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Analysis of Prioritized Strategy For Transportation Demand Management

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ABSTRACT

Background: The development of a city will always be followed by the development and growth of the transportation sector, so that the problems in this transport sector will always overshadow the development of an urban area. The transportation problems are not only about comfortability, other things in the transportation system should also be considered (e.g. density, congestion, delays, parking system, etc.). Objective: This study would formulate the alternative concepts of public participation which are obtained from the indicators of public participation variable. The selection of alternative concepts appropriate with public participation in the implementation of transportation need management was done by using the hierarchical analysis method for expert (expert choice) and stated preferences approach for the public transport passengers. Results:the results of the analysis stated that there were three attributes for that can be used in transportation demand management (TDM) strategy, namely public transportation improvement, traffic constraints, and ride-sharing. Based on the the results of AHP analysis, it is ideal to implement TDM based on public participation. Based on the results of AHP analysis, it was known that the three variables used are public transportation improvement, traffic constraints, and ride-sharing Conclusion: The results based on the AHP analysis showed that it is realized that the three variables used as the parameters for transportation needs management in City of Malang and Surabaya, such as public transportation improvement, traffic constraints, and ride sharing.

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INTRODUCTION

The development of a city will always be followed by the development and growth of the transportation sector, so that the problems in this transport sector will always overshadow the development of an urban area. The problems are not only about comfort, other things in the transportation system should also be considered (e.g. density, congestion, delays, parking system, etc.). In addition, the problems related to the transportation may also cause environmental pollution through increased exhaust gases from the vehicles—this is a form of wasting energy.

The imminent growing number of vehicles is one of indicators of the development of transportation in Indonesia, where each year the development shows significant growth number. According to the report of the Central Bureau of Statistics of Indonesia (BPS) just until 2009, the number of two-wheel vehicles as well as four-wheel vehicles was 70,714,569 units. According to the data from Association of Indonesian Automotive Industry (GAIKINDO), the production of car in 2010 was 764,710 units, increased by 894,164 units in 2011 and as many of 1,116,230 units in 2012. Data from Association of Indonesian Motorcycle Industry (AISI) showed that during 2010, the production of the motorcycles was as many as 7,395,390 units, in 2011 increased to 8,006,293 units, 4,311,019 units in 2012, and until March of 2013, 1,977,097 units had been produced.

Besides due to the rampant and growing number of vehicles, the congestions on the main road sections in major cities are because of lack of development of the roads, and also the behavior of users, especially public transport drivers who ignore the traffic rules. In specific, the ignorance towards the traffic regulations by the motorists, including public transport drivers, contributes to the worse congestion up to 20 percent (Instran, 2010).

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The increasing number of vehicles in the City of Malang, for example, has led to the extraordinary congestion problems in the next few years. Currently, there are congestions in several streets or locations, and anticipation for further constructions of the streets seems difficult to do.

As one of the cities for education as well as tourism in East Java, City of Malang in 2015 is predicted to face total congestions. The prediction is based on the policies of the City Government that does not have long term planning to develop city street networks for 2010-2030 (Kangnarada, 2011).

Likewise in Surabaya, motorcycle as a personal transportation is preferred by the majority of urban residents. This motorcycle is chosen because of its easiness to avoid frequent congestions in daily routine; public transport, on the other hand, is considered slow and not effective to pass the congestion of the city. In addition, the easiness to buy the motorcycle offered by the dealers becomes one significant factor for the growing number of motorcycles; the credit system is very easy, that with a little earnest money, the society may already take the motorcycle home.

If these problems are always undermined, the streets in Surabaya will be more jam-packed with vehicles. Due to unbalanced way in the growth of vehicles and the capacity of existing roads, this may lead traffic stuck in Surabaya, and a total congestion will occur as well like in Malang in the coming years.

The government indeed strives to reduce the congestion, such as expanding the capacity of the streets, implementing several traffic engineering models as well as developing models for transportation demand managements.

The development concept of transportation demand management is expected to replace the conventional approach in solving the traffic problems in the city. This concept will implement some particular strategies and policies to reduce travel needs (reducing mobility), especially for private vehicles or to arrange transportation distribution at a certain time and location. This concept is believed to be an alternative that is very cost-effective compared with other stragies like the expansion of the streets to provide more traffic capacity and the application of other technology that is more expensive. This concept is also in line with the concept of sustainable transport which is the strengthening of the urban transportation system with a more efficient alternative fuel consumption so it may decrease the impact to the environment (Tamin, 2008).

Based on the previous explanation, public participation is a very effective approach in the process of formulating a strategy or policy for transportation management, especially for public transport (transportation demand management) to become sustainable transportation. Society is expected to support the program through participation of their aspiration and preference. Therefore, it is necessary to conduct a research on transportation demand management strategy in accordance with the expectations of society, so that people may be cooperative in giving full support to the program.

Methodology:

This study was conducted in the City of Malang and Surabaya. The respondents were selected based on the AHP analysis, including respondents from Department of Transportation of both City Government of Malang and Surabaya, and some academicians (experts) in Malang and Surabaya. As the limited number of populations from the Department of Transportation offices, the sampling was based on purposive sampling method, which is the sampling process was based on the number of population and in accordance with the criteria set by the researchers. The samples for the AHP analysis were 40 people, in detail of 20 people from related bureaucrates in Malang and Surabaya, and the other 20 were academicians in Malang and Surabaya.

