

LABOR ABSORPTION FACTORS OF MICRO, SMALL, AND MEDIUM ENTERPRISES (SMES) IN SUMATRA ISLAND: PANEL DATA ANALYSIS FOR THE 2020–2024 PERIOD

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Received: 18/06/2026 | Revised: 02/07/2026 | Accepted: 20/07/2026 | Published: 28/07/2026

Abstract

The purpose of this study is to analyze the influence of the number of Micro and Small Industries (MSMEs), the value of MSME *output*, and GRDP on the absorption of MSME labor in 10 (ten) provinces on Sumatra Island for the period 2020–2024. This study uses panel data with a Fixed Effect Model (FEM) approach. The results of the study revealed that the number of MSME businesses significantly influences the absorption of MSME labor ($\beta = 1.914200$; $p < 0.05$), while the value of MSME *output* ($\beta = 0.001026$; $p > 0.05$) and GRDP ($\beta = 0.103498$; $p > 0.05$) do not significantly affect the absorption of MSME labor. The model explains 99.2364% of the variation in MSME labor absorption (Adjusted $R^2 = 0.992364$). The findings of this study are that the expansion of employment opportunities is more determined by the growth in the number of business units than by the increase in *output* or the size of the regional economy. The government should prioritize policies that encourage the formation of new MSME business units and provide training and access to capital to increase business capacity without reducing employment.

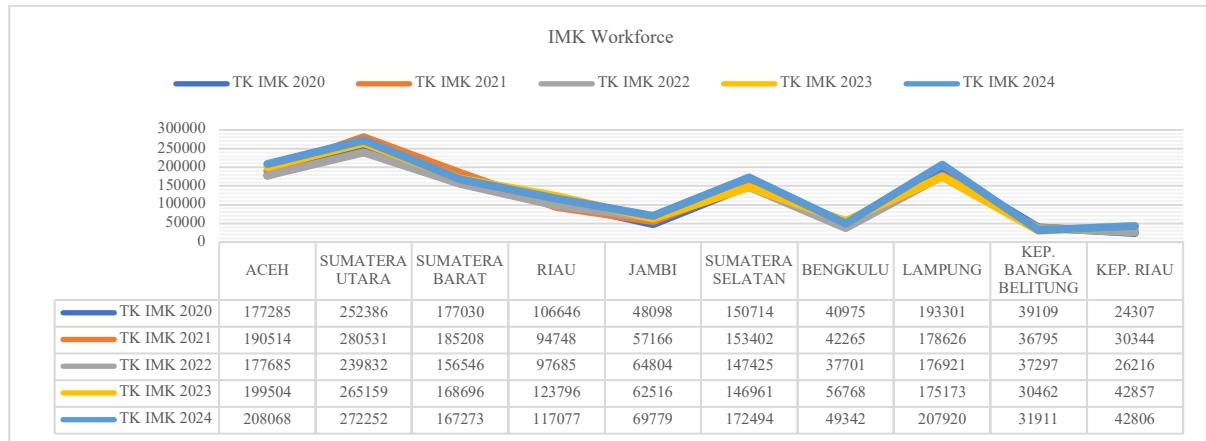
Keywords: Number of MSME businesses, MSME *output value*, GRDP, MSME workforce

