Scientific Review – Engineering and Environmental Sciences (2020), 29 (4), 532–543
Sci. Rev. Eng. Env. Sci. (2020), 29 (4)
Przegląd Naukowy – Inżynieria i Kształtowanie Środowiska (2020), 29 (4), 532–543
Prz. Nauk. Inż. Kszt. Środ. (2020), 29 (4)
http://iks.pn.sggw.pl
DOI 10.22630/PNIKS.2020.29.4.46

Agung SEDAYU

Maulana Malik Ibrahim State Islamic University of Malang, Faculty of Science and Technology

Developing Jati Kudus Terminal into a sustainable transportation infrastructure in Indonesia using the green concept

Key words: green terminal, infrastructure, transportation, sustainable, Jati Kudus Terminal

Introduction

In 2017, the Jati Terminal, located at Kudus Regency, Central Java Province, Indonesia, was classified as a type-A transportation terminal (Baedhowi, 2018). This terminal functions as an inter-city and inter-provincial public transportation node that connects the Surabaya city, East Java Province, with Jakarta city through Pantura. The operation is also based on the Indonesian Minister of Transportation Regulation No 132 of 2015. However, this terminal tends to experience a continual decline in its operation and service, thereby leading to a decrease in the number of passengers and transport vehicles. The implementation of the social distancing policies and large-scale restrictions due to the Covid-19 pandemic, which struck Indonesia in March 2020, has in variably decreased the operational rate of transportation terminals, including the Jati Kudus Terminal. In March 2020, data on the number of public transport vehicles and passengers in Jati Kudus Terminal consists of 3,638 buses operating, 42,331 passengers arriving, and 53,402 passengers departing. In April 2020, it decreased to 1,428 buses operating, 8,319 passengers arriving, and 8,831 passengers departing. Meanwhile, in May 2020, there was a significant decrease to 33 buses operating, 476 passengers arriving, and 380 passengers departing (Rahman & Munthoha, 2020). Therefore, this study aims to determine the effect of the green concept in Jati Terminal for the development of sustainable transportation infrastructure in Indonesia. Terminals play

essential roles in connecting various islands separated by oceans in Indonesia. However, a technical study is needed to evaluate and improve the Jati Terminal's performance, to prevent it from experiencing failure similar to Terboyo Semarang Terminal. Yasa (2020) stated that in 2018, the Terboyo Terminal, a type-A road transport passenger company, became a freight terminal due to a decline in performance and service. According to a research carried out by Sedayu (2019) at Tawang Alun Terminal, Jember Regency, East Java, 12 factors tend to affect terminals' performance level in accordance with the regulation of the Indonesian Minister of Transportation Regulation No 132 of 2015 on the operation of the road transport passenger terminals. These are: 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; application of environmentally friendly concepts. Therefore, the green terminal concept is used to ensure passengers, public transport operators, and tenants of commercial areas are satisfied. Humans need optimal environmental conditions because their comfort is influenced by physical and psychological environmental factors (Sugiono, Nurlaela, Kusuma, Wicaksono & Lukodono, 2020). The buildings and surrounding environment of a terminal act as a place of social, economic, and environmental interaction. Transportation infrastructure also has an impact on spatial and cultural development in the surrounding area (Stangel, 2019). The negative impact of transportation infrastructure can be minimized by the application of green concepts on buildings and facilities. The application of the green concept to terminal buildings and facilities, refers to the Green Building Council of Indonesia (GBCI, 2013). The green building principles can be applied to the built environment used by humans, especially public infrastructure such as road transport terminals.

Material and methods

Determination of research variables

Sedayu's (2019) study on the green terminal concept and the provisions in the Regulation of the Indonesian Minister of Transportation No 132 of 2015 on the operation of the road transport passenger terminal, were used to determine the research variables. The green concept of terminal buildings and facilities, refers to the green building principles by the Green Building Council of Indonesia (GBCI, 2013). A total of 10 prioritized attributes supporting the green concept, were also obtained in previous studies. These attributes are: a guarantee, responsiveness, performance, aesthetics, ease, reliability, durability, frequency, pleasure, and comfort, as well as availability (Sedayu, 2017). Furthermore, Sedayu (2018) conducted similar research at Tlogomas Terminal in Malang, East Java, Indonesia. The results showed an increase in public transport terminal services based on user expectations. The research target combines the technical and non-technical aspects of transportation with green terminals used to prevent damages to the environment. The green building emphasizes the physical aspects

and the surrounding area of the terminal (Sedayu, 2019; Figiel & Leciej-Pirczewska, 2020). Kuruvilla, Sreekumar, Valsalan, Nabeela and Kurian (2018) defined terminal as a public transportation node that causes environmental damages such as air pollution, noise, congestion, clean water damage, and land-use crisis. Complex efforts are needed for the planning and design stages of terminal infrastructure.

