

The Effect Of Road Infrastructure, Investment, Labor, And Regency/City Minimum Wages On The Manufacturing Sector In West Nusa Tenggara Province, 2019–2024

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ABSTRACT

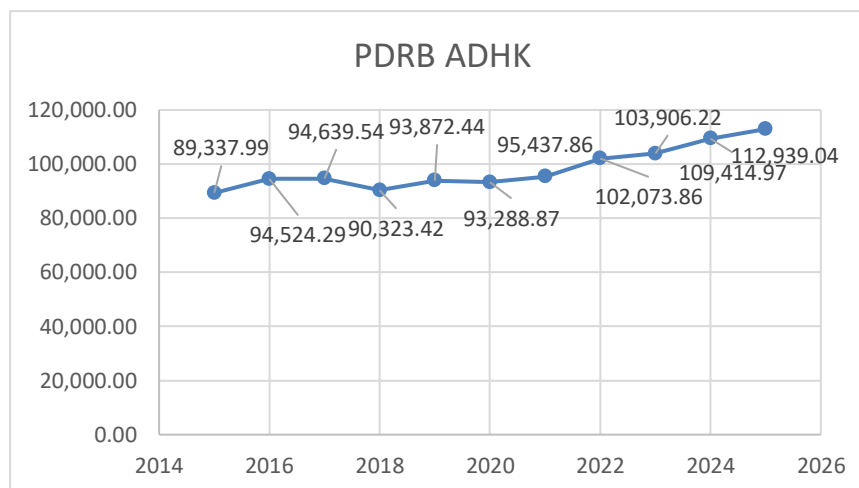
The development of the industrial sector is an important factor in promoting regional economic growth through increased production, employment creation, and value added. Several economic and production issues impact the growth of West Nusa Tenggara Province's industrial potential. The purpose of this research is to examine the relationship between industrial development (as indicated by the manufacturing sector's GRDP in the regencies and cities of West Nusa Tenggara Province from 2019 to 2024 and factors such as road infrastructure, investment, labor, and regency/city minimum wages. Using secondary panel data spanning ten regencies and cities over six years, with a total of sixty observations, this research utilizes a quantitative method. Using EViews 12, panel data regression was used to evaluate the data. Model selection tests led to the conclusion that the CEM was the best fit. Industrial development is negatively and significantly affected by road infrastructure, negatively and insignificantly by investment, positively and significantly by labor, and positively and insignificantly by the regency/city minimum wage, according to the data. All four independent factors impact the manufacturing sector's GRDP at the same time. Industrial development can be described by the variables included in the model to the tune of 93.89% (R-squared = 0.938944), with the remaining 6.11% attributable to factors outside the purview of the research. Based on these results, West Nusa Tenggara Province has to spend more, build more egalitarian infrastructure, and improve the quality of its workforce if it wants to foster industrial growth.

Keyword: Road Infrastructure, Investment, Labor, Minimum Wage, Manufacturing Sector.

INTRODUCTION

The capacity of a region to develop its manufacturing sector is an important indicator of the success of its economic development (Maulidya, 2021). Increasing the value added of products and services is only one of the benefits of industrial development; it also creates employment opportunities and increases household incomes, which in turn contributes to economic growth. In assessing the economic performance of a region, Gross Regional Domestic Product (GRDP) is one of the key indicators that should be considered. Therefore, examining the dynamics of economic sector development, particularly the industrial sector as one of the main drivers of regional economic growth, is essential for understanding the development of GRDP in West Nusa Tenggara (NTB) Province. According to Yuan et al. (2025), West Nusa Tenggara Province has demonstrated strong economic development dynamics compared with other regions in Eastern Indonesia.

