Analysis The Service Level of Pedestrian Pathways on Jalan Malioboro Yogyakarta

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Abstract

The city's tourism location continues to improve, and the number of visitors is increasing, which is also directly proportional to the number of pedestrians. Malioboro Street has become one of the best pedestrian tourist destinations but has not been accompanied by adequate security and comfort conditions to maintain a good level of pedestrian service. The purpose of this study is to determine the level of service of the pedestrian path, obtain the performance results of the pedestrian path service, and obtain the effective width that meets the needs of the pedestrian path on Malioboro Street Yogyakarta as the input and consideration for the local government in developing facilities and pedestrian support infrastructure. The research uses direct survey observations on the condition of the pedestrian path on Malioboro Street. It collects questionnaires for 100 respondents to see the performance of the pedestrian path on Malioboro Street. The result of this research is the value of the service level of the pedestrian path are varies; the importance of Los is A in the morning and B in the evening for in front of Malioboro Mall then the value of Los is B in the morning and C in the evening for in front of the Afternoon Market. Along with the prediction of creation in pedestrians in the next five years, the Los value from each observation point will drop one level below it. Meanwhile, based on research conducted with the IPA method to determine the level of satisfaction of pedestrians on Malioboro Street, the percentage of satisfaction level was 84.16%, which was included in VERY GOOD condition. In addition, the state of the effective width of the pedestrian path on Malioboro Street is by the SE Minister of PUPR 02/SE/M/2018 and can still accommodate pedestrians.

Keywords: Level Service of Pedestrian Pathways, Importance Performance Analysis, Sidewalks, Pedestrians.

1. Introduction

Entering the current digital era, Indonesia continues to improve in development, ranging from infrastructure to support smoothness in the economic process to the need to serve every activity of society. Due to community activity turnover, the number of mobility needs to be provided with adequate facilities and infrastructure like public roads for transportation to provide comfortable and good pedestrian space. Movement includes subjects, space, time, power, and direction in human activity. Pedestrians become one of the subjects which is a human movement without transportation [1] [2]. Everything needs to be guaranteed, from comfort and safety to providing the best service to pedestrians. The supply of adequate facilities and infrastructure is essential because it can support the establishment of a regular movement pattern, like a good road complementary facility, which is the pedestrian pathway. The area that can attract attention is Jalan Malioboro with all its local wisdom, from art shows to selling a typical souvenir of Yogyakarta. The Malioboro road area is one of the busiest areas in Yogyakarta, with almost 24 hours full of activities in the area which caused the intensity of pedestrians to be very crowded. The provincial strategic area, Malioboro, which is administratively in the city of Yogyakarta and the Document of RPJMD (Regional Medium Term Development Plan) of Yogyakarta City 2012-2016, the Malioboro area is a center for crowds for several activities, not only tourism activities, but rather detention, trade, services, and so on [3].

Finally, the problem began to be felt when the current facilities intended for pedestrians were disturbed by artistic and trading performance activities which were not well organized. The Malioboro road area was initially a commercial area with a walking area concept by focusing on pedestrians as the central concept. The dominant commercial area causes a reduction of comfort and service value for pedestrians in the Jalan Malioboro. Malioboro has become a magnet in Yogyakarta because of the atmosphere of the road [4] [5] [6]. Still, it is more dominated by buying and selling transactions that become a barrier or obstacle in the pedestrian path. Therefore, it needs an effort to Returning Jalan Malioboro is a pedestrian area [7] [8] [9].

2. Method

The research location is the eastern side pedestrian path on Jalan Malioboro Yogyakarta. The pedestrian path on Jalan Malioboro has a length of approximately 1.3 kilometers which stretches from Tugu Yogyakarta until the Great Post Office of Yogyakarta [10] [11] [12]. The case study was taken on the pedestrian path of Jalan Malioboro Yogyakarta because this pedestrian area had a reasonably high density, especially on holidays or weekends. In addition, it is taking a two-point differential with the reason for being able to see a significant difference in field data because of the difference in the characteristics of obstacles at the first point, namely in front of Malioboro Mall with blocks in the public seat and at the second point, namely in front of the Afternoon Market Malioboro road with obstacles in selling places. The following are the details of the point conditions that are the location of the study [13] [14].

