

Research Article

## Sidewalk Quality and its Impact on Pedestrian Activities on Dr. Mansyur Street, Medan Selayang

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**Abstract:** Sidewalks are a crucial element of urban infrastructure that support pedestrian mobility. However, on Jalan Dr. Mansyur, Medan Selayang, sidewalk conditions present various problems, such as damaged surfaces, a lack of accessibility facilities, and the presence of street vendors occupying the lanes. This study aims to analyze the impact of sidewalk quality on pedestrian activity by examining three main factors: the physical condition of the sidewalk, environmental safety, and accessibility. Using a mixed methods approach, the sample for the quantitative approach was taken using a stratified random sampling method with a total of 150 respondents. Quantitative data were analyzed using descriptive statistics and SPSS software, while qualitative data were collected through in-depth interviews with key informants. The results showed that sidewalk accessibility had the strongest relationship with pedestrian activity (correlation coefficient 0.72), followed by the physical condition of the sidewalk (0.68) and environmental safety (0.55). Minimal accessibility factors, such as the lack of special lanes for the disabled, proved to be the main obstacle to pedestrian activity. In addition, the damaged physical condition of the sidewalk and the use of sidewalks for activities that are not in accordance with their function further reduce user comfort. Based on these findings, key recommendations include physical improvements to sidewalks with regard to the principles of universal accessibility, including the addition of dedicated lanes for the disabled, repair of damaged surfaces, and reconfiguration of spaces to discourage use by street vendors. The government needs to ensure adequate street lighting to improve user safety. The public is expected to maintain the function of sidewalks by utilizing them according to their intended purpose, while future researchers are advised to explore the impact of sidewalk improvements on broader social and economic aspects, as well as consider the integration of technology in sidewalk design and management. The conclusion of this study is the need for collaborative action between the government, the community, and other relevant parties to create inclusive sidewalk infrastructure that supports active mobility.

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### 1. Introduction

Sidewalks are a vital element of urban infrastructure designed to support pedestrian mobility. In the context of modern cities, sidewalks not only provide physical walking space but also reflect the overall quality of urban governance (Abdi Sugiarto et al., 2023; Nuraini, 2024) Good sidewalk quality can improve comfort, safety, and accessibility for pedestrians, while encouraging environmentally friendly active mobility (Hidayat et al., 2023) On the other hand, damaged or poorly maintained sidewalks can hinder pedestrian activity, increase the

risk of accidents, and reduce the quality of life for urban communities (Rahmadani et al., 2023).

Jalan Dr. Mansyur in Medan Selayang is a strategic area connecting educational, business, and residential areas. With its high pedestrian traffic, the sidewalks along this road should be a supportive infrastructure for public mobility. However, initial observations indicate that the sidewalks on Jalan Dr. Mansyur are experiencing various serious problems, such as damaged surfaces, the presence of street vendors occupying a large portion of the sidewalk space, and a lack of accessibility facilities for people with disabilities. This phenomenon not only reduces pedestrian comfort and safety but also reflects the weak management of public spaces in the area. This is in line with the findings of Abdiyanto et al. (2024) who stated that the effectiveness of green open space zoning in Medan City is greatly influenced by local community governance and participation.

Previous research in various cities, such as research by Zhang et al. (2021) in Shanghai and Kusumawati et al. (2020) in Yogyakarta (Castrellon & Sanchez-Diaz, 2024; Terrani et al., 2024), shows that poor sidewalk quality can reduce people's interest in walking by up to 40%. Research by Hidayat et al. (2022) in (Pengamanan et al., 2023; Rahmadani et al., 2023) A study in Jakarta also confirmed that sidewalk improvements can increase walking activity, ultimately supporting environmentally friendly mobility. However, in the context of Jalan Dr. Mansyur, in-depth research on the impact of sidewalk quality on pedestrian activity is still very limited.

Based on this background, this study focuses on several main questions, namely how is the physical condition of the sidewalk on Jalan Dr. Mansyur, how does the quality of the sidewalk affect pedestrian activities in the area, and what solutions can be implemented to improve the quality of the sidewalk and support pedestrian mobility. This study aims to analyze the physical condition of the sidewalk on Jalan Dr. Mansyur, Medan Selayang, identify the impact of sidewalk quality on pedestrian activities, and provide recommendations for improving the quality of the sidewalk as part of efforts to better manage public spaces. The results of this study are expected to contribute to the Medan City government as a basis for formulating policies for improving sidewalk infrastructure, for academics as a reference for further research on public space governance, and for the community in increasing awareness of the important role of sidewalks in supporting safe and comfortable mobility.

