

Analysis of the potential and performance of key sectors in driving economic growth as part of efforts to address underdeveloped areas in the Nias Islands, North Sumatra Province

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ABSTRACT

This study investigates the leading economic sectors in the Nias Islands, examines their role in supporting underdeveloped area development, and analyzes the effects of leading and non-leading sectors on economic growth. Using GRDP data from five regencies/city during 2015–2024, the study employs Location Quotient (LQ), Dynamic Location Quotient (DLQ), Shift-Share, Klassen Typology, and simple linear regression analyses. The results identify agriculture, forestry, and fisheries as the dominant leading sectors. However, both leading and non-leading sectors have negative and statistically insignificant effects on economic growth. These findings indicate that the economic potential of the region has not been fully optimized and emphasize the importance of downstream development, human capital enhancement, and stronger regional economic linkages.

INTRODUCTION

Economic development is a process aimed at improving the well-being of society through economic growth, income equality, job creation, and sustainable improvements in quality of life. In the context of regional development, success is measured not only by high economic growth but also by a region's ability to reduce inequality and improve the well-being of its people equitably (Todaro & Smith, 2020). However, development disparities between regions remain a challenge faced by many developing countries, including Indonesia. Differences in geographical conditions, availability of natural resources, quality of human resources, fiscal capacity, and infrastructure result in uneven economic development across regions (Hadju et al., 2021).

Development disparities in Indonesia are evident in the differences in economic progress between urban and rural areas, between the western and eastern parts of the country, and between mainland and island regions. Economic activity, investment, and infrastructure development tend to be concentrated in already developed areas, creating an agglomeration effect that reinforces economic growth in those regions. Conversely, regions with limited accessibility and infrastructure face obstacles in developing their local economic potential. These conditions lead to income disparities, low productivity, and limited employment opportunities, which ultimately slow down the regional development process (Rachmawati et al., 2025).

The issue of development inequality is also a priority on the Sustainable Development Goals (SDGs) agenda, particularly Goal 10 on reducing inequalities. Sustainable development emphasizes not only economic growth but also the equitable distribution of development benefits so that they can be felt by the entire community regardless of their geographic location. Therefore, developing regional economic potential is a key strategy for fostering inclusive economic growth while reducing regional disparities (Handrian & Andry, 2020).

One region still facing various development challenges is the Nias Islands in North Sumatra Province. The Nias Islands are an archipelago comprising Nias Regency, South Nias Regency, North Nias Regency, West Nias Regency, and Gunungsitoli City. Four of the regencies in this region are still classified as underdeveloped areas under the government's policy on accelerating development in underdeveloped regions. Geographical isolation from the main island of Sumatra causes this region to face various obstacles, such as high transportation costs, low regional connectivity, limited market access, and low mobility of production factors. These conditions result in a slower economic development process compared to other regions in North Sumatra (Saputra Syam, 2024).

The underdevelopment of the Nias Islands is not only due to geographical factors but is also linked to the socioeconomic conditions of the local population. In 2024, the poverty rate in several regencies of the Nias Islands remained above the provincial average, while average years of schooling were below the North Sumatra average. Additionally, some areas face a high risk of natural disasters, including tsunamis and landslides, further complicating regional development challenges. These conditions indicate that the underdevelopment in the Nias

Islands is a multidimensional issue requiring an integrated development approach grounded in the region's local potential.

On the other hand, the Nias Islands possess significant economic potential. The region is supported by abundant natural resources, particularly in the agriculture, forestry, fisheries, and marine sectors. Additionally, nature- and culture-based tourism potential also serves as a promising source of economic growth. The regional economic structure indicates that the agriculture, forestry, and fisheries sectors remain the dominant sectors, contributing the most to the Regional Gross Domestic Product (RGDP) in most districts. This situation indicates that sectors based on local resources remain the primary pillars of community economic activity and have the potential to be developed as the region's flagship sectors (Central Bureau of Statistics of North Sumatra, 2024).

From the perspective of economic base theory, a leading sector is one that possesses a comparative advantage and is capable of generating an economic surplus for the region, thereby driving growth in other sectors through the multiplier effect (Nailil et al., 2026). This theory explains that regional development will be more effective if it is focused on sectors that have the capacity to generate higher economic growth compared to other sectors. Meanwhile, Schumpeter's growth theory emphasizes that economic growth occurs through innovation, structural transformation, and the development of sectors capable of creating high value-added in the economy (Pyka & Lee, 2021). Therefore, identifying leading sectors is crucial as the foundation for formulating regional development policies, particularly in underdeveloped regions that require new sources of economic growth.

Previous studies have consistently emphasized the importance of leading sectors as drivers of regional economic development. Research conducted by (Eferli Halawa, 2023) identified the agriculture, forestry, and fisheries sector as the primary contributor to the economic structure of the Nias Islands. Similarly, (Muljanto, 2021) reported that the agriculture, trade, construction, and manufacturing sectors possess significant potential to stimulate regional economic performance. Furthermore, various empirical studies have demonstrated that analytical tools such as Location Quotient (LQ), Shift-Share analysis, and Klassen Typology are effective in identifying strategic sectors, thereby providing valuable information for local governments in formulating development priorities and regional economic policies.