In recent years, the GRDP of West Nusa Tenggara has experienced significant fluctuations. These fluctuations have been influenced by both internal and external factors, including changes in the region's economic structure and the COVID-19 pandemic in 2020, which substantially restricted economic activities. Therefore, Figure 1 presents the development of the industrial sector's GRDP at constant prices (ADHK) in West Nusa Tenggara Province for the period 2020–2024:



Source: Statistics Indonesia (BPS) of West Nusa Tenggara

Figure 1. GRDP at Constant Prices of West Nusa Tenggara Province, 2015–2024

The GRDP graph of West Nusa Tenggara Province at constant prices from 2015 to 2025 indicates a generally increasing economic trend, except in 2018 and 2020, when a decline occurred. As a consequence of the COVID-19 pandemic, GRDP decreased to IDR 93,288.87 billion in 2020. Following this decline, the regional economy began to recover, with GRDP increasing to IDR 95,437.86 billion in 2021 and continuing to rise to IDR 112,939.04 billion in 2025. This development indicates an improving process of economic recovery and growth in West Nusa Tenggara following the pandemic.

Efforts to diversify the regional economy, reduce dependence on non-renewable natural resources, and expand employment opportunities for the people of West Nusa Tenggara have increasingly emphasized the development of the industrial sector (BPS NTB, 2020). The contribution of the industrial sector to the GRDP of West Nusa Tenggara has shown a positive trend. This development is consistent with the regional government's objective of increasing the contribution of the manufacturing sector to GRDP in the coming years as part of the province's long-term economic development strategy (BPS NTB, 2025).

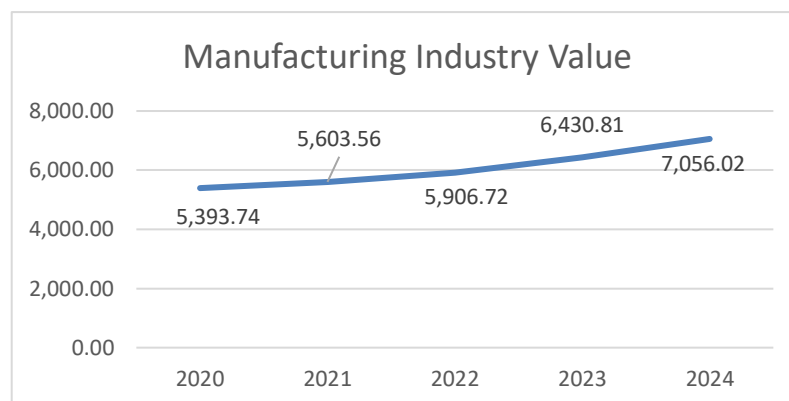


Figure 2. Gross Regional Domestic Product (GRDP) at Constant Prices for the Manufacturing Sector in West Nusa Tenggara Province, 2020–2024

An analysis of the manufacturing sector in West Nusa Tenggara during 2020–2024 indicates that the sector experienced continuous growth throughout the period. The value of the manufacturing sector increased from 5,393.72 in 2020 to 5,603.56 in 2021. It subsequently increased to 5,906.72 in 2022, followed by a more substantial increase to 6,430.81 in 2023, and reached 7,056.02 in 2024. This trend demonstrates that the industrial sector has increasingly contributed to the regional economy.

The development of an industrial sector in a region is influenced by various fundamental factors. Based on theoretical perspectives and previous empirical studies, several factors significantly affect industrial development, including infrastructure, labor availability, and minimum wages (Pangastuti, 2015). Infrastructure plays an important role as public

capital in supporting industrial production and distribution activities. Two of the most essential types of infrastructure for the industrial sector are road and electricity infrastructure. Road infrastructure plays a particularly important role in supporting a region's logistics system. Adequate road infrastructure facilitates connections between production centers, markets, and sources of raw materials. Consequently, the distribution of goods and the mobility of production factors can operate more efficiently, thereby reducing transportation costs and improving industrial competitiveness (Rahmatika et al., 2024).