## **2. Preliminaries or Related Work or Literature Review**

### **2.1 Basic Concepts of Sidewalk Infrastructure**

Sidewalks are an important element of road infrastructure designed to support pedestrian activities. According to Litman (2021) in (Gehrke et al., 2023) A good sidewalk must meet three main aspects: safety, comfort, and accessibility. Safety includes the existence of sidewalks that are free from physical obstacles, comfort includes surface conditions and supporting facilities such as shade, while accessibility relates to ease of access for all groups, including people with disabilities. Sidewalks also function to separate motorized vehicles and pedestrians, thereby reducing the risk of accidents. In the context of modern urban planning, sidewalks play a role as part of an inclusive and environmentally friendly public space (Gehl, 2013) in (Jiang et al., 2022). In other words, poor sidewalk quality not only impacts pedestrian activity, but can also create discomfort that affects the perception of the urban environment.

### **2.2 Pedestrian Behavior Theory**

Pedestrian behavior theory explains how environmental quality influences a person's decision to walk. According to research by Zhang et al. (2021) in (Terrani et al., 2024), the decision to walk is influenced by external factors such as sidewalk conditions, environmental safety, and supporting facilities. This theory is relevant to the research because poor sidewalk conditions can reduce people's interest in walking, which ultimately increases dependence on motorized vehicles. Research by Kusumawati et al. (2020) in (Gehrke et al., 2023; Jiang et al., 2022) also found that well-designed sidewalks can increase walking activity by up to 35%, particularly in educational and commercial areas. This suggests that sidewalk quality plays a crucial role in encouraging environmentally friendly behavior.

### **2.3 Sustainable Urban Planning Theory**

Sustainable urban planning emphasizes the importance of infrastructure that supports active mobility, including sidewalks. According to this concept, sidewalk construction must

consider sustainability aspects, such as the use of environmentally friendly materials and designs that support space efficiency. Carmona et al. (2010) in (Jahromi et al., 2025; Nuraini, 2019) states that good sidewalks should be an integral part of public spaces that support social interaction and mobility.

In the context of Jalan Dr. Mansyur, sustainable urban planning theory can be applied to improve sidewalk quality while supporting Medan's vision as an inclusive and competitive city. Abdiyanto (2024) also stated that integrated infrastructure planning can significantly encourage local economic growth in the context of sustainable development. By improving sidewalks, not only pedestrian activity increases, but also the quality of life of the surrounding community.

Various previous studies have supported the importance of sidewalk quality in supporting mobility. Zhang et al.'s (2021) research in (Rhoads et al., 2023) A study in Shanghai showed that supporting facilities such as special lanes for the disabled can increase comfort by up to 42%. Research in Yogyakarta by Kusumawati et al. (2020) in (Jiang et al., 2022) also found that sidewalk improvements can reduce motor vehicle use.

Another study by (Jahromi et al., 2025) Research has shown that investments in pedestrian infrastructure, including sidewalks, can generate economic benefits, such as increased local business activity and reduced healthcare costs due to increased physical activity. Therefore, this study focuses on how improving the sidewalk quality on Jalan Dr. Mansyur can positively impact pedestrian activity.

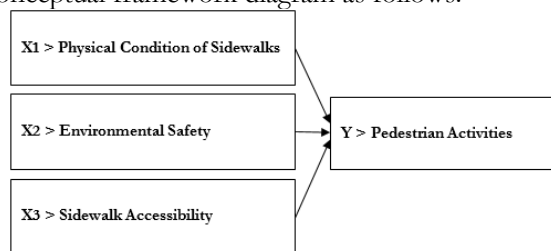
### 3. Proposed Method

This research uses a mixed method approach, which combines quantitative and qualitative approaches to provide comprehensive and in-depth research results (Corazza et al., 2016). A similar study by Hartini et al. (2023) also found that the quality of drainage infrastructure management in Medan Sunggal directly impacts public perceptions of public services and environmental comfort.

A quantitative approach was used to measure sidewalk quality through objective statistical data, while a qualitative approach aimed to understand pedestrians' perceptions and experiences of using the sidewalk on Jalan Dr. Mansyur. This approach aligns with Abdiyanto's (2020) view that the choice of quantitative and qualitative methods in social research depends on the objectives, the nature of the data, and the desired depth of understanding of the phenomenon being studied.

