

# **ANALYSIS OF SUSTAINABILITY OF ECONOMIC SECTOR IN PROBOLINGGO DISTRICT EAST JAVA PROVINCE – INDONESIA**

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**Abstract:** Gross Regional Domestic Product (PDRB) is the amount of gross added value arising from all economic sectors in the region. It aims to help formulate regional policies, plan and evaluate development results, and provide information that can describe the regional economic performance. The purpose of this research is to analyse sustainable economic sector in Probolinggo district east Java province – Indonesia. A sustainable sector means a sector that is currently included as a basis and will remain a basis sector in the future even if the growth is slow or fast. The analytical methods used include analysis of Location Quotient (LQ), Dynamic Location Quotient (DLQ), and Klassen Typology. Of the 17 economic sectors that contributed to the PDRB of Probolinggo district, with the results of the LQ analysis, 7 sectors were in basic categories and 10 sectors were in non-basic categories. Results of the comparative analysis of LQ and DLQ indicates that there are 5 leading sectors, 2 prospective sectors, 6 mainstay sectors, and 4 lagging sectors. The results of the classification typology analysis consisted of 3 fast-growing and fast-growing sectors, 7 sectors is growing fast, 4 advanced and slow-growing sectors, and 3 relatively lagging sectors. From the three analysis results, it can be seen that the sustainable sectors are agriculture, forestry, and fisheries (second rank ); electricity and gas procurement sector (first rank); water supply, waste management, waste and recycling sectors (third rank); health service sector and social activities (fourth rank); other service sectors (rank fifth); processing industry sector; construction sector; transportation and warehousing sector; the accommodation and food and drink provision sector; information and communication sector; and the education services sector.

**Keywords:** *Sector, Development, Sustainability, Gross Regional Domestic Product.*

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## **INTRODUCTION**

Background, economic growth is one of the benchmarks that can be used to increase the development of a region from various economic sectors indirectly to describe the rate of economic change (Twuska 2018). China has succeeded in achieving high levels of economic growth for almost 40 years. It is said that the size of the GDP of a country has no relationship with the quality of life of people, what matters is how the benefits of economic growth are distributed among the people (source) Therefore, the economic performance of a nation must be assessed, no less important development. In Iran analysis of

environmental sustainability, with Pareto programming optimizing cost minimization, minimizing carbondioxide emissions, and maximizing job opportunities were created (Atabaki and Aryanpur 2018) Economic growth and its processes are the main requirements for sustainable regional economic development. Because sustainable population growth means that economic needs also increase so that additional income is needed every year (Amalia 2019). To optimize local economic development in an autonomous era which refers to Law no. 32 of 2004 concerning Local Government, automatically requires local governments to be globally oriented. This causes competition between countries to get higher and will have an impact on the Indonesian economy, especially

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in the regions. Therefore, the government's challenge is no longer autonomy or decentralization, but each region is required to improve its competitiveness (Tampilang, Koleangandan, and Wauran 2012). It should be realized that the selection of leading sectors is not only adjusted to regional characteristics but the strategy for accelerating regional development itself in the form of comparative and competitive advantages (Ziyadaturrofiqoh, Zulfanetti, and Safari 2018); (Safri and Hidayat 2018). One important indicator to determine economic conditions in a region at a certain period is through Gross Regional Domestic Product (GRDP) data, both at current prices and constant prices. GRDP is the amount of added value generated by all business units in a particular country or is the total value of final goods and services produced by all economic units (BPS Probolinggo, 2020) The success of economic development is seen through economic growth, where economic growth can be measured one of which uses the Gross Regional Domestic Product (GRDP).

The problem is, of the 17 economic sectors that contribute to GRDP, it is not yet known which sectors can be sustainable. Because it could be that the current sector is said to be a basis but with changes in the local economy it can turn into a non-basic sector in the future, or vice versa, a sector that is now non-basis but can become a basis sector in the future. Hence, the purpose of this research is to analyse sustainable economic sector in Probolinggo district east Java province – Indonesia.

