

Research paper

# Modeling Accessible Streets and Sidewalks in South Sulawesi, Indonesia

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## Abstract

This study investigates the accessibility of public spaces, particularly roads and sidewalks, for persons with disabilities in the city of South Sulawesi, Indonesia. This research is driven by the critical need to create an inclusive environment that serves all individuals, emphasized by the UN Convention on the Rights of Persons with Disabilities and Indonesian Law No. 8/2016. The purpose of this research is to evaluate infrastructure, identify obstacles faced by individuals with disabilities, and propose a model of disability-friendly public spaces. We used case study methods, focusing on the city of Parepare which involve the collection of in-depth interview data with people with disabilities, public space managers, and government officials, direct observation of roads and sidewalks, and analysis of relevant policy and regulation. We used thematic analysis to analyze the collected data, identifying key themes related to accessibility challenges and potential solutions. These findings reveal that the streets and sidewalks of Parepare often lack adequate accessibility features, such as sufficient width, smooth surfaces, and clear signage. Obstacles such as utility poles and parked vehicles further hinder mobility. The implication is the need for improved infrastructure design, policy implementation, and public awareness to enhance the quality of life for people with disabilities. This study recommends enhancing collaboration with the disability community, conducting regular audits of public spaces, and implementing universal design principles to create an inclusive environment and make Parepare a Disability Smart City (DSC).

**Keywords:** *Public Space, Disability, Accessibility, Road Modeling, Sidewalk, Parepare City*

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## 1 Introduction

Disability-friendly public spaces are one of the most important aspects in creating an inclusive and equitable environment for all individuals, including those with special needs (Patrick & McKinnon, 2022).. The UN Convention on the Rights of Persons with Disabilities 2006 emphasizes the importance of accessibility in all aspects of life,



including urban planning and public space design (United Nation, 2006). The Indonesian government has observed the guarantee of access for persons with disabilities, one of which is through Law No. 8 of 2016 concerning persons with disabilities. The standards for the provision of public facilities such as roads and sidewalks in public spaces in accordance with technical provisions for persons with disabilities are outlined in the Minister of Public Works and Public Housing Regulation No. 14/PRT/M/2017. Parepare City has also issued Regional Regulation No. 7/2023 on the Implementation of Respect, Protection, and Fulfillment of the Rights of Persons with Disabilities. Based on data from the Parepare City BPS in 2022, the total population included 414 persons with disabilities in Parepare City. This indicates the need for attention in the planning and design of infrastructure in Parepare City to meet their needs. However, more accurate data cannot be ensured, as it is not uncommon for families of persons with disabilities to hide their disabled family members to avoid embarrassment or consider persons with disabilities as a "bad image" in their families (Muhammadiyah & Selao, 2024)..

This study examines the design of disability-friendly public spaces, specifically road and sidewalk models, and reveals that numerous cities nationwide have started implementing universal design principles to enhance accessibility. For example, research by Kockelman et al. (2002) shows that sidewalk designs that consider slope, width, and smooth surfaces can enhance comfort and safety for people with disabilities. Additionally, evaluation tools such as the Disability Inclusion Evaluation Tool (DIETool) by Rebernik et. al. (2019), provide guidance for urban planners to assess and enhance disability inclusion in public spaces. By using a data-driven approach, this research aims to identify and analyze the factors affecting accessibility for people with disabilities in this city.

In addition, this research will also propose solutions and recommendations that can be implemented by local governments to improve the quality of public spaces. The aim of this research is to provide a deeper understanding of the condition of roads and sidewalks in Parepare and to develop a model that can be used as a guide in the planning and design of more disability-friendly public spaces. It is hoped that this research can contribute to efforts to create a more inclusive and equitable city for all its residents. What is the condition of the roads and sidewalks in Parepare for people with disabilities, and what models can be applied to independently improve disability accessibility?

## **2 Research Methodology**

This research employs a qualitative approach combined with a case study method. The qualitative approach is chosen because the researcher aims to comprehend intricate social phenomena, including the accessibility of public spaces for individuals with sensory, physical, and intellectual disabilities. The case study focuses on the city of South Sulawesi as the research location, where the researcher will explore how the modeling of roads and sidewalks can support the creation of disability-friendly public spaces. According to Creswell (2014), qualitative research provides deep insights into individual experiences, as well as the social and cultural contexts in which they exist. The data obtained from this research is expected to provide a clear picture of the



challenges and opportunities in creating inclusive infrastructure for people with disabilities in Parepare. It is important to gain a comprehensive understanding of the existing policies and infrastructure that contribute to accessibility for people with disabilities. This research will involve community participation, particularly from people with disabilities, to gain direct perspectives on their experiences using public spaces in the city of Parepare.

