TRANSPORT PROBLEMS 2021 Volume 16 Issue 3
PROBLEMY TRANSPORTU DOI: 10.21307/tp-2021-043

Keywords: MAMCA; seaport; stakeholders; toll road; west java; Indonesia

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USING MAMCA FOR SELECTING TOLL ROAD TRACE TO WEST JAVA SEAPORT, INDONESIA

Summary. The construction of Patimban Port in West Java Province has a potential to increase the flow of exported and imported goods in West Java. The increase will have an impact on the rising traffic flow of vehicles to or from Patimban port. The government has included the construction of the Subang-Patimban toll road in the national spatial plan. This research analyzes stakeholders and the criteria that they expect in the selection of alternative routes to Patimban port. The Multi Actor Multi Criteria Analysis (MAMCA) methodology used aims to evaluate differences in criteria between stakeholders. The selection of alternatives for all stakeholders uses two calculation methods or scenarios, namely, the similarity of weight for all stakeholders as scenario I and weighting the number of criteria considered by stakeholders in determining the alternative chosen trace as scenario II. The result of the selected alternative calculation is different between scenario I and scenario II.

1. INTRODUCTION

Indonesia's logistical performance score, as measured by the Logistic Performance Index (LPI) from 2010 to 2016, ranked above 50, and in 2018, it is ranked 46 of all countries measured by the World Bank's logistics performance. At the ASEAN level, Indonesia's ranking is still below Singapore, Thailand, Vietnam and Malaysia [25]. Port performance in Indonesia plays an important role in measuring logistics performance in exports, import and domestic trade. There are 5 main ports in Indonesia that are essential for Indonesia's trade flows, namely, Tanjung Priok Port in Jakarta, Balikpapan Port in Kalimantan, Belawan Port in Medan-North Sumatra, Tanjung Perak Port in Surabaya-East Java and Makassar Port in Ujung Pandang-South Sulawesi. Tanjung Priok Port is the only cargo terminal in the western region of Java Island in the coastal and cape areas covering Banten, DKI Jakarta and West Java Provinces. The cargo volume of Tanjung Priok Port in 2017 reached 6,079,762 TEUs, which included container flows at Tanjung Priok Port, New Priok Container Terminal I, Koja TPK and JICT [15].

In 2011, the Ministry of Transportation of Indonesia, in collaboration with the Japan International Corporation Agency (JICA), implemented a Master Plan Study Project for Port and Logistics Development in the Greater Jakarta Metropolitan Area with the aim of evaluating and prioritizing alternative construction of a new container terminal [8]. The Ministry of Transportation of Indonesia decided to choose Cilamaya as an alternative as a new port to support Tanjung Priok port where Cilamaya is located 80 kilometers east of Tanjung Priok Port. Cilamaya is located in Cilamaya District, Karawang Regency, West Java Province. However, on 2 April 2015, the Vice President of Indonesia, Dr. H. Muhammad Jusuf Kalla, in a meeting at the Tanjung Jaya Village Office, Tempuran Sub-District, Karawang, decided to shift the Cilamaya Port Construction location to the east by considering that if the Cilamaya Port is still built, it is feared that it may disrupt oil production and Pertamina's ONWJ oil and

gas block, where its production is equivalent to 71,000 barrels of oil per day [16]. As a follow-up, Ministry of Transportation of Indonesia conducted a Prefeasibility Study on the Construction of a New Port on the North Coast of West Java and Feasibility Study on the Construction of Patimban Port in Subang Regency, West Java Province, which was established by The Decree of the Minister of Transportation of the Republic of Indonesia Number: KP 190 Year 2016 dated March 28, 2016. This decision is important because the studies conducted in 2011 need to be adapted to a new geographical condition, namely, in the Patimban Village, Pusakanegara District, Subang Regency, West Java Province, 32 km away east of the initial port planned in Cilamaya.

