Analysis of the Leading and Non-Leading Sectors of South Sulawesi's Revenue Potential

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Abstract

This study aims to identify leading sectors and non leading sectors and analyze the potential of non leading sectors in South Sulawesi. This research method uses Location Quotient (LQ) to measure sector concentration relative to the national level and KlassenTypology to classify economic sectors based on growth dynamics and regional economiccontribution. This research utilizes data from the Central Bureau of Statistics (BPS) of Indonesia and South Sulawesi covering the years 2019-2023. The results show that sectors such as agriculture, forestry, fisheries, construction, wholesale and retail trade, financialand insurance services, education services, and health services and social activities are leading sectors with significant comparative advantages. In contrast, sectors such as mining, manufacturing, transportation, warehousing, accommodation and food services,and information and communication have the potential to be further developed with appropriate investment and supportive policies. Strategies to develop non-lead sectors include increased investment in technology and infrastructure, human resource development, and the provision of strong policy support. These developments are criticalto diversifying the economy and achieving sustainable growth in South Sulawesi.

Keywords: leading sector; non-leading sector; location quotient; klassen typology; grdp; gdp;

1. Introduction

South Sulawesi, as one of the provinces in Indonesia, has significant economic diversity supported by various industrial sectors. Leading sectors such as agriculture, fisheries, and mining have long been recognized as the main drivers of regional economic growth. (Sulaiman, 2021). However, the potential of non flagship sectors often receives less attention in economic development studies, which in turn can contribute new perspectives in development strategies. This study aims to identify the leading sectors in South Sulawesi and analyze the potential of the non leading sectors in supporting the regional economy. Previous research by Rasulong et al, (2022) used Location Quotient (LQ) and Shift Share Analysis methods to analyze the leading economic sectors in Soppeng Regency, South Sulawesi. The results showed that the agriculture, fisheries, and trade sectors had a major contribution to the region's Gross Regional Domestic Product (GRDP). This study provides strong evidence of the importance of these sectors in driving local economic growth. A similar study in Central Java by Prabowo (2020) on the agribusiness sector found that although the sector has great potential, challenges such as limited market access andlack of technological support make its contribution to the provincial

economy still not optimal. This research suggests the need for more effective policy interventions to support the development of the agribusiness sector in Central Java. Research by Ahmad et al (2020) on the potential of the tourism sector in the coastal areas of South Sulawesi found that despite the great potential, the lack of infrastructure and effective tourism promotion has caused this sector to not make an optimal contribution to the regional economy. The study highlights the need for increased investment in infrastructure andbetter marketing strategies to develop the tourism sector. Previous research has tended to focus on sectors that have been identified as leading, such as agriculture and mining. Few studies have explicitly measured or evaluated how non- featured sectors can contribute to economic diversification and sustainable growth in South Sulawesi. This creates a gap in the literature that ignores the significant potential of under- explored sectors tha have the capacity to drive regional economic growth (Hasanuddin, 2022).The objectives of this research include. Identifying Leading Sectors: Review and determine the leading economic sectors in South Sulawesi that have the largest contribution to Indonesia's Gross Domestic Product (GDP). Analyzing the Potential of Non-Prominent Sectors: Evaluate the potential of non- leading sectors that have not been optimized in their contribution to the regional economy, but have great opportunities to be developed.Literature Review

2.1 Leading Sectors in South Sulawesi

Study by Rahaman & Purnomo, (2022) identified that the agriculture, fisheries and mining sectors have long been pillars of the economy in South Sulawesi, contributing significantly to regional GDP. The study highlights how these sectors influence the local economy through job creation and exports. Rahman and Purnomo suggest that the sustainability of these sectors is important for long-term economic stability, but also warn about the risks associated with over-reliance on them.

2.2 Non-leading Sector Potential

Lee & Kim, (2023) explored the potential of non-prime sectors such as information technology, renewable energy, and tourism in South Sulawesi. The study shows that although these sectors are still in the early stages of development, they offer significant economic diversification opportunities and can help reduce pressure on the flagship sector. They also discuss how innovation and investment in non flagship sectors can drive economic growth and resilience to global market fluctuations. Non-superior sector development factors researched by Thompson et al., (2024) highlighted that factors such as government policies, access to markets, and infrastructure play a crucial role in the development of non-standard sectors. The research shows that without adequate policy support and investment in infrastructure, these sectors cannot develop optimally. The research also identifies the need for quality human resource development to support innovation and growth in the non-standard sectors.

