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8th Asia Pacific Structural Engineering & Construction Conference (APSEC 2012)

1st International Conference on Civil Engineering Research (ICCER 2012)

2 - 4 October 2012 | Surabaya, Indonesia

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Sustaining the World with Better Structures and Construction Practice

Proceedings of the

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Sustaining the World with Better Structures and Construction Practices

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TRANSPORTATION INFRASTRUCTURE

APSEC 2012 *is an international conference focusing on topics related to structural engineering and construction. The 1st APSEC conference was held in 1989 in the historical city of Malacca. Since then the conference was held regularly at every three years and had attracted many researchers, academicians and engineers from local and abroad. The previous 7th APSEC 2009 was jointly organised with Universitas Pelita Harapan, Indonesia and was held at Awana Porto Malai, Langkawi, Malaysia. APSEC 2012 is organized to provide platform for exchanging ideas on latest advances in research and innovations, as well as state-of-the-art information in the fields of structural engineering and construction between scientists and engineers from both the academia and industries.*

ICCER 2012 *is a two yearly event aimed at establishing scientific link at international level, in order to share and disseminate valuable information on activities in Civil Engineering research in developing countries. The conference covers state-of-the-art Civil Engineering research in the field of structure, material, transportation engineering and management, water resource engineering and management, geotechnical engineering, construction engineering and management, education in Civil Engineering, design, experiment and construction regulations and other related Civil Engineering research issues. The conference offers opportunities to young researchers, postgraduate students and professionals to share ideas related to Civil Engineering research in developing countries. The conference also provides opportunities for future planning and initiative of collaborations and joint-venture research.*

*The theme "**Sustaining the world with better structures and construction practice**" expresses a wide range of issues to be discussed in the conference.*

This year conference is jointly organised by Faculty of Civil Engineering, Universiti Teknologi Malaysia, Malaysia and Faculty of Civil Engineering & Planning, Institut Teknologi Sepuluh Nopember, Indonesia.

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MESSAGE FROM CHAIRMAN OF THE APSEC 2012

APSEC is a conference that has been organized by the Faculty of Civil Engineering, UTM, after every three years. Beginning from APSEC-5 (2003), we organised this conference jointly with other institutions. For this conference, not only do we jointly organised with ICCER (ITS) but also the venue itself is outside Malaysia, i.e. in Surabaya Indonesia. The theme of today's conference is 'Sustaining the World with Better Structures and Construction Practice'. This theme was chosen with the hope that this conference will be able to generate creative and innovative ideas in addressing the current hot issues of green technology, sustainable materials, automation, disaster management, soil structure interaction, structural analysis, material behavior, composite structure particularly in the construction sector.

This conference has been well attended as well as successful. Our participants are from around the globe (Europe, Middle East, Africa, America, Australia, Malaysia and Indonesia). Hence this conference provides a good platform for discussion and forum for engineering professionals, academics and researchers to widen their knowledge and approaches in solving engineering problem and research. A total number of 130 papers were received and reviewed. Almost 90% were presented. This proceeding is divided into sixteen sections in two separate volumes according to discipline and area. The sections are Keynote, Construction and Environmental, Construction Management, Composite Structures, Disaster Mitigation, Earthquake Engineering, Engineering Education and Training, Industrialised Building System, Innovative Construction Materials and Material Behaviour, Non Destructive Testing, Structural Analysis and Design, Sustainable Construction and Building, Soil-Structures Interaction, Safety and Reliability and Transportation Infrastructure,

I would like to express my deepest appreciation, especially to our distinguished keynote speaker, Minister Ir. Djoko Kirmanto-Indonesia who officiated this conference. My appreciation also to all the keynote speakers; Prof. Dr. Eng. Yoshihiko Ohama-Japan (polymer concrete), Prof. Dr. Muhd Zaimi Abdul Majid-Malaysia (construction), Prof Dr. Wahid Omar-Malaysia (green campus), Prof Dr Pierino Lestuzzi-Switzerland (earthquake), session chairman and also to all presenters and participants for their contribution to this conference