INTRODUCTION

Economic development is an effort to improve the quality of life of the community (Azhari & Nuraini, 2024). The workforce plays a crucial role in the economic development process (Hikmah & Sishadiyati, 2024). One indicator of success in economic development is increased employment. The Micro and Small Industry (MSME) sector supports job creation in Indonesia (Manganti & Budyanra, 2025). Sumatra Island ranks second in Indonesia after Java in terms of economic growth (Wijimulawiani, 2022). Analysis of BPS data for the 2020–2024 period shows that the development of the MSME workforce on Sumatra Island fluctuates between provinces. North Sumatra is recorded as the province with the largest number of MSME workers (from 252,386 to 272,252). Riau Islands has the lowest number, although it has increased (from 24,307 to 42,806). Several provinces experienced a decline, such as West Sumatra (from 177,030 to 162,723) and the Bangka Belitung Islands (from 39,109 to 31,911). This inequality and decline indicate challenges in the capacity of MSMEs to absorb labor. According to W. Arthur Lewis (1954) in his Sector Dualism Theory, the economy of developing countries consists of the agricultural and non-agricultural sectors (Rahayu et al., 2025). The non-agricultural sector plays a role in driving economic growth in Indonesia (Hubbansyah et al., 2023). The increase in the number of business units and the increase in the value of MSME *output* illustrate the expansion of economic activity that has the potential to drive labor demand. GRDP growth indicates an increase in the overall production capacity of the region.

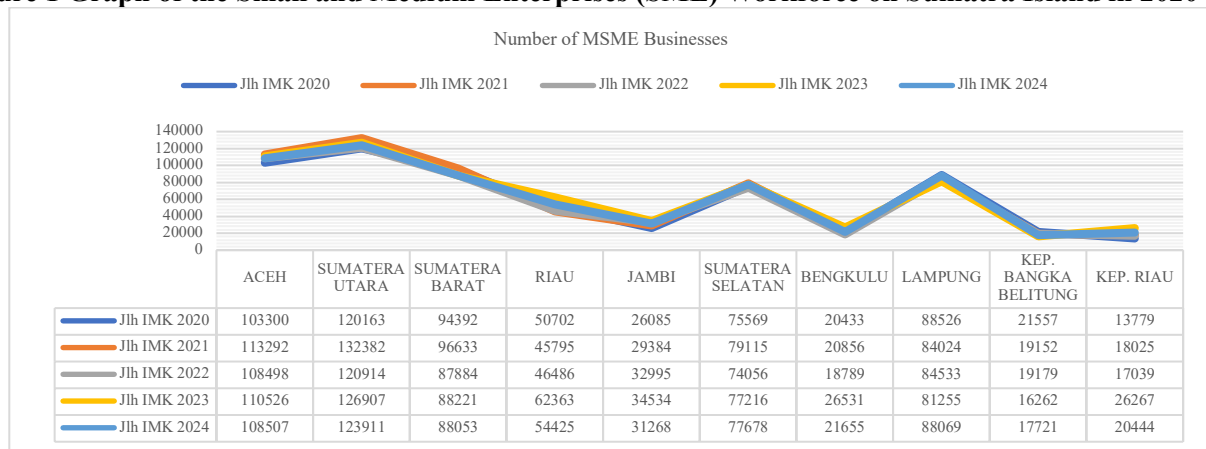
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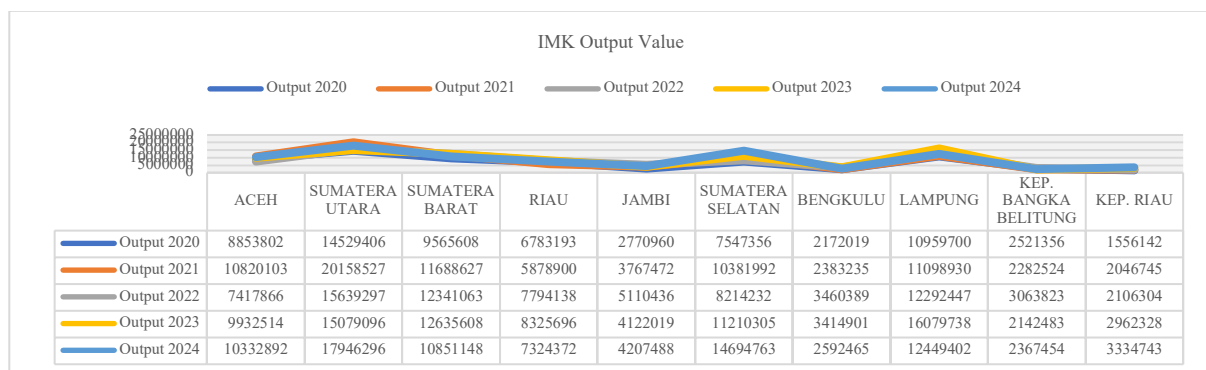
Source: (Central Statistics Agency, 2025b)