Despite these contributions, several research gaps remain. First, most studies focus primarily on identifying leading sectors without examining whether these sectors contribute to overcoming the structural problems of underdeveloped regions. Second, empirical evidence regarding the relationship between leading sectors and regional economic growth remains inconsistent. Some studies report a positive and significant impact of leading sectors on economic growth, whereas others find insignificant effects, indicating the need for further investigation. Third, previous studies generally focus on leading sectors only, while comparisons between leading and non-leading sectors in explaining regional economic growth remain limited. Finally, studies focusing on geographically isolated island regions, such as the Nias Islands, remain scarce,

even though such regions possess unique development constraints related to accessibility, connectivity, and market integration.

Unlike previous studies that mainly focused on identifying leading sectors, this study simultaneously examines leading-sector identification, regional underdevelopment, and economic growth within a single analytical framework. In addition, the study focuses on the Nias Islands as an underdeveloped archipelagic region and employs a combination of Location Quotient (LQ), Dynamic Location Quotient (DLQ), Shift-Share Analysis, Klassen Typology, and regression analysis to provide a more comprehensive assessment of regional economic potential and development performance.

Based on this context, the study seeks to identify sectors with the potential to serve as leading sectors in the Nias Islands, assess their contribution to efforts aimed at reducing regional underdevelopment, and evaluate the influence of both leading and non-leading sectors on the economic growth of the region over the 2015–2024 period.

THEORETICAL REVIEW

Economic Base Theory

Economic Base Theory explains that regional economic growth is largely determined by sectors that are capable of producing goods and services for markets beyond regional boundaries. These sectors, commonly referred to as base or leading sectors, generate external income that flows into the regional economy and stimulates the development of other sectors through multiplier effects (Tarigan, 2018). In contrast, non-base sectors primarily serve local demand and depend on the performance of leading sectors for their growth.

Within the context of regional development, identifying leading sectors is essential because these sectors possess comparative and competitive advantages that can strengthen regional economic performance. Regions endowed with abundant natural resources and sectoral specialization are generally expected to have one or more leading sectors capable of driving economic activities and creating development opportunities.

Previous studies provide empirical support for this argument. (Eferli Halawa, 2023) identified agriculture, forestry, and fisheries as the dominant sectors in the Nias Islands. Similarly, (Widiarani et al., 2021) found that leading sectors play a crucial role in strengthening regional economic structures through their contribution to Gross Regional Domestic Product (GRDP). Putri et al. (2024) also reported that agriculture, forestry, and fisheries constitute major base sectors that significantly contribute to regional economic development. These findings indicate that regions with distinctive economic characteristics tend to possess sectors with the potential to become leading sectors.

Based on Economic Base Theory and previous empirical findings, the following hypothesis is proposed:

H1: There are economic sectors with the potential to become leading sectors in the Nias Islands, North Sumatra Province.

Theories of Economic Development

According to (Todaro & Smith, 2020), economic development is a multidimensional process encompassing not only economic growth but also poverty reduction, employment creation, equitable income distribution, and improvements in living standards. In the context of underdeveloped regions, development policies should focus on utilizing local economic potential to generate sustainable economic activities and improve community welfare.

Leading sectors are expected to contribute to regional development because they create employment opportunities, increase household income, attract investment, and stimulate the growth of supporting sectors. Through these mechanisms, leading sectors can reduce structural constraints commonly faced by underdeveloped regions, including poverty, limited economic opportunities, and weak regional competitiveness.

Several studies support this perspective. (Kogoya et al., 2024) found that leading sectors play a strategic role in supporting regional economies through increased output and employment opportunities. Likewise, (Huda & Cahyono, 2021) demonstrated that the development of leading sectors contributes significantly to sustainable regional economic development. (Noor, 2023) further argued that the optimization of base sectors can accelerate development in underdeveloped regions when supported by adequate infrastructure, investment, and human capital.

Therefore, leading sectors are expected to play an important role in supporting efforts aimed at reducing regional underdevelopment.

H2: Leading sectors play a positive role in supporting efforts to address underdevelopment in the Nias Islands, North Sumatra Province.

Schumpeterian Growth Theory

Schumpeterian Growth Theory emphasizes that economic growth is driven by innovation, productivity improvements, and structural transformation within the economy (Pyka & Lee, 2021). Sectors that possess competitive advantages and generate higher value added are expected to become engines of economic growth because they attract investment, create employment opportunities, and stimulate economic expansion.

From this perspective, leading sectors are expected to exert a stronger influence on economic growth than non-leading sectors because they possess greater capacity to generate economic surplus and multiplier effects. However, non-leading sectors may also influence economic growth indirectly through their supporting role in providing inputs and services required by productive sectors. Consequently, both leading and non-leading sectors may contribute to regional economic performance, although the magnitude and direction of their influence can vary depending on regional characteristics.

