PROJECTION OF INVESTMENT AND INCREMENTAL CAPITAL OUTPUT RATIO ANALYSIS OF NUSA TENGGARA BARAT PROVINCE

ABSTRACT

Aims: This study aims to project investment in the Province of NTB.
Study design: This research is a quantitative research using secondary data for analysis. Place and Duration of study: West Nusa Tenggara, Duration of study from September to December
Methodology: There are two analytical tools used, namely trend analysis to make investment projections based on the MAPE (Mean Absolute Percentage Error) and MAD (Mean Absolute Deviation) values. Furthermore, investment needs are analyzed using the Incremental Capital Output Ratio (ICOR).
Results: Based on the results of the study, it was found that the investment trend in NTB was using the exponential growth model. Based on ICOR analysis, the average ICOR value in 2011 – 2020 is 12, 11 with the assumption of a lag of 0, and reaches 8 with a grace period of 3 years. If it is assumed that the ICOR value of NTB has not changed, namely 8, then with economic growth of 7% as targeted in the RPJMD 2109-2023, an increase in investment of 56% is needed, even though if viewed from the average increase in investment, it was only 43% in 2016 – 2020.
Conclusion: The projection carried out in this study only uses trend analysis. In subsequent research, the use of other analysis tools to projections such as the use of dynamic systems and modeling can be done so that the projection of investment needs can be in accordance with the regional concert.

Kata Kunci: ICOR; MAPE; MAD; analysis trend; investasi

1. INTRODUCTION

Investment developments are one of the factors that influence economic growth (Ariska et al., 2016). Investment carried out appropriately can support the improvement of the welfare of the Indonesian people (Purwadi et al., 2018). The higher the economic level of a country, the higher the ability of a country in prospering the community. Investment is one of the economic growth driving machines. In the closed economy, the source of investment funds comes from domestic savings, while the open economy of funding sources can be obtained through foreign loans (Kuncoro, 2010).

The target of economic growth has been determined in the economic development planning of an area. One source of economic development is an investment. For this reason, in achieving the economic growth target, an indicator is needed by investment known as the incremental capital-output ratio (ICOR), namely additional output and additional capital. The Harrod-Domar model associates the influence of additional capital stocks against output called ICOR. This ICOR calculation is used to determine the amount of investment needs at the economic growth rate. ICOR coefficient value is an overview of investment efficiency implanted in an area or in a country in a certain period. The higher the ICOR, identify the possibility of injecting in the use of investment. Conversely, low ICOR shows efficiency in the use of capital. The Province of West Nusa Tenggara (NTB) has a mass related to regional investment.

Increased investment, government cooperation and business entities ,and ease of licensing are the goal of performance in supporting the NTB mission which is towards NTB Sejahtera and Mandiri through poverty reduction, reducing the gaps, and inclusive economic growth that relies on agriculture, tourism, and industrialization. Increasing the realization of investment is the main performance indicator (IKU) in the field of investment found in the

Document of the Regional Medium-term Development Plan (RPJMD) of the NTB Province of 2019 - 2023. Based on data obtained from the Investment Office and Integrated Service One Door (DPMPTSP) of NTB Province, the achievement of investment realization in 2019 was 62.65%. However, because of the Pandemic Covid-19, the target change at the NTB Provincial RPJMD in 2019 - 2023. Thus, the achievement of investment realization in 2019 became a baseline or initial value at the RPJMD. The achievement of investment realization in 2020 was 100.23%, which meant that in 2020, the investment target was reached. The realization of investment per sector for each PMA (foreign investment) and PMDN (domestic investment) can be seen in Table 1.

