**Review** Article

# Analysis of Economic Impact of Road Transportation Investment in North Sumatra

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Abstract - The Indonesian Government has been trying to improve the investment, especially transportation infrastructure, which has been driving all economic efforts. This kind of accessibility can accelerate the process of inter-districts integration reaching the isolated places so that equal distribution will happen. This research aims to prove the impact of infrastructure investment of road transportation upon the economic development in North Sumatra empirically. Multiplier analysis has to be done figuring out the impact of infrastructure investment of road transportation upon the output and the revenue produced in the area researched. This research has applied Input-Output analysis. As a matter of fact, the value of forwarding linkage of the construction sector is in the third place, and the value of backward linkage of the construction sector is in the first place. However, the superior sector in North Sumatra Province is the industrial manufacturing sector. But, the construction sector is in the first place refers to the value Nevertheless, the value of of multiplier revenue. manpower employment is in fifth place, and the value of multiplier output of the construction sector is in second place. Actually, the infrastructure investment of road transportation has increased the value of multiplier revenue, manpower employment, and output. And the infrastructure investment is able to increase PDRB at all economic sectors in North Sumatra. *Therefore, the* government should have prepared a policy or regulation which can increase the investment of private sectors because it can provide a significant impact on the economics of the district and can reduce the government budget expenditure.

*Keywords* - *Investment, Road transportation, Multiplier, Input-Output analysis* 

#### I. INTRODUCTION

National Revenue has been increasing each year, explaining that the economic development is getting better for a country. A huge national revenue has been produced by varied driving factors such as either state investment or private investment. Investment can increase national revenue and economic development thru a multiplier mechanism. Nowadays, the Government of Indonesia has been trying so hard to increase investment, especially in the transportation infrastructure, which is the supporting agent of all the economic activities. People's economics will be developing if they have a good accessible transportation facility and infrastructure. This kind of accessible facility can speed up the process of interarea integration reaching the isolated place in order to spread out the evenness distribution of country development. This transportation facility has been opening business trading opportunities for some districts and has been reducing the differences in infrastructure conditions. However, it could accelerate the development of the related area. Having such the transportation, it is expected that it could vanish the isolated area and give a stimulant of area development at all sectors such as trading and industries or other sectors which are distributing to all area.

2004 the investment value of domestic In transportation was Rp 1,887.7 billion. However, it had been decreasing for years after, nevertheless it had increased significantly in 2010 for the total amount of Rp 13.787.7 billion. From 2011 up to 2012, the investment had been decreasing, but in 2013 it had increased to Rp 13,178.4 billion. The fluctuation of transportation investment affected the National Revenue (PDB) in every It has happened due to each sector economic sector. requiring the transportation (distribution) facility such as road transportation either getting the raw materials or performing the marketing. And transportation sector can be multiplier effects for other sectors. It means that the more the development of transportation happens, the more the development of other sectors will be. Therefore, the transportation sector could produce a positive effect for other sectors overall. The availability of road transportation infrastructure does not only enable to speed up the goods distribution and people movement, but also is able to get the optimal economic resources allocation, and in the end, it will reduce the inter-district economic imbalanced.

In Indonesia, which is a big archipelago country, road transportation, as well as effective crossing transportation infrastructure which can reach an isolated area, is very important, since it is not only making people mobility easier but also making goods and services distribution easier. In spite of being the breath of economics, road transportation is also the key role of the development of the small island, which is a front-liner and isolated island, and it has made inter-island connection in Indonesia come true. It aims this research to prove the impact of infrastructure invesment of road transportation upon the economic development in North Sumatra empirically.

#### **II. LITERATURE REVIEW**

Economic development is one of the goals of district economics development. Economic development in a particular area is influenced by some factors, one of the factors is the development of the infrastructure sector. However, the research about the correlation between economic development and infrastructure has been done quite a lot. Infrastructure is a key role in promoting or maintaining rapid economic development. A well-designed of infrastructure has made inclusive development thru the benefits sharing for poor people and the community, especially it can develop a connection of isolated areas and countries to the main business small centers (Bhattacharyay, 2010).

