Public Attitude to Urban Public Transportation Services in Jember, Indonesia

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Abstract. In this current condition, people's interest in using public transportation in Jember is decreasing with a low load factor value below 50%. It can be caused by the quality of services provided by service providers to the satisfaction of public transport users. This study aims to examine the users' satisfaction and investigate the willingness to pay (WTP) for public transport services in Jember. Importance-Performance Analysis (IPA) method is used to determine the level of satisfaction of public transport users in Jember District. The descriptive statistics are performed to understand the WTP value. The satisfaction level of public transport users is obtained from several attributes that belong to the Cartesian diagram. The attributes that need improvement are the punctuality of the services, providing a sense of security and comfort and first aid facilities. The user's WTP is Rp.4,000.00 - Rp.5,000.00. Directions for future studies are presented.

Keywords: customer satisfaction, public transport, service quality, willingness to pay

1. Introduction

Urban public transportation is a transport mode needed to support economic activities and urban development. Urban transportation services must be implemented efficiently and effectively. The criteria for fast, safe, adequate capacity, convenience, and affordable transportation fares need to be considered in implementing good services of urban public transport. The facilities of public transport such as stops for boarding and dropping passengers that could be at any place and existing routes make this an advantage and one of the attractions for service users, unlike public transportation such as buses that have specific stops [1]. The decline in the quality of urban public transportation services is partly due to the less than optimal service from service providers [2].

Public transportation in Jember is one of the means of mobility for the community to meet the needs of daily life. Urban public transportation in the form of Lyn (8 seaters car) serves 17

transportation routes [3]. A study in Jember [4] stated that public transportation in Jember had a load factor of 50% in 2015. Based on the criteria contained in SK 678/AJ.206/DRJD/2002 concerning Technical Guidelines for the Implementation of Public Transportation in Urban Areas, public transport routes should be fixed and regular. Based on Department of Transportation Jember data, 80% of the urban public transportation system in Jember needs to be improved. Public interest decreased due to the fleet that was not feasible to operate. High investment costs and low potential demand make many unmaintained fleet conditions [5].

The tariffs for public transport in Jember currently are IDR 5,000 for the public and IDR 2,500 for students. The determination of the basic tariff should be calculated based on Willingness to Pay (WTP). The correct calculation was expected to produce urban transportation fares that are reasonably fair for producers and consumers so that urban transportation becomes the primary choice of transportation means.

The cause of the poor condition of public transport is the insufficient level of service provided by providers. This condition leads to the low satisfaction of public transport users. Some factors affect the satisfaction of public transportation users, such as reliability, responsiveness, assurance, empathy, and tangible. Efforts to increase the interest of public transport users in Jember Regency need to be carried out to solve the existing transportation problems. Therefore, this study aims to determine the level of service quality and the factors that influence the interest of service users and the suitability of transportation fares based on WTP.

This study contributes to the public transport study in two notable ways. First, to date, there is no study examining the public transport services performance from the user's point of view in Jember. Second, in terms of survey technique, besides letting respondents filled the survey by themselves, we conducted several online meetings to guide some respondents in completing the questionnaire. This technique also beneficial to extract more information from respondents, especially when we use open questions in the survey.

2. Material and Methods

Jember is the third biggest city in East Java Province, Indonesia. Based on the Indonesian Statistics data, Jember's population in 2015 was 2.409 million. Jember has an area of 3.293 km². This city has an urban public transport system called "lyn". The performance of the urban public transport system is low due to the massive ownership of two-wheeled motorized vehicles, the popularity of the ride-hailing system, and the inadequate condition of supporting facilities. Therefore, Jember has been chosen as a case study.

2.1. Data Collection Method

Data needed in this research is primary data. The primary data was obtained directly from the field by distributing questionnaires to service users. A total of 400 respondents participated in this survey—the first section of the questionnaire mainly contained socio-demographic characteristics. In the second part, respondents were asked to indicate their preferences towards the service quality of public transportation in Jember. This section required respondents to rate the importance and performance of service quality using a five-points Likert scale. Then, an open question regarding how much they are willing to pay for the service was asked.