Figure 1 Graph of the Small and Medium Enterprises (SME) Workforce on Sumatra Island in 2020-2024



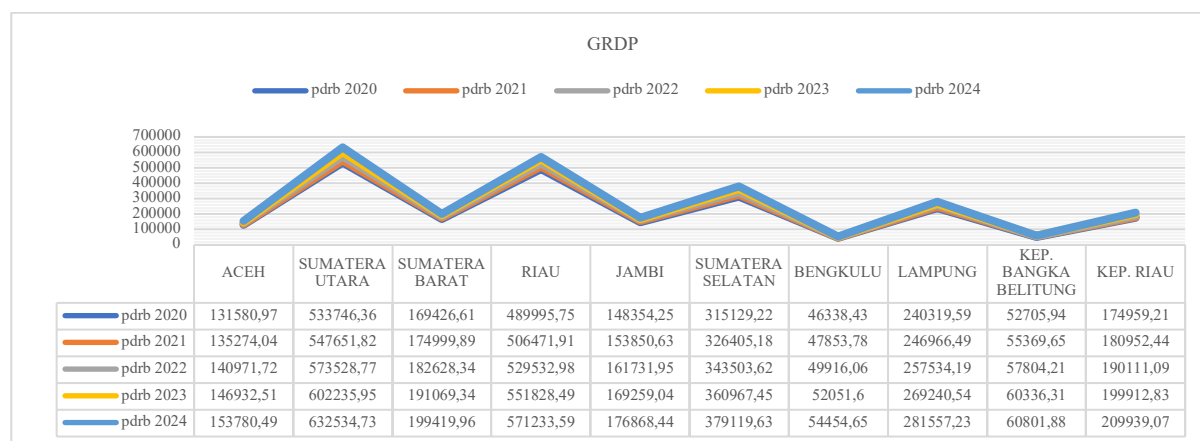
Source: (Central Statistics Agency, 2025a)

Figure 2 Graph of the Number of MSME Businesses on Sumatra Island in 2020-2024



Source: (Central Statistics Agency, 2025c)

Figure 3 Graph of IMK Output Value on Sumatra Island 2020-2024



Source: (Central Statistics Agency, 2026)

Figure 4 Graph of GRDP on Sumatra Island 2020-2024

Based on BPS data for 2020–2024, Figures 1-4 show facts that are not entirely in line with theory. West Sumatra Province experienced an increase in the value of MSME *output* (from Rp9,565,608 to Rp10,851,148) and an increase in GRDP (from Rp169,426.61 billion to Rp199,419.96 billion), but the number of MSME workers actually decreased (from 177,030 to 162,723). Lampung Province experienced a slight decrease in the number of MSME businesses (from 88,526 to 88,069), but the number of workers increased (from 193,301 to 207,920). Riau Province experienced an increase in GRDP (from Rp489,995.75 billion to Rp571,233.59 billion), but the increase in the MSME workforce was relatively limited (from 106,646 to 117,077). These three provinces demonstrate differences between conditions on Sumatra Island during the 2020-2024 period and existing theories. The 2020-2024 period was chosen because it represents the post-COVID-19 pandemic recovery, marked by significant changes in business activities, production, and employment among micro, small, and medium enterprises (SMEs). This highlights the need for research into the factors influencing labor absorption in the micro, small, and medium industry sector on Sumatra Island during the economic recovery period.

