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Sistematic Literature Review: Exploring of Determinant Factors For The Implementation of The Effectiveness of The Construction of The Trans Sumatra Toll Road, Indonesia

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Abstract: There are many researchers who are interested in conducting research by raising the issue of factors that influence the implementation of the effectiveness of toll road construction and its impact on the potential economic growth of the region through which it passes, but have difficulty finding what are the most dominant factors that can be used to explain variations in their influence on development. toll road. This research aims to reveal, explore and analyze determinant factors that can explain variations in their influence on the effectiveness of the construction of the Trans Sumatra toll road, Indonesia. This research used 1,100 journals and the existing journal data. The analysis technique uses systematic literature review analysis with three stages of analysis including identification, screening and included. The novelty produced in this research is that the researcher identified several determinant factors that can explain variations in their influence on the effectiveness of toll road construction which can be used by researchers who are interested in raising the issue of toll road construction. The results of this research show that there are several determinant factors that can explain variations in their influence on the effectiveness of toll road construction, both directly and indirectly, including the variables of logistics cost efficiency, regional development, land use changes, toll procurement costs, local revenue, inter-city transportation, growth. regional economy, performance of the transportation and warehousing sectors, performance of the tourism sector, and performance of the agriculture, forestry and fisheries sectors.

Keyword: Implementation, Development Effectiveness, Trans Sumatra Toll Road.

INTRODUCTION

In an archipelagic country that has 17,508 islands, a road network system is a fundamental need to connect people and trade with jobs, services, markets, reduce logistics costs and stimulate industrial growth in Indonesia. Responding to these needs, the government places high connectivity as one of its main priorities. Through Presidential Regulation Number 100 of 2014 which was later amended by Presidential Regulation

Number 117 of 2015, it became the legal basis for the construction of the Trans Sumatra toll road from Lampung Province to Aceh Province.

As the second largest island in the archipelago with a population exceeding 55 million people, the island of Sumatra plays an important role in the country's holistic economy. Blessed with a variety of natural potential and abundant commodities ranging from rubber, palm oil, coffee, petroleum, coal and natural gas, since 2015 the island of Sumatra has been recorded as contributing 22.21% of Indonesia's gross domestic product, the second largest after the island of Java, (BPS, 2023). Therefore, the progress and sustainability of the economy of the island of Sumatra is very important to ensure stability and growth in the region. If growth stops, the development of the surrounding areas will also be hampered.

Infrastructure development in the form of toll roads aims to provide connectivity between regions so that economic activities can run. Economic activities characterized by buying and selling transactions really require connectivity between regions so that goods and services can be exchanged from one region to another. With economic activity in society, economic growth can be increased. This is the importance of developing JTTS so that it can further encourage economic growth.

The construction of toll roads is carried out to facilitate traffic in developing areas, increase the usability and effectiveness of goods and services distribution services to support increased economic growth, ease the burden on the government and increase the distribution of development results and justice, (Law No.38/ 2004 on Roads).

The Indonesian government is focusing on improving the basic infrastructure sector, one of the national priorities is the development of road infrastructure.

A number thousands of kilometers of toll roads are being built and operational. One of them is the Trans Sumatra Toll Road (JTTS) which crosses the provinces of Lampung to Aceh with a main corridor of 2,069 km and a supporting corridor of 919 km.

The development of JTTS can significantly affect the efficiency of logistics costs because inventory turnover becomes faster as a result of faster delivery times and also because insurance and administration costs tend to remain constant. Logistics cost efficiency occurs when delivery times become faster, vehicle maintenance costs become more efficient by up to 10% and there is the potential for other surcharge costs to disappear (baketrans.dephub.go.id, 2022).

A country's logistics costs reflect the level of efficiency of a country in sending goods from the point of origin to the point of destination. Compared to developed countries and other ASEAN member countries, logistics costs in Indonesia are relatively high. The main factor causing this is the inefficiency of current logistics routes, namely the long supply chain for sending raw materials to Indonesia which has to go through consolidated warehouses in Malaysia and Singapore, which is the cause of high logistics costs.

Land use that does not take into account ecological balance can be seen from land that was originally a swamp or rainwater catchment being converted into a JTTS area without considering the capacity of the land (Ritohardoyo, 2002). Macro economic development, especially in toll road infrastructure development policies, should have a positive impact on economic growth, because it will have a number of multiplier effects on all sectors and components in the economy (IMF, 2015; Srinivasu & Rao, 2013).