2.2. Data Analysis

Data analysis is carried out using Importance Performance Analysis (IPA). IPA is a tool in analyzing the performance of services provided with the level of satisfaction or expectations of users. The results of the comparison are in the form of conformity levels, which will later determine the priority scale in handling service improvements. IPA uses the performance and importance plotting of attributes scored by users into four quadrants:

- Quadrant 1: Low performance – High importance: attributes in this group show primary weaknesses. Users find these attributes essential. Thus, the organization should improve these attributes to raise the user's satisfaction.
- Quadrant 2: High performance – High performance: attributes falling to this category show major strength that has exceeded the standard performance level. Users find these attributes important, and they are satisfied with the performances.
- Quadrant 3: Low performance – Low importance: attributes in this class show a low level of performance. However, these attributes are not too important, and they do not threaten an organization.
- Quadrant 4: High performance – Low importance: attributes falling to this category have low potential to level up users' satisfaction. Although these attributes have high performances, users do not regard them as essential.

The IPA method has been extensively used to investigate the user's satisfaction towards transportation services. A study in Iran [6] use IPA to investigate the service attributes of the bus. This study argues that the policymakers should improve the comfort attributes such as cleanliness, ventilation, and facilities for disabled people and the elderly. Another study in Aceh [7] shows that there are several attributes that needed to be improved, such as arrival time punctuality, waiting time, passenger assistance, and available seats. Meanwhile, Ratnasari et al. [8] uses IPA method to examine users' satisfaction toward railway station performance.

Service attributes are obtained from the selection process with the general criteria needed by the community regarding existing public transportation services with a servsqual approach. There are eleven service attributes that are included in 5 variable dimensions with symbols.

Table 1. Attributes of Public Transportation Services in Jember

Dimension	Symbol	Statements
Reliability	A	Places of the arrival of public transportation match the route
	B	A stop (hop on/off) closes to the main road
	C	Punctuality of arrival or departure of public transport matches the schedule
Responsiveness	D	The speed of driver responds to complaints from transportation service users
	E	The speed of the driver responds to an emergency on the way
Assurance	F	The driver provides a sense of security and comfort while travelling
	G	Availability of accident/safety insurance
Empathy	H	The friendliness of the driver on the trip
	I	The willingness of the driver to serve if a problem occurs on the way
Tangible	J	Availability of good roads along the route
	K	Availability of health facilities/ first aid in public transportation

3. Result and Discussion

Table 2 provides a summary of the socio-demographic characteristics of the respondents. We have a balanced sampling of gender. More than half of respondents have senior high school education qualifications (65%) and are students (68%). This finding matches with the trip purpose where 59% of them are trip for school. Most of the respondents have income under IDR 1,000,000.

Table 2. Socio-demographic characteristics

Characteristics	Number of respondents	Percentage
Gender		
Male	198	50%
Female	202	50%
Age		
10 – 18 years	53	13%
19 – 27 years	263	66%
28 – 36 years	36	9%
37 – 45 years	21	5%
> 46 years	27	7%
Education		
Junior high school	14	4%
Senior high school	261	65%
Vocational degree	37	9%
Bachelor's degree	85	21%
Postgraduate degree	2	1%
Occupation		
Student	270	68%
Civil servant	25	6%
Private sector	48	12%
Entrepreneurship	45	11%
Trip purpose		
Work/business	73	18%
Family business	41	10%
School	234	59%
Leisure	45	11%
Income (million)		
< IDR 1	231	58%
IDR 1 – 2	54	13%
IDR 2 – 3	47	12%
IDR 3 – 4	43	11%
IDR 4 – 5	19	5%
> IDR 5	6	1%

3.1. Validity and Reliability Test

The validity and reliability tests are used to determine whether the data collected is valid or not by matching the calculated r-arithmetic, Cronbach α and r-tables. The validity test is obtained by correlating each attribute score with the sum of the overall attribute scores offered. Suppose the results of the number of attribute scores are significantly correlated with the results of each attribute. In that case, the interpretation of the attribute values can be said to be successful (Table 3).

