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Improving The Integration and Connectivity of Feeder Wira Wiri, Suroboyo Bus, Trans Semanggi Bus, and Trans Jatim Bus in Surabaya City Purabaya-Rajawali Routes

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Abstract

Surabaya City has several public transportation such as Feeder Wira Wiri and Suroboyo Bus managed by Surabaya City Government, Bus Trans Semanggi managed by the Ministry of Transportation of the Republic of Indonesia, and Bus Trans Jatim managed by East Java Provincial Government. Based on observations in Purabaya-Rajawali routes, these public transportation services have yet to achieve maximum integration between modes, hence requiring analysis to improve the integration and connectivity of these public transportation systems. This analysis assesses customer satisfaction regarding the integration and connectivity of Feeder Wira Wiri, Suroboyo Bus, Trans Semanggi Bus, and Trans Jatim Bus along the Purabaya-Rajawali routes in Surabaya City. The methods used Customer Satisfaction Index (CSI) to calculate user level of user satisfaction and Quality Function Deployment (QFD) used by integrating Importance-Perfomance Analysis (IPA) and Kano model. From the analysis results, the satisfaction level indicates a value of 68.01% (satisfied). So, it is needed to improve existing attribute integration. From this analysis, 11 technical responses were obtained to improve integration attributes. The final result of this research indicates that 11 improvements of integration attributes can be implemented in the integration system between services of Feeder Wira Wiri, Suroboyo Bus, Trans Semanggi Bus, and Trans Jatim Bus in Surabaya City Purabaya-Rajawali routes.

Keywords

Integration attribute, service user satisfaction, integration of public transportation

INTRODUCTION

Surabaya City is the capital of East Java Province, part of the territory of the Unitary State of the Republic of Indonesia. Surabaya is the second-largest metropolitan city in Indonesia after Jakarta [1]. According to the East Java Province Central Statistics Agency in Surabaya, Surabaya City has an area of around 326.81 square kilometers [2]. From this area, Surabaya City is divided into 31 sub-districts and 154 urban villages [3]. The population of Surabaya City in 2022 reach around 2,972,801 people and it is predicted that this number will increase as the years go by [4]. As time goes by, population density causes an increase in traffic volume which risks causing traffic jams. Besides population density, traffic jams can also be caused by the high use of private vehicles on the roads, the lack of availability of adequate public transportation for the community, and the poor condition of road infrastructure [5].

Private vehicle ownership, especially in big cities such as Surabaya City, continues to increase every year along with the increase in population. According to data from the East Java Province Central Statistics Agency in the city of Surabaya in 2019, 495,596 people owned cars, and 2,517,449 people owned motorbikes with a total population of 2,896,195 people. However, in 2020 there was an increase, 503,066 people owning cars and 2,599,332 people owning motorbikes with a total population of 2,904,751 people [6] [7].

Surabaya City intensively improving its land-based public transportation system, this is proven by the existence of Feeder Wira Wiri, Suroboyo Bus, and Trans Semanggi Bus. Suroboyo Bus is a bus transportation service with modern facilities owned by the Surabaya City Government which is intended as public transportation similar to city buses in the Surabaya City metropolitan area and was launched on April 7, 2018, with an initial route from Purabaya-Rajawali Terminal [8]. Currently, Suroboyo Bus serves two routes including Purabaya-Rajawali and TOW-UNESA [9]. Trans Semanggi Bus is an urban bus transportation service system by Teman Bus which was launched on December 29, 2021 [10]. The procurement of the bus fleet is borne by the Ministry of Transportation of the Republic of Indonesia. Trans Semanggi buses serve two routes including Kejawan Putih Tambak-UNESA and Gunung Anyar-ITS-Kenjeran Park [11]. Feeder Wira Wiri operated in 2023 with 52 vehicles serving six routes, including code FD01 serving Benowo-Tunjungan Terminal, code FD02 serving Mayjend Sungkono-Balaikota, code FD03 serving Joyoboyo-Gunung Anyar Intermodal Terminal, code FD05 serving Puspa Raya-HR. Muhammad, code FD06 serves the Joyoboyo-Lakarsantri

