

Evaluation of Performance Satisfaction Level of Tawang Alun Green Terminal in Jember

Agung Sedayu

Abstract—Tawang Alun Terminal is a terminal type A that located in Jember Regency, East Java, which serves as a transit node for inter-provincial inter-city public transport connect the western and eastern parts of East Java. This study aims to evaluate the performance satisfaction level of Tawang Alun terminal by referring to the principle of environmentally friendly terminal or Green Terminal. The method used is analysis of multiple linear regression. The research respondents are terminal users which passengers, operators, and tenants of commercial facilities in the terminal. The twelve (12) performance factors include: Security, Safety and Health, Management Responsiveness, Building Utilities, Architectural Aesthetics, Ease and Accessibility, Transportation Reliability, Building Durability, Frequency and Density, Comfort and Regularity, Availability and Capacity of Public Facilities, and Application of Environmentally Friendly Concepts. The results of the analysis generate the influence of 12 performance variables represented by the value of R Square equal to 0.96. It means that the variability of the performance of the Tawang Alun terminal can be explained by the regression equation equal to 96%, while the remaining 4% is explained by other variables outside the model equation.

Index Terms— Performance satisfaction level, Green Terminal, transit node, public transport, environmentally friendly concepts.

I. INTRODUCTION

Tawang Alun Terminal is a terminal type A that located in Jember Regency, East Java, which serves as a transit node for inter-provincial inter-city public transport connect the western and eastern parts of East Java [1]. This terminal is an important node connecting transportation between Surabaya, Malang, Pasuruan and Probolinggo with Banyuwangi, Situbondo, and Bondowoso. This terminal was established in 1992 and currently the terminal condition is a decline in the number of passengers and public transport vehicles [2]. Figure 1 shows the front of the Tawang Alun Terminal area, while Figure 2 is the connection between the terminal access with highway. This study aims to evaluate the performance satisfaction level of Tawang Alun terminal by referring to the principle of environmentally friendly terminal or Green Terminal. At present, Green Terminal is an important issue because it can be used as a concept to solve the problem of

environmental damage. The environmental damage caused by transportation activities that also occur in terminals [2].



Fig. 1. The front of Tawang Alun terminal [2]



Fig. 2. Access to Tawang Talun terminal [2]

This study conducted an analysis of the influence level of green terminal performance factors that have been carried out previously by Sedayu (2016)[2]. Sedayu carried out the description of the performance satisfaction level of Tawang Alun Green Terminal in Jember. The method used is multiple linear regression analysis that determines the influence level between the 12 performance factors. The results of research conducted by Sedayu generated 12 performance factors

A.Sedayu is with the ¹Maulana Malik Ibrahim State Islamic University of Malang East Java Indonesia.(e-mail: uinsedayu@gmail.com)

include Security, Safety and Health, Management Responsibility, Building Utility, Architectural Aesthetic, Ease and Affordability, Transportation Reliability, Building Durability, Frequency and Density, Comfort and Regularity, Availability and Capacity of Public Facilities, and Implementation of Environmentally Friendly Concepts. These twelve performance factors are used as references in this study with analysis to evaluate and estimate terminal performance based on user satisfaction level. Terminal users are people who routinely use terminal services so that they understand terminal development. Terminal users include public transport passengers, public transport operators, and tenants of commercial facilities in the terminal.

