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## Analyzing user satisfaction and perception for the sustainable development of Mama Ngina waterfront in Kenya

### Kenya'daki Mama Ngina Waterfront'un Sürdürülebilir Kalkınmasına İlişkin Kullanıcı Memnuniyeti ve Algısının Analizi

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#### Abstract

Public spaces play a crucial role in the well-being of communities, providing accessible, and open areas for various activities. This article focuses on the significance of analysing user satisfaction and perception in shaping the future of Mama Ngina Waterfront, a newly developed public space in Mombasa, Kenya. Mama Ngina Waterfront aims to enhance the social and economic welfare of the local society by offering a range of amenities and services. Understanding user perception and satisfaction is crucial for the waterfront's sustainable development. The article explores the research questions related to user perception and satisfaction, discusses the methodology employed, evaluates the findings, and provides recommendations for improvement. The study employed observation and questionnaires to collect data from visitors, residents, and business owners in the surrounding area. The questionnaire distributed 138 respondents. The evaluation of the findings highlights both positive aspects and areas for improvement, covering functionality, socio-cultural aspects, political considerations, and user perception. By addressing these areas for improvement and considering user feedback, Mama Ngina Waterfront can thrive as an attractive, vibrant, and inclusive public space, contributing positively to the social fabric and economic growth of the society in Mombasa, Kenya.

**Key Words:** User Satisfaction, Perception, Sustainable Development, Mama Ngina Waterfront, Kenya.

#### Özet

Kamusal alanlar, çeşitli etkinlikler için açık ve erişilebilir alanlar sağlayarak toplulukların refahında çok önemli bir rol oynamaktadır. Bu makale, Kenya, Mombasa'da yeni geliştirilen bir kamusal alan olan Mama Ngina Waterfront'un geleceğini şekillendirmede kullanıcı memnuniyetini ve algısını analiz etmenin önemine odaklanmaktadır. Mama Ngina Waterfront, çeşitli olanaklar ve hizmetler sunarak yerel halkın sosyal ve ekonomik refahını artırmayı amaçlamaktadır. Kullanıcı algısını ve memnuniyetini anlamak, kıyının sürdürülebilir gelişimi için çok önemlidir. Makale, kullanıcı algısı ve memnuniyeti ile ilgili araştırma sorularını araştırıyor, kullanılan metodolojiyi tartışıyor, bulguları değerlendiriyor ve iyileştirme için önerileri sunuyor. Çalışmada, çevredeki ziyaretçilerden, sakinlerden ve işletme sahiplerinden veri toplamak için gözlem ve anketler kullandı. Anket 138 katılımcıya dağıtıldı. Bulguların değerlendirilmesi, işlevselliği, sosyo-kültürel yönleri, politik düşünceleri ve kullanıcı algısını kapsayan hem olumlu yönleri hem de iyileştirme alanlarını vurgulamaktadır. Mama Ngina Waterfront, iyileştirme için bu alanları ele alarak ve kullanıcı geri bildirimlerini dikkate alarak çekici, canlı ve kapsayıcı bir kamusal alan olarak gelişebilir ve Kenya'nın Mombasa kentindeki toplumun sosyal dokusuna ve ekonomik büyümesine olumlu katkıda bulunabilir.

**Anahtar Kelimeler:** Kullanıcı Memnuniyeti, Algı, Sürdürülebilir Kalkınma, Mama Ngina Waterfront, Kenya.

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## Introduction

Public space is described as an area where individuals normally have unlimited access and right of way. To put it another way, public spaces, and places are open to anyone who has the legal right to be there. A public space is a place as is open to the public and where people can gather for individual or group activities. People have access to information, access to spaces, access to resources, and access to activities (UN-Habitat, 2018). Public spaces, as defined by the Charter of Public Space, "all places publicly owned or of public use, accessible and enjoyable by all for free and without a profit motive". Public space analysis is the process of assessing the usefulness, quality, and accessibility of public places in a certain location. Public spaces can be divided into four categories which include: streets, public open spaces, public facilities, and markets.

Public open space can be described as undeveloped space or property without buildings (or other constructed structures) that is open to the public, offers opportunities for recreation for locals, and contributes to the neighborhood's aesthetic appeal and environmental quality. Public open spaces come in many different forms and can generally be categorized as Gardens, Public beaches, Parks, Waterfronts, and Playgrounds. Also, these areas are open to everyone without payment and are often maintained by the government (UN-Habitat, 2018).

Water enhances interactions between people and their surroundings and creates a more comfortable and enjoyable setting. Therefore, it has a positive impact on people's productivity in their social, professional, and personal life (Popović et al., 2015). The term "waterfront" defines "the urban area in direct contact with water" (Moretti, 2010). According to Timur, 2013, waterfront regions usually is occupied by port activities and port infrastructures (Timur, 2013). Yassin et al., 2010, indicated that the waterfront is defined generally as the area of interaction between the water and urban development (Yassin et al., 2010). Hou (2009), identified the waterfront area as a conflux area of land and water (Hou, 2009). In the past, waterfronts have provided a variety of functions, such as commerce, sustenance, industry, and transportation (The Waterfront Center, 1999).

Mama Ngina Waterfront is a newly developed public space located in Mombasa, Kenya, which aims to enhance the economic and social welfare

of the local community. The waterfront provides various amenities and services that meet the needs of visitors and residents, such as restaurants, recreational facilities, and spaces for artistic and cultural events. However, the success of Mama Ngina Waterfront depends on the satisfaction and perception of its users. Analyzing user satisfaction and perception is a crucial component of the development of Mama Ngina Waterfront. Understanding what users think about the waterfront, how they use it, and what aspects they appreciate or dislike can help inform future decision-making and guide further development. This article discusses the importance of analyzing user satisfaction and perception for the development of Mama Ngina Waterfront in Kenya. It explores the various research methods that can be used to collect user feedback and identifies the key areas that need to be addressed to ensure the waterfront remains a vibrant and attractive destination for years to come.

## Research Questions/Hypothesis

The research questions will guide the analysis of user satisfaction and perception, providing valuable insights for the sustainable development and ongoing management of Mama Ngina Waterfront. Below are some research questions:

1. How does the public perceive and experience Mama Ngina Waterfront in terms of its usefulness, quality, and accessibility as a public space?
2. What are the areas of improvement or concern identified by users of Mama Ngina Waterfront, and how can these findings inform future development and management strategies?
3. What are the potential challenges faced by users of Mama Ngina Waterfront, and how can these be addressed to ensure a more inclusive and accessible public space for all individuals?

*Hypothesis: Satisfaction and perception of users of Mama Ngina Waterfront in Kenya significantly impact the sustainable development of the waterfront.*

The hypothesis suggests that user satisfaction and perception play an essential role in the sustainable development of Mama Ngina Waterfront. It points out that the level of satisfaction and perception among users will have a significant influence on the long-term

success and viability of the waterfront as a public space. By analyzing user satisfaction and perception, the research uncovered insights into the strengths, weaknesses, and areas for improvement of Mama Ngina Waterfront. The hypothesis suggests that addressing and enhancing user satisfaction and perception can contribute to the sustainable and ongoing development of the waterfront, ensuring its attractiveness and functionality for the local community and visitors alike.

### **Limitations of the Study**

The study was conducted within a limited time frame, which affected the depth and comprehensiveness of the data collected. Long-term trends and changes in user satisfaction and perception could not be fully captured within the scope of the study.

### **Literature Review**

In this section, sustainability, sustainable development, principles of sustainable waterfront development and finally the criteria to analyze user perception of waterfront development have been researched by literature review.

### **Sustainability**

In order to satisfy present-day wants while assuring that future generations will be able to satisfy their own requirements, sustainability is a broad and diverse term that includes the responsible and balanced management of resources, systems, and activities. In terms of the environment, sustainability means preserving and safeguarding ecosystems, biodiversity, and natural resources (Brundtland, 1987). It entails encouraging behaviors that lessen waste production, minimize pollution, and moderate the damaging effects of human activity on the environment. To guarantee the resilience and integrity of ecosystems for future generations, sustainable environmental management practices include implementing efficient resource usage, embracing renewable energy sources, engaging in sustainable agriculture, preserving natural habitats, and more.

