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MANAGEMENT OF PUBLIC TRANSPORTATION PERFORMANCE MODEL BASED ON SAFETY TRANSPORTATION, PERIODIC TRANSPORTATION TEST, BEHAVIOR, AND SATISFACTION IN CIREBON CITY

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ABSTARCT

The development of cities in Indonesia is marked by the high number of commuters (commuters) who travel between the main city and the surrounding city or district (hinterland) or between regions within a city due to an increase in population, population activities, types of services, and the relative functioning of the economy national and regional level of a country..

Transportation problems and challenges are multi-dimensional between transportation systems and urban systems, both operational, management and policy aspects. Urban transport policies that care about sustainable development in developing countries are very complex, but can be studied especially in the public transportation system because it is more possible when compared to private transport at this time.

In Indonesia, the number of motorized vehicles is increasing every year. The addition of that number in 2012 reached 10,036 million units, resulting in the population recorded in the Indonesian National Police increased 12% to 94.292 million units compared to only 84.19 million in 2011 (Kurniawan, 2013). Based on data from the National Police also stated that in 2012 there were 109,038 accident cases with 27,441 people died. Different data from the Coordinating Ministry for Economic Affairs and People's Welfare of the Republic of Indonesia states that motorcycle rider accidents have reached 120,226 times or 72% of all traffic accidents in a year. Most accident cases occur in people with lower middle economic level as motorcycle and public transportation users (State Intelligence Agency, 2013).

As released by WHO (World Health Organization), of all accidents that occur on the highway, the human error factor (human error) has the highest contribution, reaching between 80-90 percent compared to the factor of vehicle vehicle improperities ranging from 5-10 percent, as well as due to damage to road infrastructure by 10-20 percent (DG Hubdat, 2010). Vehicle facilities that often occur are less than 1 millimeter of tire grooves resulting in vehicle skid or tire breaks, brakes failing, metal fatigue resulting in broken vehicle parts, worn equipment not replaced, and various other causes. This is very much related to the technology used and the care done to the vehicle. One of the government's efforts to improve road safety is through safety vehicle action programs such as compliance with vehicle operations, organizing periodic and type test repair procedures, handling overloading, vehicle scrapping, and developing motor vehicle design that aims to improve vehicle safety technology (DG Hubdat, 2013).

Keyword: Transportation Performance, User Satisfaction.

I. INTRODUCTION

3.1. BACKGROUND

Transportation has a strategic role in supporting national development and integration as part of efforts to advance public welfare as mandated in the Preamble of the 1945 Constitution of the Republic of Indonesia. Road transportation as part of the National Transportation System has a very important role with regard to the distribution of population, goods or animals in order to support the smooth running of government activities, economic development, and regional development. The rapid population growth and the increasing need for transportation services require an increase in the element of safety in the provision of transportation services both quantitatively and qualitatively.

Strategic steps to improve road transportation safety in order to help create a zero accident condition include implementing safety guarantees for the use of transportation facilities to meet the technical requirements and roadworthiness of vehicles. In connection with the guarantee of security and technical safety for the use of motorized vehicles on the road, it is necessary to conduct a careful vehicle testing and carried out by professionals who are in accordance with applicable regulations. Therefore, the implementation of motorized vehicle testing should be able to become one of the counterbalancing or negative impact forces caused by technological advances in the transportation sector.

3.1. PROBLEM IDENTIFICATION

Cirebon City consists of 5 subdistricts, 22 villages and has an administrative area of ± 37,358 km² (Badan Pusat Statistik, 2006), directly adjacent to Cirebon Regency.

The development of the number of motor vehicles has an impact on the level of traffic density every day in the Cirebon City. In the period of 2012 the number of motor vehicles increased to 164,953 units compared to 2011 of 151,065 units. This is an increase in the number of potential motorized vehicles recorded at West Java Provincial Dispenda Service Branch Office Cirebon City Region by 13,888 units or around 9,193% (Samsat, 2013). The increase in the number of vehicles has resulted in traffic

congestion which is often found on almost every road, especially during rush hour and increasing traffic accidents.

The number of traffic accidents in the city of Cirebon in 2012 reached 231 events with 53 fatalities. The number of accidents has jumped dramatically to 129 incidents or an increase of about 126.47% compared to last year which only occurred 102 events with 31 fatalities (Unit Laka Lantas, 2013). Accident prevention and handling is a multi-sectoral activity, which requires the interaction of all transportation components, both the infrastructure system, facilities, environment, and the users of transportation itself.