Previous empirical findings reveal mixed results. (Qubro et al., 2021) found that leading sectors positively and significantly affected economic growth in Banyuwangi Regency, whereas non-leading sectors showed insignificant effects. Similarly, (Eka Sulistya Anggraeni & Niniek Imaningsih, 2025) reported that base sectors significantly contributed to regional economic growth. However, (Hasriadi et al., 2023) found that the tourism sector did not

significantly influence economic growth in Palopo City. These inconsistent findings suggest that the relationship between sectoral performance and economic growth remains context-dependent and requires further investigation, particularly in underdeveloped island regions such as the Nias Islands.

Based on Schumpeterian Growth Theory and previous empirical evidence, the following hypothesis is formulated:

H3: Leading sectors and non-leading sectors influence economic growth in the Nias Islands, North Sumatra Province.

Conceptual Framework

In this research framework, leading sectors and non-leading sectors are treated as independent variables, whereas economic growth is designated as the dependent variable. The determination of leading sectors is based on the integration of Location Quotient (LQ), Dynamic Location Quotient (DLQ), Shift-Share analysis, and Klassen Typology. The GRDP values associated with both sector groups are then employed to examine their effects on regional economic growth. Furthermore, the identification results are used to analyze how leading sectors contribute to development initiatives aimed at overcoming the challenges of underdeveloped regions in the Nias Islands.

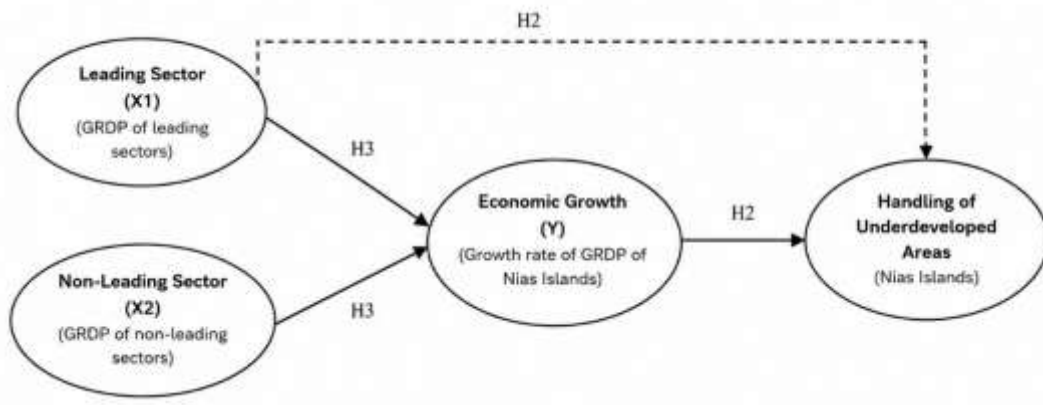


Figure 1. Conceptual Framework

METHODOLOGY

This research adopts a quantitative methodology based on secondary data consisting of Gross Regional Domestic Product (GRDP) by economic sector and regional economic growth indicators in the Nias Islands, North Sumatra Province, for the period 2015–2024. The study covers five administrative areas, namely Nias Regency, South Nias Regency, North Nias Regency, West Nias Regency, and Gunungsitoli City. The population comprises all economic sectors included in the GRDP statistics of the Nias Islands. A saturated sampling technique was applied, allowing all economic sectors to be incorporated into the analysis. The required data were collected from official publications issued by the Statistics Indonesia of North Sumatra Province and the respective regency and city statistical offices within the Nias Islands.

The analytical framework is grounded in a regional economic perspective. The identification of leading sectors was undertaken through the integration of Location Quotient (LQ), Dynamic Location Quotient (DLQ), Shift-Share analysis,

and Klassen Typology. The LQ approach was utilized to distinguish between base and non-base sectors, whereas DLQ was employed to evaluate future sectoral development prospects. Shift-Share analysis was applied to examine sectoral growth patterns and competitive performance, while Klassen Typology was used to classify the level of regional economic development. Hypothesis 2 was not examined through regression analysis but was evaluated using an integrated interpretation of the Location Quotient (LQ), Dynamic Location Quotient (DLQ), Shift-Share Analysis, and Klassen Typology results. Sectors identified as leading sectors and located within relatively advanced or rapidly growing regional categories were considered to have the potential to support efforts aimed at reducing regional underdevelopment. Therefore, the assessment of H2 was based on the extent to which leading sectors demonstrated comparative advantages, competitive growth performance, and contributions to regional development within the Nias Islands. To further investigate the relationship between sectoral performance and economic outcomes, separate regression models were estimated to independently assess the influence of leading and non-leading sectors on economic growth. Prior to hypothesis testing, a series of classical assumption tests, including normality, heteroscedasticity, and autocorrelation tests, were conducted to ensure that the regression model satisfied the Best Linear Unbiased Estimator (BLUE) assumptions and produced reliable estimation results.

RESULTS

This study was conducted through several stages of analysis. The first stage involved describing the general conditions of the Nias Islands region, which consists of Nias, South Nias, North Nias, West Nias, and Gunungsitoli. Next, GRDP data by economic sector for the 2015–2024 period were analyzed to identify core and non-core sectors, assess sectoral growth prospects, measure sectoral competitiveness, and examine the impact of leading and non-leading sectors on economic growth.