The construction of toll roads as a means of connectivity between regions, toll roads are expected to become connecting routes and logistics distribution routes for goods and services from peripheral/rural areas to urban areas or vice versa. In management science, logistics involves activities that focus on getting the right quantity of the right product, to the right place, at the right time, and at the lowest cost. The physical distribution of goods which is part of logistics management activities certainly has a big influence on determining the price

of an item. Currently, the physical distribution process of goods still takes quite a long time and causes high distribution costs.

This research aims to explore, identify and analyze determinant factors that can explain variations in their influence on the effectiveness of the construction of the Trans Sumatra toll road, Indonesia, both direct and indirect variations in influence. To obtain more comprehensive and holistic research results, researchers do not only stop at the determinant factors which are independent variables but also other variables such as mediating, moderating and control variables.

The novelty raised in this research is that the researcher identified various determinant factors that can explain variations in their influence on the effectiveness of toll road construction and their impact on the potential economic growth of the region through which the toll road passes, both direct and indirect variations in influence.

Another novelty emerged when researchers also highlighted the performance of regional economic sectors such as the performance of the transportation and warehousing sectors; The performance of the tourism sector and the performance of the agriculture, forestry and fisheries sectors are used as control variables in the research framework to explain variations in their influence on the effectiveness of toll road construction.

METHOD

Research Method

This research uses qualitative methods with a systematic literature review approach. This approach requires a process that is transparent, can be replicated and implemented by other researchers and is coherent. Thus, this approach requires a comprehensive, holistic and rigorous framework for a literature review, (Thorpe et al, 2005; Surucu-Balci, Cagatay & Gokcay, 2024).

Research Location

This research was conducted in the postgraduate library of the Institute of Transportation and Logistics, ITL Trisakti by utilizing access links to international journals provided by the Trisakti University academic community. The research period starts from 10 February 2024 to 25 March 2024 and is carried out in a team that has scientific interests and specialties that are relevant to the issues raised in this research, namely a doctorate in the scientific field of transportation and logistics management.

Data Collection Method

A The data collection in this research used the documentation method using purposive sampling techniques in collecting the data. Several criteria in data collection include:

1. Researchers use journals through international and well-accredited journal links such as the Scopus Elsevier journal link and the Emerald Insight journal link.
2. The journal focuses on publications from the last ten years (2015-2024) to obtain phenomena and novelties from research.
3. The journal studied uses the keyword efficiency of toll road construction which aims to look for determinant factors that influence it, both directly and indirectly.
4. The journal is easily accessible (open access) by both researchers and other researchers, so that the credibility of the data used is maintained and can be trusted.
5. The journal is focused on the scientific fields of management, transportation and logistics management, road infrastructure management and land transportation management,
6. To obtain comprehensive and holistic research results, researchers also used several national and international journal links as complementary data from the two main sources of links used in this research.

Data Processing

The data processing in this research uses the help of statistical software VOSviewer version 1.6.17 which is used to identify and explore thematic content issues from each journal produced by previous researchers which are related to the determinant factors that influence the effectiveness of toll road construction. Then, to get comprehensive and holistic research results, the researcher continued by using NVivo 12 Plus statistical software to find word frequency queries from all journals used and analyze the relationship between one keyword and another keyword by utilizing the output results from cluster analysis, so that obtained variations of factors that become determinant factors.

Analysis Technique

The analysis technique used in this research uses a systematic literature review approach which consists of several stages of analysis including the identification stage (planning the research process); screening stage (conducting the review process); and the included stage (reporting and dissemination), namely in more detail the intended stages as presented below.

