Analysis of Pedestrian Services in Metropolitan Cities: Case of Jakarta Business Area

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Abstract

One of the characteristics of an excellent urban environment is a friendly environment for pedestrians. Pedestrian facilities that meet the standards are required in the central business district, where most activities are walking. In recent years, Jakarta, as a business city, has continued to improve its pedestrian facilities. Of course, these improvements must be examined whether they are following the community's needs or viceversa. This paper aims to find out about the level of comfort and level of service at the new pedestrian facilities in the Metropolitan City of Jakarta. The research method was carried out through a survey and a questionnaire. Data was collected in the Mega Kuningan Business District with repaired pedestrians. The number of respondents was 100 people. The analysis carried out is Importance Performance Analysis (IPA) and Level of Service (LoS) analysis. The results of this study indicate that the newly built pedestrian has met level A. Based on the analysis of interest, it is still necessary to increase security. Meanwhile, based on the comfort analysis, additional lighting and shade are required. This study shows that pedestrians' improvement in the business district in the Metropolitan City of Jakarta is good and needs to be developed in other locations.

Keywords:

Business Area, Level of Service, Pedestrian, Metropolitan City,

1.   Introduction

Cities have various functions, such as a place to live, commercial activities, education, work, and others. In most cities as a central business area, the area is much mobilized by foot. Walking is an environmentally friendly mode of transportation for short trips. Walking makes people healthy because walking burns calories or does not emit greenhouse gases. Moreover, walking is an ideal transportation method in urban areas because it does not require parking space.

Figure 1. Pedestrian in Metropolitan City

The existence of sidewalks encourages people to walk instead of using other modes of transportation; this, in turn, reduces pollution and improves physical condition and health. As a result, various activities are created, and social relations are enhanced due to people's presence in suitable spaces on the street. (Osman, 2016)

Safety, security, convenience, and comfort is a fusion system that is necessary so that pedestrians can comfortably(Özyilmaz Küçükyağci, 2018). Good pedestrian facilities encourage people to want to walk, while inadequate, pedestrian facilities prevent using the area or geometrical roads. This creates a need to assess pedestrian facilities' performance is very important (Cepolina et al., 2018).

Motorized traffic was predominant in the frame of the traditional transport planning approach. Recognizing the deterioration of quality of life that has been caused by this domination, societies are trying to adopt and implement a more sustainable, non-motorized perspective of mobility.(Amprasi et al., 2020)

An excellent urban environment is a pedestrian-friendly urban environment. One of the efforts to achieve this is the development of pedestrian areas and adequate pedestrian facilities. Efforts to reintroduce pedestrian mode in urban areas that only focus on improving pedestrian areas often fail to encourage people to walk. Therefore other attributes that support walking activities must also be considered.

Research from Stanford University in 2017 showed that Indonesia's people are in the down position in the case of air-walking. Many factors have earned Indonesia this predicate (Althoff et al., 2017). Several factors of inadequate pedestrian paths, namely the width that does not meet standards, potholed roads, etc.

Pedestrians along the study route have had inadequate lighting conditions, and there is no shade, there are illegal parking and sidewalk improvements repetitive and time-consuming. Based on the following case in this regard needs to be done pedestrian comfort analysis covering pedestrian perception of convenience features pedestrian in area Business Mega Kuningan Jakarta.

2. Literature Review

2.1. Pedestrian

Pedestrian comes from the Latin *'pedesterpedestris'*, which is a person walking or a pedestrian. Pedestrian also comes from Greek, namely from the word pedos, which means foot, so pedestrians are defined as people who walk or pedestrians. In this case, it means people's movement from one place to another place as origin as a destination on foot.

Pedestrian is a term in transportation used to describe people who walk on pedestrian paths, be it on roadsides, sidewalks, particular pedestrian paths, or road crossings. However, pedestrian paths in an urban context are usually designated as unique spaces for pedestrians that function to protect pedestrians from motorized vehicles, in Indonesia, better known as sidewalks. The need for pedestrian facilities is usually concentrated in urban areas, given society's high dynamics, especially in crowded centers such as trade centers, stations, terminals, schools, and others.

2.2 Characteristic of Pedestrians

The characteristic of pedestrians is one of the main factors in the design and operation of transportation facilities. The main variables used to determine pedestrian movement characteristics are current, speed, and density, while the pedestrian facility in question is space for pedestrians.

Characteristic parameters most commonly used to describe the walk is sidewalks and have spacewalkers. Pedestrian speed is influenced by an urgency to arrive, terrible weather conditions, walking, or facilities congestion. This results in differences in the statistical values obtained in different previous experiments. (Martinez-Gil et al., 2017)

Much descriptive information on pedestrian characteristics was collected. By conducting this case, much information has been collected about the gender of the pedestrian, the age of the pedestrian, the estimated age, mode (walking or running), activities in walking, assistance, observation signs, and other factors, which provides a reasonable basis for describing pedestrian activity and behavior. This can be seen from the existence of the pedestrian in what location or area.