Promoting social fairness, justice, and inclusion is part of social sustainability. It entails building societies that give everyone access to equal opportunity, basic necessities, quality healthcare,

and housing (Estupiñán & Alvarez, 2016). Socially responsible behavior is to improve the welfare and standard of living for both current and future generations while also eradicating poverty and discrimination. Fairtrade, ethical corporate practices and a wealth distribution that is equal are the goals of economically sustainable activities (Brundtland, 1987). They encourage invention, technical development, and the growth of environmentally friendly companies that minimize adverse environmental effects while generating employment opportunities and enhancing societal well-being.

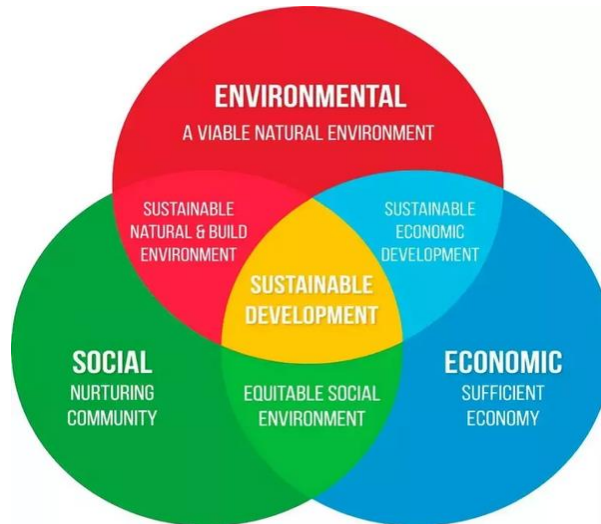
### **Sustainable Development**

Development that is sustainable is one which satisfies existing demands without jeopardizing the capacity of future generations to satisfy their own needs (Brundtland, 1987). The Environment and Development Conference of the United Nations in Rio de Janeiro in 1992 (also known as the "Rio Conference") helped to popularize the concept of sustainable development. The idea of sustainable development represents a principle of action that attempts to combine economic, social, and ecological objectives in addition to awareness of the current environmental risks (Gauzin-Müller, 2002).

Residents of the city must experience improved living conditions as a result of sustainable urban development along the waterfront. Thus, it is necessary to combine economic, social, and ecological goals. A sustainable waterfront is defined as "a place where people of all ages and backgrounds can live, visit, play, learn, and work in a way that celebrates and strengthens the economic vitality, opportunities, heritage, diversity, natural environment, beauty, and creativity of the city" (Niemann & Werner, 2016).

### **Principles of Sustainable Waterfront Development**

Determining the set of guidelines for appropriate urban waterfront development is important. Sustained performance is dependent on a variety of external factors, such as changes in the local, national, and international economy and politics. The main topics covered in this article will be the functional, physical, economic, cultural, and social factors that affect waterfront development (Üzümcüoğlu & Polay, 2022).



**Figure 1.** Shows sustainability aspects relationship to sustainable development (SSLA, 2013).

**Physical Aspects:** Urban environments can possess a range of qualities, including mobility, diversity, livability, connectedness, personality, and personal freedom (Carmona, 2021). The physical characteristics of an area can vary widely, encompassing its density, typology, architectural style, building height, block size, street frontage, and street width. To enhance physical quality, pathways, proper seating, lighting, and in addition to cleanliness, it is also important to landscape, provide aesthetic comfort, and ensure ease of access (Alsumsam, 2017). As pointed out by Shah & Roy, several critical physical aspects are necessary for a sustainable waterfront, such as the general condition of infrastructure facilities, safety on the promenade, street furniture, maintenance and hygiene, and proper signage (Shah & Roy, 2017).

**Functional Aspects:** Urban waterfronts offer various recreational opportunities, such as gathering places, fishing spots, and picnic grounds. However, it is crucial to consider safety aspects, lighting components, playgrounds, and green spaces during the design phase to ensure a safe and enjoyable experience for all visitors (Zhao, 2020). Incorporating recreational facilities, shoreline parks, and promenades into waterfront development can enhance their appeal and make them popular tourist destinations. Coastal regions can offer a range of functions, including accessibility to beaches, marine biodiversity, historical and cultural legacies, aesthetics, convenient infrastructure, and dining options. As a result, waterfront areas can be utilized for a variety of purposes, such as bungalows, resorts, retail establishments, cafes, hotels, and restaurants (Breen & Rigby, 1985).

**Social Aspects:** An individual's sense of safety greatly impacts their participation in public life and social relationships in urban settings. The way in which individuals interact with each other is heavily influenced by their personal experiences, including their family background, cultural and national identity, ethnicity, socio-economic status, and way of life (Porteous, 1977). Therefore, it is essential that urban waterfront development activities offer an equitable distribution of the quality of life among all members of society. To ensure that the urban waterfront development process is effective, it must take into account the frequency, intensity, and mode of use, as well as the realistic demands of the community.

**Economic Aspects:** The economic advantages of urban blue spaces are significant, contributing to their growing popularity as both residential areas and tourist destinations. Effective management of waterfront areas can enhance the local image, attract more visitors, create employment opportunities, stimulate local business growth, increase municipal revenue, and reduce operating expenses and rental costs. Despite the challenges, research by (Brückner et al., 2022) suggests that the regeneration of urban blue spaces can be economically beneficial and advantageous for both social well-being and the environment, particularly in areas with limited resources.

**Cultural Aspects:** To ensure successful urban waterfront development, it is important to incorporate the historical references of the city to attract visitors. Providing cultural and artistic activities, as well as exhibition spaces, can also be considered an effective component of the

development process (Zhou, 2020). Port cities may increase their creative potential and provide more creative spaces by maintaining historic harbors and reusing them for artistic uses. The revitalization of the waterfront with cultural and creative activities is crucial as it can generate revenue, job opportunities, and enhance the city and region's overall appearance (Kostopoulou, 2013).

### **Criteria to Analyze User Perception of Waterfront Development**

Within the research to analyze the Dubai Water Canal by (Jung et al., 2021), the usage and perception of waterfronts can be measured by the use of five factors which include: safety, accessibility, landscape management, convenience of use, and facility management status.

**Accessibility:** Accessibility is a critical factor in the success of any urban development project, and it has several important criteria. One of the key features of accessibility is the presence of clear and informative signage to guide people to their desired destinations. Additionally, convenient and reliable public transportation options are essential to ensure that people can easily and efficiently travel to and from the area. The accessibility of the area for pedestrians is also a critical factor, with walkways and sidewalks that are safe, convenient, and easy to use. Finally, the convenience of entering and exiting the area by car and adequate parking spaces are also important considerations to ensure that people can quickly and easily access the area without experiencing delays or traffic congestion. If the waterfront is easy to get to and use, users will perceive the waterfront as more attractive and desirable.

**Convenience of Use:** The convenience of use is an essential criterion when it comes to analyzing waterfronts. It includes features such as ease of use in facilities for walking and running, cycling, and sports activities. Additionally, it considers the convenience of using rest areas, playgrounds, and public toilets. These features can significantly impact the user experience and their perception of the waterfront. Therefore, the convenience of use criterion plays a crucial role in shaping the perception of the waterfront and can contribute significantly to its overall success.

**Facility Management:** Proper management of pedestrian and bicycle roads is critical to ensure the safety and convenience of users. The management status of sports facilities, such as

their maintenance and availability, is also a significant consideration. In summary, a well-managed waterfront facility can provide a comfortable and safe environment for visitors to enjoy various activities, and the facility management status plays a crucial role in achieving this goal.