Investment contributes to increased production capacity, capital formation, employment opportunities, and technological development, thereby promoting economic growth (Nugroho et al., 2025). In addition to investment, human resources and wage policies are important determinants of industrial development. A competent workforce enables industrial production processes to operate more efficiently and achieve their potential. A large labor force can provide a demographic dividend when it can be optimally absorbed by the industrial sector (Issue et al., 2025). Furthermore, minimum wage policies represent an important factor affecting production costs and industrial competitiveness. Although higher wages may increase workers' purchasing power and stimulate economic activity, they may also increase production costs for firms (Athallah et al., 2025).

Previous studies related to this topic have produced different findings, indicating the existence of a research gap. Prihatini (2024), in a study conducted on Java Island, found that road, electricity, and water infrastructure had a positive and significant effect on economic growth. However, Cornelius and Primandhana (2022) found that electricity infrastructure had a significant effect on GRDP in Surabaya, whereas road infrastructure had no significant effect. Meanwhile, Oliveira (2023) demonstrated that electricity and road infrastructure, when examined separately in Belu Regency, did not have a significant effect on economic development. These differences in empirical findings indicate that regional characteristics may influence the effectiveness of infrastructure and labor-related policies in supporting industrial performance.

This study is important because most previous studies have focused on the effects of these variables on aggregate GRDP rather than specifically on the manufacturing sector. By using a more recent observation period, namely 2019–2024, this study is expected to provide a more relevant description of recent economic conditions, particularly following the COVID-19 pandemic and during the subsequent economic recovery process in West Nusa Tenggara. This period is particularly important because it represents a transition from an economic crisis toward a more stable recovery phase. Therefore, this study aims to examine the effects of road infrastructure (X1), investment (X2), labor (X3), and regency/city minimum wages (X4) on industrial development in West Nusa Tenggara Province during 2019–2024.

RESEARCH METHODS

This study employs a quantitative approach with an associative research design. In quantitative research, hypotheses are tested through statistical data analysis, while an associative approach is used to determine the effects of independent variables on a dependent variable (Sugiyono, 2017). The study uses secondary data obtained through documentary records and a literature review of official publications issued by the Central Statistics Agency (BPS) and Satu Data NTB. The dataset consists of 60 observations covering 10 regencies/cities in West Nusa Tenggara Province during 2019–2024.

The dependent variable is manufacturing-sector GRDP at constant prices. The independent variables consist of the number of workers, the length of roads in good condition, domestic investment (PMDN), and regency/city minimum wages.

The data were analyzed using panel data regression with EViews 12. The Chow, Hausman, and Lagrange Multiplier (LM) tests were employed to determine the most appropriate model among the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effects Model (REM). Classical assumption tests were subsequently conducted, including normality, multicollinearity, autocorrelation, and heteroskedasticity tests. Hypothesis testing was conducted using the t-test, F-test, and coefficient of determination (R^2) to assess the explanatory power of the model and the effects of the independent variables on the dependent variable.

RESULTS AND DISCUSSION

Data Analysis Results

Panel Data Regression Model Selection

The purpose of model selection is to determine the most appropriate panel data estimation model among the CEM, FEM, and REM. The Chow, Hausman, and LM tests were used to evaluate the suitability of the three models. The results indicate that the CEM is the most appropriate model for this study:

Tabel 1
Hasil Uji Chow, Uji Hausman, Uji Lagrange Multiplier (LM)

Uji Chow	
Cross-section Chi-square	0.1660
Keputusan	> 0.05
Model Terpilih	CEM
Uji Hasuman	
Cross-section Random	0.0082
Keputusan	< 0.05
Model Terpilih	FEM
Uji Lagrange Multiplier (LM)	
Bruesch-Pagan (Both)	0.1257
Keputusan	> 0.05
Model Terpilih	CEM

Sumber: Hasil Olah dengan Eviews 12.

