CONTRIBUTION AND PROJECTIONS OF THE PROCESSING INDUSTRY TO GRDP IN CENTRAL SULAWESI

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ARTICLE INFO	ABSTRACT
    	This research employed a quantitative descriptive approach to examine secondary data sourced from Central Sulawesi Province's Central Statistics Agency (BPS). Specifically, the study delved into Gross Regional Domestic Product (GRDP) data from 2019 to 2023, aiming to analyze the manufacturing industry sector's contribution and project its potential impact until 2028. Data analysis was conducted using the sector contribution formula and the least squares method. The findings revealed that the manufacturing industry sector consistently contributed an average of 29,76% to the province's GRDP over the past five years. Projections based on the analysis suggest a promising 53% increase in the sector's contribution to the GRDP in the subsequent five years.

1. INTRODUCTION

The processing industry is a vital contributor to Indonesia's economy. It significantly boosts GDP, job creation, and foreign exchange earnings. Given Indonesia's agricultural foundation, the government prioritizes developing the processing industry to support the agricultural sector (agro-industry) and other industries (Amin, 2015). Therefore, the processing industry sector is prepared to be able to become the driving force and lead (the leading sector) in encouraging the development of related industries, as well as the development of other economic sectors (Saragih, 2010). In the future, it is expected that developments in the economy will trigger the desire and endeavour to transform various sectors (Hajeri et al., 2015).

According to Arsyad (2010), regional economic development is the way in which governments and communities utilise existing resources and collaborate with the private sector to generate new jobs and spur economic growth.The processing industry sector in Central Sulawesi Province has become a driver of economic growth. Its contribution to Gross Regional Domestic Product (GRDP) is very large, driven by the expansion of mineral-based industries. So the potential for growth in this sector is very large, which is expected to make a major contribution to the welfare of the people in Central Sulawesi Province. If the GRDP of a region is higher, the achievement in development is also greater. This can be seen from the increase in output per capita, providing more choices for people's purchasing ability and the number of goods and services available (Syahputra, 2017).

Economic growth signifies a sustained increase in a country or region's capacity to produce a wider range of goods and services for its people. This growth is driven by technological advancements and the necessary institutional and ideological adaptations (Jhingan, 2016). One indicator in looking at economic development is through the development of Gross Regional Domestic Product (GRDP). Gross Regional Domestic Product (GRDP) is formed from the added value of each sector, described by how much dependence a region has on the production capabilities of each sector (Nuryadi, 2021).

Table 1. Gross Regional Domestic Product (GRDP) of Central Sulawesi Province
Based on 2010 Constant Prices According to Business Fields (2019-2023)

GRDP Business Field	GRDP at Constant Prices (Billions of Rupiah)				
	2019	2020	2021	2022	2023
Agriculture, Forestry and Fisheries	29,995.99	29,593.65	30,793.12	31,639.57	32,186.01
Mining and Quarrying	19,971.59	22,040.21	24,739.37	29,820.42	33,238.02
Processing Industry	29,483.94	36,464.64	43,361.21	56,659.02	71,124.90
Procurement of Electricity and Gas	51.31	52.91	55.05	60.12	64.12
Water Supply, Waste Management, Waste and Recycling	135.18	136.27	141.73	146.41	150.56
Construction	12,833.47	11,746.44	13,889.02	15,153.25	15,308.46
Wholesale and Retail Trade	9,256.70	8,687.49	9,670.51	10,776.60	11,397.68
Transportation and Warehousing	4,119.23	2,754.82	2,933.64	3,703.91	3,930.51
Provision of Accommodation and Food and Drink	520.64	463.10	525.04	587.40	643.7
Information and Communication	4,461.45	4,843.49	5,254.72	5,504.89	5,880.72
Financial Services and Insurance	2,239.53	2,459.06	2,712.19	2,684.32	2,715.44
Real Estate	1,895.37	1,902.49	1,948.09	2,120.95	2,280.74
Company Services	261.52	254.78	262.69	280.74	296.54
Government Administration, Defense, and Social Security	6,453.44	6,467.25	6,847.97	6,835.48	6,977.39
Educational Services	3,891.52	3,828.19	38,585.40	3,986.38	4,164.84
Health Services and Social Activities	1,538,00	1,632.67	1,717.59	1,759.20	1,861.28
Other Services	825.58	825.22	848.55	906.18	960.46
Total GRDP	127,935.06	134,152.69	149,815.86	172,624.82	193,181.36

