined by natural elements like beaches and green spaces. When it comes to their inland functions, they typically promote commercial, cultural, and tourism endeavors, industrial and production activities, and living and service needs (Yuting et al. 2022).

The urban waterfront holds significant importance in shaping cityscapes, not solely for its role in mitigating urban heat islands and providing space for public activity but also for its contributions to improving economic sector for the local communities, prosperities, and sense of belonging of the area (Binns and Nel 2002).

The following factors are critical to enhancing waterfront spaces in major cities: governance management, connected enterprise planning, public participation, improvements of accessibility, ecological expansion, and heterogeneity benefits (Jun and Song 2023). As a result, it elevates people's social, professional, and personal productivity (Erçin and Abdallah 2023). There are two ways to view the Bengawan Solo River, which flows through Surakarta City: as a positive or negative issue. Pollution of river water by industrial waste and trash is still an issue. In addition to the river, there are frequently slums in the vicinity of the riverbank. The community's feeling of connection to the river in which they reside must be strong, as neglecting the river's environment can worsen the quality of the settlement's surroundings. The riverbank area at Tirtanadi Dam in Surakarta is one of the places where revitalization is taking place.

This dam was constructed at the meeting point of the Pepe River, a tributary of the Bengawan Solo River, and the Gajah Putih River. Riverbank areas, including slum settlements, have been revitalized to become open spaces in the form of parks and pedestrian pathways in order to support the area's appeal as a tourist destination (Herjuna 2020). This park has emerged as Surakarta's new hub of activity following its opening in 2019. This area can accommodate a range of activities, including sports, community gatherings, and street vendor stalls.

To measure the effectiveness of waterfront public spaces based on user satisfaction, an assessment is required. Developing new strategies for future development also identifies the significance of related criteria. Setting appropriate

strategies requires combining importance and performance. When evaluating the quality of Tirtanadi Dam Park as a public space, Importance Performance Analysis (IPA) is a useful tool.