The Chow test produces a probability value of 0.1660, which is greater than 0.05. The Hausman test produces a probability value of 0.0082, while the LM test produces a probability value of 0.1257. Based on the overall model-selection procedure, the CEM is selected as the most appropriate model for estimating the panel regression in this study.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-13.79608	7.931254	-1.739457	0.0875
X1	-0.306926	0.108576	-2.826825	0.0065
X2	-0.000978	0.024534	-0.039873	0.9683
X3	1.420501	0.080763	17.58854	0.0000
X4	0.532127	0.535364	0.993954	0.3246

Source: Data processed using EViews 12.

Figure 3. Panel Data Regression Results: Common Effect Model

The panel regression equation estimated using the *Common Effect Model* is:

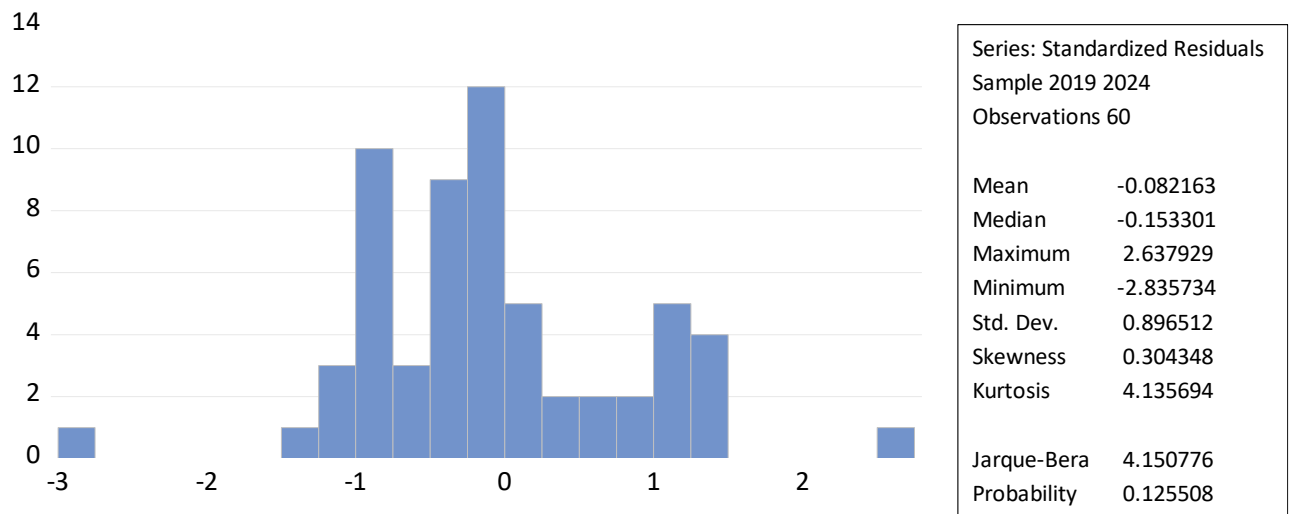
$$Y = -13.79608 - 0.306926X_1 - 0.000978X_2 + 1.420501X_3 + 0.532127X_4 + e$$

Classical Assumption Tests

The panel regression model used in this study is the CEM, which employs the Ordinary Least Squares (OLS) approach (Ghozali, 2018). Therefore, classical assumption tests were conducted as follows.:

a. Normality Test

The normality test aims to determine whether the residuals in the regression model are normally distributed. A good regression model is characterized by normally distributed residuals. The Jarque-Bera test was employed to examine normality. A probability value greater than 0.05 indicates that the residuals are normally distributed, whereas a probability value below 0.05 indicates that they are not normally distributed (Ghozali, 2018).



Source: Data processed using Eviews 12.

Figure 4. Normality Test Results

The Jarque-Bera statistic is **4.150776**, with a probability value of **0.125508**. Since the probability value is greater than 0.05, the residuals can be concluded to be normally distributed.

b. Multicollinearity Test

The multicollinearity test aims to determine whether a strong relationship exists among the independent variables in the regression model. A good regression model should be free from multicollinearity. The Variance Inflation Factor (VIF) was used to assess multicollinearity. A VIF value below 10 and a tolerance value above 0.10 indicate that the model is free from multicollinearity (Widarjono, 2018).