Intermodal Terminal, and code FD07 serves the Bratang Terminal-Pasar Turi Station [12]. The East Java Provincial Government is also participating in improving the quality of integrated services within one urban agglomeration area in East Java such as Gerbangkertosusila which was inaugurated on August 19, 2022 [13]. Trans Jatim buses are available on several routes including Surabaya City via Trans Jatim Bus. Trans Jatim buses serve three routes, including Sidoarjo-Gresik, Surabaya-Mojokerto, and Mojokerto-Balongpanggang [14].

Based on the desired line analysis from previous research, it is said that most movement in Surabaya City occurs in the Purabaya-Rajawali route. Besides that, a corridor that has the potential for mass public transportation in Surabaya City is the Waru-Red Bridge corridor [15]. Locations of bus stops that are integrated between public transportation services in Surabaya City for the Purabaya-Rajawali route include Siola, Tunjungan, Embong Malang, Pangsud, Sono Kembang, Gubernur Suryo, Basra, Urip Sumoharjo 1, Urip Sumoharjo 2, Pandegiling 1, Pandegiling 2, Marmoyo, Joyoboyo 2, Terminal Intermodal Joyoboyo, Alun-Alun Contong, Pirngadi, Blauran, Simpang Dukuh/Pemuda, Pangsud, Kaliasin, Darmo Santa Maria, Gozco, Darmo RS, Purabaya Terminal.

Based on brief observations in the Purabaya-Rajawali route in November 2023, show that some bus stops do not yet have supporting infrastructure facilities for people with disabilities as stated in Minister of Public Works Regulation No. 30/PRT/M/2006 Guidelines on Technical Facilities and Accessibility in Buildings and the Environment [16]. In addition, several transfer locations do not have inter-service facilities such as route information boards, and departure and arrival schedule information so there is no clear inter-service information and guaranteed waiting times for service users. At several stopping places, the distance between the crossing facility in the form of a zebra crossing and the stopping place does not meet the technical guidelines, namely Decree of the Director General of Land Transportation No: 271/HK.105/DRJD/96 concerning Technical Guidelines for Engineering Stopping Places for Public Passenger Vehicles that is the maximum distance between stopping places and pedestrian crossing facilities are 100 meters away [17]. Based on the fare aspect, the public transportation payment system, for example, the Wira Wiri Feeder and the Trans Semanggi Bus, is still separate so that passengers who want to change modes from the feeder to the Trans Semanggi Bus need to pay again. Public transportation applications, namely Gobis and Teman Bus, do not yet provide information between services such as transfer locations and waiting times between services for users who want services to change modes.

Problems related to the integration and connectivity of public transportation in the Purabaya-Rajawali route must be followed up so that analysis can be carried out to help improve performance and resolve complaints submitted by users. By improving the integration between public transportation in Surabaya City such as Feeder Wira Wiri, Suroboyo Bus, Trans Semanggi Bus, and Trans Jatim Bus in the Purabaya-Rajawali route, users can use integrated public transportation services easily, comfortably, quickly, and affordably.

RESEARCH SIGNIFICANCE

This analysis aims to obtain improvement priorities of integration between public transportation services such as Feeder Wira Wiri, Suroboyo Bus, Trans Semanggi Bus, and Trans Jatim Bus in Surabaya City Purabaya-Rajawali routes, so it can increase public interest in continuing to use public transportation that can reduce traffic jams in Surabaya City. In addition, it is hoped that the results of this research become a reference for the problems of integration that have more than one service of public transportation in another city in Indonesia.

