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THE ANALYSIS OF NATIONAL ROAD USER SATISFACTION IN URBAN AREAS (CASE STUDY OF THE PGC-KRAMAT JATI-GRAHA CIJANTUNG ROUTE, JAKARTA)

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ABSTRACT

Jalan Raya Bogor is a national road that connects the cities of Jakarta, Bogor, and Depok. Therefore, this national road is significant for the surrounding community to carry out activities and even affect the surrounding economy. Therefore, the quality of road services such as road pavement conditions, road shoulder conditions, drainage/waterway conditions, complementary road conditions, markings, signs, condition of complementary road buildings, and condition of plants/grass around the road are essential indicators for achieving good road service. Therefore, identification is needed regarding the evaluation of road service performance by applying the following aspects of the provisions of the road terms applicable in Indonesia. Furthermore, the most important thing is the achievement of community needs in transportation activities. Therefore, this study aims to identify the performance of road services in terms of the level of importance and the level of application of road infrastructure components in the perception of road users with the methods used using the Customer Satisfaction Index and Importance Performance Analysis analysis.

INTRODUCTION

People carry out their daily activities such as work, school, recreation, and social interaction by moving from one place to another. The activity of changing places is often referred to as "transportation." In almost all countries, including Indonesia, the highest intensity of transportation activities occurs in the capital regions, where urbanization is one of the most significant contributing factors in this regard. Public and private transportation are the two main modes of transportation for people to travel in their daily movements. The Bogor highway is a national road that is vital in connecting Jakarta, Depok, and Bogor. Therefore, the condition of the road surface must always be evaluated periodically so that it is comfortable to walk and durable. Thus, Jalan Raya Bogor is the immediate access that connects several cities, namely Bekasi, Jakarta, and Depok. Therefore, this road is significant for residents living in the area. To have loyal customers, the service industry must meet the quality of service expected by satisfied customers and have trust in the service provider (Khoirunnisa, Princess, Cahya, & Sari, 2022) (Kusmaryono & Sepinggan, 2020); (Sobihah, Mohamad, Ali, & Ismail, 2015).

Therefore, the quality of road services is needed to serve the community's needs in carrying out transportation activities. This study aims to identify the performance of road services. In terms

of the level of importance and the level of application of road infrastructure components in the perception of road users, it can be known the priority of handling road service performance that still needs to meet the expectations of road users on the Bogor Highway section. In improving the quality of road services, road user satisfaction can also be used to determine the actual road conditions and handling needed to enhance the comfort of road users (Nofriyanti, 2020).

Travel satisfaction is a type of road user satisfaction. Measuring road user satisfaction is a form of assessment of the achievement of service quality within the scope of performance of road infrastructure components and travel satisfaction. Road users' satisfaction with the performance of road services is greatly influenced by the travel mode used. The choice of travel mode for travel satisfaction is related to travel time, vehicle speed, vehicle operating costs (BOK), safety during travel, road pavement structure, and road geometrics. A road user satisfaction survey is conducted to determine road user satisfaction with the road service (Hasan, Nature, Mim, & Das, 2020); (Faisal, Mulyono, & Utomo, 2022); (Vinayaka & Kurugod, 2017).

LITERATURE REVIEW

Road Pavement Maintenance

Roads as a supporting system for the economic, social, and cultural fields and the environment are significant for the community. Therefore, the road requires maintenance so that later the road can be used comfortably and has a long and optimal service life. However, the pavement of roads traversed by traffic will undoubtedly experience a decreased quality, both structurally and functionally. To overcome this, road maintenance is carried out continuously with good planning and sufficient maintenance, as well as road-type maintenance can be a solution. Maintenance management systems have been implemented on roads since the 1970s, generally considered a good and valuable help for road managers. Since that time, this system has been widely applied to Pavement Management Systems, and the abbreviation PMS has become very popular in many countries in America and Europe. The developed pavement management process provides a systematic and consistent method for selecting Maintenance, Repair, and Rehabilitation. It is because PMS is based on the road pavement life cycle cost analysis required to reliably analyze the costs incurred at the initial construction stage and the costs incurred at the discharge time. Therefore, to develop a road-efficient pavement maintenance system, it is imperative to develop a model for predicting pavement damage (Sita & Mulyono, 2016); (Loprencipe, Pantuso, & Di Mascio, 2017); (Choi & Do, 2019).