## RESEARCH METHODS

This research was conducted in Probolinggo Regency in 2020, using secondary data, the data used were the PDRB data of Probolinggo Regency and the PDRB data of East Java Province. The analytical methods used are Location Quotient (LQ), Dynamic Location Quotient (DLQ), and Klassen Typology. The Location Quotient (LQ) method is used to determine which sectors are classified as basis and sectors that are classified as non-basis. Meanwhile, the Dynamic Location Quotient (DLQ) method is used to determine which sectors in the regions are growing faster or slower than those of the same sector in the national scope. The comparison of LQ and DLQ results can determine whether the sector is included in the leading, prospective, reliable, or underdeveloped sectors. Klassen typology method is used to determine fast-growing and fast-growing sectors, fast-growing sectors, advanced and slow-growing sectors, and / or relatively underdeveloped sectors. The LQ formula is: Where:

However, the calculation formula used in this study is (Budiharsono 2001):

$$LQ = \frac{V_1^R / V^R}{V_1 / V}$$

Where:

$V_1^R$ : The value of GRDP of a district level sector Probolinggo

$V^R$ : The value of GRDP of all district level sectors Probolinggo

$V_1$ : The value of GRDP of a sector at the provincial level in East Java

$V$  : The value of GRDP of all sectors at the provincial level in East Java

Based on the location quotient (LQ) analysis, if the value of  $LQ > 1$  then the sector becomes the basis or potential, the resulting product can not only meet the needs in the region but can also be exported outside the region. The higher the LQ value than one, the higher the comparative advantage (Cahyono, S Andy and Wijaya 2014);(R. Jumiyaniti 2018);(Hartarto 2016);(Sapriadi and Hasbiullah 2015). Conversely, if the value of  $LQ < 1$ , then the sector is classified as non-basis, has no advantage / non-potential, the production of that sector in a region cannot fulfill its own needs so it needs supplies or imports from outside. If the value of  $LQ = 1$ , the sector is classified as non-basis, has no advantages, the production of that sector is only able to meet the needs of the region itself and cannot be exported.

Changes in the local economy over a certain period of time can be tested through Dynamic Location Quotient (DLQ) so that sectoral changes can be identified. DLQ is a modified form of SLQ by accommodating the amount of GRDP from a sector or sub-secto's production value. The rise and fall of LQ can be seen for certain sectors at different time dimensions with the following formulations (Nazipati 2007)

$$DLQ_{ij} = \frac{(1+g_{ij})/(1+g_i)}{(1+G_i)/(1+G)}$$

$DLQ_{ij}$ : Sector potential i index at the district level;

$g_{ij}$  : The rate of added value growth in sector i at the district level;

$g_i$  : The average GNP growth rate at

district level;

$G_i$  : The rate of added value growth in sector  $i$  at the provincial level;

$G$  : Average GNP growth at the level Province.

The DLQ value is more than 1, then the potential development of sector  $i$  in a region is faster than that of the same sector in the national scope. Conversely, if the  $DLQ < 1$ , then the potential for sector  $i$  development in the region is lower than the national as a whole.

The comparison between  $SLQ / LQ$  and  $DLQ$  values can be used as a criterion in determining whether an economic sector is classified as superior, prospective, reliable, and underdeveloped. The criteria are as follows (Dewi and Yasa 2018);(Suyatno 2007):

a. If the value of  $LQ$  and  $DLQ > 1$ , the leading sector means that the sector will remain the basis for both now and in the future.

b. If the value of  $LQ > 1$  and  $DLQ < 1$ , the sector is prospective, it means that the sector will shift from a base sector to a non-basis in the future.

c. If the value of  $LQ < 1$  and  $DLQ > 1$  is a mainstay sector, it means that the sector will shift from a non-base sector to a basic sector in the future.

d. If the value of  $LQ$  and  $DLQ < 1$ , the sector is lagging, meaning that the sector will continue to be non-basis both now and in the future.

Formula: Klassen Typology

$$\begin{aligned} rik &= \frac{P_{ikt} - P_{it}}{P_{ik0}} \times 100\% \\ yik &= \frac{P_{ik}}{P_{tk}} \times 100\% \\ ri &= \frac{P_{it} - P_{i0}}{P_{i0}} \times 100\% \\ yi &= \frac{P_i}{P_t} \times 100\% \end{aligned}$$

Information:

$rik$  = The rate of growth in the value of production at level Probolinggo district

$ri$  = The rate of growth in the value of production  $i$  at level East Java Province

$yik$  = Contribution  $i$  to the total value of production level Probolinggo district