METHODOLOGY

A. DATA COLLECTION

In this study, sample criteria will be used for satisfaction questionnaires from people who have traveled using Feeder Wira Wiri, Suroboyo Bus, Trans Semanggi Bus, and Trans Jatim Bus. The number of respondents is obtained by the Slovin formula as stated in Equation 1. The calculation result of the Slovin formula is used as the minimum number of samples so that if the sample exceeds the minimum number, the sample will still be used. The population size that will be used to determine the number of samples is data from the average number of daily users between the services listed. Data on the number of passengers on the Feeder Wira Wiri, Suroboyo Bus, Trans Semanggi Bus, and Trans Jatim Bus were taken from March to October 2023. The data obtained from the relevant sources such as the Surabaya City Transportation Service, East Java Provincial Transportation Service, and the Ministry of Transportation are in the form of monthly passenger data so that the number of daily users will be calculated in the form of the average number of daily users per month. The number of daily users of public transportation services was 8.252, as seen in Table 1.

Table 1 Number of daily users between services

Suroboyo Bus (corridor 1)	Number of Daily Inter-Service Users
FD01	966
FD02	171
FD03	398
FD06	704
FD07	126
Trans Semanggi (corridor 2)	1.248
Trans Jatim (corridor 1)	4.639
Total	8.252

The calculation of this number of samples uses significant levels of 5% and 10% obtained based on 90% and 95% confidence levels. From the calculation results using the Slovin formula, it was obtained that the number of samples needed was 99 to 382 respondents. Due to limited time and cost, the number of samples to be used for satisfaction analysis is 150 respondents with a confidence level is 91.9%.

$$n = \frac{N}{1 + Ne^2} \quad (1)$$

Note:
n = Sample size
N = Population
e = Margin of Error

The research instrument is in the form of a questionnaire form used to obtain respondents' answers to the questions asked. The questionnaire also uses integration attributes which have been adapted to several references such as previous research journals related to integration satisfaction analysis and the 2013 Multimodal Transportation Management Research and Development Centre [18]. Integration attributes are also adapted to the context of public transportation integration in Surabaya City such as Feeder Wira Wiri, Suroboyo Bus, Trans Semanggi Bus, and Trans Jatim Bus. Apart from that, a questionnaire was also prepared for the relevant parties in this research. This questionnaire is used to obtain goal and sales point values from related parties regarding the improvement of integration attributes. A list of integration attributes that have been prepared can be seen in Table 2.

Table 2 User satisfaction level criteria

No	Servqual Dimension	Attribute	Form of Integration
1	Responsiveness	Application of continuous tickets	Fare Integration
2		Affordability of combined fares	Fare Integration
3		Ease of getting service information which are available in full and can be accessed on a smartphone	Information Integration
4	Tangibles	Uniformity of means of payment	Fare Integration
5		Availability of service information listed at the bus stop	Information Integration
6		Availability of signs indicating where to get on and off for other services at integrated stops	Information Integration
7		The distance is not too far	Infrastructure Integration
8	Assurance	The convenience of service users when accessing transfer stops between services using pedestrian facilities	Infrastructure Integration
9		Ease of service users to transfer	Infrastructure Integration
10	Empathy	The convenience of service users when accessing transfer stops between services for people with disabilities, the elderly, and pregnant women	Infrastructure Integration
11		Ease of service users to transfer especially for people with disabilities, the elderly, and pregnant women	Infrastructure Integration
12	Reliability	Suitability of operational hours with the operational schedule of public transportation	Schedule Integration
13		Alignment of the arrival time of the previous mode with the departure time of the following mode when changing modes	Schedule Integration
14		Long waiting time between modes when switching modes	Schedule Integration
15		Ease of reaching the destination location with connectivity between services	Network Integration
16		Matching capacity between services when changing modes	Network Integration