The data collection techniques in this research include in-depth interviews, direct observations, and document analysis of disability samples including sensory disabilities, intellectual disabilities, and physical disabilities. In-depth interviews will be conducted with various parties, including persons with disabilities, public space managers, and local government officials. With this interview, the researchers will explore their experiences and views regarding the accessibility of roads and sidewalks in the city of Parepare, South Sulawesi, Indonesia. Previous research has shown that in-depth interviews can provide rich and detailed information about the subject to be studied (Brinkmann, 2013). Direct observations were conducted to assess the physical condition of roads and sidewalks, including the presence of supporting facilities such as ramps, tactile paving, warning signs, and road surfaces that are friendly to people with disabilities. This observation is to assess the extent to which the existing infrastructure meets the accessibility standards set by the government. In addition, a document analysis will be conducted to examine policies and regulations related to public space accessibility, in accordance with Minister of PUPR Regulation No. 14/PRT/M/2017 on building accessibility requirements.

Data analysis in this study is conducted through a thematic analysis approach. The first step is interviews and the collection of observation notes; then the researcher will identify the main themes that emerge from the data collection. According to (Braun & Clarke, 2006), thematic analysis allows researchers to systematically organize data and identify relevant patterns within the research context. After the main themes are identified, the researcher will code the data to group the information based on relevant categories. The results of this analysis are expected to provide deeper insights into the accessibility conditions of roads and sidewalks in the city of Parepare, as well as how it affects the daily lives of people with disabilities. In this way, researchers can identify the gap between existing policies and the reality on the ground. These findings will serve as the basis for providing concrete recommendations to policymakers and other stakeholders in the effort to create disability-friendly public spaces in the city of Parepare.

## **3 Literature Review**

### **3.1 Disability-Friendly Public Space Concept**

Public spaces are an integral part of social life, providing places for interaction, activities, and community mobility (Qi et al., 2024).. In the context of cities, public spaces include streets, sidewalks, parks, and other public areas that are accessible to all individuals, without exception (Errante, 2020). A good public space not only fulfills aesthetic functions but must also be able to create an open and welcoming environment for all users, including people with disabilities (Pineda, 2022). This has



become increasingly important given the rising awareness of disability rights and the need to create a more just and equitable society (Ravazzoli & Torricelli, 2017). Accessibility is one of the key aspects in creating disability-friendly public spaces (Nakarmi & Shrestha, 2023). In this case, the importance of accessibility lies not only in the physical aspect but also in the social and psychological aspects (Zhang et al., 2024).

Public space is defined as an area that can be accessed and used by everyone without exception (Chhabra & Shukla, 2024). Related to urbanization, public spaces encompass various elements such as roads, sidewalks, parks, and squares that play an important role in community life (Whaley et al., 2024). In the city of Parepare, public spaces have the potential to improve the quality of life and well-being of the community, especially for people with disabilities who often face difficulties in accessing public facilities (Nakarmi & Shrestha, 2023). Well-designed public spaces can provide economic and social benefits (Florida, 2017). On the other hand, public spaces that are not disability-friendly can cause dissatisfaction and reduce social participation (Whaley et al., 2024).

Accessibility is a concept that refers to the ability of all individuals, including people with disabilities, to access and use public facilities (Syafi'ie, 2014). According to the American Disability Act (ADA, 2010), accessibility encompasses various aspects such as buildings, transportation, and public infrastructure that enable individuals with disabilities to fully participate in community life. In the city of Parepare, accessibility has become an important issue considering the presence of a population of persons with disabilities who require special attention in the planning and development of public spaces (Zulpiani & Rusyani, 2023). The importance of accessibility for people with disabilities cannot be underestimated (Lestari & Raodah, 2020). Good accessibility allows them to interact with society, participate in social activities, and access public services (Pivetta et al., 2020). Modeling roads and sidewalks that consider accessibility for people with disabilities is greatly needed (Naghdizadegan Jahromi et al., 2023).