Location Quotient (LQ) Analysis

The Location Quotient (LQ) method was employed to determine the economic sectors that serve as the regional economic base in the Nias Islands. Sectors with an LQ value greater than one ($LQ > 1$) are classified as base sectors, indicating a relatively higher concentration of economic activity compared to the reference region. In contrast, sectors with an LQ value below one ($LQ < 1$) are categorized as non-base sectors, reflecting a lower level of specialization within the regional economy.

Table 1. Location Quotient (LQ) Results for the Nias Islands, 2015–2024

Business Sector	Nias	West Nias	North Nias	South Nias	Gunungsitoli
A	Base	Base	Base	Base	Non Basis
B	Base	Base	Base	Base	Base
C	Not Base	Not Base	Not Base	Not Base	Not Base
D	Not Base	Not Base	Base	Not Base	Not Base

E	Not Base	Not Base	Not Base	Not Base	Base
F	Not Base	Base	Not Base	Base	Base
G	Not Base	Not Base	Not Base	Not Base	Base
H	Not Base	Not Base	Not Base	Not Base	Base
I	Not Base	Not Base	Base	Not Base	Base
J	Not Base	Not Base	Not Base	Not Base	Not Base
K	Not Base	Not Base	Not Base	Not Base	Base
L	Not Base	Base	Not Base	Base	Base
M,N	Not Base	Not Base	Not Base	Not Base	Not Base
O	Base	Base	Base	Base	Base
P	Not Base	Base	Not Base	Base	Base
Q	Not Base	Not Base	Not Base	Not Base	Not Base
R,S,T,U	Not Base	Not Base	Not Base	Not Base	Not Base

Source: Processed data, 2026

The results of the LQ analysis reveal that the agriculture, forestry, and fisheries sector constitutes a major base sector in Nias Regency, South Nias Regency, North Nias Regency, and West Nias Regency. Furthermore, the mining and quarrying sector is identified as a base sector throughout the Nias Islands region. A different pattern is observed in Gunungsitoli City, where economic activities are largely concentrated in the tertiary sector, with trade, transportation, and education emerging as the principal drivers of the local economy.

Dynamic Location Quotient (DLQ) Analysis

The Dynamic Location Quotient (DLQ) approach was utilized to examine the long-term prospects of economic sectors. A sector is regarded as having favorable development prospects when its DLQ value exceeds one, suggesting that its growth is expected to outperform the corresponding sector at the reference level. In contrast, sectors with DLQ values below one are categorized as having limited development prospects due to their comparatively lower growth dynamics.

Table 2. DLQ Results for the Nias Islands, 2015–2024

Business Sector	Nias	West Nias	North Nias	South Nias	Gunungsitoli
A	P	P	P	P	P
B	TP	TP	TP	TP	TP
C	TP	TP	TP	TP	TP
D	TP	TP	TP	TP	TP
E	P	P	P	P	P
F	P	TP	P	TP	P
G	TP	TP	TP	TP	TP
H	P	P	P	P	TP
I	P	P	P	P	P
J	P	P	P	P	P
K	TP	TP	TP	TP	TP

L	P	P	P	P	P
M,N	P	P	P	P	P
O	TP	TP	TP	P	TP
P	P	TP	TP	P	P
Q	P	P	TP	TP	P
R,S,T,U	P	P	P	P	P

Source: Processed data, 2026

These results indicate that sectors labeled “P” are those with promising prospects for the future, while those labeled “TP” are sectors with no promising prospects for the future. The analysis shows that several sectors – such as water supply, transportation and warehousing, accommodation and food services, information and communication, real estate, business services, and other services – tend to be promising in most regions. These findings suggest the potential for a shift in the economic structure of the Nias Islands from the primary sector toward the secondary and tertiary sectors. A summary of the DLQ results is presented in Table 2.

Shift-Share Analysis

Shift-Share Analysis is used to examine changes in economic structure and sectoral competitiveness. This analysis consists of three components: Potential Regional (PR), Proportional Share (PS), and Differential Share (DS).