2.3 Economic Base Theory

According to Tarigan cited in Rasulong & Zaimuddin, (2020) economic base theory, commonly called base analysis, is used to identify income derived from the base sector. Changes in the base sector will generally directly cause changes in regional income and in the long run will lead to an expansion of employment opportunities. This theory states that

economic growth in a region will be largely determined by the ability of a region to produce goods and services that can be exported outside the region or region.

2.4 GDP and GRDP

Gross Domestic Product (GDP) is a leading indicator that measures the total value of goods and services produced within a country during a given period. GDP is used to assess a country's economic performance and measure the level of economic growth. Recent research by Jones & Klenow (2020) discusses an alternative approach to GDP measurement, looking at broader aspects of well-being beyond just economic output. Gross Regional Domestic Product (GRDP) measures the total value of goods and servicesproduced by a region or province in a given period. GRDP is important for assessing regionaleconomic performance and assisting in regional development planning. Research by Suwandi & Fathoni, (2022) examines regional economic growth in Indonesia and its disparities using GRDP analysis as well as influencing factors such as infrastructure and investment.

2. Materials and Methods

This research uses quantitative research methods by utilizing time series secondary data with data periodization for the last 5 years (2019-2023). Time series is a set of data recorded sequentially in fixed time intervals. Time series analysis is used to identify patterns, trends, and cycles in data to make predictions or understand the dynamics of the observed phenomenon. The data itself is sourced from the official website of the Central Statistics Agency (BPS) of Indonesia and South Sulawesi. The data collection method to achieve the objectives in this study was entirely done through literature studies by taking data from the Central Bureau of Statistics, so there was no need for sampling techniques and questionnaires (Darda et al., 2021).

Table 1. Indonesia's GDP In The Last 5 Years

[2010 Series] 52 GDP Sectors	[2010 Series] Annual GDP by Business Field (Billion Rupiah)				
	NATIONAL (INDONESIA)				
	2019	**2020**	**2021**	**2022**	**2023**
A. Agriculture, Forestry and Fisheries	1354399,1	1378398,9	1404190,9	1435853,2	1454586,9
B. Mining and Quarrying	806206,2	790475,2	822099,5	858146,6	910679,4
C. Processing Industry	2276667,8	2209920,3	2284821,7	2396603	2507799,8
D. Electricity and Gas Procurement	111436,7	108826,4	114861,1	122451,9	128460,5

E. Water Supply, Waste Management, Waste and Recycling	9004,9	9449,3	9919,3	10240,1	10741,4
F. Construction	1108425	1072334,8	1102517,7	1124725,2	1179989,3
G. Wholesale and Retail Trade; Repair of Cars and Motorcycles	1440185,7	1385651,2	1449831,4	1529951,8	1604114
H. Transportation and Warehousing	463125,9	393418,9	406169,3	486873,8	554854,9
I. Provision of Accommodation and Meals	333304,6	299122,4	310737,6	347854,6	382674,5
J. Information and Communication	589536,1	652062,9	696506,1	750319	807304,6
K. Financial Services and Insurance	443093,1	457486,5	464637,7	473623,8	496236,8
L. Real Estate	316901,1	324259,4	333282,9	339014,9	343864,8
M,N. Corporate Services	206936,2	195671,1	197106,7	214399	232076,1
O. Government Administration, Defense and Compulsory Social Security	365538,8	365446	364246,6	373404	378989,1
P. Education Services	341349,9	350272,8	350660	352673,5	358952,1
Q. Health Services and Social Activities	127487,9	142227,3	157085,5	161397,8	168926,2
R,S,T,U. Other Services	205011,4	196608,9	200773,2	219778,4	242891,7
Gross Domestic Product	10949155,4	10722999,3	11120059,7	11710247,9	12301393,6

The data sources from South Sulawesi are as follows.