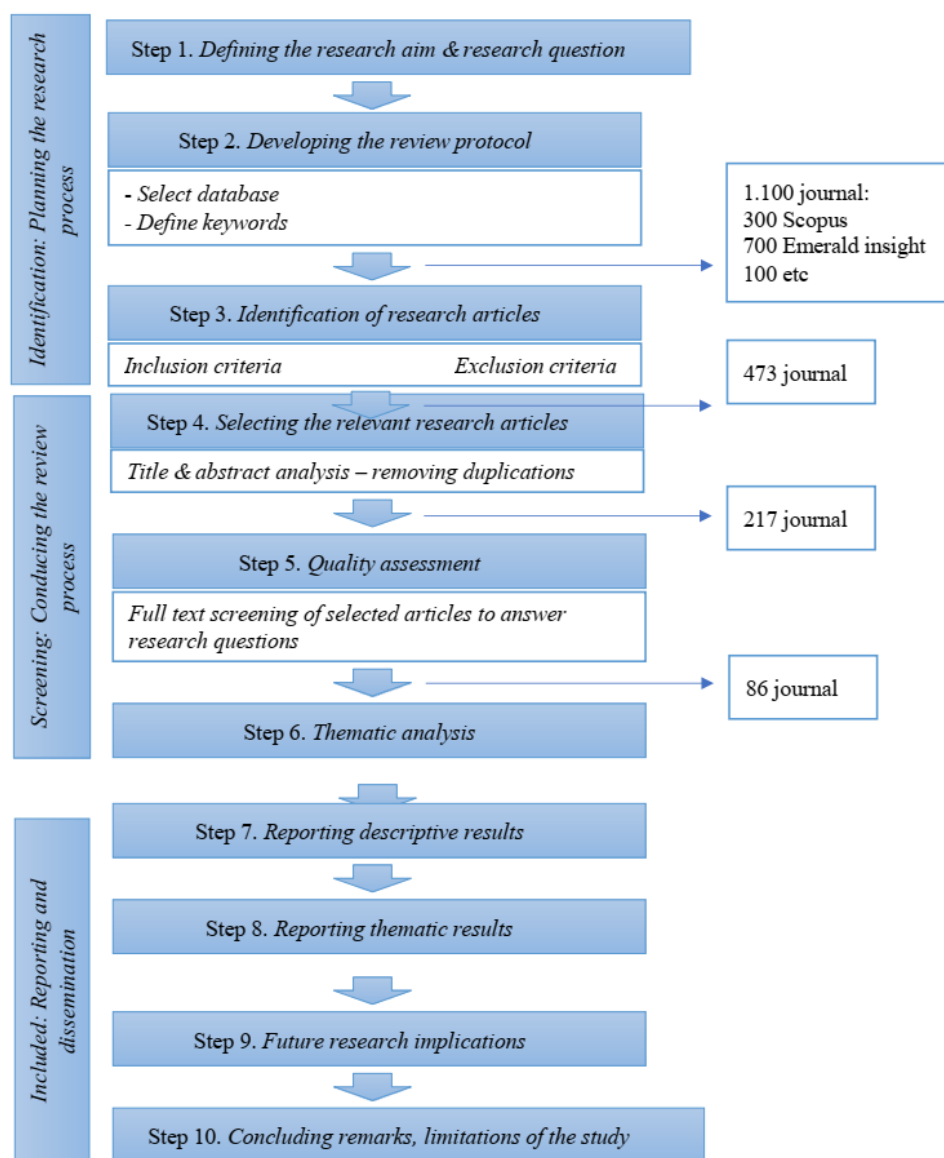


Figure 1. Systematic Literature Review Analysis Stage

Furthermore, the stages of systematic literature review analysis in this research are as follows:

1. Identification stage (planning the research process). This stage includes three steps including: (a) determining research objectives and questions; (b) developing a review protocol which includes selecting a database, determining appropriate keywords and identifying a search strategy involving as many as 1,100 journals; and (c) identifying inclusion and exclusion criteria, namely focusing on journals that conduct research on toll road construction efficiency as inclusion criteria by identifying 473 journals, while the exclusion criteria require researchers to exclude review articles, conference papers and books into the research database including languages other than English and Indonesian were not included in this study.
2. Screening stage (carrying out the review process). At this stage the researcher selected research journals that were relevant, of good quality and the results of data analysis were relevant to the research problems raised involving 217 journals. Title and abstract analysis was carried out to select relevant research journals. At this stage, empirical-based research and journal conceptualization were selected to reveal the context of the development of information exchange via digital platforms. This is done to examine all journals and determine whether the selected journal can answer the research question. At this stage the number of journals used was 86 journals.
3. Stages included (reporting and dissemination). At this stage, reviewing and conducting a thematic analysis includes objectives, constructs used, methods applied and theories adopted. Coding schemes were developed and journals were classified to convert very large data sets into easily digestible and organized formats. The coding scheme was designed to answer each research question determined inductively while reading the journal which includes dynamic capabilities, performance outcomes, barriers and supporting factors as well as their subcategories including the methods and theories adopted, (Surucu-Balci, Cagatay & Gokcay, 2024)

