

Service Influence Modelat Hamid Rusdi Terminal in Malang Indonesia

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ABSTRACT

Hamid Rusdi Terminal in Malang Indonesia has important role as a transit node for public transport between Malang with cities in East Java. Currently, the terminal is declining in performance and service, so that the necessary evaluation to enhance and improve the performance and service. This research aims to create a model to explain the influence level of service variables of Hamid Rusdi terminal. The method used is the analysis of Structural Equation Modeling (SEM) with AMOS 19. The result obtains 12 service factors consisting of Assurance, Responsiveness, Performance, Esthetic, Easy, Reliability, Durability, Empathy, tangible, Frequency, Comfort, and Availability. The factors are arranged in 4 variables contain Terminal Management (X_1), Transport Service (X_2), Terminal Facilities (X_m), and User Satisfaction (Y). The relationship between variables show a strong level of significance. The variability of Terminal Facilities (X_m) is explained by Terminal Management (X_1) and Transport Service (X_2) amounted to 78%, While the User Satisfaction (Y) which can be explained by the variability of Terminal Management (X_1), Transport Services (X_2), and Terminal Facilities (X_m) with 85,2%. This result indicate that the influence level between variables is positive value and significant.

KEYWORDS: Influence model, service, terminal

1. INTRODUCTION

The road transport passenger terminal has important role for the development progress in Indonesia [1]. At this time, the condition and performance of public transport terminal continues to decline with increasing public interest in the use of private vehicles, for example in Surabaya which is one of the major cities in Indonesia increased by 455% use of personal vehicle began in 1976 to 1998[2]. In addition, the terminal performance declining is also caused by no enhancement in public transportation sector. This condition requires a study to evaluate the terminal services according to user perception, because there are many previous studies considering the technical aspects without regards the user requirements and needs [3]. This research aims to make a model of influences level of services variables in Hamid Rusdi Terminal. Terminal according to the Transportation Ministry Decision No. 31 Year 1995 is a terminal type B to serve intercity transportation in one province. The method used is the analysis of *Structural Equation Modeling* (SEM) with AMOS 19.0. The result model can be used to evaluate and estimate the influence level between terminal services of Hamid Rusdi Terminal in Malang Indonesia.

2. MATERIALS AND METHODS

The research location is Hamid Rusdi Terminal Malang East Java Indonesia. The data collection use survey and interview method to respondent. The data collection tool that as research instrument to be tested by validity and reliability test use SPSS 18. After the instrument is stated valid and reliable, in the next step the instrument is analyzed by *Structural Equation Modeling* (SEM) with AMOS 19. The steps in this research method that developed is shown in **Figure 1**.

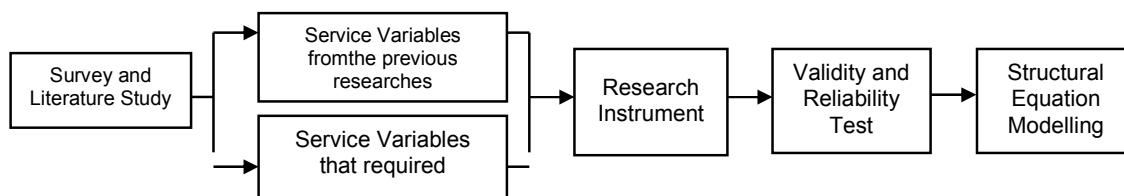


Figure 1. The research method that is developed

The services variables as Voice of User are obtained from the previous researches and preliminary survey. The number of respondents in this survey is 30 persons. Table 1 shows the previous researches and its variables.

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Table 1.The Previous Researches