LITERATURE REVIEW

Micro and Small Industries

Small and Medium Enterprises (SMEs) businesses require limited capital but employ a large workforce, making them highly adaptable to changes in the local market (Central Statistics Agency, 2024). SMEs play a vital role in the national economy, creating jobs and playing a crucial role in driving regional economic growth (Immanuel, 2026).

Absorption of Micro and Small Industry Labor

According to Kuncoro (2012) in (Tampubolon, 2025), labor absorption is essentially a picture of how many people ultimately find work and what positions are filled in various sectors. According to Law No. 13 of 2003, labor is every person who has the ability to perform work to produce goods or services for themselves or other parties (Syah et al., 2024).

Number of Micro and Small Industrial Enterprises

The number of business units represents the level of industrial development in a region. The more businesses opened, the greater the opportunities for people to find employment (MZ Arifin & Hasmarini, 2025).

Micro and Small Industry *Output* Value

According to the Central Statistics Agency (BPS) (2019), in Gulo et al., 2022, output is the total of all products produced by an industry, from manufactured goods and services to electricity sales, to by-products such as production waste and semi-finished goods. Output *indicates* the health of an industry. A consistently rising *output* indicates a company's profitability. This healthy financial condition will ultimately encourage companies to expand or open new branches, ultimately increasing the need for new workers.

GRDP

Constant-price GRDP is more often used as a benchmark for real growth. Constant-price GRDP is adjusted to base-year prices to avoid being affected by price increases or inflation (Central Statistics Agency, 2025d). According to Maharani (2016) in Amparian et al., 2022, the GRDP figure serves as a report card for development success in a

region. This research aimed to analyze the effect of industrial business units and labor wages (as an indicator of the industrial sector) on the labor absorption and Gross Regional Domestic Product (GRDP) in the industrial sector in South Kalimantan Province. The research employed secondary data collected from time series to see the data developed during the period from 1998 to 2018. These data were then analyzed using the path analysis method. The results revealed that the industrial business units and labor costs have a significant effect on employment. Furthermore, the industrial business unit variables did not have a direct, significant influence on the GRDP of the industrial sector. A significant effect was also found between labor wages and labor absorption on the GRDP of the industrial sector. In an indirect manner, the labor absorption variable acts as an intermediary for the influence of the industrial business unit variable on the GRDP of the industrial sector. Meanwhile, in the effect of the labor wages on the GRDP of the industrial sector, the labor absorption variable does not act as an intermediary. Generally, labor wages have a greater effect on the GRDP of the industrial sector than the variables of industrial business units. Interestingly, a different conclusion was revealed by Nunung (2018) that the minimum wage in her research does not have a significant impact on employment in Central Java Province because there are companies that set wages below market prices. Furthermore, Rochmani et al. (2016) reported that the number of industrial business units does not positively impact labor absorption because industrial conditions in Central Java Province are labor-intensive. Therefore, labor absorption is not affected by the presence or absence of business

RESEARCH METHODOLOGY

This research was conducted in 10 (ten) provinces on the island of Sumatra, namely Aceh, North Sumatra, West Sumatra, Riau, Jambi, South Sumatra, Bengkulu, Lampung, Bangka Belitung Islands, and Riau Islands during the period 2020-2024. All data are sourced from official publications of the Central Statistics Agency (BPS). The variables analyzed consist of MSME labor absorption as the dependent variable, while the number of MSME businesses, MSME *output value*, and GRDP are used as independent variables. The relationship between variables is analyzed using a panel data regression model as follows:

$$TK\ IMK = \alpha + \beta_1 JLH\ IMK + \beta_2 OUTPUT\ IMK + \beta_3 GRDP + e$$

TK IMK	= Total Absorption of IMK Workforce
α	= Constant Number of 0.05
β_1	= Coefficient of the Number of IMK Variable
β_2	= Coefficient of IMK <i>Output Value Variable</i>
β_3	= PDRB Variable Coefficient
JLH IMK	= Number of IMK Businesses
IMK	<i>OUTPUT</i> = IMK <i>Output Value</i>
GRDP	= Gross Regional Domestic Product at Constant Prices
e	= Error

RESULTS AND DISCUSSION

Panel Data Regression Model Selection

Several techniques used to estimate panel data regression model parameters include *the Common Effects Model* (CEM), *the Fixed Effects Model* (FEM), and *the Random Effects Model* (REM). The steps used to test the best regression results are the Chow Test, the Hausman Test, and the LMTest.