In 2016, the President of Indonesia established Patimban Port as a national strategic project through Presidential Regulation No. 47 of 2016 as stipulated in the National Strategic Project in Presidential Regulation No. 3 of 2016 concerning the Implementation Acceleration of The National Strategic Projects. Patimban port development will require an investment of US$ 3.1 billion with a 40-year concession period [2]. It is planned for Patimban Port to have a capacity of 7.5 million TEUs in 2037, and will be developed in land area of 686.33 hectares and an area of 25,756.05 hectares. The construction of Patimban port is planned to be conducted in 3 stages, with the completion of the construction phase planned for the first phase in 2022, the second phase in 2025 and the third phase of construction in 2029.

Road access to Patimban port from Jomin intersection (National Road) both to and from the Port on weekdays has entered a degree of saturation (V/C) of more than 0.8 and at the Pamanukan intersection (Provincial Road) both to and from the Port on weekdays and holidays, a degree of saturation (V/C) of more than 0.8 [9]. Therefore, new access is needed to connect the national road to Patimban Port to anticipate congestion on roads that have experienced a decline in services.

This study aims to identify the best alternative choice in determining the toll trace of the Subang-Patimban toll road by involving stakeholders. The objectives of this study are identification of relevant stakeholders, identification of their role in legislation and determination of the criteria of each stakeholder used in selecting the toll road trace and alternatives selected by each stakeholder and all stakeholders.

This paper is divided into six parts. The next section discusses the literature review of previous studies on the selection of road alignments. This is followed by the research methodology using Multi Actor Multi Criteria Analysis (MAMCA) and application methodology using weight criteria and output results for each stakeholder, selected alternatives based on the weighting criteria of each stakeholder and selected alternatives based on all stakeholder weighting scenarios, discussions and conclusions.

2. LITERATURE REVIEW

Planning for transportation infrastructure development is conducted in several stages, starting with identifying population distribution by various sectoral activities and by region, followed by studying the aspects of space in the general spatial plan (province or district) in terms of spatial designation and utilization; calculating the production of various sectoral commodities and other goods produced in various regions; and calculating the saturation degree or the V/C ratio between cargo traffic volume (v) and road capacity (c) that is needed to plan road widening or new road construction. In addition, the last stage involves making planning more comprehensive, directed and adjusted to the needs of the future, which means that road network development planning is conducted appropriately [1].

Freight transportation has several choices of modes, namely road, rail and sea. Each mode of transportation has advantages and main characteristics in terms of its operations and commercial. However, the magnitude of demand is influenced by an integrated transportation system that requires maximum flexibility resulting in capital competition that occurs at various levels and taking into account several dimensions. For distance and cost dimensions, transport by road has a low cost for a distance of less than 500-750 km; transport by train has a low cost for a distance between 750 and1500 km; and transport by sea has a low cost for a distance above 1500 km [17]. The relationship between road transportation and Indonesia's national productivity has a very strong correlation compared to air, sea and rail transportation. The correlation coefficient values are 0.988 for land transportation, 0.983 for air transportation, 0.909 for sea transportation and 0.720 for railroad transportation [4].

Toll roads, according to the definition of Law Number 38 Year 2004, are public roads that are part of the road network system and national roads for which users are required to pay tolls. Toll Trace Planning is one part of toll road concession. In determining the toll road trace, a road geometric plan is needed that is part of the road planning, focusing on horizontal alignment and vertical alignment. Therefore, it can fulfill the basic functions of the road, providing optimal comfort in traffic flow according to the planned speed [19]. In general, road geometric planning consists of planning aspects of road alignment, road land consisting of roadway and road margin, bends, drainage, road grades, excavations and embankments [22]. The aim of road geometric planning is to produce safe infrastructure, efficient traffic flow services and maximize the level of usage ratio or implementation costs.

