Level of Service Evaluation of Pedestrian Facility in Tourism Area: Case Study Jalan Braga, Bandung

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Abstract

Jalan Braga is a modern tourist area located in the center of Bandung City with its strategic location and being in the middle of the city invites many visitors with various modes of transportation to pass through the road. The uniqueness of this street lies in its distinctive pedestrian street with Dutch heritage buildings and paintings made by the Bandung painting artist community, which affect the level of pedestrian service. This study was structured to evaluate the service level of existing Pedestrian Facilities referring to the Technical Planning Guidelines. The analytical method used is Index Performance Analysis by comparing the value of Performance and Interest in Pedestrian Facilities in the City of Bandung. The research results show that the average performance index is 4.40, the average interest index is 3.00, and the average GAP is 1.19. Most suggestions were obtained for increasing the comfort of the pedestrians and the availability of seating facilities.

Keywords: Level of Service, Pedestrian, Tourism Area.

1. Introduction

In the current era of advanced transportation, it is common for people to mobilize using modes of transportation even though the distance traveled is not too far. The urgency of everyone also influences this. However, walking is repositioned as the potential to 'ease the position,' which reflects social, physical, and individual factors of inequality in walking (Massingue, 2021). Traffic on pedestrian facilities is an initial problem for all traffic. Users of pedestrian facilities can influence and benefit the surrounding social environment. Historically in Europe, traffic in urban areas began to change for the better by guaranteeing pedestrian rights in 1960. Since then, researchers have developed their research by adding safe areas to traffic, home zones, and meeting zones. So that around 2000, a 'walkable' area and community behavior had grown (Yoon, 2020).

Society continues to develop, and the population continues to grow, so the level of service provided to accommodate this most basic form of transportation is an indicator of the development of a society (Chen, 2017). The level of service is a condition that can be described through the factors that influence it, namely travel time, freedom of maneuver, obstacles, comfort, and security. (Henson, 2000). In determining the level of service, a standard or measuring instrument is needed so that a pedestrian can be said to have a good level of service. Several factors affect the level of service of a pedestrian facility, which can be divided into two, namely external and internal factors. External factors, namely from tangible manifestations that, can be felt by users of the pedestrian facilities themselves, for example, the conditions of the construction of pedestrian facilities, the influence of the speed of the surrounding vehicles, the availability of separate lanes for vehicles and pedestrians (Raji, 2021). Internal factors, namely the characteristics and behavior of pedestrian facility users themselves.

Pedestrian facilities mentioned in the technical planning can be grouped into three groups. The first is the pedestrian, a path for pedestrians in the Space Belonging to the road with the addition of structural and aesthetic elements. The pedestrian condition is usually elevated above the surface of the road pavement. The second is crossing facilities, which accommodate conflicts between motorists and users of pedestrian facilities. Several aspects must be prioritized in designing it: safety, security, convenience, smoothness, system integration, comfort, and attractiveness. The third is facilities for people with special needs by adding a material color texture called a detectable warning. People with special needs can feel these symbols to detect conditions on the pedestrian (Puspaningtyas & Achmad, 2020).

The review area in this study was carried out on Jalan Braga, Bandung. Braga is a street full of historical values that do not fade. Jalan Braga is a Dutch heritage road still thick with Dutch culture. The old Dutch heritage building still stands strong and is the main attraction for people to visit Jalan Braga. The establishment of cafes and shopping centers along Jalan Braga also influences the attractiveness of Jalan Braga. The most famous thing about Jalan Braga is the many sellers of paintings Jalan Braga made by the painter community in Bandung, which makes the eyes unable to be separated from these paintings. However, apart from that, there is much misuse of functions in pedestrian facilities caused by road users. Several conditions occur in the misuse of the function of pedestrian facilities that cause obstructions to the activities of users of pedestrian facilities. There are activities of street vendors who live in the pedestrian facility function area at certain times, the pedestrian as a parking area for motorized vehicles, and the ramp above the pedestrian, which disturbs the comfort of pedestrian facility users. While in other places, it becomes an emergency lane for motorized vehicles when traffic jams occur. Even in some places, pots and other ornaments fill the pedestrians so that the primary function of the pedestrian itself is not achieved (ANASTA, 2021).