Table 3. GRDP Of South Sulawesi In The Last 5 Years

[2010 Series] 52 GRDP Sectors	[2010 Series] Annual GRDP by Business Field (Billion Rupiah)			
	SOUTH SULAWESI			

	2019	2020	2021	2022	2023
A. Agriculture, Forestry and Fisheries	66615,94	66139,9	70357,8	72162,73	72226,3
B. Mining and Quarrying	17237,9	17330,64	17228,08	17283,69	19639,35
C. Processing Industry	44830,63	42781,92	44075,32	48363,16	50425,63
D. Electricity and Gas Procurement	310,62	318,67	353,3	405,21	440,17
E. Water Supply, Waste Management, Wasteand Recycling	369,71	394,15	410,19	436,78	449,62
F. Construction	41232,63	41875,48	43609,99	44303,91	46608,53
G. Wholesale and Retail Trade; Repair of Carsand Motorcycles	51376,92	49799,33	53035,21	56510,16	59194,12
H. Transportation and Warehousing	11982,7	9410,66	-	11999,56	13024,23
I. Provision ofand Accommodation Meals	4907,93	4236,64	4361,95	5135,6	5474,93
J. Information and Communication	23339,17	25869,89	27522,34	28966,31	30953,15
K. Financial Services and Insurance	11185,27	11457,58	11587,74	11720,73	12061,83
L. Real Estate	11276,11	11703,74	12005,49	12468,89	13094,38
M, N. Corporate Services	1507,22	1355,8	1440,27	1644,24	1796,82
O. Government Administration, Defense and Compulsory Social Security	14423,36	14416,91	14837,68	15132,58	15641,08

P. Education Services	18410,59	19465,08	20178,62	20750,36	21329,67
Q. Health Services and Social Activities	6708,17	7382,8	7956,36	8643,79	9277,7
R,S,T,U. Other Services	4791,5	4215,38	4534,06	4967,33	5524,67
Gross Regional Domestic Product	330506,38	328154,57	343395,41	360895,02	377162,17

The analysis methodology involved the use of Location Quotient (LQ) to identify leading sectors based on the level of industry concentration relative to the national, and Klassen Typology to classify economic sectors based on economic growth and contribution.

3.1 Location Quotient (LQ)

Location Quotient (LQ) is an analytical method used to measure the level of industry sector concentration within a region compared to a broader base, such as the national level. It helps determine the leading sectors of a region, with the basic formula comparing the proportion of a particular sector in the region to the proportion of the same sector at the national level. This method is widely used to identify regional competitive advantages and provides a solid basis for strategic planning and resource allocation (Pangow et al., 2023).The Location Quotient (LQ) analysis method can be used to identify leading and non-leading sectors, as well as a basis for determining superior commodities in a region (Jauhari, 2020). Determination of leading sectors can also be done by taking into account the comparative advantages and availability of resources in each district and through Klassen typology analysis, leading sectors in a region can be identified. This analytical tool can be usedthrough a sectoral approach, which is a combination of locatient quotient (LQ) analysis and shift share (SS) analysis (Hariyanti,

2022).

$$LQ = (Ei/Et) / (Ni/Nt)$$

- Ei = Number of jobs or output in industry sector i in the analyzed region.
- Et = Total number of jobs or output across all sectors in the analyzed area.
- Ni = Number of jobs or output in industry sector i across the reference region (i.e., country).
- Nt = Total number of jobs or output in all sectors across the reference region (i.e., country).

Interpretation of the formula is as follows:
    ☐ If LQ > 1, the sector is more concentrated in the analyzed region compared to the reference region.
    ☐ If LQ = 1, the sector's concentration in the analyzed region is the same as in the reference region.
    ☐ If LQ < 1, the sector is less concentrated in the analyzed region compared to the reference region.

3.2 Klassen typology

The Klassen typology is used to classify regions based on their economic growth dynamics and sectoral contributions. This classification includes four quadrants:
    Quadrant I: Sectors with high growth and contribution.
    Quadrant II: Sectors with high growth but low contribution.
    Quadrant III: Sectors with low growth and low contribution.
    Quadrant IV: Sectors with low growth but high contribution.

Table 4. Klassen Typology Formula

GDRP per Capita Growth Rate	Yi = Yn	Yi > Y
ri = rn	Developed and fast-growing regions	Fast-growing regions
ri < r	Developed but depressed regions	Relatively under developed regions

Description:
ri: Region i's GRDP growth rate
rn: National GRDP growth rate
Yi: Per capita income of Region i
Yn: National per capita income

This method is very useful for analyzing and directing development policies more effectively, helping local governments identify sectors that require further intervention or support to accelerate regional economic growth (Pangow et al., 2023). Klassen typology analysis is used to explain the pattern and structure of regional sectorgrowth. Each economic sector in each region can be divided into leading sectors, developing sectors, potential sectors,

and lagging sectors. This analysis is based on grouping by looking at sector growth and income represented using a matrix or cartesian diagram (Harjanti et al., 2021). The selection of leading sectors can also be based on the sector's ability to drive the economy and make a significant contribution to regional economic growth (Hana Mumtaz & Sukarsih, 2022). The leading sector is expected to be a driving force for other sectors, so thatthe selection of the leading sector is key in the regional economic development strategy (Wahyudi, 2021). In the context of South Sulawesi, research related to the role of the agricultural sector in regional economic growth can also provide valuable insights Zuhdi, (2021). In addition to the agricultural sector, the plantation sector also has potential as a significant economic recovery sector (Syahfera & Sunyigono, 2021). The development of the agricultural andplantation sectors can be an important strategy in optimizing the economic potential of South Sulawesi.