Fig 1. The research location is in front of Malioboro Mall and front of the Afternoon Market

The total width in front of Malioboro Mall is 6 meters and has an obstacle in the form of a public sea width of 3.5 meters. In comparison, in front of the afternoon market have 6 meters total width with barriers in the form of bicycle parking and 4 meters of selling places.
The study was conducted for two days, divided onintoWednesdays and Sundays. Data retrieval day is divided into two days, on weekdays and on weekends; this is intended to get time when the crowds are up to their peak. Data retrieval is divided into 3-time sessions every day, morning at 08.00 - 10.00, noon at 1:00 p.m. – 3:00 p.m., and the night at 19.00 - 21.00. The interval used in the survey is every 15 minutes to survey the number of pedestrians and every 15 minutes with a 10-meter observation distance.
The method used in the study this time is observant manually data retrieval or surveying pedestrian path identification, pedestrian current, pedestrian speed, and questionnaire against pedestrians. The results can be analyzed to obtain the level of service and performance of pedestrian pathways on Jalan Malioboro Yogyakarta.

Before the study was conducted, the surveyor was given a field orientation of the activities that will be carried out in the form of a survey mechanism, an explanation of the use of the tools, and the placement of surveyors. Implementation of pedestrian current data retrieval passing by pedestrian paths on Jalan Malioboro conducted a surveyor with direct observations and calculated the number of pacing pedestrians on the way every 15 minutes. The Surveyor recorded data obtained on the form provided.
In implementing pedestrian speed data retrieval, the surveyor records the time needed by pedestrians passing point A to point B as far as 10 meters using a stopwatch. Samples were taken as much as possible and carried out the data retrieval every 15 minutes. After that, the Surveyor recorded data obtained on the form provided. Furthermore, a survey with questionnaires was distributed online to anyone who had ever run and used a pedestrian pathway facility on Jalan Malioboro Yogyakarta.

3. Result and Discussion

3.1 Sidewalk Identification
By analyzing the physical condition of the Pedestrian Path on Jalan Malioboro with the identification of the sidewalk, as shown above, it contains a form to provide an assessment of the conformity of the standard pedestrian path on Jalan Malioboro, sourced or concerning the Circular of the Minister of PUPR NO 2/SE/M/ 2018. The results of the data collection can be seen in the table below.

Table 1. Sidewalk Identification

No	Description	Minimum Size	Fit Yes	Fit No	Additional Notes
1	**Pedestrian Space**				
	Pedestrian width	0.75 m	√		2 – 2.5 m
	Two people walking in a row	1.5 m	√		2 – 2.5 m
	Three people walking in a row	3 m		√	2 – 2.5 m
	Vertical direction 2.5 meters with barrier-free	2.5 m	√		
2	**Pedestrian Free Space**				
	Giving freedom to pedestrians			√	Marketeer
	High accessibility			√	Marketeer
	Guaranteed safety and security		√		
	Guaranteed comfort		√		
	Have a complimentary view of the surroundings		√		
	Have a minimum height	2.5 m	√		
	Have a minimum side width	0.3 m	√		

3	**Minimum Distance of Pedestrian Path with Building**			
	Minimum distance from building	0.75 m	√	
	Height difference with the main road	0.2 m	√	0.25 m
	The difference with the green line	0.15 m		√
4	**Facilities on the Sidewalk**			
	GreenLine		√	
	Lighting		√	
	Seat		√	
	Public toilet		√	Only 1
	Safety Fence	0.9 m		√
	Trash Bin		√	
	Marking		√	
	Disability Friendly Facilities		√	
	Waiting Booth			√
	Bus Stop		√	

By the identification that has been done, it is known that of the 24 criteria for Malioboro Street, 18 measures have been met, and 6 of them have not been completed.