### **3.2 Related Policies and Regulations**

Persons with disabilities in Indonesia have rights regulated by various laws and policies (Nurlaily et al., 2022). One of the most important legal foundations is Law No. 8 of 2016 on Persons with Disabilities. This law emphasizes that persons with disabilities have the right to equal and non-discriminatory treatment in various aspects of life, including accessibility to public spaces. In addition, the Minister of PUPR Regulation No. 14/PRT/M/2017 on Accessibility for Persons with Disabilities also provides more specific guidelines on how public spaces, including roads and sidewalks, should be designed to meet the needs of persons with disabilities.

The city of Parepare, as one of the cities in South Sulawesi, has adopted local policies to support people with disabilities. One of the initiatives undertaken is the formation of the Accessibility Coordination Team for Persons with Disabilities, which is tasked with overseeing and ensuring that all new infrastructure projects meet the accessibility standards set by the central government. However, the challenges faced in the city of Parepare are not insignificant. This results in difficulties for people with disabilities in their daily activities (Jaganjac et al., 2017).

The city of Parepare has also made efforts to raise public awareness about the importance of accessibility for people with disabilities. Through campaigns and



seminars, the local government is striving to educate the public about the rights of persons with disabilities and the importance of disability-friendly public spaces (Smith, 2023). The results of these efforts still need to be improved, considering that many people do not understand disability issues (Washington, 2022). In infrastructure development, collaboration between the government, the community, and the disabled individuals themselves is necessary (Aman et al., 2023). A participatory approach in the planning and design of public spaces will be very helpful in ensuring that all parties are accommodated (Kusumaningdyah & Purnamasari, 2018).

### **3.3 Related studies**

Numerous studies have been conducted to explore aspects of disability-friendly public spaces. One study by Hacini et al. (2022) in Algeria found that good sidewalk design can significantly improve the mobility of people with disabilities. Another study by Eisenberg et al. (2022) shows that the use of appropriate materials in the construction of roads and sidewalks can reduce barriers for people with disabilities. Additionally, research by Sastrawan and Linggasani (2022) in Surabaya shows that community participation in public space planning can raise awareness of the importance of accessibility.

Modeling roads and sidewalks in other cities also provides valuable insights into the development of Parepare City. For example, research by Mahotra (2023) in New Delhi, India, shows that the integration of technology in pavement design can enhance user experience, especially for people with disabilities. In the city of Melbourne, Australia, Moiseev et al. (2019) revealed that designs that consider the needs of people with disabilities can reduce accidents and enhance feelings of safety. In Copenhagen, Das (2020) showed that well-designed public spaces can enhance social interaction and mobility for people with disabilities.

## **4 Discussion**

Disability-friendly public spaces are an important issue in the development of modern cities, including in Indonesia. The city of Parepare, as one of the developing cities in South Sulawesi, faces the challenge of creating inclusive infrastructure for all its citizens, including people with disabilities. Therefore, it is important to conduct an in-depth analysis of the road and sidewalk conditions in Parepare, as well as to identify the obstacles faced by people with disabilities. This article aims to explore the existing infrastructure conditions, describe the roads and sidewalks in Parepare, and identify the obstacles faced by people with disabilities.

### **4.1 Road And Sidewalk Conditions in Parepare**

The road and sidewalk infrastructure in the city of Parepare is currently still facing various challenges in terms of accessibility for people with disabilities. Based on research by Aman et al. (2023), many roads do not meet the accessibility standards set by the government. For instance, many roads exhibit insufficient sidewalk width, uneven surfaces, and a deficiency in signs and supportive facilities like benches and rest areas. Many roads and sidewalks in Parepare have uneven surfaces, as well as a lack of supporting facilities such as ramps and rest areas that are accessible to wheelchair users. This shows that there is still much work to be done to ensure that public infrastructure is accessible to all citizens. Based on data from the BPS Parepare City in



2022, the population of persons with disabilities in Parepare City reached 414, with a sample size of 150 in this study. The table below displays the characteristics of the sample:

*Table 1. Gender frequency and percentage of persons with disabilities in Parepare*