Previous research on trace selection in Indonesia includes the Analytic Network Process Approach in the Selection of Road Traces (Case Study: Gorontalo Province Collector Road Development) [6], Multi Criteria Analysis Approach in the Selection of Road Traces in Isolated area of Aralle Tabulahan Mambi West Sulawesi Province [5], Development of Road Infrastructure Route Planning: Increasing Feasibility of Toll Road Projects [11] and Selection of Road Traces Based on Multi Criteria Analysis (Feasibility Case of NAD Province East Cross Highway) [18]. In those studies, for the road trace selection, only alternative criteria were used without considering the role of stakeholders, whereas in the study [10] (Planning of Trace Planning for Gempol-Mojokerto Toll Road), the trace selection only involved stakeholders from the regulator side, namely, the Central Government and the Regional Government. Thus, this paper focuses not only on the stakeholder's side of the Central Government and the Regional Government but also that of investors, potential users and the public.

3. RESEARCH METHODOLOGY

This research uses The Multi Actor Multi Criteria Analysis Methodology, which was developed by Cathy Macharis, a professor from Vrije Universiteit Brussels-Belgium. It was developed with the aim of providing a comparison of various strategic alternatives, supporting decision-makers in making their final decisions. Because all the objectives of different actors are taken into account, the best compromise solutions that are more suitable can be provided back to the decision-makers. Therefore, the support for reconciliation is much higher. In the MAMCA methodology, each stakeholder group can have its own criteria [14]. The fact that leaders know that they are included in a comprehensive evaluation system changes their way of thinking and motivates them to make appropriate decisions [13]. By including stakeholders from the beginning to the very end of the decision process, implementation and mitigation pathways can be developed [12, 24]. Furthermore, the analysis of all produced data and the assessment input of all stakeholders involved in the decision process can be at the global level (for all stakeholders), but the most important is per actor. MAMCA provides an indication of the preferences of each actor and shows the most promising alternatives to be implemented.

The steps of the methodology are described further as follows:

First step: Defining alternative. The first step of the Multi Actor Multi Criteria Analysis methodology consists of identifying and classifying possible alternatives proposed for evaluation. The possible alternatives are taken from the project consortium.

Second Step: Stakeholder Analysis. Stakeholders are people who have interests, financial or others, in the form of the consequences of each decision. Some legal bases were used to identify the stakeholders.

Third Step: Defining Weight and Criteria. The criteria were selected based on previous studies and Indonesian government regulations. The choice and definition of evaluation criteria are mainly based on the identified objectives of the stakeholders and the objectives of the considered alternatives. Naturally, this impact will be reflected in the goals of stakeholders (if all relevant stakeholders are included). When the government is one of the stakeholders, usually the case in evaluating transportation projects, it can be said that these stakeholders represent the standpoint of the community, and therefore, it must be the only thing that must be followed. The perspective analysis of other stakeholders, such as

users, local residents, producers, etc., will show whether certain actions might be adopted or rejected by these groups.

Fourth Step: Criteria, indicators and measurement method. At this stage, the previously identified stakeholder criteria are 'operationalized' by building indicators (also called metrics or variables) that can be used to measure whether, or to what extent, alternatives contribute to each individual criterion.

Fifth Step: Analysis and overall ranking. For this study, the author will use the AHP method with a comparison procedure in pairs using the Saaty scale. Data processing will use MAMCA Software with the AHP Priority Calculator online software developed by Business Performance Management Singapore.

Sixth Step: Result. Multi-actor multi-criteria analysis provides a comparison of different strategic alternatives, and supports decision-makers in making their final decisions by showing each stakeholder whose elements have a positive or negative impact on sustainability.

4. METHODOLOGY APPLICATION

4.1. Defining Alternative

The determination of an alternative toll road trace for road plans needs to consider various aspects including topography, geography and spatial planning. Plans for the construction of the Subang-Patimban toll road were initiated by the consortium of PT. Jasa Marga (Persero) Tbk. In addition to providing adequate access for vehicles to and from Patimban port to the hinterland area, it also provides alternatives for vehicles originating from regencies Indramayu, Subang and Purwakarta [7].