2.3 Sidewalks

According to the Cambridge Dictionary (Cambridge Dictionary, 2020), sidewalks are paths with hard surfaces on which people walk on one or both sides of the road. Sidewalks are a must-have facility on every highway. Therefore, it needs special attention from the government so that the sidewalks run according to their function so that they do not make the sidewalk only as decoration.

Sidewalks are built as access to all transportation facilities that can support security for pedestrians and motorists. The sidewalk shall provide lighting, shade, wide enough, and signs for disability facilities (Movahed et al., 2012).

2.4 Sidewalk Function

According to Laokaaitou's research in the journal (Osman, 2016), sidewalks' primary function is to fill the convenience of pedestrians' paths traversed and ensure safety from motorized vehicle movement on the highway. The effective use of

design elements makes the walkway synergize well with the surrounding buildings and adjacent spaces to integrate incidental spaces into larger urban structures.

Pedestrian ways as an important part of urban areas have a function as a link between areas, buildings, or facilities. One of the various attributes of pedestrian ways to achieve pedestrian safety and comfort is the dimension of the pedestrian (Sukasta & Winandari, 2020).

A useful sidewalk function can create a walking speed for pedestrians that is not low because this is related to the adequate space well. The availability of sufficient space is a significant element of pedestrian movement along an urban segment and is a key performance measure for evaluating pedestrian movement operations with sidewalk comfort. People speed and space available is a performance measure that is widely used for evaluation standard right width in urban areas (Zheng et al., 2016). Mobilization of pedestrians, which is high but does not cause congestion in pedestrian locations, can make pedestrians have an appropriate function.

2.5   Service Standards

Service Standards are benchmarks used as guidelines for service delivery and reference for assessing service quality as obligations and promises of administrators to the public to provide quality, fast, easy, affordable, and measurable services.

Acceptable service standards can provide a sense of security, comfort, and tranquility for pedestrians. Service standards can be measured from pedestrians' ability to accommodate pedestrians within a particular time so that it does not interfere with the geometry of other roads. Pedestrian ability can be rated on a scale of A until F seeing the density and speed of pedestrians passing.

3.   Research Methodology

In this research, the required data sources are primary data and secondary data. Variables bound are used in research; this is the pedestrian foot's comfort, while variable independent is a pedestrian foot. The election variable results are derived from the observation field with a look and feel as directly as the user.

The engineering survey of the research is through questionnaires were distributed to 100 respondents. The questionnaire consists of 12 questions with answers following their position—response answer according to the angle of view of them. The questionnaire in this study used an interval measurement scale, namely the Likert scale—questionnaire at the weekday and weekend, located in the pedestrian of the center Metropolitan City of Jakarta.

Analysis and processing of data from the survey results of the condition of the pavement and the questionnaire results were received feedback from a respondent pedestrian walking. The survey results will be compared with a standard pavement that effect, whereas the results of the questionnaire respondents will be tested by using SPSS software version 17.0. Served by using methods Importance Performance Analysis (IPA) because it will be generated the data in the form of indicators that need to be corrected or reduced to maintain the satisfaction of pedestrian foot, the result is relatively easy to interpret, the scale is easy to understand, and require low cost, while the analysis of satisfaction using methods Level of Service (LoS) (Shan et al., 2016)

3.1.   Data Processing and Data Management

A questionnaire survey was conducted to collect data on the comfort of stiff pedestrians with the importance of sidewalk facilities. The questionnaire is divided into five sections. Part first shows the respondents' characteristics, such as gender, age, or occupation. Part two contains questions about the condition of the pavement, part to three of the security sidewalk, part four of the cleanliness of sidewalks, and part of the last of the beauty of the pavement.

The correspondent asked to provide ratings on comfort and the level of interest in the facility sidewalk. The scale of satisfaction and the level of interest given the line's scale gives the respondent space empty of expressing preferences they are and are not restricted in that specific numbers are provided only. Respondents can traverse a position anywhere in the line to express a preference for them with free. All questions in the questionnaire are provided in a closed-form.

Convenience Level					Questionnaire			Intersts Level				
Very Unimportant			Very Important					Very Dissatisfied			Very Satistied	
1	2	3	4	5	No		No	1	2	3	4	5
					12A	Kereb conditions	12B					

Figure 2 Questionnaire for the convenience and importance

In research, it takes samples by selecting a sampling, just for who passed through lane pavement at the study course location. Before distributing that fact, conducted a survey calculation to see the population of resident area Karet Local Government, by taking the data from the body center of statistics Indonesia.