The level of consistency of answers to questions that have been given to respondents can be known after conducting a reliability test. The results of the questionnaire can be said to be consistent if the reliability testing is completed. Reliability test is the level of accuracy, precision, and service attributes. Service attributes can be declared reliable or trustworthy if the Cronbach α > 0.7 [9] (Table 4).

Table 3. Validity Test of Service Attribute Expectation and Performance

Attributes	r table	Expectation		Performance	
		r arithmetic	Explanation	r arithmetic	Explanation
A	0.098	0.593	Valid	0.695	Valid
B	0.098	0.662	Valid	0.669	Valid
C	0.098	0.599	Valid	0.744	Valid
D	0.098	0.538	Valid	0.733	Valid
E	0.098	0.641	Valid	0.754	Valid
F	0.098	0.577	Valid	0.668	Valid
G	0.098	0.612	Valid	0.711	Valid
H	0.098	0.672	Valid	0.739	Valid
I	0.098	0.69	Valid	0.761	Valid
J	0.098	0.682	Valid	0.733	Valid
K	0.098	0.48	Valid	0.681	Valid

Table 4. Reliability Test of Service Attribute Expectation and Performance

Attributes	Expectation		Performance	
	Cronbach α	Explanation	Cronbach α	Explanation
A	0.734	Reliable	0.754	Reliable
B	0.729	Reliable	0.753	Reliable
C	0.734	Reliable	0.748	Reliable
D	0.737	Reliable	0.750	Reliable
E	0.730	Reliable	0.749	Reliable
F	0.737	Reliable	0.751	Reliable
G	0.733	Reliable	0.748	Reliable
H	0.729	Reliable	0.750	Reliable
I	0.726	Reliable	0.750	Reliable
J	0.731	Reliable	0.748	Reliable
K	0.740	Reliable	0.749	Reliable

3.2. User Satisfaction Analysis of Public Transport Services in Jember

User satisfaction of public transport services is obtained from the level of importance (expectations) and performance levels by interviewing respondents. After obtaining the results, the actions to improve the service attributes can be determined (Table 5).

The value of the highest level of importance for the service attribute is that the driver provides a sense of security and comfort with the symbol F, while the value of the level of importance for the smallest attribute is the speed with which the driver responds to complaints from service users with the symbol D.

The average value of importance and level of performance is used to determine the coordinates of the Cartesian diagram. The coordinates of each attribute have an effect on determining the grouping of the four quadrants of the Cartesian diagram. On the X-axis, the quadrant axis value is obtained at the point of 2.5236, and on the Y-axis, the quadrant axis value is 3.5806. The average value is obtained from the sum of the average values of X and the average of Y divided by the number of service attributes.

Table 5. Average Value of Interest Level and Performance Level

Attributes	ΣX	ΣY	Average of X	Average of Y
A	1120	1443	2.8	3.6075
B	1084	1440	2.71	3.6
C	984	1454	2.46	3.635
D	1010	1377	2.525	3.4425
E	1049	1413	2.6225	3.5325
F	915	1500	2.2875	3.75
G	1040	1442	2.6	3.605
I	1056	1398	2.64	3.495
J	1010	1440	2.525	3.6
K	754	1433	1.885	3.5825

Table 6. Conformity Rate Value

Attributes	ΣX	ΣY	Conformity Rate	Percentage (%)
A	1120	1443	0.7762	77.62
B	1084	1440	0.7528	75.28
C	984	1454	0.6768	67.68
D	1010	1377	0.7335	73.35
E	1049	1413	0.7424	74.24
F	915	1500	0.6100	61.00
G	1040	1442	0.7212	72.12
H	1082	1415	0.7647	76.47
I	1056	1398	0.7554	75.54
J	1010	1440	0.7014	70.14
K	754	1433	0.5262	52.62

The priority order of service improvements to achieve user satisfaction is determined by the percentage value of the level of service attribute conformity (Table 6).