Saleh (2014:12) describing that infrastructure is required not only to improve the competitiveness of investment, production, and trading, but also to accelerate the evenness of development distribution in order to reduce poor and jobless people. . It is in line with Genie (2004 mentioned on Permana and Asmara, 2009:49) describing that refers to macroeconomics, the infrastructure of service facility will affect marginal of private capital, but productivity refers to microeconomics it is affecting the production cost reduction. Todaro and Smith (2011:226) have described that the availability of the infrastructure is the most important thing for a country to speed up and spread out the economic development. And economic development of a district relies on the availability of infrastructure in the It is in line with some previous related district or area. researches. In the research of Shi (2013) refers to the objects of the research in China, she has defined that in order to increase the Gross Domestic Product (GDP) of the country, one of the crucial requirements is to develop better infrastructure construction in the public investment sector.

Asian Development Bank (2012:14) determined that infrastructure is a key role in economic development and poverty reduction either directly or indirectly. Infrastructure construction is creating additional job and economic activities, reducing production costs thru the transportation of the related area, improving the production overall, providing better distribution to the market and economic centers, and improving access to other main facilities. As a matter of fact, infrastructure is just like a machine or wheels of fortune for the economic activity, which is the input and output of developing countries, and almost all productivity sectors have been affected by the infrastructure itself. However, the infrastructure of road transportation, especially transportation networks, has been building up the structure of national coverage, which has a strong connection with either the economic development of a district or the social culture of the society. In the context of economics, road transportation is society's social investment as the resource of economic development. Nevertheless, it is very difficult to achieve economic development without having proper road transportation. Tambunan (2005), cited by Arman (2008), defined that the economic benefit of road infrastructure is affected by a proper infrastructure construction that can meet society requirements and business development. Tambunan has indicated that the benefit of infrastructure variable (measured based on the length of asphalt road) upon varied vegetable products in Java has been significantly affecting vegetable products instead of irrigation construction. Furthermore, he has indicated that infrastructure is a driving force of economic development. Nevertheless, infrastructure has provided the benefit of economic sector improvement since it is considered as social overhead capital (Hirschman mentioned on Permana (2009:11).

In order to reach the goals of this research, there are some steps to be done which are described in Fig 1. Since the infrastructure construction of road transportation as a driving force for economic growth is very important, analysis and evaluation of the impact of infrastructure investment of road transportation upon the economics should have to be performed comprehensively according to the economics macro requirement. Measuring the impact of infrastructure investment of road transportation applying partial microanalysis instrument to identify cost and benefit basically is not strong enough. The weakness of this effort is that it cannot accurately measure cost and partial profit as well as multiplier impact produced overall. Profit and cost identification, either directly or indirectly. has produced particular difficult circumstances during the analysis. Therefore, it is very crucial to include partial aspects and interconnection between the economic sector and authority institution, so that multiplier impact upon other industries and the distribution of people prosperity can be measured accordingly.

The stages of the research are described in Fig 1. In general, there are some stages to be respected in this research. The primary stage is to inventory secondary data such as Table IO in north Sumatra, economic indicators, and other relevant data. Furthermore, the observation about the planning of infrastructure construction of road transportation must be done to obtain a primary description of various types of road transport infrastructure, which one of them has been constructed and which one of them has been activating. All secondary data have been reconciled or checked and rechecked to figure out its validity so that the data are reliable to be used as data resources. However, a multiplier analysis has to be done to figure out the impact of infrastructure investment of road transportation upon the output and the revenue received in the area of the research. Based on the result of multiplier calculation, an analysis of interconnected sectors can be performed to find out to what extent the development or changing of a certain

sector has affected other developing and changing sectors or it has been affected by other developing or changing sectors. Both analyses above have been done after getting thru the data on the Input-Output Table in North Sumatra. Instead of using the data on the Input-Output Table, an analysis of economic development can be done to obtain the comparison between before and after the infrastructure of road transportation being constructed and when it is activating. The last stage is to perform an evaluation of each result of analysis to find out the benefit of the infrastructure development of road transportation upon the economic development overall.



Fig. 1 Conceptual Design

#### **III. METHODS**

Data required in this research are as the following:

- Data related to the planning of infrastructure development of road transportation as the following, but it is not limited to DED, feasibility study, or similar study.
- Data of the investment or budget spending for the infrastructure construction of road transportation (from APBN and or APBD), which has been activated minimum a year.
- Data of Input-Output in North Sumatra.
- PDRBP in North Sumatra.
- Economic Development in North Sumatra
- Indicator of Economic Macro in North Sumatra

The data analysis method used the input-output analysis. Table I-O is a statistical information system being prepared in matrix figures describing the transaction of goods and services in the economic sectors. Aspects that are going to be indicated on the table I-O are that each sector is related to/dependent on each other. To what extent is the dependence of a sector can be identified by the input used in the production process.