3.2. Research Data Testing

In data processing, researchers used descriptive statistical data analysis techniques. The technique is used researcher for the collection of data by spreading the questionnaire. The spread of the questionnaire is to use a method of sampling that has been taken into account up in advance use Slovin formula which involves some residents in the area of research and process it conducted the test as follows:

3.2.1. Validity Test

A validity test in this study was carried out to indicate the extent to which the measuring instrument (instrument) measures what you want to measure. The question items in the questionnaire are declared valid if r> r table. Researchers used the SPSS program to determine the validity of the results.

3.2.2. Reliability Test

The research will be used the techniques Cronbach alpha (c). This technique is used to measure the reliability of question items whose scores are in the form of a range of values (e.g., 0-10, 0-7) or a scale (or 1-3, 1-5). The Cronbach's Alpha formula used is shown in the following formula:

$$\propto = \left[\frac{k}{k-1}\right]\left[1 - \frac{\Sigma\sigma_b^2}{\sigma_t^2}\right]$$

Explanation:

$\propto$ = instrument reliability coefficient (Cronbach alpha)

K   = number of data variables that make up the latent variable

$\Sigma\sigma_b^2$ = total item variant

In the reliability test of a questionnaire, there is a basis for decision -making up first. In determining the results of the test of reliability is used SPSS to know the results as follows:

- If the Cronbach's Alpha value is> 0.60, it is reliable or consistent
- If the Cronbach's Alpha value <0.60, then it is not reliable or consistent

3.2.3. GAP Analysis Test

GAP analysis is useful as a search for differences in factors between expectations and expectations obtained in the comfort and interests of this pedestrian. If the GAP is negative, it means that people's expectations are not in line with the expectations that are obtained. The analysis is useful as a starting measure that all expectations be under expectations in the future.

3.2.4. Effectiveness Level

Data analysis begins with tabulating data from primary data collection for each variable, and then the data is analyzed using descriptive statistics to determine the mean and standard deviation. Results of statistical descriptive analyzed and then put into the diagram Cartesian science. To measure the extent to which the performance and satisfaction of researchers used the IPA method, while the analysis of the satisfaction of pedestrian services used the LoS method.

4. Result and Analysis
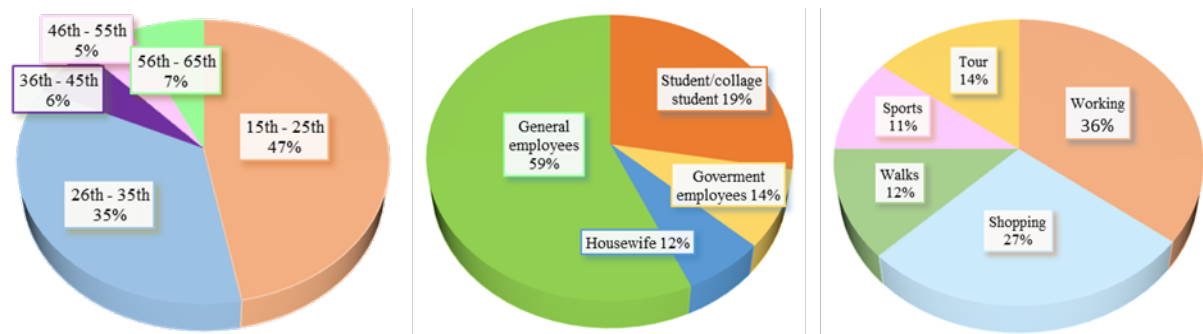
4.1. Characteristics of Respondents

Figure 3 Characteristic of age, occupation, and walking activities respondents

It can be seen that from the results of 100 respondents, it was found that the most were in a characteristic of the age between 15 -25 year by 47%, for characteristic work as private employees by 59% and for the interest in walking in the sidewalk as working by 36%. Research locations are in shopping areas and offices, respondent data taken through questionnaires utilize google media form.

4.2 GAP Analysis

In the calculation analysis of GAP, they then compared convenience and interests. It is necessary to know what the course becomes an indicator that people get from expectations, with are expected.

If the result is negative, then expectations are not the same reality of the way, things have to be rejected the measure in pavement development ahead of her that both her balanced.

Table 1 GAP Analysis

No.	Indikator	Convenience	Interests
1	Sidewalk width	4.00	4.11
2	Sidewalk conditions for the disabled	3.02	3.46
3	Sidewalk surface conditions	3.22	4.06
4	Slope and slope	3.57	3.88
5	Noise conditions	3.54	3.16
6	The condition of the dividing sign	4.09	4.27
7	Lighting	3.84	3.30
8	Kereb conditions	3.24	3.41
9	Cleanliness conditions	4.36	4.22
10	Cleanliness of the channel	4.09	4.18
11	Condition of trees/shade	3.71	3.59
12	The pavement against its shape	3.51	3.26