Increasing the number of motor vehicles and increasing the number of traffic accidents is one of the problems that needs to be done by a study. In addition, an assessment of the technical conditions and road worthiness of motor vehicles and the performance of motorized vehicle testing systems needs to be done in reducing events and controlling accident rates.

In this regard, the main problem in this study is "**How is the Public Transportation Performance Management Model Based on Transportation Safety, Vehicle Periodic Tests, User Behavior and Satisfaction in Cirebon City**".

3.1. PROBLEM FORMULATION

Based on the background and indication of the problem, the formulation of the problem that becomes the research question is as follows:

1. How is the performance of public transportation in Cirebon City based on transportation safety factor?
2. How is the performance of public transportation in Cirebon City based on the vehicle periodic-test factor?
3. How is the performance of public transportation based on user behavior factors?
4. How is the performance of public transportation based on user satisfaction factors?
5. What is the public transport performance model based on transportation safety factors, periodic vehicle tests, user behavior, and user satisfaction in Cirebon City?

3.1. PURPOSE AND OBJECTIVE

The purpose of this study is to examine the performance of passenger public transport based on transportation safety factors, periodic tests of vehicles, user behavior, and user satisfaction in the Cirebon City.

The specific objectives are:

- a. Assess the current non-bus passenger public transport route/route performance based on transportation safety factors.
- b. Review and analyze the performance of public transportation in the city of Cirebon based on periodic vehicle testing.
- c. Review and analyze public transport performance based on user behavior factors.
- d. Review and analyze public transport performance based on user satisfaction factors.

3.1. SCOPE OF PROBLEM

To be more targeted, this study is limited by the following matters:

- a. The performance evaluation of the current public transport route/route pattern of passengers based on transportation safety factors, periodic tests of vehicles, behavior, and satisfaction of transportation users in the city of Cirebon is only in the existing conditions and the opinions of the experts in this research as respondents.
- b. This research conducts quantitative research, and is complemented with qualitative data/information.

II. LITERATURE REVIEW

2.1. City Structure and Movement System

Urban areas are inhabited by many residents in a relatively limited area. Urban problems will increase along with rapid economic growth. Although the structure of the city seems irregular, it has a certain pattern of regularity. City structure theories are used to study the form of land use which usually consists of land use for housing, business, industry, agriculture and services, this will affect the pattern of movement and distance. (Koestoeer, et al, 2001: 32).

The first model is the concentric zone proposed by EW Burges which describes the city

structure as a pattern of five concentric circle zones. Where the dynamics of urban development will occur with the expansion of the zone in each circle. The first zone forms the location of the central activity or Central Business Distric (CBD), generally a social, economic, cultural and political activity, this is identified by the existence of transport routes from all directions that are centered to this zone so that it is a zone with a high level of accessibility that is Burges considered by "the area of dominance".

Next is the transition zone with mixed land use, both housing and supporting facilities, has a developmental character that can change according to the needs of the city. The third zone, if the condition of the city is an industrial city, then the land use can be transformed into labor housing. Land use patterns formed in this model and the distance to each center will form a variety of movement patterns. Closer distance to the central location is an influential factor in choosing an area. For details, the city structure model above can be seen in **Figure 2.1**.

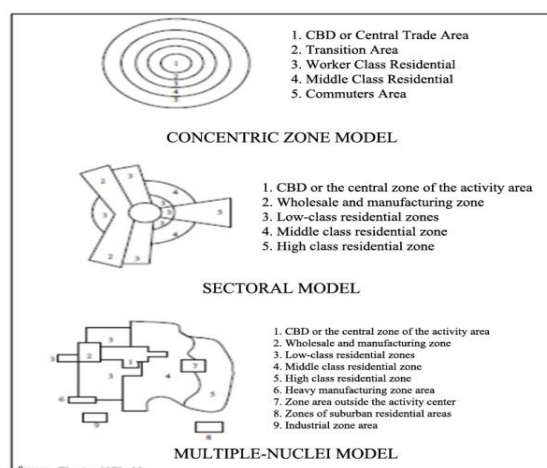


Figure 2.1. City Structure Model

The pattern of urban development can be influenced by certain topographical conditions or socioeconomic developments, such as: diffuse patterns, parallel patterns and clump patterns.