Tabel 1. Realization PMA/ PMDN per Sector

No	Sector	PMDN		PMA	
		2019	2020	2019	2020
1	Tourist	1.088.214.867.228	694.145.315.315	1.840.003.268.613	769.024.365.885
2	Transportation transportation	1.908.976.176.462	1.486.915.009.167	229.963.976	60.571.335.000
3	Trading	164.661.911.369	248.356.777.217	9.325.219.798	6.486.775.216
4	Agriculture	7.447.830.070	2.860.309.150	148.251.201	-
5	Fishery	89.202.137.477	85.169.482.914	21.408.413.400	20.201.006.000
6	farm	100.460.006.445	36.237.161.722	-	-
7	Mining, energy, electricity	1.839.430.518.209	3.898.881.757.860	2.201.142.868.774	3.485.723.043.710
8	Industry	267.430.297.032	544.776.583.769	20.438.693.816	4.662.096.377
9	Other services	15.148.685.063	29.087.967.699	64.524.397.963	45.047.798.696
10	PUPR	15.734.008.218	46.909.694.246	167.386.456.266	90.563.822.100
11	Health	199.575.549.331	43.824.159.039	6.385.000	335.165.517
12	Cooperative	2.897.010.499	270.000.000	-	-
13	Environment			-	565.333.806

Source: DPMPTSP Province NTB, Data is processed

Based on Table 1, it can be seen that there are five leading sectors in PMDN and PMA from 2019 to 2020, namely the mining, tourism, transportation, fisheries, and industry sectors. Investment research is carried out by Ariska (2016) regarding the impact of investment on the economy. The results of the peenlitian stated that the investment in the industry sector was very influential on the economy in East Java. Other studies were also carried out by Devi and Indrajaya (2014) concerning the Analysis of Investment Needs for Potential Sectors in the Buleleng Regency. This research uses ICOR analysis. The results of this study indicate that the result was found that sector who became the potential sector in Buleleng Regency, namely the agricultural sector with the sub-sector of foodstuffs, plantation crops, sub-sectors of the farm and the results (Devi & Indrajaya, 2014). Other studies were carried out by Purwadi (2018) which also calculated investment growth targets using ICOR in Papua Province.

2. LITERATURE REVIEW

Investment is amount which is spent by the business sector to increase capital stocks in a certain period (Nanga, 2005). Development of methods that analyze the economy of an important region is very useful to collect data on the regional economy concerned and the growth process, which can then be used as a guideline for determining what actions must be taken to accelerate the existing growth rate (Tarigan, 2010). According to Sadono Sukirno (Sukirno, 2010) Investment activities enable society to continue to improve economic activities and employment opportunities, increase national income and increase the level of prosperity of the community. This role comes from three important functions of investment activities, namely, investment is one of the components of aggregate expenditure so that the increase in investment will increase aggregate demand, national income and employment opportunities, the increase in capital goods as a result of the investment will increase production and investment capacity to be followed by developments technology.

The relationship between investment (PMA and PMDN) with employment opportunities, investment not only creates deman, but also increases production capacity. Workers who are one of

the factors of production will automatically be increased by users. The dynamics of investment affect the height of the low economic growth, reflecting the letharch of development. So every country seeks to create a climate that can excite investment, especially private investment that can help open employment so that it can increase employment opportunities (Dumairy, 2010).

Gross Regional Domestic Product (GRDP) According to the Central Statistics Agency is the number of gross added values produced by the business unit in a domestic area. Or is the number of results of all the value of the final goods and services produced by all economic activities in a region. GRDP is one of the important indicators in economic growth in a particular area and in a certain period (a year) produced by all economic activities in a country or an area, there are two ways in the presentation of GDP, which is on the basis of prices apply and on the basis of price constant.

GRDP on the basis of current prices shows the added value of goods and services that are calculated using prices in the current year and is used to determine the ability of economic resources and economic structure of an area. GRDP on the basis of constant prices shows the added value of these goods and services can be calculated using the price of goods that apply to a certain year as the base year and used to determine economic growth in real year from year to year.

Data on GRDP is one of the macroeconomic indicators that can indicate regional economic conditions every year. Benefits that can be obtained from this data include:

a) GRDP on average price (nominal) demonstrates the ability of economic resources produced by an area. A large GRDP value shows the ability of large economic resources, and vice versa.
b) GRDP for constant prices (real) can be used to indicate the rate of economic growth as a whole or every business field from year to year.
c) Distribution of GDP at prices applies according to the business field shows the structure of the economy or the role of each business field in an area. The business field that has a big role shows an area's economic base.
d) The per capita GRDP on the basis of current prices shows the value of GRDP per head or by population.
e) PDR Per capita on the basis of constant prices is useful for knowing the real growth of the economy per capita population of an area.