$y_i$  = Contribution  $i$  to the total value of production level East Java Province

Where :

$P_{ikt}$  = District level production value of sector  $i$  Probolinggo in year  $t$

$P_{iko}$  = District level production value of sector  $i$  Probolinggo at the beginning of the year

$P_{it}$  = Production value of sector  $i$  at the provincial level in Java East in year  $t$

$P_{io}$  = Production value of sector  $i$  at the provincial level in Java East at the start of the year

$P_{ik}$  = Production value of sector  $i$  at district level Probolinggo

$P_{tk}$  = total district level production value Probolinggo

$P_i$  = Production value of sector  $i$  at the provincial level in Java East

$P_t$  = total production value at the provincial level of East Java

Table 1. Klaseen Typology of Sector Growth

Kontribusi Laju pertumbuhan	$yik > y_i$	$yik < y_i$
$rik > ri$	Sektor maju dan tumbuh cepat	Sektor berkembang cepat
$rik < ri$	Sektor maju dan tumbuh lambat	Sektor relatif tertinggal

## RESULTS AND DISCUSSION

Based on the results of the Location Quotient analysis of 17 economic sectors on the PDRB data of Probolinggo Regency based on constant prices for 2015-2019, it was found that the base sector on which there were 7 sectors, namely: agriculture, electricity and gas procurement, water supply, waste management, disposal and recycling, the real estate sector, government administration, and compulsory social security, the health services sector and social activities, and other service sectors. Meanwhile, 10 non-basic sectors. The details of the basis and non-basic sectors are as shown in Table 2 below.

Table 2. Result of Location Quotient (LQ) Analysis of Economic Sectors Probolinggo Regency East Java Indonesia in 2019

No	Bussines Sector	LQ	Criteria
1	Agriculture, Forestry and Fisheries	2,70	Basic
2	Mining and excavation	0,60	Non Basic
3	Processing industry	0,79	Non Basic
	Procurement of Electricity and Gas	3,06	Basic
	Water Supply, Waste Management, Waste and Recycling	1,29	Basic
	Construction	0,77	Non Basic
	Wholesale Retail Trade; Car and Motorcycle Repair	0,71	Non Basic
8	Transportation and Warehousing	0,26	Non Basic
9	Provision of Accommodation and Food and Drink	0,27	Non Basic
10	Information and Communication	0,75	Non Basic
11	Financial Services and Insurance	0,69	Non Basic
12	Real Estate	1,50	Basic
13	Company Services	0,40	Non Basic
14	Mandatory Government Administration, Defense and Social Security	1,37	Basic
15	Education Services	0,12	Non Basic
16	Health Services and Social Activities	1,00	Basic
17	Other Services	1,42	Basic

The non-base sector signals to the Probolinggo district government and East Java Province to evaluate policies, programs, and development activities that have been implemented and establish appropriate policies to facilitate this non-basic sector to become a base sector in the future. This can be done through the right acceleration/ acceleration activities and appropriate development budgeting.

Dynamics of Economic Sector Movement in the Last Four Years (2015-2019) in Probolinggo Regency

Table 3. Results of Dynamic Location Quotient (DLQ) Analysis of Economic Sectors Probolinggo Regency in 2019

No	Business Sector	LQ	DLQ	Criteria
1	Agriculture, Forestry and Fisheries	2,70	1,21	Superior
2	Mining and excavation	0,60	0,24	Left behind
3	Processing industry	0,79	1,26	Mainstay
4	Procurement of Electricity and Gas	3,06	5,63	Superior
5	Water Supply, Waste Management, Waste and Recycling	1,29	1,18	Superior
6	Construction	0,77	1,52	Mainstay

7	Wholesale Retail Trade; Car and Motorcycle Repair	0,71	0,99	Left behind
8	Transportation and Warehousing	0,26	1,31	Mainstay
9	Provision of Accommodation and Food and Drink	0,27	1,05	Mainstay
10	Information and Communication	0,75	1,27	Mainstay
11	Financial Services and Insurance	0,69	0,93	Left behind
12	Real Estate	1,50	0,84	Prospective
13	Company Services	0,40	0,86	Left behind
14	Mandatory Government Administration, Defense and Social Security	1,37	0,83	Prospective
15	Education Services	0,12	1,07	Mainstay
16	Health Services and Social Activities	1,00	1,11	Superior
17	Other Services	1,42	1,11	Superior