3.2 Pedestrian Service Level Analysis

It was continued with data recapitulation and obtained the most pedestrian hours by adding up the total pedestrians from the north and south, which were grouped into hourly data in each session. The recapitulation results of the most hourly pedestrian data and the pedestrian flow are calculated in the following table.

Table 2. Pedestrian Flow in Front of Malioboro Mall

Time	Monday, 17/03/21		Sunday, 23/03/21	
	Number of Pedestrians	Flow (person/m/minutes)	Number of Pedestrians	Flow (person/m/minutes)
MORNING				
08.00-09.00	344	2	1179	8
09.00-10.00	363	2	1346	9
10.00-11.00	416	3	1215	8
AFTERNOON				
13.00-14.00	362	2	983	7
14.00-15.00	574	4	885	6
15.00-16.00	580	4	1151	8
NIGHT				
19.00-20.00	1008	7	1161	8
20.00-21.00	1709	11	1765	12
21.00-22.00	1513	10	1796	12

Table 3. Pedestrian Flow in Front of Afternoon Market

Time	Monday, 17/03/21		Sunday, 23/03/21	
	Number of Pedestrians	Flow (person/m/minutes)	Number of Pedestrians	Flow (person/m/minutes)
MORNING				
08.00-09.00	377	3	1187	10
09.00-10.00	448	4	1389	12
10.00-11.00	460	4	1253	10
AFTERNOON				
13.00-14.00	410	3	1068	9
14.00-15.00	602	5	1084	9
15.00-16.00	602	5	1208	10
NIGHT				
19.00-20.00	1033	9	1213	10
20.00-21.00	1656	14	1818	15
21.00-22.00	1535	13	1818	15

After getting the pedestrian flow at both observation points and the pedestrian flow, the data obtained in the field is the speed of pedestrians by calculating the travel time from point A to point B as far as 10 meters. The recapitulation of data from the two observation points is as follows.

Table 4. Pedestrian Speed in Front of Malioboro Mall

Time	Monday, 17/03/21	Sunday, 23/03/21
	Speed Average	Speed Average
MORNING		
08.00-09.00	50.13	40.65
09.00-10.00	45.00	41.28
10.00-11.00	47.28	42.68
AFTER-NOON		
13.00-14.00	48.96	45.07
14.00-15.00	44.93	42.28
15.00-16.00	48.07	43.63
NIGHT		
19.00-20.00	42.67	45.98
20.00-21.00	43.92	40.58
21.00-22.00	47.08	39.26

Table 5. Pedestrian Speed in Front of Afternoon Market

Time	Monday, 17/03/21	Sunday, 23/03/21
	Speed Average	Speed Average
MORNING		
08.00-09.00	46.81	41.00
09.00-10.00	43.73	40.52
10.00-11.00	44.18	41.46
AFTER-NOON		
13.00-14.00	44.72	42.68
14.00-15.00	42.19	40.69
15.00-16.00	44.83	40.19
NIGHT		
19.00-20.00	40.28	42.97
20.00-21.00	40.87	38.79
21.00-22.00	43.16	37.81

After obtaining all the necessary data in determining the value of the pedestrian path service level, the next step is to classify the pedestrian path service level using the amount of pedestrian space in each time session obtained. The Level of Service values classification reference is the LOS Standard Level table of the Minister of Public Works Regulation Number: 03/PRT/M/2014.