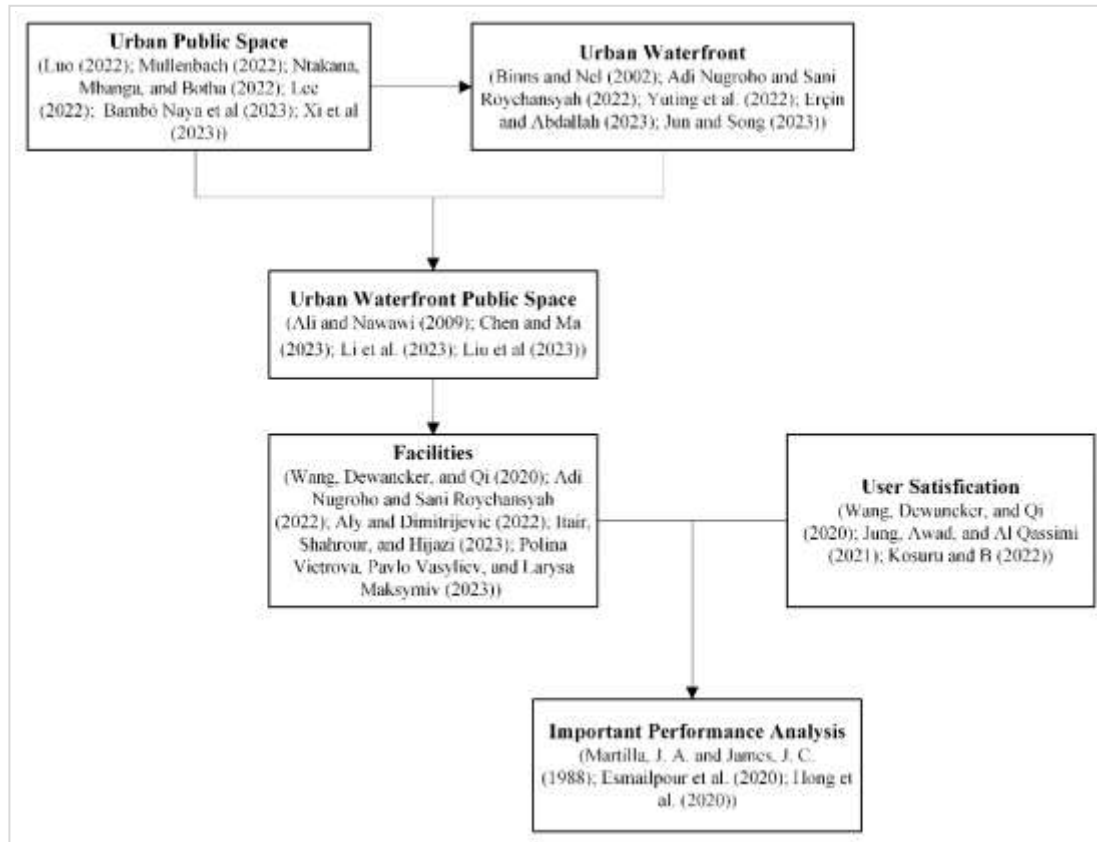


Figure 1. The theoretical framework

Wang, Dewancker, and Qi (2020) pointed out the citizens' preferences of the social functions of waterfront space in urban areas that indicate the landscape, supporting facilities and road functions have the least users' satisfaction level. Moreover, measured the public perception of riverfront public space, resulting in a lack of facilities and shady pockets (Kosuru and B 2022). Apart from measuring the level of user' satisfaction, they also stated factors to enhance users' satisfaction (Jung, Awad, and Al Qassimi 2021). The satisfaction and perception of users with waterfront public space have been the subject of previous research, which has left a gap regarding how the findings of this research are translated into strategies for the development of waterfront public space. Based on users' perceptions, this study examines the significance and effectiveness of various elements

of urban waterfront public space, translating those findings into action plans. This study intends to develop strategies for the development of Tirtanadi Dam Park as an urban waterfront public space, with input from users regarding the park's significance and performance. All parties involved in Tirtanadi Dam Park development are anticipated to benefit from the outcomes.

Methods

Tirtanadi Dam Park in Surakarta City served as the study's location (figure 2). The park can be found close to the Tirtanadi Bus Station on the Bengawan Solo riverbank. The government officially opened Tirtanadi Dam Park in 2019 after the dam's construction, which started in

2016, was finished at the end of 2018. The park provides space for a variety of community events. Tirtonadi Dam Park's location in Surakarta City is depicted in figure 2. The area is 1,84 Ha and measures 654 meters in length.

Surveys conducted with visitors to urban parks and firsthand observation provided the data.

In all, thirty people answered the survey. The minimum number of respondents for a questionnaire should be thirty, according to Singarimbun and Efendi (1995), who provided this information in their determination of the sample size. A standard curve will thus be resembled by the value distribution.