B. DATA ANALYSIS

The analysis will use the following methods including Customer Satisfaction Index (CSI), Importance Performance Analysis (IPA), Kano model, and Quality Function Deployment (QFD). The first step before calculating Customer Satisfaction Index and Importance-Performance Analysis is to calculate the average value of the level of satisfaction and expectations. Analysis of the level of satisfaction and expectations aims to obtain the level of satisfaction and expectations of service users regarding integration attributes. This analysis uses data from filling out questionnaires by users of the Feeder Wira Wiri, Suroboyo Bus, Trans Semanggi Bus, and Trans Jatim Bus services on Purabaya-Rajawali route. Then, the data would be analyzed by using the Customer Satisfaction Index and Importance Performance Analysis. The level of satisfaction and expectation is defined by two variables respectively, including x and y [19]. The value used in this analysis is the average value from the calculation results using Equation 2 and Equation 3.

The Customer Satisfaction Index (CSI) is an index used to measure the overall level of user satisfaction by considering the level of importance of the attributes related to the product or service being measured. The results of the analysis using Customer Satisfaction Index method are in the form of a service satisfaction index on existing conditions. Then the service satisfaction index will be compared with the interval value to obtain an interpretation of service user satisfaction with the integration attribute [20]. The interval value can be seen in Table 3.

Table 3 User satisfaction level criteria [20]

No	CSI Value (%)	Note
1	81%-100%	Very Satisfied
2	66%-80.99%	Satisfied
3	51%-65.99%	Quite Satisfied
4	35%-50.99%	Less Satisfied
5	0-34.99%	Not Satisfied

Importance Performance Analysis (IPA) method is used to determine service user satisfaction with service providers by comparing satisfaction of implementation performance with the expectations of service users. The result of the comparison of satisfaction and expectations will be obtained as the level of suitability. This analysis makes it easier for service providers to evaluate and

improve the performance of the services provided. This paper presents the gap between satisfaction and expectation level which is calculated using the formula shown in Equation 4. Each customer and expectation level uses the average value shown in Equation 2 and Equation 3 [21].

$$\bar{X} = \frac{\sum Xi}{n} \quad (2)$$

$$\bar{Y} = \frac{\sum Yi}{n} \quad (3)$$

Note:
$\bar{X}$ = Average customer satisfaction level
$\bar{Y}$ = Average customer expectation level
n = Sample size

$$Q = P - E \quad (4)$$

Note:
Q = Service quality gap
P = Customer satisfaction level ($\bar{X}$)
E = Customer expectation level ($\bar{Y}$)

Kano model offers several insights into product attributes that users consider important. Kano also produced a methodology for mapping consumer responses to questionnaires into its models. In its model, Kano distinguishes six types of product needs that affect user satisfaction differently when met including must-be (if these requirements are not met, users will feel very dissatisfied), one-dimensional (user satisfaction goes hand in hand with the level of fulfilment), attractive (meeting these requirements results in more than proportional satisfaction, if these requirements are not met, no feelings of dissatisfaction arise), indifferent (illustrates that user satisfaction is not influenced by the services provided), reverse (illustrates that the service performance provided to service users is inversely proportional to the level of user satisfaction), and questionable (describes the discrepancy between the questions given in the questionnaire and the answers given by the respondents) [22] [23]. To calculate using the Kano model, it is necessary to determine the Kano category which is obtained by matching the respondent's functional and dysfunctional answer values [24]. Kano model evaluation table which can be seen in Table 4.

Table 4 Kano model evaluation [24]

Customer Requirements		Dysfunctional 1	2	3	4	5
Functional	1	Q	A	A	A	O
	2	R	I	I	I	M
	3	R	I	I	I	M
	4	R	I	I	I	M
	5	R	R	R	R	Q

Note: M= Must be; O= One dimensional; A= Attractive; I= Indifferent; R= Reverse; Q= Questionable

Quality Function Deployment (QFD) translates what users need into product or service characteristics that users need [25]. The tool used in QFD is the House of Quality (HOQ). The tool used in QFD is the House of Quality (HOQ), could be seen in Figure 1. House of Quality (HOQ) is matrix-shaped like a house that consists of two parts including vertical and horizontal. The horizontal section provides information about the user and the vertical section provides technical information that is a response to user input [26]. The purpose of HOQ is to convert user opinions directly to the technical characteristics or technical specifications of a product or service produced [27]. The method to be used is Quality Function Deployment which is integrated with Importance-Performance Analysis method and Kano model developed to guarantee that the product or service will be able to satisfy the needs of service users [28].