The results of the analysis of Location Quotient and Dynamic Location Quotient are juxtaposed so that the economic potential of each sector is known. From the results of the analysis in Table 2. It can be seen that the agricultural, forestry and plantation sectors; electricity and gas procurement sector; water supply, waste management, waste and recycling sectors; health service sector and social activities; and other service sectors will remain as a base sector both now and in the future. Research from (Zamida 2017) shows that the Agriculture sector is the base sector. Meanwhile, the real estate sector; the government administration, land, and social security sectors will shift from a basic to a non-basic sector in the future. Processing industry ; construction ; the transportation and trade ; the accommodation and food and beverage supply ; information and communication; and the education service sectors will shift from a non-base sector to a basic sector in the future. Mining and quarrying sector; wholesale and retail trade, car and motorcycle repair; the financial services and insurance sector; the corporate service sector is a sector that will remain a non-base sector both now and in the future.

### Structure of Economic Growth Patterns in Probolinggo Regency

The structure of the economic growth pattern can be determined by using Klassen's typology analysis. In Klassen typology, there are two indicators used, namely: growth rate and contribution of each sector in Probolinggo Regency. By determining economic growth as the vertical axis and the average contribution of each sector as the horizontal axis, then it is divided into four classifications or quadrants, namely advanced and fast-growing sectors; the developed sector grows slowly; fast-growing sector; and a sector that is relatively lagging.

Table 4. Results of Analysis of the Probolinggo Regency's GRDP Growth Rate in 2019

	<b>Bussines Sector</b>	<b>y<sub>ik</sub></b>	<b>y<sub>i</sub></b>	<b>r<sub>ik</sub></b>	<b>r<sub>i</sub></b>
A	Agriculture, Forestry and Fisheries	34,03	12,55	0,12	2,77
B	Mining and excavation	2,41	4,02	2,14	6,74
C	Processing industry	23,41	29,5	8,57	6,73
D	Procurement of Electricity and Gas	0,99	5,46	4,96	2,70
E	Water Supply, Waste Management, Waste and Recycling	0,12	0,09	5,00	4,59
F	Construction	7,41	9,62	8,16	5,90
G	Wholesale Retail Trade; Car and Motorcycle Repair	12,82	18,05	6,91	7,06
H	Transportation and Warehousing	0,89	3,41	8,41	6,60
I	Provision of Accommodation and Food and Drink	1,51	5,73	8,12	7,89
J	Information and Communication	3,38	4,58	7,73	6,23
K	Financial Services and Insurance	1,87	2,72	5,09	5,50
L	Real Estate	2,44	1,62	5,26	6,40
	Company Services	0,33	0,82	6,08	7,14
O	Mandatory Government Administration, Defense and Social Security	3,18	2,32	4,27	6,69
	Education Services	2,62	2,65	5,90	5,56
	Health Services and Social Activities	0,63	0,63	6,84	6,25
R, S, T, U	Other Services	1,97	1,38	5,17	5,24

Based on the results of the analysis of the growth rate and contribution of the Probolinggo Regency GRDB sector in 2019 in table 4 it can be seen that the manufacturing industry sector; water supply, waste processing, waste and recycling sectors; Real estate sector; the health services sector and social activities are developed and growing fast. Agriculture, forestry, and fisheries sectors; mandatory government administration, defense, and social security sectors; as well as other service sectors are developed and slow-growing sectors, in Russia effective policies aimed at the sustainable development of the agricultural sector, because it is important to achieve SDGs

Russia's agricultural potential is the most important one that will enable the sustainable development of the agricultural sector, taking into account local, regional and global perspectives (Bogoviz 2019); electricity and gas procurement sector, construction sector; wholesale and retail trade, car and motorcycle repair; the transportation and warehousing sector; the accommodation and food and beverage supply sector; information and communication sector; and the education services sector is a fast-growing sector. While the mining and quarrying sector; the financial services and insurance sector; and the corporate service sector is relatively underdeveloped.