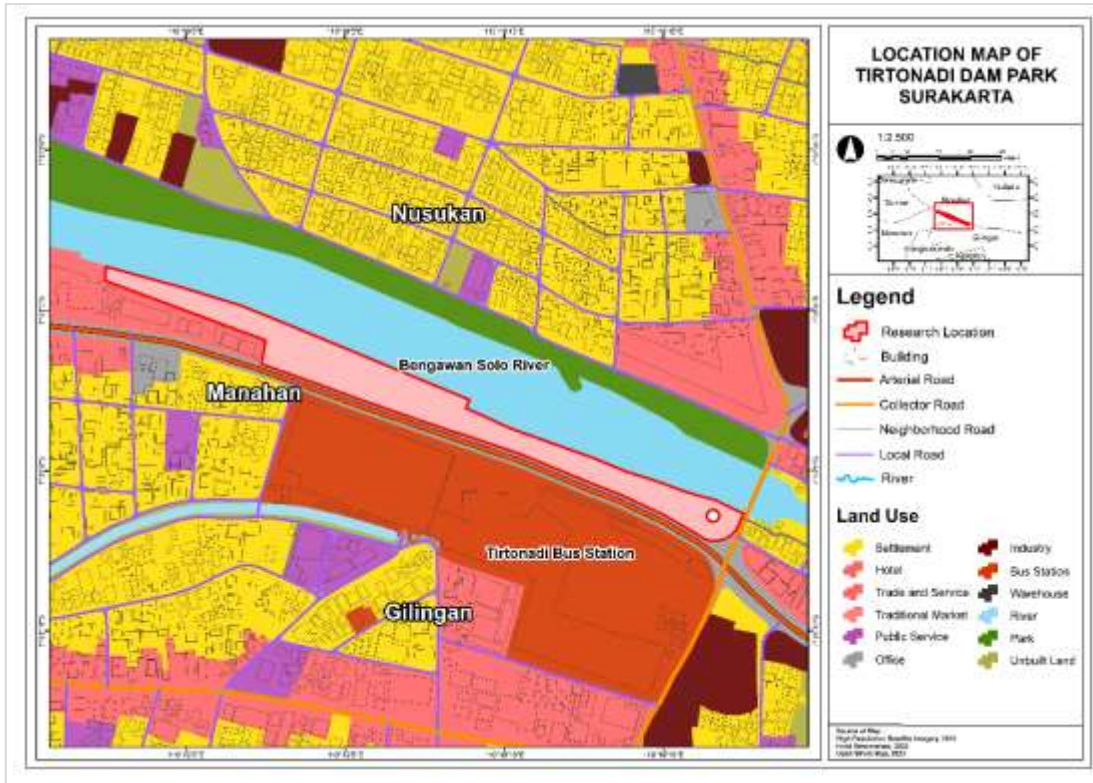


Figure 2. Location map of Tirtonadi Dam Park Surakarta

According to associated standards for the components of public space, the evaluation was organized. The following standards for developing waterfront public spaces are outlined by Adi Nugroho and Sani Roychansyah (2022):

Table 1. Waterfront public spaces criteria

Variables	Indicators
Infrastructure	<ol style="list-style-type: none"> 1. Availability of recreational facilities (multifunctional plaza, play facilities for children); 2. Availability of lighting facilities; 3. Availability of sports facilities (field, outdoor fitness, jogging track); 4. Quality of infrastructure (drainage, clean water).
Access and linkage	<ol style="list-style-type: none"> 1. Quality of pedestrian paths;

Variables	Indicators
	<ol style="list-style-type: none"> 2. Availability of facilities for disabled people; 3. Availability of vehicle parking space; 4. Access to public and private transportation.
Comfort and images	<ol style="list-style-type: none"> 1. Security in public spaces; 2. Sound/noise comfort level; 3. Environmental cleanliness; 4. Availability of shading vegetation.
Uses and activity	<ol style="list-style-type: none"> 1. Interaction among visitors; 2. Existing community activities; 3. Diversity of visitor ages; 4. Availability of various informal sectors/ street vendors.

Source: Adi Nugroho and Sani Roychansyah (2022)

The management recommendations for appropriate allocations that should increase user

satisfaction are prioritized by Importance Performance Analysis (IPA). It may therefore prove to be a helpful and practical tool for making decisions (Hong et al. 2020). Essentially, urban governance would gain from using the IPA to gauge user satisfaction with the quality of services provided in waterfront public spaces and from suggesting managerial tactics to increase its adoption. This method helps to understand how residents feel about governance indicators that they believe are important but are currently performing poorly (Martilla, J. A. and James, J. C. 1988). Esmailpour et al. (2020) state that IPA

entails generating a graphical depiction of the significance and performance of particular attributes in a given service that users assess.

Four quadrants were identified based on the grand mean of importance and performance scores for the attributes. Attributes in each quadrant were ranked according to their gap that is, their performance score less importance score. When it comes to budget allocation and performance improvement, it is best to focus on attributes with a smaller gap, especially in quadrant IV.