**Safety:** By ensuring the safety of waterfronts, users can enjoy their experience without any worries, leading to a more positive perception of the waterfront. For instance, the safety of traffic and pedestrians is crucial, as it can directly affect the users' ability to move around freely and safely. Additionally, users should feel secure when using any facilities provided along the waterfront. Night lighting conditions play an essential role in ensuring the safety of the waterfront, as well as the safety of users when using the waterfront during the night.

**Landscape Management:** Landscape management is essential in creating a visually pleasing environment for waterfront users. The use of soft landscaping, such as plants and trees, can help create an aesthetically pleasing and relaxing atmosphere. The landscape design should also be appropriate for the area's climate and conditions to ensure the longevity of the vegetation and its visual appeal.

### **Methodology**

The article opted for the qualitative approach of research employing observation and the use of questionnaires. As for observation, google maps will be used to gather information about the public space including the physical features of the space, such as layout, design, and size. A volunteer will be sent to take photos and observe the activities, behavior, and social interactions of people as well as the available amenities like seating, lighting, and restrooms in the park. Questionnaires were used to gather information about how people use the space and how they perceive the park. Respondents were visitors, residents, and business owners in the surrounding area. Questions can be asked about the patterns of visits, favorite activities, and recommendations for improvement. The questionnaire attained a total of 138 respondents. The questionnaire started out with basic demographic questions like age, gender, level of education, occupation, purpose of visit, preferred time period of visit, frequency of visit, and among others. In the subsequent second section, the questionnaire analyzed the sustainability factors of the waterfront development. Criteria for this section were derived from the research by

(Üzümcüoğlu & Polay, 2022) where they analyzed the case of the Kyrenia Waterfront. The following sustainability principles were used in the questionnaire to collect data,

- Physical aspects
- Functional aspects
- Social aspects
- Economic aspects

- Cultural aspects
- Political aspects

Finally, the third section focused on user satisfaction and perception of the waterfront. This section was based on the research that focused on the evaluation of the Dubai Canal done by (Jung et al., 2021). Table 1 below summarizes the measures that were used.

**Table 1.**  
*Design principles based on research by Jung et al. 2021.*

<b>Design Principles</b>	<b>Features</b>
<b>Accessibility</b>	Informational Signs Public transportation convenience Walking convenience Sufficient parking spaces Use of parking lots convenience Entering/exiting convenience by car
<b>Convenience of Use</b>	The convenience of running and walking The convenience of bicycle use Sports facilities' convenience The convenience using of the resting area Using the public toilets convenience The convenient use of the playground
<b>Facility Management</b>	Pedestrian roads' management status The status of management of bicycle roads Sports facilities' status of management Management of the rest areas Management of the public toilets
<b>Safety</b>	Safety of pedestrian/traffic Safety of facility Conditions of night lighting Safety of children's playgrounds Safety of public toilet
<b>Landscape Management</b>	Facilities of landscape and marina Nature Harmony of the facility Management of the green area Sufficiency of green area

**Findings**

**Case Study Area of Mama Ngina Waterfront, in Kenya**

Mama Ngina Waterfront is a newly developed public space located in Mombasa, Kenya, which aims to enhance the economic and social welfare

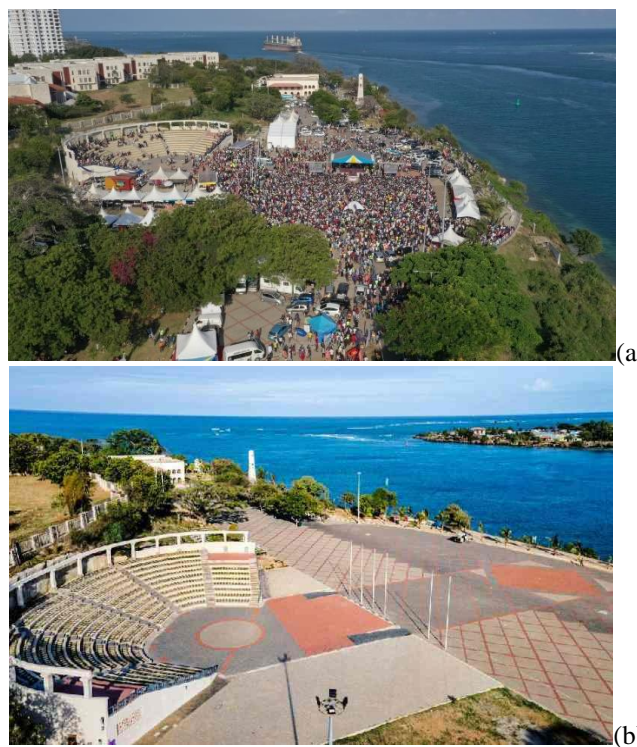
of the local community. The waterfront provides various services and amenities that meet the needs of residents and visitors, such as restaurants, recreational facilities, and spaces for artistic and cultural events. However, the success of Mama Ngina Waterfront depends on the satisfaction and perception of its users.



**Figure 2.** Shows satellite image of Mama Ngina Waterfront (Google Earth, 2023)

Above is a gateway, which is a physical structure, such as an arch or a monument, that marks the entrance to a particular area or signifies a transition between two places. The gateway is used at the entrance and exit to mark the exact extent of the waterfront. It is also used

to control the number of vehicles accessing the waterfront during special events like music concerts. Public vehicles are barred from accessing the site, the gateway is used to enforce this law in this regard.



**Figure 3. (a) (b):** The image above shows the amphitheater during a music concert. It has the capacity to hold more than twenty thousand people (3 (a); Kenyan Yungin, 2020. 3 (b); Robert Menza, 2023)



**Figure 4.** Shows empty waterfront part (Author, 2023)

The image above shows a part of the waterfront that has been neglected. There are no paths or sidewalks for people to walk on. There is poor landscaping. The grass is not well-kept and is withering away. The people in the image are forced to rest on the ground, this is due to the fact that there is a lack of benches in this part of the waterfront.

## Results

The following results were obtained from a questionnaire that attained 138 respondents. The data is combined and subdivided into subtopics for a better analysis. The waterfront was assessed by the respondents on a Likert scale of 1 to 5, with 1 representing strongly disagree and 5 representing strongly agree.

## Functional Aspects

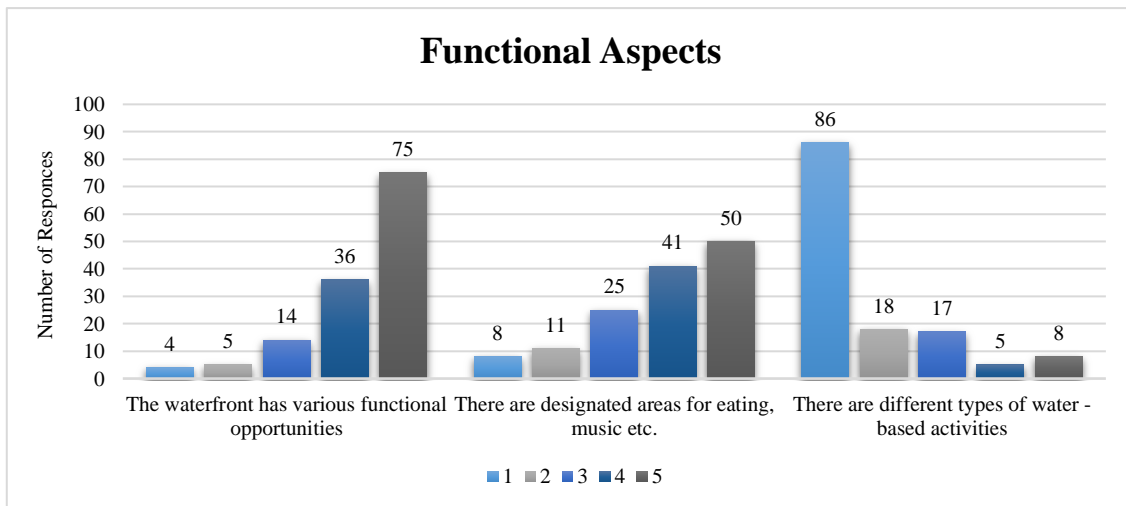
The data in the figure below reveals that users generally perceive the waterfront as having various functional opportunities. A significant majority of respondents (75) rated the availability of functional opportunities at the waterfront as a 5, indicating a strong agreement. Additionally, 36 respondents rated it as a 4, further emphasizing the positive perception of functional opportunities. The findings suggest that the waterfront provides an array of

possibilities for users to engage in different activities.