Validity and reliability tests of research instruments

The validity and reliability tests of research instruments were conducted on 30 respondents. The validity test uses Pearson's product–moment correlation which is to calculate the correlation coefficient of each item in the research instrument on the total score. The research instrument is called valid if the correlation value is above 0.60 (Sedayu & Mangkoedihardjo, 2019). The reliability test uses the consistency coefficient (Cronbach alpha). The research instrument is called reliable if the alpha coefficient (Cronbach alpha coefficient) is above 0.60 (Sedayu & Mangkoedihardjo, 2019). The measurement scale for the level of user importance and satisfaction is shown in Table 1.

TABLE 1. Measurement scale of research instruments

Measurement scale	User importance	User satisfaction
1	not important	not satisfied
2	not too important	less satisfied
3	quite important	quite satisfied
4	important	satisfied
5	very important	very satisfied

The Slovin formula was used to determine the number of respondents (Sedayu & Mangkoedihardjo, 2019). This study obtained data from a total of 1,800 people that use terminal services, consisting of passengers, public transport operators, and tenants of commercial areas. The number of respondents is daily data of terminal users during the 24-hour public transport service in the Jati Kudus Terminal. The respondent is aware of the daily development of the terminal so as to provide accurate information about the service and performance of the Jati Kudus Terminal. The public transport passengers chosen as respondents are daily users of the terminal. The number of respondents is calculated as follows:

$$n = \frac{N}{(1 + (N \cdot e^2))}$$

Thus, it becomes

$$n = \frac{1{,}800}{(1 + (1{,}800 \cdot 0.05^2))} = 327.3 \approx 328$$

where:
n – number of samples or respondents,
N – total population,
E – 5% error rate.

The results of these calculations explain that the research instrument was distributed to 328 respondents.

Multiple linear regression analysis

The multiple linear regression method was used to determine the effect of the research variables on the green concept. The multiple linear regression generates a mathematical model that can be used by Jati Kudus Terminal managers to

evaluate terminal performance based on the green concept. The terminal manager is the Directorate General of Land Transportation of the Indonesian Ministry of Transportation. This analysis phase used for a computer program called the SPSS 23 statistics to produce a regression model based on the level of terminal user satisfaction. In addition, the classical assumption test comprising of normality, linearity, multicollinearity, autocorrelation, heteroscedasticity, and the partial effect was used to carry out multiple regression analysis (Sedayu & Mangkoedihardjo, 2019). Figure 1 shows the relationship between independent and dependent variables. The multiple linear regression model is stated in the following function:

$$Y = a_0 + a_1X_1 + a_2X_2 + \ldots + a_nX_n$$

where:
Y – dependent variable (green terminal performance),
a_0 – constant,
a_1, a_2, a_3 – coefficient of independent variables,
X_1, X_2, X_n – 1st, 2nd, and n-th independent variables.

Results and discussion

Results of research instrument determination

The results used to determine the research instrument consists of 12 green terminal performance variables, as shown in Table 2. In addition, it also shows the average scores of user importance and satisfaction on the performance of the Jati Kudus green terminal. The performance variables refer to the Indonesian Minister of Transportation Regulation No 132 of 2015 on the operation of the road transport passenger terminals. The green concept in terminal buildings and facilities was developed based on green building principles by the Green Building Council of Indonesia (GBCI, 2013). The performance variables emphasize service to the terminal users by reducing environmental damage caused by transportation activities. The green terminal also provides convenience for users of disabled persons, including seniors, infants, pregnant women, and people with disabilities to use public transportation in the terminal. Green building also emphasizes the building and its facilities