Table 3. Potential Regional (PR) Results for the Nias Islands, 2015–2024

Business Sector	Nias		West Nias		North Nias		South Nias		Gunungsitoli	
	PR	ΔQIJ	PR	ΔQIJ	PR	ΔQIJ	PR	ΔQIJ	PR	ΔQIJ
A	51,40	49,41	79,52	60,58	51,66	43,35	28,53	24,03	19,48	15,41
B	9,11	10,57	10,01	11,45	5,51	6,36	1,63	1,88	3,56	2,70
C	0,21	0,15	0,27	0,21	0,21	0,16	0,12	0,08	0,24	0,22
D	0,10	0,12	0,14	0,19	0,14	0,14	0,06	0,09	0,16	0,20
E	0,01	0,04	0,05	0,02	0,05	0,02	0,00	0,00	0,14	0,10
F	11,25	6,69	21,34	18,98	8,37	4,66	4,26	4,48	26,81	21,70
G	8,44	9,83	13,76	16,31	9,12	11,68	5,62	7,43	37,69	46,39
H	1,47	1,12	5,61	6,26	1,54	1,49	0,72	0,77	11,11	14,02
I	1,78	1,90	3,43	3,29	2,43	2,29	0,81	0,87	4,82	5,73
J	0,27	0,41	1,72	2,47	0,40	0,58	0,24	0,38	3,09	4,15
K	1,37	1,53	2,41	2,13	1,66	1,93	0,86	0,85	4,32	4,58
L	1,94	1,22	7,59	6,49	3,12	2,46	1,23	0,89	6,32	5,20
M,N	0,07	0,06	0,06	0,05	0,06	0,05	0,04	0,03	0,38	0,37
O	12,16	11,27	15,32	10,70	6,06	4,24	3,82	2,26	6,34	4,83
P	1,41	1,47	4,56	4,26	1,91	2,10	0,94	0,83	7,70	7,44
Q	0,77	0,71	1,43	1,39	0,80	0,83	0,33	0,37	0,92	0,83
R, S, T, U	0,20	0,16	0,20	0,22	0,25	0,24	0,12	0,09	0,44	0,38

Source: Processed data, 2026

Table 4. Proportional Share (PS) Results for the Nias Islands, 2015–2024

Business Sector	Nias	West Nias	North Nias	South Nias	Gunungsitoli
A	0,91	0,55	0,95	1,63	0,91
B	-1,47	-0,26	-0,89	-1,63	-1,47
C	-0,08	-0,04	-0,08	-0,10	-0,08
D	0,00	0,00	0,00	0,00	0,00
E	0,00	0,00	0,00	0,00	0,00
F	0,83	0,31	0,61	1,54	0,83
G	0,98	0,66	1,06	1,57	0,98
H	0,19	0,10	0,20	0,67	0,19
I	0,65	0,29	0,86	1,25	0,65
J	0,23	0,20	0,33	1,44	0,23
K	-0,24	-0,15	-0,30	-0,43	-0,24
L	0,19	0,12	0,31	0,74	0,19
M,N	0,01	0,01	0,01	0,01	0,01
O	-2,01	-0,62	-1,00	-2,53	-2,01
P	0,25	0,16	0,34	0,80	0,25
Q	0,07	0,03	0,07	0,13	0,07
R,S,T,U	0,07	0,04	0,08	0,07	0,07

Source: Processed data, 2026

Table 5. Differential Share (DS) Results for the Nias Islands, 2015–2024

Business Sector	Nias	West Nias	North Nias	South Nias	Gunungsitoli
A	-2,90	-5,05	-9,26	-20,57	-2,90
B	2,93	0,50	1,74	3,08	2,93
C	0,01	0,01	0,03	0,03	0,01
D	0,02	0,03	0,00	0,06	0,02
E	0,00	0,00	0,00	0,00	0,00
F	-5,39	-0,09	-4,32	-3,91	-5,39
G	0,42	1,14	1,50	0,97	0,42
H	-0,54	-0,04	-0,26	-0,01	-0,54
I	-0,53	-0,23	-1,00	-1,39	-0,53
J	-0,08	-0,06	-0,15	-0,69	-0,08
K	0,40	0,14	0,57	0,15	0,40
L	-0,92	-0,46	-0,96	-1,85	-0,92
M,N	-0,02	-0,01	-0,02	-0,02	-0,02
O	1,12	-0,93	-0,82	-2,10	1,12
P	-0,19	-0,27	-0,15	-1,10	-0,19
Q	-0,12	0,01	-0,04	-0,18	-0,12
R,S,T,U	-0,11	-0,07	-0,10	-0,05	-0,11

Source: Processed data, 2026

The Potential Regional results indicate that several sectors in the Nias Islands have the capacity to support economic growth in the broader region. The Proportional Share results indicate that the wholesale and retail trade,

agriculture, construction, accommodation and food services, and information and communication sectors are growing relatively rapidly in several regions. Meanwhile, the Differential Share results show that the mining and quarrying, wholesale and retail trade, and financial and insurance services sectors have relatively better competitiveness compared to other sectors.

Klassen Typology Analysis

The Klassen typology is used to classify regions' development status based on economic growth rates and per capita income.

Table 6. Results of the Klassen Typology for the Nias Islands, 2015–2024

Criteria		Per Capita Income	
		$Y_i > Y$	$Y_i < Y$
Growth Rate	$r_i > r$	Developed and rapidly growing regions	Rapidly developing regions
	$r_i < r$	Developed but struggling regions 1. Gunungsitoli City	Relatively underdeveloped regions 1. Nias Regency 2. South Nias Regency 3. North Nias Regency 4. West Nias Regency

Source: Processed data, 2026

Based on the Klassen Typology results, Gunungsitoli City belongs to the rapidly growing region category, as its average economic growth performance surpasses the provincial growth rate of North Sumatra. Despite this achievement, its per capita income has not yet reached the provincial average. Conversely, Nias, South Nias, North Nias, and West Nias Regencies are classified as relatively underdeveloped regions due to their lower economic growth rates and per capita income levels compared with the provincial benchmarks.