As the road pavement ages, it will undoubtedly experience a decrease in service. Pavement layers are also often damaged before reaching the life of the plan. Damage to the pavement can be seen from functional and structural failures. According to the Road Maintenance Manual No: 03 / MN / B / 1983 issued by the Directorate General of Wildlife Development, road damages caused by pavement materials/materials used are not good, including fine cracks, slip cracks (slippage c r a c k s), surface defects and detachment of aggregate grains. Cracks are the most frequent damage to road pavements (Yunardhi, H, 2019); (Sumiati & Hasan, 2013); (Wang, W. & Su, C., 2020).

The main threats drivers face come from other vehicles, and most fatal accidents result from more than one vehicle in the road environment. Therefore, to avoid accidents on the road, one of them requires handling road damage. The handling of road damage can be classified as follows: Routine Maintenance, that is, maintenance given only on the surface layer intended to improve driving quality without increasing structural strength, and is carried out throughout the year. Periodic maintenance is carried out on the road at certain times (not continuously throughout the year) and naturally increases structural capabilities. Road Repair, namely road handling, improves road services through structural and geometric improvements to achieve the planned level of service (Bila, Sivrikaya, Khan, & Albayrak, 2016).

Customer Satisfaction Index (CSI)

The customer satisfaction index (CSI) is an index to determine the level of customer satisfaction as a whole with an approach that considers the level of importance of the attributes of the product or service being measured. Customer satisfaction can be seen from the level at which needs, wants, and expectations are met, resulting in continuous use or user loyalty. In addition, user satisfaction can be achieved if the product or service presented reaches or even exceeds the wishes of its users (Widodo & Sutopo, 2018); (Hamzah, Rahmadhani, & Purwati, 2022).

In creating user satisfaction, the most crucial factor is the quality of the product or service's performance. Six elements contribute to the measurement of the road user satisfaction index, including (1) road safety at 17%; (2) road infrastructure components at 26%; (3) environmental impact at 17%; (4) service to road users 12%; (5) social factors of 14%; and (6) traffic management of 14%. Therefore, CSI analysis with a level of satisfaction that is already in the satisfied category will still need to maintain existing services and improve quality because it has not yet entered the category of very satisfying (Jin & Lim, 2021) (Adikesuma & Nahdiyah, 2020); (Wibawa, Sumarwan, & Dewi, 2014).

CSI provides precise data on the level of customer satisfaction so that at specific units of time, it can conduct periodic evaluations to improve what is lacking and the service that customers consider a plus. The overall calculation of CSI according to the CSI calculation is the average value in the satisfaction column (I) summed so that it is obtained Y, and also the multiplier I with P in the score column (S) is calculated and obtained T. CSI is obtained from the calculation (T/5Y) x 100%. Five on (5Y) is the maximum value used on the measurement scale. CSI can be calculated by the formula: (Sulistiani, 2021); (Choi & Do, 2019).

$$\text{CSI} = \frac{T}{5Y}\ x\ 100\ \%$$

Information:

T = Total value of CSI

5 = Maximum value on the measurement scale

Y = The total value of the expectation column

Table 1 Satisfaction Level Criteria

No	Value of CSI (%)	description(CSI)
1	81% - 100%	satisfied
2	66% - 80,99%	Very satisfied
3	51% - 65,99%	Quite satisfied
4	35% - 50,99%	Less satisfied
5	0% - 34,99%	Not satisfied

The maximum value of CSI is 100%. A CSI value of 50% or lower indicates poor service performance. Conversely, a CSI value of 80% or higher indicates that users are satisfied with the performance of the service.

Importance-Performance Analysis (IPA)

The Importance-Performance Analysis (IPA) method is a business research technique to understand customer satisfaction and formulate strategies for improving products/services. The data used to conduct the IPA is obtained from consumers through surveys. However, surveys are expensive in terms of time and money (Bi, Liu, Fan, & Zhang, 2019); (Azzopardi & Nash, 2013); (Bi, Liu, Fan, & Zhang, 2019).

Research using the Importance-Performance Analysis (IPA) method has the quality of its data obtained from the survey depending on the complexity or length of the questionnaire and the willingness of respondents to participate. Moreover, the data obtained from biased surveys quickly need to be updated. Therefore, it is worthwhile to consider alternatives to other data sources to perform IPA. In addition, with the advancement of information technology and the internet, consumers are increasingly posting online reviews about products/services on the internet (Groves, 2006); (Bi, Liu, Fan, & Zhang, 2019); (Fang, Ye, & Law, 2016).