The amount of physical investment that is realized in a certain year is reflected by the magnitude of gross fixed capital formation (PMTB). Whereas what is meant by PMTB is to include the procurement, manufacture, and purchase of new capital goods from within the country and numbers from abroad, which is included in the PMTB is an improvement of capital goods which results in additional use age or improve the ability of capital goods reduced by the sale of used capital goods. Items categorized as capital goods have the characteristics of these items have an economic element of more than one year, the value of goods is relatively large when compared to the output produced, and can be used repeatedly in the production process.

Private investment in Indonesia is guaranteed since the issuance of Law No. 1 of 1967 concerning Foreign Investment and Law No. 6 of 1968 concerning Domestic Investment, which is then completed and refined with Law No. 11 of 1970 About Foreign Investment and Law No. 12 of 1970 concerning domestic investment. Based on the source of capital ownership, private investment can be divided into foreign investment and domestic investment.

3. METHODOLOGY

This research is a quantitative study using secondary data originating from the Central Nusa Tenggara (NTB) Central Statistics Agency (NTB) and the Integrated Investment and One Door Service (DPMPTSP) NTB. To answer the research question, two analysis tools are used, namely analysis trends to carry out investment projections and incremental capital output ratios (ICOR) to determine the investment needs to achieve the NTB Provincial Economic Growth Target contained in Development Plan Documents Development Plans (RPJMD).

The investment projection was carried out to forecast the investment achievement of the next 4 years, namely 2021 -2024 based on the investment realization of previous years. The analytical tool used is trend analysis, namely with the choice of pattern is linear, quadratic, and exponential growth. The equation in each of these patterns is as follows (Juanda & Junaidi, 2012).

Model *linear* $: Y_t = \beta_0 + \beta_1 T$

Model *quadratic* : $Y_t = \beta_0 + \beta_1 T + \beta_2 T^2$
Model *Exponential Growth* : $Y_t = \beta_0 e^{\beta_1 T}$
with T is a variable time.

The best selection of this model is seen from MAPE (Mean Absolute Percentage Error) and MAD (Mean Absolute Deviation). The smaller the value of the measurement, the model obtained is getting better (Juanda & Junaidi, 2012). This method is a short-term forecasting method that uses past data to predict future data (Satyarini, 2007).

The theoretical ICOR concept was first introduced by R.F. Harrod and Evsey Domar. This concept is known as a Harrod-Domar model. Basically, this model shows the connection between the output of an economy with the size of the capital stock needed. The relationship is illustrated in the following equation.

$$ICOR = \frac{\Delta K}{\Delta Y}$$

Keterangan:
ΔK : Additional Capital Stock
ΔY : Additional output or regional income (PDRB)

Additional stock capital or input in this case is an investment (i), so the above equation can be made into this:

$$ICOR = \frac{I}{\Delta Y}.$$

In this study, the amount of investment was measured using the value of gross fixed capital (PMTB), while the additional output used the value of GDP. In fact, investment planted has different times to produce output. Some types of investments have been able to produce in the same year when the investment was implanted. However, some other types of investments need more than a year even a few years later produce output, therefore the calculation of ICOR can be modified using time lag to adjust the length of time needed since the investment is carried out to produce output. By looking at the fact that the output caused by an investment requires different times, the coefficient is felt more representative if it is calculated in a certain period of time (period). For these interests there are two methods commonly used approach namely:

a. Accounting Method
   The accumulation method assumes that the emergence of output increases over a certain period of time is caused by the accumulation of investment in the same period. Mathematically can be formulated:
   $$ICOR = \frac{\sum I}{\sum \Delta Y}$$
b. Standard Method
   The standard method is based on a simple average principle. This method is done by searching for the ICOR coefficient first in each year, then look for the average. Mathematically as follows:
   $$\mathrm{ICOR} = \frac{1}{\mathrm{n}} \sum \frac{\mathrm{I}_{(\mathrm{t})}}{\mathrm{Y}_{(\mathrm{t})} - \mathrm{Y}_{(\mathrm{t}-1)}}$$

In this study used using the accumulation method. The assumptions used in the drafting of ICOR are, first, output changes are solely due to changes in capital or by investment. Second, other factors outside of investment, such as labor use, the application of technology and self-employed capabilities is assumed to be constant.