Table 5. Results of the Analysis of the Contribution of the Probolinggo Regency PDRB Sector in 2019

	<b>Bussines Sector</b>	<b>Growth Rate</b>	<b>Contrib ution</b>	<b>Sector Criteria</b>
A	Agriculture, Forestry and Fisheries	$r_{ik} < r_i$	$y_{ik} > y_i$	Advanced & slow growing sector
B	Mining and excavation	$r_{ik} < r_i$	$y_{ik} < y_i$	The sector is relatively lagging behind
C	Processing industry	$r_{ik} > r_i$	$y_{ik} > y_i$	Advanced & fast growing sector
D	Procurement of Electricity and Gas	$r_{ik} > r_i$	$y_{ik} < y_i$	Fast growing sector
E	Water Supply, Waste Management, Waste and Recycling	$r_{ik} > r_i$	$y_{ik} > y_i$	Advanced & fast growing sector
F	Construction	$r_{ik} > r_i$	$y_{ik} < y_i$	Fast growing sector
G	Wholesale Retail Trade; Car and Motorcycle Repair	$r_{ik} > r_i$	$y_{ik} < y_i$	Fast growing sector
H	Transportation and Warehousing	$r_{ik} > r_i$	$y_{ik} < y_i$	Fast growing sector
I	Provision of Accommodation and Food and Drink	$r_{ik} > r_i$	$y_{ik} < y_i$	Fast growing sector
J	Information and Communication	$r_{ik} > r_i$	$y_{ik} < y_i$	Fast growing sector
K	Financial Services and Insurance	$r_{ik} < r_i$	$y_{ik} < y_i$	The sector is relatively lagging behind
L	Real Estate	$r_{ik} > r_i$	$y_{ik} > y_i$	Advanced & fast growing sector
M, N	Company Services	$r_{ik} < r_i$	$y_{ik} < y_i$	The sector is relatively lagging behind
O	Mandatory Government Administration, Defense and Social Security	$r_{ik} < r_i$	$y_{ik} > y_i$	Advanced & slow growing sector

P	Education Services	$r_{ik} > r_i$	$y_{ik} < y_i$	Fast growing sector
Q	Health Services and Social Activities	$r_{ik} > r_i$	$y_{ik} > y_i$	Advanced & fast growing sector
R, S, T, U	Other Services	$r_{ik} < r_i$	$y_{ik} > y_i$	Advanced & slow growing sector

Based on the results of the analysis of the growth rate and contribution of the Probolinggo Regency PDRB sector in 2019 in Table 3 it can be seen that the manufacturing industry sector; water supply, waste processing, waste and recycling sectors; real estate sector; the health services sector and social activities are developed and growing fast. Agriculture, forestry, and fisheries sectors; mandatory government administration, defense, and social security sectors; as well as other service sectors are developed and slow-growing sectors. In Russia effective policies aimed at the sustainable development of the agricultural sector, because it is important to achieve SDGs. (Bogoviz, Aleksei 2019)

Russia's agricultural potential is the most important one that will enable the sustainable development of the agricultural sector, taking into account local, regional and global perspectives (Bogoviz 2019); electricity and gas procurement sector, construction sector; wholesale and retail trade, car and motorcycle repair; the transportation and warehousing sector; the accommodation and food and beverage supply sector; information and communication sector; and the education services sector is a fast-growing sector. While the mining and quarrying sector; the financial services and insurance sector; and the corporate service sector is relatively underdeveloped.

Table 6 Result Of LQ,DLQ and Class Typology

No	Result LQ Analysis	Result LQ Analysis	LQ And DLQ Comparati on	Klassen Typology
1	Agriculture, Forestry and Fisheries	Basic	Superior	Advanced & slow growing sector
2	Mining and excavation	Non Basic	Left behind	The sector is relatively lagging behind
3	Processing industry	Non Basic	Mainstay	Advanced & fast growing sector
4	Procurement of Electricity and Gas	Basic	Superior	Fast growing sector