Table 6. Service Level Value

Service Level	Pedestrian Space	Speed Average	Pedestrian Flow	Volume/Capacity Ratio
A	≥ 12	≥ 78	$\leq 6,7$	$\leq 0,08$
B	$\geq 3,6$	≥ 75	≤ 23	$\leq 0,28$
C	$\geq 2,2$	≥ 72	≤ 33	$\leq 0,40$
D	$\geq 1,4$	≥ 68	≤ 50	$\leq 0,60$
E	$\geq 0,5$	≥ 45	≤ 83	$\leq 1,00$
F	$< 0,5$	< 45	Variable	1,00

Assessment of the service level of the pedestrian path on Monday and Sunday in front of Malioboro Mall by taking the results of calculating the need for pedestrian space in each session can be seen in the table below.

Table 7. The Value of Service Level of Monday Pedestrians in Front of Malioboro Mall

Busiest Hours	Speed (m/minutes)	Flow (person/m/minutes)	Density (person/m2)	Pedestrian Space (m2/org)	Service Level
MORNING					
08.00-09.00	50.13	2	0.046	**21.86**	A
09.00-10.00	45.00	2	0.054	**18.59**	A
10.00-11.00	47.28	3	0.059	**17.05**	A
AFTERNOON					
13.00-14.00	48.96	2	0.049	**20.29**	A
14.00-15.00	44.93	4	0.085	**11.74**	B
15.00-16.00	48.07	4	0.080	**12.43**	A

NIGHT					
19.00-20.00	42.67	7	0.157	**6.35**	**B**
20.00-21.00	43.92	11	0.259	**3.86**	**B**
21.00-22.00	47.08	10	0.214	**4.67**	**B**

Table 8. The Value of Service Level of Sunday Pedestrians in Front of Malioboro Mall

Busiest Hours	Speed (m/minutes)	Flow (peson/m/minutes)	Density (person/m2)	Pedestrian Space (m2/org)	Service Level
MORNING					
08.00-09.00	40.65	8	0.193	**5.17**	**B**
09.00-10.00	41.28	9	0.217	**4.60**	**B**
10.00-11.00	42.68	8	0.190	**5.27**	**B**
AFTERNOON					
13.00-14.00	45.07	7	0.145	**6.88**	**B**
14.00-15.00	42.28	6	0.140	**7.17**	**B**
15.00-16.00	43.63	8	0.176	**5.69**	**B**
NIGHT					
19.00-20.00	45.98	8	0.168	**5.94**	**B**
20.00-21.00	40.58	12	0.290	**3.45**	**C**
21.00-22.00	39.26	12	0.305	**3.28**	**C**

After obtaining an assessment of the level of service of the pedestrian path on Monday and Sunday in front of Malioboro Mall, the results of the evaluation of the level of service of the pedestrian path in front of Afternoon Market by taking the results of calculating the need for pedestrian space in each session can be seen in the table below.

Table 8. The Value of Service Level of Sunday Pedestrians in Front of Afternoon Market

Busiest Hours	Speed (m/minutes)	Flow (person/m/minutes)	Density (person/m2)	Pedestrian Space (m2/org)	Service Level
MORNING					
08.00-09.00	46.81	3	0.067	**14.90**	**A**
09.00-10.00	43.73	4	0.085	**11.71**	**B**
10.00-11.00	44.18	4	0.087	**11.52**	**B**
AFTERNOON					
13.00-14.00	44.72	3	0.076	**13.09**	**A**
14.00-15.00	42.19	5	0.119	**8.41**	**B**
15.00-16.00	44.83	5	0.112	**8.94**	**B**
NIGHT					
19.00-20.00	40.28	9	0.214	**4.68**	**B**
20.00-21.00	40.87	14	0.338	**2.96**	**C**
21.00-22.00	43.16	13	0.296	**3.37**	**C**

Table 8. The Value of Service Level of Sunday Pedestrians in Front of Afternoon Market