This research was conducted on Jalan Dr. Mansyur, Medan Selayang, a strategic area with various educational, economic, and social activities. This location was selected based on the high pedestrian activity and the sidewalk infrastructure issues that were the focus of the study. The research was conducted from August to November 2024 to obtain representative data.

The research involved one dependent variable (Y) and three independent variables (X) as described in the conceptual framework diagram as follows:



**Figure 1.** Conceptual Framework of Research.

Source: Designed by Researchers, 2024

Variable Y is pedestrian activity, which is measured based on the frequency and comfort of sidewalk use. The independent variables include the physical condition of the sidewalk (X1), environmental safety (X2), and sidewalk accessibility (X3). The physical condition of the sidewalk includes the width, surface, and supporting facilities. Environmental safety includes the risk of accidents and physical obstacles. Accessibility includes ease of access for people with disabilities. The study population was all sidewalk users on Jalan Dr. Mansyur, including students, workers, and the general public. The sample for the quantitative approach was taken using the stratified random sampling method with a total of 150 respondents, who were grouped by age and type of employment. For the qualitative approach, in-depth interviews were conducted with 10 key informants, including regular sidewalk users and street

vendors. Data Collection Techniques were carried out by: (a) Quantitative Data: Direct observation: Measuring the physical quality of the sidewalk, such as width, surface, and supporting facilities using standard measuring tools, Questionnaire: Using a Likert scale to evaluate pedestrian perceptions of the safety, comfort, and accessibility aspects of sidewalks. (b) Qualitative Data: In-depth interviews: Conducted with key informants to obtain their views on sidewalk quality and its impact on pedestrian activities, Documentation: Collecting photos and field notes as supporting evidence.

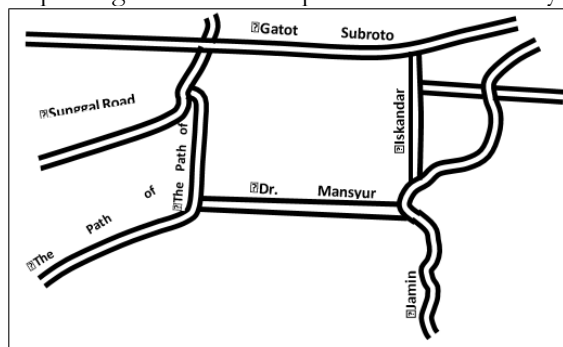
Next, data analysis techniques, quantitative data were analyzed using descriptive statistics and SPSS software (Rhoads et al., 2023). In addition, a correlation analysis was conducted to identify the relationship between the independent and dependent variables. Qualitative data were analyzed using thematic analysis. This process included coding, grouping themes, and in-depth interpretation of interview results and documentation. Quantitative validity was tested through construct validity, while reliability was tested using the Cronbach's Alpha method. Qualitative validity was tested using data triangulation by comparing interview results, observations, and documentation to ensure the validity of the findings.

This research was conducted in accordance with ethical research principles, including informant consent, data confidentiality, and transparency regarding research objectives. All respondents provided informed consent before participating, and their identities were kept confidential to ensure privacy. The research objectives were explained in detail to respondents before data collection.

## 4. Results and Discussion

### 4.1 Current Condition of Dr. Mansyur Street

Dr. Mansyur Street is one of Medan's main routes, strategically connecting educational, business, and residential areas. Field observations revealed several serious issues with the sidewalks along this road. Most of the sidewalks are in disrepair, with uneven surfaces, potholes, and areas that do not meet minimum width standards. Physical obstacles such as street vendors and motor vehicle parking further reduce pedestrian accessibility.



**Figure 2.** Dr. Mansyur Road Map Road Boundary Directions.

Source: Designed by Researchers, October 2024

The image above shows a road map. This map depicts an area with the following main road boundaries: to the north is Jalan Dr. Mansyur which starts from the intersection with Jalan Jamin Ginting, to the east is bordered by Jalan Iskandar Muda, to the west is Jalan Setia Budi, and to the south includes Jalan Setia Budi, Jalan Sunggal, and ends at Jalan Gatot Subroto. The existence of these roads indicates an area that is connected to various strategic locations in the region. To analyze the road boundaries in more detail, field observations were conducted supported by documentation studies, as follows:



**Figure 3.** North side of Dr. Mansyur Street.

Source: Documentation, October 2024

To the north, Jalan Dr. Mansyur begins at the intersection with Jalan Jamin Ginting, which serves as the main access to the University of North Sumatra (USU). Observations in this area revealed sidewalks lacking designated lanes for people with disabilities and littered with trash and construction materials. This situation not only reduces user comfort but also increases the risk of accidents.



