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# Service Improvement of Joyoboyo Public Transport Terminal in Surabaya

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## Abstract

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Joyoboyo public transport terminal is terminal type B in Surabaya that has an important role as a node of public transportation among cities. The terminal is in operation since 1969 and until now steadily declining services and desolate from passengers and freight vehicles. The local government of Surabaya continues to improve the terminal service by attempting to revitalize terminal. To support the revitalization efforts, it is necessary to support a research study consider satisfaction and user expectations. This study aims to determine the improvement target of Joyoboyo terminal services based on user perception. The used method is Quality Function Deployment (QFD) aims to determine priorities and improvement targets of service quality according to the terminal user. The technical responses collection in response to the level of user importance, user satisfaction and user expectations gained 19 technical responses. From the 19 technical responses, the effort to improve transport services quality has the highest target score, while the effort to increase the number and capacity of toilet has the lowest scores in service improvement target of Joyoboyo terminal. The target for improving Joyoboyo terminal services consisted of facilities, comfort, security and safety, cost, and employee or officer in a management institution of Joyoboyo terminal. In conclusion, the effort to improve transport services quality has the highest target score, while the effort to increase the number and capacity of toilet has the lowest scores.

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**Keywords:** Service, improvement, public transport, terminal.

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## Introduction

Joyoboyo public transport terminal is a terminal type B which is managed by the local government of Surabaya. This terminal as in KM 31/1995 (Ministry of Transportation, 1995) serve public transportation transit among cities in the province (AKDP). Joyoboyo terminal has been established since 1969 are directly connected and adjacent to Purabaya terminal (type A) which is also managed by the local government of Surabaya (Sedayu, 2013). Currently, the terminal services continued to decline. The condition can be understood because public interest in private vehicles as the main transportation facility in their trips make the existence of public transport are being abandoned. Those problems also occurred in another big city in Banjarmasin, South of Kalimantan (Fitriati, 2014).

Data show that Surabaya as one of Indonesia's second largest city and the capital of East Java province increased by 455% in the use of private vehicles from 1976 to 1998 (Sulistio *et al.*, 2010). To solve the problem it needed revitalization that can increase the functionality and role in supporting the success of public transport as one solution to transportation problems. It is also supported by

the study of Imran and Matthews (2015) for Auckland, New Zealand. To support the revitalization efforts it required a study to evaluate the service improvement of Joyoboyo terminal. The previous studies and research that has been done on the technical aspects only and not involve the terminal user. The previous research that has been done on the terminal Joyoboyo aimed to determine the priority of improving Joyoboyo Terminal services (Sedayu, 2013). Therefore, this study is a next step to continue the previous study, aiming to set targets for service improvement based on user perception in Joyoboyo terminal.

## Materials and Methods

The used method is Quality Function Deployment (QFD) that was developed by Yoji Akao QFD from Japan in 1966. This method has been known and applied by many companies in the world in developing the design quality of services and goods product in order to find and satisfy the customers needs. Before analyzing, the first step is data collecting using research instruments. The measurements scale in research instrument are shown in Table 1.

**Table 1:** The measurement scale in research instrument.

Scale	Importance level (TK)	User Satisfaction (KP)	User Expectation (HP)
1	Not important	Not satisfactory	Not expected
2	Less important	Less satisfactory	Less expected
3	Quite important	Quite satisfactory	Quite expected
4	Important	Satisfactory	Expected
5	Very important	Very satisfactory	Very expected

The research instrument in the form of a questionnaire distributed to respondents. Data were collected for further analysis with QFD. Research instruments are developed based on previous studies and

adapted to the existing condition of the terminal. Table 2 shows the previous studies are referred for this study. The research instrument consisted of 54 items of questions related to Joyoboyo terminal services.