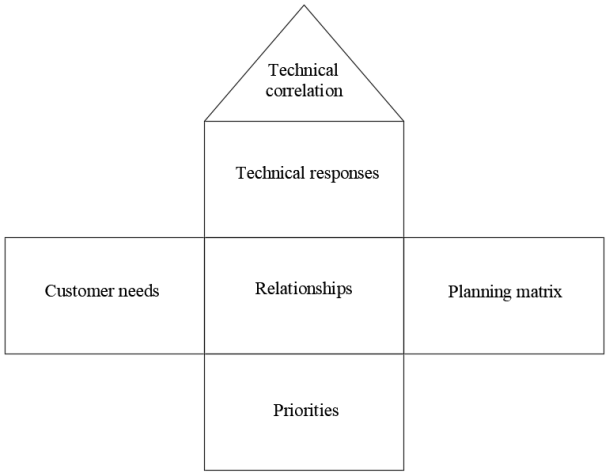

Figure 1 House of quality [27]

RESULTS AND DISCUSSIONS

Customer Satisfaction Index method is used to obtain the general level of satisfaction. In general, it means that the level of satisfaction includes all integration attributes based on existing conditions. The level of satisfaction with the CSI method is obtained by calculating the average weight of the satisfaction level and expectation level, then interpretation is carried out based on the predetermined range of values. The results of the calculation of the Customer Satisfaction Index can be seen in Table 5.

Based on the results listed in Table 5 the CSI value is 68.01%. This value is in the range of index values of 68.01%-84% and is included in the satisfied category, so it can be seen that public transportation users are quite satisfied with the integration and connectivity of Feeder Wira Wiri, Suroboyo Bus, Trans Semanggi Bus, and Trans Jatim Bus for Purabaya-Rajawali route.

Furthermore, an analysis will be carried out with Importance-Performance Analysis. The analysis to calculate the gap is obtained from the difference between the average level of satisfaction and expectation. The equation can be seen in Equation 2 and Equation 3. Based on Table 6, shows that all attributes have a negative gap or a satisfaction level that is smaller than the expected level.

Kano model uses the results of filling out the questionnaire respondents in the functional and dysfunctional sections will be evaluated using Table 4 to obtain Kano category from the integration attributes of each respondent. Then, after determining Kano category from the integration attributes of all respondents, accumulation was carried out for each category with one respondent giving a value of one. The number of Kano

categories for each integration attribute from the accumulation of all respondents is in Table 7.

Table 5 Customer satisfaction index

No	MIS	WF	MSS	WS
1	4.03	0.057430826	3.51	0.201390764
2	4.50	0.064181801	3.78	0.242607207
3	4.48	0.063896548	3.62	0.231305505
4	3.85	0.054863554	3.67	0.201532123
5	4.33	0.061804697	3.58	0.221260816
6	4.46	0.063611296	3.49	0.221791385
7	4.47	0.064752306	3.27	0.211524199
8	4.50	0.064181801	3.11	0.19981934
9	4.43	0.063135875	3.33	0.210452917
10	4.49	0.061139108	2.89	0.176488225
11	4.33	0.061709613	2.91	0.179780673
12	4.53	0.064562137	3.43	0.221232924
13	4.29	0.063991633	3.36	0.215011886
14	4.48	0.063896548	3.49	0.222785966
15	4.55	0.064942474	3.48	0.22599981
16	4.34	0.061899781	3.34	0.20674527
Total	70.04	1	54.42	3.38972901
Satisfaction Index				68.01%