Source: Badan Pusat Statistik (2024)

In assessing regional economic growth in a certain period, an important indicator used is Gross Regional Domestic Product (GRDP) data at current prices and constant prices. GRDP data for a region can be used as information regarding economic growth and community welfare in that region. The better the value of a region's Gross Regional Domestic Product, the higher the economic growth or prosperity of the community (Todaro, 1998). GRDP is formed from various economic sectors such as the agricultural sector, the financial services and insurance sector, and other sectors including the manufacturing industry sector (Nuryadi, 2021).

Central Sulawesi Province is one of the provinces located on Sulawesi Island, where the manufacturing industry sector is one of the mainstay sectors in driving the wheels of development. The Gross Regional Domestic Product (GRDP) of the manufacturing industry sector in Central Sulawesi Province has always increased every year. Table 1 also indicates that the manufacturing industry sector provides a positive contribution and is the largest contributor to the GRDP of Central Sulawesi Province.

Table 2. GRDP Growth at Constant Prices 2010 Central Sulawesi Province

Year	GRDP (Billion Rupiah)	Economic growth (%)
2019	127,935.06	8.83
2020	134,152.69	4.86
2021	149,815.86	11.68
2022	172,624.82	15.22
2023	193,181.36	11.91

Source: Badan Pusat Statistik (2024)

As illustrated in Table 2, Central Sulawesi Province experienced a steady increase in its Gross Regional Domestic Product (GRDP) from 2019 to 2023, culminating in a value of 193,181.36 in 2023. Notably, the province achieved its highest economic growth rate in 2022, with a significant 15.22%. Given this positive trajectory, this research aims to delve deeper into the manufacturing industry sector, analyzing its contribution to the province's GRDP and projecting its potential impact on future economic growth.

2. RESEARCH METHODS

According to Sugiyono (2018), research methods can be interpreted as a scientific approach to collecting data with specific purposes. In this study, the method used is Quantitative Descriptive. Quantitative research methods can be understood as a philosophical research approach, used to understand certain populations or examples, data collection using research instruments, and quantitative/statistical data analysis. In this descriptive research, researchers explain the real conditions of the situation being studied. Activities in quantitative descriptive research are to collect in-depth information about the state of various events or variables (Sugiyono, 2022).

The method used in this study is quantitative descriptive which aims to reveal something as it is. The quantitative descriptive method is a method that aims to describe something that is studied based on real things by drawing conclusions from observed phenomena using numerical statistics (Sulistyawati et al., 2022). This research was conducted in Central Sulawesi Province with the consideration that Central Sulawesi Province where the manufacturing industry sector is still the mainstay of the GRDP contributor in Central Sulawesi Province. Data collection in this study used documentation techniques. Documentation techniques are data collection from documents or written evidence in the form of data reports taken regarding GRDP from the Central Statistics Agency from 2019 to 2023.

In this study, an analysis technique consisting of 2 parts was used, namely the sectoral contribution which is analogous to having a contribution to the formation of GRDP, the amount of contribution processing industry sector is stated in the following formula (Rahman et al., 2019):

$$CMIS = \frac{GRDPmis}{GRDPtot} \; x \; 100\% \quad\text{...(1)}$$

Description:
CMIS : Contribution of the manufacturing industry sector in a particular year
GRDPmis : GRDP of the manufacturing industry sector in a particular year
GRDPtot : Total GRDP of Central Sulawesi Province in a certain year

To assess the growth of the manufacturing industry sector's contribution to the Gross Regional Domestic Product, the Least Squares Method was employed. This method identifies a linear relationship between two variables by fitting a trend line that minimizes the squared differences between the original data and the trend line data. The outcome is a line equation with a negative or positive slope coefficient (Septiawan & Astuti, 2016).