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3. Results and Discussion

Based on LQ analysis, several sectors such as agriculture, forestry and fisheries, construction, wholesale and retail trade, financial and insurance services, education services, and health and social services are leading sectors in South Sulawesi. These sectors have comparative advantages and significant contributions to the regional economy. In contrast, sectors such as mining and quarrying, manufacturing, transportation and warehousing, provision of accommodation and food, and information and communication arenon-leading sectors that have the potential to be further developed through appropriate investment and supportive policies.

Table 7. Average Growth by Business Sector

Sector	Average Growth	Description
A. Agriculture, Forestry and Fisheries	1.614.830.177	Base
B. Mining and Quarrying	0.692452583	Non Basis
C. Processing Industry	0.64484414	Non Basis
D. Electricity and Gas Procurement	0.101352751	Non Basis
E. Water Supply, Waste Management, Waste and Recycling	1.362.306.233	Base
F. Construction	1.271.548.258	Base
G. Wholesale and Retail Trade; Repair of Cars and Motorcycles	118.816.075	Base
H. Transportation and Warehousing	0.640817844	Non Basis

I. Provision of Accommodation and Meals	0.470177843	Non Basis
J. Information and Communication	1.278.511.619	Base
K. Financial Services and Insurance	0.80807456	Non Basis
L. Real Estate	1.192.220.416	Base
M,N. Corporate Services	0.241939116	Non Basis
O. Government Administration, Defense and Compulsory Social Security	1.316.520.603	Base
P. Education Services	1.862.159.436	Base
Q. Health Services and Social Activities	1.612.312.424	Base
R,S,T,U. Other Services	0.736265654	Non Basis

The development of non-lead sectors is essential to diversify the economy and achieve sustainable growth in South Sulawesi.

After calculating the average contribution of each sector based on the class typology analysis, it is concluded as follows.

Quadrant 1 (Advanced and Fast-Growing Regions) consists of the Agriculture, Forestry, and Fisheries; Real Estate sectors. **Quadrant 2** (Fast Developing Areas) consists of the Mining and Quarrying; Water Supply; Waste Management and Recycling; Construction, Wholesale and Retail Trade; Car and Motorcycle Repair; Corporate Services; Government Administration; Defense and Compulsory Social Security; Educational Services Health Services and Social Activities sectors. **Quadrant 3** (Developed but Depressed Regions) consists of the Manufacturing Industry; Electricity and Gas Procurement; Information and Communication sectors.**Quadrant 4** (Relatively Underdeveloped Regions) consists of the Transportation and Warehousing; Accommodation and Food Supply; Financial Services and Insurance; Other Services sectors.

Table 8. Growth Determination by Business Sector

Sector	Description	Quadrant
A. Agriculture, Forestry and Fisheries	Developed and fast-growing regions	1

B. Mining and Quarrying	Fast-growing regions	2
C. Processing Industry	developed but depressed regions	
D. Electricity and Gas Procurement	developed but depressed regions	3
E. Water Supply, Waste Management, Waste and Recycling	Fast-growing regions	2
F. Construction	Fast-growing regions	2
G. Wholesale and Retail Trade; Repair of Cars and Motorcycles	Fast-growing regions	2
H. Transportation and Warehousing	relatively underdeveloped regions	4
I. Provision of Accommodation and Meals	relatively underdeveloped regions	4
J. Information and Communication	developed but depressed regions	3
K. Financial Services and Insurance	relatively underdeveloped regions	4
L. Real Estate	Developed and fast-growing regions	1
M,N. Corporate Services	Fast-growing regions	2
O. Government Administration, Defense and Compulsory Social Security	The region is developing Rapidly	2
P. Education Services	The region is developing Rapidly	2
Q. Health Services and Social Activities	The region is developing Rapidly	2
R,S,T,U. Other Services	relatively underdeveloped regions	4