The IPA method begins with developing a list of attributes by which the evaluation is carried out. From the list, survey questionnaires can be developed using a Likert scale or other numerical scales to measure performance scores and the importance of each attribute in the list. Next, mean values and significant scores are calculated and then used as coordinates to plot individual attributes in two dimensions with the performance of the attributes on the x-axis and the importance of the attributes on the y-axis (Tannady, 2018); (Tannady, 2018); (Sampson & Showalter, 1999).

METHOD

The research was conducted in November 2022 and is located on Jalan Raya Bogor Route PGC-Kramat Jati-Graha Cijantung Road, East Jakarta. This research was performed using a Google Drive questionnaire with questions about the interests and satisfaction of users of this Bogor Highway.

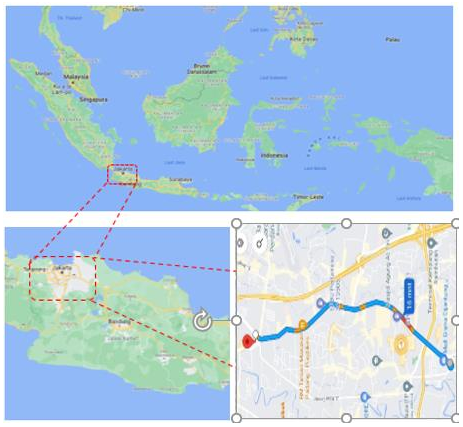

Figure 1. Research Location

This study aims to determine the level of satisfaction of road users with the level of service of the road infrastructure provider or the government. The systematic scientific research process must begin with identifying the right problem. The method of this study uses data collection methods, namely primary data and secondary data collection. Data is one of the leading forces in compiling scientific research and modeling. The data obtained will help road operator agencies and related road operating institutions as considerations to carry out appropriate handling to improve the quality of current and future road services (Rifai, Hadiwardoyo, Correia, & Pereira, 2016); (Rifai, Hadiwardoyo, Correia, Pereira, & Cortez, 2015); (Subotić, Tešić, & Vidović, 2017).

Secondary data collection is obtained through literature related to research and research documents such as public road image data and road damage data. While the primary data from this study is obtained directly from the research subjects, the researchers use online questionnaires. This questionnaire was shared directly through social media. The researchers transferred the link in the questionnaire regarding matters concerning the subject's satisfaction (road user) with the object of this study, namely Jalan Raya Bogor. Researchers chose online questionnaires because they were more effective and efficient against time and place constraints. This study was attended by 43 respondents, of which 42 respondents were highway users who had gone through or used the road. The online questionnaire contains questions arranged in a close-ended and open-ended manner. Closed-door questions aim to find out information regarding the gender, occupation, and age of respondents. Meanwhile, open questions aim to determine respondents' satisfaction with passing the Bogor Highway section of the PGC - Kramat Jati - Graha Cijantung road route. Data analysis data processing to determine the perception of satisfaction from road users towards the Bogor Highway section PGC - Kramat Jati - Graha Cijantung Road Route using the Importance Performance Analysis (IPA) and Customer Satisfaction Index (CSI) methods.

RESULTS AND DISCUSSION

The questionnaire was distributed online to respondents or road users who had passed or crossed the Bogor Highway, PGC – Kramat Jati – Graha Cijantung Road Route. Based on the

questionnaire that has been distributed and obtained, 43 respondents, of which 42 respondents have gone through or passed through the road.

Characteristics of Respondents

Based on the results of the questionnaire of 42 respondents, it was found that the more significant respondents were the female sex characteristics by 52.4%. For age characteristics, more aged 21-30 years by 81 %. The characteristics of the dominant type of employment of private employees are 57.1%. The predominant objective characteristic of passing the Bogor Highway PGC – Kramat Jati – Graha Cijantung Road Route is working at 42.9%. The frequency characteristic of passing the Bogor Highway Section PGC – Kramat Jati – Graha Cijantung Road Route in a week is dominant by more than three times by 52.4%. The characteristics of vehicles that are usually used when passing the Bogor Highway PGC – Kramat Jati– Graha Cijantung Road route is private motorbikes 73.8%.