Table 6 Gap of satisfaction and expectation level

No	Average Satisfaction Level	Average Expectation Level	Gap
1	3.51	4.03	-0.52
2	3.78	4.50	-0.72
3	3.62	4.48	-0.86
4	3.67	3.85	-0.17
5	3.58	4.33	-0.75
6	3.49	4.46	-0.97
7	3.43	4.47	-1.05
8	3.11	4.50	-1.39
9	3.33	4.43	-1.09
10	3.36	4.49	-1.13
11	2.91	4.33	-1.41
12	3.43	4.53	-1.10
13	2.89	4.29	-1.39
14	3.49	4.48	-0.99
15	3.48	4.55	-1.07
16	3.34	4.34	-1.00

After that, the total is divided into two types of combined values based on (one dimensional, attractive, and must-be) and (indifferent, reverse, and questionable). The combined values are then compared with the Blauth Formula including: if (one-dimensional + attractive + must-be) > (indifferent + reserve + questionable) then the grade is obtained from the maximum of (one-dimensional + attractive + must-be); if (one-dimensional + attractive + must-be) < (indifferent + reserve + questionable) then the grade is obtained from the maximum of (indifferent + reserve + questionable); if the total value is (one-dimensional + attractive + must-be) = (indifferent + reserve + questionable) then the grade obtained is the maximum among all canoe categories of one-dimensional, attractive, must-be, indifferent, reserve, questionable. The results of determining Kano category for each integration attribute can be seen in Table 8.

Tabel 7 Number of kano categories

No	Number of Kano Categories					
	M	O	A	I	R	Q
1	12	22	60	56	0	0
2	13	80	9	48	0	0
3	13	58	27	52	0	0
4	17	15	67	51	0	0
5	42	40	26	38	2	2
6	40	45	47	18	0	0
7	35	65	13	37	0	0
8	44	59	15	30	0	2
9	32	42	51	23	1	1
10	43	49	23	35	0	0
11	44	45	11	50	0	0
12	25	59	49	16	1	0
13	14	62	48	24	2	0
14	22	57	25	38	3	5
15	28	61	32	29	0	0
16	28	66	23	33	0	0

Table 8 Kano category determination

No	M+O+A	I+R+Q	Kano's Category
1	94	56	A
2	102	48	O
3	98	52	O
4	99	51	A
5	108	42	M
6	132	18	A
7	113	37	O
8	118	32	O
9	125	25	A
10	115	35	O
11	100	50	O
12	133	17	O
13	124	26	O
14	104	46	O
15	121	29	O
16	117	33	O

The analysis of IPA and Kano will be used or integrated with QFD method to determine the priority for improving integration attributes of public transport using House of Quality (HOQ) which the final result can be seen in Figure 2. There are many steps to get a final result from HOQ. The selection of integration attributes for customer needs will use the results of calculations using IPA method and Kano model that has been calculated previously. The conditions for selecting integration attributes for customer needs in QFD method are integration attributes that have a negative gap and that fall into Kano category, including must be (M), one-dimensional (O), and attractive (A). From these requirements, all integration attributes have been fulfilled and can be used for analysis with QFD method.

Based on the results of a literature study accompanied by discussions with related agencies, it was found that technical responses to increase integration attributes between Feeder Wira Wiri, Suroboyo Bus, Trans Semanggi Bus, and Trans Jatim Bus services. Technical responses are responses to customer needs to fulfill user desires, the technical responses include providing an integrated/continuous fare system; improving waiting times/headways for public transport; adjusting operational

schedules to other public transportation schedules; increasing the fleet of public vehicles; adding service information between services on smartphones; additional transfer locations for safe and comfortable intermodal transfer services; improve and add supporting facilities to access transfer locations for general users, people with disabilities, the elderly and pregnant women; additional signs for transfers between services at transfer locations; addition of inter-service information boards at transfer locations; additional service information between services in public transportation; uniform payment methods.