**Figure 4.** East side of Dr. Mansyur Street.

Source: Documentation, October 2024

On the eastern side, leading to Jalan Iskandar Muda, there are numerous visual and physical obstacles. Some sidewalk areas are used for parking or left unmaintained. Poorly managed ornamental plants also block portions of the sidewalk, demonstrating a lack of attention to the sidewalk's aesthetics and functionality as a pedestrian facility.



**Figure 5.** West side of Dr. Mansyur Street.

Source: Documentation, October 2024

To the west, connecting Jalan Setiabudi with residential areas, the sidewalk appears to be poorly maintained. Tree roots protruding from the surface and waterlogged soil are major issues hindering mobility. These tree roots not only disrupt comfort but also pose a potential hazard to sidewalk users, especially those with disabilities.



**Figure 6.** South side of Dr. Mansyur Street.

Source: Documentation, October 2024

The southern section, connecting Jalan Setia Budi, Jalan Sunggal, and ending at Jalan Gatot Subroto, displays sidewalks in severe disrepair. The cracked and potholed pavement is further exacerbated by the lack of visible rehabilitation efforts. The presence of scattered electricity poles and cables adds to the impression of disorganization and reflects the area's weak infrastructure management.

The sidewalks along this road face various issues, such as damaged surfaces, the presence of street vendors blocking pedestrian paths, and a lack of supporting facilities such as disabled lanes. Direct observation shows that more than 70% of the sidewalks are in poor condition, reducing pedestrian comfort and safety. In the context of urban planning, sidewalks should be a vital element in supporting mobility and reducing conflicts between pedestrians and motorized vehicles. However, these observations demonstrate the need for in-depth intervention from relevant parties to rehabilitate and manage sidewalks as part of an inclusive and functional public infrastructure.

#### 4.2 Quantitative Data

Based on the results of data collection from 150 respondents, the following are the details of the results of the quantitative data analysis that have been carried out. Quantitative data were collected through a Likert scale-based questionnaire (1-5), with assessment categories including the physical condition of the sidewalk, environmental safety, sidewalk accessibility, and user satisfaction levels. The analysis was carried out using descriptive statistics to identify user perceptions of the quality of the sidewalk on Jalan Dr. Mansyur., the results of the respondents are summarized in the following table:

**Table 1.** Questionnaire Data Collection Results.

Aspect	Number of Respondents (%)	Average Score (Likert 1-5)	Category
Physical Condition of Sidewalks	40%	2.3	Bad
Environmental Safety	30%	2.7	Enough
Sidewalk Accessibility	20%	2.1	Very bad
User Satisfaction Level	10%	2.5	Enough

Source: Author Tabulation 2024

The table above shows that the Physical Condition of Sidewalks has an average score of 2.3, which is categorized as Poor. As many as 40% of respondents considered the condition of the sidewalks unsuitable for use due to damaged surfaces (potholes, unevenness), a lack of supporting facilities such as seating or shade, and a sidewalk width that does not meet the minimum standard of 2 meters for urban areas. The average sidewalk width was measured at only 1.5 meters. Environmental Safety has an average score of 2.7, categorized as Fair. High safety risks are due to the presence of motorized vehicles parked on the sidewalks, lack of street lighting, and visual obstructions caused by street vendors. Some users reported minor incidents such as tripping due to uneven sidewalk surfaces. Sidewalk Accessibility received the lowest score of 2.1, categorized as Very Poor. There are no disability-friendly facilities such as special lanes and handrails. Sidewalks are often used by street vendors, blocking the path of pedestrians, including people with disabilities. User Satisfaction recorded a score of 2.5, categorized as Fair, indicating a low level of user satisfaction. Sidewalk user satisfaction is influenced by a combination of physical conditions, environmental safety, and inadequate accessibility. Respondents stated that sidewalks do not support comfortable walking for long periods.