Gender		Frequency	Percent
Valid	Male	83	55.3
	Female	67	44.7
	Total	150	100.0

*Table 2. Age range of persons with disabilities in Parepare*

Age		Frequency	Percent
Valid	10-20 Years	6	4.0
	21-30 Years old	40	26.7
	31-40 Years old	34	22.7
	41-50 Years old	38	25.3
	50 Years and above	32	21.3
	Total	150	100.0

*Table 3. Disability Status*

Disability Status		Frequency	Percent
Valid	Physical Disability	59	39,3
	Intellectual Disability	19	12,7
	Sensory Disability	72	48,0
	Total	150	100.0

Table I, presenting the characteristics of respondents based on gender, reveals that the majority of respondents are male at 55.3% and female at 44.7%. Table II, which focuses on the age of the respondents, shows that the average percentage is the same for all respondents, except for the age group 10–20, which only comprises 4%. In Table III, the majority of respondents, 48%, have sensory disabilities, while 39.3% have physical disabilities. The remaining respondents, out of a total of 150, have intellectual disabilities.



The roads and sidewalks in the city of Parepare have diverse characteristics. In the city center, the streets are wider and have sidewalks, but they are often not well-maintained. Many sidewalks are filled with obstacles such as utility poles, billboards, and improperly parked vehicles, making it difficult for people with disabilities to move freely (Eisenberg et al., 2022).. However, many sidewalks do not have a flat and safe surface for people with disabilities, especially those who use wheelchairs. In this study, the ideal sidewalk should have a minimum width of 1.2 meters so that wheelchair users and pedestrians can move safely. Field survey results reveal that the condition of roads and sidewalks does not meet the standards set by the Indonesian Minister of Public Works and Public Housing Regulation No. 14/PRT/M/2017. These regulations pertain to the provision of public facilities, including roads and sidewalks, in public spaces. These facilities must comply with technical provisions for persons with disabilities. The following figure illustrates this clearly:





Figures 1, 2 and 3. The current state of roads and sidewalks fail to meet established standards, posing challenges for individuals with disabilities to participate in public activities. The sidewalks have holes, and their condition is similar to the absence of obvious signs at intersections, while a width of more than 1.5 meters is already up to standard. The lack of knowledge among planners and field implementers about which standards to follow is a contributing factor. The city government should use these findings to determine compliance with international or national standards. Limited Awareness and Training: Participants noted that the lack of awareness and training among city planners and public service providers regarding the needs of persons with disabilities contributes to the persistence of these barriers.

The main obstacle for people with disabilities in Parepare regarding road and sidewalk infrastructure is the lack of appropriate facilities. Many people with disabilities, especially those who use wheelchairs, face difficulties in accessing roads and sidewalks that are not friendly. The main obstacles include the lack of disability-friendly transportation facilities, insufficient information about accessibility, and the social stigma that still exists in society (Hadi et al., 2020). In addition, many people with disabilities report difficulties in accessing public services such as schools, hospitals, and government offices. In addition, the lack of obvious signs and instructions also poses a challenge. Signs that are not visible or informative can be confusing for people with disabilities, especially those with visual impairments. According to (Pivetta et al., 2020), clear and accessible information is crucial for enhancing the mobility of people with disabilities in public spaces. This is reinforced by research by Patrick and MacKinnon (2022) which shows that the community needs to be involved in the planning and design process of public spaces to create an inclusive environment. Therefore, there needs to be a collaborative effort between the government, the community, and people with disabilities to identify and address existing barriers.

## **4.2 Field observations**

The observation method used in this research is a qualitative approach with direct observation techniques and interviews. Observations were conducted at several strategic points in the city of Parepare, including shopping areas, parks, and public transportation routes, as well as roads and sidewalks. Interviews were conducted with persons with disabilities, public space managers, and the general public to gain a broader perspective on existing accessibility. This research also refers to the accessibility standards set by Law Number 8 of 2016 concerning persons with disabilities and the accessibility guidelines adopted from American Disability Act.

Observation results show that there are several obstacles faced by people with disabilities in accessing public spaces in the city of Parepare. For instance, the city of Parepare suffers from uneven sidewalks, a lack of clear signage, and inadequate supporting facilities such as seating and disability-friendly toilets. From observations, all the existing sidewalks do not meet accessibility standards, such as improper slopes and physical barriers. In interviews, many people with disabilities stated that they feel hindered in their daily activities due to the inadequate condition of roads and sidewalks. One respondent, a person with a motor disability, expressed that he often has to ask for help from others to navigate difficult-to-reach areas. This indicates the need for more attention from the government and society in creating more inclusive public spaces.