Simple Linear Regression Analysis

To investigate the relationship between sectoral performance and regional economic growth, this study applied simple linear regression analysis. The effects of leading sectors and non-leading sectors were estimated independently through separate regression models, allowing for a clearer assessment of the extent and direction of each variable's contribution to economic growth in the Nias Islands during 2015–2024. Data analysis results indicate that the regression equation for the leading sector is:

$$PE = 1103.219 - 0.001SU$$

where PE refers to economic growth and SU represents the GRDP of the leading sector. The estimated coefficient for the leading sector is negative, indicating that growth in the leading sector's GRDP is associated with a decline in economic growth. Nevertheless, this coefficient only reflects the direction of the relationship, and its statistical relevance must be verified through subsequent

significance testing. Meanwhile, the regression equation for the non-leading sector is:

$$PE = 1120.463 - 0.001SNU$$

In the regression model, SNU denotes the GRDP value of the non-leading sectors. The negative coefficient suggests an inverse association between the performance of non-leading sectors and regional economic growth. However, the coefficient alone is insufficient to establish a meaningful relationship; therefore, additional hypothesis testing is necessary to determine both the magnitude and statistical significance of the observed effect.

Results of Classical Assumption Tests

Classical assumption tests were conducted to ensure that the regression model meets the criteria for the Best Linear Unbiased Estimator (BLUE). The tests performed include tests for normality, heteroscedasticity, and autocorrelation.

Table 7. Results of Classical Assumption Tests

Test Type	Key Sector Model	Non-Key Sector Model	Criteria	Conclusion
Normalitas (Shapiro-Wilk)	0,200	0,194	Sig. > 0,05	The data are normally distributed
Heteroskedastisitas (Glejser)	0,290	0,258	Sig. > 0,05	There is no heteroscedasticity
Autokorelasi (Run Test)	0,314	0,314	Sig. > 0,05	There is no autocorrelation

Source: Processed data, 2026

Based on the results presented in Table 7, the normality test indicates significance values of 0.200 for the leading-sector model and 0.194 for the non-leading-sector model. Since both values exceed the 0.05 significance threshold, the residuals of the two regression models can be considered normally distributed. In addition, the heteroscedasticity test produced significance values of 0.290 and 0.258 for the leading-sector and non-leading-sector models, respectively. As these values are also greater than 0.05, there is no evidence of heteroscedasticity in either model.

The autocorrelation test, conducted using the Run Test, generated a significance value of 0.314 for both regression models. Because this value is higher than 0.05, the residuals are assumed to be randomly distributed and free from autocorrelation. Overall, the findings from the classical assumption tests confirm that the regression models satisfy the required statistical assumptions and are therefore appropriate for subsequent hypothesis testing.

Coefficient of Determination (R²)

The coefficient of determination (R²) serves as a measure of the explanatory capacity of the regression model by indicating the proportion of

variation in the dependent variable that can be accounted for by the independent variable.

Table 8. Coefficient of Determination Results

Model	R ²	Interpretation
Key Sector	0,275	Accounting for 27.5% of the variation in economic growth
Non-Key Sector	0,259	Accounting for 25.9% of the variation in economic growth

Source: Processed data, 2026.

As presented in Table 8, the leading-sector model produces a coefficient of determination (R²) of 0.275. This result indicates that approximately 27.5% of the variation in economic growth in the Nias Islands can be explained by changes in the leading sector, whereas the remaining 72.5% is attributable to other factors that are not incorporated into the model.

Similarly, the non-leading-sector model yields an R² value of 0.259, suggesting that non-leading sectors contribute to explaining 25.9% of the variation in regional economic growth. The remaining 74.1% is influenced by other determinants beyond the scope of the variables included in this study. These findings imply that both models possess limited explanatory power, indicating that economic growth in the Nias Islands is also shaped by various economic, social, and structural factors not examined in the present research..

Hypothesis Test Results

Hypothesis testing was conducted using a (partial) t-test at a 5 percent significance level to determine the effect of each independent variable on economic growth.

Table 9. Results of the (Partial) t-Test

Variable	Calculated t	Table t	Sig.	Decision
PDRB of Key Sector	-1,743	2,306	0,119	H ₀ accepted
PDRB Of Non-Key Sector	-1,673	2,306	0,133	H ₀ accepted

Source: Processed data, 2026.

According to the results presented in Table 9, the leading-sector variable produced a t-statistic of -1.743 with a significance value of 0.119. Because the probability value exceeds the 0.05 significance threshold and the absolute value of the t-statistic is lower than the critical t-value ($1.743 < 2.306$), the effect of the leading sector on economic growth is statistically insignificant. Although the estimated coefficient indicates a negative relationship, the empirical evidence does not support the hypothesis that the leading sector significantly influences economic growth in the Nias Islands.

Similarly, the non-leading-sector variable generated a t-statistic of -1.673 with a significance value of 0.133. Since the significance level is greater than 0.05 and the absolute t-statistic is below the critical value ($1.673 < 2.306$), the non-leading sector also exhibits a negative but statistically insignificant relationship with economic growth. These findings suggest that, during the 2015–2024 period,

neither leading sectors nor non-leading sectors were able to exert a meaningful influence on the economic growth performance of the Nias Islands. This condition indicates that regional economic growth may be driven by other factors beyond the sectoral variables examined in this study.