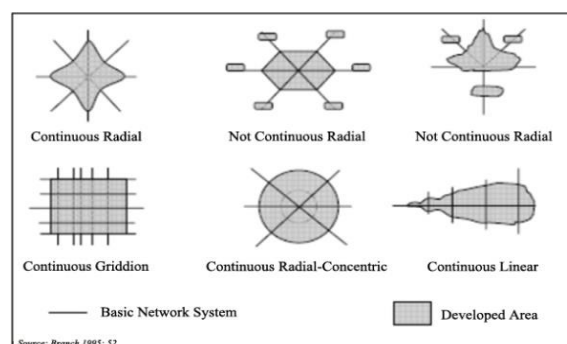
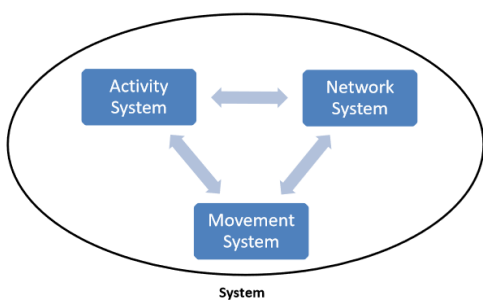


Figure 2.2. General Pattern of Urban Development

2.2. Transportation System

The transportation system is a system that functions to move people or goods from one place to another in an effort to overcome geographical and topographic barriers.

In broad terms (macro) the study of transportation systems consists of several smaller (micro) system components, interrelated and interrelated. While the micro transportation system itself according to Tamin (2000: 28), consists of several systems such as: activities, transportation infrastructure networks, traffic and institutional movements.



Source: Tamin, (2000)

Figure 2.3. Macro Transportation System

2.3. Individual Selection Behavior in Transportation

In general consumer behavior the emphasis lies on the decision process of buying products or services, then in the selection of trips the emphasis is on the process of choosing. Travel agents are usually faced with some of the most prominent alternatives are what service products or modes of transportation will be used in traveling. In examining travel behavior, Gleave (1991) distinguishes elements that are external (such as perceptions, attitudes, preferences). The process that underlies travel behavior is shown in Figure 2.4.

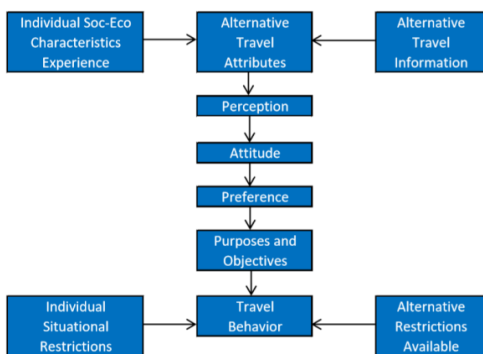


Figure 2.4. Individual Travel Behavior (Manheim, 1979)

2.4. Public Transport Performance

To find out the performance of public transportation, there are several elements that can be used as a reference and describe the expected characteristics of transportation as determined by the government in this case the Ministry of Transportation in terms of both quantity and quality of transportation, as in the following table:

Table 2.1. Public Transportation Service Standards Indicators Departement of Transportation

| Scale | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|-------|-------|-------|------|-------|------|-------|-----|--------|-------|-------|
| 1 | >1 | >1 | <5 | >15 | >12 | <13 | <4 | <82 | >30 | 05-18 |
| 2 | 0,8-1 | 0,7-1 | 5-10 | 10-15 | 6-12 | 13-15 | 4-6 | 82-100 | 20-30 | 05-20 |
| 3 | <0,8 | <0,7 | >10 | <10 | <6 | >15 | >6 | >100 | <20 | 05-22 |

Source: Directorate General of Land Transportation

Value Remarks:

1. For service standards with less criteria
2. For service standards with moderate criteria
3. For service standards with good criteria

Explanation of the table is:

Column 1 the average load factor (loadfactor) during peak hours, is the ratio of the number of users of public transport to the seating capacity available during peak hours.

Column 2 the average load factor (loadfactor) outside rush hour, is the ratio of the number of users of public transport to the seating capacity available outside peak hours.

Column 3 average travel speed (km/h), is the time taken to take a route from beginning to end.

Column 4 average time between/headway, is the time interval required to get one DAMRI bus to the next bus. The time unit used is minutes.

Column 5 average travel time, is the time required to cover one kilometer of the length of the route, the unit used minutes/km.

Column 6 service time (hours), is the time required by the DAMRI bus to provide services to users from the beginning to the end of the operation.