II. METHOD

2.1 Determination of performance factors of green terminal

The research instrument is a questionnaire includes green terminal performance factors to determine the satisfaction level of terminal user. Several studies that have become comparative and reference studies include research conducted by Marinov et al (2014) [3] which aims to find models for increasing the efficiency level of terminal and train station performance. This study obtains results about the integration between the terminal and the station can improve the performance of the infrastructure network. Botha et al (2014) [4] conducted a research about a sustainable social approach to the integration of modal changes in the phenomenon of urban migration. The results of this research are research variables include land use, location, community activity centers, and transport mode requirements. Sedayu (2015) [5] conducted a study compile a Model for the Influence Level of Service Variables of Hamid Rusdi Terminal in Malang Indonesia. The results described that the influence level between variables were positive and significant. User Satisfaction can be explained by the variability of terminal management, Terminal Facilities, and Transportation Services. Wiegman et al (2015) [6] conducted a statistical analysis to measure port performance. The port performances are capacity and accessibility. Chowdhury et al (2016) [7] conducted a study determines the influence of accessibility to the behavior of public transport users. This research produces residential density, the quality of the built environment, and the level of safety. The variables supported the pedestrian accessibility to the terminal. Accessibility to various travel destinations include workplaces, educational institutions, and sub-urban areas also have a significant influence between the user satisfaction level with the public transport terminal. Arifin (2017) [8] conducted a research about Analysis of Terminal Operational Performance (Case Study of the Samarinda Seberang Terminal). Arifin generated a result that the Samarinda terminal had not functioned according to its type and function. A research conducted by Carteni et. al (2017) [9] aims to find out the quality of public transport and travel experience. The results of this study generated factors have influence to travel time, comfort, cleanliness, aesthetics, and

availability of facilities. Sedayu (2018) [10] tried to create optimization model of green terminal performance. The study resulted a regression model to calculate the performance of the green terminal and prioritize the performance improvement based on the optimization results. The optimization refers to the level of importance and user satisfaction. The respondent research is public transport passenger in terminals, public transport operators, and tenants of commercial facilities in the terminal. The measurement scale used is a Likert scale includes,

- 1 = Not satisfactory
- 2 = Less satisfactory
- 3 = Quite satisfactory
- 4 = Satisfactory
- 5 = Very satisfactory

The next step is validity and reliability test of instrument before being distributed to respondents. The validity and reliability test in research instruments by using SPSS 20.0 program to 30 people [11]. The validity test uses the equation Pearson to determine the validity of questionnaires to respondent by calculating the correlation coefficients of each item with a total score. The instruments have high validity if the correlation value is above of 0.6 [11]. The reliability test aims to determine the level of reliability of research instruments as a data collection tool. The instrument is reliable if the alpha coefficient (Alpha Cronbach coefficient) is above of 0.60 [11]. Determination number of research respondents in the survey after trial test was calculated by using Bernoulli equation [10]:

$$N \geq \frac{\left(Z_{\frac{\alpha}{2}}\right)^2 p \cdot q}{e^2} \quad (1)$$

$$\text{The result is } N \geq \frac{(1,96)^2 \cdot 0,95 \cdot 0,05}{(0,05)^2} \rightarrow N \geq 72,99 \approx 73$$

With description,

- N = number of minimum sample
- Z = normal distribution value
- e = error rate
- p = proportion of questionnaires that are assumed correct
- q = proportion of questionnaire that are assumed incorrect

The value is considered correct equal to 95%, and then questionnaires that are considered incorrect equal to 5%. To avoid lacking of data because of mistake of filling or the questionnaires are not return, so the number of respondents to be used are 100 persons.

2.2 Multiple Linear Regression Analysis

A Multiple Linear Regression Analysis is used to determine the influence of the research variables of the Tawang Alun green terminal in Jember. Multiple linear regression includes a requirement test which is Classical Assumption Test. A Classical Assumption Test includes Normality, Linearity of Regression Line, Multicollinearity, Autocorrelation, Heteroscedasticity, and Partial Influence [12]. This study includes 12 independent variables and one dependent variable. Figure 3 describes the relationship of 12 independent variables to one dependent variable.