Estimates of investment needs are based on the target of the rate of economic growth. In this case, the higher the expected economic growth rate, the greater the investment needs in the future (Purwadi et al., N.D.). If you know the value of the ICOR (k) and the target of economic growth (ΔY) in the region, the estimation or projection of investment needs (i) can be calculated using the following equation.

$$\hat{I} = k \times \Delta Y$$

Estimates of investment needs presented in the above equation, also calculated based on the grace time, this is adjusted to the ICOR time grace used in the equation. Suppose the ICOR used has a one-year grace, then the estimated investment calculated also has a one-year grace. So if the ICOR time grace is two years, it means that the investment estimate is also based on a two-year-old deadline.

4. RESULTS AND DISCUSSION

The projection of the amount of investment in PMA, PMDN by using an analysis trend approach. The MAPE and MAD values were obtained as follows.

Tabel 2. Nilai MAPE dan MAD PMDN, PMA dan Total Investasi

Tren	Indikator	PMDN	PMA	Investasi
Linear	MAPE	2,0249E+01	8,79E+01	1,43E+01
	MAD	1,6536E+12	2,46E+12	1,80E+12
Quadratic	MAPE	2,1289E+01	8,81E+01	1,50E+01
	MAD	1,6536E+12	2,58E+12	1,80E+12
Exponential-Growth	MAPE	1,9671E+01	5,91E+01	1,39E+01
	MAD	1,6529E+12	2,33E+12	1,77E+12

Source: Results of Data with Minitab

Based on table 2 it can be seen that the most suitable model for projecting the number of PMDN is the Exponential-Growth model that is:

$$Y_t = 117167472258068\ (0{,}864^t).$$

The most suitable model for projecting the number of PMA is:

$$Y_t = 349747846804\ (1{,}040^t).$$

While the most suitable model to project the total total investment is:

$$Y_t = 1273026435981 5(0{,}973^t).$$

Based on the results of the model analysis above, the projection of the number of PMA, PMDN, and the total investment are as follows:

Tabel 3. Value projection PMDN, PMA and Value Project

Years	PMA	PMDN	Total
2021	4,72E+12	5,64E+12	1,11E+13
2022	4,91E+12	4,87E+12	1,08E+13
2023	5,11E+12	4,21E+12	1,05E+13
2024	5,32E+12	3,64E+12	1,02E+13

Source: Results of Data with Minitab

Although statistically the amount of investment has a downward trend, however, the DPMPTSP Province of NTB is optimistic there will be an increase in the number of investments. This is due to the existence of a strategic area that is an opportunity for an increase in investment value. Based on the results of the FGD and in-depth interviews with DPMPTSP, information is obtained that the NTB Province has several strategic areas that are expected to become potential areas to increase investment value in NTB Province. The strategic area is as follows:

1. Special Economic Zone (SEZ) Mandalika
2. Global Hub Bandar Kayangan
3. Rinjani-UNESCO Global Geopark
4. Samota (Saleh-Moyo-Tambora)
5. Amant Smelter
6. Sakosa (sangang, Komodo, Sape)
7. Three Gili (Trawangan, Meno and Water)
8. Development of Islamic Center Destinations

In this section, there will be a calculation of ICOR values and investment needs to achieve the economic growth target contained in the NTB Provincial RPJMD document in 2019 - 2023. ICOR value is used to determine the level of investment efficiency on the NTB Provincial GRDP. In this study, the data used to determine the investment incurred is the data for the formation of a permano fixed capital (PMTB). According to BPS, PMTB is expenses for capital goods that have an ageing life of more than a year and are not consumed goods. PMTB includes buildings, roads, airports, and machinery, and equipment. ICOR calculation is done by looking at the ratio between PMTB and GDP on the basis of constant prices. The value can be seen in the following table.