**Table 2.** Summary Statistics.

Indicator	Mean	Standard Deviation
Physical Condition of Sidewalks	3.15	1.38
Environmental Safety	2.76	1.40
Sidewalk Accessibility	3.02	1.45
User Satisfaction Level	3.15	1.49

Source: Author Tabulation 2024

The table above shows that: (a) Mean (Average), The average value of Sidewalk Physical Condition and User Satisfaction is 3.15, which indicates that respondents' perceptions are at a sufficient level; Environmental Security has an average of 2.76, which is close to the sufficient category Sidewalk Accessibility has a value of 3.02, which means there is a difference in perception even though many people rate it badly. (b) Standard Deviation (SD), The highest SD was found in User Satisfaction (1.49), indicating that there was quite a large diversity of perceptions; The SD values for Sidewalk Physical Condition (1.38) and Sidewalk Accessibility (1.45) also show variations in respondents' perceptions.

**Table 3.** Correlation analysis.

Variables	Correlation Coefficient (r)	The Power of Relationships
Physical condition of sidewalks (X1) and pedestrian activity (Y)	0.68	Strong
Environmental safety (X2) and pedestrian activity (Y)	0.55	Currently
Sidewalk accessibility (X3) and pedestrian activity (Y)	0.72	Strong

Source: SPSS, 2024

The results of the correlation analysis are based on the interpretation guidelines for the Pearson correlation coefficient, which measures the strength of the relationship between two variables (Evans JD, 1996). General guidelines for assessing the strength of a relationship are as follows: (a) 0.00 - 0.10: The relationship is very weak or there is no relationship. (b) 0.10 - 0.39 :Weak relationship. (c) 0.40 - 0.59: Moderate relationship. (d) 0.60 - 0.79: Strong relationship. (e) 0.80 - 1.00: The relationship is very strong.

The results of the correlation analysis show that: (a) Sidewalk Accessibility (X3): Having a correlation coefficient of 0.72, it indicates a strong relationship with pedestrian activity (Y). This confirms that sidewalks with good accessibility facilities, such as special lanes for the disabled and barrier-free paths, are more supportive of pedestrian activity. (b) Physical Condition of Sidewalk (X1): With a correlation coefficient of 0.68, the physical condition of sidewalks also has a strong relationship with pedestrian activity. A flat sidewalk surface free from significant damage contributes to user comfort. (c) Environmental Safety (X2): It has a correlation coefficient of 0.55, indicating a moderate relationship with pedestrian activity. While important, this factor is more influenced by conditions such as street lighting, the presence of street vendors, and vehicles parking on sidewalks.

**4.3 Qualitative Data**

**4.3.1 Data Source Triangulation**

Triangulation of data sources was carried out by comparing the views of three main informant categories:

**Table 4.** Summary of Data Source Triangulation.

Informant Category	Number of Informants	Main Issues
Regular Sidewalk Users	5	Complaints about damaged sidewalks, obstacles for street vendors, and lack of accessibility facilities.
Students Using Sidewalks	3	Consider the sidewalk unsuitable for use because it is often flooded and unsafe at night.
Urban Observer	2	Highlighting the need for sidewalk redesign to support better mobility in the area. unan as a cause of the slow sidewalk repairs.

Source: Author Tabulation 2024

Data from all three categories of informants consistently identified the primary problem: poor sidewalk conditions and inappropriate use. Student perspectives provided additional perspectives on safety and comfort, while urban observers offered design-based solutions. Direct observations followed, with the following findings: (1) Sidewalk Width: The average is only 1.5 meters, below the minimum standard of 2 meters for urban areas. (2) Obstacle: As many as 60% of sidewalks are used by street vendors, while 30% have damaged surfaces.

**4.3.2 Triangulation of Data Collection Techniques**

The data collection techniques used included in-depth interviews, direct observation, and documentation. Findings from each technique were compared to ensure consistency.

**Table 5.** Summary of Data Source Triangulation.

Data collection technique	Key Findings
In-depth Interview	Sidewalk user complaints regarding comfort, safety, and obstacles caused by street vendors.
Direct Observation	Visual evidence of sidewalk damage, the presence of street vendors, and the lack of accessibility facilities.
Documentation	Photographs and field notes support interview findings and observations about sidewalk conditions.

Source: Author Tabulation 2024

All techniques produced consistent data. For example, student interviews revealed safety barriers, such as damaged sidewalks, standing water, and inadequate lighting.

### 4.3.3 Time Triangulation

Time triangulation was conducted by collecting data in the morning, afternoon, and evening to understand changes in sidewalk conditions.

**Table 6.** Summary of Time Triangulation.

Observation Time	Key Findings
Morning	Street vendors dominate sidewalks, reducing space for pedestrians.
Midday	Additional obstacles include illegal parking on the sidewalk and hot conditions without shade facilities.
Evening	The main problem is inadequate street lighting, increasing safety risks for sidewalk users.