Chow Test

The Chow test is used to select the best model between CEM and FEM. Based on Table 1, the *Cross-section Prob value F* = 0.0002 (<0.05) means the selected estimation model is FEM.

Table 1 Chow Test Results

Redundant Fixed Effects Tests			
Equation: Untitled			
Cross-section fixed effects test			
Effects Test	Statistics	df	Prob.
Cross-section F	5.084703	(9.37)	0.0002
Cross-section Chi-square	40.252754	9	0.0000

Hausman test

The Hausman test was used to select the best model between FEM and REM. Based on Table 2, the value of *Prob Cross-section random* = 0.0047 (<0.05) so the selected estimation model is FEM, so it does not continue to the LM test.

Table 2 Hausman Test Results

Correlated Random Effects - Hausman Test

Equation: Untitled

Cross-section random effects test

Test Summary	Chi-Sq. Statistic	Chi-Sq. df	Prob.
Random cross-section	12.959999	3	0.0047

Classical Assumption Test

Normality Test

The test used is the *Jarque-Bera Normality test*. Based on Figure 1, the *Jarque-Bera Probability value* = 0.069500 (>0.05) so the data is normally distributed.

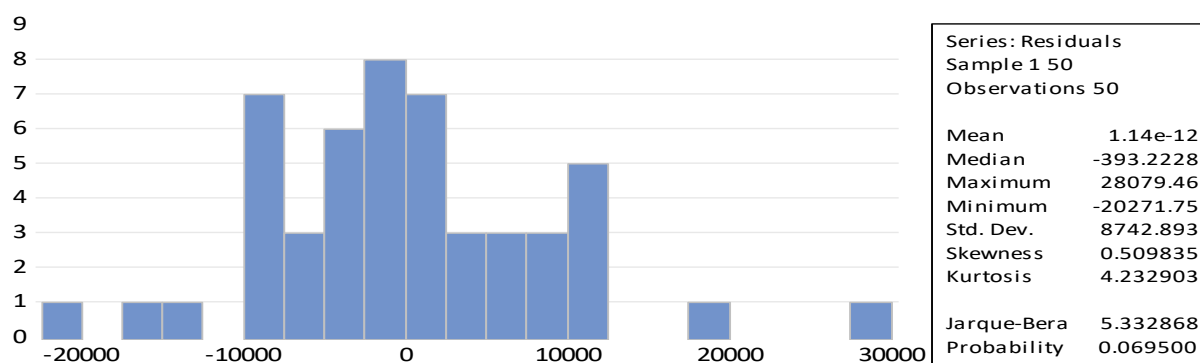


Figure 5 Normality Test Results

Heteroscedasticity Test

The test used is the *White Heteroscedasticity test*. Based on table 3, the *Prob. Obs*R-Square value* = 0.2653 (>0.05) means the data does not show symptoms of heteroscedasticity.

Table 3 Heteroscedasticity Test Results

Heteroskedasticity Test: White

Null hypothesis: Homoskedasticity

F-statistic	1.276214Prob. F(9,40)	0.2796
Obs*R-squared	11.15443Chi-Square Prob.(9)	0.2653
Scaled explained SS	15.26110Chi-Square Prob.(9)	0.0840

Multicollinearity Test

The test used was the *Variance Inflation Factor (VIF)*. Based on Table 4, the *Centered VIF value* for the independent variable is less than 10, indicating that the data used does not exhibit symptoms of multicollinearity.