#### **IV. RESULTS AND DISCUSSIONS**

Development of bus stations and crossing ports construction, either river crossing ports or lake crossing ports in North Sumatra, has been providing a positive impact to the social economics. Based on field observation, crossing port in Sibolga has been activating, and new business opportunities are opened, such as food and beverages stalls, and they are still working on it at the moment. A resource person who is on the field says that: "Since this crossing port has been activated, it can be assumed that those food and beverages stalls can cover their operational cost and goods purchased to sell".

Activating this port, passengers are more comfortable crossing the lake or river since it has provided a comfortable rest area completed with parking lots. One of the resources persons who use a ferry(small passenger ship crossing the sea/lake) says:

"At this moment, the facility of the passengers is better, and it has made people easier go back home to Nias to see their parents. They do not find any difficulties to get public transportation to Sibolga".

A complete description of the development of road transport infrastructure in North Sumatera during the period of this study (2012-2016) was described in table 1 here below:

No.	Investment: Construction of Road Transportation Infrastructure	Total Investment	Year
1	Developing land area of Ferry port Sibolga construction at Sibolga(including supervising)	4.011.184.000	2013
2	Developing river port construction at Port Paluh Subur Kab. Deli Serdang (including supervising)	2.292.230.000	2013
3	Developing river port construction at capital city of Kec. Muara Batang Gadis Singkoang Kab.Madina - first step (including supervising)	4.500.000.000	2013

Table 1. List of the Construction of Road Transportation Infrastructure in North Sumatra period 2012 - 2016

4	Developing/improving lake port construction at Ajibata Kab. Tobias (including supervising)	3.357.127.000	2013
5	Developing/improving lake port construction at Haranggaol Kab. Simalungun (including supervising) - completed.	4.819.336.000	2013
6	Developing/improving lake port construction in Nainggolan Kab. Samosir (including supervising.	1.833.172.000	2013
7	Developing/improving lake port construction in Mogang Kab. Samosir/Falifi (including supervising)	2.872.413.000	2013
8	Developing/Improving Lake Port construction in Bontaen Lotung Kab. Samosir (including supervising)	2.872.413.000	2013
9	Developing Crossing Port Ro-Ro construction at Gunung (mountain) Sitoli. Gunung Sitoli city by pass Sibolga- Gunung Sitoli First step (including supervising)	10.000.000.000	2014
10	Developing River Port construction at the Capital City of Kec. Muara Batang Gadis Singkoang Kab. Madina Second Step (including supervising)	3.762.290.000	2014
11	Developing Bus Station construction Type A Amplas(finishing)	10.000.000.000	2014
12	Developing Bus Station construction Type A Amplas (finishing)	5.800.000.000	2015
	Jumlah	56.120.165.000	

## A. Infrastructure Development of Road Transportation in connection with Input-Output Model

In connection with an analysis of the input-output model referring to the transaction table in North Sumatra, infrastructure development of road transportation has been placed into other construction sectors. Output is defined as goods and services produced in a certain area without looking at the owner of production factors which is available in that area; however, it is identified as domestic output or domestic product. In general, the output is calculated based on multiplying the goods or services volume with unit price or tariff, for example; Output of construction sectors is all amount of the projects which has been done during the period of calculation, without considering whether the project either has been completed or not during that period.

#### B. Backward Linkage and Forward Linkage Analyses

Backward linkage or deployment power has been indicating the total domestic output produced by all economic sectors due to the increase of one unit of the last requirement at a particular sector. The higher the backward linkage of one sector has happened, the bigger the power of that sector will be in the economic development. The higher the index of deploying power( IBlj)of the economic sector has happened, the bigger the power of that sector will be in other sectors development, it indicates that linkage of that sector with other sectors is quite big.

Linkage of inter sectors is depicted to what extent of output has been produced by a particular sector as the result of increasing the last requirement at all economic sectors. This inter-sectors linkage is defined as forwarding linkage or degree of sensitivity of the sector. Index of the degree of sensitivity (IFLj) is a measurement of total impact upon the output of the sector due to using the output of this sector by other sectors as an input. The higher the index of sensitivity happens, the bigger the index of sensitivity of the related sector will happen due to the development of other sectors which have been using the related sector for their production process.