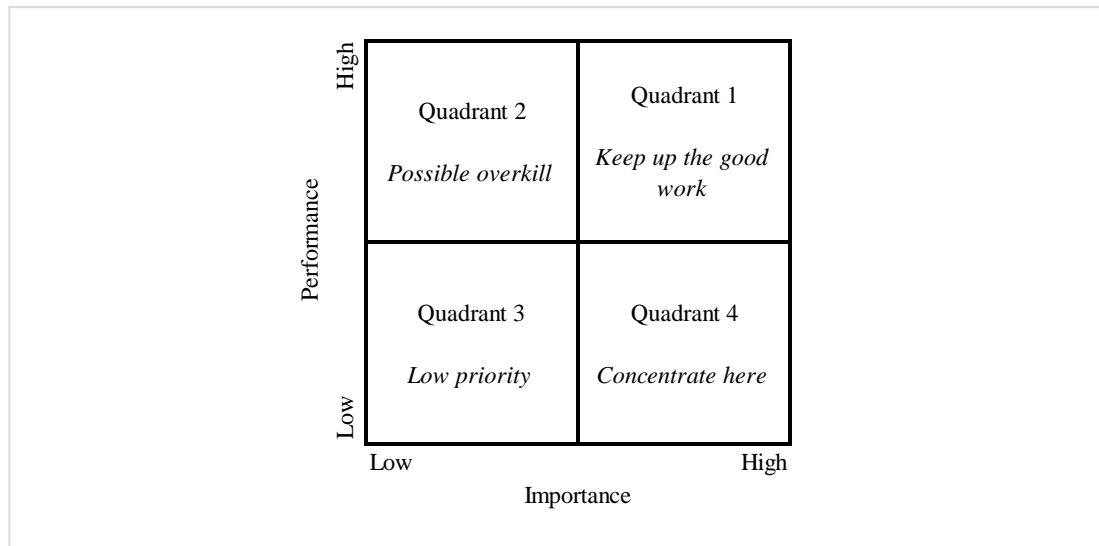


Figure 3. The standard IPA plots
Source: (Sever 2015)

Quadrant I: High Performance – High Importance (Sustain current initiatives/Keep Up the Good Work): Attributes falling into this quadrant signify notable strengths with a consistently high-performance level. Users view these qualities as fundamental and are happy with them. It is recommended that the budget allotted to attributes in this category be kept the same or possibly increased.

Quadrant II: High Performance – Low Importance (Possible excess): Attributes in this category, indicating secondary and less significant strengths, have a minimal probability of attracting users. Users consider these attributes' performance to be adequate but not essential. It might not be necessary to devote budgetary resources to this category; instead, they could be used to improve attributes in other categories, especially Quadrant IV.

Quadrant III: Low Performance – Low Importance (Low priority): Attributes in this category perform poorly for users, but their low importance means they pose no significant threat to an organization. These qualities are regarded as slight disadvantages. Funds in this category are not highly coveted, and improving them might not be worth the effort unless consistent outcomes are obtained.

Quadrant IV: Low Performance – High Importance (Focus efforts here): Attributes in this category signify primary weaknesses. If these characteristics are ignored, an organization's capacity to draw customers and compete with others may be compromised. To improve attributes in this category, more funding and significant effort must be allocated.

The first phase of this study was a review of the literature on riverbanks as urban public spaces

along the waterfront. A literature review identified variables that needed more investigation. Field observations and questionnaires distributed to 30 visitors were employed to gather the data. Importance Performance Analysis was used to process the data and produce development strategies for Tirtonadi Dam Park. Figure 4 depicts the flow of the research methodology.

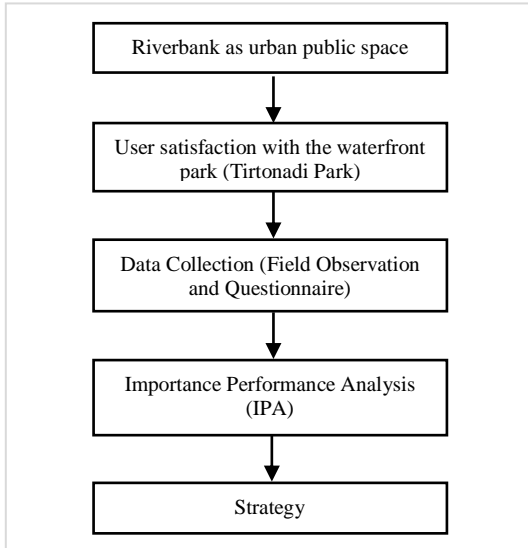


Figure 4. Research flow chart

Results and discussion

Tirtonadi Dam Park as urban public space

Tirtonadi Dam Park has served as a public open space for the people of Surakarta City and the surrounding area since it opened in 2019. As seen by the numerous street vendor booths in the park, Tirtonadi Dam Park has a culinary center. Along with savoring delectable food, guests can take in the view of the Bengawan Solo River as a result of the culinary center's evenly spaced seating arrangements. Children and adults alike make up the visitor base of Tirtonadi Dam Park. Following the conclusion of the day's activities, Tirtonadi Dam Park is comparatively busier in the afternoon. When the sun sets, visitors are also typically treated to an even more breathtaking view. Tirtonadi Dam Park promotes both passive and active participation. People can gather with the communities, interact, and socialize. Furthermore, sitting alone as a passive activity also occurs in Tirtonadi Dam Park.