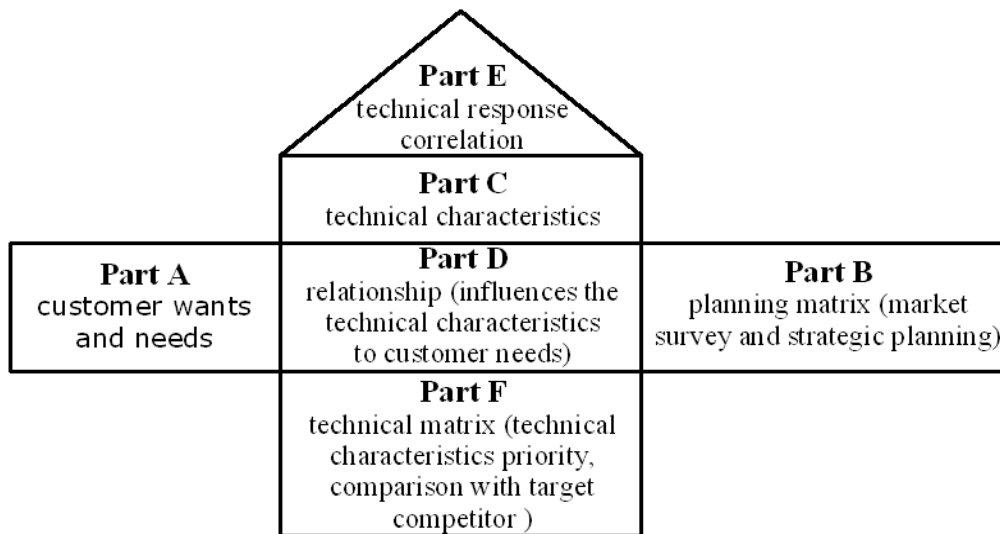
**Table 2:** The previous researches.

No	Researcher (year)	Method	Variables
1	Mendis (2008)	Focus Group Discussion (FGD) and conceptual study	Bio-retention, infiltration median, natural concrete, vegetation, water patch area, water drainage, Life circulation, and soil maintenance
2	Jarsemskiene (2009)	Analysis-constant return to scale (DEA-CRS) and data envelopment analysis (DEA)	Time, efficiency, cost, responsibility, and accessibility
3	Sedayu (2012)	Description and conceptual study	Management and organization, technical facilities, quality of service, and user satisfaction
4	Sedayu <i>et al.</i> , (2012)	Survey, scoring, and visualization with Visual Basic 6.0	Availability of facilities and transport services
5	Lindstrom (2013)	Simulation and modeling	Building material, construction system, energy source, vehicle type, and spacial
6	Pusporini <i>et al.</i> , (2013)	Quality Function Deployment (QFD)	Material, product dimension, useable,

7	Hermawan (2013)	and Fuzzy Logic Life Cycle Assessment (LCA)	pollutant, vehicle emission Construction material and construction steps
8	Sedayu <i>et al.</i> , (2013)	Importance Performance Analysis (IPA) and Quality Function Deployment (QFD)	Security, safety, aesthetics, accessibility, reliability, comfort, and facility
9	El-Geneidy <i>et al.</i> , (2014)	Field survey, observation, Interview, circulation and walking study	Waiting time, pedestrian ways, walkways, distance, landscape, and vegetation

Quality Function Deployment (QFD) is method to determine priorities and targets to improve the quality of terminals service according to customer needs by making

house of quality (HoQ) that is part QFD analysis as shown in Figure 1.



**Fig. 1:** House of Quality in QFD.  
Source: Nurhayati R (2002).

The respondents are passengers of public transportation who regularly or often use the terminal and its facilities. The reason of using this sampling type, because the population components have heterogeneous

characteristics, and the heterogeneity have significance to the achievement of the research goals. The determination of this research sample is sought by the Bernoulli equation:

$$N \geq \frac{\left( Z_{\alpha/2} \right)^2 p \cdot q}{e^2} \quad (1), \text{ so that become } N \geq \frac{(1,96)^2 \cdot 0,95 \cdot 0,05}{(0,05)^2} \rightarrow N \geq 72,99 \approx 73$$

Where, N = amount of minimum sample; Z = value of normal distribution; e = level of error; p = proportion of questionnaires that are assumed true; q = proportion of questionnaire that are assumed false. Value is assumed true equal to 95%, and then questionnaires that are assumed wrong equal to 5%. To avoid lacking of data because of mistake of filling or the questionnaires are not

return, the number of respondents to be used by 125 persons.

**Stages in QFD Analysis Includes**

Customer Satisfaction Performance: user assessment about how well the management institution or employees give services to the customer.

$$\text{Weight Average Performance} = \frac{\sum \text{Performance Weight}}{\text{Number of Respondent}}$$

$$= \frac{\sum (\text{Level of satisfaction}) \times \text{Number of respondent}}{\text{Number of respondent}} \quad (2)$$

Customer Expected Performance: part of the Customer expected performance, *Weight Average*

$$\text{Performance} = \frac{\sum \text{Expected Performance Weight}}{\text{Number of Respondent}}$$

$$= \frac{\sum (\text{Level of expected performance}) \times \text{Number of respondent}}{\text{Number of respondent}} \quad (3)$$

Negative gap indicates the problems faced by the management institution so that the necessary corrective action in order to improve the quality of services.

Goal: how much the level of expected satisfaction performance can be achieved by the management institution or employees to meet every customer needs.

