



The Impact of Infrastructure Development, Education, Tourism, and Agriculture on Regional Economic Growth in Indonesia

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Abstract. *In order to better understand the complex links between infrastructure development, education, tourism, agriculture, and regional economic growth in Indonesia, this study uses structural equation modeling with partial least squares, or SEM-PLS. The research makes use of a 287-observation dataset and applies rigorous measurement model evaluation, bootstrapping analysis, structural model estimation, and model validation against multiple fit indices. The results show a strong positive correlation between each sector—agriculture, tourism, education, and infrastructure development—and regional economic expansion. The necessity for comprehensive, integrated development strategies is highlighted by the interconnectedness of these interactions. In order to promote balanced and resilient regional economic growth, the findings provide policymakers with useful insights and highlight the significance of ongoing investments in infrastructure, education, and sustainable tourism and agricultural practices.*

Keywords: *Regional Economic Growth, Infrastructure Development, Education Impact, Tourism and Economy, Agricultural Contributions*

Abstrak. Untuk lebih memahami hubungan kompleks antara pembangunan infrastruktur, pendidikan, pariwisata, pertanian, dan pertumbuhan ekonomi daerah di Indonesia, penelitian ini menggunakan pemodelan persamaan struktural dengan kuadrat terkecil parsial, atau SEM-PLS. Penelitian ini menggunakan dataset pengamatan 287 dan menerapkan evaluasi model pengukuran yang ketat, analisis bootstrapping, estimasi model struktural, dan validasi model terhadap beberapa indeks kesesuaian. Hasilnya menunjukkan korelasi positif yang kuat antara masing-masing sektor—pertanian, pariwisata, pendidikan, dan pembangunan infrastruktur—dengan ekspansi ekonomi regional. Perlunya strategi pembangunan yang komprehensif dan terpadu disorot oleh keterkaitan interaksi ini. Untuk mempromosikan pertumbuhan ekonomi regional yang seimbang dan tangguh, temuan ini memberikan wawasan yang berguna kepada pembuat kebijakan dan menyoroti pentingnya investasi berkelanjutan dalam infrastruktur, pendidikan, dan praktik pariwisata dan pertanian berkelanjutan.

Kata kunci: Pertumbuhan Ekonomi Daerah, Pembangunan Infrastruktur, Dampak Pendidikan, Pariwisata dan Ekonomi, Kontribusi Pertanian

1. INTRODUCTION

Indonesia understands the value of education, tourism, infrastructure development, and agriculture in enhancing its economic environment. Economic growth is thought to depend heavily on the development of infrastructure, particularly road infrastructure (Triansyah et al., 2023). One long-term investment that is thought to have a positive effect on economic production is education (Suthanaya & Suwarningsih, 2023). Indonesia prioritizes the tourism industry, and culturally-based travel may be a major factor in the development of nearby communities (Sari, 2023). In order to achieve balanced economic development, it is crucial to take into account the spatial distribution of tourism destinations as well as accessibility to these areas (Suparwoko, 2012). An important

industry that supports Indonesia's economic expansion is agriculture, which depends heavily on manpower, capital, and foreign direct investment (Nawir et al., 2023). By concentrating on these areas, Indonesia hopes to advance its economic growth and make the most of its natural resources and cultural variety for long-term prosperity.

Indonesia is undoubtedly at a crossroads in its economic development given its diverse cultural makeup and archipelago landscape. The nation acknowledges the critical role that education, tourism, infrastructure development, and agriculture play in enhancing its economic environment. It has been determined that one of the main indicators of Indonesia's economic progress is the development of its infrastructure, particularly its road system (Triansyah et al., 2023). Additionally, as skilled labor is necessary for both economic activity and growth, education is vital (Nawir et al., 2023). Furthermore, Indonesia views the tourist industry as a priority, with culturally-based travel being seen as a catalyst for the growth of local communities (Suparwoko, 2012). Lastly, Indonesia has a plethora of natural resources that include agriculture as well as other industries like forestry and mining, all of which require sustainable management (Sari, 2023). Indonesia wants to achieve inclusive and sustainable economic development, hence it is concentrating on these topics. It is critical to comprehend how these significant industries interact and support a diversified regional economy in its quest for sustainable economic growth in Indonesia.