Table 3 below is the analysis of forwarding linkage and backward linkage arranged by using the aggregation (classification of similar sectors) of 71 business sectors mentioned on the Table of Input and Output North Sumatera Province year 2000, which was aggregated to be 17 sectors.

		Linkage	
No.	Sector	(Backward	(Forward
		Linkage)	Linkage)
1.	Agriculture, Forestry and Fishery	0.9023	1.6487
2.	Mining and Excavation	0.8369	0.8068
3.	Processing Industry	1.2246	3.4549
4.	Electricity and Gas Supply	1.1391	0.7493
5.	Water Supply, Waste, Garbage, and Recycle Management	0.9946	0.6849
6.	Construction	1.3430	0.9483
7.	Big Distributor and Retails, Cars and Motorcycles Workshops.	0.8352	1.2043
8.	Accomodation, Food and Beverages supply	1.1850	0.7295
9.	Transportation and Warehousing	0.9384	0.9194

Table 2. Analysis of forwarding Linkage and Backward Linkage, North Sumatera

10.	Information and Communication	0.9438	0.7424
11.	Financing and Insurance Company	0.8303	0.7558
12.	Real Estate	0.9739	0.7490
13.	Company services	1.0120	0.7341
14.	State Administration, Defense Administration and Obligation of Social Security Administration	0.6520	0.6520
15.	Educational services	0.8927	0.7171
16.	Health and Social Activity Services	1.1301	0.7174
17.	Other services	1.1661	0.7861

On table 2 above has depicted the analysis of forwarding linkage and backward linkage describing the value of forwarding linkage and construction sector, which is on the third place having the value of forwarding linkage of 0.9483, after processing industry sector, agriculture and fishery, and forestry sectors and big distributor and retails, car and motorcycle workshop. It has explained that every increase of the last requirement of 1 rupiah, the output of construction sector which is directly sold or allocated to another sector will be increasing 0.9483 rupiahs. However, it has indicated that the construction sector has had big efforts to drive the development of downstream/end sectors which is the user of the output of the construction sector.

Referring to Table 2, it has depicted that the value of backward linkage of construction sectors is in the first place, which is 1.3430. This value has explained that if the last requirement is increased by one rupiah of construction, the requirement of construction sector input upon other sectors as well as the construction sector itself will increase by 1.3430 rupiahs. This value has indicated that the construction sector is having a bigger effort driving the development of upstream sectors as input of the supplies at construction sector rather than sensitivity efforts upon other sectors.

Nevertheless, the construction sector is not automatically becoming the superior sector because it is not in compliance with the value of the index of deploying effort (IBLj) and index of sensitivity degree (IFLj), requiring that being superior economic sector it should have had the value of both IBLj and value of IFLj which is bigger than one and IFLj is bigger than IBLj value. In this analysis, Table 2 has indicated that the industrial processing sector has an IBLj value of 1.2246 and an IFLj value of 3.4549, which is the superior economic sector in North Sumatera. The superior sector is related to the spreading index and sensitivity index in North Sumatera, which has indicated that infrastructure construction investment of road transportation has been driving the development of the industrial processing sector, which is relatively massive compared to other sectors, either in the production line or distribution line.

### C. Impact of Road Transportation Infrastructure Construction upon Economic Indicator Change.

Multiplier figure is applied to define direct impact and indirect impact of output changes due to end/final requirement which has been changed. This study has applied total effect covering the effect of output increment of economic sectors, which has been organizing direct input of the related sector and the effect of output increment of other economic sectors.

In order to find out the impact of infrastructure construction of road transportation upon the revenue, calculation of multiplier figures has been done based on Table I-O North Sumatera Province by involving the investment value or budget of road transportation infrastructure construction. After involving the investment of infrastructure construction of road transportation into the revenue, the description has depicted them on table 3 below:

No.	Sector	Multiplier before the investment	Multiplier after the investment	(%) Increment
1.	Agriculture, Forestry and Fishery	1.2085	1,7929	0,5845
2.	Mining and Excavation	1.5907	5,1624	3,5717
3.	Processing Industry	2.3072	3,0773	0,7701
4.	Electricty and Gas Supply	6.4580	14,6099	8,1519
5.	Water supply, Waste, Garbage and Recycle Management	2.6651	11,1168	8,4516
6.	Construction	15.4873	23,4122	7,9249
7.	Big Distributors and Retails, Cars and Motorcyles Workshop	1.2168	2,0103	0,7935
8.	Accomodation, Food and Beverages Supply	2.2809	4,9700	2,6891
9.	Transportation and Warehousing	1.5736	3,5904	2,0168