Table 4 Multicollinearity Test Results

Variance Inflation Factors

Date: 05/16/26 Time: 12:47

Sample: 1 50

Included observations: 50

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	6873980.	4.221139	NA
JLH_IMK	0.007133	23.58501	6.251252
OUTPUT_IMK	5.16E-07	27.59577	7.608858
GRDP	9.29E-05	5.288903	1.727819

Estimation Results of Selected Panel Data Regression Model Equation

Based on the results of the *Chow* and *Hausman tests*, the *Fixed Effect Model (FEM)* was found to be the best panel data regression method . The results are as follows:

Table 5 Fixed Effect Model Test Results

Dependent Variable: TK_IMK

Method: Panel Least Squares

Date: 05/16/26 Time: 13:16

Sample: 2020 2024

Periods included: 5

Cross-sections included: 10

Total panel (balanced) observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-29769.39	19647.80	-1.515151	0.1382
JLH_IMK	1,914,200	0.280616	6.821416	0.0000
OUTPUT_IMK	0.001026	0.000782	1.311238	0.1979
GRDP	0.103498	0.057333	1.805203	0.0792
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.994234	Mean dependent var		124647.5
Adjusted R-squared	0.992364	SD dependent var		76985.72
SE of regression	6727.239	Akaike info criterion		20.68461
Sum squared residual	1.67E+09	Schwarz criterion		21.18174
Log likelihood	-504.1153	Hannan-Quinn criter.		20.87392
F-statistic	531.6799	Durbin-Watson stat		2.027396
Prob(F-statistic)	0.000000			

Adjusted R-squared Test

Based on table 5, the *adjusted R-squared value* = 0.992364 shows that the Number of MSME Businesses, MSME *Output Value* and GRDP together influence and explain 99.2364% of the variation in MSME Labor Absorption, the remaining 0.7636% is influenced by other factors outside the model.

Joint Effect Significance Test (F Test)

Based on table 5, the Prob. (F-statistics) value ($p = 0.0000$; $p < 0.05$) so that the variables Number of MSME Businesses, MSME *Output Value* and GRDP together have a significant effect on the MSME Labor Absorption variable.

t-Test Results

Based on table 5, the variable number of MSME businesses significantly influences MSME labor absorption ($\beta = 1.914200$; $p < 0.05$), while the MSME *output value* ($\beta = 0.001026$; $p > 0.05$) and GRDP ($\beta = 0.103498$; $p > 0.05$) do not significantly influence MSME labor absorption.

Discussion

The Influence of the Number of MSME Businesses on the Absorption of MSME Labor

The variable of the number of MSME businesses significantly influences MSME labor absorption ($\beta = 1.914200$; $p < 0.05$). This finding supports research by (Nababan, 2025) in North Sumatra Province and (Herdianto et al., 2025) at the provincial level in Indonesia, which proves a positive and significant influence of the number of MSME units on labor absorption. This finding is consistent with the Sector Dualism Theory, which states that the traditional and modern sectors develop in parallel, with the non-agricultural sector tasked with absorbing the remaining labor from the traditional sector. The large number of MSME businesses also demonstrates the increasing ability of the non-agricultural sector to absorb labor, so that the development of business units on the island of Sumatra contributes to increasing MSME labor absorption. The island of Sumatra for the period 2020–2024 represents a period of economic recovery after the COVID-19 pandemic. During this period, uncertainty in the formal sector encouraged people to create independent jobs by opening micro and small business units. This demonstrates that MSMEs implement adaptive strategies amidst economic uncertainty (Herlin et al., 2025) . Improving MSME business performance plays a role not only in the economic recovery process but also in creating jobs for the community. As a labor-intensive sector, MSMEs have the capacity to absorb a large workforce, thus making a significant contribution to employment in Indonesia. This is compounded by the fact that MSMEs are less dependent on large capital and foreign debt, making this sector more resilient in facing the impacts of the global crisis (Manganti & Budyanra, 2025) .