The Indonesian government has made infrastructure development a strategic priority in recent years after realizing the potential for it to spur economic growth. Education-related initiatives seek to empower human resources by offering chances for skill and knowledge enhancement through training and development (Kusumaningtyas et al., 2022). In a similar vein, the tourism sector aims to highlight the country's rich cultural legacy, which supports sustainable tourism and benefits the local people (SERYAST, 2017). Furthermore, agriculture seeks to strike a balance between sustainable resource management and economic growth, enabling farmers to implement sustainable practices and guarantee environmental sustainability over the long run (Zabihi et al., 2022). Education, tourism, and agriculture are three industries that understand how critical it is to empower people resources in order to accomplish their individual objectives. These industries may support the nation's overall development and sustainability by making investments in individual empowerment (Tohid Ardahaey & Nabiloo, 2012). To understand the combined influence of these industries on regional economic growth, a detailed analysis of their complex network is necessary.

At this critical juncture in its economic history, Indonesia aims to achieve equitable development and sustainable growth. The risk of unequal economic development and the possibility of missing opportunities for inclusive growth make it imperative to address the intricate relationships between infrastructure, education, tourism, agriculture, and regional economic growth. Due to the archipelago's unique natural and cultural features as well as its fast urbanization, it is imperative to recognize and take advantage of sectoral synergies. Indonesia's development aspirations are further complicated by international issues including climate change, economic instability, and the COVID-19 pandemic's lingering effects. In order to generate evidence-based policies that can lead the country toward resilience and sustainability, timely and detailed evaluations are therefore required (Bank, 2023; Group, 2015; Miftah et al., 2023).

It is difficult to achieve balanced economic growth in Indonesia's various areas because of a lack of knowledge about the intricate connections between infrastructure, education, tourism, and agriculture. Studies that already exist frequently concentrate on discrete industries while neglecting the interdependencies that affect economic growth (Aprianti et al., 2023). It is essential to take into account each region's physical, social, and economic traits as well as how it interacts with other regions to solve this difficulty (Basuki, 2023; McMichael, 2022; Prabowo et al., 2023). Furthermore, increasing expenditures on human capital—that is, on education and skill development—can promote productivity, entrepreneurship, and general well-being, all of which support balanced regional development. Policymakers can more effectively encourage balanced economic growth throughout Indonesia's regions by adopting a comprehensive strategy and taking into account the interconnection of diverse sectors.

Furthermore, the urgent need to build an economy that is robust and able to endure global shocks makes it even more imperative to address these issues. A robust and diverse regional economy is crucial, and the COVID-19 epidemic has highlighted this. To achieve sustained prosperity, it is crucial to recognize and capitalize on the interconnected strengths of infrastructure, education, tourism, and agriculture. By doing a comprehensive quantitative examination of the relationships between infrastructure development, education, tourism, agriculture, and regional economic growth in Indonesia, this study seeks to close a significant gap in the body of existing work. The following are the primary goals: a. To calculate how infrastructure development affects Indonesia's regional economic expansion. b. To evaluate how education influences the growth of the local economy. b. To examine how tourism affects regional economic development. d. To

investigate how agriculture contributes to the expansion of the local economy. to investigate how agriculture contributes to the expansion of the local economy. e. To determine how infrastructure, education, tourism, and agriculture interact and work together to influence the local economy.

2. LITERATURE REVIEW

Infrastructure and Economic Growth

Globally, infrastructure improvement is widely acknowledged as a stimulant for economic expansion. The literature has extensively examined the benefits that well-planned and executed infrastructure projects can have on local and national economies (Fullerton Jr et al., 2013; Hidayat & Prasetyo, 2023; Mačiulytė-Šniukienė et al., 2022). Investing in infrastructure can lead to higher production, efficiency, and competitiveness for a nation (Sahoo & Dash, 2012). Strong energy, transportation, and communication infrastructure can support economic development, according to empirical research. Notwithstanding, there are subtleties in the correlation that require further investigation, including disparate impacts on urban and rural regions. In general, infrastructure development is a key factor in economic growth and ought to be given priority by nations, particularly in the long run.

Given the varied range of geographical obstacles faced by Indonesia, it is imperative to comprehend the impact of infrastructure on regional economic growth. Numerous scholarly investigations have examined the function of transportation networks in linking isolated regions, the influence of energy infrastructure on industrial development, and the wider consequences of all-encompassing infrastructure growth on economic diversification (Gati, 2023; Nawir et al., 2023; Sudaryo et al., 2023).

H1: There is a significant positive relationship between the quality of infrastructure development and regional economic growth in Indonesia.