Improvement Ratio (IR): a parameter of efforts that should be done by the management institution or employees to improve the quality of services. IR formula:

$$IR = \frac{\text{Goal}}{\text{Customer Satisfaction Performance}} \quad (4)$$

$$\text{Raw Weight} = (\text{Importance to Customer}) \times (\text{Improvement Ratio}) \times (\text{Sales Point}) \quad (5)$$

Normalized Raw Height contains the *Raw Weight* value that is scaled in design between 0 to 1 or expressed in percentage. *Normalized Raw Height* =

$$\frac{\text{Raw Weight}}{\text{Raw Weight Total}} \quad (6)$$

Sales Point is determined by the management institution, this value reflects the ability to sell services and products based on how well each user or customer wishes can be fulfilled. Scale for Sales Point is:

1.0 Indicates no selling point.




1.2 Indicates medium selling point.

1.5 Indicates strong selling point.

Raw Weight contains the calculation values from data and decisions were made during the preparation of the planning matrix. Value of raw weight for each customer needs is:

Technical Response is discussions result between researchers with management employees that should have been by public transport terminal according to customer input. Relationships and priorities matrix will be described how the technical response influenced the handling and controlling what the customer needs and customer satisfaction performance.

**Table 3:** The relationship matrix symbols.

Definition	Symbol	Numerical value
No relationship	Empty	0
Weak relationship		1
Moderate Relationship		3
Strong Relationship		9

Source : Nurhayati R (2002).

The priority value describes the contribution from technical responses to customer fulfillment. Contribution (cont) =  $\sum$  Normalized Raw Height x Relationship Matrix Numerical Value (7)

Contribution value: priority and technical responses in scale 0 to 1 that indicates the percentage to be obtained from: Normalized contribution (NC) =

$$\frac{\text{Contribution}}{\text{Total Contribution}} \quad (8)$$

Where cont = contribution

*Own Performance* (OP) dapat dihitung dengan menggunakan rumus sebagai berikut :

$$OP = \frac{\sum (\text{CSP} \times \text{nv})}{\sum \text{nv}}$$

Where,

CSP = customer satisfaction performance

nv = numerical value

Arrange and make affinity diagram that describe the classification of a terminal service attributes.

## Results

The collecting results for research instruments are shown in Table 4. This is the distributing results of questionnaire to 125 respondents. It shows the level of importances (TK), user satisfaction (KP), and user expectations (HP) to Joyoboyo terminal services. Gap value obtained from the difference KP with HP.

**Table 4:** The level of user importance, satisfaction, and expectation in Joyoboyo Terminal.

No	Research Instruments	Mean Value			Gap
		TK	KP	HP	
1	Security and safety protection	4,025	4,280	4,240	-0,040
2	Providing Health help and aid	3,970	4,160	4,088	-0,080
3	Obtaining necessary transport modes	4,050	3,810	4,248	-0,080
4	Clarity Assurance in travel destinations selection	3,940	3,920	4,008	0,312
5	Employees attention to all customer complaints	3,755	3,925	4,112	-0,040
6	Employees responsive to all customer problems	3,835	3,995	4,040	-0,104
7	Employees serving with polite, friendly, and neat	3,955	4,225	4,136	-0,032
8	Employees have sufficient skills and abilities	4,035	4,285	3,968	0,112
9	Functioning of lighting (natural and artificial)	3,960	3,960	3,640	0,296
10	Functioning of bathroom facilities	4,005	4,040	4,256	-0,040
11	Functioning of air circulation	3,580	3,665	4,088	-0,168
12	Good road performance	3,745	3,960	3,832	0,240
13	Good parking performance	3,895	4,060	3,920	0,040
14	Waiting room aesthetically	3,790	3,920	4,144	-0,088
15	Corridor aesthetically	3,815	3,740	4,200	-0,048
16	Arrival and departure gate aesthetically	3,680	3,565	3,976	-0,064
17	Garden and landscape aesthetically	3,990	3,905	4,288	-0,120
18	Amenity and Easy accessibility in location	3,775	3,795	3,696	0,288
19	Amenity and Easy in room or space circulation	3,745	3,810	3,760	0,240
20	Easy for getting ticket	3,925	3,910	4,080	0,192
21	Reaching prices such as ticket, taxes, food, and drinks	3,760	3,775	3,864	0,224
22	Ease of getting information	3,730	3,910	3,936	-0,088
23	Ease of getting facilities	3,805	4,075	4,008	-0,016
24	No additional charges or payment (extortion)	3,690	3,950	4,104	-0,096
25	Arrival and departure time	4,070	4,120	3,896	0,248
26	No long waiting time	3,700	3,780	4,240	-0,040
27	Ticketing service on time	3,410	3,765	4,088	-0,080
28	Durability of facilities services	3,855	3,800	3,744	0,136
29	Durability of transportation services	3,825	3,950	3,784	0,120
30	Normal Queuing for passenger ticketing	4,050	3,940	3,960	0,184
31	Passenger densities inside and outside of terminal	3,935	3,920	4,160	-0,064
32	No vehicle flow congestion occurs	3,815	3,960	4,072	-0,128
33	Free from cigarette smoke, vehicles smoke, and odors	3,815	4,085	4,280	-0,104
34	Free from noise, glare, and unfavorable view	3,965	4,025	3,928	-0,072
35	Cleanliness interior and exterior	3,790	3,940	4,176	-0,040
36	No ticket brokers	3,655	3,795	4,200	-0,016
37	Regularity in roads, parking, circulation, and space organization	3,985	3,955	3,928	-0,088
38	Availability of adequate parking space	3,905	3,840	3,856	-0,088
39	Availability of adequate waiting room space	3,955	4,095	3,768	0,256
40	Availability of number of kiosk and retail facilities	4,005	4,000	3,976	-0,088
41	Availability of adequate waste facilities	3,725	3,890	4,024	0,024
42	Availability of adequate lodging facilities	3,480	3,555	4,056	0,152
43	Availability of canteen, restaurant, and food store	3,830	3,835	3,848	0,256
44	Availability of travel information board	3,605	3,690	3,520	0,376
45	Availability of information and complaint center	3,895	3,850	3,672	0,320