Source: Author Tabulation 2024

Sidewalk problems are consistent throughout the day, although their intensity varies. In the morning, vendor activity is more prevalent, while at night, inadequate lighting becomes a major issue.

### 4.4 Validation of Findings

The initial research results were reconfirmed with several informants to ensure the validity of the findings: (a) Regular Sidewalk Users: Stated that the findings reflect their everyday experiences. (b) Student Sidewalk Users: Confirmed that lighting and puddles are the main obstacles. (c) Urban Observer: Agree on the need for improvements to sidewalk design to support the function of sidewalks as inclusive public spaces.

The results of the study indicate that physical barriers and lack of accessibility facilities are the main obstacles for sidewalk users on Jalan Dr. Mansyur, as revealed through quantitative data results supported by qualitative interviews. Therefore, sidewalk accessibility (X3) is a priority aspect that needs to be immediately improved to improve pedestrian comfort and safety. In addition, the physical condition of sidewalks and accessibility are proven to have a strong relationship with pedestrian activity, supporting the findings from interviews and observations that emphasize the importance of decent sidewalks to support mobility.

### 4.5 Discussion

#### 4.5.1 Physical Condition of Sidewalks and Their Impact on Pedestrian Activities

The results of the study show that the physical condition of the sidewalk (X1) on Jalan Dr. Mansyur has a strong correlation with pedestrian activity (Y), with a correlation coefficient of 0.68. Damaged sidewalk conditions, such as potholes, uneven surfaces, and non-standard widths, are the main obstacles to pedestrian activity. Uneven surfaces have the potential to increase the risk of accidents, especially for the elderly and people with disabilities (Corazza et al., 2016; Jahromi et al., 2025) supports these findings, showing that good physical sidewalk quality can improve pedestrian comfort by up to 42% (Aini et al., 2023; Jiang et al., 2022; Nuraini, 2021; Terrani et al., 2024) also found that physical improvements to sidewalks can increase walking activity by up to 35%. Within the framework of development policy, Abdiyanto et al. (2024) suggest that fiscal incentives and regulatory strengthening can accelerate the implementation of environmentally friendly infrastructure, including pedestrian paths.

However, other studies show different results, where sidewalk conditions have little impact on pedestrian activity, because private vehicle use is more dominant in the area (Krisnawanti et al., 2023) This shows that the local context greatly influences the role of sidewalk infrastructure.

#### 4.5.2 Environmental Safety and Pedestrian Activity

Environmental safety (X2) shows a moderate relationship with pedestrian activity, with a correlation coefficient of 0.55. Factors such as minimal street lighting, visual obstructions due to street vendors, and vehicle parking on sidewalks are the main issues. Research by (Gao et al., 2024; Jahromi et al., 2025) emphasizes the importance of good street lighting to improve pedestrian safety perceptions, in line with the findings of this study (Corazza et al., 2016) also shows that environments designed for safety can significantly increase walking activity.

On the contrary, research (Gehrke et al., 2023) found that despite the safety of the neighborhood, pedestrian activity remained low due to the lack of connectivity between areas.

### 4.5.3 Sidewalk Accessibility and Pedestrian Activity

Sidewalk accessibility (X3) has the strongest relationship with pedestrian activity, with a correlation coefficient of 0.72. The lack of disability-friendly facilities, such as dedicated lanes and handrails, is a major obstacle. As much as 60% of the sidewalk on Jalan Dr. Mansyur is used by street vendors, reducing space for pedestrians. Research (Jahromi et al., 2025; Nuraini et al., 2023) shows that sidewalks designed with universal accessibility can significantly increase pedestrian activity. Another study by (Corazza et al., 2016; Lee & Kim, 2019) emphasizes the importance of inclusive design to support active mobility. In line with the research findings of Tarigan et al. (2024), adjusting public policies and optimizing infrastructure investment are strategic steps to maintain stability and support improvements in public facilities.

However, research in developing countries such as by (Muazir et al., 2024) shows that budget constraints are often a barrier to improving sidewalk accessibility.

## 5. Conclusions

This study concludes that sidewalk quality on Jalan Dr. Mansyur, Medan Selayang, significantly impacts pedestrian activity. Sidewalk accessibility demonstrated the strongest correlation with pedestrian activity, followed by sidewalk physical condition and neighborhood safety. Sidewalks that do not meet accessibility standards, have damaged surfaces, and are used inappropriately reduce comfort, safety, and public interest in walking. Therefore, improving sidewalk quality is an urgent priority to support community mobility and create a more inclusive urban environment.