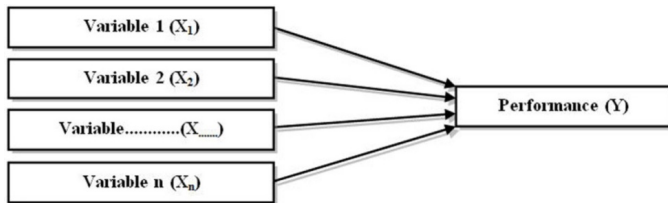


Fig. 3. Relationship Between Variables in Green Terminal Performance

$$Y = a_1X_1 + a_2X_2 + \dots + a_nX_n + c \quad (2)$$

With description, Y = Dependent variable; a_0 = Intercept; a_1, a_2, a_3 = Independent coefficient; X_1 = Independent variable 1; X_2 = Independent variable 2; X_n = Independent variable at n .

III. RESULTS AND DISCUSSION

3.1 Results of Determination of Green Terminal Performance Factors

The Performance factors described in this paper is a next research from the previous study in Sedayu (2016) [2] who generated 12 factors include: Security (X_1), Safety and Health (X_2), Management Responsibility (X_3), Building Utility (X_4), Architectural Aesthetic (X_5), Ease and Affordability (X_6), Transportation Reliability (X_7), Building Durability (X_8), Frequency and Density (X_9), Comfort and Regularity (X_{10}), Availability and Capacity of Public Facilities (X_{11}), and Implementation of Environmentally Friendly Concepts (X_{12}).

3.2 Results of Validity and Reliability Test

The results of the validity and reliability test of instruments to 30 people were generated by analyzing user satisfaction level. This result is shown in Table 1.

TABLE I
RESULT OF VALIDITY AND RELIABILITY TEST IN RESEARCH INSTRUMENT

No	Performance Factors	Validity test (correlation value)	Reliability Test (alpha value)
1	Security (X_1)	>0.6	0.963 (>0.6)
2	Safety and Health (X_2)	>0.6	0.981 (>0.6)
3	Management Responsibility (X_3)	>0.6	0.905 (>0.6)
4	Building Utility (X_4)	>0.6	0.911 (>0.6)
5	Architectural Aesthetic (X_5)	>0.6	0.875 (>0.6)
6	Ease and Affordability (X_6)	>0.6	0.882 (>0.6)
7	Transportation Reliability (X_7)	>0.6	0.890 (>0.6)
8	Building Durability (X_8)	>0.6	0.945 (>0.6)
9	Frequency and Density (X_9)	>0.6	0.932 (>0.6)
10	Comfort and Regularity (X_{10})	>0.6	0.907 (>0.6)
11	Availability and Capacity of Public Facilities (X_{11})	>0.6	0.966 (>0.6)
12	Implementation of Environmentally Friendly Concepts (X_{12})	>0.6	0.871 (>0.6)

Table 1 describes the result of validity and reliability test for 12 performance factors of Tawang Alun Green Terminal in Jember. The instrument is proven valid and reliable, so that the instrument can be used as a data collection tool for further analysis purposes.

3.3 Regression models for green terminal performance

The results of analysis of multiple linear regression are shown in Table II. This result also generated a regression model equation. This analysis uses SPSS 20 software.

TABLE II
ANALYSIS RESULT OF MULTIPLE LINIER REGRESSION

Variables	Unstd.	t-count	t-table	Criteria
(constant)	14.24			
Security (X_1)	3.02	2.44		t count > t table
Safety and Health (X_2)	2.76	2.62		t count > t table
Management Responsibility (X_3)	2.21	2.70		t count > t table
Building Utility (X_4)	3.53	2.17		t count > t table
Architectural Aesthetic (X_5)	3.46	4.20	1.82	t count > t table
Ease and Affordability (X_6)	6.44	3.58	(dk = 50 and alpha = 5%)	t count > t table
Transportation Reliability (X_7)	8.53	4.67		t count > t table
Building Durability (X_8)	3.24	6.31		t count > t table
Frequency and Density (X_9)	1.55	4.09		t count > t table
Comfort and Regularity (X_{10})	2.98	3.31		t count > t table
Availability and Capacity of Public Facilities (X_{11})	8.16	2.86		
Implementation of Environmentally Friendly Concepts (X_{12})	7.30	5.92		
R	= 0.98	Description :		
R Square	= 0.96	- Number of data (respondent) = 100		
α	= 0,05	- Dependent variable (Y)		