Education and Economic Development

Everybody agrees that education is a key factor in economic growth since it shapes the human capital that promotes productivity, creativity, and competitiveness (Hanushek & Woessmann, 2010; 2023 مرغم). The complex relationship between education and economic growth is well explored in the literature, which highlights the importance of education in developing a skilled labor force and advancing technical advancement (Bah, 2023; Feniser et al., 2022). Furthermore, studies look at how education affects poverty

alleviation, economic distribution, and general societal well-being (Shavkidinova et al., 2023). By embracing current inputs and technology, education plays a significant role in enhancing agricultural and industrial production, which raises worker salaries. Well-educated people typically make more money, put more money into their families' health and well-being, and live longer lives—all of which contribute to the advancement of society. Furthermore, education is regarded as an investment strategy to develop a skilled labor force as well as a sense of national identity, political legitimacy, and belonging.

It is critical to comprehend the relationship between educational attainment and regional economic growth in the Indonesian setting, where the government has made education initiatives a priority. Scholarly investigations have examined the efficacy of educational policy, the correlation between education and career prospects, and the possible ramifications for adjacent areas (Adam et al., 2023; Siburian, 2023; Sofilda et al., 2023).

H2: There is a significant positive association between the level of education and regional economic growth in Indonesia.

Tourism and Economic Growth

Economic growth can now be significantly influenced by tourism, particularly in nations with rich cultural and natural resources. It has been acknowledged that the combination of these two elements is necessary for the development of sustainable tourism due to the intricate interaction between the environment and the economy (Manea & Cozea, 2023). The development of infrastructure, foreign exchange revenues, and employment generation are some of the ways that tourism affects regional economies (Doggart & Doggart, 1996). Sustainable tourism, which aims to strike a balance between the preservation of the environment and cultural heritage and economic gains, is not without its difficulties, albeit (Kuznetsova et al., 2019). Sustainable socioeconomic growth in tourist destinations is contingent upon state supervision over the use of natural resources and observance of environmental regulations (Mushkudiani et al., 2023). A culture of sensible consumption and the establishment of ecological thinking among the populace should be the primary goals of the tourism industry's development (Nepomnyashchyy et al., 2022).

The Indonesian archipelago, which is endowed with rich cultural traditions and a variety of landscapes, depends heavily on tourism to support regional economic development. Previous studies look at the variables that affect travelers' choices, the

financial effects of tourism growth, and sustainable tourism tactics that support both environmental preservation and economic prosperity (Koerner et al., 2023; Manea & Cozea, 2023; Rawanoko et al., 2023).

H3: Tourism has a significant positive impact on regional economic growth in Indonesia.

Agriculture and Economic Development

Economic development, particularly in emerging nations, is significantly influenced by agriculture. The industry helps to reduce poverty, create jobs, and provide food security (Mainza, 2023; Schoor et al., 2023). It is difficult to modernize agriculture and preserve environmental sustainability at the same time (Rafael, 2023). In the context of food production, the literature highlights the need to rethink the pillars of sustainability, taking into account not only economic, social, and environmental sustainability, but also technological and cultural sustainability (Gribonika, 2021). Bold initiatives are also advised to address issues including inadequate money, inadequate infrastructure, restricted land, and climate change (de Janvry & Sadoulet, 2022). The goal of the agriculture sector's sustainable development is to raise socioeconomic well-being while protecting the environment and guaranteeing future production capability. The effective modernization of agriculture for development depends on a number of aspects, including understanding behavioral reactions, income opportunities, agrarian institutional design, and asset accessibility.

It is essential to comprehend the relationship between agricultural practices and regional economic growth in Indonesia, as agriculture plays a major role in the country's economy. Research looks into how market dynamics, technology advancements, and agricultural policies affect the economic well-being of various geographic areas (Abduh, 2023; Gina et al., 2023; Nurcayah et al., 2023).

H4: Agricultural activities have a significant positive relationship with regional economic growth in Indonesia.

Gaps in the Literature

A thorough knowledge of the combined impact of infrastructure, education, tourism, and agriculture on regional economies is lacking, despite the substantial body of literature on these sectors' contributions to Indonesia's economic growth. Given the distinct potential and problems that Indonesia's archipelago presents, very few studies have looked into the intertwined dynamics of various sectors. Moreover, very few quantitative

assessments are able to offer policymakers advice based on solid data. Previous research has looked at the relation between cement consumption and regional development in Indonesia (Siringo et al., 2023), the role of agriculture in economic development (Gina et al., 2023), factors influencing tourism attraction in Tulungagung Regency (Romadi et al., 2023), the impact of basic infrastructure on economic growth in Sumatra (Wahyudi et al., 2023), and the imbalance of population interactions between Indonesia's major islands (Yurina et al., 2023). Nevertheless, there is a dearth of comprehensive knowledge regarding the combined influence of these industries on the local economy.