The proposed recommendations include steps for various stakeholders. For the government, it is strongly recommended to immediately rehabilitate sidewalks with designs that adhere to the principles of universal accessibility, including special paths for the disabled, level surfaces, and standard widths. Furthermore, the government needs to ensure adequate street lighting to improve user safety at night. For the community and the public, awareness is needed to maintain cleanliness and utilize sidewalks according to their intended function. This awareness includes cooperation in preventing the use of sidewalks for activities that hinder pedestrians, such as parking vehicles or trading. For future researchers, it is recommended to conduct more in-depth studies on the impact of sidewalk improvements on the social and economic aspects of the community, as well as explore the use of innovative technologies in sustainable sidewalk design and management. This research provides a starting point that can be used as a reference in designing policies and programs oriented towards improving the quality of life for urban communities.

## References

- Abdi Sugiaro, Lubis, R. P., Sinaga, K., & Torotodo Harefa. (2023). Edukasi Smart Bisnis UMKM Pengrajin Olahan Limbah Rumah Tangga Untuk Pengeembangan Wilayah Masyarakat Kelambir Lima. *JURNAL ABDIMAS MADUMA*, 2(2), 49-58. <https://doi.org/10.52622/jam.v2i2.190>
- Abdiyanto, A. (2020). *Metode penelitian sosial & sains*. Aneka Ilmu.
- Abdiyanto, A. (2024). The role of infrastructure in driving economic growth: A review from a development economics perspective. *Business and International Management*.
- Aini, C. N., Azizah, Q., & Muharrani, S. (2023). ARAHAN PELESTARIAN TATA RUANG PERMUKIMAN MASYARAKAT ETNIS MANDAILING DI SUMATERA UTARA. *NALARs*, 23(1), 1. <https://doi.org/10.24853/nalars.23.1.1-16>
- Castrellon, J. P., & Sanchez-Diaz, I. (2024). Effects of freight curbside management on sustainable cities: Evidence and paths forward. *Transportation Research Part D: Transport and Environment*, 130. <https://doi.org/10.1016/j.trd.2024.104165>
- Corazza, M. V., Di Mascio, P., & Moretti, L. (2016). Managing sidewalk pavement maintenance: A case study to increase pedestrian safety. *Journal of Traffic and Transportation Engineering (English Edition)*, 3(3), 203-214. <https://doi.org/10.1016/j.jtte.2016.04.001>
- Damanik, R., Rangkutty, D. M., & Abdiyanto, A. (2024). Analisis kebijakan moneter dan fiskal terhadap green trade di Indonesia. *JEMSI (Jurnal Ekonomi, Manajemen, Dan Akuntansi)*, 10(4), 2770-2780. <https://doi.org/10.35870/jemsi.v10i4.2929>
- Digital Publishing Institute. (n.d.). Available at: <https://www.mdpi.com/2071-1050/11/17/4645> (Accessed: March 24, 2025).
- Gao, Y., Du, D., & Furuya, N. (2024). Micro-scale built environment and pedestrian behavior: A focus on sidewalks in commercial districts in Tokyo. *Frontiers of Architectural Research*. <https://doi.org/10.1016/j.foar.2024.08.008>