No	Researcher	Year	Research Variables	Method
1	Weihua [4]	2010	Stoparea, arrival, capacity, service time, andheadway	Mathematics modeling: cumulative distribution function (CDF)
2	Saputra [5]	2010	Arrival and departure time, Informationsystemforservices, Road condition, and facilities	Survey, CSI, and IPA
3	Sedayu [3]	2012	Reliability, availability, amenity, durability, Responsiveness, comfort, assurance, frequency, performance, and aesthetics	Descriptive and VisualizationwithVisualBasic
4	Abad [6]	2013	Waiting area, Arrival/Departure, and capacity	Mapping survey and capacity calculation
5	Sedayu [7]	2013a	Reliability, availability, amenity, durability, Responsiveness, comfort, assurance, frequency, performance, and aesthetics	Importance Performance Analysis (IPA) and Quality Function Deployment (QFD)
6	Sedayu [8]	2013b	Reliability, availability, amenity, durability, Responsiveness, comfort, assurance, frequency, performance, and aesthetics	Importance Performance Analysis (IPA)
7	Sedayu [1]	2014a	Location, Facilities Availability, Aesthetic, Durability, and Reliability	Importance Performance Analysis (IPA) and Quality Function Deployment (QFD)
8	Sedayu [9]	2014b	Reliability, availability, amenity, durability, Responsiveness, comfort, assurance, frequency, performance, and aesthetics	Importance Performance Analysis (IPA)
9	Bovea [10]	2014	Equipment, Material, Employees skill, and Workplace condition, and Environment	Green Quality Function Deployment (GQFD) and Life Cycle Assessment (LCA)
10	Adewumi [11]	2014	Reliability, speed, and facilities	Phisical assessment and Critical review

The respondents are public transportation passenger that use frequently the terminal service. Sample determination by use Bernoulli equation:

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

Where, N = number of sample; Z = normal distribution value; e = level of error; p = proportion of questioner that assumed true: and q = proportion of questioner that assumed wrong. The value that assumed true is 95%, and the value that assumed wrong is 5%. To avoid the lack of data and data errors, in this condition to be decided by using 75 respondents. The measurement scale consist of 5 scales of likert:

1. Scale 1: not satisfactory
2. Scale 2: less satisfactory
3. Scale 3: fairly satisfactory
4. Scale 4: satisfactory
5. Scale 5: very satisfactory

Validity test is used to know the validity of questioner to respondents. The number of respondents are 30 persons [12]. This test as correlation test by use product moment from Pearson equation as follows:

$$r_{xy} = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{\{[N \sum X^2 - (\sum X)^2]\{[N \sum Y^2 - (\sum Y)^2]\}}}} \dots\dots\dots(2)$$

- Where :
- r_{xy} = Correlation coefficient for all items
 - X = Respondents score for each item
 - Y = Score total for each respondents in all items
 - $\sum X$ = Number of score in distribution X
 - $\sum Y$ = Number of score in distribution Y
 - $\sum X^2$ = Number of square of each score X
 - $\sum Y^2$ = Number of square of each score Y
 - N = Number of subjects

In this research, an instrument is difined has strong correlation if the correlation value more bigger than 0,6 [12].

Reliability test aim to know that data collector can show the level of accuracy, stability, and consistency in define phenomena in different time. To examine the internal consistency by using consistency coefficient (Alpha Cronbach). Alpha Cronbach equation that used in this reliability test as follows:

$$r_1 = \frac{k}{k-1} \left[\frac{1 - \sum \sigma b^2}{\sigma.t^2} \right] \dots\dots\dots(3)$$

Where : r_1 = Instrument consistency
 k = Number of question iteml
 $\sum \sigma b^2$ = Number of variance
 σb^2 = Total variance

The instrument will be reliable if the consistency coefficient has value above 0,60[12]. The both test include validity and reliability test by using SPSS 18.0.

The analysis with SEM aim to make model that explain the relationship between terminal services variables by using AMOS 19. The model that developed is path analysis and recursive model. This model is the next development from multiple regression analysis and bivariate. Figure 2 show the model of SEM that developed in this research.

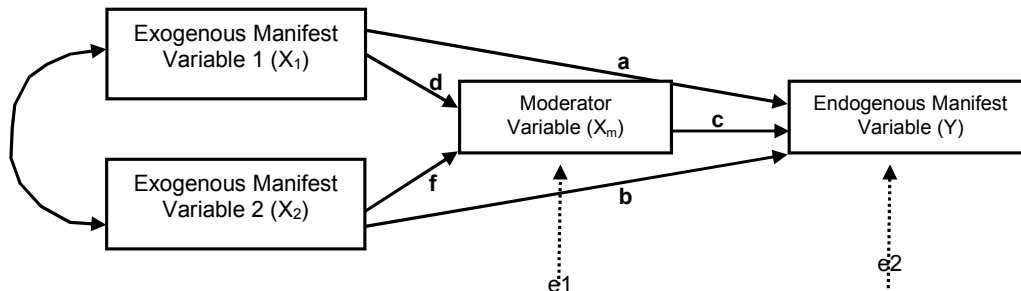


Figure 2. Model of SEM Analysis

The research variables are divided into 4 variables (see Figure 2). The model can be explained as follows:

- Exogenous Manifest Variable 1 (X_1)
- Exogenous Manifest Variable 2(X_2)
- Moderator Variable (X_m).
- Endogenous Manifest Variable (Y)

The model that defined in this regression equation below:

$$Y = aX_1 + bX_2 + cX_m + e_1 \dots\dots\dots(4)$$

$$X_m = dX_1 + fX_2 + e_2 \dots\dots\dots(5)$$

3. RESULTS AND DISCUSSION

The result of research survey and study of the previous research obtain 12 services factors that include Assurance, Responsiveness, Performance, Esthetic, Easy, Reliability, Durability, Frequency, Comfort, and Availability. The factors are arranged in 4 variables as like is shown in Table 2 – 5. Table 2 – 5 also show the result of validity and reliability test for each instrument. Table 2 explain the terminal management variable (X_1) is valid with correlation value more bigger than 0,6 ($>0,6$). For reliability test, variable X_1 also reliable which has alpha value 0,942 and this value more bigger than 0,6 ($>0,6$). The terminal management variable (X_1) is to become Exogenous Manifest Variable 1.

Table 2. Terminal Management Variable (X_1)

No	Service Factors	Sub-Factor	Validity Test	Reliability Test
1	Performance	Maintenance and management	Correlation value $>0,6$	0,942 $> 0,6$
2	Assurance	Security, safety, health, travel services		
3	Easy	Information, ticketing, circulation		
4	Responsiveness	Skill and capability, attention to user		

Table 3 show factors and sub factors in transport services variable (X_2). Transport services variable (X_2) as Exogenous Manifest Variable 2 (X_2) consist of 8 factors that are Performance, Esthetic, Easy, Reliability, Durability, Frequency, Comfort, and Availability. Instrument of variable X_2 are defined valid and reliable, because the value for correlation and consistency $> 0,6$. The result of validity and reliability test can be seen in Table 2.

Table 3.Transportation Service Variable (X_2)

No	Service Factors	Sub-Factor	Validity Test	Reliability Test
1	Performance	Lighting, air circulation, utility, road, parking	Correlation value (r) >0,6	0,974 > 0,6
2	Esthetic	Parking area, waiting room, landscape, corridor		
3	Easy	Room circulation, accessibility		
4	Reliability	Travel time, public vehicle, travel scheduling		
5	Durability	Materials of parking, road, landscape		
6	Frequency	Traffic and passenger jam, parking capacity		
7	Comfort	Free from noise, bad smoke, disturbing		
8	Availability	Waiting room, hall/lobby, corridor, locker, information, health center, praying place, retail, canteen, utility facilities, bank, ATM, office, traffic sign, money changer, telecommunication, hostel		

Terminal facilities variables are as moderator variable (X_m) in this research model. The Terminal facilities variables consist of 5 factors include Reliability, Responsiveness, Assurance, Empathy, and Tangible. The validity and reliability test of transportation services variables are shown in Table 4 that is valid and reliable. All value of correlation and consistency > 0,6.

Table 4.Terminal Facilities Variables(X_m)

No	Service Factors	Sub-Factor	Validity Test	Reliability Test
1	Reliability	Arrival and departure time, room organization	Correlation value (r) >0,6	0,968 > 0,6
2	Responsiveness	Clear information, problem solving for user		
3	Assurance	Public transport achievement, reachable in cost		
4	Empathy	Good service for passenger, facility for disable person		
5	Tangible	Clean, esthetic, comfort, availability, regularly in corridor, parking area, traffic sign, outdoor, indoor, arrival and departure gate		

User satisfaction variable to become Endogenous Manifest Variable (Y) consist of Assurance, Responsiveness, Performance, Esthetic, Easy, Reliability, Durability, Frequency, Comfort, and Availability. The result of validity and reliability test of variable Y are shown in Table 5. This result define that the variable Y is valid and reliable for all items of its instrument because the value > 0,6. This validity and reliability test for 4 variables is valid and reliable and can be analyzed in the next steps.