Table 2. Respondent Characteristics Data

No.	Characteristics of Respondent Data	Variabel	Value (%)
1	Gender	Woman	52,4%
		Man	47,6%
2	Age	<20 year	9,5%
		21-30 year	81,0%
		31-40 year	0,0%
		41-50 year	4,8%
		51-60 year	4,8%
		> 60 year	0,0%
3	Type of Work	Government Employees	7,1%
		Private-Employee	57,1%
		Public Company Employee	9,5%
		Entrepreneur	0,0%
		Housewife	4,8%
		Student or College Student	21,4%
		Public Transport Driver	0,0%
4	Residence	Jakarta	71,4%
		Bogor	4,8%
		Depok	14,3%
		Tanggerang	0,0%
		Bekasi	4,8%
		etc.	4,8%
5	destination	Working	42,90%
		Studying	28,60%
		Sporting	0,00%
		shopping	14,30%
		etc.	14,30%
6	Frequency	one time	21,40%
		two times	21,40%
		three times	4,80%
		more than three times	52,40%
7	Commonly used vehicles	Private Motorcycles	73,80%
		Private car	11,90%
		Taxibike online	4,80%
		Public transport	9,50%

GAP Analysis

Based on the calculation of satisfaction and importance values as in Table X. Where the importance value reduces the satisfaction value, a GAP value is obtained, which, if the result is negative (-), identifies the discrepancy of expectations from road users. With this GAP Analysis, an evaluation and improvement of the object to be studied can be carried out.

Table 3. Comparison of Importance and Performance

No	Indicator	Importance	Performance	GAP
A1	Pavement condition	4,69	3,48	-1,21
A2	Road shoulder condition	4,43	3,02	-1,40
A3	Drainage/drain conditions	4,55	2,90	-1,64
A4	Condition of road equipment, markings and signs	4,64	3,36	-1,29
A5	Condition of supporting buildings	4,40	3,29	-1,12
A6	Condition of plants/grass	4,14	3,10	-1,05
	Average	4,48	3,19	-1,29

Based on the results in the table above, we get the average value of the importance of 4.48, categorized as essential in all variables. In the satisfaction category, an average satisfaction of 3.19 was obtained, categorized as dissatisfied. The indicator with the highest importance value is indicator A1 (road pavement condition), with a value of 4.69, while the lowest is indicator A6 (Plant/grass condition), with a value of 4.14. The indicator with the highest satisfaction value is indicator A1 (road pavement condition), with a value of 4.69, while the lowest is indicator A3 (drainage/waterway condition), with a value of 2.9.

Gap analysis is obtained from the results of reducing performance on importance. If the Gap result is negative, then the user's expectation of the user's interest in the satisfaction of the object used is not as expected. On the other hand, suppose the result is positive, then vice versa. Based on the results in the table above, the average Gap result is -1.29, with the highest Gap value being in indicator A6 (Plant/grass condition) with a value of -1.05 and the lowest Gap value at Gap value A3 (drainage/waterway condition) with a value of -1.64.

It can be seen from the table that the pavement condition of Bogor Highway meets the requirements in the technical planning guidelines, where the value of importance and satisfaction is already above the overall average. A gap value of -1.21 (negative) was obtained so that the expectations of the interests of the people who use the Bogor Highway for the satisfaction of the road are appropriate and lacking. The condition of the shoulder of the road is much uneven, cracked, and hollow. Conditions correlated with the results in the table above, where the value of importance and satisfaction is below the average, and the GAP result shows a -1.4 (negative), indicating that the interest in community satisfaction is not appropriate or lacking. When researchers conducted a field survey of the drainage condition of the Bogor Highway, there was still garbage covering the inlet of the Bogor Highway canteen. In the rainy season, there were often puddles, and there had even been floods on the road. So based on the table above, the value of interest shows that the result of interest is greater than the average value of the interest, so the condition of road drainage is critical to them. However, because there is much waste in the drainage

channel, Jalan Raya Bogor shows a low satisfaction result of 2.9, and the GAP value shows a result of -1.94 (negative), which means the importance of satisfaction is not appropriate or lacking. The condition of road equipment, markings, and signs is still quite good in the field. The results in the table above show a GAP result of -1.29 (negative), indicating that the importance of community satisfaction is not appropriate or lacking.

The condition of complementary road buildings, for example, guardrails, is still quite good in the field. The table above shows a gap of -1.12 (negative), indicating that the importance of community satisfaction needs to be more appropriate and lacking. The condition of the plants/grass from direct observation is still many clay plants covering the road signs, so the signs cannot be seen from a distance by users of the Bogor Highway.