RESULTS AND DISCUSSION

Based on the three stages of systematic literature review analysis above, namely the identification stage, screening stage and included stage, the total journals processed in this research were 1,100, consisting of 300 journals obtained from the Scopus journal link, 700 journals obtained from the Emerald Insight journal link and the rest 100 journals were obtained from various journal links, both national and international, while still referring to the main thematic, namely the efficiency of toll road construction.

Data processing of 300 journals from the Scopus link and 700 journals from the Emerald Insight link was carried out using VOSviewer 1.6.17 software to capture key thematic words from each journal included in this research database and link one thematic issue with other thematic issues to obtain variations. The determinant factors are assessed as being able to explain variations in their influence on toll road construction efficiency variables, both variations in direct influence and indirect influence.

Based on the results of qualitative data processing with the help of VOSviewer statistical software in Figure 2, it can be explained that of the 300 journals that researchers obtained from the Scopus journal link which raised the issue of the effectiveness of toll road construction, previous researchers linked several determinant factors as research variables which were considered to be able to explain variations its influence on the effectiveness of toll road construction. There are several determinant factors that are used as variables to explain variations in their influence on the effectiveness of toll road construction, such as

environmental change factors, namely regional development variables and land use change variables.

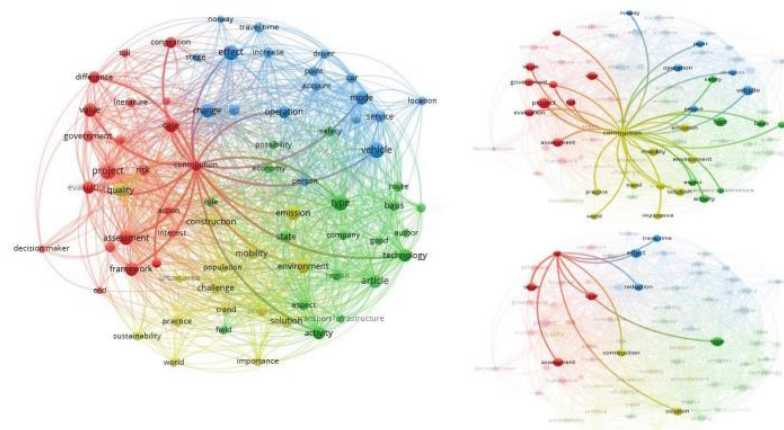


Figure 2. Thematic Identification in Scopus Journal

Furthermore, there are also several previous researchers who have linked other determinant factors such as variations in the effectiveness variable of toll road construction with the value variable of logistics cost efficiency (value), the variable of increasing economic potential (multiplier economic effect) and the variable of road procurement costs (assessment). This variable is thought to be the most dominant determinant factor in explaining its influence on the effectiveness of toll road construction, because these variables are the cause and impact factors of toll road construction activities. To get variations of other variables, researchers also identified thematic issues from 700 journals that researchers found on the Emerald Insight link.