I would like to extend my appreciation to the following organizations who have given support for this conference ; The Construction Industry Development Board Malaysia (CIDB), Public Works Department (JKR), Board of engineers (BEM), The Institution of Engineers Malaysia (IEM), Malaysian society for engineering and technology (MSET), Federation of engineering institution in Islamic countries (FEIIC), Malaysian highway authority (MHA), the Mayor from the city of Surabaya Indonesia, HK-PT HUTAMA KARYA (persero), Waskita, NK-PT NIDYA KARYA (persero), GEOSISTEM, Public works ministry of Indonesia. Thank you to our partner ICCER from the Department of Civil Engineering, Faculty of Civil Engineering & Planning, Institut Teknologi Sepuluh Nopember (ITS).

Special thank you to all APSEC organizing committee, the International Advisory and Technical Committee for their time and effort put forth to ensure the success of this conference. To all delegates and participants I wish you beneficial sessions throughout the conference and a pleasant stay in Surabaya, Indonesia.

PROF. DR. MOHAMMAD BIN ISMAIL
Universiti Teknologi Malaysia

FORWARD

MESSAGE FROM CHAIRMAN OF THE ICCER 2012

Assalamu'alaikum Wr. Wb.

It is my pleasure to conduct the Joint Conference of the 1st International Conference on Civil Engineering Research (ICCER) and the 8th Asia Pacific Structural Engineering and Construction (APSEC) 2012 in Mercure Grand Mirama Hotel, Surabaya, Indonesia at 2-4 October 2012.

I would like to extend my warmest regards to all of the distinguished participants, especially those who have travelled long distances to be present in Surabaya. Welcome to Indonesia, especially welcome to the heroic city of Surabaya, which has a high spirits of creation and innovation.

This joint conference is an event aimed for establishing a scientific link at international level, in order to share and disseminate valuable information on activities in Civil Engineering under the theme of Sustaining the World with Better Structures and Construction Practice. The conference covers state-of-the-art Civil Engineering research in the field of structure, material, transportation engineering and management, water resource engineering and management, geotechnical engineering, construction engineering and management, education in Civil Engineering; and other related Civil Engineering research issues: such as design, experiment and construction regulations.

I believe that that the conference will provide an opportunity for participant to disseminate new knowledge, and to share recent experiences, as well as new practices, technologies, and related codes.

In closing, I would like to once again extend my gratitude to all the participants and I look forward to a most successful and fruitful conference. Your contribution to this conference is highly appreciated.

Thank you for your attention. God bless all of you.

Wassalamu'alaikum Wr. Wb.

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Design of Minimum Services Standard of Public Transport Terminal Infrastructure in Indonesia

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***Abstract*— Determination of minimum service standards (MSS) has been carried out by the government of Indonesia as a commitment to serve people in all development sectors. One of that commitment to determine a MSS in transport infrastructure sectors, especially public transport terminal. Public transport terminal for passengers to date still not have a MSS. Law, Code, Government Regulation, Minister of Transportation decision, and other policies had not made more detailed and complete to provide guidance on terminal minimum service. This study suggests a contextual and conceptual discussion about design of a MSS which refers to previous studies and MSS in other sectors that had been made in Indonesia. Significance of a MSS for terminal was needed, because many passenger terminals in Indonesia had a low performance, ineffective and inefficient. The Result of this study is services indicators and service improvement prioritization of public transport terminal with customer involvement.**

Keywords: design of a MSS, transport terminal Infrastructure.

I. INTRODUCTION

The Indonesia government had effort to meet commitment to serve people completely. This is evidenced by establishment of government policies of minimum service standards in all development sectors, including transport infrastructure sector for national and local area. Passenger terminal is part of transport infrastructure still not have minimum service standards. Government policies on the terminal such as law, government regulation, minister of transportation decision, and other policies that have not been detailed and complete set up and provide guidance on passenger terminal minimum service. Along with declining in the performance and effectiveness of the terminal, The public transport services are also lower [1]. This conditions need improvement, because transportation infrastructure effect on macros transport system that are needed by community [2]. This research was motivated by number of studies and planning for terminal on technical aspects only, and did not consider user or customer parameters that are terminal passenger, sometimes terminal has been designed by good technically, but still not satisfying customer. This study aims to establish a minimum service standards (MSS) of public transport terminal are still not detailed as set out in the Minister of Transportation Decision no. 31/1995 about Road Transport Terminal [3], which only provides an explanation, definition, and classification of terminal facilities and the general outline that must be owned by terminal. The novelty of this study in terms of setting minimum service standards (MSS) of terminal according to perception and needs of customers who called voice of customer, because the study of the existing terminal is only to evaluate and design the terminal use technical aspects only, without regard to customer needs and desires. The Issues in this review are :