Variable	Coefficient Uncentered Variance	Centered VIF	Centered VIF
C	62.90480	66224.62	NA
X1	0.011789	425.5697	3.088113
X2	0.000602	108.0672	1.303817
X3	0.006523	1184.693	3.495995
X4	0.286615	64533.06	1.189662

Source: Data processed using Eviews 12.

Figure 5. Multicollinearity Test Results

The centered VIF values are 3.088113 for X1, 1.303817 for X2, 3.495995 for X3, and 1.189662 for X4. Since all centered VIF values are below 10, the regression model satisfies the assumption of no multicollinearity.

c. Autocorrelation Test

The autocorrelation test is used to determine whether residuals from one observation period are correlated with residuals from another period. Autocorrelation commonly occurs in time-series data. This study employs the Breusch-Godfrey Serial Correlation LM test (Ghozali, 2018).

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.627037	Prob. F(2,53)	0.5381
Obs*R-squared	1.386891	Prob. Chi-Square(2)	0.4999

Source: Data processed using EViews 12.

Figure 6. Autocorrelation Test Results

The probability value of the Chi-square statistic associated with Obs*R-squared is 0.4999, which is greater than 0.05. Therefore, the model does not exhibit autocorrelation in its residuals.

d. Heteroskedasticity Test

The heteroskedasticity test is conducted to determine whether the variance of the residuals differs across observations. A good regression model should have constant residual variance, or homoskedasticity. The Breusch-Pagan-Godfrey test was employed to examine heteroskedasticity. A probability value greater than 0.05 indicates that the regression model does not suffer from heteroskedasticity (Ghozali, 2018).

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.619037	Prob. F(4,55)	0.1825
Obs*R-squared	6.320643	Prob. Chi-Square(4)	0.1764
Scaled explained SS	59.03459	Prob. Chi-Square(4)	0.0000

Source: Data processed using Eviews 12.

Figure 6. Heteroskedasticity Test Results

The Obs*R-squared value is 6.320643, with a Chi-square probability value of 0.1764. Since the probability value is greater than the 5% significance level, the regression model is concluded not to exhibit heteroskedasticity.

HYPOTHESIS TESTING

Hypothesis testing is conducted to determine whether the independent variables have partial or simultaneous effects on the dependent variable. The tests consist of the t-test, F-test, and coefficient of determination:

T-Test

The t-test is used to determine the partial effect of each independent variable on the dependent variable. The test is conducted by comparing the probability value with the 0.05 significance level. If the probability value is below 0.05, the independent variable has a statistically significant partial effect on the dependent variable (Akbar et al., 2023).

Variable	Coefficient		t-Statistic	Prob.
	t	Std. Error		
C	-13.79608	7.931254	-1.739457	0.0875
X1	-0.306926	0.108576	-2.826825	0.0065
X2	-0.000978	0.024534	-0.039873	0.9683
X3	1.420501	0.080763	17.58854	0.0000
X4	0.532127	0.535364	0.993954	0.3246

Source: Data processed using Eviews 12.

Figure 7. Results of the t-statistic test

The interpretation of the results is as follows:

1. Road Infrastructure

The road infrastructure variable has a probability value of 0.0065, which is below 0.05. Therefore, road infrastructure has a negative and significant effect on manufacturing-sector GRDP.

2. Investment

The investment variable has a probability value of 0.9683, which is greater than 0.05. Therefore, investment has a negative but statistically insignificant effect on manufacturing-sector GRDP.

3. Labor

The labor variable has a probability value of 0.0000, which is below 0.05. Therefore, labor has a positive and significant effect on manufacturing-sector GRDP.