The results of the analysis generate the influence of 12 performance variables represented by the value of R Square equal to 0.96. It means that the variation of Tawang Alun green terminal in Jember can be explained by the regression equation equal to 96% while the remaining 4% is explained by other variables outside the model equation. The value of R is 0.98 which the influence of 12 performance variables is very significant. The analysis can produce the regression model as follows,

$$Y = 14.24 + 3.02X_1 + 2.76X_2 + 2.21X_3 + 3.53X_4 + 3.46X_5 + 6.44X_6 + 8.53X_7 + 3.24X_8 + 1.55X_9 + 2.98X_{10} + 8.16X_{11} + 7.30X_{12}$$

With description, Y = performance of Tawang Alun green terminal in Jember; X_1 = Security; X_2 = Safety and Health; X_3 = Management Responsibility; X_4 = Building Utility; X_5 = Architectural aesthetics; X_6 = Ease and Affordability; X_7 = Transportation Reliability; X_8 = Building Durability; X_9 = Frequency and Density; X_{10} = Comfort and Regularity; X_{11} = Availability and Capacity of Public Facilities; and X_{12} = Implementation of Environmentally Friendly Concepts.

3.4 Results of Classical Assumption Tests and Partial Influences

The results of calculations of normality test generate Kolmogorov-Smirnov Test Z with each variable has an Asymp. value. Sig. 2 tailed > from an alpha level equal to 0.05. It means that the data are derived from a population with normal distribution. Linearity test results describe the significance value > 0.05 for 12 variables so that the regression line model is linear. The results of the Multicollinearity test calculation describes the significance value is greater than the alpha level equal to 0.05, so that it can be concluded that there is no multicollinearity among the independent variables. The results of the analysis for the autocorrelation test generate a Durbin-Watson value equal to 1.969. This value is said to be close to score 2, so it can be concluded that there is no autocorrelation between observational data. The results of calculations for 12 variables generate a significance value greater than the specified alpha level (0.05), so that heteroscedasticity does not occur. The results of the partial effect test describe 12 variables have a very significant influence with the results of t-count > t-table.

IV. CONCLUSIONS AND RECOMMENDATION

The regression model evaluates the performance of Tawang Alun green terminal with 12 Performance factors include : Security (X₁), Safety and Health (X₂), Management Responsibility (X₃), Building Utility (X₄), Architectural Aesthetic (X₅), Ease and Affordability (X₆), Transportation Reliability (X₇), Building Durability (X₈), Frequency and Density (X₉), Comfort and Regularity (X₁₀), Availability and Capacity of Public Facilities (X₁₁), and Implementation of Environmentally Friendly Concepts (X₁₂). The results of the analysis generate the influence of 12 performance variables represented by the value of R Square equal to 0.96. It means that the variation of Tawang Alun green terminal in Jember can be explained by the regression equation equal to 96% while the remaining 4% is explained by other variables outside the model equation. The value of R is 0.98 which the influence of 12 performance variables is very significant. The analysis process create regression model $Y = 14.24 + 3.02X_1 + 2.76X_2 + 2.21X_3 + 3.53X_4 + 3.46X_5 + 6.44X_6 + 8.53X_7 + 3.24X_8 + 1.55X_9 + 2.98X_{10} + 8.16X_{11} + 7.30X_{12}$. The results of calculations of normality test generate Kolmogorov-Smirnov Test Z with each variable has an Asymp value. Sig. 2 tailed > from an alpha level equal to 0.05. It means that the data are derived from a population with normal distribution. Linearity test results describe the significance value > 0.05 for 12 variables so that the regression line model is linear. The results of the Multicollinearity test calculation describes the significance value is greater than the alpha level equal to 0.05, so that it can be concluded that there is no multicollinearity among the independent variables. The results of the analysis for the autocorrelation test generate a Durbin-Watson value equal to 1.969. This value is said to be close to score 2, so it can be concluded that there is no autocorrelation between observational data. The results of calculations for 12 variables generate a significance value greater than the specified alpha