The least squares method is a technique for analyzing time series data to predict future trends based on past contributions. It identifies the best-fitting line or curve through historical data points, minimizing the sum of squared errors. This method is commonly used to forecast future values and make informed decisions (Pamungkas, 2016). The equation formula used is as follows:

$$y = a + bX \dots\dots(2)$$

$$a = \frac{\sum Yi}{n} \dots\dots(3)$$

$$b = \frac{\sum XY}{\sum X^2} \dots\dots(4)$$

Description:
Y   : Percentage value of projected growth contribution of the manufacturing industry sector
a   : Average percentage contribution of the manufacturing industry sector in the observation year
b   : Average increase in contribution of the manufacturing industry sector in the observation year
X   : Series
Yi   : Percentage contribution of the manufacturing sector in year-i
n   : Number of years of observation

3. **RESULTS AND DISCUSSION**
Analysis of the Contribution of the Manufacturing Industry Sector

The manufacturing sector has played a significant role in driving the economic growth of Central Sulawesi Province over the years. This sector has consistently increased its contribution to the region's Gross Regional Domestic Product (GRDP), reflecting its growing importance to the local economy. Several factors, including investments, government initiatives, and a favorable business environment, have fueled this sector's expansion. Table 3 below provides a detailed breakdown of the manufacturing sector's contribution to the GRDP from 2019 to 2023, showcasing a steady upward trend over this period.

Tabel 3. Contribution of the Manufacturing Industry Sector
to the GRDP of Central Sulawesi Province

Year	GRDPmis (Billion Rupiah)	GRDPtot (Billion Rupiah)	GRDPmis : GRDPtot (Billion Rupiah)	CMIS (%)
(1)	(2)	(3)	(4) = (2) : (3)	(5) = (4) x 100
2019	29,483.94	127,935.06	0.230460204	23.05
2020	36,464.64	134,152.69	0.271814453	27.18
2021	43,361.21	149,815.86	0.289430038	28.94
2022	56,659.02	172,624.82	0.328220588	32.82
2023	71,124.90	193,181.36	0.368176826	36.82
Total				148.81
Average				29.76

Source: Processed Data (2025)

The manufacturing sector has emerged as a pivotal force driving economic growth in Central Sulawesi Province. As detailed in Table 3, the sector's contribution to the Gross Regional Domestic Product (GRDP) has demonstrated a consistent upward trend from 2019 to 2023, culminating in a substantial peak of 36.82% in 2023. This significant surge can be attributed to a confluence of factors, including substantial investments channeled into the sector, proactive government initiatives aimed at fostering industrialization, and the creation of a conducive business environment. The increasing prominence of the manufacturing sector underscores its potential to further catalyze economic activity, generate employment opportunities, and enhance the overall prosperity of Central Sulawesi Province.

Central Sulawesi Province is strategically positioning itself as a key player in the global nickel industry. To capitalize on this promising opportunity, the provincial government is actively promoting the development of the nickel processing industry. Through strategic collaborations with foreign investors, the government is undertaking substantial investments to establish a state-of-the-art smelter capable of producing high-value nickel derivatives, such as stainless steel. Furthermore, the government is actively encouraging the growth of the lithium-ion battery industry, which relies heavily on nickel as a primary raw material. This strategic focus on the nickel industry positions Central Sulawesi to become a prominent center for battery production within Indonesia, thereby contributing to the nation's broader objectives of electric vehicle development and sustainable energy solutions.

Analysis of Projection of Contribution of Manufacturing Industry Sector

This research leverages the least squares method trend analysis to forecast the growth trajectory of the manufacturing sector's contribution to Central Sulawesi Province's Gross Regional Domestic Product (GRDP) over the next five years. By examining historical GRDP data from 2019 to 2023, the study aims to project the sector's future impact on the province's overall economic output. The findings of this analysis are meticulously presented in Table 4 and Table 5, providing a comprehensive overview of the projected trends and figures.