The analysis that has been done results showed that for noise conditions, lighting, cleanliness conditions, conditions of trees/shade, and the pavement against its shape were still not the same as the pedestrian
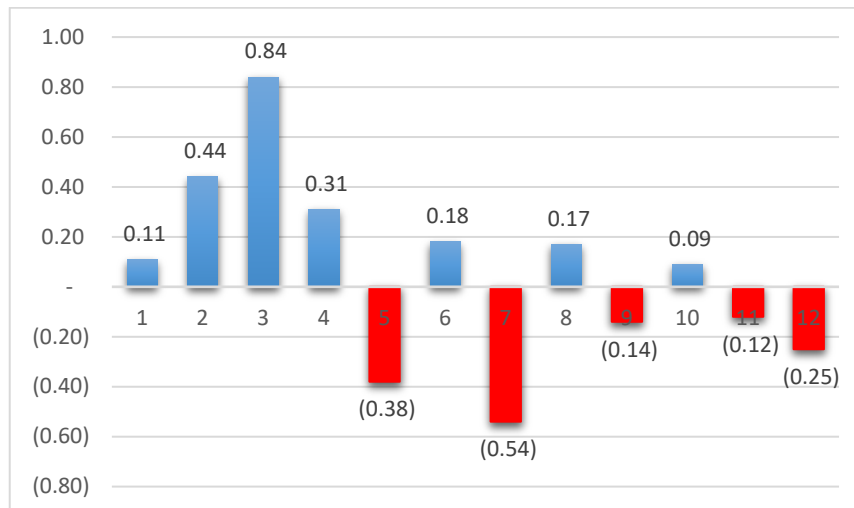
Figure 4. Indicators of comfort and importance of sidewalk facilities

In the figure 4 above, it can be seen that this graph shows that indicators 5, 7,9,11, and 12 are below the expectations of sidewalk users, so this shows that the minus parts should be further improved.

4.4 Analysis of IPA and LoS

From the data, the results of a questionnaire about the perception of pedestrians walking analyzed using methods IPA seen that the graph IPA matrix as follows:

1. Quadrant I, which is the main priority, is the indicator of lighting (7) and shade (12)

2. Quadrant II achievement is maintained on indicators width of sidewalks, signs on the surrounding pavement, the cleanliness of garbage, and the channel's cleanliness in the surrounding pavement.

3. Quadrant III, with low priority in handling, curb indicators are separating the road, sidewalks for people with disabilities, noise, and the sidewalk's shape.

4. Quadrant IV, which is categorized as excessive, has an indicator of the sidewalk's shape, namely the surface of the sidewalk and the slope and slope of the sidewalk.
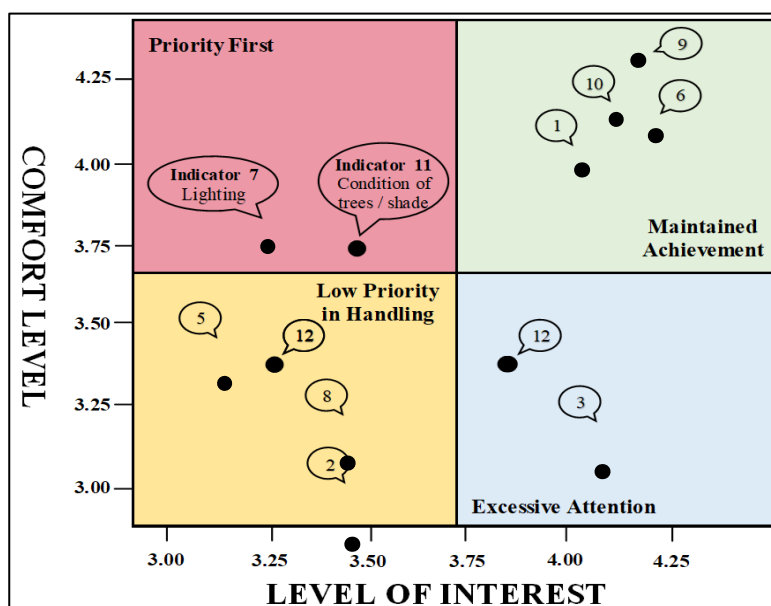

Figure 5 IPA Matrix

The results of the research on pedestrian density in this case study do not exceed capacity. The condition of the sidewalks can be categorized as having level A service standards. Although sometimes, they are still disturbed due to waiting for public transportation, crossings, and other activities.

The improvement of sidewalk facilities carried out by the city government has a perfect effect on pedestrians. It can be seen that only two indicators need improvement.

5 Conclusion

Based on some research beforehand, the conditions pedestrian in Jakarta Metropolitan City are not in standards, but when this city of Jakarta continues to improve with arranging pedestrian to be comfortably used for pedestrian foot. The study results have demonstrated that LoS is on a scale of A. By using IPA, it is still necessary to repair shading and lighting facilities.

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Bibiografi

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