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Producing alternative concept for the Trans-Sumatera toll road project development using location quotient method

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Abstract

The Trans-Sumatera Toll Road (TSTR) is one of Indonesia's mega project infrastructures and is planned to stretch along Northern Sumatera provinces from Aceh to North Sumatera for about 800 km. Currently, the project development is only feasible in particular routes due to high investment costs and limited demand for revenue. This paper will investigate the best alternative route by considering related aspects to improve its viability. The research method used a combination of quantitative and qualitative approaches through desk study and in-depth interviews. This research produced optimum route for the Northern Sumatera area and also revealed dominant sectors for both provinces.

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1. Introduction

Infrastructure plays significant role in increasing national economic growth and creating economic mobility for civilians. The quantity and quality of infrastructure in a country also determines investment attractiveness for private sectors and the nation's competitiveness in a global scale [1]. As one of the most significant sectors, road infrastructure in Indonesia has to be improved significantly in terms of quantity, quality and proper government management. According to the Global Competitiveness Report in 2012, the quality of road infrastructure in Indonesia placed at 78

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from 148 countries. This report shows Indonesia's infrastructure condition still behind neighboring countries such as Singapore, Malaysia and Thailand. Improving Indonesia's position will then require mutual collaboration among the government, academics, private sectors and also the society.

Indonesia's government has attempted to minimize the infrastructure gap, particularly in the road sector, by initiating the development of Trans Sumatera Toll Road in recent years. This mega project infrastructure required huge investments of about 340 trillion rupiah to construct ± 2,788 kilometers, which connects Bandar Lampung in Southern Sumatera to Aceh in Northern Sumatera [2]. The development of this project was expected to create equality of welfare by connecting a road network system in Sumatera Island.

Many researchers have been shown the benefits of toll road construction for various aspects of life in their respective findings. Toll road contribution ranging from reducing transportation and logistics costs, accelerating economic mobility [3], opening new job opportunities in a greater scale [4], creating industrial areas such as cement, steel and construction services [5], improving investment attractiveness [6], as well as generating economic activities around the region [7, 8].

However, despite its huge positive impact to accelerate nation's economic growth, the Trans Sumatera Toll Road is only feasible in a selected part of the route. In contrast, as the second contributor for national GDP, Sumatera Island has many potential areas that can be developed for greater purpose. Therefore, the regional development has to be considered as the main aspect in determining Sumatera potential sectors. It requires identification of featured sectors in every city and district that can be used as an input for the government to formulate the best policy regarding this mega project development.

This research will create alternatives concept for Trans Sumatera Toll Road project particularly in Nanggroe Aceh Darussalam and North Sumatera provinces by producing new route selections. It will consider Gross Regional Domestic Product (GRDP) and population in both provinces. It will be obtained from related sources from books, journals, public records and published reports. The research findings expected can be used by the government to increase the feasibility of the project by considering its added value and potential economic growth.

2. Research methodology

This research will use two approaches by using Location Quotient (LQ) method and the investigation of secondary data. Data collection will be extracted from GRDP and population from statistic of Indonesia to produce targeted outcomes. LQ analysis argued as one of efficient method to analyze and determine the diversity of local economic basis. It also provides the overview about economic stability and flexibility in the region through the investigation of industrial degree. Many scholars have used this method in various degrees of research. It can be used as an estimator of industrial concentration [9], to investigate marine sector policy [10], and also analyze carbon emission [11]. It is also used for food, forestry and tourism sector [12−14].

LQ is an indirect measurement method that determines basis and non-basis sectors by using secondary data from economic indicators in the region particularly from GRDP, population and workforce per sector. The secondary data will be retrieved from books, public records such as The Annual Statistic Report, policies, and government reports. LQ means ratio between two proportions. It compares the relative function of value from the GRDP of production commodity sector in a region to the relative function from the whole value of GRDP. In mathematical equation, LQ can be formulated as follows.

$$LQ_i = \frac{e_i/e}{E_i/E} \tag{1}$$

Where:

LQ_i = LQ value for i sector in a district
e_i = GRDP for i sector in a district
e = GRDP whole sector in a district
E_i = GRDP sector i in province of the district
E = GRDP whole sector in province of the district

LQ will produce a coefficient from 0 to unlimited value. LQ < 1 means the commodity sector in that region has no comparative industrial cluster. LQ = 1 indicates no distinguishing feature from one region to the others. LQ > 1 shows the investigated sector has a comparative industrial sector.