Finally, the results of this observation provide a strong basis for recommending improvements to road and sidewalk infrastructure in the city of Parepare. Collaborative efforts between the government, the community, and people with disabilities are needed to create more inclusive and friendly public spaces for everyone.

The voices of persons with disabilities, in creating disability-friendly public spaces, are crucial to listening to the voices of persons with disabilities themselves. Their voices are often overlooked in the decision-making process, even though they are the primary users of the facilities designed. Involving people with disabilities in discussions and public forums can provide valuable insights into the needs and challenges they face (Das, 2020) . Additionally, case studies in several cities around the world show that involving people with disabilities in public space planning can lead to more inclusive designs. For example, the city of Melbourne, Australia, has implemented the "Disability Inclusion Action Plan" program that involves people with disabilities in every stage of planning and designing public spaces (OECD, 2020) . As a result, many public facilities have become more friendly for people with disabilities, such as wider sidewalks and better access to public transportation. This is in line with the Smart City principle that prioritizes technology to improve the quality of life for the community, including people with disabilities (Bastien et al., 2020)..

The role of the community in creating friendly public spaces: The community plays an especially key role in creating disability-friendly public spaces. Community participation in the planning and maintenance of public spaces can encourage the creation of a more inclusive environment. This indicates that education and public awareness need to be enhanced to create friendly public spaces (Sastrawan & Linggasani, 2022). As a result, the design produced is more in line with user needs, and it also enhances the sense of ownership and responsibility of the community towards public spaces. Not only that, but the community can also play a role in monitoring and maintaining public facilities (Syaodih & Aprilesti, 2020). By forming community groups focused on accessibility issues, they can monitor the condition of roads and sidewalks, as well as report existing problems to the government.

This approach has proven effective in several areas, where active community monitoring can improve the quality of public infrastructure (Saraswat et al., 2022). Lastly, it is important to create a culture of mutual cooperation in society to support people with disabilities. Through social activities that involve all layers of society, such as cleaning and repairing public facilities, it is hoped that a high sense of empathy and solidarity for people with disabilities can be created (Khalid et al., 2022). Thus, public spaces in the city of Parepare can become more friendly and inclusive for all residents.

### **4.3 Road and Sidewalk Modeling Models**

The definition and basic principles of developing disability-friendly public spaces are a necessity in creating an inclusive environment that is accessible to everyone, including people with disabilities. The definition of disability-friendly public spaces refers to areas designed with consideration for the needs of individuals with several types of disabilities, whether physical, sensory, or cognitive. According to Law Number 8 of 2016 concerning Persons with Disabilities, every individual is entitled to the same accessibility to public spaces and public services (Law of the Republic of Indonesia, 2016). The basic principles that must be applied in the modeling of roads and sidewalks



include accessibility, comfort, safety, and aesthetics. In the context of Parepare City, the modeling of disability-friendly roads and sidewalks must consider the local geographical, demographic, and cultural conditions. For example, narrow and uneven sidewalks can be a barrier for wheelchair users, while the lack of clear signage can make it difficult for visually impaired individuals to navigate.

Universal design is an approach aimed at creating products and environments that can be used by everyone, without the need for adjustments (Arora & Deshpande, 2021). For example, sidewalks designed with adequate width, smooth surfaces, and clear visual markers can enhance the experience of road users (Hosseini et al., 2022). Thus, collaboration between the government, designers, and people with disabilities will result in a more inclusive and sustainable environment for all city residents.

One example of the successful implementation of universal design can be seen in several major cities around the world, such as Melbourne, which has implemented the Disability Access and Inclusion Plan (OECD, 2020). This plan covers various aspects, from road planning and sidewalks to other public facilities. In Melbourne, sidewalks are designed with features such as slip-resistant surfaces, lane markers, and adequate resting areas for wheelchair users. This shows that with proper planning, accessibility can be effectively achieved. In addition, it is also important to involve people with disabilities in the planning and design process. Their participation can provide valuable insights into the needs and challenges faced in the use of public spaces.