Figure 5. Street vendors/culinary center in Tirtonadi Dam Park



Figure 6. Visitors' activities in Tirtonadi Dam Park



Figure 7. River as the main attraction

Importance performance analysis (IPA) score

This section uses tables and charts to describe the Importance Performance Analysis (IPA)

results for the waterfront public space criteria attributes. A detailed summary of the average importance and performance scores of these attributes as rated by survey participants is given in [table 2](#). Notably, the qualities of pedestrian pathways (3.97), accessibility to public and private transportation (3.97), and the availability of different informal sectors or street vendors (4.10 out of 5) are the attributes with the highest average performance scores. The availability of facilities for the disabled (1.47), sound or noise comfort level (2.77), and the availability of sports facilities (field, outdoor fitness, jogging track)

(2.80) on the other hand, had the lowest average performance levels.

The highest levels of importance were given to environmental cleanliness and public spaces security (both scoring 4.93 out of 5), the quality of pedestrian paths (4.83), and the infrastructure (drainage, clean water) (4.80). On average, importance consistently outweighed performance. On the other hand, visitor interaction (3.60), the availability of sports facilities (field, outdoor fitness, jogging track) (3.73), and the existence of ongoing community activities (3.80) were the attributes with the lowest average importance levels.

Table 2. Average performance and importance results for waterfront public spaces criteria services

No	Variables	Indicators for waterfront public space criteria	Average Score		Gap
			Performance	Importance	
1		Availability of recreational facilities	3.70	4.63	-0.93
2		Availability of lighting facilities	3.60	4.67	-1.07
3	Infrastructure	Availability of sports facilities (field, outdoor fitness, jogging track)	2.80	3.73	-0.93
4		Quality of infrastructure (drainage, clean water)	3.00	4.80	-1.80
5		Quality of pedestrian paths	3.97	4.83	-0.87
6	Access and Linkage	Availability of facilities for disabled people	1.47	4.57	-3.10
7		Availability of vehicle parking space	3.77	4.40	-0.63
8		Access to public and private transportation	3.97	4.50	-0.53
9		Security in public spaces	3.80	4.93	-1.13
10	Comfort and Images	Sound/noise comfort level	2.77	4.30	-1.53
11		Environmental cleanliness	3.83	4.93	-1.10
12		Availability of shading vegetation	3.30	4.70	-1.40
13		Interaction among visitors	2.93	3.60	-0.67
14	Uses and Activity	Existing community activities	3.57	3.80	-0.23
15		Diversity of visitor ages	3.30	4.17	-0.87
16		Availability of various informal sectors/ street vendors	4.10	4.63	-0.53
Mean			3.37	4.45	

The differences in average performance and importance scores are displayed in [table 2](#). The facilities available to the disabled are found to have the largest gaps, with a gap of -3.10. This indicates a significant deficit. In addition, there is a noticeable -1.80 gap in the infrastructure quality, particularly in the areas of clean water and drainage. Moreover, there is a -1.53 gap in the noise and comfort level attribute.

On the other hand, smaller differences as little as -0.23 are seen between average performance and importance scores for ongoing community activities. Comparably, the average difference

between the perceived importance and actual performance of both the availability of vehicle parking spaces and the accessibility of both private and public transportation is -0.53.

Importance performance analysis (IPA) results

Following assessment, all criteria are divided into four groups, or quadrants. Every quadrant has distinct priorities and meanings. [Table 3](#) presents the IPA results for the waterfront public spaces criteria services, which are visually represented in [figure 8](#).