The relationship between technical responses and customer needs will be determined. Relationship Matrix is an assessment of the strength of the relationship between customer needs and technical responses. The relationship is assessed on a scale of 0 if there is no relationship, 1 if the relationship is weak, 3 if the relationship is moderate, and 9 if the relationship is very strong. The symbols used to describe relationships in the relationship matrix are strong relationships symbolized by (◉), medium relationships symbolized by (○), weak relationships symbolized by (△), and no relationship is considered empty.

Furthermore, a process will be carried out to determine a planning matrix that functions to describe consumer perceptions observed through market surveys. The first step is importance to customer. The importance to customer calculation uses an integration of Importance Performance Analysis (IPA) method and Kano model. The second step is to determine the goal. Goal is the target user satisfaction value that the relevant agency wants to achieve with the integration of Feeder Wira Wiri, Suroboyo Bus, Trans Semanggi Bus, and Trans Jatim Bus in Surabaya City on the Purabaya-Rajawali Route. Goals can be measured on a scale of 1 to 5 with each scale representing 1= very dissatisfied, 2= not satisfied, 3= quite satisfied, 4= satisfied, and 5= very satisfied. The third step is improvement ratio. Improvement ratio is a value that shows how much improvement or improvement must be made to improve services. The fourth step is to determine sales point. Sales point is an attribute that is considered to influence Feeder Wira Wiri, Suroboyo Bus, Trans Semanggi Bus, and Trans Jatim Bus services. The value of the sales point consists of 1= high, 1.2= medium, and 1.5= none. The fifth step is to calculate raw weight and normalized raw weight. Raw weight value shows how

Description of technical correlations:
Strong positive influence = ✓✓
Moderate positive influence = ✓
No influence = Blank

Description of matrix relationships:
Strong relationship = ◉
Medium relationship = ○
Weak relationship = △
No relationship = Blank

Technical Correlations

Technical Responses

No	Customer Needs	Providing an integrated/continuous tariff system	Improvement of waiting time/headway for public transport	Adjustment of operational schedules with schedules of other public transportation	Addition to the fleet of public transportation vehicles	Addition of service information between services on smartphones	Addition of transfer locations for safe and comfortable intermodal transfer services	Improve and add supporting facilities to access transfer locations for general users, people with disabilities, the elderly and pregnant women	Added signs for transfers between services at transfer locations	Addition of inter-service information boards at transfer locations	Added service information between services in public transportation	Uniform payment methods	Planning Matrix: Absolute adjust importance to customer	Goal	Improvement ratio	Sales point	Raw weight	Normalize row weight
		Relationships																
1	Application of continuous tickets between Wira Wiri Feeder, Suroboyo Bus, Trans Semanggi Bus and Trans Jatim Bus services	◉											8.38	5	1.43	1	11.94	0.051
2	Affordability of combined fares for Wira Wiri Feeder, Suroboyo Bus, Trans Semanggi Bus and Trans Jatim Bus services	◉											6.48	5	1.32	1	8.57	0.036
3	Ease of getting service information in the form of routes, rates, operating hours and transfer stop locations which are available in full and can be accessed on a smartphone					◉							7.71	5	1.38	1	10.64	0.045
4	Uniformity of means of payment											◉	2.67	5	1.36	1	3.63	0.015
5	Availability of service information in the form of arrival schedules, routes, fares, operating hours and transfer stop locations listed at the bus stop and on the bus					◉				◉	◉		3.26	5	1.40	1	4.56	0.019
6	Availability of signs indicating where to get on and off for other services at integrated stops								◉				17.36	5	1.43	1	24.90	0.106
7	The distance between the Wira Wiri Feeder, Suroboyo Bus, Trans Semanggi Bus and Trans Jatim Bus services is not too far						◉						9.36	5	1.46	1	13.66	0.058
8	Convenience of service users when accessing transfer stops between services using pedestrian facilities						◉	◉					12.48	5	1.61	1	20.04	0.085
9	Ease of service users to transfer between Wira Wiri Feeder, Suroboyo Bus, Trans Semanggi Bus and Trans Jatim Bus services						◉	◉	◉				19.36	5	1.50	1	29.04	0.124
10	Convenience of service users when accessing transfer stops between services for people with disabilities, the elderly and pregnant women							◉					10.11	5	1.49	1	15.04	0.064
11	Ease of service users to transfer between Wira Wiri Feeder, Suroboyo Bus, Trans Semanggi Bus and Trans Jatim Bus services, especially for people with disabilities, the elderly and pregnant women							◉					12.23	5	1.72	1	20.99	0.089
12	Suitability of operational hours for Wira Wiri Feeder, Suroboyo Bus, Trans Semanggi Bus, and Trans Jatim Bus with the operational schedule of public transportation		○	◉									9.96	4	1.17	1	11.62	0.049
13	Alignment of the arrival time of the previous mode with the departure time of the following mode when changing modes		○	◉									11.95	5	1.73	1	20.64	0.088
14	Long waiting time between modes when switching modes		◉	◉	◉								8.90	5	1.43	1	12.76	0.054
15	Ease of reaching the destination location with connectivity between services						◉						9.77	5	1.44	1	14.04	0.060
16	Matching capacity between services when changing modes				◉								8.68	5	1.50	1	12.99	0.055
	Priorities																	
	Contribution	0.785	0.900	1.724	0.497	0.582	2.940	3.258	2.065	0.175	0.175	0.139						
	Normalize Contribution	0.059	0.068	0.130	0.038	0.044	0.222	0.246	0.156	0.013	0.013	0.010						
	Priority	6	5	4	8	7	2	1	3	9	10	11						