The design of disability-friendly roads and sidewalks is a crucial step in creating inclusive public spaces for all segments of society. In the context of the city of Parepare, special attention needs to be given to accessibility for people with disabilities, especially in designing road and sidewalk elements. The use of special paths for pedestrians with disabilities and the placement of obvious signs are other essential elements. These signs must have high color contrast to be easily visible to people with visual impairments. According to research conducted by Eisenberg et al. (2022), the presence of clear signs and instructions in public spaces can minimize confusion and increase the confidence of people with disabilities when engaging in activities outside their homes. Through a participatory approach, the resulting design will be more aligned with the actual needs of users, creating public spaces that are inclusive and friendly for everyone (Kusumaningdyah & Purnamasari, 2018).

The selection of appropriate technology and materials in modeling disability-friendly roads and sidewalks is crucial to achieving optimal accessibility goals. The materials used must have characteristics that support the movement of people with disabilities, such as slip-resistant and durable surfaces. For example, the use of paving block materials with appropriate textures can reduce the risk of slipping for wheelchair users or pedestrians with physical limitations (Zulpiani & Rusyani, 2023). Innovative technologies such as sensors and mobile applications can also be implemented to enhance accessibility. The use of smart city technology that integrates accessibility data can enable the government to make the necessary adjustments in public infrastructure. By combining modern technology and the right materials, the city of Parepare can create roads and sidewalks that are not only disability-friendly but also sustainable and inclusive for all its users. This is in line with the principles of universal design that prioritize accessibility and comfort for everyone (Pineda, 2022).



One of the cities that has successfully implemented a disability-friendly public space model is Melbourne, Australia. This city has implemented the Disability Access and Inclusion Plan (DAIP) 2020-2024, which aims to create better accessibility for all citizens, including people with disabilities. Through this plan, Melbourne focuses on developing inclusive public infrastructure, such as wider sidewalks, barrier-free pathways, and public facilities accessible to everyone (OECD, 2020). Statistics show that after the implementation of DAIP, there was a significant increase in the use of public facilities by people with disabilities. This shows that investment in accessibility is not only beneficial for people with disabilities but also improves the overall quality of life for the community (Anthony et al., 2023). According to Anthony et. al. (2023), this success is evident from the increased participation of people with disabilities in community activities and the use of public facilities.

In Europe, the city of Barcelona is also a good example of this. By applying universal design principles, Barcelona has transformed many streets and sidewalks to ensure accessibility for people with disabilities. This initiative not only includes physical aspects but also involves training for civil servants to understand and meet the needs of people with disabilities (Das, 2020). Through this case study, it is clear that the implementation of disability-friendly public space models has proven effective in various cities around the world. This success demonstrates the importance of government and community commitment in creating an inclusive environment for all individuals.

The lesson that can be drawn from the case studies of cities that have successfully implemented disability-friendly public space models is the importance of community participation in the planning and design process. In Melbourne, for example, the city government involves people with disabilities at every stage of the DAIP development. This ensures that their needs and expectations are met, thereby creating truly inclusive public spaces (Whaley et al., 2024). Moreover, the importance of a data-driven approach in designing disability-friendly public spaces is also noticeably clear. In Barcelona, the use of surveys and data analysis to understand the needs of people with disabilities has helped in formulating more targeted policies. This data also enables the government to monitor the progress and effectiveness of the policies implemented (Eisenberg et al., 2022).

#### **4.4 Implementation and challenges**

The implementation of disability-friendly public spaces in the city of Parepare requires systematic steps focused on infrastructure planning and design. The first step is to conduct a thorough assessment of the current condition of roads and sidewalks. According to Hadi et. al. (2020), It is important to identify the barriers faced by people with disabilities in accessing public spaces. This assessment should include measurements of sidewalk width, surface slope, and the presence of supporting facilities such as signage and lighting. In addition, there is a need to develop design standards that refer to international guidelines, such as those established in the Americans with Disabilities Act (ADA, 2010). The implementation of these standards will ensure that all elements of roads and sidewalks are accessible to everyone, including people with disabilities.



Community involvement in this process not only raises awareness but also provides valuable input on the needs of people with disabilities. This is in line with the inclusive approach proposed by Pineda (2022) where the community is invited to actively participate in public space planning. Lastly, regular evaluation and monitoring need to be conducted to ensure that the measures taken are effective and meet the needs of persons with disabilities. Using clear success indicators can help in assessing the impact of the changes made, as well as providing the necessary data for further improvements (Rebernik et al., 2019).