Table 3. Importance performance analysis (IPA) results for waterfront public spaces criteria services for survey sample

No	Quadrant	Indicators for waterfront public space criteria	Average Score		Gap
			Performance	Importance	
1	Quadrant I (Keep Up the Good Work)	Availability of various informal sectors/ street vendors	4.10	4.63	-0.53
2		Access to public and private transportation	3.97	4.50	-0.53
3		Quality of pedestrian paths	3.97	4.83	-0.87
4		Environmental cleanliness	3.83	4.93	-1.10
5		Security in public spaces	3.80	4.93	-1.13
6		Availability of recreational facilities	3.70	4.63	-0.93
7		Availability of lighting facilities	3.60	4.67	-1.07
8	Quadrant II (Possible Overkill)	Availability of vehicle parking space	3.77	4.40	-0.63
9		Existing community activities	3.57	3.80	-0.23
10		Diversity of visitor ages	3.30	4.17	-0.87
11	Quadrant III (Low Priority)	Interaction among visitors	2.93	3.60	-0.67
12		Sound/noise comfort level	2.77	4.30	-1.53
13		Availability of sports facilities (field, outdoor fitness, jogging track)	2.80	3.73	-0.93
14	Quadrant IV (Concentrate Here)	Availability of facilities for disabled people	1.47	4.57	-3.10
15		Quality of infrastructure (drainage, clean water)	3.00	4.80	-1.80
16		Availability of shading vegetation	3.30	4.70	-1.40

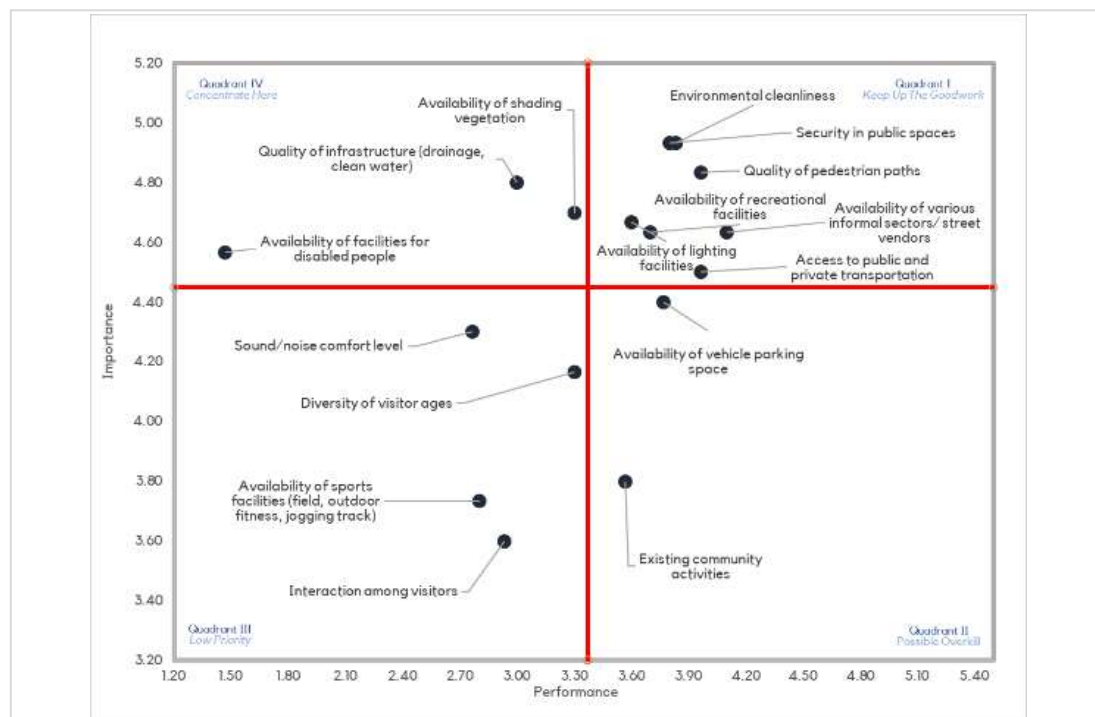


Figure 8. Importance performance analysis (IPA) chart for waterfront public space criteria services

According to the IPA analysis, the large discrepancy between performance and importance which is represented by a score of -3.10 means that it is imperative to give the enhancement of facilities for the disabled top

priority. It is also critical to devote resources and funds to improving the quality of infrastructure, particularly in the areas of drainage and clean water, as well as making sure that there is shade-producing vegetation. These aspects are located in

quadrant IV, which suggests that focused efforts are required to close the performance gap between perceived importance and current performance.