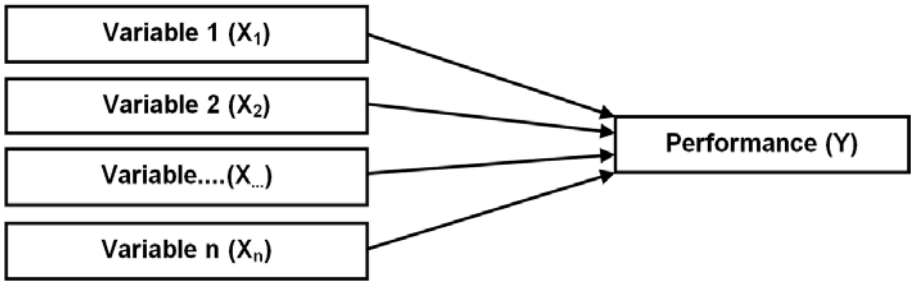

FIGURE 1. Relationship between green terminal performance variables

can guarantee comfort, safety, health, and safety for disabled persons (Sedayu, Setiono, Subaqin & Gautama, 2020). Table 2 explains that the variable of the transportation service reliability, ticketing, and travel costs (X_8) have the highest and lowest average scores based on user importance and satisfaction. This shows that timely and affordable transportation services are important (with an average score of 3.98) for users, but actual performance are less satisfied (with an average score of 2.24).

The green terminal concept is one of the solutions used to solve transportation problems in developing countries, including Indonesia. However, there are numerous problems associated with transportation terminals such as traffic congestion, unreliable service, accidents, environmental damage, and the difficulty in implementing non-motorized rules. (Babatunde & Perera, 2016; Yapicioglu, Mogbo & Yayani, 2017; Ahmed & El Monem, 2020). The twelve performance variables shown in Table 2 are the regression model variables used to evaluate terminal performance. The green terminal is part of green transportation in the development of infrastructure that can use electric vehicles as an effort to apply environmentally friendly concepts. The benefits of this technology can reduce air pollution emissions and energy efficiency, especially in densely populated areas (Hamurcu & Eren, 2020).

The validity and reliability test results of research instruments

A total of 30 respondents were used to test the validity and reliability levels of the research instruments in Table 2. The validity test results of the instruments showed that the correlation coefficient of each item had a total score above 0.60, therefore, the instrument is valid. While the reliability test results explain that the Cronbach alpha coefficient is

TABLE 2. Levels of importance and satisfaction on the performance of the Jati Kudus green terminal

Green terminal performance variable	Average score	
	importance	satisfaction
Security guarantee and freedom from criminal acts (X_1)	3.72	2.58
Safety and health guarantee and freedom from accidents (X_2)	3.85	2.78
Responsiveness of the terminal manager in providing services (X_3)	3.64	3.47
Availability and capacity of supporting facilities (X_4)	3.80	3.06
Architectural aesthetics within and outside the buildings (X_5)	3.69	3.49
Ease of obtaining general travel information (X_6)	3.76	2.91
Affordability and accessibility in and out of the terminal (X_7)	3.66	3.58
Reliability of transportation services, ticketing, and travel costs (X_8)	3.98	2.24
Performance durability and visual of terminal building facilities (X_9)	3.63	3.73
The density of people and vehicles in the terminal area (X_{10})	3.71	3.82
Comfort, regularity and cleanliness (X_{11})	3.75	3.81
Application of environmentally friendly concepts on terminal and transportation facilities (X_{12})	3.87	2.31

above 0.60, so it can be concluded that the instrument is reliable. The validity and reliability test results showed that the research instrument is feasible and can be used as a data collection tool. Also, the use of questionnaires in carrying out surveys integrated the technical and non-technical aspects of the terminal. Data collection tool in the form of questionnaires that can obtain the perception of respondents, namely users of the Jati Kudus Terminal. The non-technical aspects of the terminal are sourced in the user interests and satisfaction used to evaluate the technical aspects of the terminal, thus manifesting conformity between the two aspects. User perception is considered to improve terminal performance, as terminals as public facilities and infrastructure aim to meet the public interests and needs (Sedayu, 2017; Dakhil, Shaheed & Alobaidi, 2019; Ferza, Hamudy & Rifki, 2019). Sustainable transportation networks by integrating infrastructures also consider the perception of all stakeholders, including users (Tadic, Krstic, Roso & Brnjac, 2019). Road transport terminals can be integrated with airports, seaports, railway stations, and other supporting transport hubs to realize effective and efficient sustainable transportation. Transportation infrastructure such as terminals can also connect with other public facilities can make it easier for people to reduce the use of private vehicles. This can solve transportation problems in the form of traffic congestion and accidents, environmental pollution, and travel cost inefficiencies.