In essence, the density of the pedestrian has the same pattern as the flow of motor vehicles on the streets, namely the area that accommodates and the number of obstacles that reduce the effectiveness of a building's services. Therefore, the factors that influence the density of pedestrians are used as variables to measure the level of pedestrian service in Jalan Braga. With the preparation of this paper, it is hoped that it will provide an evaluation and assessment of the existing physical conditions, safety, comfort, and current aesthetic value of Jalan Braga, Bandung City.

2. Literatur Review

2.1 Level of Services

The level of service is one of the most crucial components for assessing the level of service by considering pedestrians' effective width and flow (Campisi, 2022) . The Service Level of Pedestrian Facilities is widely used to assess Pedestrian Facilities (Sangeeth, 2019) . In addition, service level is a criterion for quality assessment in modern and practical theory in transportation planning and the design of various types of transportation infrastructure (Kopylova, 2018).

The level of service for Pedestrians can be measured from the performance and interest of the Pedestrian Facilities and the nature of the Pedestrians. The level of service is also influenced by traffic factors, the condition of road facilities, and environmental factors (Shu, 2021). The nature of Pedestrians is complex and multi-dimensional because when we walk, we interact with the entire environment and the people in it (Feng, 2021). Security, comfort, and convenience are systems needed so pedestrians can walk comfortably (Rifai, 2021).

2.2 Pedestrian Facility

Several studies on public transportation show that walking is the primary mode and the most accessible mode for someone to able to access other modes of transportation (Ignaccolo, 2019). Walking is often the only access available. For longer trips, walking is usually the initial and final phase of the trip (Sharifi, 2020). The public transportation system and private vehicles influence urban life's comfort. Public vehicles now provide routes to the city center, which increases the level of urban density. However, this can harm pedestrians (Lavrov, 2018).

Pedestrian Facility users face several obstacles when they travel, including conflicts with motorized vehicles, U-turns, other pedestrians, and varying speeds of oncoming vehicles. Several factors, including comfort, safety, and convenience, cause this. Therefore, pedestrian safety facilities need to be improved by providing safety facilities and lighting to maintain and reduce the impact of surrounding traffic (Ahmed, 2021).

Pedestrian transport studies have attempted to identify user perceptions influencing how a person walks. The influencing factor is the perception of safety and comfort in the environment. Pedestrian facilities in urban areas design control signs, pedestrian paths, and access to local roads influence walking frequency (Bhaduri, 2019) . While persons with disabilities also constitute an essential part of the pedestrian user population, they are often overlooked due to a lack of available data (Nasr Esfahani, 2022).

2.3 Community Activity

Pedestrian mobilization for pedestrians in the city environment is the key to the sustainability of social and economic relations, which are essential for improving and maintaining the quality of life (Marisamynathan, 2018) . From a social perspective, dividing and unifying empty areas is necessary for those needing them. Activities such as eating, working, resting, shopping, and even selling occur in several places that are considered related to their social function (Lamprecht, 2020). Therefore, the social function of having pedestrians will generate economic and social activities for the surrounding community.

The attractiveness of a place can be viewed from the aspects of geology, topography, and historical value. A city full of history plays a vital role in maintaining history, historical dimensions, clarity of mind, and the form of urban structures, which have implications for social, cultural, and economic aspects of community activities (Mehanna, 2019). As a modern tourist spot, Jalan Braga is currently visited by many people because the buildings around the road are unique, attracting many visitors. The legendary buildings from the Dutch heritage stand firm and are used as tourist attractions. Now, most of them have turned into culinary tours. Apart from that, Jalan Braga is famous for selling antique paintings displayed along the way. This gives its aesthetic value to painting lovers.