Based on the results of calculating the data above, the determination of quadrants based on quadrants needs to be analyzed to determine the role of several sectors in South Sulawesi's

GRDP to further contribute to Indonesia's National GDP. The results of the analysis are as follows:

Quadrant 1: Advanced and Fast-Growing Regions (Agriculture, Forestry, and Fisheries; Real Estate). Agriculture, Forestry and Fisheries, shows steady growth and significant contribution to the South Sulawesi economy. This reflects the sector's comparative advantage, which can be further strengthened by investment in agricultural technology, irrigation infrastructure, and continued policy support. Real Estate is also experiencing rapid growth, indicating a high demand for property, both commercial and residential. Support in the form of regulations that favor property development and investment can further increase the sector's contribution.

Quadrant 2: Fast Developing Areas (Mining and Quarrying; Water Supply; Waste Management and Recycling; Construction, Wholesale and Retail Trade; Automobile and Motorcycle Repair; Corporate Services; Government Administration; Defense and Compulsory Social Security; Educational Services Health Services and Social Activities). The mining and quarrying sector, although growing fast, still has a low contribution, requiring investment in green technology and operational efficiency to boost its growth, supported by effective environmental management and waste management policies. The construction sector reflects rapid infrastructure development and requires support in the form of infrastructure financing and regulation for sustainable development. The wholesale and retail trade sector shows rapid growth and requires support for trade infrastructure and marketaccess. Meanwhile, the corporate services, government administration, education, and health services and social activities sectors show rapid growth and increased contribution, which canbe further enhanced with the support of human resource development policies and investmentin technology.

Quadrant 3: Developed but Depressed Regions (Processing Industry; Electricity and Gas Procurement; Information and Communication) Manufacturing has a large contribution but growth is depressed, requiring revitalization and technological innovation to improve competitiveness. The electricity and gas procurement sector, essential for basic infrastructure, is also experiencing depressed growth and requires investment in energy generation and distribution. The information and communications sector has great potential but requires digital infrastructure support and improved access to technology to achieve optimal growth.

Quadrant 4: Relatively Underdeveloped Regions (Transportation and Warehousing; Provision of Accommodation and Drinking Food; Financial and Insurance Services; Other Services). The transportation and storage sector has slow growth and low contribution, requiring increased investment in transportation and logistics infrastructure. The accommodation and food services sector needs further support through promotion and development of tourism infrastructure. The financial services and insurance sector shows no comparative advantage and requires increased financial inclusion and financial services innovation. Other services sectors, with lower concentration than the national average, require policy support for servicessector development.

4. Conclusion

Based on analysis using the Location Quotient (LQ) and Klassen Typology methods, several sectors in South Sulawesi were identified as leading sectors with comparative advantages and significant contributions to the regional economy. These sectors include

agriculture, forestry and fisheries, construction, wholesale and retail trade, financial and insurance services, education services, and health and social services. These sectors show potential to be further developed through appropriate investment and sustainable policy support.In contrast, several sectors such as mining and quarrying, manufacturing, transportation and warehousing, provision of accommodation and food, and information and communication were identified as non-leading sectors. These sectors have the potential to be further developed through investments in green technology, operational efficiency, and supportive policies.

5. Suggestion

1. Develop City Infrastructure and Facilities. Study Nugraha Rusli et al., (2021)shows that improvements in urban infrastructure and facilities can support the growth of non-base sectors. The government should focus on providing supportive infrastructure such as transportation, water management, and other publicfacilities to improve the competitiveness of these sectors. The same thing was also conveyed by Anwar, (2023) which shows that in East Java, infrastructure improvements support the growth of the manufacturing, trade, and communication sectors. Better infrastructure improves transportation accessibility and efficiency, which in turn supports local economic growth.

2. Invest in Technology and Innovation. Study by Masik et al., (2021) highlights the importance of smart technology adoption and innovation in the development of the non-base sector. The use of technologies such as blockchain and smart city solutions can improve the operational efficiency and competitiveness of the non-base sector.

3. Economic Diversification. Diversification of products and services helps reduce the risk of dependence on a single sector and opens up new economic opportunities. By developing different types of products, non-base sectors can become more adaptive to market and technological changes. Lee & Kim, (2023) emphasized the importance of diversification in improving the competitiveness of non-base sectors. For example, the agricultural sector can be encouraged to develop processed products or new crop varieties that have high added value.By implementing these strategies, the non-base sector in South Sulawesi is expected to develop into a more productive and highly competitive base sector, thus contributing more to the regional and national economy.

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