Results of multiple linear regression analysis

The multiple linear regression analysis results in Table 3 were used to obtain the level of influence of 12 green terminal performance variables with an R^2 value of 0.94. This means that the regression equation is used to determine performance by 94%, while the remaining 6% analyzes external variables. R value of 0.97 means that the influence of 12 performance variables is very strong. The equation of the regression model obtained is as follows:

$$Y = 16.23 + 2.27X_1 + 4.30X_2 + 2.19X_3 + 3.56X_4 + 2.85X_5 + 5.13X_6 + 2.76X_7 + + 6.34X_8 + 3.08X_9 + 1.71X_{10} + 3.42X_{11} + + 5.78X_{12}$$

where:
Y – green terminal performance,
X_1 – security guarantee,
X_2 – safety and health guarantee,
X_3 – responsiveness, and responsibility of the terminal manager,
X_4 – facility availability and capacity,
X_5 – architectural aesthetics,
X_6 – easy access to information,
X_7 – terminal affordability and accessibility,
X_8 – reliability of transportation services,
X_9 – performance durability and visual of building facilities,
X_{10} – density of people and vehicles,
X_{11} – comfort, regularity, and cleanliness,
X_{12} – application of environmentally friendly concepts.

TABLE 3. Results of multiple linear regression analysis

Variable	Unstandardized coefficients	t-Count	t-Table
constant	16.23		1.07 (df = 50; α = 5%)
X_1	2.27	4.82	
X_2	4.30	3.55	
X_3	2.19	4.74	
X_4	3.56	3.92	
X_5	2.85	4.15	
X_6	5.13	2.54	
X_7	2.76	3.90	
X_8	6.34	2.85	
X_9	3.08	5.18	
X_{10}	1.71	5.23	
X_{11}	3.42	4.02	
X_{12}	5.78	3.19	
R = 0.97 R^2 = 0.94 α = 0.05		number of data (respondent) = 328 dependent variable (Y)	

The regression model shows that the variable constant is positive, therefore, a positive value is obtained when X is added to Y. This regression model is used as a model to evaluate the performance of the green terminal.

The classic assumption results were used to obtain the z-value of the Kolmogorov–Smirnov test. These results explained that each performance variable has an asymptotic significance value of 2 which is greater than the alfa level of 0.05. This means that the data comes from normally distributed populations. Furthermore, the linearity test results obtained significance values above 0.05 for 12 performance variables, therefore, the regression model is linear. The results showed no multicollinearity among the independent variables because the significance value is greater than the alpha level of 0.05. The autocorrelation test results obtained a Durbin–Watson value of 1.996, which is close to 2. Therefore, there was no autocorrelation between the observational data. There was no significant value in the heteroscedasticity test results for 12 variables because the significance value of the alpha level is above 0.05. The partial effect test results show that the 12 variables have a very strong and significant effect on the results of the t-count > t-table. The regression model fulfilled the needed concept, therefore, it can be used to calculate the performance of the green terminal.

The Jati Kudus Terminal needs to improve its service to prevent customer decline and other forms of failures incurred by the Terboyo Semarang Terminal. In 2018, the Terboyo Terminal, a type-A road transport passenger com-

pany, became a freight terminal due to a decline in performance and service. It is connected to the Jati Kudus Terminal through Demak Regency and the North Coast (Pantura) route and links public transportation between Jakarta city and the Surabaya city, East Java Province. The Pantura route is a national road and a major alternative means of transportation on the Java island. Figure 2 shows the current quite condition of the Jati Kudus Terminal due to the limited number of passengers and public transportation. Figure 3 shows that the Terboyo Terminal is associated with the disruption of services due to the occurrence of tidal floods from the Java sea coast. The coastal area adjacent to this terminal was initially a mangrove forest with the ability to withstand a tidal flood, however, it has been converted into public facilities and infrastructure. Figure 3 shows water inundating the Terboyo Terminal area due to tidal flood from the Java Sea. The Jati Kudus Terminal management needs to learn from the failed experience of the Terboyo Terminal in providing infrastructure.