3. Methodology

This research was conducted in the city of Bandung. The research location is on Jalan Braga, shown in figure 1. As one of the modern attractions in the middle of the city where most visitors come to walk, Jalan Braga must pay attention to the comfort and safety of pedestrian facilities. As a result, pedestrians on Jalan Braga have now been revitalized by adding security for pedestrian paths in the form of concrete balls and ornamental plants in pots.
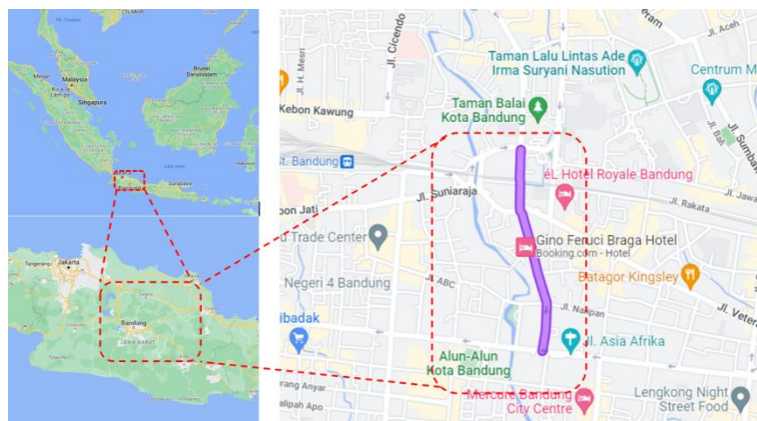

Figure 1. Research Location

The situation and conditions of pedestrians on Jalan Braga are shown in figure 2.

Figure 2. Situation of Pedestrian

Analysis of Pedestrian Facilities is carried out using the Performance Index Analysis method. The level of service is measured using the IPA (Index Performance Analysis) method, which this method is used to compare the level of performance and the level of importance based on the questionnaires distributed. An assessment was also made of suggestions for increasing the effectiveness of the facilities deemed necessary by the community. The minimum number of population samples used in the study uses the Slovin formula. The minimum number of respondents used is 100 people. The variables used in determining the level of service refer to Pd-03-2017 Technical Planning Guidelines, specified in **Table 1.**

Table 1. Parameters the research

No	Variable	Source
1	Pedestrian width	
2	Pavement surface	
3	Lighting	
4	Shielding/Shading Facilities	
5	Seating Facilities	Pd-03-2017 Technical
6	Cleanliness and trash facilities	Planning Guidelines
7	Crossing zone facilities	
8	Stop facilities	
9	Disability Facilities	
10	Curb condition	

4. Result and Analysis

4.1 Characteristics of Respondent Data

Data obtained from 133 respondents; it is known that the results of most responses are from the age range of 21-30 years with a percentage of 69.2% who work as private employees of 40.8% with a frequency of crossing the pedestrian <3 In the last two years, 48.3% with the primary purpose of recreation. Data on Respondent Characteristics can be seen in **Table 2.**

Table 2. Respondent Characteristics

No	Characteristics		Value (%)
1	Gender	Man	70
		Woman	30
2	Age	<20	15,8
		21-30	69,2
		31-40	2,5

No	Characteristics		Value (%)
		41-50	7,5
		51-60	2,5
		>60	2,5
3	Last Education	Elementary School	0
		High School	0
		Senior High School	25,8
		Diploma Degree	30
		Bachelor Degree	38,3
		S2	5,8
		S3	0
4	Occupation	PNS/Akpol/TNI	11,7
		Private Employees	40,8
		BUMN Employee	0,8
		Self Employed	5
		Housewife	1,7
		Student	35
		Other	5
5	Domicile	Bandung	69,2
		Jakarta	8,3
		Bogor	1,7
		Tangerang	2,5
		Bekasi	5,8
		Other	12,5
6	Frequency	<3 Times	48,3
		3-10 Times	42,5
		>10 Times	9,2
7	Main Purposes	Shop	16,7
		Exercise	7,5
		Recreation	69,2
		Work	0,8
		Other	5,8

4.2 Comparison of Importance and Performance Index

A comparison of performance and interest value needs to be analyzed against the Gap, as shown in Table 3, where interest value reduces performance value. So that the Gap results are obtained if the results are negative (-), indicating a mismatch of road user expectations. By knowing the Gap value, evaluation and improvement can be carried out on the facilities and the current condition of the existing pedestrians.