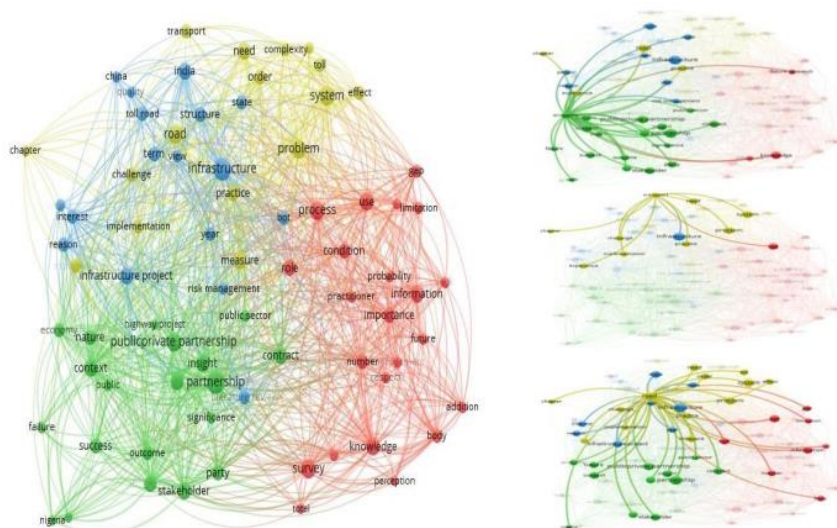
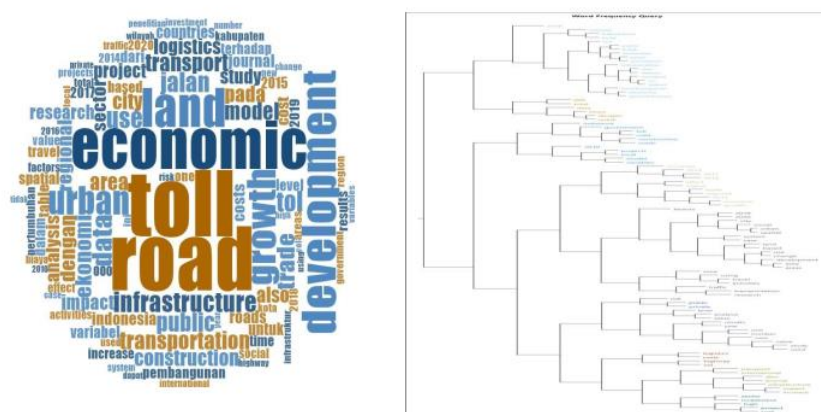


Figure 3. Thematic Identification in Emerald Insight Journal

Based on the results of qualitative data processing with the help of VOSviewer statistical software in Figure 3 above, it can be explained that of the 700 journals that researchers obtained from the Emerald Insight journal link which raised the issue of the effectiveness of toll road construction, previous researchers linked several determinant factors as research variables that were assessed. can also explain variations in its influence on the effectiveness variable of toll road construction.

There are several determinant factors that are used as variables to explain variations in their influence on the effectiveness of toll road construction, such as the variable of increasing economic potential (economic outcomes) achieved from toll road construction activities, including the use of inter-city transportation (transport) business actors for the use of toll roads. which can connect from one city to another in different areas. Apart from that, there are also previous researchers who have linked the effectiveness of toll road construction with the variable costs of toll road procurement (infrastructure projects).

Finally, to obtain more comprehensive and holistic research results, researchers also used various national and international journal links which were deemed to have relevance to the topic being discussed, namely the thematic issue of the effectiveness of toll road construction.



Gambar 4. Thematic Identification in Journals

Based on the results of qualitative data processing in 100 journals from various national and international journal links with the help of Nvivo 12 Plus statistical software in Figure 4 above, several keywords (word frequency queries) were obtained consisting of the words toll road infrastructure development, change in utilization or usage. land, potential for economic growth, development of regional transportation modes, urbanization patterns of communities active around toll roads and several other key words.

The relationship between one keyword and another keyword can also be seen in the results of cluster analysis, such as the traffic flow of goods moving is closely related to logistics efficiency, including the relationship between the volume of vehicles crossing the toll road and the speed of vehicles crossing the toll road. Apart from that, there is a link between toll road construction and the potential for regional economic growth, sources of income for local governments and the performance of business sectors in the areas through which toll road construction passes.

Furthermore, the following are the results of identifying several determinant factors that can be used as variables that can explain variations in their influence on the effectiveness implementation variable for the construction of the Trans Sumatra toll road, Indonesia, namely as presented as follows:

Table 1. Identification of Determinant Factors of Toll Road

No	Faktor Determinan	Referensi
1	Logistics Cost Efficiency	Voronina et al, 2022; Banomyong et al., 2022; Brusselaers et al., 2023; Quak et al., 2016; Soorya et al., 2020; Dwtasari et al., 2020; Karpushko et al., 2021; Xu et al., 2020; Saussier et al., 2015; Kumara et al., 2019; Yulius et al, 2021; Panasyuk et al., 2013; Sharipbekova et al., 2018; Reza et al., 2013; Fauzi et al., 2023; Doll et al., 2017.