FIGURE 2. Jati Kudus Terminal which is quiet from passengers and public transportation (Baedhowi, 2018)

FIGURE 3. The terminal which is flooded due to tidal flood from the Java Sea (Purbaya, 2017)

Terminal becomes a node of changing modes of transportation for passengers and freights. Terminals can connect many areas with transportation activities that are the main needs of the community. This is because the terminal plays an important role in connecting regions (Idicula, Syam, Joseph & Harithamol, 2016). Road transport terminals can connect between regions in Indonesia as an archipelago country separated by many oceans that have high disparities in all development sectors. The national development can be evenly distributed throughout the region supported by transportation infrastructure including road transport terminals. Even development throughout Indonesia can reduce the level of disparity in the economic and investment sectors. Road transport terminals are also integrated with other infrastructures within urban and rural areas. Urban and rural areas can be connected with transportation infrastructure to realize the interaction between the two regions, thus preventing the negative impact of urbanization. Jati Kudus Terminal is connected to international airports, international seaports, and national railway stations in Indonesia's Central Java Province. Road transport

terminals integrated with airports, railway stations, seaports, and other transportation infrastructure can support the transfer of passengers and freights between domestic and international regions. The application of the green concept to airports, railway stations, and seaports provides many benefits and impacts on the economic, energy, environmental, and transportation safety sectors. Airports managed on a sustainable principle can reduce inefficiencies of energy consumption and operational costs. The life cycle of the airport and its facilities can be maintained with the use of renewable resources (Wan, Peng, Wang, Tian & Xu, 2020). In addition to serving as a node for passenger transfer, the seaport becomes a node of export and import activity between domestic and international regions, thus improving the national economic. A greening of port management in view of safeguarding their license to operate, and increasing their economic and environmental competitiveness (Notteboom & Lam, 2018). The integration between the road transport terminal and the railway station can provide ease of transfer of modes for passengers and freights by land line. The transfer of passenger mode between trains and public transport in urban areas can prevent traffic accidents and travel delays (Hasiak, 2019).

Conclusions

The results showed that the transportation service reliability, ticketing, and travel costs have the highest and lowest average score based on the level of user importance and satisfaction, respectively. The influence of the 12 variables, represented by the R^2 value of 0.94, showed a regression equation of 94%, while external variables explain the remaining 6%. The influence of 12 performance variables is very strong and significant, with an R value of 0.97, therefore, the resulting regression model has also fulfilled the classical assumption requirement test. The twelve variables include Security guarantee; Safety and health guarantee; Responsiveness, and responsibility of the terminal manager; Facility availability and capacity; Architectural aesthetics; Easy access to information; Terminal affordability and accessibility; Reliability of transportation services; Performance durability and visual of building facilities; Density of people and vehicles; Comfort, regularity, and cleanliness, and; Application of environmentally friendly concepts. The Jati Kudus Terminal managers need to pay attention to the 12 performance variables to improve their performance and support the sustainable development of transportation infrastructure in Indonesia. Jati Kudus green terminal concept can reduce transportation problems in the form of traffic congestion and accidents, waste of energy consumption, environmental pollution, and inefficiencies of travel costs. The Jati Kudus Terminal plays an essential role in connecting various islands separated by oceans in Indonesia. The terminal is connected to airports, railways, seaports, and other transportation infrastructures, thereby increase the national economy and investment. Jati Kudus Terminal connects rural and urban areas so as to prevent the negative impact of urbanization.

References

Ahmed, M.M.A.W. & El Monem, N.A. (2020). Sustainable and green transportation for better quality of life ase study Greater Cairo – Egypt. *HBRC Journal*, *16*(1), 17-37. https://doi.org/10.1080/16874048.2020.1719340

Babatunde, S.O. & Perera, S. (2016). Cross-sectional comparison of public-private partnerships in transport infrastructure development in Nigeria. *Engineering, Construction and Architectural Management*, *24*(6), 875-900. https://doi.org/10.1108/ECAM-11-2015-0186

Baedhowi, I. (2018-02-10). *Sarana Perhubungan dan Terminal di Kabupaten Kudus*. Retrieved from: https://isknews.com/sarana-perhubungan-dan-terminal-di-kabupaten-kudus [access: 08.06.2020].