- Gehrke, S. R., Phair, C. D., Russo, B. J., & Smaglik, E. J. (2023). Observed sidewalk autonomous delivery robot interactions with pedestrians and bicyclists. *Transportation Research Interdisciplinary Perspectives*, 18. <https://doi.org/10.1016/j.trip.2023.100789>
- Hartini, M. I., Nuraini, C., Milanie, F., & Abdiyanto, A. (2023). Characteristics and management of drainage infrastructure in Medan Sunggal District, Medan City. *International Journal Paper Advance and Scientific Review*, 4(4), 62-90. <https://doi.org/10.47667/ijpasr.v4i4.259>
- Hidayat, R., Milanie, F. M., Nuraini, C., Azhari, I., & Sugiarto, A. (2023). Success Factors in Managing Wastewater Infrastructure through Community Participation (Case Study: Wastewater Infrastructure in Residential Areas of Medan Deli Subdistrict, Medan). *International Journal Paper Advance and Scientific Review*, 4(4), 26-44. <https://doi.org/10.47667/ijpasr.v4i4.256>
- Jahromi, M. N., Samany, N. N., Argany, M., & Mostafavi, M. A. (2025). Enhancing sidewalk accessibility assessment for wheelchair users: An adaptive weighting fuzzy-based approach. *Helijon*, 11(1). <https://doi.org/10.1016/j.helijon.2024.e41101>
- Jiang, Y., Han, S., Li, D., Bai, Y., & Wang, M. (2022). Automatic concrete sidewalk deficiency detection and mapping with deep learning. *Expert Systems with Applications*, 207. <https://doi.org/10.1016/j.eswa.2022.117980>
- Krisnayanti, D. S., Pasa, M. S., & Cornelis, R. (2023). ANALISIS KEKERINGAN METEOROLOGI DENGAN MENGGUNAKAN METODE STANDARDIZED PRECIPITATION INDEX DI KUPANG - NUSA TENGGARA TIMUR. *JURNAL SUMBER DAYA AIR*, 19(1), 1-12. <https://doi.org/10.32679/jsda.v19i1.793>
- Kurniawan, H., Abdiyanto, A., & Milanie, F. (2024). An analysis of Regulation Number 2 of 2015 implementation Medan City Regional concerning Medan City green open space zoning. *Jurnal Ekonomi*, 13(3), 44-62.
- Lee, H., & Kim, S.-N. (2019). Shared space and pedestrian safety: Empirical evidence.
- Muazir, S., Rizki Amalia, R., Lestari, L., Nurhamasyah, M., Ridha Alhamdani, M., & Mustikawati, M. (2024). Identification of centrality of West Kalimantan tourist attractions based on network analysis. *Jurnal Pariwisata Pesona*, 9(1), 80-94. <https://doi.org/10.26905/jpp.v9i1.12693>
- Nuraini, C. (2019). Morphology of residential environment of Singengu village in Mandailing Julu, North Sumatra. *Journal of Regional and City Planning*, 30(3), 241-260. <https://doi.org/10.5614/jpwk.2019.30.3.5>
- Nuraini, C. (2021). KARAKTER LINGKUNGAN PERUMAHAN BERBASIS SPACE ATTACHMENT YANG ADAPTIF DAN RESPONSIF DI MANDAILING. *NALARs*. <https://jurnal.umj.ac.id/index.php/nalars/article/view/8035>
- Nuraini, C. (2024). The Architectural Tectonics of Traditional Buildings in Mandailing, North Sumatera, Indonesia. *Civil Engineering and Architecture*, 12(2), 892-916. <https://doi.org/10.13189/cea.2024.120217>
- Nuraini, C., Sitompul, K., Fawwaz, D. M., Sofyan, M., & Fitri, N. (2023). THE SEPARATION OF ACTIVITY SPACES IN RESIDENTIAL ENVIRONMENT AS AN ADAPTIVE HOUSING CONCEPT STRATEGY. <https://proceeding.dharma-wangsa.ac.id/index.php/PROSUNDHAR/article/view/223>
- Pengamanan, E., Bersih, A., Pelanggan, M., Tirta, P., Sebagai, K., Wilayah, P., Tanjungbalai, K., Ruri, ), Lubis, P., Sugiarto, A., & Kunci, K. (2023). INFORMASI ARTIKEL ABSTRAK. 4, 2494-2498. <https://doi.org/10.55338/jpkmn.v4i3>
- Rahmadani, D., Abdiyanto, A., & Sugiarto, A. (2023). Implementation of Environmental Cleanliness Program through the Role of the Community in Pematang Siantar City. *International Journal Paper Advance and Scientific Review*, 4(3), 36-46. <https://doi.org/10.47667/ijpasr.v4i3.254>
- Rhoads, D., Solé-Ribalta, A., & Borge-Holthoefer, J. (2023). The inclusive 15-minute city: Walkability analysis with sidewalk networks. *Computers, Environment and Urban Systems*, 100. <https://doi.org/10.1016/j.compenvurbsys.2022.101936>
- Tarigan, N. L. B., Rangkuty, D. M., & Abdiyanto, A. (2024). Model controlling economic stability through interest rate at TIMI countries (Thailand, Indonesia, Malaysia, India). *International Journal of Economics, Commerce, and Management*, 1(3), 347-362. <https://doi.org/10.62951/ijecm.v1i3.137>
- Terrani, E., Picción, A., Bentancur, O., & Cruz, G. (2024). Effect of street trees shade on perceived thermal comfort in a south temperate climate: The sidewalks of Montevideo (Uruguay). *Helijon*, 10(12). <https://doi.org/10.1016/j.helijon.2024.e32762>