Next, we compared the value of the level of conformity with the value of the decision-making score. If the results of the level of conformity have a lower value than the value of the decision-making score, the attribute needs to be treated with improvement (action); if the result of the level of conformity is higher, then the attribute needs to be maintained its performance (hold).

Table 7. Result of Hold and Action

Attribute	Conformity Level (%)	Decision Score	Hold and Action
A	77.6161		Hold
B	75.2778		Hold
C	67.6754		Action
D	73.3479		Hold
E	74.2392		Hold
F	61.0000	70.5488	Action
G	72.1220		Hold
H	76.4664		Hold
I	75.5365		Hold
J	70.1389		Action
K	52.6169		Action

In Table 7, the results of hold and action are obtained from each attribute of public transportation services. Attributes A, B, D, E, G, H, and I with hold results mean that attributes with a level of conformity above the decision score need to be maintained or service quality improved. While attributes C, F, and J with a level of conformity below the decision score need improvement.

In Figure 1, we get a Cartesian diagram with four quadrants and the position of the attribute points of each quadrant. There are attributes C, F, and K in quadrant I, which means that the service attributes

need improvements. In quadrant II, attributes A, B, G, and J mean that the service attributes are classified as good performance and high importance, so they need to be maintained. In quadrant IV, attributes D, E, H, and I mean that the service attributes are classified as having good performance but are not considered essential by service users.
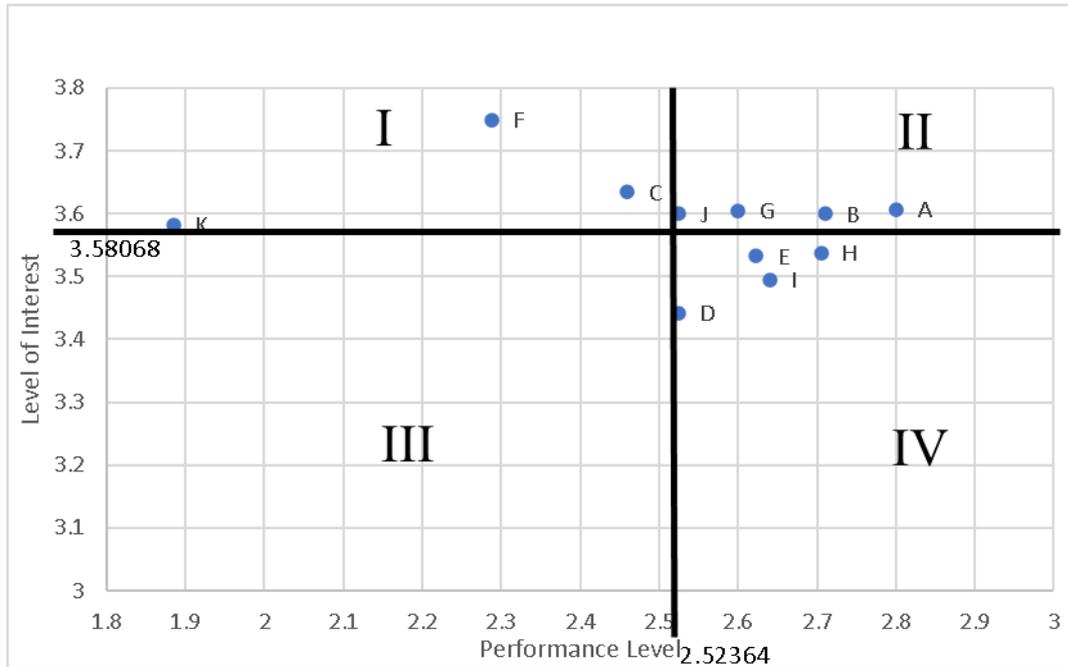
Figure 1. Cartesian Diagram of Public Transport Service Attributes
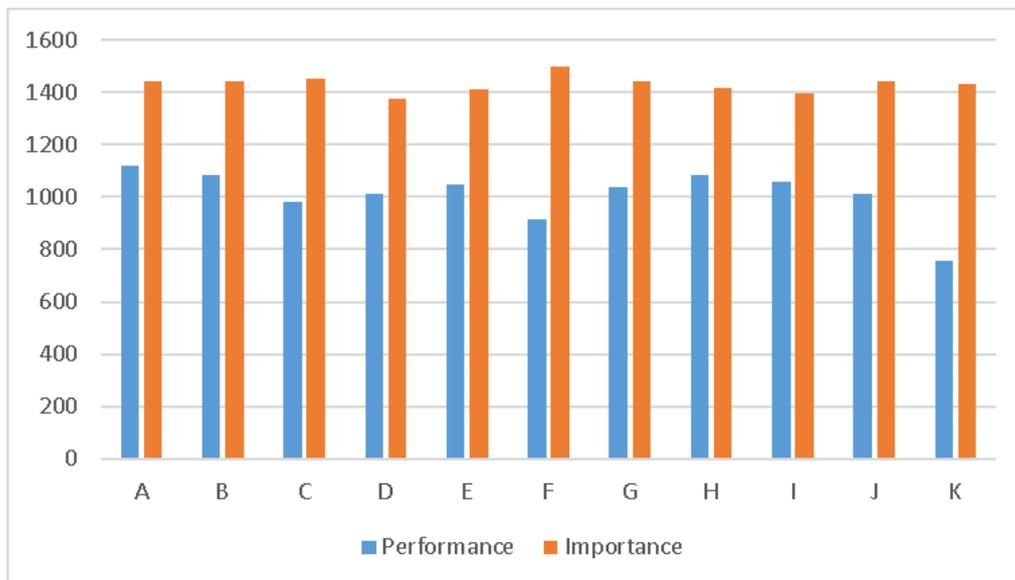
Figure 2. Gap Between Performance and Importance