DISCUSSION

Potential Key Sectors in the Nias Islands

The research findings indicate that the agriculture, forestry, and fisheries sectors, as well as the mining and quarrying sectors, have the greatest potential to become leading sectors in the Nias Islands. The dominance of these two sectors indicates that the regional economic structure remains reliant on the primary sector, which utilizes natural resources as the primary basis for economic activity. This condition reflects the characteristics of an archipelagic region that still relies on the comparative advantage of natural resources to drive regional economic activity.

From the perspective of Economic Base Theory, leading sectors serve as the foundation capable of generating income from outside the region and driving the development of other economic sectors through multiplier effects. The presence of the agriculture and mining sectors as leading sectors indicates that these two sectors remain the main pillars of the Nias Islands' economy. However, the dominance of the primary sector also suggests that the process of economic structural transformation is still proceeding relatively slowly.

In addition to the primary sector, this study found that the trade, transportation, accommodation, and information-communication sectors are beginning to show promising prospects for development. These findings suggest opportunities for economic diversification toward more productive secondary and tertiary sectors. These results align with (Rosmeli, 2022), who states that the primary sector remains the primary leading sector in developing regions, but it must be supported by the development of other sectors to foster more sustainable economic growth.

The Role of Key Sectors in Addressing Underdeveloped Regions

The evaluation of H2 was based on the combined results of the LQ, DLQ, Shift-Share Analysis, and Klassen Typology. The findings indicate that agriculture, forestry, fisheries, and mining sectors possess comparative advantages and positive development potential in several districts of the Nias Islands. In addition, the Klassen Typology results show that although most regencies remain relatively underdeveloped, these sectors continue to serve as the main economic base of the region. Therefore, the findings provide indicative evidence that leading sectors have the potential to contribute to efforts aimed at reducing regional underdevelopment.

Key sectors play a vital role in supporting efforts to address underdeveloped areas in the Nias Islands. As a region that still faces various development constraints, the development of key sectors can increase employment opportunities, expand economic activities, and boost community income. This role is particularly important because the majority of the population still relies on agriculture, forestry, and fisheries for their livelihoods.

According to Todaro and Smith, economic development aims not only to boost economic growth but also to improve the quality of life for communities through poverty reduction and equitable development. In the context of the Nias Islands, the development of key sectors can serve as a tool to enhance community well-being, strengthen economic linkages between regions, and foster the growth of supporting sectors such as trade, transportation, and services.

In addition to boosting economic activity, key sectors also have the potential to strengthen regional development capacity through increased investment and local economic revenue. The more these key sectors develop, the greater the opportunity for local governments to accelerate the development of infrastructure, education, and other public services. This finding aligns with (Noor, 2023), who states that base sectors can serve as a crucial instrument in accelerating development in underdeveloped regions if supported by improvements in human capital quality, investment, and regional connectivity.

The Impact of Key Sectors and Non-Key Sectors on Economic Growth

This study shows that neither key sectors nor non-key sectors have been able to serve as the primary drivers of economic growth in the Nias Islands. This finding indicates that the magnitude of a sector's contribution to the regional economic structure does not necessarily translate into its ability to boost economic growth. In other words, the regional sectoral potential has not yet fully succeeded in generating a strong economic multiplier effect. Therefore, H3 is rejected.

This situation arises because the economy of the Nias Islands remains dominated by traditional primary sectors that produce goods in the form of raw materials. The low level of downstream processing results in relatively small value added, and inter-sectoral linkages have not developed optimally. Consequently, increased activity in both leading and non-leading sectors has not been able to drive broad and sustainable economic growth.

These findings reinforce the results of the study by (Marsolihah et al., 2026), which indicate that leading sectors do not always have a significant impact on economic growth if their management is not yet optimal and they are not yet capable of generating high added value. Additionally, limitations in investment, human resource quality, the use of rudimentary technology, and high logistics costs due to the archipelagic nature of the region further constrain the economic sectors' contribution to regional growth. From a Schumpeterian perspective, economic growth requires innovation and structural transformation, yet these processes are still progressing slowly in the Nias Islands. Therefore, the primary challenge of regional economic development does not lie in the availability of key sectors, but rather in the ability to optimize these sectors so they can generate added value, competitiveness, and sustainable economic growth.

CONCLUSIONS AND RECOMMENDATIONS

This study aimed to identify potential leading sectors in the Nias Islands, evaluate their role in supporting the development of underdeveloped regions, and examine the influence of both leading and non-leading sectors on regional economic growth during the 2015–2024 period.

First, the results indicate that agriculture, forestry, and fisheries, as well as mining and quarrying, are the sectors with the greatest potential to function as leading sectors in the Nias Islands. In several districts and municipalities, other sectors, including trade, construction, transportation and warehousing, accommodation and food service activities, and public administration, also demonstrate promising development prospects. These findings confirm the continued dominance of resource-based activities within the regional economic structure.