Table 3. Multiplier Figure of The Revenue Before and After Investment, North Sumatera

S. G. Prasetya & Yustiana Wardhani / IJEMS, 7(2), 3-11, 2020

10.	Information and Communication	1.8999	6,5453	4,6455
11.	Finance and Insurance Services	1.2428	4,7154	3,4726
12.	Real Estate	1.8213	4,7526	2,9313
13.	Company Services	3.9863	12,9317	8,9453
14.	State Administration, Defence and Obligation of Social Security Administration	1.0000	1,1195	0,1195
15.	Educational Services	2.1501	6,2378	4,0876
16.	Health and Social Activities Services	7.8453	23,0824	15,2371
17.	Other Services	1.6947	3,9005	2,2058

Referring to the result in Table 3, it has indicated that the construction sector has been in the first place at multiplier value of the revenue, which is 23.4122, it means that if the last requirement of infrastructure sector has increased one point of rupiah, it will increase family income at all economic sectors of 23.4122 rupiahs. However, increasing multiplier value has happened due to infrastructure investment of road transportation which is a relatively big value compared to other sectors which are 7.9249 % and it has taken the fifth place. This circumstance has indicated that the amount of infrastructure investment of road transportation provided by North Sumatera Province Administration is a relatively huge value compared to the investment of all construction sectors, instead of electricity and gas supply, water supply, waste, garbage, and recycle goods processing, company service, and health service as well as social activity indicating that multiplier increment of construction sector after the investment is relatively big.

In order to find out the impact of infrastructure construction of road transportation upon manpower employment, therefore, multiplier figures have been calculated based on Table I-O of North Sumatera Province and have involved the investment value/amount or budget of infrastructure construction of road transportation. After having been involved in the elements of infrastructure construction of road transportation upon the revenue, Table 4 below has indicated the related figures.

Table 4. Multiplier_Figures of Manpower Employment before and after the investment North	Sumatera
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		Multiplier Value	Multiplier Value	Development
No.	Sector	Before the	After the	(% Increment)
		Investment	Investment	(70 merement)
1.	Agriculture, Forestry and Fishery	2.5711	3,6237	1,0526
2.	Mining and Excavation	1.8556	3,8621	2,0065
3.	Processing Industry	4.3276	6,4584	2,1307
4.	Electricy and Gas Supply	1.1187	2,6384	1,5137
5.	Water Supply, Waste, Garbage and	1 6544	5 0607	1 3153
	Recycle Management	1.0344	5,9097	4,5155
6.	Construction	2.0927	3,1975	1,1048
7.	Big Distribution and Retails, Car and	1.0636	1 7507	0.6871
	Motorcycle Workshop	1.0050	1,7507	0,0071
8.	Accomodation, Food and Beverages	1 5406	3 0585	1 5179
	Supply	1.5400	5,0505	1,5177
9.	Transportation and Warhousing	1.1979	2,3927	1,1948
10.	Information and Communication	2.2947	5,5712	3,2765
11.	Finance and Insurance Services	1.1299	3,6672	2,5373
12.	Real Estate	2.2974	4,4231	2,1257
13.	Company Service	1.4784	4,4052	2,9268
14.	Government Administration, Defence			
	and Obligation of Social Insurance	1.0000	1,6670	0,6670
	Administration			
15.	Educational Services	1.2198	3,4696	2,2498
16.	Health and Social Activity Service	1.7803	5,0395	3,2592
17.	Other Services	1.4053	2,8431	1,4378

Referring to the multiplier value on the 4, it has indicated all multiplier values of manpower employment of each economic sector after investing the infrastructure of road transportation. Multiplier value of manpower employment of construction sectors has been on 11th place with the value of 3.1975. This value has indicated that if the last requirement of the construction sector is increased by one unit rupiah, manpower employment of all economic sectors will increase by 3.1975.

If we look at the increment value, after investing in the infrastructure of road transportation, the multiplier value of construction has increased 1.1048 %. This positive increasing value has indicated that the infrastructure investment of road transportation is able to give a positive impact upon the increment of manpower employment in each sector.