It can be seen from figure 2 that the value of the importance level of all service attributes is on average 1,400 while the value of the performance level of all service attributes is on average 1,000.

This shows that all service attributes are considered important by users. All attributes are considered to have poor performance.

3.3. Public Transport Fare Based on WTP

WTP analysis was conducted to determine the willingness of passengers to pay fares with service facilities provided by the owner or driver of urban public transportation. In the questionnaire, there are several choices of public transportation fares offered to range from IDR 2,000 to IDR 6,000. Users have the freedom to choose the tariff according to their willingness to pay for the services.

	IDR 2,000 - IDR 3,000	IDR 3,000 - IDR 4,000	IDR 4,000 - IDR 5,000	IDR 5,000 - IDR 6,000	> IDR 6,000
Frequency	59	83	150	62	46
% frequency	14.75%	20.75%	37.50%	15.50%	11.50%
% cummulative frequency	15%	36%	73%	89%	100%
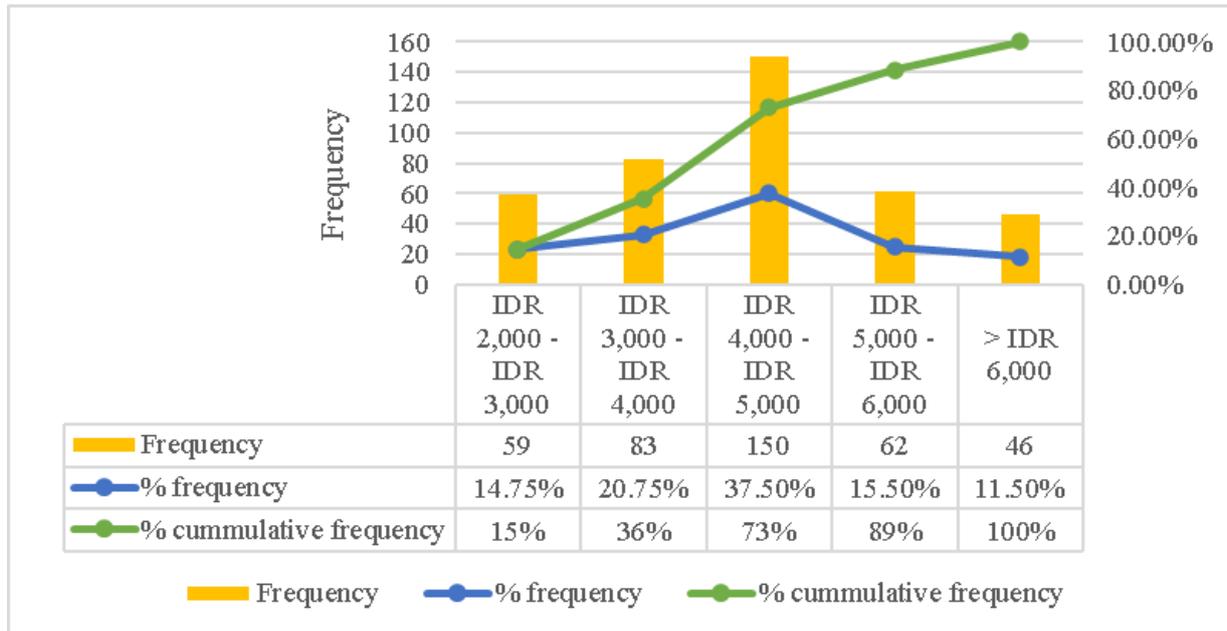
Figure 3. WTP for Public Transport Services