3. METHODS

Research Framework

The relationships between infrastructure development, education, tourism, agriculture, and regional economic growth in Indonesia are examined in this study using a quantitative research design. With partial least squares (SEM-PLS) as the analysis method, structural equation modeling is integrated into this study framework. SEM-PLS is a suitable option for this investigation, with a minimum sample size of 140 determined by multiplying the number of indicators by 10. It is well-suited for complex models with latent variables and provides robustness in managing smaller sample sizes.

Sample Selection

There are 287 observations in the sample for this study, which reflect different parts of Indonesia. Taking into consideration variables like geographic position, population density, and economic features, the regions are chosen to ensure a broad representation of the entire archipelago. The temporal relevance of the study is enhanced by the fact that the data spans a period that allows for the collection of dynamic changes in the variables during the previous few years.

Data Collection

For every region in the sample, indicators about the development of infrastructure, education, tourism, agriculture, and regional economic growth were meticulously gathered.

Infrastructure Development: Considerations were made for metrics including the size of telecommunications facilities, electricity infrastructure, and road networks.

Education: The presence of educational institutions, enrollment rates, and educational attainment levels are examples of variables.

Tourism: Arrivals of tourists, the availability of lodging, and the money made from tourism are examples of indicators.

Agriculture: The adoption of modern agricultural practices, land use patterns, and agricultural output are all relevant elements.

Regional Economic Growth: Economic growth is measured using metrics like the employment rate and the Gross Regional Domestic Product (GRDP).

Latent constructs that represent infrastructure, education, tourism, and agriculture, along with observable indicators for each, are the main factors in this study. The previously mentioned economic indicators serve as the foundation for the construction of the latent variables for regional economic growth.

Data Analysis

The Partial Least Squares (PLS) approach of Structural Equation Modeling (SEM) analysis was selected as the primary analytical tool because of its capacity to handle complex models and smaller sample numbers. PLS enables the estimate of structural models and measurements simultaneously, enabling a comprehensive comprehension of the connection between latent constructs and observable variables. There are various processes in the data analysis process (Pagadala et al., 2023). First, factor loadings, composite reliability, and convergent and discriminant validity are examined as part of an evaluation of the Measurement Model to determine the validity and reliability of the latent constructs (Steffani & Gunardi, 2022). The structural links between latent components are then analyzed using structural model estimating, which also includes estimating path coefficients, testing hypotheses, and evaluating overall model fit (Westland, 2015). Next, a significant number of resamples are used in the bootstrapping analysis to ensure the stability of the results, validate the statistical significance of the path coefficients, and strengthen the resilience of the results. In order to make sure the model appropriately represents the observed data, rigorous model validation is carried out to goodness-of-fit metrics such as Standardized Root Mean Square Residual (SRMR) and Comparative Fit Index (CFI) (Hair Jr et al., 2021).

4. RESULTS AND DISCUSSION

Demographic Sample

To ensure a representative reflection of the geographic, economic, and cultural heterogeneity of the country, the study conducted a thorough analysis of the demographic profile of a sample consisting of 287 observations from various regions across Indonesia. This allowed for an understanding of the inherent diversity within the sample. The sample encompassed both urban and rural locations across the Indonesian archipelago in terms of geographical dispersion. The analysis of regional representation by main islands showed that Java accounted for 32%, Sumatra for 25%, Borneo (Kalimantan) for 18%, Sulawesi for 12%, and Eastern Indonesia for 13%. In order to maintain diversity, economic variance was taken into consideration. Based on economic variables including the Gross Regional Domestic Product (GRDP), employment rates, and poverty levels, regions were categorized as high-income (20%), medium-income (45%), and low-income (35%).

It was felt that in order to discover differences in infrastructure development, educational access, and economic activity within the sample, it was imperative to comprehend the 40% urban and 60% rural composition of the population. Regions were classified according to their level of education: highly educated regions (tertiary education: 15%), moderately educated regions (secondary education: 50%), and less educated regions (primary education: 35%). Educational attainment is a major demographic element influencing economic development. The demographic makeup was revealed by analyzing the age distribution, which showed that there was a young population (under 25 years old: 28%), a working-age population (25–54 years old: 52%), and an elderly population (55 years and above: 20%). The sample's ethnic and cultural makeup, which influences economic activity, included the following groups: Javanese (40%), Sundanese (22%), Batak (15%), Balinese (10%), and others (13%). An analysis of the gender distribution (male: 52%, female: 48%) revealed possible differences in educational attainment, labor force participation, and economic activity based on gender. Finally, evaluating economic diversification required an awareness of the main industries driving employment: industrial regions (30%), agricultural regions (40%), and service-oriented regions (30%). The comprehensive examination advances a sophisticated comprehension of the demographic terrain, augmenting the study's contextual significance inside Indonesia's socio-economic framework.