Data on alternative traces are obtained from the initiator equipped with technical characteristics, land suitability and physical land, as well as road accessibility.

Toll Trace Alternative I stretch from the Subang Toll Gate to the national road that approaches Patimban port access road as long as 29.8 km without opening access along the toll lane. This trace has 23 road crossings, 7 river crossings and 1 railroad crossing.

Toll Trace Alternative II stretches from around the intersection of Cikopo toll road to the national road equal to alternative I with a length of 54.2 km. This trace is the longest, with 41 road crossings, 7 river crossings and 1 railroad crossing.

Toll Trace Alternative III extends from around km 88 of CIPALI toll roads along 37.8 km with the same end as the other alternatives with 30 road crossings, 3 river crossings and 1 railroad crossing.

The land use of the three alternatives is dominated by empty land/rice fields and plantations, a small portion of settlements and industrial estates specifically for alternatives II and III. An overview of the alternative trace of the Subang-Patimban toll road can be seen in Fig. 1.

4.2. Stakeholder Analysis

Determination of stakeholders who play an important role in the construction of toll roads must be considered from the process stages being carried out by the research, namely, the planning of the road. Stakeholders can influence or be influenced by actions, goals and organizational policies. The authors in this case used the stage of approval of the business entity initiative, where the actors involved are still in a position to consider the choice of proposed trace from the proponent.

At the toll road concession stage with business entity initiatives and feasibility study activities, those who play an important role in evaluating the network system and the feasibility of the project are the Directorate General of Highways as representatives of regulators and the central government.

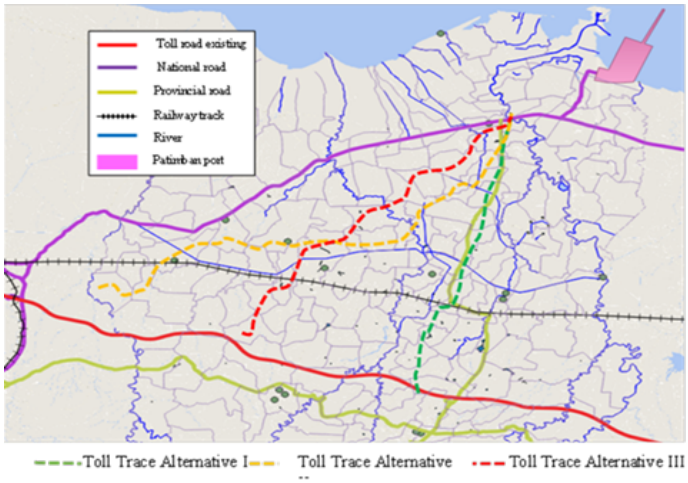

Fig. 1. Three trace alternatives of Subang-Patimban toll road [7]

Subang-Patimban Toll Road is included in the National Regional Spatial Plan, however it is necessary to obtain input and approval from the Regional Government to improve the quality and effectiveness of regional spatial planning. As a toll road initiator business entity, PT. Jasa Marga also needs to be involved because it is the main shareholder so that the toll road selection decision is in their hands.

According to research conducted by JICA, the construction of Patimban port will accommodate shipping activities in the form of containers, import of raw materials and export of processing industries, especially the results of both 2-wheeled and 4-wheeled vehicle manufacturers for the inter-island domestic market and export or import to/from overseas. Thus, it is also necessary to observe from the side of the transportation entrepreneur represented by the Indonesian Logistics and Forwarder Association (ALFI). For representatives of the community elements, Pusakanagara sub-district was chosen because the community had conditions similar to land acquisition in the construction of the Patimban port and its road access.

Every stakeholder act on written legal bases in conducting his or her duties. Tab. 1 presents the details of stakeholders and the responsibility on a legal basis in providing alternative decisions for Subang-Patimban toll road.