Table 4. PMTB and PDRB On Constant Price

Years	PMTB (Millions of rupiah)	PDRB (Millions of rupiah)
2010	19005302.81	70122726.13
2011	20052850.3	67379140.58
2012	22001259.95	66340812.44
2013	22213426.07	69766714.41
2014	22950228.59	73372963.8
2015	25615716.06	89337985.8
2016	27709645.23	94524289.85
2017	28526820.95	94608209.35
2018	30007146.38	90349129.08
2019	32163880.02	93869731.82
2020	30182581.97	93269133.91

Source: NTB Province BPS

Based on the data, the ICOR coefficient of NTB in 2011 - 2020 is as follows.

Tabel 5. Coefficient ICOR NTB in 2011 - 2021

Tahun	Lag 0	Lag 1	Lag 2	Lag 3
2011	-7.30899			
2012	-21.1891	-19.3126		
2013	6.483964	6.422034	5.853305	
2014	6.364016	6.159703	6.10087	5.560583
2015	1.60449	1.437532	1.391381	1.378091
2016	5.34285	4.939108	4.425161	4.283094
2017	339.9308	330.1932	305.2415	273.4791
2018	-7.04545	-6.69788	-6.50602	-6.01438
2019	9.135902	8.523298	8.102823	7.870711
2020	-50.2542	-53.5531	-49.9621	-47.4974

Source: NTB Province BPS

Based on the table above, assuming that there is no grace between the investment and the output produced, it can be seen that the amount of investment is inefficient or in other words Investment Productivity is not good, especially in 2017 even though the assumption is a period of one to three years to produce output . The tilapia ICOR Lag 0 coefficient states that the investment issued in the year, then the output is felt in that year. The ICOR LAG 1 coefficient, LAG 2 and LAG 3 stated that investments made in a certain year, the output will be felt or the results at 1, 2 and 3 years the following year. Investment productivity is said to be good if it has a coefficient between 3 to 4. The higher the ICOR coefficient, it indicates that the increased investment inefficient are planted.

The value of the ICOR coefficient in 2019 is 7.87, indicating that to increase the 1% GRDP, it requires an increase in investment of 7.87%. When compared to the value of ICOR Indonesia in 2013 - 2015, the value of the ICOR NTB in that year can also be said to be almost close to efficiently. Based on the results of the Institute for Development of Economy & Finance in 2016, it was found that in 2013-2015 ICOR Indonesia rose back from 4.5% in 2013 to 6.8% in 2015. Literally the ICOR terminology of 6.8 indicates to increasing GDP by 1% requires an increase in investment of 6% of GDP. This means that in 2015 there has been an economic leak of 41.12% (from a moderate value of 3% - 4%).

The average ICOR coefficient of NTB Province in 2011 - 2020 using the standard and accumulated methods can be seen in the following figure.