Tabel 4. Least Squares Method Trend Analysis

Year	Y	X	XY	X^2
2019	23.05	-2	-46.10	4
2020	27.18	-1	-27.18	1
2021	28.94	0	0.00	0
2022	32.82	1	32.82	1
2023	36.82	2	73.64	4
Total	148.81	0	33.18	10
Average (a)			29.76	
Average (b)			3.32	

Source: Processed Data (2025)

Tabel 5. Projection of Contribution of Manufacturing Industry Sector

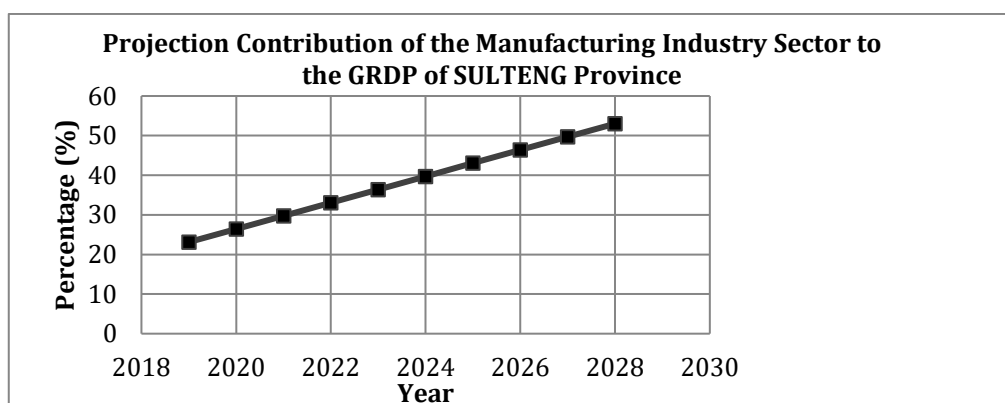| Year	Equality	A	b	X	Projection CMIS
2019	Y = a + bX	29.76	3.32	-2	23.12
2020	Y = a + Bx	29.76	3.32	-1	26.44
2021	Y = a + bX	29.76	3.32	0	29.76
2022	Y = a + bX	29.76	3.32	1	33.08
2023	Y = a + bX	29.76	3.32	2	36.40
2024	Y = a + bX	29.76	3.32	3	39.72
2025	Y = a + bX	29.76	3.32	4	43.04
2026	Y = a + bX	29.76	3.32	5	46.36
2027	Y = a + bX	29.76	3.32	6	49.68
2028	Y = a + bX	29.76	3.32	7	53.00

Source: Processed Data (2025)

Figure 1. Projection Results Diagram of the Contribution of the Manufacturing
Industry Sector to the GRDP of Central Sulawesi Province in 2019-2023
Source: Processed by the author, (2025)

The results presented in Figure 1 illustrate the projected growth of the processing industry sector's contribution to Central Sulawesi Province's Gross Regional Domestic Product (GRDP), calculated using the least squares method trend equation. The analysis indicates that the peak projected contribution of the processing industry sector is anticipated in 2028, reaching a significant 53%. Based on data projections from 2019 to 2023, the processing industry sector's contribution to the province's GRDP is expected to steadily increase over the next five years, culminating in 2028. This upward trend in the projection figures can be attributed to the consistent annual growth in the sector's contribution to the province's GRDP, as evidenced by the data presented in Table 3.

4. CONCLUSION

The processing industry sector has consistently been a significant driver of economic growth in Central Sulawesi Province, contributing an average of 29.76% to the Gross Regional Domestic Product (GRDP) between 2019 and 2023. This substantial contribution underscores the sector's critical role in shaping the province's economic landscape. Furthermore, the projected growth rate of 53% until 2028 indicates an optimistic outlook for the future of the processing industry sector. This anticipated growth trajectory suggests that the sector is poised to further bolster its contribution to the province's economy and drive sustainable development.

The findings of this study have broad implications for various stakeholders. Scientifically, the academic results contribute to the literature on the growth of the manufacturing sector at the regional level, particularly in understanding the contribution trend to GRDP. For policymakers, the projected increase until 2028 highlights the need for sustainable industrial development strategies, including investment incentives, infrastructure development, and labour skills upgrading. Meanwhile, for businesses, the trend reflects opportunities for business expansion and diversification, which may explain the increase in the industry's contribution to GRDP. However, this study has some limitations, such as reliance on historical data and quantitative methods that have not considered external factors such as economic policies or global market dynamics. Hence, future research could integrate a qualitative approach to explore the facts.

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