- Column 7 frequency, is the number of DAMRI buses operating during certain intervals.
- Column 8 the number of vehicles operating (%), is the percentage of the number of vehicles operating with the number of vehicles permitted.
- Column 9 is the average passenger waiting time (minutes), is the average waiting time needed to get a bus. This waiting time is 1/2 of the headway or the time interval required to get DAMRI bus transportation from one bus to the next.
- Column 10 beginning and end of service time, is the average travel time needed by the bus from the beginning to the end of the operation.

testing, user behavior, and public transport user satisfaction statistically and modeling with Partial Least Square (PLS)

- c. A search of literature is needed as an attempt to understand the basic theories that support the objectives to be achieved in research. As a reference and comparison, a review of previous studies is also provided that has a similar theme or has similarities in the subject matter.
- d. Data is collected from related agencies such as the Department of Transportation, DGH, BPS, and so on.
- e. The data obtained is then processed. The data that has been processed is then analyzed using statistical methods (PLS) which have been selected from various libraries taken as research reference material.

The total weighted values for public transport service performance standards are as follows:

Table 2.2. Transport Service Standards Based on Weight Weights

| No | Criteria | Total Weight Value |
|----|------------------------|--------------------|
| 1 | Good | 18.00 - 24.00 |
| 2 | Satisfactory | 12.00 - 17.99 |
| 3 | Less than Satisfactory | < 12.00 |

Source: Directorate General of Land Transportation

III. METHODOLOGY

3.1. Research Thinking Flow

The flow of thought based on the above schema can be explained as follows:

- a. The background of the research is the importance of an objective and accurate assessment of the performance of public transport based on transportation safety factors, motor vehicle testing, user behavior, and public transport user satisfaction. With this assessment known performance and user characteristics based on the variables used.
- b. From the background then the research objectives and objectives were formulated. Among the aims and objectives of the study is to find out how the performance of public transportation based on transportation safety factors, motor vehicle

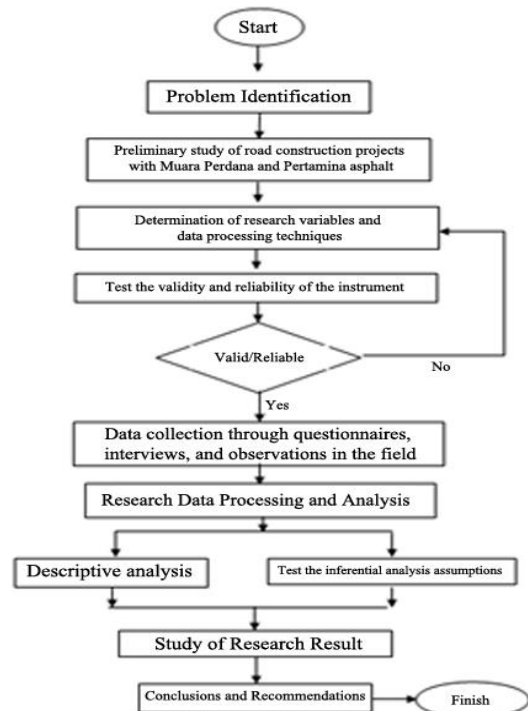


Figure 3.1. Research Methodology

3.2. Data

The data in this study consisted of primary and secondary data over the past 5 years.

- a. **Primary Data**
Primary data includes data on technical quality and characteristics of public transport services. The data includes the results of the public transportation performance questionnaire, transportation safety questionnaire, motor vehicle testing, user behavior, public transport user satisfaction, and so on. Primary data were

obtained from surveys in the field using the questionnaire method or direct interviews with respondents of experts, people who are experienced with road works, or the general public.

- b. Secondary Data
Secondary data includes data on service costs or public transport maintenance, annual maintenance costs, total traffic, etc.

3.3. Research Variables and Instruments

Table 3.1. Research Variables and Parameters

| No. | Variables | Parameters | Measurment Unit |
|-----|-----------------------------------|---|------------------|
| 1 | Transportation Safety | Comparison between the number of accident events against the number of vehicle movements and the number of passengers | Likert Scale 1-5 |
| 2 | Public Transport Vehicle Testing | Testing of motor vehicles in Cirebon City | Likert Scale 1-5 |
| 3 | User Behavior | Public transport user perceptions about travel attributes | Likert Scale 1-5 |
| 4 | User Satisfaction | Public transport user satisfaction perception | Likert Scale 1-5 |
| 5 | Public Transportation Performance | Weighting of public transport performance | Likert Scale 1-5 |

Table 3.2. Likert Scale

| Scale | Expectation Level | Performance Level |
|-------|-------------------|-------------------|
| 1 | Not Important | Not Satisfied |
| 2 | Less Important | Less Satisfied |
| 3 | Quite Important | Quite Satisfied |
| 4 | Important | Satisfied |
| 5 | Very Important | Very Satisfied |

Source: Sugiyono (2009).

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