Table 1

Stakeholder structure by legal bases

Stakeholder	Institution	Hierarchy	Legal Bases
Government	Directorate General of Road	Central	Law on Road No.38 Year 2004 and Regulation of Ministry of Public Work No.06/2018.
	Local Planning Board	Local	Law on Spatial Planning No.26 Year 2007 and Regulation of Ministry of Home Affairs No.116 Year 2017
Investor	PT. Jasa Marga, Tbk.	Central	Letter of Agreement from The Minister of Public Work No.1214 Year 2017.
Potential Users	Indonesian Logistic and Forwarder Association	Central and Local	Regulation of Minister of Transport No.49 Year 2017.
Communities	Pusakanegara District	Local	President Regulation No.47 Year 2016.

4.3. Determining Criteria and Indicators

A transportation project can be evaluated from its own performance measures. Performance measures can be one of the criteria used by many actors or stakeholders in decision-making from the impact. Therefore, various categories and types of impacts that are expected to occur in response to changes in the transportation system need to be identified before analyzing the details of the impacts [20].

In the Multi Actor Multi Criteria Analysis method, the bases of the evaluation criteria are the goals and objectives of each actor and not the effects or impacts that are generated as in the Multi Criteria Analysis. The toll road system affects people's lives in various ways. The influence of the lifestyle has a direct impact not only on individuals but also on society as a whole. Improved systems produce significant changes in individual mobility and economic behavior. Because the toll road system is part of social production and distribution systems, it promotes public accumulation, capital as well as private technology and increases the activity distribution and income in the market. This has led to an increase in living standards, especially in industrial areas in terms of efficient use of national resources. The results can enable relocation of industrial activities. It can also lead to balanced regional development and help to achieve justice in the region and National Unity. While toll road systems make a variety of positive contributions, there are negative impacts, such as traffic accidents (the cause of property damage and injury or loss of human life) and environmental and ecological impacts [23]. The criteria and indicators used in this study are presented in Tab. 2.

Table 2

Criteria, indicators and measurement

Criteria	Indicators and Effectiveness Measurements	Reference
Travel Time	Vehicle travel hours; Vehicle delay; Vehicle stop; Travel time from point to point	Tabucanon & Lee [23]
Travel Cost	Vehicle operating cost; Toll road cost; Parking cost	
Security	Accident rate; Traffic violation; Road geometric condition	
Congestion	Critical path volume; Service rate; Volume–capacity ratio	
Equity/Justice	Travel cost to the center; Travel time to the center; Gross Regional Domestic Product (GRDP)	
Productivity	Operational cost per vehicle; Operating income per fee; Passenger per hour vehicle; Passenger per vehicle; Passenger per km vehicle	
Comfort and convenience vehicle usage	Road surface roughness; Total Travel Time; Population with affected area; Number of vehicles based on occupancy; Kilometer of traveling vehicle; Traffic volume	
Operational Cost	Operation and Maintenance Costs; Operating income for each deficit	
Capital Cost	Capital cost total	
Noise Impact	Noise level; Number of residences affected by noise exceeding the set threshold; Number of noise receptor sites above the threshold	
Air pollution	Level of pollutant concentration; Emission tonnage	
Energy Consumption	Energy Consumption; Vehicle Kilometer	
Change of household occupancy	Area of land acquired; Change of community structure and institutions	

Spatial Plan	Compliance with the National Spatial Planning; Compliance with the Provincial Spatial Planning; Compliance with the City/District Spatial Planning	Regulation of the Minister of Public Works – Republic of Indonesia No. 13 Year 2010 on Toll Road Procurement Guidelines
Infrastructure Development Plan	Compliance with the Regional Medium Term Development Plan; Compliance with the National Medium Term Development Plan;	
Depreciation of Rice Fields/Plantations	The area of rice fields/plantations affected	Sinha & Labi [20]
The increase of direct and indirect employment	The number of new employment opportunities both directly and indirectly	
Impact of Environmental Change	Perception of customer satisfaction with transportation decisions that have an environmental impact	

4.4. Operationalization of criteria

Each criterion that forms the basis of stakeholder assessment in the selection of alternative traces is operationalized in possible alternatives. The experience and background of stakeholders are very relevant to the ability to use these criteria. The results of the operationalization of each stakeholder's criteria are shown in Tab. 3.