Busiest Hours	Speed (m/minutes)	Flow (person/m/minutes)	Density (person/m2)	Pedestrian Space (m2/org)	Service Level
MORNING					
08.00-09.00	41.00	10	0.241	**4.15**	**B**
09.00-10.00	40.52	12	0.286	**3.50**	**C**
10.00-11.00	41.46	10	0.252	**3.97**	**B**
AFTERNOON					
13.00-14.00	42.68	9	0.209	**4.80**	**B**
14.00-15.00	40.69	9	0.222	**4.50**	**B**
15.00-16.00	40.19	10	0.250	**3.99**	**B**
NIGHT					
19.00-20.00	42.97	10	0.235	**4.25**	**B**
20.00-21.00	38.79	15	0.391	**2.56**	**C**
21.00-22.00	37.81	15	0.401	**2.50**	**C**

By predicting the growth of pedestrians in the Jalan Malioboro area in the next five years and getting the Level of Service value at the same two points to find out how the strength of the pedestrian path is to be able to continue to accept the growth of its users, especially for tourism activities and the mobility of surrounding community activities. Predictions and assumptions about the increase in the number of

pedestrians on Jalan Malioboro can be searched using data from the graph of the growth of tourists to the Special Region of Yogyakarta. The following is a data presentation and calculation of the increase in pedestrians.

Table 9. DIY Tourist Growth

Year	Number of Tourists	Growth
2015	4.122.205 orang	-
2016	4.549.574 orang	9,4 %
2017	5.229.298 orang	13%
2018	5.689.091 orang	8%
2019	6.549.381 orang	13 %

Average tourist growth DIY 2015-2019 $= \frac{9,4\%+13\%+8\%+13\%}{4} = 10,85\%$

Assuming that the average tourist growth every year is 10.85% and assuming a situation where there is no Covid 19 pandemic because the data obtained are in 2015-2019, then the pedestrian flow on Malioboro Street in the next five years can be calculated by the following way.

Pedestrian Flow in 2026   = 15 ped/m/minutes

(With flow at 21.00-22.00 in front of Afternoon Market)

$$= 15 \, (\, 1 + i \,) \, n$$
$$= 15 \, (\, 1 + 0,1085 \,) \, 5$$
$$= \mathbf{25 \ ped/m/minutes}$$

After calculating the growth of pedestrian flow, the growth of all pedestrian development tows can also be obtained every hour and can find the predicted Level of Service value in 2026 or the next five years. Here are the expected results.

Table 10. Prediction of Weekdays Pedestrian Service Level in Front of Malioboro Mall

Busiest Hours	Speed (m/minutes)	Flow (person/m/minutes)	Density (person/m2)	Pedestrian Space (m2/org)	Service Level
Monday, 17 May 2021					
MORNING					
08.00-09.00	50.13	4	0.077	**13.06**	A
09.00-10.00	45.00	4	0.090	**11.11**	B
10.00-11.00	47.28	5	0.098	**10.19**	B
AFTERNOON					
13.00-14.00	48.96	4	0.082	**12.12**	A
14.00-15.00	44.93	6	0.143	**7.02**	B
15.00-16.00	48.07	6	0.135	**7.43**	B
NIGHT					
19.00-20.00	42.67	11	0.264	**3.79**	B
20.00-21.00	43.92	19	0.434	**2.30**	C
21.00-22.00	47.08	17	0.359	**2.79**	C

Table 11. Prediction of Weekends Pedestrian Service Level in Front of Malioboro Mall

Busiest Hours	Speed (m/minutes)	Flow (person/m/minutes)	Density (person/m2)	Pedestrian Space (m2/org)	Service Level
MORNING					
08.00-09.00	40.65	13	0.324	**3.09**	B
09.00-10.00	41.28	15	0.364	**2.75**	C
10.00-11.00	42.68	14	0.318	**3.15**	C
AFTERNOON					
13.00-14.00	45.07	11	0.243	**4.11**	B
14.00-15.00	42.28	10	0.234	**4.28**	B
15.00-16.00	43.63	13	0.294	**3.40**	C
NIGHT					
19.00-20.00	45.98	13	0.282	**3.55**	C
20.00-21.00	40.58	20	0.485	**2.06**	D
21.00-22.00	39.26	20	0.510	**1.96**	D

Continuing to the second point, the data collection took place in front of the Afternoon Market, Jalan Malioboro. Here are the predictions for the next five years.