In this study, it would be formulated an alternative concept based on public participation obtained from the indicators of public participation variables. The selection of alternative concept for the appropriate public participations in relation to the implementation of transportation demand management was done by using the hierarchical analysis method for expert's choices and stated preferences approach for the public transport mode pessangers. In the analytical methods, it required criteria for assessment of the participation variable, which was obtained from the technical guidance document traffic restrictions by Directorate General of Land Transportation of Ministry of Transportation.

Model of public participation function in the implementation of transportation demad management could be described through the variable of weighing priority level on which became consideration basis of the respondents. Each participant would give preference to the pairwise comparison of variables from highest to lowest levels (Figure 4.6). Stages of hierarchical analysis procedures were from creating hierarchy tree, matrix formation for pairwise comparison, synthesis of priority, and consistency ratio calculation were conducted with the assistance of expert choice software. In the final stage level, the development of transportation management (TDM) strategy was also responded by using the rating system as the final goal of the model of AHP structure.

RESULTS AND DISCUSSION

The results of the priority setting for transportation demand management (TDM) strategy variables in East Java from each respondent were then concluded to determine the priority levels of TDM strategy variables by all parties (experts). The compilation of all priority levels were calculated as averaged values for the weighting in the development analysis in the following tables:

Information:
Respondent 1: Bureaucrates in the City of Malang
Respondent 2: Academicians in the City of Malang
Respondent 3: Bureaucrates in the City of Surabaya
Respondent 4: Academicians in the City of Surabaya

According a research by Karin (2010) entitled *A Bottom-up Approach to Implement Transportasion Demand Management Measures in Developing Countries: Bangkok Experience*, the results of the analysis stated that there were three attributes for that can be used in transportation demand management (TDM) strategy, namely public transportation improvement, traffic constraints, and ride-sharing. Based on the the results of AHP analysis, it is ideal to implement TDM based on public participation. Based on the results of AHP analysis, it was known that the three variables used are public transportation improvement, traffic constraints, and ride-sharing.

Conclusion:

Based on the the results of AHP analysis in the previous section, it was known that the three variables used as parameter of transportation demand management (TDM) in the City of Malang and Surabaya are public transportation improvement, traffic constraints, and ride-sharing.

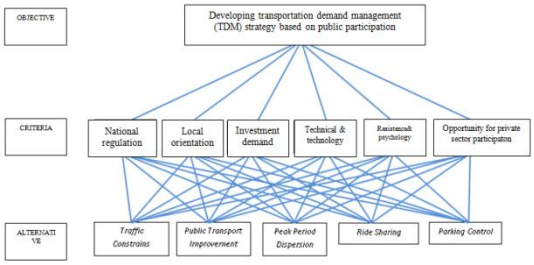

Fig. 1: Hierarchical structure for the development of transportation demand management (TDM).

Table 1: Priority levels of TDM concept based on bureaucrates in Malang.

Priority	Factors	Value of VP
I	*Public Transport Improvement*	0.422
II	*Traffic Constraint*	0.266
III	*Parking Control*	0.134
IV	*Ride Sharing*	0.113
V	*Peak Period Dispersion*	0.065

Table 2: Priority levels of TDM concept based on academicians in Malang.

Priority	Factors	Value of VP
I	*Traffic Constraint*	0,416
II	*Public Transport Improvement*	0,252
III	*Parking Control*	0,137
IV	*Ride Sharing*	0,116
V	*Peak Period Dispersion*	0,077

Table 3: Priority levels of TDM concept based on bureaucrates in Surabaya.

Priority	Factors	Value of VP
I	*Public Transport Improvement*	0,500
II	*Parking Control*	0,158
III	*Traffic Constraint*	0,134
IV	*Peak Period Dispersion*	0,073
V	*Ride Sharing*	0,066

Table 4. Priority levels of TDM concept based on academicians in Surabaya.

Priority	Factors	Value of VP
I	*Traffic Constraint*	0,379
II	*Public Transport Improvement*	0,334
III	*Ride Sharing*	0,191
IV	*Parking Control*	0,096
V	*Peak Period Dispersion*	0,056

Table 5: The average of priority levels transportation demand management (TDM) system.

Variables	Respondents				Total	Average values	Priority
	1	2	3	4			
Traffic Constraint	0.266	0.416	0.134	0.379	1.195	0.299	II
Public Transport Improvement	0.421	0.253	0.501	0.334	1.509	0.377	I
Ride Sharing	0.134	0.137	0.158	0.096	0.525	0.131	III
Parking Control	0.065	0.077	0.074	0.056	0.271	0.068	V
Peak Period Dispersion	0.113	0.116	0.066	0.196	0.487	0.122	IV

REFERENCES

Berrittella, M., 2007. *An AnalithycalHierrarchi Process For The Evaluation Of Transport Policies To Reduce Climate Change Impact*, Nota Di Lavoro.

Buehler, R., 2006. Making Urban Transport Sustanable, Journal Of American Planning Association, 72: 3.

Errampalli, M., M. Okusima, 2005. *Microscopic Simualtion Model Considering Public Transport Policy*, Journal Of Eastern Asia Society For Transportation Studies, 6.

Miro, F., 2005. *Transportation Planning* in Indonesia Language *PerencanaanTransportasi*, PenerbitErlangga, Jakarta.

Tamin, 2000. *Planning and Transportation Modelling* in Indonesia Language *Perencanaandan Pemodelan Transportasi*, Penerbit ITB, Bandung