2	Regional Development	Zhang et al., 2023; Nohekhan et al., 2021; Maina et al., 2023; Hammes et al., 2021; Domon et al., 2022; Marlon et al., 2011; Risper et al., 2021; Anas et al., 2015; Sungkono et al., 2019; Lupu, 2019; Kumari et al., 2017.
3	Changes In Land Use	Susseno et al., 2015; Truong et al., 2020; Aikous et al., 2023; Tello-Toapanta et al., 2022; Bamrungkhul et al., 2022; Andani et al., 2019; Salim et al., 2022; Sonu et al., 2021; Saffarzadeh et al., 2020; Sihombing et al., 2010; Wahyudi et al., 2021;
4	Toll Road Procurement Costs	Solak et al., 2022; Shu et al., 2021; Chung, 2018; Welde et al., 2020; Costa et al., 2022; Zhao et al., 2022; Romano et al., 2023; Dianasari et al., 2021; Suliantoro et al., 2018; Gross et al., 2011; Kumara, 2019.
5	Regional Original Income	Arumandani., 2023; Utama., 2018; Wahab et al., 2016; Prasetyo et al., 2019; Chairunnisa, 2022; Setyowati et al., 2021; Rante et al., 2017; Parengkuan et al., 2022; Kandyoh et al., 2021; Zou et al., 2018; Nath, 2020; Khakim et al., 2011.
6	Inter-City Transportation	Stokenberga et al., 2021; Andini et al., 2019; Sumaryoto et al., 2020; Zulman et al., 2022; Sembiring et al., 2019; Ayuningtyas et al., 2019; Rizki et al., 2019; Nugraha et al., 2023.
7	Growth In Regional Economic	Siswoyo., 2020; Kandyoh et al., 2021; Marpaung et al., 2021; Omid, 2015; Albalate et al., 2007; Nath et al., 2020; Putra et al., 2023; Ahmad., 2022; Arumandani et al., 2023.
8	Performance Of The Transportation And Warehousing	Xianghui et al., 2016; Munim et al., 2018; Sharipbekova et al., 2018; Karpushko et al., 2021; Pitoy, 2020; Mahroof et al., 2019; Mukiyanto et al., 2015.
9	Tourism Sector Performance	Ruhyana et al., 2023; Manurung et al., 2020; Roffiuddin., 2019; Iqbal et al., 2020; Risper et al., 2021; Ulfa et al., 2018; Wahyudi et al., 2021; Prasetyo et al., 2019.
10	Performance Of The Agriculture, Forestry And Fisheries Sectors	Amfopo et al., 2020; Surya et al., 2020; Yunanto., 2018; Munibah, 2008; Ahmad et al., 2022; Salim et al., 2022; Sonu et al., 2021; Yunanto et al., 2018

Based on the results of identification and exploration of qualitative data, it is known that there are several determinant factors that can be used as research variables in explaining variations in their influence on the effectiveness of toll road construction, including the following:

1. Logistics cost efficiency It is the best comparison between input and output with the resources used as well as the optimal results achieved by using limited resources (Hasibuan, 2010).
2. Regional development It is an effort to utilize the economic potential of the region which aims to increase economic growth, improve community welfare, eradicate poverty, increase competitiveness and reduce regional inequality (Rustiadi et al., 2018; Kumari & Devadas, 2017).
3. Changes in land use These are activities related to efforts to change the use or activities of land that are different from previous activities, whether for commercial, industrial or other uses (Munibah, 2018).
4. Regional original income Referring to Law number 23/2014 concerning regional government, what is meant by regional income is all regional rights that are recognized as an addition to the value of net assets in the relevant budget period. Original regional income is the basic capital for each region in carrying out government and development activities, as well as evidence of the high level of public awareness in supporting the government to explore sources of original regional income. This income can be in the form of revenue obtained from the regional tax sector, regional levies resulting from regionally owned companies, results from the management of separated regional assets, and other regional original income (Mardiasmo, 2002; Halim, 2012; Siahaan, 2016).