4. Regency/City Minimum Wage

The regency/city minimum wage variable has a probability value of 0.3246, which is greater than 0.05. Therefore, the regency/city minimum wage has a positive but statistically insignificant effect on manufacturing-sector GRDP.

F-Test

The F-test is used to determine whether the independent variables jointly or simultaneously affect the dependent variable. The test is conducted by examining the probability value of the F-statistic. If the probability value is below 0.05, the independent variables jointly have a significant effect on the dependent variable (Akbar et al., 2023).

Root MSE	0.892799	R-squared	0.938944
Mean dependent var	33.02046	Adjusted R-squared	0.934503
S.D. dependent var	26.80534	S.E. of regression	0.932498
Sum squared resid	47.82539	F-statistic	211.4527
Durbin-Watson stat	0.693777	Prob(F-statistic)	0.000000

Source: Data processed using EViews 12.

Figure 8. Results of the F Statistical Test

The F-statistic is 211.4527, with a probability value of 0.000000. At the 5% significance level ($\alpha = 0.05$), the probability value is below 0.05. Therefore, H_0 is rejected and H_1 is accepted. This finding indicates that road infrastructure, investment, labor, and regency/city minimum wages jointly have a significant effect on manufacturing-sector GRDP in the regencies/cities of West Nusa Tenggara Province during 2019–2024.

Coefficient of Determination (R^2)

The coefficient of determination is used to assess the extent to which the independent variables explain variation in the dependent variable. The coefficient of determination ranges from 0 to 1 (Dukalang, 2020). A higher R^2 indicates a greater ability of the independent variables to explain the dependent variable, whereas a lower R^2 indicates limited explanatory power, with the remaining variation being explained by variables outside the model (Rahayu et al., 2023).

Root MSE	0.892799	R-squared	0.938944
Mean dependent var	33.02046	Adjusted R-squared	0.934503
S.D. dependent var	26.80534	S.E. of regression	0.932498
Sum squared resid	47.82539	F-statistic	211.4527
Durbin-Watson stat	0.693777	Prob(F-statistic)	0.000000

Source: Data processed using EViews 12.

Figure 9. Results of the Coefficient of Determination (R^2) Analysis.

The estimated R-squared value is 0.938944. This indicates that road infrastructure, investment, labor, and regency/city minimum wages jointly explain 93.89% of the variation in manufacturing-sector GRDP. The remaining 6.11% is explained by other factors not included in the research model.

DISCUSSION

The Effect of Road Infrastructure on Manufacturing-Sector Development

Based on the partial t-test, road infrastructure has a negative and significant effect on manufacturing-sector development in the regencies/cities of West Nusa Tenggara Province during 2019–2024. The negative coefficient indicates that improvements in road infrastructure were associated with a decline in manufacturing-sector GRDP during the study period, *ceteris paribus*, with investment, labor, and regency/city minimum wages held constant.

Theoretically, this finding can be explained through the Solow growth theory. In the Solow growth framework, capital is an important factor in increasing production capacity and efficiency. Infrastructure can be regarded as a form of capital that supports economic activities. Adequate road infrastructure can improve production efficiency by facilitating the movement of raw materials, labor, and manufactured goods. Consequently, better road conditions and availability should facilitate industrial production and distribution activities (Adipathy & Armunanto, 2025).

This finding is consistent with the study by Fradya Randa and Lastri Anggi Fani (2023), which found that infrastructure had a negative effect on economic growth. Their findings indicate that infrastructure development does not always generate positive economic impacts when infrastructure utilization is not optimal. This condition is relevant to the present study because improvements in road infrastructure may not provide direct benefits to the industrial sector if the roads constructed do not directly connect production centers, industrial areas, commercial centers, and market areas (Randa & Fani, 2023).

This condition is also consistent with the infrastructure situation in West Nusa Tenggara Province. Although road construction and rehabilitation continue to be implemented to improve regional connectivity, their benefits for industrial development may not be immediately realized if road networks do not fully reach remote villages, areas with potential for factory development, industrial zones, and other economic centers.