The increment value of 1.1048 %, which is relatively small, and has taken 14th place. It is indicated that the value of infrastructure investment of road transportation provided by North Sumatera Province is relatively small if it is compared to the investment value of the construction sector in overall and other sectors. Nevertheless, it is related to the character of workers in the construction sector who are temporary workers instead of permanent workers.

The output of multiplier value has indicated that the total value of the output produced by the economic sector has been covering any changes of one unit of the last requirement in a related sector. In order to find out the impact of infrastructure construction on-road transportation, the calculation of multiplier value is based on Table I-O North Sumatera Province by involving the investment value or budget of infrastructure construction of road transportation. After involving the elements of investment infrastructure construction of road transportation, Table 5 below has described the output of its economics.

No.	Sector	Multiplier Value Before Investment	Multiplier Value After Investment	Change
1.	Agriculture, Forestry and Fishery	1.1042	1,6216	0,5174
2.	Mining and Excavation	4.7726	9,4929	4,7203
3.	Processing Industry	29.5112	43,5349	14,01237
4.	Gas and Electricty Supply	6.1672	12,7597	6,5924
5.	Water Supply, Waste, Garbage, and Recycle Management.	1.6089	6,6351	5,0262
6.	Construction	20.1461	30,6350	10,4889
7.	Big Distributors and Retails, Cars and Motorcyles Workshop	1.1473	1,6583	0,5110
8.	Accomodation, Food and Beverages Supply	1.3083	2,9007	1,5924
9.	Transportation and Warehousing	1.5165	3,0262	1,5097
10.	Information and Communication	1.4600	4,7764	3,3163
11.	Finance and Insurance Services	1.4273	3,6286	2,2012
12.	Real Estate	7.7324	13,6591	5,9267
13.	Company Service	2.5006	8,2768	5,7762
14.	Goverment Administration, Defense and Obligation of Social Insurance Administration	1.0000	4,3350	3,3350
15.	Educational Service	1.8885	4,8951	3,0066
16.	Health and Social Activity Service	2.4696	7,7419	5,2723
17.	Other Services	2.4008	5,0477	2,6470

The output of multiplier value in Table 5 has indicated an output of multiplier value at each economical sector after investing the infrastructure of road transportation. Output multiplier value of the construction sector has taken 2nd place with a value of 31.6350. This value has indicated that each increment of one unit rupiah of the last requirement of construction value will be increasing the output of all economical sectors by 30.6350 rupiahs. Looking at this increment value, after investing in road transportation infrastructure, the multiplier value of construction has increased 10.4889 %. This increase has indicated that infrastructure investment of road transportation is able to give a positive impact upon the increasing of sector output. Therefore, having the relatively increasing value of 10.4889 % and having been in 2nd place, it is indicated that value of infrastructure investment of road transportation provided by North Sumatera Province which is relatively big compared to the investment value of construction sector in overall and other sectors, instead of Processing-Industrial Sector, increasing multiplier value of construction sector after the investment is relatively big.

The calculation of the impact of infrastructure investment of road transportation has stimulated the increase of investment of infrastructure sector during 2014 – 2016 with the investment value of Rp 56,120,165,000. This investment has covered subsectors supporting the infrastructure sector of road transportation such as station, port, and heavyweight measurement equipment.

	Table 0. Impact of Road Transportation Imras	PDRB Before	PDRB After	
No.	Sector	Investment (Million	Investment (Million	Increment
		Rupiah)	Rupiah	
1.	Agriculture, Forestry and Fishery	115.190,25	178.654,57	63.464,32
2.	Mining and Excavation	6.581,44	33.868,07	27.286,63
3.	Processing Industry	93.241,47	782.938,58	689.697,11
4.	Gas and Electricity Supply	597,74	5.004,39	4.406,65
5.	Water Supply, Waste, Garbage and Recycle Management	441,82	3.419,20	2.977,38
6.	Construction	60.232,62	614.788,87	554.556,25
7.	Big Distributors and Retails, Cars and Motorcycles Workshop.	78.324,82	129.414,40	51,089,58
8.	Accomodation, Food and Beverages Supply	22.990,25	72.206,33	49.216,08
9.	Transportation and Warehousing	10.598,78	29.286,75	18.687,97
10.	Information and Communication	9.594,39	47.788,77	38.194,38
11.	Finance and Insurance Service	15.738,02	60.385,88	44.647,86
12.	Real Estate	20.078,79	109.008,41	88.929,62
13.	Company Service	4.224,04	35.316,25	31.092,21
14.	Goverment Administration, Defense and Obligation of Social Security Administration	16.427,96	44.803,40	28.375,44
15.	Educational Service	8.848,51	40.235,12	31.386,61
16.	Health Service and Social Activity Service	4.020,16	45.245,71	41.225,55
17.	Other Services	2.332,95	7.993,57	5.660,62
	Total	469.464,01	2.240.358,26	1.770.894,25