Table 3. Comparison of Importance and Performance Index

No	Variable	Importance	Performance	Gap
A1	Pedestrian width	3,27	4,33	1,07
A2	Pavement surface	3,49	4,38	0,89
A3	Lighting	3,57	4,67	1,10
A4	Shielding/Shading Facilities	2,91	4,42	1,51
A5	Seating Facilities	3,38	4,18	0,81
A6	Cleanliness and trash facilities	2,98	4,73	1,75
A7	Crossing zone facilities	3,18	4,56	1,38
A8	Stop facilities	3,01	3,91	0,90

No	Variable	Importance	Performance	Gap
A9	Disability Facilities	3,03	4,61	1,58
A10	Curb condition	3,31	4,23	0,92
	Average	3,21	4,40	1,19

From the table above, an average importance of 3.21 is obtained, which can be categorized as an essential category in all variables. In the performance category, the average performance is 4.40, which is categorized as a satisfied category. To the table, the width of the pedestrian on Jalan Braga already meets the requirements in the technical planning guidelines, where the value of interest and performance is above average. The Gap value is 1.07 (Positive) that obtained, so it can be said that the width of the pedestrian, in terms of importance and performance, is good.

The pavement surface on Jalan Braga is installed using granite which is not slippery when conditions are wet. In actual conditions, not all pedestrians on Jalan Braga have a flat surface. Influenced by the surrounding buildings, there are many shops and other buildings, so it is common to find ramps at several points. The table above shows good importance and performance values, in which road users feel satisfied and are not disturbed by the presence of ramps at several pedestrian points. Street lighting on Jalan Braga is already in the Pedestrian Facility area. At night, the lighting works fine. According to the table above results, the value of performance and interest is obtained, which is said to be quite good. Lighting facilities need to be maintained condition.

Jalan Braga is a modern tourist destination, so shops have installed canopies for shelter along the way. From the results obtained in the table, the importance level is relatively moderate, and the performance value is relatively high. Shops and other buildings along Jalan Braga influence this. Seating facilities available on Jalan Braga are in the tortilla area. Its location does not make Pedestrians disturbed by the presence of seats. The value of interest and seat performance can be seen in the table with a good value of interest and performance. However, in certain conditions, seating facilities are often misused as a place to sell, which sometimes feels annoying.

In the table results, the value of relative importance is moderate, and performance is exemplary. However, in actual conditions, garbage piles often occur due to a need for more public awareness to dispose of waste in its place. This is also supported by the small number of trash cans that make pedestrians throw garbage out of place. Crossing facilities on Jalan Braga are only at the end of the road. Therefore, pedestrians very often cross to change destinations in the middle of the road. This has an impact on the long queue of motorized vehicles. In the table results, the value of interest is in the medium category, and performance is in the excellent category.

Following the function of the land as a modern tourist destination, people come to Braga with various modes of transportation. In this case, for public transportation modes, the unavailability of bus stops results in queues of vehicles when visitors want to get off the vehicle. In this table, the value of the importance of the bus stop is moderate, and the value of performance is moderate. Then a particular drop-off area is needed for various modes of transportation to avoid queues for vehicles. Disability facilities are marked with a yellow textured marker as in the Technical Planning Guidelines Pd-03-2017-B. With this facility, the function of the pedestrian is complete, and it is helpful for all levels of society. This facility also provides a sense of security for users with disabilities, in the table obtained the value of moderate importance and moderate performance value. The curb conditions on Jalan Braga in the table obtain a good importance value and a moderate performance value. The curb condition on Jalan Braga has followed the rotary slope, using a parallel curb ramp. However, there are several points where the curb is in bad condition with a slanted and eroded position.