46	Availability of safety goods repository	3,930	4,010	3,984	0,016
47	Availability of adequate tariffs board and list per route	3,925	4,065	4,088	-0,160
48	Adequate on number of bathrooms and space for clean bathroom	3,795	3,760	3,872	0,128
49	Clean religious facilities : place for pray	3,775	3,785	4,080	0,000
50	Availability of transportation routes signs	3,815	3,860	4,144	-0,104
51	Availability of telecommunication facilities (telephone,internet,TV)	3,980	3,875	3,792	0,144
52	Availability of travel agent counters	3,965	3,930	3,592	0,208
53	Availability of health aid centre	3,465	3,550	3,960	0,304
54	Availability of bank facilities, ATM center, and money changer	3,515	3,600	4,088	0,032

Furthermore, it can be made technical response (technical characteristics) from terminal institution to address the main priorities of negative Gap value (see Table 4) as follows,

1. Increasing security and safety protection (R-1).
2. Adding health facilities and workers (R-2).
3. Improving officer or employees service and performance (R-3).
4. Maintain toilet facilities (R-4).
5. Maintain and provide air conditioning facilities (R-5).
6. To make more aesthetic to waiting rooms, corridors, and gate arrival or departure (R-6).
7. To make more aesthetic to gardens and landscaping (R-7).
8. Adding information facility and complaints center (R-8).
9. Increase the number and performance of the facility (R-9).
10. Eliminate illegal persons (R-10).
11. Improving the quality of transport services (R-11).

12. Improve ticket service performance (R-12).
13. Improving the quality of service and performance of visitor circulation (R-13).
14. To make easy in the vehicles flow and circulation (R-14).
15. Provide comfort in terminal outside and inside (R-15).
16. Supporting the terminal cleanliness (R-16).
17. Eliminate extortion (R-17).
18. Adding parking facilities (R-18).
19. Increase the number and capacity of toilet (R-19).

The house of quality are built to get the improvement target and priority. To make the house of quality is required calculations in Goal, Improvement Ratio (IR), Sales Point (SP), Raw Weight (RW), and Normalized Raw Weight (NRW). From the stage of making a house of quality (see Figure 2) then got many technical response targets that must be done by the terminal management institution that Joyoboyo Terminal Institution and Department of Transportation under the Local Government of Surabaya (see Table 5).