Users' perceptions regarding designated areas for specific activities, such as eating or enjoying music, were slightly more mixed. While 50 respondents indicated a strong agreement (rating of 5) with the presence of designated areas, a considerable number of participants (41) rated it as a 4, indicating a relatively positive perception. However, it is worth noting that a portion of the respondents (25) rated it as a 3, suggesting room for improvement in providing more designated areas for specific activities.

Water-based activities play an important role in the overall experience of a waterfront. The data reveals interesting insights regarding the types of water-based activities available. Surprisingly, the majority of respondents (86) rated the presence of different water-based activities as a 1, indicating a strong disagreement. This finding suggests that users perceive limited options for engaging in water-based activities at the waterfront. However, a closer look at the data reveals that a smaller but still notable number of respondents rated it positively (18, 17, 5, and 8 for ratings 2, 3, 4, and 5, respectively), implying that there is still interest in having diverse water-based activities (Figure 5).





**Figure 5.** Graph showing Functional aspects (Authors, 2023)

### Physical Aspects

The data reveals varying user perceptions regarding the maintenance of the waterfront. While a substantial number of respondents (60) rated the maintenance as a 3, indicating a neutral stance, a significant portion (28) rated it as a 4, indicating a relatively positive perception. Furthermore, 18 respondents rated it as a 5, implying that they strongly agree with the waterfront being well maintained. However, a minority of participants (6) rated it as a 1, indicating a strong disagreement.

User ratings on the condition of urban furniture at the waterfront were relatively positive. A majority of respondents (48) rated it as a 3, indicating a neutral perception. Additionally, 29 participants rated it as a 4, suggesting a positive perception of the furniture's condition. Furthermore, 24 respondents rated it as a 5, indicating a strong agreement that in good condition is urban furniture. However, a smaller portion of respondents (14) rated it as a 1, indicating a strong disagreement. These findings highlight the importance of maintaining and upgrading urban furniture to ensure a positive user experience.

Accessibility is a critical factor in ensuring the inclusivity and convenience of a waterfront. The figure below shows data that demonstrates varying user perceptions regarding the accessibility of the waterfront through multiple means. A significant portion of respondents (45) rated the accessibility as a 5, indicating a strong agreement. Furthermore, 38 participants rated it

as a 4, emphasizing a positive perception. However, a notable number of respondents (25) rated it as a 3, suggesting room for improvement in terms of accessibility. Moreover, a minority of participants (12) rated it as a 1, indicating a strong disagreement. These findings highlight the need to ensure easy and diverse means of accessing the waterfront to accommodate different user preferences and needs.

The inclusivity of waterfront areas is crucial, and user ratings shed light on the accessibility for able and disabled people. A significant portion of respondents (41) rated the accessibility as a 5, indicating a strong agreement. Moreover, 34 participants rated it as a 4, further emphasizing a positive perception. However, a smaller but notable number of respondents (37) rated it as a 3, indicating room for improvement in terms of accessibility for able and disabled individuals. It is essential to address the concerns of these users to ensure equal access and enjoyment of the waterfront.

User ratings regarding the availability of car parks at the waterfront were relatively positive. A majority of respondents (44) rated the car parks as a 5, indicating a strong agreement. Additionally, 30 participants rated it as a 4, suggesting a positive perception of car park adequacy. However, a notable number of respondents (31) rated it as a 3, indicating a relatively neutral stance. These findings suggest that while the car parks are generally perceived as adequate, further improvements could be made to cater to the parking needs of waterfront visitors (Figure 6).

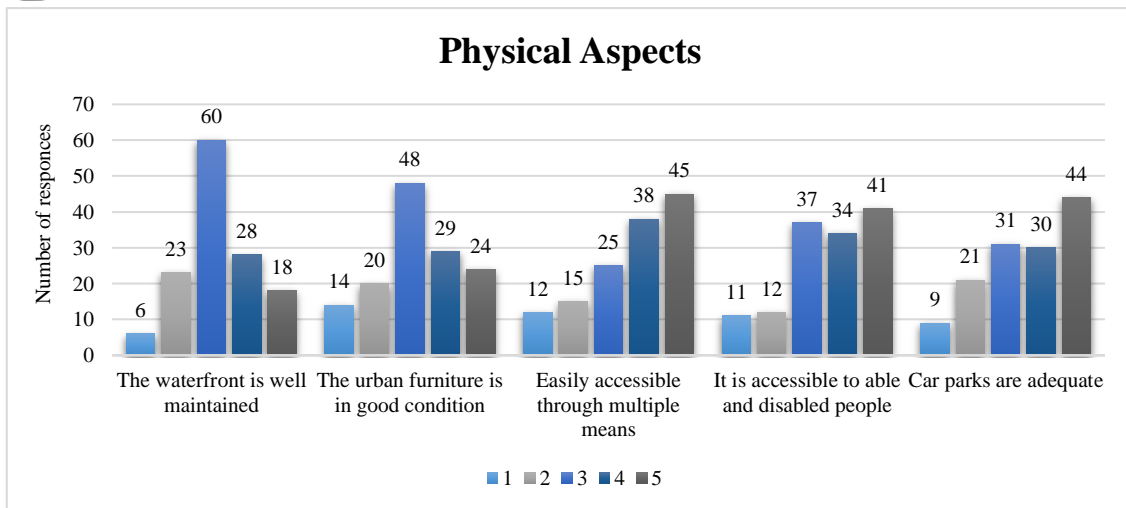


Figure 6. Graph showing Physical aspects (Authors, 2023)

### Socio-Cultural Aspects

User ratings indicate varying perceptions of the attractiveness of the waterfront environment. A majority of respondents (53) rated the attractiveness as a 4, indicating a positive perception. Additionally, 45 participants rated it as a 5, emphasizing a strong agreement. However, it is worth noting that a smaller portion of respondents (2) rated it as a 1, indicating a strong disagreement. These findings indicate that while the majority of users find the waterfront environment attractive, efforts can be made to further enhance its visual appeal.

The data reveals mixed perceptions regarding the inclusivity of the waterfront across different social classes. While a considerable number of respondents (75) rated it as a 5, indicating a strong agreement, indicating openness to people from different social classes, a minority of participants (7) rated it as a 1, indicating a strong disagreement. These findings highlight the importance of fostering an inclusive environment that welcomes individuals from diverse social backgrounds.

The data indicate that the waterfront generally possesses a sense of place. A significant portion of respondents (49) rated it as a 4, indicating a positive perception, and 54 participants rated it as a 5, suggesting a strong agreement. However, it is worth noting that a smaller but notable number

of respondents (6) rated it as a 1, indicating a strong disagreement. These findings suggest that the majority of users perceive a distinct sense of place at the waterfront, but efforts can be made to further enhance this aspect.

Responses regarding the protection of the waterfront's historical integrity were somewhat mixed. While a substantial number of respondents (45) rated it as a 4, indicating a positive perception, a notable portion of participants (30) rated it as a 3, suggesting a relatively neutral stance. Additionally, a smaller but still notable number of respondents (18) rated it as a 2, indicating a relatively negative perception. These findings highlight the need to prioritize the protection and preservation of the waterfront's historical integrity to maintain its cultural significance.

The data reveals varying perceptions regarding the availability of cultural activities and public art at the waterfront. While a significant number of respondents (41) rated it as a 4, indicating a positive perception, a smaller portion of participants (35) rated it as a 3, suggesting a relatively neutral stance. Moreover, a considerable number of respondents (22) rated it as a 2, indicating a relatively negative perception. These findings emphasize the importance of providing a diverse range of cultural activities and public art installations to enrich the waterfront experience for visitors (Figure 7).