Table 12. Prediction of Weekdays Pedestrian Service Level in Front of Afternoon Market

Busiest Hours	Speed (m/minutes)	Flow (person/m/minutes)	Density (person/m2)	Pedestrian Space (m2/org)	Service Level	
MORNING						
08.00-09.00	46.81	5	0.112	**8.90**	**B**	
09.00-10.00	43.73	6	0.143	**7.00**	**B**	
10.00-11.00	44.18	6	0.145	**6.89**	**B**	
AFTERNOON						
13.00-14.00	44.72	6	0.128	**7.82**	**B**	
14.00-15.00	42.19	8	0.199	**5.02**	**B**	
15.00-16.00	44.83	8	0.187	**5.34**	**B**	
NIGHT						
19.00-20.00	40.28	14	0.358	**2.80**	**C**	
20.00-21.00	40.87	23	0.565	**1.77**	**D**	
21.00-22.00	43.16	21	0.496	**2.02**	**D**	

Table 13. Prediction of Weekends Pedestrian Service Level in Front of Afternoon Market

Busiest Hours	Speed (m/minutes)	Flow (person/m/minutes)	Density (person/m2)	Pedestrian Space (m2/org)	Service Level	
MORNING						
08.00-09.00	41.00	17	0.404	**2.48**	**C**	
09.00-10.00	40.52	19	0.478	**2.09**	**D**	
10.00-11.00	41.46	17	0.422	**2.37**	**C**	
AFTERNOON						
13.00-14.00	42.68	15	0.349	**2.87**	**C**	
14.00-15.00	40.69	15	0.372	**2.69**	**C**	
15.00-16.00	40.19	17	0.419	**2.39**	**C**	
NIGHT						
19.00-20.00	42.97	17	0.394	**2.54**	**C**	
20.00-21.00	38.79	25	0.654	**1.53**	**D**	
21.00-22.00	37.81	25	0.671	**1.49**	**D**	

3.3 Questionnaire Data Analysis with Importance Performance Analysis Method

With the total number of pedestrians counted at both points, which is 36,613 pedestrians, the sample size taken is

$$n = \frac{N}{1+Ne^2} = \frac{36.613}{1+36.613\,(0,05)^2} = 395 \text{ sample}$$

(Because it more than 100 then used 100 samples)

Questionnaires were distributed online to every pedestrian, and everyone who has ever enjoyed walking on the pedestrian path in the Jalan Malioboro area of Yogyakarta, the respondents sought were 100 respondents. The 20 questions contained in the questionnaire are as follows [15] [16] [17].

Table 14. Questionnaire Question Indicator

No	Indicator
1	Adequate pedestrian path drainage
2	The width of the pedestrian path is at least 2 meters.
3	Condition of floor mats on pedestrian paths
4	Walkway grade (easy to access)
5	The tidiness of the pedestrian path
6	Availability of facilities for the disabled and the elderly
7	Have lighting
8	Have a traffic sign
9	There is a barrier between the pedestrian path and the road.
10	Availability of seats
11	Availability of trash bin
12	Availability of public toilets
13	Availability of stops/shelters
14	Availability of shade trees
15	Availability of People Crossing Bridge (JPO)
16	Cleanliness of the pedestrian path

17	Ease of walking on the pedestrian path
18	Order on pedestrian paths (illegal parking, traders, etc.)
19	Order health protocol during a pandemic
20	Affordable accessibility between public transportation modes

One of the stages in visualizing the level of satisfaction and importance into a Cartesian diagram is by determining the level of unity between matter and joy using the Importance Performance Analysis method with a comparative analysis of the satisfaction score and the importance score. The following table shows the level of conformity. The existing conformity level table is as follows [18] [19] [20].