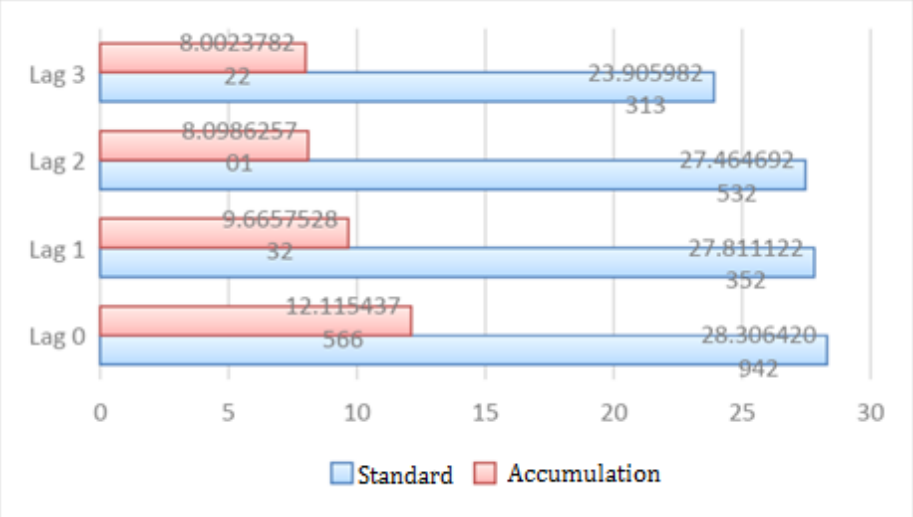

Figure 1. Average ICOR NTB Coefficient in 2011 - 2020

Source: NTB Province BPS

Calculated using the accumulation method, the ICOR Coefficient of NTB Province for the period 2011 - 2020 is 12.12 at LAG 0, reduced to 8 on LAG 3. The ICOR 8 coefficient value, indicates that to increase the GRDP 1%, require an increase in an investment of 8%. With the value of the ICOR coefficient which is still high, the NTB Provincial Government must work with extra in increasing investment in the following years. Nationally, the target of ICOR Indonesia in 2020 - 2024 was in the range of 6.6 - 7.0. The next question is, the amount of investment needs. If it is assumed that the value of the ICOR NTB has not changed, which is 8, then the investment requirement based on the economic growth target which becomes Iku at the NTB Province RPJMD in 2019 - 2023 is as follows.

Figure 2. NTB Investment Needs

Source: Secondary data is processed

In Figure 2, it can be seen that NTB's investment needs to achieve the expected target are still high. In 2023, the target of investment growth requirements was 52% even though when viewed from the average increase in investment was only 43% in 2016 - 2020. The NTB Provincial Investment Needs in all sectors were not the same, so that in this study ICOR value would be calculated per sectoral and its investment needs. To do this calculation, Table I-O 52 Sector in 2016. The sectoral ICOR value obtained in 2016 is assumed to remain or unchanged up to 2023. The value of the sectoral ICOR is as follows.

Table 6. NTB ICOR coefficient per sectoral

Sector	PMTB	GDRP Growth	ICOR
Agriculture for Horticulture Plants Season, Annual Horticulture, and others	163,270	487988.69	0.33
Seasonal and annual plantations	418,359	119752.21	3.49
farm	945,478	509560.29	1.86
Fishery	51,679	606564.38	0.09
Mining and other excavations	1,754,506	332441.88	5.28
Food and beverage industry	1,236	322602.39	0.00
Tobacco Processing Industry	7	52117.68	0.00
Textile and clothing industry	25,469	12196.99	2.09
Wood industry, wood and cork goods and woven goods from bamboo, rattan and the like	60,816	24486.32	2.48
Paper industry and paper goods, printing and recording media reproduction	1,795	4180.34	0.43
Chemical, Pharmaceutical and Traditional Medicine Industry	353	633.69	0.56
Rubber industry, rubber and plastic items	167	241.05	0.69
Industrial excavation is not a metal	182,883	12993.02	14.08
Basic metal industry	3,936	680.06	5.79
Industrial goods from metal, computers, electronic goods, optics and electrical equipment	108,343	2581.08	41.98
Transportation tool industry	43,607	4035.71	10.81
Furniture industry	407,209	8184.33	49.75
Other Processing Industry, Repair Services and Installation of Machinery and Equipment	164,657	2231.99	73.77
Electricity	1,802	13287.45	0.14
Construction	24,139,113	1044106.95	23.12
Trade of cars, motorbikes and their reparation	478,336	261152.58	1.83
Great and retail trade, not a car and motorbike	2,403,389	1280411.21	1.88
Land transportation	452,665	321817.34	1.41
Sea transportation	258,204	6420.23	40.22
Lake River Transportation and Crossing	47,719	38720.5	1.23
Air transport	29,295	169300.99	0.17
Warehousing and Transportation Support Services, Post and Couriers	25,178	27769.99	0.91
Provision of accommodation	499	191928.23	0.00
Provision of food	11,205	104645.27	0.11
Information and Communication Services	215,830	184038.8	1.17
Financial intermediary services other than central banks	1,170	519805.89	0.00
Other financial services	4	62923.55	0.00
Company Services	217,580	19674.14	11.06
Government Administration, Defense and Social Security Mandatory	7,177	368940.41	0.02
Education services	866	543724.55	0.00
Health Services and Social activities	11,554	170893.49	0.07
Other services	50,595	186100.11	0.27