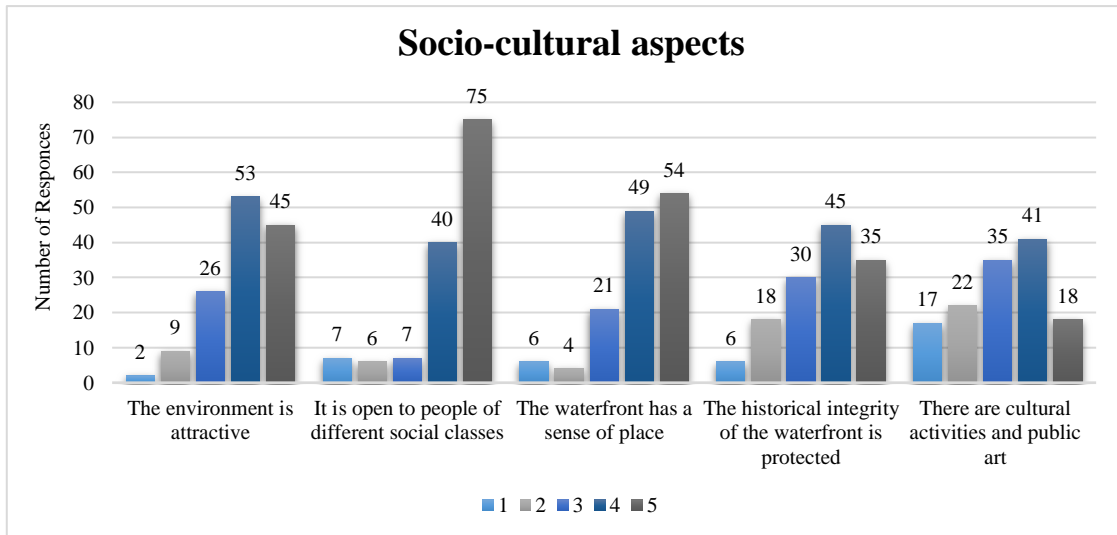


Figure 7. Graph showing socio-cultural aspects (Authors, 2023)

**Political Aspects**

User ratings indicate mixed perceptions regarding the municipality's adaptation of proper regulations for continuous maintenance. A significant number of respondents (60) which is 45% of total responses, rated the municipality's regulations as a 3, indicating a relatively positive perception. However, it is worth noting that a portion of participants (36) which is 27%, rated

it as a 4, suggesting room for improvement in adapting more robust regulations. Moreover, a smaller but notable number of respondents (14) rated it as a 2, indicating a relatively negative perception. These findings suggest that while some users perceive the presence of regulations, there is a need for further improvement in terms of their effectiveness and implementation (Figure 8).

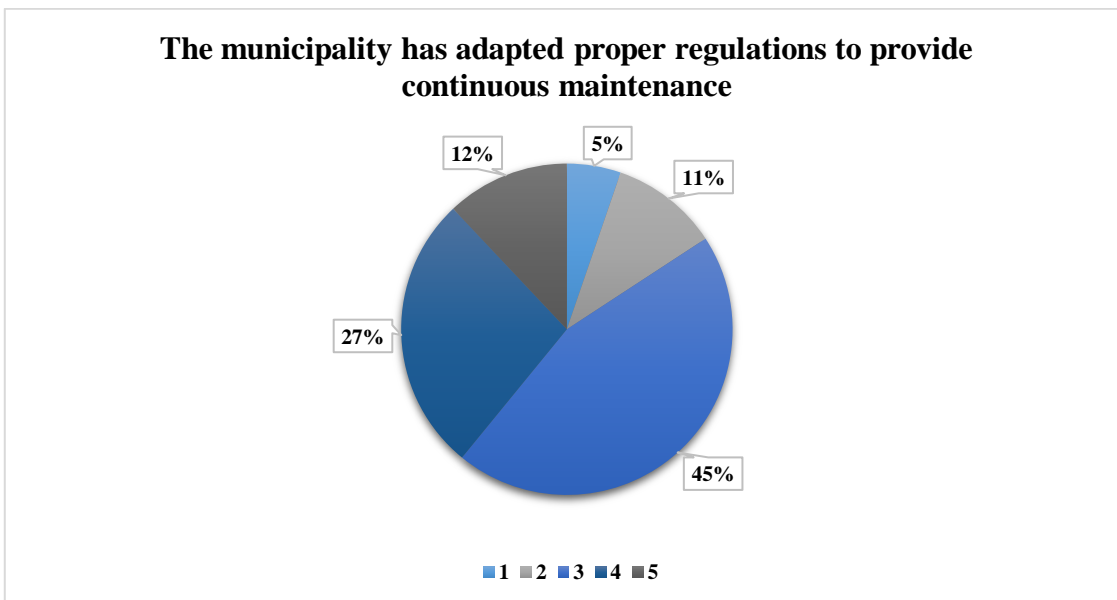


Figure 8. Graph showing political aspects (Authors, 2023)

**Availability of Amenities at the Waterfront**

User responses indicate that a considerable number of respondents (45) affirm the presence of sports facilities at the waterfront, while a larger portion of participants (90) indicate their absence. These findings suggest that there may

be a need to further develop or improve sports facilities to cater to the interests and recreational needs of waterfront visitors.

Data reveal a significant majority (112) confirming the presence of public toilets at the waterfront, while a smaller number of

participants (21) indicate their absence. This indicates a positive aspect of amenities, as the availability of public toilets contributes to the convenience and comfort of visitors.

User responses indicate that a substantial majority (106) acknowledge the presence of a playground at the waterfront, whereas a smaller portion of respondents (28) state its absence. This suggests that the waterfront is equipped with a playground, providing an additional recreational option for families and children.

Responses reveal that a significant number of participants (37) perceive the presence of bicycle

tracks at the waterfront, while a larger portion (98) report their absence. These findings suggest that there may be a need to consider implementing or improving bicycle tracks to encourage cycling and promote a more active and environmentally friendly means of transportation at the waterfront.

The data indicate that a majority of participants (92) acknowledge the presence of adequate street lights in the area, while a smaller number (39) perceive their absence. This highlights the importance of ensuring well-lit spaces for safety and visibility, contributing to a sense of security during evening hours (Figure 9).

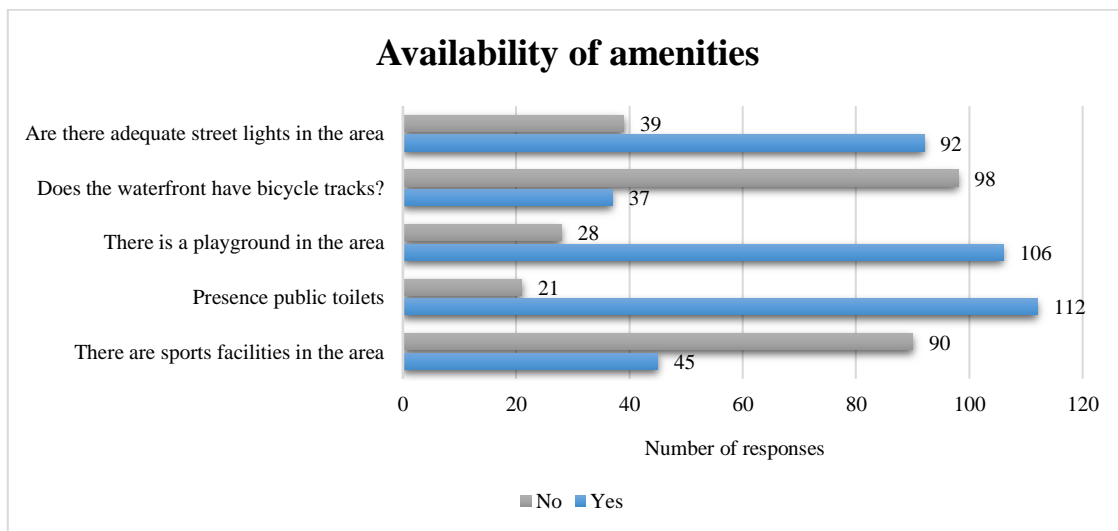


Figure 9. Graph showing availability of amenities (Authors, 2023)

### User Perception

#### Accessibility

User ratings reveal mixed perceptions regarding the visibility of traffic signage in the area. A significant number of respondents (42) rated the visibility as a 3, indicating a relatively neutral perception. However, it is worth noting that a smaller but notable portion of participants (36) rated it as a 4, suggesting a positive perception. Moreover, 18 respondents rated it as a 5, indicating a strong agreement with the visibility of traffic signage. Conversely, 19 participants rated it as a 1, indicating a relatively negative perception. These findings highlight the need for improvements in enhancing the visibility and effectiveness of traffic signage at the waterfront.