Table 15. Conformity Level

Variable	Satisfaction X	Importance Y	Conformity Level %	Description
1	376	433	86.84	VERY GOOD
2	395	439	89.98	VERY GOOD
3	389	434	89.63	VERY GOOD
4	406	444	91.44	VERY GOOD
5	359	426	84.27	VERY GOOD
6	353	427	82.67	VERY GOOD
7	398	445	89.44	VERY GOOD
8	367	413	88.86	VERY GOOD
9	384	414	92.75	VERY GOOD
10	388	434	89.40	VERY GOOD
11	377	432	87.27	VERY GOOD
12	259	383	67.62	GOOD
13	355	402	88.31	VERY GOOD
14	327	407	80.34	GOOD
15	248	326	76.07	GOOD
16	349	431	80.97	GOOD
17	371	440	84.32	VERY GOOD
18	319	421	75.77	GOOD
19	323	429	75.29	GOOD
20	357	436	81.88	VERY GOOD
	Average		**84.16**	**VERY GOOD**

Based on the analysis of the level of conformity above, it can be concluded that the average obtained overall percentage is 84.16% and is included in VERY GOOD conditions.

After that, the next step is the late data taken from the respondents and then analyzed using the Importance Performance Analysis method, which includes quadrant analysis and gap analysis. Quadrant analysis has a function to show the relationship between assessing the level of importance and the respondents' level of satisfaction. The Cartesian diagram with predetermined attributes can be seen below.
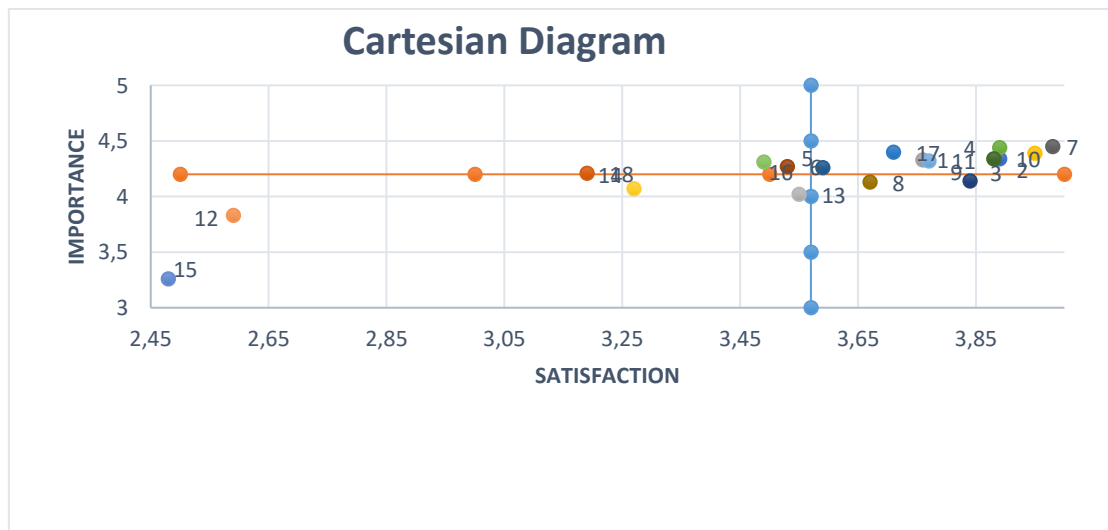

Fig 2. Cartesian Diagram

Based on the IPA graph in the picture above, the factors related to services can be grouped into each quadrant as follows:
1. **Quadrant A**
   Quadrant A is the main priority which explains that satisfaction from the service of the Malioboro pedestrian path is low, but the level of importance according to pedestrians is high. The attributes contained in quadrant A are:
   - Availability of facilities for the disabled and the elderly
   - Clean the pedestrian path
   - Order pedestrian paths (illegal parking, street vendors, etc.)