1. What kinds of variables of public transport terminal services in Indonesia according to customer needs and wants?
2. How does the priority to improve service quality of public transport terminal in Indonesia according to customer needs and wants?
3. How do the variables influence public transport terminal services in Indonesia according to customer needs and wants on services quality that had been provided?

II. METHOD

This study suggests a contextual and conceptual discussion to arrange the design of a MSS of transport terminal which is based on previous studies and other MSS techniques with adopted services variables and method of determining priority of terminal service according to customer perception. Methods for identify variables with terminal services to customers through a preliminary survey to obtain voice of customer and use Importance Performance Analysis (IPA), to determine the priority of improving service quality use Quality Function Deployment (QFD), and to determine the degree of influence these variables on service quality use Structural Equation Modeling (SEM). Survey respondents

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were customers and terminal organization. Customers who use terminal to be classified as passenger, commercial areas tenant, and public transport operators. The location of this study on three city in Indonesia that are Surabaya, Malang, and Kediri.

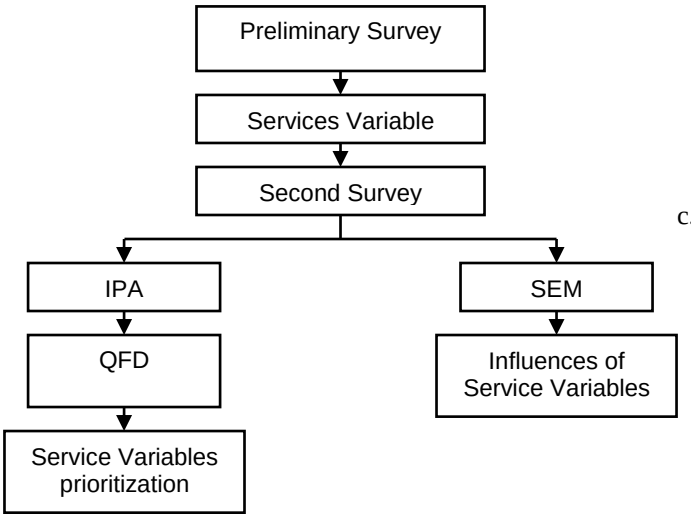

Fig 1. Research method development

The research method development is shown in Figure 1. To know the priority of the terminal service variable according to customer and organizer can arrange house of quality (HOQ) that is part of QFD analysis as shown in Figure 2. Figure 3 shows the path diagram of SEM analysis to determine influence levels of each service variable.

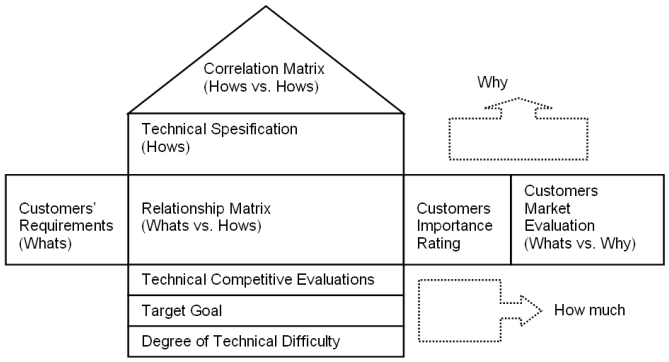

Fig 2. House of quality (HOQ) in QFD

Terminal services variables are supported by several indicators. These variables were divided into four sections, namely:

1. Management and organization with these indicators: Performance, Security, Easily, and Responsiveness.
2. Transport technical and facilities with indicators: Performance, Aesthetics, convenience, Reliability, Durability, Frequency, and Leisure
3. Service quality contains indicators : Reliability, Responsiveness, and Security
4. Customer satisfaction with indicators : Assurance, Responsiveness, Performance, Aesthetics, convenience, Reliability, Durability, Comfort, and Frequency

This research use disproportioned stratified random sampling, which is sampling from population members at random and stratified, but some are less proportional [4]. The following description of the stakeholder to become sample target and information source for interviews,

1. User include :
   a. Passengers who regularly or frequently use terminal.
   b. Passengers who rarely use terminal.
   c. Tenant who use commercial facilities such as kiosks, travel agents, shops, and restaurants.
   d. Public transport operators

2. Organization, management, and related institution, comprising:
   a. Terminal Management Organization
   b. Department of Transportation
   c. Department of Public Works
   d. Department of Urban and Regional Planning
   e. Regional Development Planning Board

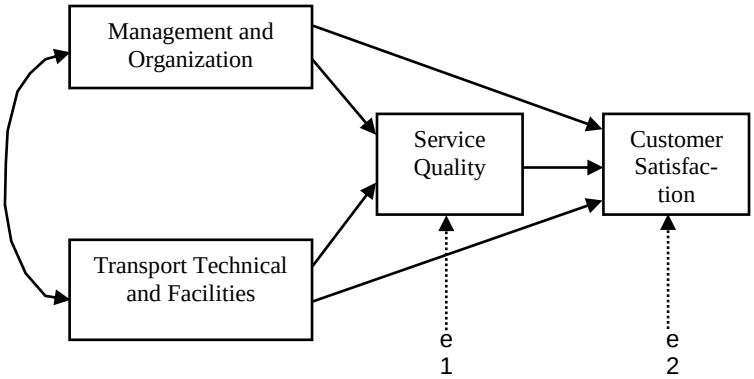

Fig 3. Path diagram model in SEM analysis

The reasons of using this sampling type, because the elements characterized are heterogeneous sample or population, and the heterogeneity have significance to achieve research goals. To determine samples by using Bernoulli formula:

$$N \geq \frac{\left(Z_{\alpha/2}\right)^2 p.q}{e^2} \qquad (1)$$

Where :
N = minimum number of samples
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%, so the minimum number of respondents :

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$N \geq \frac{(1,96)^2.0,95.0,05}{(0,05)^2} \rightarrow N \geq 72,99 \approx 73$ respondents

To avoid lack of data due to improper charging or questionnaire not to be return, so it's used:

• Terminal Type A : 73 + (50% x 73) = 110 respondents.

• Terminal Type B : 73 + (10% x 73) = 81 respondents.

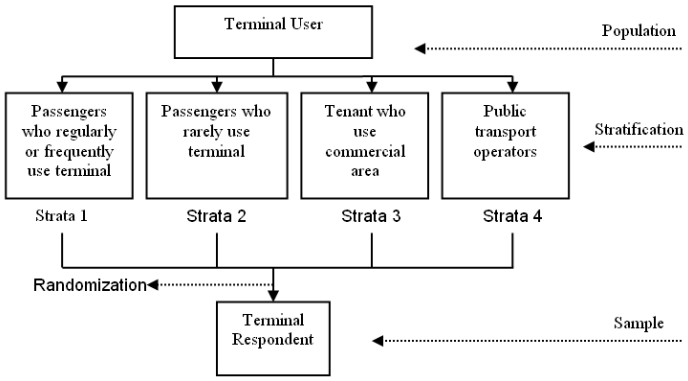

Fig 4. Stratified random sampling technique of terminal user

Figure 4 describes the stratified random sampling and disproportionate to terminal user. Respondent consisting of management and related institution adapt to requirement and willingness to develop technical response and technical characteristics as an answer to needs, interests, and user satisfaction on terminal service quality.

III. RESULTS

Codes or rules that already exist in Indonesia, which gives a description and explanation of terminal such as the Law of Republic of Indonesia no. 22/2009 about Traffic and Transportation [5], Regulation of Government of Indonesia no. 43/1993 about Infrastructure and Traffic [6], Minister of Transportation Decision no 31/1995 about Transport Terminal [3]. The third rules grouped passenger terminal into :

1. Type A, has function to serve public transport for inter-city and inter-provincial transportation, state boundary transportation, transportation between cities in the province, and urban and rural transportation;
2. Type B, has function to serve public transport for transportation between cities in the province, and urban and rural transportation;
3. Type C, has function to serve rural transportation.