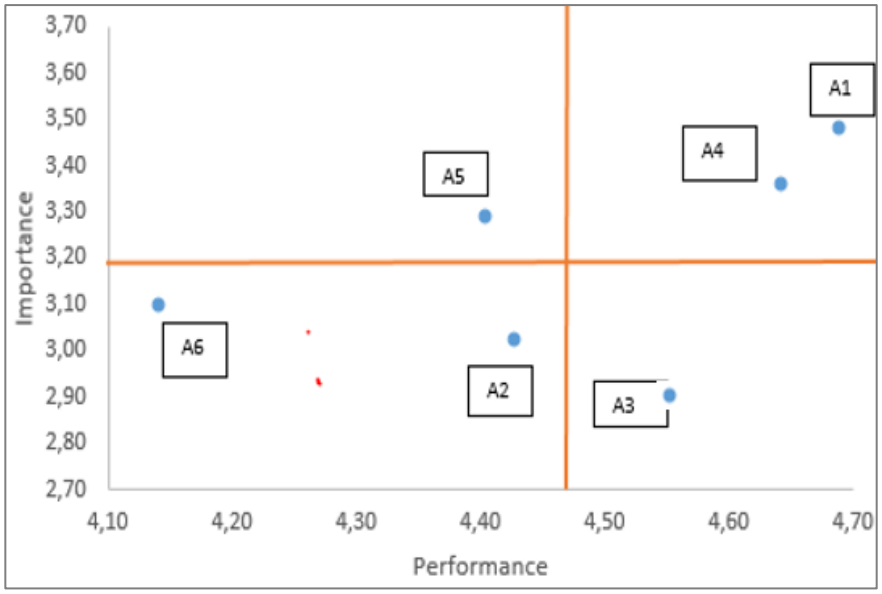

Figure 2. Index Performance Analysis (IPA) results

Based on the cartesian diagram above, the attributes A1 (Road pavement conditions) and A4 (Road equipment conditions, markings, and signs) are in quadrant II which means that these attributes are suitable according to the user and need to be maintained in quality. On the other hand, the attributes A2 (Road shoulder condition) and A6 (plant/grass maintenance) are in quadrant III, meaning that the importance level is low and the satisfaction level is also low. Hence, it is worth improving the quality. For A5(the condition of the complementary road building) is in quadrant I, meaning that the attribute is considered essential but still unsatisfactory, so the attribute is the main priority in improving quality. Whereas A3 (drainage/drainage condition) is in quadrant IV, which means that the attribute is satisfactory but not considered essential, this attribute is not the focus in quality improvement.

Table 4. Table of Calculation Results of the CSI

Code	Importance (I)	Performance (P)	Score (S)
	scale from 1-5	Scale from 1-5	(I) x (P)
A1	4,69	3,48	16,30
A2	4,43	3,02	13,39
A3	4,55	2,90	13,21
A4	4,64	3,36	15,59
A5	4,40	3,29	14,47
A6	4,14	3,10	12,82
	26,86		85,79

From the CSI calculation results, CSI is obtained from the result (T / 5Y) x 100%. Where T is the total value of the CSI, 5 is the maximum value on the measurement scale, and Y is the total column of importance. The CSI result is (26.86/5(85.79)) x 100% = 63.88%.

Table 5. CSI Satisfaction Level Criteria

No	Value of CSI (%)	description(CSI)
1	81% - 100%	satisfied
2	66% - 80,99%	Very satisfied
3	51% - 65,99%	Quite satisfied
4	35% - 50,99%	Less satisfied
5	0% - 34,99%	Not satisfied

Based on CSI calculations, the result of 63.88% was obtained, based on the table, which means that Bogor highway users are quite satisfied.

CONCLUSIONS

From the results of this study, it shows that the level of satisfaction of Bogor Highway users with the Bogor Highway PGC-Kramat Jati-Graha Cijantung Road Section Route based on the results of the Performance Analysis Index (IPA) is attributed to A2 (Road shoulder condition) and A6 (plant/grass maintenance) is in quadrant III which means that the level of importance and satisfaction is low which means the role of the government is needed to improve the quality of road services and more importantly the attributes A5(the condition of the complementary road building) because it is in quadrant I where the attribute is considered essential to the community but still unsatisfactory. If based on the results of the Customer Satisfaction Index (CSI), the final result of 63.88% is obtained, which means that the community is quite satisfied when passing the Bogor Highway.

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