Table 3

Order of selected criteria and weight for each stakeholder

Priority	Stakeholder				
	Central Government	Local Government	Investor	User Candidate	Community
1	Travel time (0.191)	Spatial plan (0.3079)	Capital costs (0.3537)	Travel time (0.2856)	The impact of environmental change (0.4681)
2	Spatial plan (0.1282)	The impact of environmental change (0.2238)	Safety (0.1816)	Travel costs (0.2185)	Depreciation of agricultural land (0.2457)
3	Capital costs (0.1131)	Depreciation of agricultural land (0.1543)	Transportation (0.1816)	Safety (0.1611)	Increasing employment directly & indirect (0.1176)
4	Infrastructure development plan (0.0924)	Infrastructure development plan (0.115)	Resettlement (0.1042)	Traffic (0.1171)	Resettlement (0.0900)
5	Operational cost (0.0749)	Resettlement (0.0653)	Infrastructure development plan (0.0570)	Justice / Law / Legal (0.0771)	Traffic (0.0786)
6	Traffic (0.0701)	Air pollution (0.0414)	Travel time (0.0504)	Productivity (0.0573)	
7	Travel cost (0.0517)	The impact of noise (0.0301)	Spatial plan (0.0386)	Convenience (0.0480)	

8	The impact of environmental change (0.0483)	Travel time (0.0276)	Convenience (0.0329)	Energy consumption (0.0198)	
9	Safety (0.0418)	Increasing employment directly & indirectly (0.0213)		Air pollution (0.0156)	
10	Legal (0.0395)	Safety (0.0133)			
11	Energy consumption (0.0404)				
12	Convenience (0.0383)				
13	The impact of noise (0.0349)				
14	Air pollution (0.0339)				

4.5. Overall analysis

The overall analysis of alternative subjects is operationalized using the procedures of many criteria in general. Thus, the contribution of each alternative to certain assessment criteria is compared in pairs to their contribution to other assessment criteria, based on measurement indicators. Pairwise comparisons are made to provide their preferences for certain alternatives to the criteria. MAMCA software is used, which not only allows the grouping of stakeholder criteria per group of actors to support actor-oriented assessment but also provides a clear and visual picture of the results of the assessment. The results of the overall analysis for each stakeholder are shown in Tab. 4.

Table 4

Alternative choice results for alternative options

Stakeholder	Alternative Trace I	Alternative Trace II	Alternative Trace III
Central government (DM_1)	0.69 (1)	0.19 (2)	0.12 (3)
Local government (DM_2)	0.45 (1)	0.23 (3)	0.32 (3)
Investor (DM_3)	0.20 (3)	0.25 (2)	0.55 (1)
User candidate (DM_4)	0.16 (3)	0.54 (1)	0.30 (2)
Community (DM_5)	0.13 (3)	0.37 (2)	0.50 (1)

4.6. Result

Alternative traces chosen for each stakeholder can be different or the same. It is very difficult to consider that one actor is more important than another. Therefore, assumptions are needed in weighting for each stakeholder. Weighting will be calculated based on 2 types of scenarios.

Scenario I:

In this scenario, it is assumed that each stakeholder has the same level of importance in the selected alternative. This scenario refers to the study [3]. Therefore, the weight will be assigned equally to the number of stakeholders.

Calculation method:

$$A_j = \sum \left(A_{ij} * \frac{1}{\sum DM} \right), i,j = 1,2,\ldots\ldots,n \quad (1)$$

where A_j = Alternative evaluation values j; A_{ij} = Alternative evaluation values j from stakeholders i and DM= Stakeholder.