The fare based on the WTP survey for urban public transport passengers in Jember Regency is IDR 4,000 – IDR 5,000. The largest percentage of passengers chose willingness to pay range in accordance with the current urban public transport operating fare, which is IDR 5,000. This proves that the suitability of the current tariff is still considered good by passengers.

3.4. Discussion and Policy Implications

Attributes that need improvements are the punctuality of departure and arrival of the services, the safety and comfort, and the first aid facility in the public transportation. Public transportation services in most developing countries are unreliable and do not have a fixed schedule. A study in Malaysia [10] argues that reliability (e.g. punctuality, frequency) is essential in choosing transport modes. This study also states that the safety factor is a major concern and needs to be improved to increase users' satisfaction with bus services. This aligns with a study in Amman, Jordan [10] which states that the safety of travel on public transportation is the most important factor needing improvement.

In this study, many attributes are classified into quadrants II and IV. Places of arrival attribute found to be classified in quadrant II. It indicates that customers do really care about the arrival places of the public transport, as long as the services are running on their routes, customers will be satisfied. This condition explains the condition of public transport in most developing countries, where public transport can stop everywhere at the customers' request. Respondents also indicated that accident insurance is essential for them. This is aligned with a study in Bandung [11] which states that respondents do not agree to pay insurance premium although they know that it is important for them.

Meanwhile, driver's response regarding speed complaints is not important. However, a study in Denmark [12] find that speeding is one factor that influences the bus accident severity level. Therefore, these attributes should be maintained well to increase the number of customers. Driver's friendliness is also found to be less important for customers. Nevertheless, a study in Columbia [13] suggests that drivers' kindness is important and that authorities should train their BRT drivers and staff to improve communication skills.

4. Conclusions

Using a case study in Jember, Indonesia, eleven public transport attributes were evaluated by performing IPA. The reliability and validity test showed that attributes used in this study were acceptable. IPA results indicated that transport agencies and policymakers should improve the punctuality of the arrival and departure schedule. The safety factor is one of the essential needs to be improved to raise the satisfaction of users towards the services. In addition, public transport providers should occupy their services with the first aid facilities.

WTP survey showed that respondents were satisfied with the fares. Users are willing to pay in the range of IDR 4,000 – IDR 5,000. This value is relatively similar with the actual tariff of public transportation in Jember.

This study's limitation is that the attributes used were extracted from the current regulation. Future studies can explore more attributes extracted from the previous studies, such as cleanliness [6] and vehicle safety against accidents [14], [15]. Furthermore, including fares as a factor to investigate the satisfaction of public transport users can be a good idea [16]. Other methods could give additional insights regarding the user's satisfaction study towards transportation services, such as ordinal logistic regression [17], [18] and Important-Satisfaction Analysis [19].

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