level (0.05), so that heteroscedasticity does not occur. The results of the partial effect test describe 12 variables have a very significant influence with the results of t-count > t-table. The results of the classical assumption test and partial influence have fulfilled the requirements that the regression model is feasible to be used as a model of performance evaluation in Tawang Alun green terminal. The management of the Tawang Alun terminal in Jember can improve the terminal performance based on the results of the evaluation.

REFERENCES

- [1] Anonymous, "Minister of Transportation Regulation No. 132 Year 2015 about Implementation of Road Transport Passenger Terminal," Jakarta: Indonesian Ministry of Transportation, 2015.
- [2] Sedayu, Agung, "Description of Satisfaction Level of Green Terminal Tawang Alun Performance in Jember," *Proceedings of the National Seminar on Application of Regional Infrastructure Technology (ATPW) 2016: Governance of Water Resources to Support Food Security and Environmental Sustainability*, ISSN 2301-6752. Civil Engineering Sepuluh Nopember Institute of Technology (ITS) Surabaya, June 2, 2016.
- [3] M. Marinov, L.D. Giovanni, G. Bellisai, J. Clevermann, A. Mastellou, D. Victoria, and L. Deleva, "Analysis of Rail Yard and Terminal Performances," *Journal of Transport Literature*, Vol. 8 n. 2, pp. Apr. 178-200 2014 ISSN 2238-1031, 2014.
- [4] B. Botha, C. Adendorff, G. Gericke, and G.L. Adendorff, "Integrative Transport and Capital Interchanges: A Social Sustainable Approach Towards Urban Migration," *Journal of Civil Engineering and Construction Technology*, Vol. 5 (6), pp.49-62, ISSN 1996-0816, 2014.
- [5] Sedayu, Agung, "Service Influence Model at Hamid Rusdi Terminal in Malang Indonesia," *Journal of Applied Environmental and Biological Sciences* Vol 5 (9) 53-59-2015 ISSN: 2090-4274, 2015.
- [6] B. Wiegmans, P. Witte, and T. Spit, "Inland Port Performance: A Statical Analysis of Dutch Inland Ports," *Transportation Research Procedia - Science Direct Elsevier* 8, 2015, 145-154 ISSN 2352-1465, 2015.
- [7] Chowdury, Subeh, "The Effect of Access and Accessibility on Public Transport Users' Attitudes," *Journal of Public Transportation*, Vol. 19, No. 1, 97-113 ISSN. 2375-0901, 2016.
- [8] Arifin, Triana Sharly P., "Analysis of Terminal Operational Performance (Case Study of the Samarinda Seberang Terminal)," *Foundation Journal* Vol. 6 No. 2 - 2017, 2017.
- [9] Carteni, Armando, "Public Transport Quality and Travel Experience: The Italian Case Study," *European Scientific Journal July 2017 / SPECIAL / Edition*, ISSN 1857-7881 (Print) e - ISSN 1857-7431, 2017.
- [10] Sedayu, Agung, "Performance Optimization Model of Hamid Rusdi Green Terminal in Malang," *Journal of Applied Environmental and Biological Sciences*, Vol 8 (5) 16-23 -2018 ISSN: 2090-4 274, 2018.
- [11] Sugiyono, "Statistics for Research. Bandung: Alfabeta press, 2009.
- [12] Sudarmanto, and R, Gunawan, "Multiple Linear Regression Analysis with SPSS," Yogyakarta: Graha Ilmu, 2005.