Source: Secondary data is processed

Based on table 15, it can be seen that the inefficient sector is industry, construction, and sea transportation. If it is associated with the superior investment sector, the mining sector, it can be seen that the ICOR value is 5.28. This value indicates that the amount of investment incurred is quite efficient when viewed from the NTB Provincial GRDP. The other superior sectors, namely the transportation sector based on Table 15 can be seen that the average ICOR transportation sector which includes land, sea, air, rivers, lakes, and crossings is 1.47. The ICOR coefficient value also indicates that the investment incurred in this sector is efficient.

The sectors that are superior in PMA and PMDN are the tourism sector. Iku tourism sector is assessed from GRDP from the provision of meals and drinking and accommodation, based on the results of calculations in Table 15, the ICOR coefficient is 0.05. This coefficient indicates that investment in this sector is very efficient. The industrial sector is one of the sectors that the amount of investment incurred is very efficient. This can be seen from the overall ICOR of the industrial sector is 2.24. Likewise with the trade and livestock sectors also have low ICOR. The investment needs of each superior sector can be seen in Figure 3.

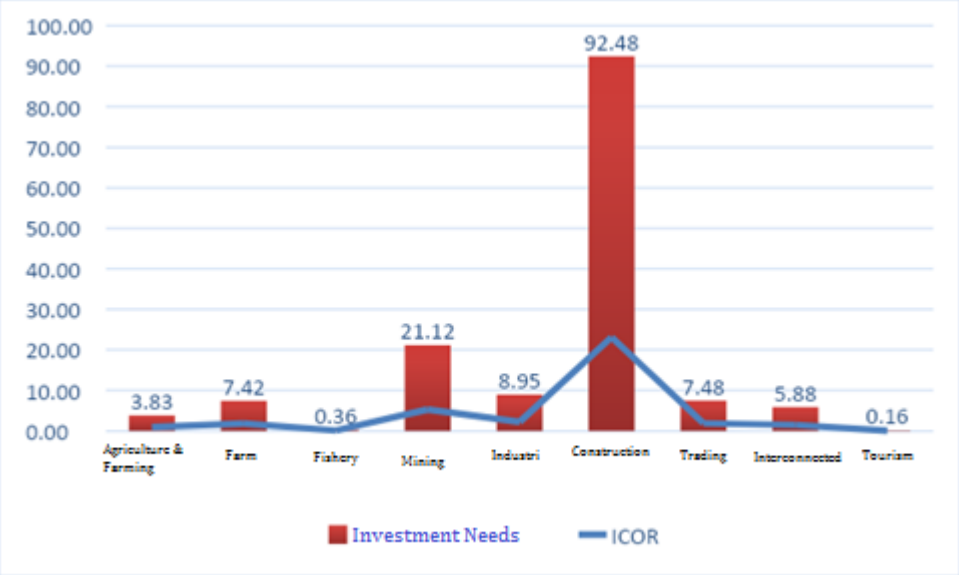

Figure 3. NTB Investment Needs Per Sectoral

Source: Secondary data is processed

5. CONCLUSION

This research was conducted to predict the value of investment and investment needs to achieve the economic growth target of the province of NTB. The results of this study are as follows:

1) The projection model of the amount of investment is $Y_t = 12730264359815(0{,}973^t)$.
2) Based on trend analysis, it is found that the number of investments will reach 10,200 billion rupiahs by 2024.
3) Based on ICOR analysis the investment made in NTB province has not been efficient. This was seen from the average ICOR value in 2011 - 2020 was 12, 11 assuming lag 0, and reached 8 with a 3-year grace period.
4) If it is assumed that the value of the NTB ICOR has not changed, which is 8, then with 7% economic growth as targeted at the RPJMD 2109-2023, then an increase in an increase in 56%, even if seen from the average increase in investment is only 43% in 2016 - 2020.
5) 5. The projection carried out in this study only uses trend analysis. In subsequent research, the use of other analysis tools for projections such as the use of dynamic systems and modeling can be done so that the projection of investment needs can be in accordance with the regional concert.

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