The ratings indicate varying perceptions regarding the accessibility of the waterfront by public transport. While a notable number of respondents (36) rated it as a 4, indicating a positive perception, a similar portion of

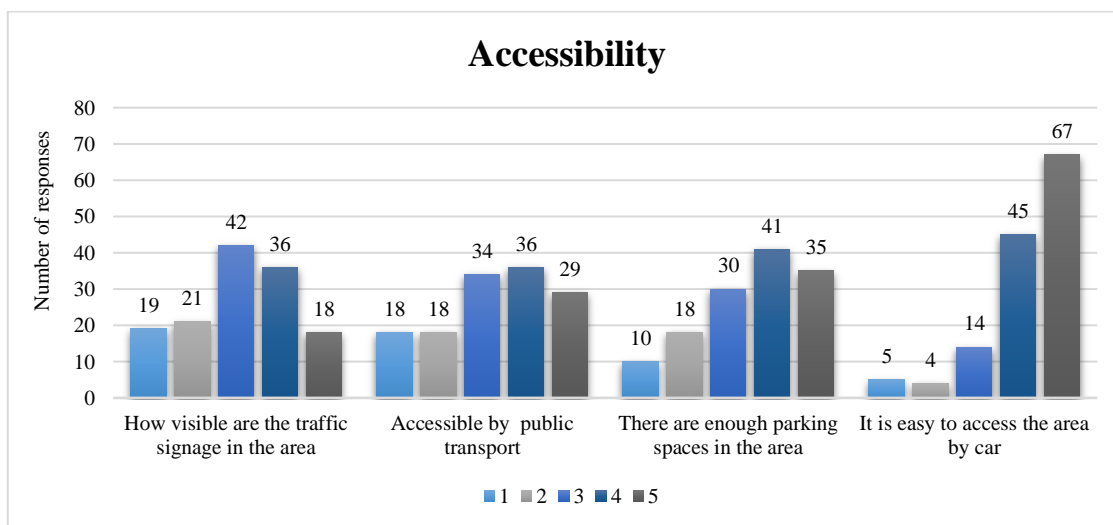
participants (34) rated it as a 3, suggesting a relatively neutral stance. Additionally, 29 respondents rated it as a 5, implying a strong agreement with the accessibility by public transport. However, a smaller but still notable number of participants (18) rated it as a 1, indicating a relatively negative perception. These findings highlight the importance of ensuring convenient and efficient public transport options to enhance accessibility to the waterfront.

Data suggest mixed perceptions regarding the availability of parking spaces at the waterfront. While a notable number of respondents (41) rated the availability as a 4, indicating a positive perception, a similar portion of participants (30) rated it as a 3, suggesting a relatively neutral stance. Moreover, 35 respondents rated it as a 5, implying a strong agreement with the availability of parking spaces. However, a smaller but still notable number of participants (10) rated it as a 1, indicating a relatively negative perception. These findings emphasize the importance of

providing adequate parking spaces to accommodate the needs of waterfront visitors.

User ratings indicate positive perceptions regarding the ease of accessing the waterfront area by car. A significant number of respondents (45) rated the ease of access as a 4, indicating a

positive perception. Moreover, 67 participants rated it as a 5, suggesting a strong agreement. Conversely, a smaller but notable number of respondents (5) rated it as a 1, indicating a relatively negative perception. These findings highlight the relatively smooth and convenient access by car to the waterfront area (Figure 10).



**Figure 10.** Graph showing accessibility (Authors, 2023)

### Convenience of Use

User ratings indicate varying perceptions regarding the convenience of sidewalks for walking or jogging at the waterfront. While a significant number of respondents (49) rated the convenience as a 4, indicating a positive perception, 54 participants rated it as a 5, suggesting a strong agreement. Conversely, a smaller but still notable number of participants (3) rated it as a 1, indicating a relatively negative perception. These findings highlight the importance of well-maintained and convenient sidewalks to facilitate walking and jogging activities at the waterfront.

The responses suggest mixed perceptions regarding the convenience of using bicycles at the waterfront. While a considerable number of respondents (48) rated the suitability as a 4, indicating a positive perception, 46 participants rated it as a 5, suggesting a strong agreement. However, a smaller but still notable number of respondents (4) rated it as a 1, indicating a relatively negative perception. These findings emphasize the need to improve infrastructure and amenities to enhance the convenience of bicycle use at the waterfront.

The ratings reveal mixed perceptions regarding satisfaction with public toilets at the waterfront. A significant number of respondents (60) rated the satisfaction as a 3, indicating a relatively positive perception. However, it is worth noting that a smaller but notable portion of participants (15) rated it as a 4, suggesting a relatively higher level of satisfaction. Conversely, 20 respondents rated it as a 1, indicating a relatively negative perception. These findings highlight the need for attention and improvements in the maintenance of public toilets at the waterfront to enhance user satisfaction.

Users indicate mixed perceptions regarding satisfaction with the playground at the waterfront. While a notable number of respondents (52) rated the satisfaction as a 3, indicating a relatively positive perception, a smaller but still notable portion of participants (23) rated it as a 4, suggesting a higher level of satisfaction. Moreover, 10 respondents rated it as a 5, implying a strong agreement with the satisfaction. However, a smaller but still notable number of participants (11) rated it as a 1, indicating a relatively negative perception. These findings emphasize the importance of maintaining and enhancing the playground facilities to meet the diverse needs and expectations of waterfront visitors (Figure 11).

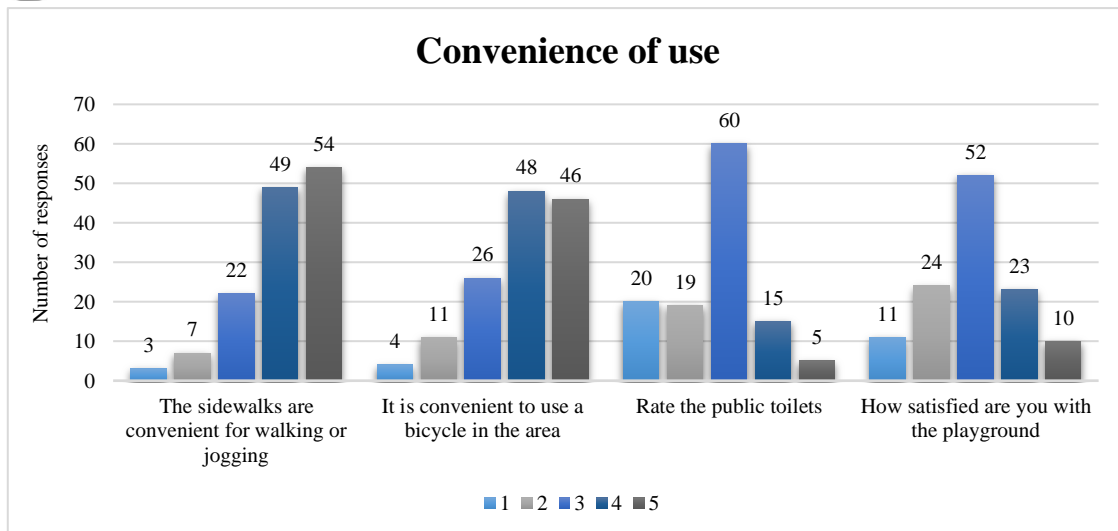


Figure 11. Graph showing convenience of use (Authors, 2023)

### Facility Management Status

The data indicate varying perceptions regarding the maintenance of sidewalks and paths at the waterfront. While a notable number of respondents (51) rated the maintenance as a 3, indicating a relatively positive perception, a smaller but still notable portion of participants (40) rated it as a 4, suggesting a higher level of satisfaction. Moreover, 30 respondents rated it as a 5, implying a strong agreement with the well-maintained condition of sidewalks and paths. Conversely, a smaller portion of participants (5) rated it as a 1, indicating a relatively negative perception. These findings suggest that while many users perceive the sidewalks and paths as well maintained, there is room for improvement in ensuring their upkeep to enhance the overall user experience.