This study will assess terminal type A and B, because both terminals in Indonesia called main terminal. Many variables from previous researches is shown in Table 1. These variables are taken in accordance with the conditions in Indonesia and added to the variable that comes from the voice of customer.

TABLE 1.VARIABLES FROM PREVIOUS RESEARCHES

No	Researcher	Year	Indicators
1	Constantine [7]	1999	Security, information, availability, and aesthetics
2	Dragu, et al [8]	2001	Security, reliability, frequency, accessibility, commodities, information, comfort, and aesthetics
3	Trogisch [9]	2001	Location
4	Rauf [1]	2002	Completeness and facilities condition, comfort, and security
5	Sholichin, et al [10]	2005	Space and site area
6	Purba [11]	2009	Facilities and management, accessibility, roads service levels, security and environmental comfort.
7	Weningtyas, et al [12]	2009	Reliability, physical aspects, and responsiveness.
8	Pati, et al [13]	2009	Time, place flexibility for ticket payment, safety maintain of passengers and goods, and easy to get telephone service
9	Jarsemskiene [14]	2009	Time, efficiency, cost, responsiveness, and accessibility
10	Saputra, et al[15]	2010	Time of arrival and departure, information services systems, luggage workers, road conditions, and terminal facilities.

The services variables as shown in Table 1 are grouped into eight dimensions of quality [16], include:

1. Performance is a good level of consistency and product functions.
2. Aesthetics are associated with the appearance of product and facilities, equipment, personnel, and communication materials related to the services.
3. Service ability related to improve the product easily.
4. Features are the product characteristics are functionally different from similar ones.
5. Reliability is the probability of the product or service within a certain period.
6. Durability is the useful life of the product.
7. Quality of conformance is a parameter show that a product or service meets determined specifications.
8. Fitness for use is the suitability of product performance its functions as well as advertised or promised.

Variable operational framework based on service quality improvement goals by meeting customer needs. If the customer needs are met, the customer satisfaction will be met too. If not, it is necessary to repair terminal services variable. Flowchart of the operational framework of this research is shown in Figure 5.

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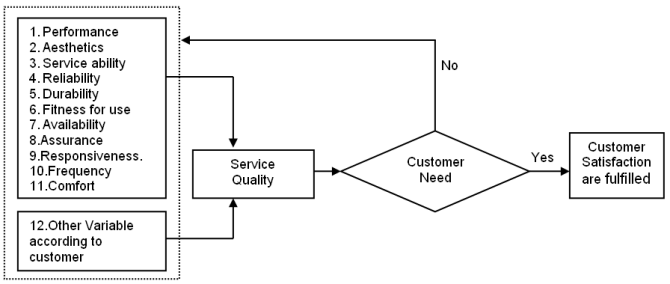

Fig 5. Operational framework of the service variables

IV. DISCUSSION

Terminal is one of the transport infrastructure serve transfer of passengers and goods by public transport. Terminals were supported by facilities which are prepared to serve its customers. Performance Based Design of Buildings (PeBBu), Final Report Domain, CIBdf 2005 [17], provided definition and performance based development on infrastructures or facilities system, include building, bridge, open space facilities, roads, terminals, and others. The main framework of this study based on performance concept according to PeBBu as shown in Figure 6. The demand aspects are user languages that are defined functional need to be translated to performance language for required facilities or products. The supply aspect can be obtained by solution form for the technical specification that ultimately to produce performance specifications with process of measurement, calculation, and simulation. This process creates performance specifications. Two performance languages, demand and supply are matched or compared for the suitability or similarity.