Dakhil, A.J., Shaheed, S.M. & Alobaidi, D.A. (2019). Studying and evaluating the performance of pedestrian crossing facilities in Babil governorate. *Scientific Review – Engineering and Environmental Sciences*, *28*(3), 417-431. https://doi.org/10.22630//PNIKS.2019.28.3.39

Figiel, E. & Leciej-Pirczewska, D. (2020). The way to limit emission – energy efficient buildings. The example of the largest facility in Poland in nearly Zero Energy Building standard. *Scientific Review – Engineering and Environmental Sciences*, *29*(1), 81-92. http://doi.org/10.22630/PNIKS.2020.29.1.8

Ferza, R., Hamudy, M.I.A. & Rifki, M.S. (2019). Tirtonadi Bus Terminal Services: An Innovation Derailed? *Jurnal Bina Praja*, *11*(2), 171-183. https://doi.org/10.21787//jbp.11.2019.171-183

Green Building Council of Indonesia [GBCI]. (2013). *Perangkat Penilaian Greenship* [*Greenship Rating Tools*]. Retrieved from: https://www.gbcindonesia.org/download//doc_download/125-ringkasan-greenship-nb-v1-2-id [access: 09.09.2020].

Hamurcu, M. & Eren, T. (2020). Electric Bus Selection with Multicriteria Decision Analysis for Green Transportation. *Sustainability*, *12*(7), 2777. https://doi.org/10.3390/su12072777

Hasiak, S. (2019). Access mobility to local railway stations: current travel practices and forecast. *Cybergeo: European Journal of Geography*. https://doi.org/10.4000/cybergeo.33488

Idicula, A.C., Syam., G.E., Joseph, E. & Harithamol, T.H. (2016). Improvisation of Nagampadam Bus Terminal. *International Journal of Science Technology & Engineering*, *3*(01/041), 237-241. Retrieved from: http://www.ijste.org/articles/IJSTEV3I1100.pdf [access: 15.05.2020].

Kuruvilla, R., Sreekumar, R., Valsalan, N., Nabeela M.M. & Kurian, T. (2018). Redesign of Existing Private Bus Terminal at Kothamangalam. *International Research Journal of Engineering and Technology*, *5*(3), 1430--1431. Retrieved from: https://www.irjet.net/archives/V5/i3/IRJET-V5I3322.pdf [access: 03.06.2020].

Notteboom, T. & Lam, J.S.L. (2018). The Greening of Terminal Concessions in Seaports. *Sustainability*, *10*(9), 3318. http://doi.org/10.3390/su10093318

Peraturan Menteri Perhubungan Republik Indonesia Nomor PM 132 Tahun 2015 tentang Penyelenggaraan Terminal Penumpang Angkutan Jalan [*Regulation of the Minister of Transportation of the Republic of Indonesia No 132 of 2015 concerning the implementation of road transportation passenger terminals*]. http://hubdat.dephub.go.id/km//tahun-2015/1818-peraturan-menteri-perhubungan-republik-indonesia-nomor-pm-132-tahun-2015-tentang-penyelenggaraan-terminal-penumpang-angkutan-jalan [access: 29.05.2020].

Purbaya, A.A. (2017-06-02). *Banjir Rob Genangi Terminal Terboyo Semarang*. Retrieved from: https://news.detik.com/berita-jawa-tengah//d-3518827/banjir-rob-genangi-terminal-terboyo-semarang [access: 20.05.2020].

Rahman, Y. A. & Munthoha, A. (2020-07-15). *Sempat Menurun, Jumlah Penumpang di Terminal Kudus Mulai Naik Lagi*. Retrieved from: https://www.murianews.com/2020/07/15/191843/sempat-menurun-jumlah-penumpang-di-terminal-kudus-mulai-naik-lagi.html [access: 11.09.2020].

Sedayu, A. (2017). Prioritas Peningkatan Pelayanan Terminal Tlogomas Kota Malang [Service Improvement Priority in Tlogomas Terminal Malang City]. *Warta Penelitian*

Perhubungan, 29(2), 191-200. http://doi.org/10.25104/warlit.v29i2.555

Sedayu, A. (2018). Pendekatan QFD Menggunakan Respon Teknis Untuk Peningkatan Pelayanan Terminal: Studi Kasus Terminal Tlogomas Kota Malang [The QFD Approach Uses Technical Response to Terminal Services Improvement: A Case Study of Malang City Tlogomas Terminal]. *Jurnal Penelitian Transportasi Darat*, *20*(2), 65-74. http://doi.org/10.25104/jptd.v20i2.631