4.3 Index Performance Analysis

The IPA method used four quadrants of the total number of respondents, with the results shown in figure 3. There are four quadrants in the IPA analysis. Quadrant I shows the main priority, quadrant II must be maintained, quadrant III is a low priority, and quadrant IV is categorized as excessive.
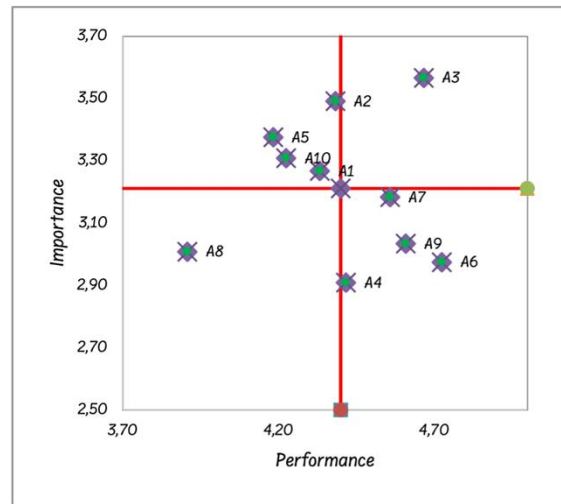
Figure 3. Result of Index Performance Analysis

From the results of the IPA analysis, there are four indicators in quadrant I, namely Pavement Width (A1), Pavement Surface (A2), Seating Facilities (A5), and Kerb Conditions (A10). In quadrant II there is one indicator, namely lighting (A3). Also, In quadrant III, there are four indicators, namely Protection/Shading Facilities (A4), Cleanliness and Trash Facilities (A6), Crossing Zone Facilities (A7), and Disability Facilities (A9). Finally, in quadrant IV, one indicator is Bus Stop Facility (A8).
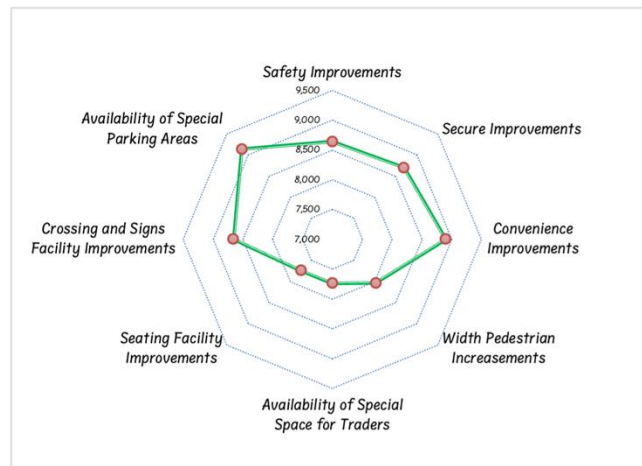

Figure 4. Suggestions for Improving Pedestrian Facility in Braga

According to data from respondents, most suggestions were obtained to increase the convenience and availability of parking spaces, as shown in Figure 4. Therefore, with this assumption, an increase in the need for parking space and an increase in comfort for the Jalan Braga pedestrians can be implemented.

5. Conclusion

From the results of the comparison table of performance and interest, it is obtained that the average performance index is 4.4, the average interest index is three, and the average Gap is 1.19. The highest interest value obtained was 3.49 for the pavement surface, and the lowest value was 2.91 for the Shading Facilities. The highest performance score is 4.73 for cleanliness and trash can facilities, and the lowest score is 3.91 for bus stop facilities. Gap analysis obtained the highest score of 1.75 for cleanliness and trash can facilities and the lowest score of 0.81 for seating facilities.

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