5. Toll road procurement costs These are the costs used to finance toll road construction including the main components of material prices, labor wages and equipment operating costs and include the costs of earthworks, pavement work, road drainage costs and other complementary work, (Regulation on Standardization of Cost Analysis of the Directorate General of Highways, Ministry of Works General Number 02/ST/BM37).
6. Inter-city transportation Is the transportation of passengers and/or goods that uses more than modes of transportation in one continuous journey which emphasizes efforts to integrate service networks and infrastructure (Sisttrans, 2005; Justification, Director General of Intermodal Transportation, Ministry of Transportation, 2011).
7. Growth in regional economic potential is an effort to increase production capacity to achieve additional output measured using Gross Domestic Product (GDP) and Gross Regional Domestic Product (GRDP) in a region, (Sumihardjo, 2008; Muktiyanto, 2015; Sasmita, 2013; Sukirno, 2014).
8. Performance of the transportation and warehousing sector is the performance of companies included in the transportation and warehousing sector in a region (Sinaga, 2020; Mahroof, 2019; Pitoy, 2019).
9. Tourism sector performance This is the performance of companies included in the tourism sector in a region (Santosa, 2011; Ramly, 2007).
10. Performance of the agriculture, forestry and fisheries sectors This is the performance of companies included in the agriculture, forestry and fisheries sectors in a region (Azifah, 2016; Khakim, 2011).

Based on the various stages of the results of the systematic literature review analysis above, several determinant factors were obtained which can be used as research variables that can explain variations in their influence on the effectiveness of toll road construction variables and their impact on regional economic growth, both as mediating variables, moderating variables and control variables in The research design that can be used by researchers who are interested in conducting research that raises issues regarding the implementation of the effectiveness of the construction of the Trans Sumatra toll road in Indonesia is as presented below.

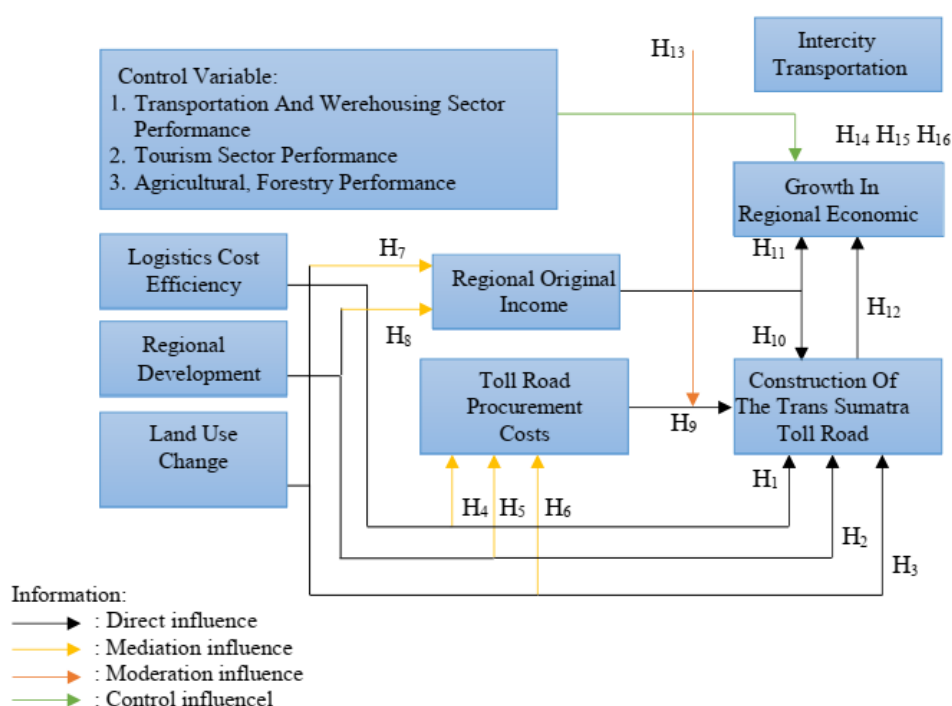


Figure 5. Conceptual Framework

CONCLUSION

The conclusion obtained from the results of the systematic literature review analysis in this research is that various determinant factors can be used as research variables which are considered to explain variations in their influence on the effectiveness of toll road construction including the variables of logistics cost efficiency, regional development and land use changes as independent variables. ; local revenue variables and toll road procurement costs as mediating variables; inter-city transportation variable as a moderating variable; transportation and warehousing sector performance variables, tourism sector performance, and agricultural, forestry and fisheries sector performance as control variables and their impact on regional economic growth as the dependent variable. For researchers who are interested in raising the issue of the effectiveness of toll road construction, this can be a reference for using the variables above in preparing their research design. To obtain comprehensive and holistic research results, researchers can add other variables that are not included in the results of this research.

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