These findings indicate that road development should not focus solely on improving road quality but should also emphasize expanding access to areas with economic and industrial potential. Therefore, the negative coefficient found in this study does not imply that road development is detrimental to industrial development. Rather, it indicates that infrastructure improvements need to be accompanied by more equitable connectivity so that they can effectively support industrial development in West Nusa Tenggara Province.

The Effect of Investment on Manufacturing-Sector Development

Based on the t-test results, investment has a negative but statistically insignificant effect on manufacturing-sector development in the regencies/cities of West Nusa Tenggara Province during 2019–2024. Thus, changes in investment were not sufficient to generate statistically meaningful changes in manufacturing-sector GRDP during the study period.

This finding is consistent with neoclassical growth theory developed by Robert Solow, which explains that economic growth is influenced by capital accumulation, which in turn increases the productive capacity of an economy (Adipathy & Armunanto, 2025). Within the industrial sector, investment can be used to add or renew machinery and production equipment, construct industrial facilities, improve technology, and expand production capacity.

This finding is also consistent with the study by Samosir, Nurjanah, and Bahri (2023), which examined the effects of investment, business units, and labor on Indonesia's manufacturing-sector GDP. Their findings indicate that investment did not have a significant effect on manufacturing-sector GDP, while business units and labor had significant effects (Samosir et al., 2023).

Therefore, investment in West Nusa Tenggara needs to be more specifically directed toward manufacturing activities to increase value added, production capacity, productivity, and economic linkages with other sectors.

Investment in West Nusa Tenggara is not exclusively directed toward manufacturing but is also distributed across mining, tourism, trade, agriculture, transportation, and other sectors. This may be one of the reasons why investment does not have a significant effect on manufacturing-sector GRDP in this study.

Consequently, investment policy in West Nusa Tenggara should place greater emphasis on manufacturing and downstream processing activities in order to increase value added, production capacity, and the contribution of manufacturing to regional economic development.

The Effect of Labor on Manufacturing-Sector Development

Based on the partial t-test, labor has a positive and significant effect on manufacturing-sector development in the regencies/cities of West Nusa Tenggara Province during 2019–2024.

Theoretically, this finding can be related to the neoclassical Solow growth theory, which explains that economic growth is influenced by capital, labor, and technology. Labor is a production factor used to produce goods and services. However, the effect of labor on output is determined not only by the number of workers but also by labor productivity, skills, education, and the capital used in the production process (Adipathy & Armunanto, 2025).

This finding is consistent with Hukaina et al. (2025), who found that labor had a positive and significant effect on economic growth in Indonesia. The consistency of these findings strengthens the view that labor plays an important role in increasing economic output.

In the manufacturing sector, workers are involved in production processes, operate equipment, process raw materials, and support distribution activities. The positive and significant effect of labor in this study indicates that manufacturing activities in the regencies/cities of West Nusa Tenggara remain strongly associated with labor utilization.

This condition is relevant to the labor situation in West Nusa Tenggara. In 2024, the labor force reached approximately 3.01 million people, while the manufacturing sector absorbed approximately 9.21% of the employed population. This condition demonstrates the important role of labor in supporting industrial activities. Therefore, increasing both the quantity and quality of labor through education, training, and skills development aligned with industrial requirements can further promote manufacturing-sector development in West Nusa Tenggara.

The Effect of Regency/City Minimum Wages on Manufacturing-Sector Development

Based on the t-test results, the regency/city minimum wage has a positive but statistically insignificant effect on manufacturing-sector development in the regencies/cities of West Nusa Tenggara Province during 2019–2024.

This finding can be related to production theory, particularly the perspective that labor is a production factor whose utilization generates costs for firms (Wahyudi et al., 2022). Wages represent compensation provided to workers for their contribution to production. An increase in the minimum wage may increase workers' income and purchasing power. However, from the firm's perspective, higher wages can increase production costs. Therefore, the effect of wage increases on industrial development ultimately depends on the firm's ability to adjust production costs and labor productivity (Susanti et al., 2026).