Quadrant I included attributes related to linkage and access, like the quality of pedestrian paths and the availability of public transportation and private vehicles; two attributes related to infrastructure, like the availability of lighting facilities and multipurpose plazas; two attributes related to comfort and image, like environmental cleanliness and public space security; and one of three attributes related to uses and activity, like the availability of various informal sectors and street vendors. This suggests that these qualities perform and have sufficient importance, suggesting that the current efforts in these areas should be kept up. In other words, people think these qualities are significant and are happy with how they perform. The local governance should continue to preserve the same inclination and uphold the current budget allocation for these attributes.

Furthermore, the presence of car parking spaces and ongoing community events are located in quadrant II, indicating a potential overemphasis. Even though these qualities work well, they are not very significant, so efforts should be adjusted appropriately.

Quadrant III, or low priority, is assigned to attributes like sound/noise comfort level, visitor diversity in age range, availability of sports facilities (field, outdoor, fitness, jogging track), and visitor interaction. These characteristics show low importance as well as poor performance, indicating that resources would be better used in more important areas.

Discussions for further waterfront public spaces criteria services development

The availability of facilities for people with disabilities, which this study rated as extremely significant but underperformed. Regretfully, it is still unavailable in the region. More sidewalks are required, as well as impeded entranceways, small hallways, and busy streets, all of which add to the difficulty and decreased safety of mobility. Consequently, it is essential to recognize that resolving mobility issues encompasses not only the functional capacities of individuals but also the design of the built and natural environments, both of which have been instrumental in fostering communities that are safer and more inclusive (Malloy 2015).

Waterparks must be safe, open to the public, and adhere to the idea of "Access for All." Stated differently, individuals with disabilities ought to have equal access to public areas as members of the general public. Discrimination occurs when individuals are not treated equally. Ensuring accessibility and inclusivity in the design of our living spaces, facilities, and neighborhoods can be a critical factor in promoting a more equitable, united, and inclusive society (Basha 2015). The process of creating public spaces that are universally accessible requires the application of several techniques. Creating anti-slip walking surfaces that are wide enough to accommodate wheelchairs and stable enough to prevent canes, crutches, or mobility device wheels from becoming stuck and posing a tripping risk is one of these tactics. To provide safety and stability, benches with armrests and back support are also necessary, especially for the elderly, the disabled, and older adults (Toronto City Council 2021). It is essential to enhance navigation and safety by incorporating guiding elements like warning and direction blocks. Accessible and secure ramps should be provided priority in the design to enable everyone to move easily. Creating inclusive public spaces also requires the provision of handicapped-accessible restrooms. Altogether, these actions help to guarantee that the environment is secure and accessible for people with varying needs and capacities (Aini et al. 2019). Additionally, it is crucial to minimize protruding objects such as overhead signboards to improve the safety of individuals with visual. Therefore, it is advised to use photoluminescent materials to mark the edges of slopes and footpaths to enhance visibility and safety during the night (Steinfeld and Maisel 2012).

Infrastructure quality (clean water and drainage), which needs to be provided priority, was identified in this study as another element with high value but poor performance. The primary components of a community's prosperity, well-being, sustainability of the environment, and population health are effective water and drainage systems. On the other hand, poorly designed, built, or maintained water and drainage systems seriously endanger the environment and the general public's health. It is necessary to carefully consider many factors when planning the drainage system. This entails keeping water from overflowing and using sturdy, long-lasting materials that can withstand a lot of foot traffic. To avoid accidents, it should also have anti-slip

heel-safe gratings installed as specified. This measure aims to minimize the risk of heels getting stuck in gratings and adhere to safety standards, primarily when the channels are frequented by cyclists and individuals using mobility aids (Hauraton 2023). Furthermore, water is one of the most essential and fundamental components of urban resource management. As a result, it is crucial to give people safe access to potable water in public areas. A community's well-being, public health, and ability to stay hydrated all depend on having access to clean drinking water, which is a basic human need. It also creates inclusive and equitable public spaces (Guy and Chase 2017). Drinking fountains are not as flexible as water bottle filling stations, which offer more options and require less adjustment for all users. Both ought to be available and positioned thoughtfully in the immediate surroundings. It is advised that water bottle filling stations be located outside of an accessible exterior travel path, but connected to one as an amenity (Toronto City Council 2021).