Sedayu, A. (2019). Evaluation of Performance Satisfaction Level of Tawang Alun Green Terminal in Jember. *Advances in Engineering Research,* 186, 304-307. https://doi.org/10.2991/apte-18.2019.54

Sedayu, A. & Mangkoedihardjo, S. (2019). Housing Project Performance Evaluation with Review Sharia Construction Management. *Current World Environment*, *14*(2), 239-244. http://dx.doi.org/10.12944/CWE.14.2.08

Sedayu, A., Setiono, A.R., Subaqin, A. & Gautama, A.G. (2020). Improving the Performance of Construction Project Using Green Building Principles. *Asian Journal of Civil Engineering*, *21*(8), 1443-1452. https://doi.org/10.1007/s42107-020-00289-1

Stangel, M. (2019). *Airport City – an Urban Design Question*. Gliwice: Helion.

Sugiono, S., Nurlaela, S., Kusuma, A., Wicaksono, A. & Lukodono, R.P. (2020). Impact of elevated outdoor MRT station towards passenger thermal comfort: a case study in Jakarta MRT. *Scientific Review – Engineering and Environmental Sciences*, *29*(1), 93-107. http://doi.org/10.22630/PNIKS.2020.29.1.9

Tadic, S., Krstic, M., Roso, V. & Brnja, N. (2019). Planning an Intermodal Terminal for the Sustainable Transport Networks. *Sustainability*, *11*(15), 4102, 1-20. http://doi.org/10.3390//su11154102

Wan, L., Peng, Q., Wang, J., Tian, J. & Xu, C. (2020). Evaluation of Airport Sustainability by the Synthetic Evaluation Method: A Case Study of Guangzhou Baiyun International Airport, China, from 2008 to 2017. *Sustainability*, *12*(8), 3334, 1-18. doi: 10.3390//su12083334

Yasa, R.M. (2020-03-11). *Terminal Parkir Truk Terboyo di Semarang*. Retrieved from: https://kompas.id/baca/nusantara/2020/03/11//terminal-parkir-truk-terboyo-di-semarang [access: 12.05.2020].

Yapicioglu, B., Mogbo, O.N. & Yitmen, I. (2017). Innovative strategies for transport policies in infrastructure development: Nigerian stakeholders' perspective. *International Journal of Civil Engineering*, *15*(5), 747-761. http://doi.org/10.1007/s40999-017-0172-0

Summary

Developing Jati Kudus Terminal into a sustainable transportation infrastructure in Indonesia using the green concept. The Jati Kudus Terminal, which plays an important role as a public transportation node on the North Coast of Java Island, has experienced a continual decline in performance and service. This study aims to determine the effect of green terminal concept variables in the Jati Kudus Terminal using the multiple linear regression methods with SPSS 23. Data collection tool in the form of questionnaires distributed to respondents, namely terminal users who know the development of the Jati Kudus Terminal every day. The perception data used in the analysis is the level of interest and satisfaction with the service and performance of the Jati Kudus Terminal. The evaluation of terminal performance refers to the regulation of the Indonesian Minister of Transportation No 132 of 2015 on the operation of the road transport passenger terminals. The green concept of terminal buildings and facilities refers to the Green Building Council of Indonesia. The results showed that the variable of transportation service reliability, ticketing, and travel costs have the highest and the lowest average scores based on user importance and satisfaction, respectively. The other variables include: security guarantee and freedom from criminal acts; safety and health guarantee and freedom from accidents; responsiveness of the terminal manager in providing services; availability and capacity of supporting facilities; architectural aesthetics within and outside the buildings; ease of obtaining general travel information;

affordability and accessibility in and out of the terminal; the density of people and vehicles in the terminal area; comfort, regularity, and cleanliness; and application of environmentally friendly concepts on terminal and transportation facilities. Therefore, managers of the Jati Kudus Terminal need to repair and improve their services according to these 12 variables. The implementation of the green concept can develop Jati Kudus Terminal into a green terminal in Indonesia that serves as a node of sustainable and environmentally friendly public transportation.

Author's address:
Agung Sedayu
(https://orcid.org/0000-0002-2013-7683)
Maulana Malik Ibrahim State Islamic University
Faculty of Science and Technology
Gajayana 50, 65144 Malang City, East Java Province
Indonesia
e-mail: uinsedayu@gmail.com