This finding is also consistent with Furqon (2014), who found that minimum wages did not have a significant effect on labor absorption in the manufacturing sector in Gresik Regency. This finding suggests that changes in wage levels do not necessarily have a direct effect on industrial-sector activities because firms' decisions are also influenced by other factors, such as the number of business units, investment, productivity, and market demand (Furqon, 2014).

Therefore, the findings of this study indicate that changes in regency/city minimum wages are not the primary direct determinant of changes in manufacturing-sector GRDP in West Nusa Tenggara.

The manufacturing sector in West Nusa Tenggara is influenced not only by minimum wage levels but also by investment, production capacity, labor productivity, and technology adoption. Differences in business characteristics across West Nusa Tenggara also result in

different capacities among firms to adjust to wage increases. Consequently, changes in minimum wages do not necessarily lead directly to increased industrial output. Improvements in productivity and business capacity are therefore required to optimize manufacturing-sector development in West Nusa Tenggara.

The Joint Effect of Road Infrastructure, Investment, Labor, and Minimum Wages on Manufacturing-Sector Development

Based on the F-test results, road infrastructure, investment, labor, and regency/city minimum wages jointly have a significant effect on manufacturing-sector GRDP in the regencies/cities of West Nusa Tenggara Province during 2019–2024.

This finding indicates that changes in road infrastructure, investment, labor, and regency/city minimum wages collectively influence manufacturing-sector development. The simultaneous significance of these variables demonstrates that industrial development is determined by the interaction of infrastructure, capital, labor, and labor-cost factors rather than by a single factor in isolation.

The coefficient of determination further supports this finding. The R-squared value of 0.938944 indicates that 93.89% of the variation in manufacturing-sector GRDP can be explained jointly by road infrastructure, investment, labor, and regency/city minimum wages. The remaining 6.11% is explained by other factors outside the research model. Therefore, the fifth hypothesis (H5), which states that road infrastructure, investment, labor, and regency/city minimum wages simultaneously affect manufacturing-sector development, is accepted.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Based on the results of the panel data regression using the Common Effect Model (CEM), this study finds that road infrastructure has a negative and significant effect on manufacturing-sector development, as proxied by manufacturing-sector GRDP, in the regencies/cities of West Nusa Tenggara Province during 2019–2024.

Investment has a negative but statistically insignificant effect on manufacturing-sector development. Labor has a positive and significant effect, while regency/city minimum wages have a positive but statistically insignificant effect on manufacturing-sector development.

Simultaneously, road infrastructure, investment, labor, and regency/city minimum wages have a *significant effect* on manufacturing-sector GRDP. The R-squared value of **0.938944** indicates that 93.89% of the variation in manufacturing-sector GRDP can be explained by the four independent variables included in the model, while the remaining 6.11% is explained by other factors outside the scope of this study.

Recommendations

Based on the findings, the regional government of West Nusa Tenggara Province is expected to improve the quality and equitable distribution of road infrastructure, particularly in areas that support production, distribution, and industrial centers.

The government should also encourage investment that is more specifically targeted toward the manufacturing sector by simplifying licensing procedures and creating a conducive business environment to increase industrial production capacity and productivity.

Given the positive and significant effect of labor, continuous efforts are required to improve labor quality through education, training, skills development, and technological competencies. Meanwhile, minimum wage policies should consider a balance between worker welfare and the capacity of businesses to remain productive and competitive.

Future research is encouraged to incorporate additional variables that may affect manufacturing-sector development, such as technological development, electricity infrastructure, energy consumption, the number of business units, and labor productivity. Future studies may also employ a longer observation period to provide a more comprehensive understanding of the factors influencing manufacturing-sector development in West Nusa Tenggara Province.

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