Stakeholder involvement is a crucial aspect in the planning of disability-friendly public spaces. The stakeholders involved include not only local governments, but also non-governmental organizations, communities with disabilities, and the general public. According to Anthony et al. (2023), collaboration between various parties can improve the effectiveness of public policies and ensure that the voices of people with disabilities are heard in the decision-making process. Local governments have a key role in providing budgets and resources for the implementation of action plans. In addition, the government needs to conduct training for construction workers and urban planners on universal design principles so that they understand the importance of creating an inclusive environment.

Non-governmental organizations (NGOs) also play a role in providing technical support and advocacy for people with disabilities. They can assist in conducting surveys and collecting data on the current accessibility conditions, as well as advocating for the necessary changes to the government. This is in line with the opinion of Luyckx et al. (2019) who state that the involvement of NGOs can strengthen public policy and ensure that the rights of persons with disabilities are protected. The general public must also be involved in this process. Through discussion forums and public consultations, the public can provide input on their needs and expectations regarding public spaces. This activity not only raises awareness of accessibility issues but also fosters a sense of ownership in disability-friendly public spaces (Khalid et al., 2022).

One of the main challenges in creating disability-friendly public spaces in the city of Parepare is budget constraints. In Indonesia, including the city of Parepare, the budget allocated for the development of disability-friendly infrastructure is often inadequate. This results in many projects planned to improve accessibility being unfulfilled or only partially implemented. For example, in several sidewalk construction projects in the city of Parepare, many of them are not equipped with necessary facilities such as ramps, warning signs, and surfaces suitable for wheelchair users. This shows that budget constraints not only affect the quality of infrastructure but also the equitable access for people with disabilities.

Resistance from the community and related parties also poses a significant challenge in the implementation of disability-friendly public spaces in the city of Parepare. According to Khalid et al. (2022), this social stigma hinders efforts to create an inclusive environment. A study by Hacini et al. (2022), shows that the lack of understanding of the long-term benefits of investing in accessibility is often the main reason for the reluctance to implement changes. Educational engagement and public awareness campaigns are also crucial in addressing this resistance. Educational programs



targeting the general public, as well as training for relevant stakeholders, can help change perceptions and attitudes toward people with disabilities.

In an effort to create disability-friendly public spaces in Parepare City, a participatory approach is one of the most effective solutions. This approach involves various stakeholders, including people with disabilities, the government, architects, and the general public, in the planning and design process of public infrastructure. According to Hacini et al. (2022), community participation in the design of public spaces not only enhances the quality of the design but also ensures that the specific needs of people with disabilities can be well accommodated. In Parepare City, a participatory approach can be implemented through discussion forums, surveys, and workshops involving people with disabilities.

Education and socialization are important aspects in creating disability-friendly public spaces in the city of Parepare. According to Aman et al. (2023), public awareness of accessibility issues has a significant impact on the implementation of disability-friendly public policies. Some strategies include formal and informal education about disability rights. This not only enhances students' understanding of disability issues but also fosters a positive attitude toward people with disabilities (Khalid et al., 2022).

At this point, the design of the roads and sidewalks is being made in line with Minister of PUPR Regulation No. 14/PRT/M/2017. This regulation says that public facilities like roads and sidewalks in public areas must meet technical standards for people with disabilities and the Guidelines for Planning Pedestrian Facilities from the Indonesian Ministry of PUPR.

## 5 Conclusion

This study shows that the modeling of disability-friendly roads and sidewalks in the city of Parepare still faces various challenges. Although there are supporting regulations, such as Law Number 8 of 2016 on Persons with Disabilities, the implementation in the field often does not meet the established standards. Data shows that around 414 people from the population of Parepare City are persons with disabilities, and many of them have difficulty accessing public spaces, especially roads and sidewalks. Disability-friendly public spaces are crucial for creating social inclusion and improving the quality of life for people with disabilities. Good accessibility is not only beneficial for people with disabilities but also for the general public, including parents and children. With road and sidewalk designs that adhere to universal design principles, Parepare is moving toward a smart disability city (SCD).

## 6 Recommendations

Recommendations for the Parepare city government are to increase collaboration with communities with disabilities in infrastructure planning and development, as well as conduct periodic audits to ensure that public spaces meet the required accessibility standards.



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