The questionnaire reveals mixed perceptions regarding the cleanliness and hygiene of public toilets at the waterfront. While a significant number of respondents (55) rated the cleanliness as a 3, indicating a relatively positive perception, a smaller but notable portion of participants (19) rated it as a 4, suggesting a higher level of satisfaction. Moreover, 7 respondents rated it as a 5, implying a strong agreement with the clean and hygienic condition of public toilets. Conversely, a notable number of participants (21) rated it as a 1, indicating a relatively negative perception. These findings highlight the need for continuous efforts to maintain and improve the cleanliness and hygiene standards of public toilets to ensure a satisfactory user experience (Figure 12).

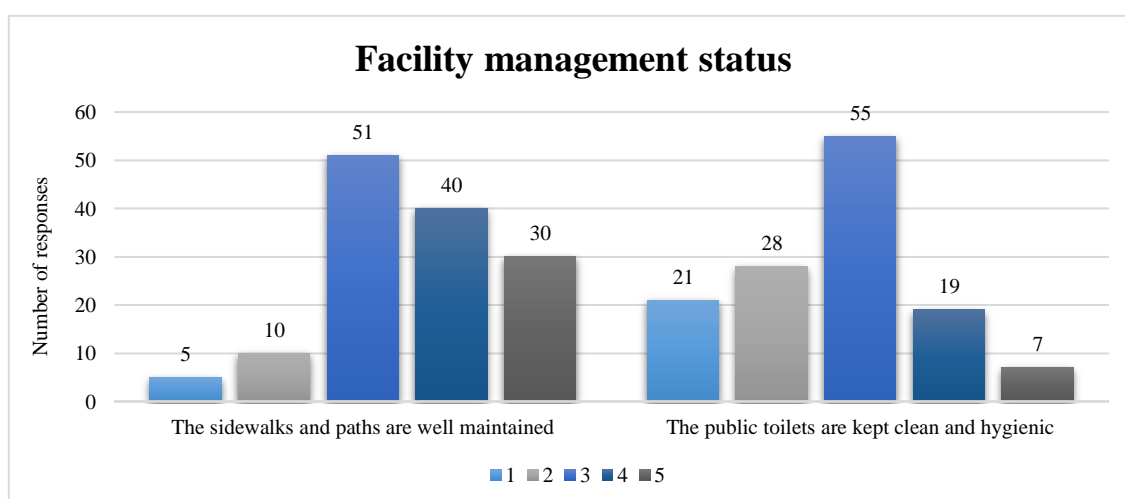


Figure 12. Graph showing facility management (Authors, 2023)

## Safety

The users indicate varying perceptions regarding traffic and pedestrian safety at the waterfront. While a notable number of respondents (51) rated the safety as a 3, indicating a relatively positive perception, a smaller but still notable portion of participants (31) rated it as a 4, suggesting a higher level of satisfaction. Moreover, 23 respondents rated it as a 5, implying a strong agreement with the safety measures in place. Conversely, a notable number of participants (9) rated it as a 1, indicating a relatively negative perception. These findings emphasize the importance of ensuring continuous efforts to enhance traffic and pedestrian safety measures at the waterfront.

The data shows mixed perceptions regarding the security of facilities at the waterfront. While a significant number of respondents (60) rated the security as a 3, indicating a relatively positive perception, a smaller but notable portion of participants (30) rated it as a 4, suggesting a higher level of satisfaction. Moreover, 15 respondents rated it as a 5, implying a strong agreement with the good security of the playground. However, a notable number of participants (14) rated it as a 1, indicating a relatively negative perception. These findings highlight the need for continuous efforts to ensure the safety and security of the playground, creating a secure environment for children and families (Figure 13).

respondents rated it as a 5, implying a strong agreement with the security of facilities. Conversely, a notable number of participants (9) rated it as a 1, indicating a relatively negative perception. These findings emphasize the need for robust security measures to ensure the safety and well-being of visitors and protect the facilities at the waterfront.

User ratings suggest varying perceptions regarding the security of the playground at the waterfront. While a notable number of respondents (56) rated the security as a 3, indicating a relatively positive perception, a smaller but still notable portion of participants (23) rated it as a 4, suggesting a higher level of satisfaction. Moreover, 9 respondents rated it as a 5, implying a strong agreement with the good security of the playground. However, a notable number of participants (14) rated it as a 1, indicating a relatively negative perception. These findings highlight the need for continuous efforts to ensure the safety and security of the playground, creating a secure environment for children and families (Figure 13).

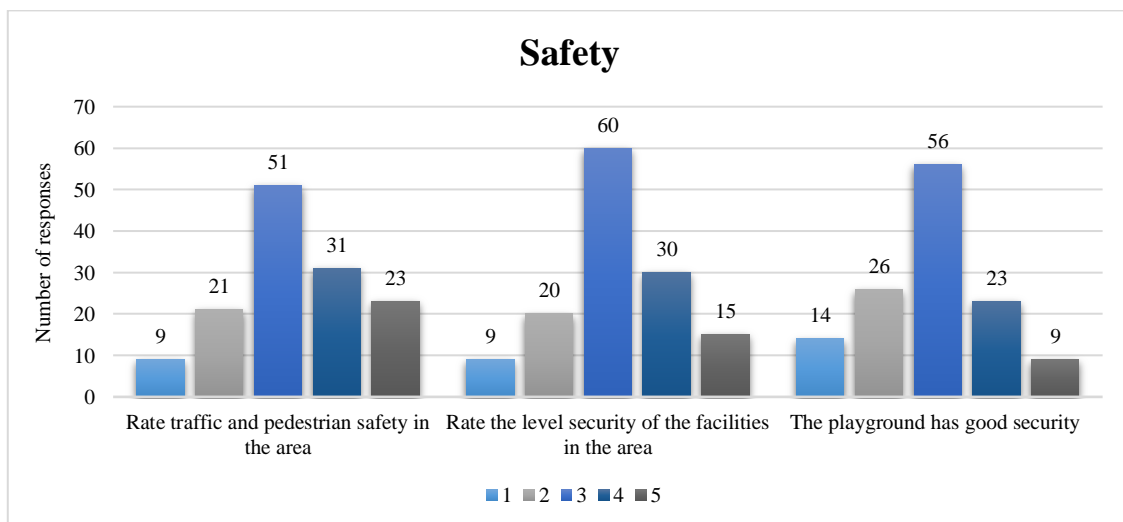


Figure 13. Graph showing safety (Authors, 2023)

## Landscape Management

The responses indicate varying perceptions regarding the maintenance of vegetation and marina facilities at the waterfront. While a significant number of respondents (52) rated the maintenance as a 3, indicating a relatively positive perception, a smaller but still notable portion of participants (30) rated it as a 4, suggesting a higher level of satisfaction. Moreover, 19 respondents rated it as a 5, implying a strong agreement with the well-maintained condition of vegetation and marina facilities. Conversely, a notable number of

participants (11) rated it as a 1, indicating a relatively negative perception. These findings suggest the need for continuous efforts to ensure the proper maintenance and upkeep of vegetation and marina facilities, contributing to an appealing waterfront environment.