Output Value on MSME Labor Absorption

output value variable does not significantly affect MSME labor absorption ($\beta = 0.001026$; $p > 0.05$). This finding is consistent with the case of West Sumatra. These findings are similar to the case in West Sumatra Province. Although MSME *output* increased, labor absorption decreased. This indicates that the increase in *output* was not caused by an increase in the number of workers, but could be influenced by increased productivity or technological changes. The relationship mentioned in Lewis's theory does not occur directly due to an increase *in output* . Increased economic activity carried out outside the agricultural sector will have implications for increased labor absorption. This implies that an increase in output can occur due to increased productivity or the use of other technologies without increasing the number of workers. This finding does not support research (Maulidah & Arisetyawan, 2026) in Central Java Province and (Syafirilia et al., 2022) in Padang Pariaman Regency which proved a positive and significant influence between production value and labor absorption. One reason why the *output value* of small and medium enterprises (SMEs) does not significantly affect labor absorption is that Murni (2013) in (Muhammad et al., 2026) proves that sustainable growth can only be achieved when the productivity of production factors increases through modernization and innovation. Technology plays a key role because it can increase efficiency and reduce production costs. This condition causes an increase in *output* but does not increase labor demand. Labor absorption on the island of Sumatra in the 2020–2024 period is driven more by the emergence of new business entities than by increasing the capacity of existing businesses.

The Influence of GRDP on the Absorption of MSME Labor

The GRDP variable does not significantly affect the absorption of MSME labor ($\beta = 0.103498$; $p > 0.05$). This finding supports research by (Anandika, 2023) in Sumatra Island in 2017–2022 and (S. Arifin, 2023) in Sumatra Island which proves that GRDP does not significantly affect labor absorption in the MSME sector. Based on Lewis's Theory, economic growth must make the modern sector develop so that it can prioritize labor absorption. However, based on the findings of this study, economic growth in Sumatra Island in the 2020–2024 period was obtained more from sectors that are not directly related to MSME activities. This can occur because economic growth in most provinces in Sumatra Island is still largely supported by the agriculture, forestry and fisheries, water supply and waste and waste management, and mining and quarrying sectors (Yulianita et al., 2023) . While the main contributing sectors grow, GRDP figures do increase, but the effect on employment in the MSME sector is not linear. GRDP growth in 2020–2024 in Sumatra represents more of an increase in added value through capital and machinery investment than an increase in human

labor. The findings suggest the possibility that GRDP growth in several provinces in Sumatra is not in terms of job creation for MSMEs, considering that regional production growth that increases regional *output* can come from more capital-intensive sectors. Empirical evidence from a panel data study of 30 Indonesian provinces for the 2018–2023 period by (Herdianto et al., 2025) reveals that the number of MSMEs, PMDN, and the value of MSME *output* have a positive and significant effect on employment, not GRDP directly. Research (Rasyid & K Indah, 2022) in Bogor Regency (2010–2020) found that GRDP did not have a positive and significant effect on employment, with 12% of the variance influenced by other factors.

CONCLUSIONS AND SUGGESTIONS

The conclusion is that the number of MSME businesses significantly influences MSME employment in Sumatra Island during the 2020–2024 period. The increasing number of business units encourages increased employment. The value of MSME *output* and GRDP does not significantly influence MSME employment in Sumatra Island during the 2020–2024 period. Empirical findings indicate that the expansion of employment opportunities is more determined by the growth in the number of business units than by an increase *in output* or the size of the regional economy. The recommendation in this study is that the government should prioritize policies that encourage the formation of new MSME business units and provide training and access to capital to increase business capacity without reducing employment. For further research, add variables such as labor quality, capital intensity, and technology adoption to explain why the increase in MSME *output* is not followed by an increase in the workforce.

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