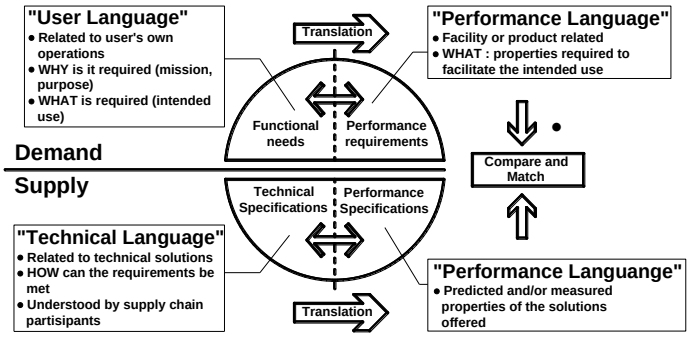

Fig 6. Performance languages Between Two Parameters
Source: Spekkink, 2005 [17]

The design of a minimum service standard on passenger terminal may refer to the Minimum Service Guidelines belongs Land Transportation Sub Sector and System Development of Traffic and urban transportation in Indonesia [18]. The contents of the guidelines define that is:

1. Passenger and cargo terminal management includes planning, implementation, and monitoring of terminal operations. For the passenger terminal as follow :
   a. Management
      1. Terminal operational planning, include:
         - Terminal space arrangement according to routes
         - Arranging facilities for passenger
         - Arranging terminal facilities
         - Designing traffic flow in terminal control area
         - Providing information board about travel routes and transport tariffs
         - Preparing officers schedule in terminal
         - Evaluating terminal operation system

      2. Terminal operational activities include:
         - Setting waiting room and traffic flow in terminal
         - Inspecting monitoring card and itinerary
         - Setting arrival and departure according to determined schedule.
         - Taking payment from terminal services
         - Notifying departure and arrival of public transport to passengers
         - Arranging traffic flow in terminal control area
         - Recording and reporting all violations
         - Record vehicles and passengers coming and leaving.

      3. Terminal Operational Control, include:
         - Transport fares
         - Eligibility of vehicles operational
         - Maximum capacity allowable
         - All service by transport service providers
         - Utilization of terminal and supporting facilities according to the function

   b. Maintenance
      Terminal maintenance activities include:
      Maintaining durability and cleanliness of terminal building
      - Maintaining durability and cleanliness of terminal equipment, signs, and information boards.
      - Keeping aqueduct and waterways
      - Keeping electrical and lighting installations
      - Maintain communication tools
      - Maintain hydrant systems and fire extinguishers

   c. Controlling
      Passenger terminal has controlling to activities that may interfere with terminal functions.

2. Operation of passenger terminal information system include:
   a. The number and type of route will be served
   b. Realization of travel route, passengers, and public transport per time unit

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c. The number and type of transportation violations
d. Passenger terminal retribution income

Operation of passenger terminal must be completed with information facilities to the public include:

a. List of travel routes and transport fares
b. List of travel schedule
c. Picture or terminal layout map with the traffic circulation system within and around the terminal
d. Signs and road markings.
e. Exit and entry passenger signage
f. Complaint boxes.

3. Human Resources (HR)

Human resources (HR), which conduct a passenger terminal operations include:

- The technical officer who has responsibilities on road transportation and traffic.
- Other officers who assist implementation of operational activities, namely: cleaning service, security, and officers who manage retribution.

5. CONCLUSION

The Minimum service standards (MSS) for passenger terminal can be assessed by the two techniques according to PeBBu include technical studies and information collecting about user wants and needs. Technical review can be done to find terminal capacity, parking capacity, vehicle queuing, public transport scheduling, and others. While user language can be obtained by brainstorming method to explore desires, interests, and users satisfaction. From this information, we obtain service indicators and attributes according to user requirements. Attributes and indicators that can be considered in a minimum service of passenger terminal include security, safety, convenience, accessibility, equity, and regularity. The indicators refer to a MSS formulation of public transport, because the existing indicators and attributes can be used to measure or evaluate terminal service quality for the future. Improvement priorities of terminal services must considered customer requirement and level of importance. Service variable has influence to service quality of transport terminal with direct and indirect effects. This influence can be modeled by Structural Equation Modeling (SEM).