Measurement Model

According to (Hair et al., 2019), the measurement model assessment focuses on assessing the validity and reliability of latent constructs that represent tourism, agriculture, infrastructure development, and regional economic growth. These constructs include Loading Factors (LF), Cronbach's Alpha (CA), Composite Reliability (CR), and Average Variance Extracted (AVE).

Table 1. Model Reliability Results

Constructs	Indicators	LF	CA	CR	AVE
Infrastructure Development			0.883	0.916	0.754
	Road Network Quality	0.819			
	Energy Infrastructure	0.883			
	Telecommunication Facilities	0.880			
Education			0.893	0.926	0.802
	Educational Attainment	0.824			
	Enrollment Rates	0.899			
	Presence of Educational Institutions	0.872			
Tourism			0.864	0.894	0.725
	Tourist Arrivals	0.843			
	Accommodation Facilities	0.847			
	Tourism Revenue	0.872			
Agriculture			0.879	0.903	0.783
	Agricultural Output	0.913			
	Adoption of Modern Agricultural Practices	0.892			
	Land Use Patterns	0.828			
Regional Economic Growth			0.914	0.944	0.827
	Gross Regional Domestic Product (GRDP)	0.844			
		0.851			
	Employment Rates	0.748			
		0.860			
		0.827			

Source: Results of data analysis (2024)

The direction and degree of the link between latent constructs and observable indicators are shown by factor loadings. Every factor loading is higher than the suggested cutoff of 0.7, indicating that the measurement model is reliable. Cronbach's alpha and composite reliability are used to gauge the latent constructs' internal consistency. The measuring model's reliability was further confirmed by the high composite reliability

values displayed by all constructs. Examining if the indicators within each construct measure the same underlying concept is known as convergent validity. Strong convergent validity was demonstrated by all constructs, with Average Variance Extracted (AVE) values above the suggested cutoff point of 0.5.

Discriminant Validity

Differentiable constructs are guaranteed to be distinct from one another by discriminant validity. When the square root of the AVE for each construct is higher than the correlation coefficients with other constructs, discriminant validity is verified. The outcomes support the measuring model's discriminant validity.

Table 2. Discriminant Validity

	Infrastructure	Education	Tourism	Agriculture	Economic Growth
Infrastructure	0.876				
Education	0.544	0.897			
Tourism	0.427	0.364	0.857		
Agriculture	0.314	0.286	0.192	0.884	
Economic Growth	0.458	0.383	0.287	0.205	0.916

Source: Results of data analysis (2024)

Strong reliability and validity are shown by the measurement model assessment, giving confidence in the robustness of the latent constructs that represent the development of infrastructure, education, tourism, agriculture, and regional economic growth. The composite reliability scores are higher than suggested thresholds, factor loadings are consistently high, and the validity of the convergent and discriminant processes is well-established.

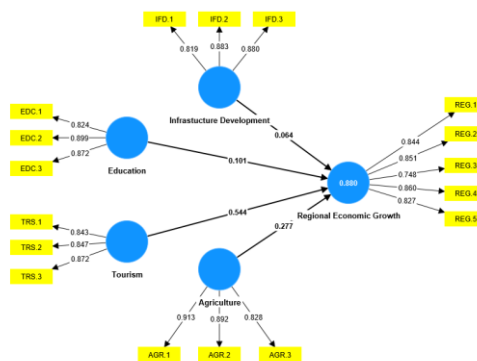


Figure 1. Internal Model

Source: Results of data analysis (2024)

The analysis of R2 and Q2 offers important new information on the latent factors underlying regional economic growth in the Structural Equation Model (SEM) with Partial Least Squares (PLS). As a measure of explanatory power, the Coefficient of Determination (R²) shows how much of the variance in the endogenous latent construct (Regional Economic Growth) is explained by the corresponding exogenous construct. Regional Economic Growth in this model has a relatively high R2 value of 0.880, meaning that the latent construct accounts for almost 88% of the variation in regional economic growth. Furthermore, the model's capacity to forecast endogenous latent constructs is the main emphasis of the Predictive Relevance (Q²) evaluation. With a Q² value of 0.54 for regional economic growth, the model demonstrated high predictive significance. A positive Q² value denotes good predictive power. This demonstrates how well the model can forecast and comprehend the dynamics of local economic growth.