Second, based on the integrated results of the LQ, DLQ, Shift-Share Analysis, and Klassen Typology, leading sectors were found to have the potential to support efforts aimed at reducing regional underdevelopment. Through employment creation, income generation, and the stimulation of local economic activities, these sectors contribute to strengthening regional development capacity. However, their potential has not yet been fully optimized due to structural constraints such as limited infrastructure, low human capital quality, weak industrial downstreaming, and high logistics costs associated with the archipelagic nature of the region.

Third, empirical analysis reveals that both leading and non-leading sectors have negative and statistically insignificant effects on economic growth in the Nias Islands. This finding suggests that the existence of sectoral potential alone is insufficient to generate sustainable economic growth. Regional economic performance is also influenced by other factors, including investment, infrastructure quality, human capital, fiscal capacity, technological development, and interregional connectivity.

Overall, the findings demonstrate that while the Nias Islands possess sectors with strong economic potential, accelerating regional development requires not only the identification of leading sectors but also efforts to enhance productivity, value-added creation, innovation, and structural transformation. Therefore, policies aimed at promoting downstream industries, improving infrastructure and connectivity, strengthening human resources, and encouraging economic diversification are essential for achieving sustainable and inclusive economic growth in the region.

FURTHER STUDY

This study has several limitations that should be noted. First, the study only uses time-series data for the 2015–2024 period, so the number of observations is relatively limited. Second, the analysis of the impact on economic growth only uses variables related to leading and non-leading sectors, so it is not yet able to capture all factors influencing economic growth in the Nias Islands. Third, this study employs an aggregated approach for the Nias Islands region, thus failing to examine the distinct characteristics of each regency/city in greater depth.

Therefore, future research is recommended to utilize panel data at the regency/city level to provide a more detailed picture of the impact of economic sectors on regional economic growth. Additionally, future research could incorporate other variables such as investment, infrastructure, human capital

quality, poverty, and local fiscal capacity to gain a more comprehensive understanding of the factors influencing economic development in underdeveloped regions. Further studies could also examine strategies for downstream processing of key sectors and the development of new economic sectors as efforts to accelerate economic transformation and enhance the competitiveness of the Nias Islands region.

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REFERENCES

- Eferli Halawa, V. (2023). ANALISIS EKONOMI SEKTOR UNGGULAN DI KABUPATEN NIAS TAHUN 2012-2021. *Journal Economic And Strategy (JES)*, 4, 62-72. <https://journal.utnd.ac.id/index.php/jes>
- Eka Sulistya Anggraeni, & Niniek Imaningsih. (2025). Klasifikasi Daerah Dan Pengaruh Sektor Ekonomi Terhadap Pertumbuhan Ekonomi Di Kabupaten Grobogan. *Curve Elasticity: Jurnal Pendidikan Ekonomi*, 6(2), 34-46. <https://doi.org/10.57094/jpe.v8i2.2934>
- Hasriadi, Yusuf Qamaruddin, M., & Rajiman, W. (2023). Pengaruh Sektor Pariwisata Terhadap Pertumbuhan Ekonomi Di Kota Palopo. *Jurnal Kajian Pendidikan Ekonomi Dan Ilmu Ekonomi*, VII(2), 387-394.
- Huda, M. F., & Cahyono, H. (2021). Increasing Economic Growth Through Leading Sector Development in Jombang Regency. *Independent: Journal Of Economics*, 1(2), 76-91.
- Kogoya, Y., Naukoko, A. T., & Masloman, I. (2024). ANALISIS SEKTOR-SEKTOR UNGGULAN DAN PERANANNYA DALAM PEREKONOMIAN KABUPATEN PUNCAK PROVINSI PAPUA. *Jurnal Berkala Ilmiah Efisiensi*, 24(7), 62-73.
- Noor, R. (2023). *Analisis Sektor Unggulan Pada Kabupaten dan Kota Provinsi Nusa Tenggara Barat Tahun 2015 - 2021* (Vol. 2021).
- Pyka, A., & Lee, K. (2021). *Innovation, Catch-up and Sustainable Development: A Schumpeterian Perspective*. Springer International Publishing. <https://books.google.co.id/books?id=1DJPEAAAQBAJ>
- Qubro, G., Muljaningsih, S., & Asmara, K. (2021). Pengaruh Sektor Unggulan Terhadap Pertumbuhan Ekonomi di Kabupaten Banyuwangi. *Jurnal Syntax Admiration*, 2(7), 167-186.

- <https://doi.org/https://doi.org/10.46799/jsa.v2i8.298>
- Todaro, M. P., & Smith, S. C. (2020). *Economic Development*. Pearson Education.
<https://books.google.co.id/books?id=VU0WyQEACAAJ>
- Widiarani, S., Priana, W., & Wahed, M. (2021). Analisis Sektor Unggulan Perekonomian Kota Balikpapan dan Kota Samarinda. *Jurnal Syntax Admiration*, 2(5), 167-186.
<https://doi.org/https://doi.org/10.46799/jsa.v2i5.2392722-5356>