Authorities must act quickly to address the availability of shade-giving vegetation if they hope to improve performance. Indonesia has a tropical climate with high levels of daylight exposure, heat, and humidity, which has a big influence on how open spaces are used and designed Khudhayer, Shaaban, and Abdul Sukor (2019) conducted a study that examined the relationship between thermal comfort and shading in hot climate areas. To determine how much solar radiation and air temperature contribute to heat stress and discomfort, especially in pedestrians, the study calculated these variables. The primary methods by which urban trees cool the environment are through evapotranspiration and shading. Trees block the absorption and retention of solar radiation on surfaces by reflecting and absorbing it through their leaves (shading) (Rahman and Ennos 2016). As a result, the inclusion of shading vegetation becomes imperative to enhance visitor comfort and reduce exposure to direct sunlight. Moreover, the presence of vegetation can play a significant role in mitigating existing emissions by aiding in their absorption.

Waterfront public space has a special characteristic because it connects urban inhabitants with nature, providing a variety of services and benefits such as stress relief (Li et al. 2023). Furthermore, it accommodates public exercise, socialization, and recreational activities

(Chen and Ma 2023). Previous research placed more emphasis on users' satisfaction and perception of waterfront public space. In the meantime, this study distinguishes between 16 indicators of public space along the waterfront for strategies. A more suitable development strategy will be produced by taking into consideration the significance and effectiveness of each indicator. The findings indicated that three areas drainage and water systems, infrastructure for the disabled, and vegetation that provides shade need to be further developed. The elements pertain to the qualities of a waterfront public area that is near to nature, making shade-producing plants, water systems, and drainage essential. Better improvements must be made to the park's infrastructure to accommodate users with disabilities and make it more inclusive. Additionally, the main draws for tourists to the urban waterfront are the numerous activities and the opportunity to communicate with a variety of people.

The waterfront recreation area must satisfy the needs of its guests by offering peaceful experiences. Since waterfront areas are popular destinations during people's free time, it is crucial to offer amenities that appeal to their preferences for how they unwind (Traboulsi et al. 2023).

It will benefit both parties to have improved amenities, accessibility, and local community-based accommodations, as this will boost the local economy and provide enough satisfactions like social and recreational facilities. When people visit waterfronts during their free time, they have the most options for where to spend their time, interact with others, and enjoy urban open space. Therefore, waterfront recreation areas need to meet users' expectations regarding how to rest. The active participation of citizens in the planning process guarantees that their perspectives, needs, and interests are appropriately taken into consideration and effectively integrated, which is why community involvement is essential to waterfront development (Syahrir 2021). Quadrant I contains of a few attributes that exhibit satisfactory importance and performance such as the availability of various informal sectors/ street vendors, accessibility to public and private transportation, quality of pedestrian paths, environmental cleanliness, security in public spaces, the availability of recreational facilities, and the availability of lighting facilities. Local communities can be further involved in this by, for instance, enacting regulations limiting the

provision of food stalls and accessories to residents only, as well as by hosting performances by the community that are culturally themed.

Conclusions

The results of the study indicate several points on waterfront public space quality. The IPA approach helps to identify which criteria need to be improved or given a specific strategy. Quadrant IV (focus here) is where you will discover the availability of shade-giving vegetation, good drainage and clean water, and accessible facilities for the disabled. This implies that these requirements represent fundamental flaws. The stakeholders ought to concentrate more of their efforts on raising the standard for the comfort and happiness of the visitors. The results also indicate that since quadrant I, which indicates both high performance and a high importance score, pertains to security, environmental cleanliness, pedestrian paths, recreational facilities, informal sectors, lighting facilities, and transportation, these aspects of the economy should be preserved. The outcomes of the IPA support Tirtonadi Dam Park's development as a waterfront public area with both tourism and economic value. As a result, enhancing waterfront facilities holds the potential to attract more visitors due to their comforting and recreational attributes. Urban redevelopment and increasing community involvement are essential. Cities' public spaces may encourage local businesses and economic growth when they are vibrant and bustling with positive activities. Future research needs to investigate what factors make public spaces appealing and how they contribute to the well-being and prosperity of communities.

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Author(s) contribution

Lintang Suminar contributed to the research concepts preparation, methodologies, investigations, data analysis, visualization, articles drafting and revisions.

Difa Ayu Balqist Ramadhani contribute to the research concepts preparation and literature reviews, data analysis, of article drafts preparation and validation.

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