Based on Table 6 using multiplier output instrument and revenue of each sector, it has indicated the impact of infrastructure investment upon the economy of North Sumatera upon PDRB Increment. According to PDRB increment, the impact of infrastructure investment has been able to increase PDRB at all economic sectors in North Sumatera, reaching Rp 1,770,894,250 million. Macro-Economic Development is usually being indicated by the amount of Bruto Regional Domestic Product (PDARB). The result of PDRB, which has been stimulated, has reached about 76.53%. However, the PDRB increment of the related investment has positively affected the economic sectors. Nevertheless, the value of Simulation of infrastructure Investment within 3 years has been developing the economic sectors about 76.53%, along with the construction sector increment of 9.21%.

#### **V. CONCLUSION**

- Forward linkage and backward linkage Referring to the value of forwarding linkage, the construction sector is in 3rd place, and the value is about 0.9483. The value of backward linkage of the construction sector is in 1st place, and the value is 1.3430. And the superior sector in North Sumatra Province is the industrial processing sector.
- Construction sector is in the first place, having a multiplier value of the revenue of 15.4873. Multiplier value of manpower employment is on the

fifth place having the value of 2.0927, but multiplier value of construction sector output is on the second place having the value of 20.1461.

- The infrastructure investment of road transportation has put the multiplier value of the construction sector in the first place and the multiplier value of the revenue of 23.4122 (increasing about 7.9249 %). Multiplier value of manpower employment is on the fifth place, and the value is 3.1975 (1.1048 % increasing), but output multiplier value of construction sector is on the second place having the value of 30.6350( increasing about 10.4889%)
- Impact of infrastructure investment of road transportation upon PDRB. Infrastructure investment has been able to increase the PDRB of all economic sectors in North Sumatera, which is Rp 1,770,894.250. The increase of PDRB obtained in the simulation is about 76.53%.

#### RECOMMENDATION

- Equitable development of infrastructure at each province in Indonesia should have been reducing the differences of inter-district economics.
- The Ministry of Transportation should have made a kind of policy that can improve the investment with private sectors. Therefore it is expected to give a significant impact on the economics of the district as well as reduce state budget expenditures.

• Improvement of State expenditure thru the Ministry of Transportation is required to make strong economical development come true by increasing the infrastructure investment.

#### REFERENCES

- Badan Pusat Statistik, Produk Domestik Regional Bruto Menurut Lapangan Usaha Provinsi Sumatera Utara 2012-2016, (2017). (Center of Statistic Bureau, Gross Regional Domestic Product According to Business Field in North Sumatera Province period 2012-2016, 2017)
- [2] Badan Pusat Statistik, Produk Domestik Regional Bruto Menurut Pengeluaran Provinsi Sumatera Utara 2012-2016, 2017. (Center of Statistic Bureau, Gross Regional Domestic Product According to Spending in North Sumatera period 2012-2016, 2017).

- [3] Biswa, Bhattacharyay, Financing Asia's Infrastructure: Modes of Development and Integration of Asian Financial Markets, (2010).
- [4] David Canning dan Peter Pedroni, The Effect of Infrastructure on Long-Run Economic Growth, (2004).
- [5] David Canning, Infrastructure's Contributions to Aggregate Output, (1999).
- [6] Filippo Schilleci, Vincenzo Todaro, Francesca Lotta, Connected Lands: New Perspectives on Ecological Networks Planning, (2007).
- [7] Kathy Schwalbe, Introduction To Project Management, (2002).
- [8] Robert J. Kodoatie, Manajemen dan Rekayasa Infrastruktur, Pustaka Pelajar, (2003).(Management and Infrastructure Engineering)
- [9] William R. Dillinger, Poverty and Regional Development in Eastern Europe and Central Asia, (2004).