The data shows mixed perceptions regarding the availability of green spaces at the waterfront. While a significant number of respondents (52) rated the availability as a 3, indicating a relatively positive perception, a smaller but notable portion of participants (27) rated it as a 4, suggesting a higher level of satisfaction. Moreover, 21

respondents rated it as a 5, implying a strong agreement with the presence of abundant green spaces. However, a notable number of participants (8) rated it as a 1, indicating a relatively negative perception. These findings emphasize the importance of ensuring the provision and maintenance of sufficient green spaces at the waterfront, allowing visitors to enjoy nature and outdoor activities.

The questionnaire suggests varying perceptions regarding the upkeep of trees and grass at the waterfront. While a notable number of

respondents (45) rated the upkeep as a 3, indicating a relatively positive perception, a smaller but still notable portion of participants (32) rated it as a 4, suggesting a higher level of satisfaction. Moreover, 19 respondents rated it as a 5, implying a strong agreement with the well-kept condition of trees and grass. However, a notable number of participants (9) rated it as a 1, indicating a relatively negative perception. These findings highlight the need for consistent maintenance and care of trees and grass to enhance the overall aesthetics and appeal of the waterfront landscape (Figure 14).

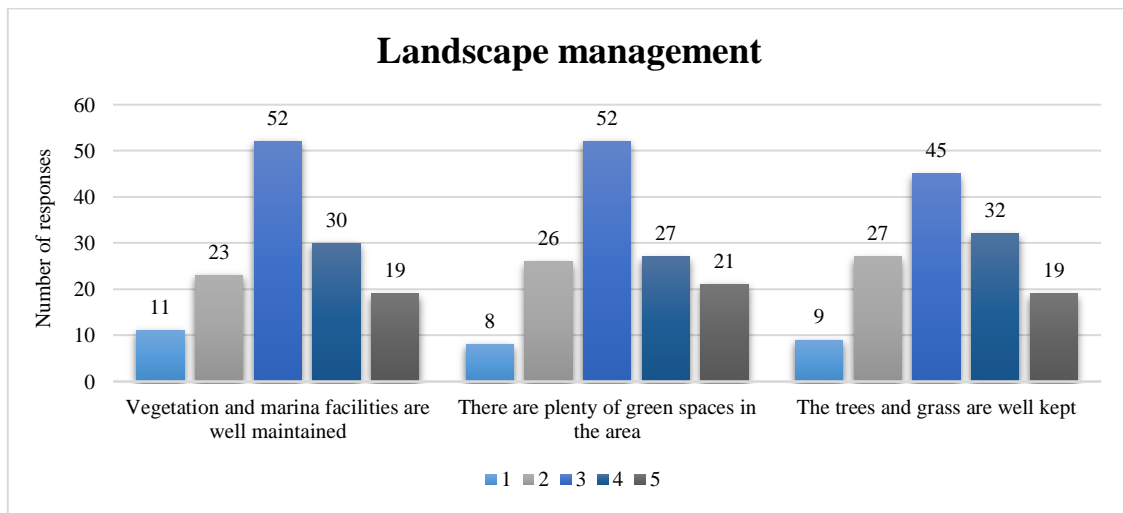


Figure 14. Graph showing convenience of use (Authors, 2023)

### Evaluation of the Findings

The evaluation of the waterfront experience reveals a mix of positive aspects and areas for improvement. In terms of functionality, users generally perceive the waterfront as offering a range of opportunities for different activities. However, there is a need for more designated areas to cater to specific activities. Water-based activities received mixed perceptions, with some expressing a lack of options and others expressing interest in diverse activities. Accessibility emerges as a critical factor, with the majority rating it positively, but there is room for improvement to accommodate different user needs. The availability of car parks received generally positive ratings, but further improvements could be made.

Regarding the socio-cultural aspects, the attractiveness of the waterfront environment was generally perceived positively, although some expressed a need for enhancements. The inclusivity of waterfront areas received positive ratings, but efforts should be made to foster an inclusive environment for individuals from diverse backgrounds. The sense of place at the

waterfront was generally positive, but there is a need for further enhancements. Historical preservation received mixed ratings, emphasizing the importance of prioritizing the waterfront's cultural significance. The availability of cultural activities and public art installations also received mixed perceptions, highlighting the need for diverse offerings. From a political perspective, the municipality's regulations received mixed ratings, suggesting the need for more effective and implemented regulations. Amenities at the waterfront were perceived positively overall, but there is a need for further development in areas such as sports facilities, bicycle tracks, and certain water-based activities.

In terms of user perception, accessibility emerged as an important aspect. Perceptions regarding the visibility of traffic signage were mixed, highlighting the need for improvements in enhancing visibility. Accessibility by public transport received varying ratings, emphasizing the importance of convenient and efficient public transport options. Satisfaction with parking spaces and ease of accessing the waterfront by car generally received positive ratings, indicating



that parking facilities are currently meeting user needs. However, there is still room for improvement to ensure a seamless and convenient experience.

Regarding the convenience of sidewalks and bicycle use, user ratings were generally positive, suggesting a satisfactory experience in these areas. However, public toilets and the playground received mixed perceptions, indicating potential areas for improvement in terms of cleanliness, maintenance, and user satisfaction. Facility management status received positive ratings for the maintenance of sidewalks and paths but showed mixed perceptions regarding the cleanliness of public toilets. This highlights the importance of consistent maintenance and cleanliness efforts to meet user expectations. Finally, safety and security received mixed ratings, indicating the need for continuous efforts to enhance measures at the waterfront. Ensuring a safe and secure environment for users is crucial for fostering a positive and enjoyable experience.

### Conclusion

In conclusion, the findings from the results indicate several key insights about the waterfront area. Functionally, users perceive the waterfront as offering various opportunities for engagement, with a strong agreement on the availability of functional opportunities. However, there is a mixed perception regarding the presence of designated areas for specific activities, suggesting room for improvement. Water-based activities were perceived as limited by the majority, although there is still interest in having diverse options. Although accessibility is usually seen favorably, there is still a need for development in terms of guaranteeing inclusivity for both able-bodied and disabled individuals. The availability of car parks was rated positively, but further improvements could be made. Socio-culturally, the waterfront is generally considered attractive and possesses a sense of place, although efforts can be made to enhance its visual appeal and protect its historical integrity. The availability of cultural activities and public art received mixed perceptions, emphasizing the importance of diversifying offerings. Politically, there is a need for further improvement in adapting more robust regulations. As for amenities, sports facilities, public toilets, and playgrounds were acknowledged, but there is a need to further develop or improve them. Convenience of use was generally positively perceived, although attention is required in areas such as traffic signage visibility and bicycle

tracks. Facility management, cleanliness of public toilets, and maintenance of sidewalks and paths received mixed perceptions, highlighting the need for continuous efforts. Safety and security were rated positively, but measures should be enhanced for traffic, pedestrian safety, and the security of facilities and playgrounds. Overall, the findings provide valuable insights for improving the waterfront's functional, physical, socio-cultural, and political aspects, as well as the availability of amenities, user perception, convenience of use, facility management, and safety.

### Recommendations

Below are recommendations that aim to address the areas for improvement identified in the findings and enhance the overall functional, physical, socio-cultural, and political aspects of the waterfront, as well as the availability of amenities and user perception. These recommendations were outlined by majority of the respondents,

- Creating more green areas with grass and plants
- Providing more trash cans and recycle bins
- Encouraging the use of bicycles and public transport
- Providing ramps for people with disabilities
- Creating more walkways for people to move around more easily
- Creating designated areas for picnics and barbeques
- Creating spaces for families (private)
- Encouraging sports activities for children.

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