Scenario II:

In this scenario, weighting is assumed based on the number of criteria chosen by each stakeholder. Each stakeholder will have a weight in accordance with the number of criteria that become the reference for the selection of alternative traces.

Calculation method:

$$A_j = \sum \left(A_{ij} * \frac{C_{DMi}}{\sum_{i=1}^{n} C_{DMi}} \right) \quad i,j = 1,2,\ldots\ldots,n \quad (2)$$

where A_j = Alternative evaluation values j; A_{ij} = Alternative evaluation values j from stakeholders i and C_{DMi} = The number of criteria from stakeholders i

In scenario I, the calculation method is conducted by assigning equal weight to all stakeholders; we will obtain an alternative evaluation value of trace III that surpasses the other alternatives by 0.358, followed by alternative trace I by 0.326 and alternative trace II by 0.316.

Meanwhile, using the calculation method of scenario II, assigning weight according to the number of criteria for each stakeholder, to check whether it will yield the same result, the alternative evaluation value of trace I outperforms other alternatives by 0.385, followed by alternative trace III by 0.315 and alternative trace II by 0.300. All of these results are shown in Tab. 5.

Table 5

Selected alternative results for each type of scenario

Scenario type	Stakeholder	Stakeholder weight	Alternative Trace I	Alternative Trace II	Alternative Trace III
Scenario I	Central government	0.20	0.326	0.316	0.358
	Local government	0.20			
	Investor	0.20			
	User candidate	0.20			
	Community	0.20			
Scenario II	Central government	0.30	0.385	0.300	0.315
	Local government	0.22			
	Investor	0.17			
	User candidate	0.20			
	Community	0.11			

5. CONCLUSION

The criteria for selecting alternative toll road arrangements are closely related to the main tasks and functions of stakeholders. The three most important criteria in the Central Government, namely, travel time, travel costs and spatial planning, are correlated with considerations in toll road implementation listed in Regulation of the Minister of Public Work No. 13 Year 2010. Local Governments choose the three most important criteria, namely, spatial plan, environmental change impact and depreciation rice fields and plantations, correlating with the position of Subang Regency as a national rice barn with the

third largest rice field area in West Java [21]. From the investors' standpoint, the three most important criteria are the cost of capital, vehicle usage and security. This also correlates with the desire of investors to benefit from the investments made. Capital costs will be incurred at the beginning of the investment covering the costs of land acquisition and construction, while vehicle usage/traffic volume will determine the feasibility of toll road investment and security determines the guarantee of services from investors to customers.

The three most important criteria of Prospective Users include service guarantee to consumers through the travel time criteria. Determining the price of logistics services will be strongly influenced by the criteria of travel and security costs, which will ensure that the customer's goods are delivered to their destination. The community side is more focused on the criteria in terms of the impact of changes on the environment, depreciation of agriculture/plantation land and of employment.

Based on the analysis, it appears that the role of the Central Government, compared to other stakeholders, is more decisive in selecting the trace. Another aspect is related to the fact that the Central Government has more criteria than other stakeholders. This is a determining factor in scenario II. Meanwhile, in terms of criteria, the impact of environmental changes is an important criterion in the final decision. The Community ranks environmental changes as the most important criterion and the Local Government ranks as the second most important criterion. The Central Government also mentions this criterion. The three parties representing the public interest support the criteria of the impact of environmental changes.

The involvement of other stakeholders outside of those involved in this research for trace selection needs to be further elaborated to gain more perspectives, especially with industrial estates and neighboring regions.

In conducting evaluations of weighting criteria, besides using AHP, there is another evaluation method in MAMCA software. This method can be used as an alternative to data processing and can be compared with the results of this study.

Further research can be carried out, namely when the toll road trace has been selected so that it can be seen what criteria remain or change. From this further research, it can also be seen which stakeholder criteria have the most influence in determining the trace selection.

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Received 03.06.2020; accepted in revised form 10.09.2021