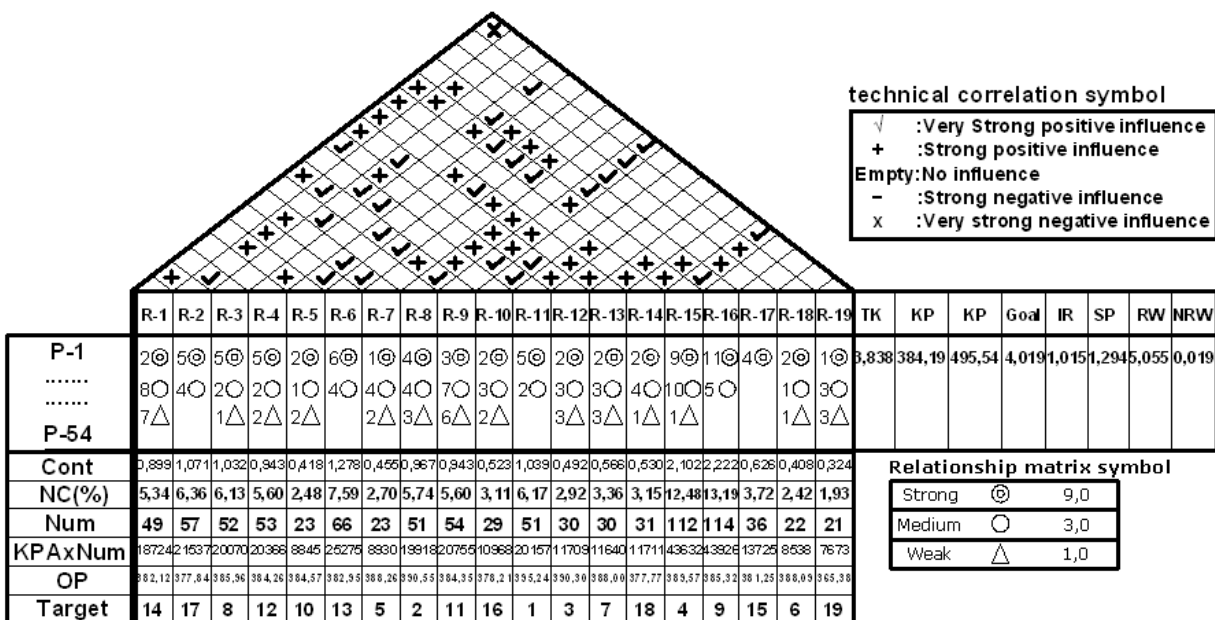


Fig. 2: House of Quality of Joyoboyo terminal services.

Table 5: The QFD results with a quality of service for Joyoboyo terminal.

Technical Response	Own Performance	Target
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R-1	382,122	14
R-2	377,842	17
R-3	385,962	8
R-4	384,264	12
R-5	384,565	10
R-6	382,955	13
R-7	388,261	5
R-8	390,549	2
R-9	384,352	11
R-10	378,207	16
R-11	395,235	1
R-12	390,300	3
R-13	388,000	7
R-14	377,774	18
R-15	389,571	4
R-16	385,316	9
R-17	381,250	15
R-18	388,091	6
R-19	365,381	19

Table 5 shows that the technical response Improving the quality of transport services (R-11) becomes the highest target with the highest score of own performance (384,352). While the technical response providing telecommunication facilities (telephone), Internet cafe, or TV (R-17) becomes the lowest target with the smallest own performance (365,381).

### Discussion

The public transport terminal management needs to improve and repair the existing services according to the technical response targets. The technical response is classified into facility, comfort, security and safety, cost, and employee or officer in a management institution of Joyoboyo terminal.

#### **Facility**

Adding health facilities.  
 Maintain toilet facilities.  
 Maintain and provide air conditioning facilities  
 To make more aesthetic to waiting rooms, corridors, and gate arrival or departure.  
 To make more aesthetic to gardens and landscaping.  
 Adding information facility and complaints center.  
 Increase the number and performance of the facility.  
 Adding parking facilities.  
 Increase the number and capacity of toilet.

#### **Comfort**

Improving the quality of transport services.  
 Improve ticket service performance.  
 Improving the quality of service and performance of visitor circulation.  
 To make easy in the vehicles flow and circulation.  
 Provide comfort in terminal outside and inside.

Supporting the terminal cleanliness.

#### **Security and Safety**

Increasing security and safety protection.  
 Eliminate illegal person.

#### **Cost**

Eliminate extortion.

#### **Employee and Human Resources**

Adding health workers.  
 Improving officer or employees service and performance.

All technical response targets above are also important things to improve services to users in developing countries such as Nairobi (Githui *et al.*, 2010) and Malaysia (Das *et al.*, 2013). The results worked well in developed countries such as Spain (Nicholas *et al.*, 2014) and other European cities (Felleson *et al.*, 2012).

### Conclusion

The effort to improve transport services quality has the highest target score, while the effort to increase the number and capacity of toilet has the lowest scores in service improvement target of Joyoboyo terminal. The target of increasing Joyoboyo terminal services consisted of facilities, comfort, security and safety, cost, and employee or officer in a management institution of Joyoboyo terminal.

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