- Order health protocols during a pandemic
- Affordable accessibility between public transportation modes

2. **Quadrant B**

Quadrant B is considered necessary, explaining the high satisfaction of the Malioboro pedestrian path and the high level of importance according to pedestrians. The attributes contained in quadrant B are:
- Adequate pedestrian path drainage channels
- The width of the pedestrian path is at least 2 meters
- Condition of floor mats on pedestrian paths
- Slope of the pedestrian path (easy to access)
- Neatness of the pedestrian path
- Has lighting
- Availability of seats
- Availability of trash cans
- Ease of walking on the pedestrian path

3. **Quadrant C**

Quadrant C is a low priority which explains that the service satisfaction of the Malioboro pedestrian path is low, but the level of importance according to pedestrians is also standard. The attributes contained in quadrant C are:
- Availability of Public Toilet
- Availability of stops/shelters
- Availability of shade trees
- Availability of People Crossing Bridge (JPO)

4. **Quadrant D**

Quadrant D is considered unimportant, which explains that the satisfaction of the Malioboro pedestrian path is high, but the level of importance according to pedestrians is low. The attributes contained in quadrant D are:
- Have traffic signs
- There is a barrier between the pedestrian path and the road

3.4 Pedestrian Path Width Analysis in the Field

By the source; SE OF THE MINISTER OF PUPR NUMBER 02/SE/M/2018, in regulating the technical rules of the pedestrian path, which is the reference in this analysis, at the survey location, Jalan Malioboro Yogyakarta, which is based on the function of the road becomes a collector road. Then the minimum effective pedestrian path that is appropriate and becomes a benchmark for the results of measurements in the field is in the table below.

With the ideal pedestrian path width table in SE OF THE MINISTER OF PUPR NUMBER 02/SE/M/2018, the following is a comparison table between the width of the reference pedestrian path above and the width of the pedestrian path based on a survey of measurements in the field in front of Malioboro Mall with an overall width of 6 meters with a barrier of 3.5 meters, and in front of Pasar Sore with an overall width of 6 meters and a wall of 4 meters as follows.

Table 16. Comparison of Calculation and Survey of Field Conditions

Location	SE Minister of PUPR No 02/SE/M/2018	Effective Width of Field Measurement
In front of Malioboro Mall	2,00 - 2,75 meter	2,5 meter
In front of Afternoon Market	2,00 - 2,75 meter	2 meter

4. Conclusion

The results of this study can be concluded on several points including:

1. The first location in Front of Malioboro Mall on weekdays and weekends still has a good LOS condition with LOS A in the morning and LOS B at night. Then in Front of Pasar Sore, LOS B in the morning and LOS C at night. As for the prediction of pedestrian growth in the next five years with an average increase of 10.85%, the LOS value at each location drops one level below it.
2. Based on research and observations carried out to determine the condition of the pedestrian path and supporting facilities on Jalan Malioboro, the section examined on the pedestrian path is by the provisions of the guidelines from the SE Minister of PUPR NO2/SE/M/2018, conditions, and six parts found 18 teams do not comply with the requirements. In addition, with the IPA method, it is known that the satisfaction level of pedestrians on Jalan Malioboro is 84.16% which is included in VERY GOOD conditions with conditions indicating that the main priority that must be considered is the availability of facilities for the disabled and the elderly, cleanliness of the pedestrian path, orderliness on pedestrian paths for both street vendors and health protocols during Covid 19, and the accessibility of public transportation between modes.
3. The SE Minister of PUPR Number 02/SE/M/2018 shows that the standard criteria have an effective width of 2 meters to 2.75 meters. In the field measurements in Front of Malioboro Mall and Front of Pasar Sore, the requirements for effective width are by applicable regulations.

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