REFERENCES

1. Rauf, Nurhayati. Application of Quality Function Deployment in Improving Public Transport Terminal Services Quality: A Case Study In Public Transport Sungguminasa Gowa Terminal - Indonesia. Postgraduate of Industrial Engineering of Sepuluh Nopember Institute of Technology, Surabaya - Indonesia, 2002, pp.1-3
2. Tamin, Ofyar Z. Planning, Modeling, and Transportation Engineering: Theory, Problem Example, and Applications. Bandung Institute of Technology - Indonesia, 2008, pp.62
3. Anonymous. Minister of Transportation Decision no. 31/1995 about Transport Terminal. Jakarta-Indonesia: Ministry of Transportation. pp.3
4. Riduwan. , A Thesis developing methods and techniques. Alfabeta, Bandung Indonesia, 2004, pp.59
5. Anonymous. The Law of Indonesia no. 22/2009 : Road Traffic and Transportation, pp.22
6. Anonymous. Regulation of Government of Indonesia no. 43/1993 about Infrastructure and Road Traffic. Jakarta: Ministry of Transportation, pp.13
7. Constantine, KOH. An Exploratory Study Into The Desired Amenities In Public Transport Terminals By Central Business District Workers. MMUTIS Technology Report, School of Urban and Regional Planning, University of the Philippines, 1999, pp.1-15
8. Dragu, V, et al. Service Quality in Terminal Joining Magistral and Urban Transport. Transportation faculty, Politehnica University of Bucharest, Romania, 2001, pp.1-7
9. Trogisch, Steven. Quality Function Deployment as a Decision Support Tool for the Sustainable Facilities Impelementation of AD. Energy Marie Curie Fellowship Conference Profactor GmbH, Steyr, Austria, 2001, pp.1-12
10. Sholichin, Ibnu. et al. Analysis of Capacity and Level of Service In Bojonegoro Rajekwesi Terminal. National Seminar on Planning and Engineering V Postgraduate of Veteran National Development University, Surabaya-Indonesia, 2005, pp.1-10
11. Purba, Djamahaen. Priority Analysis of Influencing Factors on Sarantama Terminal Effectiveness. Posgraduate of North Sumatera University, Medan-Indonesia, 2009, pp.80
12. Weningtyas, Widyarini., et al. Evaluation of a Minimum Service Standards (MSS) for Toll Road Infrastructure. Petra Christian University, Surabaya -Indonesia, 2009, pp.6
13. Pati, Rhony., et al. Passenger Perceptions on Service Quality of Travel Routes of Muara Teweh, Banjarmasin city. Petra Christian University, Surabaya-Indonesia, 2009, pp.1621-1633
14. Jarsemskiene, Ilona. Research Into The methods Of Analyzing Productivity Indicators of Transport Terminals. Transport Research Institute, Vilnius Gediminas Technical University Lithuania, 2009, pp.1-9
15. Saputra, M. et al. User Satisfaction Analysis on Service Performance of Metro Makassar Terminal. Postgraduate of Civil Engineering of Sepuluh Nopember Institute of Technology, Surabaya - Indonesia, 2010, pp.1-11
16. Wijaya, Tony. Services Management Quality: SERVQUAL Design, QFD and Kano with Application in Research Cases. Index, Jakarta-Indonesia, 2011, pp.13-14
17. Spekkink, Dik. Performance Based Design of Buildings, Final Report Domain, CIBdf, Netherlands, 2005, pp.18-20
18. Anonymous. Minimum Service Standard Guidelines for Road Transport Sub-Sector and System Development of Traffic and Urban Transportation. Jakarta: Ministry of Transportation, 2001, pp.6-14

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APSEC 2012 is an international conference focusing on topics related to structural engineering and construction. The 1st APSEC conference was held in 1989 in the historical city of Malacca. Since then the conference was held regularly at every three years and had attracted many researchers, academicians and engineers from local and abroad. The previous 7th APSEC 2009 was jointly organised with Universitas Pelita Harapan, Indonesia and was held at Awana Porto Malai, Langkawi, Malaysia. APSEC 2012 is organized to provide platform for exchanging ideas on latest advances in research and innovations, as well as state-of-the-art information in the fields of structural engineering and construction between scientists and engineers from both the academia and industries.

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