No	Result LQ Analysis	Result LQ Analysis	LQ And DLQ Comparati on	Klassen Typology
5	Water Supply, Waste Management, Waste and Recycling	Basic	Superior	Advanced & fast growing sector
6	Construction	Non Basic	Mainstay	Fast growing sector
7	Wholesale Retail Trade; Car and Motorcycle Repair	Non Basic	Left behind	Fast growing sector
8	Transportatio n and Warehousing	Non Basic	Mainstay	Fast growing sector
9	Provision of Accommodati on and Food and Drink	Non Basic	Mainstay	Fast growing sector
10	Information and Communicati on	Non Basic	Mainstay	Fast growing sector
11	Financial Services and Insurance	Non Basic	Left behind	The sector is relatively lagging behind
12	Real Estate	Basic	Prospektif	Advanced & slow growing sector
13	Company Services	Non Basic	Left behind	The sector is relatively lagging behind
14	Mandatory Government Administrati on, Defense and Social Security	Basic	prospektif	Advanced & slow growing sector
15	Education Services	Non Basic	Mainstay	Fast growing sector
16	Health Services and Social Activities	Basic	Superior	Advanced & fast growing sector
17	Other Services	Basic	Superior	Advanced & slow growing sector

The agriculture, forestry, and fisheries sectors are currently the basic and leading sectors and will remain the base sectors in the future even though their growth is slow. The mining and quarrying sector is currently classified as a non-basic and underdeveloped sector and will remain a lagging sector in the future. The manufacturing sector is currently a non-base sector, and is a mainstay as well as advanced and fast-growing but will shift to

a basic sector in the future. The electricity and gas procurement sector is currently included in the basic sector, leading and growing fast and will remain the basis for the future. The water supply, waste management, waste, and recycling sector is currently a basic, leading, advanced, and fast-growing sector and will remain a base sector for the foreseeable future. The construction sector is currently a basic, leading, advanced, and fast-growing sector and will continue to be the basis for the future. Wholesale and retail trade sector; car and motorcycle repair is currently a non-basic sector, lagging, and growing rapidly but will remain a non-base sector and lagging in the future. The transportation and warehousing sector is currently a non-basic, mainstay sector, growing rapidly but will shift from a non-base sector to a base in the future. The provision of accommodation and food and drink sector is currently a non-basic, mainstay, and fast-growing sector and will become a center for the future. The information and communication sector is currently included in the non-base sector, is a mainstay, and is developing fast and will shift to a base sector in the future. The financial services and insurance sector is currently a non-basic sector, lagging and will remain a non-basic sector and lagging in the future. The real estate sector is currently a basic, prospective, advanced, and fast-growing sector but will shift from a stale to a non-basic sector in the future. The corporate service sector is currently a non-base sector, lagging and will remain a non-base sector and lagging in the future. The Government Administration, Defense, and Compulsory Social Security sector is currently a basic, prospective, advanced, and slow-growing sector but will shift from a basic sector to a non-basic sector in the future. The education service sector is currently a non-basic sector, leading and growing rapidly but will shift from a non-base actor to a basic sector in the future. The health service sector and social activities are currently basic, leading advanced and growing fast and will remain a base sector in the future. Other service sectors are currently the basic sector, leading advanced and slow-growing but will remain as a base sector in the future, but no less important is an effective monitoring and estimation system for implementation efficiency because many of the documents do not have a monitoring and estimation system. Effective implementation efficiency is in line with the principles and practical

manifestations of the concept of sustainable development at the national level (Kvak, 2017). The LQ and DLQ approach still has the disadvantage of only grouping the GRDP regions and sectors in the company cluster based on their parameter values. There is a new approach that combines Klassen, LQ, and hierarchies agglomerative grouping (HAC) into a new method called multi-view, hierarchical agglomerative grouping (MVHAC) (Munandar et al., 2018). Besides that, the LQ research can also collaborate with the BCG matrix on research on changes in import conditions at the port of Gwang which has decreased coal imports (Mo et al., 2020)

## CONCLUSION

The results of the analysis show that:

1. Sustainable sectors are:
  - a. Agriculture, forestry and plantation sectors; electricity and gas procurement sector; water supply, waste management, waste and recycling sectors; health service sector and social activities; and other service sectors will remain the base sector both now and in the future.
  - b. Processing industry sector; construction sector; the transportation and trade sector; the accommodation and food and beverage supply sector; as well as a developed and fast-growing information and communication sector; and the education service sector will shift from a non-base sector to a basic sector in the future.
2. Unsustainable sectors are:
  - a. The real estate sector; the government administration, land, and social security sectors will shift from a basic to a non-basic sector in the future.
  - b. Mining and quarrying sector; wholesale and retail trade, car and motorcycle repair; the financial services and insurance sector; the corporate service sector is a sector that will remain a non-base sector both now and in the future.

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