Table 5.User Satisfaction Variables(Y)

No	Service Factors	Sub-Factor	Validity Test	Reliability Test
1	Assurance	Security, safety, health, travel destination	Correlation value (r) >0,6	0,952 > 0,6
2	Responsiveness	Attention, skill, quick response to user complain		
3	Performance	Lighting, air circulation, toilet, road, parking		
4	Esthetic	Esthetic, corridor, landscape, park		
5	Easy	Accessibility, room circulation, ticketing, cost, information		
6	Reliability	Arrival and departure time, waiting time, ticketing		
7	Durability	Maintainability, time service		
8	Frequency	Queuing, passenger rapid, traffic jam		
9	Comfort	Smoke, noise, clean, regularity in room, road, and parking		
10	Availability	Parking side, waiting room, retail, garbage, hostel, canteen, food shop, information center, locker, travel board, praying place, travel agent, traffic sign, telecommunication, bank, ATM, office, money changer, health center,		

Based on the result survey and instrument testing, the research variables divided into 4 variables as like in the diagram model (see Figure 3). The model can be presented in 4 variables include:

- Terminal Facilities (X_1) as Exogenous Manifest Variable 1
- Transportation Services(X_2) as Exogenous Manifest Variable 2
- Terminal Facilities (X_m) as Moderator Variable.
- User Satisfaction (Y) as Endogenous Manifest Variable.

Before make the model, the first step is normality test to data which from number of minimum respondents. All variable as manifest variable which has 15 data [13], so number of data $15 \times 4 = 60$ data. The number of respondents in Hamid Rusdi Terminal to become 75 persons. This condition make the normality test is fulfilled. The signifnace test is done by comparing the estimate value with probability test (p) in Maximum Likelihood Estimates as shown in Table 6.

Table6.Regression Weights of Terminal Variables

Variables Relationship			Estimate	S.E.	C.R.	P	Significance
Terminal Facilities (X _m)	<---	Terminal Management (X ₁)	0,367	0,115	3,189	0,001	Significant
Terminal Facilities (X _m)	<---	Transportation Services (X ₂)	0,582	0,038	15,436	***	Significant
User Satisfaction (Y)	<---	Terminal Management (X ₁)	0,370	0,206	1,797	0,072	Significant
User Satisfaction (Y)	<---	Transportation Services(X ₂)	0,696	0,130	5,367	***	Significant
User Satisfaction (Y)	<---	Terminal Facilities (X _m)	0,900	0,195	4,621	***	Significant

From Table 6, the estimation value for all variable is more bigger than p value. p Value = ***similar with 0,001. The convergent validity test to know correlation by comparing variance extracted value to 0,5.

Table7. Standardized Regression Weights of Terminal Variables

Variables Relationship			Estimate	Variance extracted	Validity
Terminal Facilities (X _m)	<-	Terminal Management (X ₁)	0,175	0,373	Valid
Terminal Facilities (X _m)	<-	Transportation Services(X ₂)	0,846		
User Satisfaction (Y)	<-	Terminal Management (X ₁)	0,086	0,149	Valid
User Satisfaction (Y)	<-	Transportation Services(X ₂)	0,495		
User Satisfaction (Y)	<-	Terminal Facilities (X _m)	0,440		

From Table 7, the value of variance extracted is more little of 0,5[13] (Santoso, 2011:113) as like below,

-Terminal Facilities Variable(X_m) = $\frac{0,175^2 + 0,846^2}{2} = 0,373 < 0,5$

-User Satisfaction Variable (Y) = $\frac{0,086^2 + 0,495^2 + 0,440^2}{3} = 0,149 < 0,5$

From the test result, the model is valid with the variables arrangement. Table 8 show the estimation value between Terminal Management Variable (X₁) with Transport Services (X₂). From the analysis result, the diagram model can be made as Figure 3.