Figure 2 House of quality

much improvement needs to be made. This value is a combination of the absolute value of adjusted importance to customer, improvement ratio, and sales point.

The relationship between technical correlations will be determined through a technical correlation matrix. In this matrix, the level of connectedness is depicted using symbols, for strong positive influence (✓✓), moderate positive influence (✓), and no influence (blank). Subsequently, a priority sequence will be carried out to increase integration and connectivity between the Feeder Wira Wiri, Suroboyo Bus, Trans Semanggi Bus, and Trans Jatim Bus services in Surabaya City on the Purabaya-Rajawali route as determined in the priorities section. Priority determination is carried out based on the results of normalized contribution calculations. The priority of technical responses is sorted with the largest normalized contribution value being the priority. So the priority for increasing integration attributes consists of improving and adding supporting facilities to access transfer locations for general users, people with disabilities, the elderly, and pregnant women; additional transfer locations for safe and comfortable intermodal transfer services; addition of signs for transfers between services at the transfer location; adjustment of operational schedules with schedules of other public transportation; improvement of waiting time/headway for public transport; providing an integrated/continuous fare system; addition of service information between services on smartphones; addition to the fleet of public vehicles; addition of service information between services in public transportation; addition of service information between services in public transportation; and uniform payment methods. After all the steps are finished, the House of Quality (HOQ) can be described based on the results of the various calculation steps that have been carried out.

CONCLUSIONS

The satisfaction level shows a value of 68.01%. This value is in the index value range of 68.01%-84% and is included in the satisfied category. It is needed to improve existing attribute integration. The priority for increasing integration attributes consists of: 1) Improving and adding supporting facilities to access transfer locations for general users, people with disabilities, the elderly, and pregnant women, 2) Additional transfer locations for safe and comfortable intermodal transfer services, 3) Additional signs for transfers between services at the transfer location, 4) Adjustment of operational schedules with schedules of other public transportation, 5) Improvement of waiting time/headway for public transport, 6) Providing an integrated/continuous fare system, 7) Addition of service information between services on smartphones, 8) Addition to the fleet of public vehicles, 9) Addition of service information between services in public transportation, 10) Addition of service information between services in public transportation, 11) Uniform payment methods.

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