Table 8. The correlation between X₁ with X₂ in Hamid Rusdi Terminal

Variables Relationship			Estimate
Terminal Management (X ₁)	<-->	Transportation Services(X ₂)	0,116

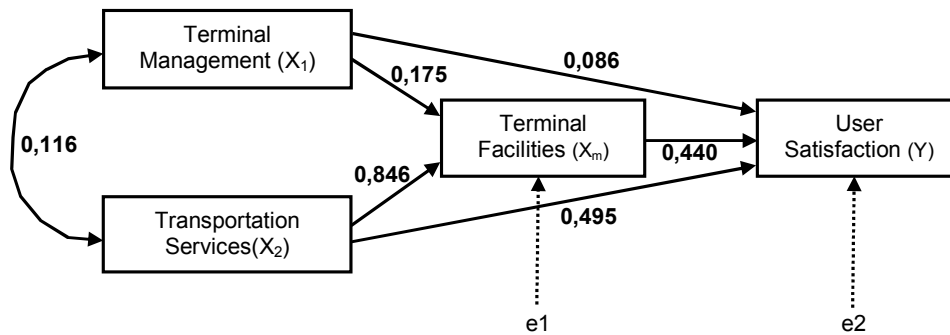


Figure3.The diagram model of Hamid Rusdi Terminal

The correlation describes the influences inter variables by a determination coefficient. Influence model of Hamid Rusdi Terminal is obtain by:

- Influence model of overall variable: $Y = 0,086X_1 + 0,495X_2 + 0,440X_m$
- Influence model of moderator variable: $X_m = 0,175X_1 + 0,846X_2$

Table 9. Correlation between X_m with Y

Variable	Estimate
Terminal Facilities (X _m)	0,780
User Satisfaction (Y)	0,852

The relationship inter variables is strong in signiffnace level. From Table 9, the model is obtained with the definition that the variability of Terminal Facilities (X_m) can be explained by Terminal Management (X_1) and Transport Services (X_2) with 78,0 %, whereas User Satisfaction (Y) can be explained by Terminal Management (X_1), Terminal Facilities (X_m), and Transport Services (X_2) with 85,2 %. From the diagram model, also obtained direct and indirect influence inter variables, so the total influences = direct influence + indirect influence. The influence relationship in the all model has positive value (See Table 10).

Table10. The relationship between Services Variables of Hamid Rusdi Terminal

Variables Relationship	Direct Influence	Indirect Influence	Total Influence
$X_1 \rightarrow Y$	0,086	$(0,175) \times (0,440) = 0,077$	0,163
$X_2 \rightarrow Y$	0,495	$(0,846) \times (0,440) = 0,372$	0,867
$X_m \rightarrow Y$	0,440	-	0,440
$X_1 \rightarrow X_m$	0,175	-	0,175
$X_2 \rightarrow X_m$	0,846	-	0,846
$X_1 \rightarrow X_2$ (recursive)	0,116	-	0,116

4. CONCLUSION

The survey result and study from the previous research produce 12 service factors include Assurance, Responsiveness, Performance, Esthetic, Easy, Reliability, Durability, Frequency, Comfort, and Availability. The factors are divided into 4 research variables consist of Terminal Facilities (X_1) as Exogenous Manifest Variable 1, Transportation Services(X_2) as Exogenous Manifest Variable 2, Terminal Facilities (X_m) as Moderator Variable, and User Satisfaction (Y) as Endogenous Manifest Variable. The result of validity test explain all items of instrument from 4 research variables are more bigger than 0,6 ($>0,6$). Its mean the instrument is valid, whereas the result of reliability test show consistency value is $0,942 > 0,6$, so the instrument is reliable. The result allow instrument to be analyzed in the next step. The analysis result obtain influence model of overall variable: $Y = 0,086X_1 + 0,495X_2 + 0,440X_m$ and influence model of moderator variable $X_m = 0,175X_1 + 0,846X_2$. The two models have been examined in significance model and validity by seeing estimate value and variance extracted. The relationship inter variable show the significance level is strong. The variability of Terminal Facility (X_m) is described by Terminal Management (X_1) and Transport Services with 78,0%. Whereas User Satisfaction (Y) can be explained by Terminal Management (X_1), Terminal Facilities (X_m), and Transport Services (X_2) with 85,2%. From the diagram model, also obtained direct and indirect influence inter variables, so the total influences = direct influence + indirect influence. The conclusion of this paper explain that the influence relationship in overall model has positive value. From the model significance, then its needed repairment and improvement in sub factors of 4 variables that have low score. The model can be used to predict or evaluate the performance and services of Hamid Rusdi Terminal in the future.

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