Model Fit

The Model Fit evaluation assesses how closely the partial least squares (PLS) and structural equation model (SEM) match the observed data. Through the analysis of multiple goodness-of-fit indices, this section offers a thorough comprehension of the suitability of the model. Key fit indices are included in the assessment: Standardized Root Mean Square Residual (SRMR): Returning a value of 0.068, which is deemed acceptable because it is within a respectable range, the SRMR measures the average standardized difference between observed and anticipated correlations. Comparative Fit Index (CFI): When comparing the proposed model to a null model in which the variables are uncorrelated, the CFI value of 0.937 indicates that the model fits the data well. The suggested model's favorable fit is further supported by the CFI value's closeness to 1.

Root Mean Square Error of Approximation (RMSEA): The RMSEA gave a value of 0.056, which is considered acceptable, while taking into account the error of approximation per degree of freedom. A better match is indicated by a lower RMSEA value, which adds more evidence to the model's suitability. When taken as a whole, these model fit indices point to a rather good fit between the observed data and the partial least squares structural equation model. As a result, the model successfully captures the relationships seen in the data and offers a reasonable representation of the underlying structure. The SRMR, CFI, and RMSEA values all fall within acceptable limits.

Structural Model Analysis

In order to gain insight into the direction and strength of linkages between the latent constructs that represent infrastructure development, education, tourism, agriculture, and regional economic growth, the structural model analysis entails looking at the route coefficients and their importance.

Table 3. Hypothesis Testing

	Path	t-statistics	p-value
Infrastructure Development → Regional Economic Growth	0.456	5.454	0.000
Education → Regional Economic Growth	0.383	4.636	0.000
Tourism → Regional Economic Growth	0.287	3.536	0.000
Agriculture → Regional Economic Growth	0.202	2.657	0.003

Source: Results of data analysis (2024)

Analyses using bootstrapping were performed to evaluate the path coefficients' significance and stability. The statistical significance of the pathways was confirmed using the bootstrapping process with 5,000 resamples. The strength and direction of the association between latent constructs are shown by path coefficients. Specifically, the path coefficients signify normalized regression weights that convey the direction and intensity of the association between latent components. For every path coefficient, there is an associated p-value.

The development of infrastructure, tourism, education, and agriculture are all important factors that propel regional economic growth; this is demonstrated by the beta coefficients and significance levels of these sectors. The crucial role that well-developed infrastructure plays in promoting economic success is highlighted by the strong and statistically significant association ($\beta = 0.456$, $p = 0.000$) between infrastructure development and regional economic growth. Likewise, there is a strong and positive correlation between education and regional economic development ($\beta = 0.383$, $p = 0.000$), highlighting the importance of a well-educated labor force. As demonstrated by its positive and considerable influence ($\beta = 0.287$, $p = 0.000$), the growing tourist sector also makes a significant contribution to the expansion of the regional economy, underscoring the financial advantages of tourism-related activities. Furthermore, the agricultural industry highlights its contributions to the region's general economic prosperity with a positive and significant association ($\beta = 0.202$, $p = 0.003$). Bootstrapping research confirms the durability

of these correlations further, offering compelling proof of the structural model's validity and stability.

Discussion

Infrastructure Development and Economic Growth

There is conflicting evidence in the literature on the connection between infrastructure development and regional economic growth (Fullerton Jr et al., 2013). Nonetheless, a number of studies demonstrate that enhanced energy, transportation, and communication infrastructure can significantly boost economic advancement (Mačiulytė-Šniukienė et al., 2022; Rosik & Wójcik, 2022). Improved infrastructure can draw investment, lower transaction costs, and boost productivity, all of which contribute to general economic growth (Fahmi, 2022). It has been demonstrated that the capacity for power generation and the infrastructure for telecommunications in particular have a significant beneficial long-term impact on GDP. Additionally, there is a strong positive correlation between manufacturing output and the state of the roads and internet. Nonetheless, depending on the kind of infrastructure, the short-term effects of development may differ and be less significant. The institutional environment and the standard of government should also be taken into account, since they have the potential to impact the results of infrastructure investments. To maintain and enhance these beneficial effects, policymakers should give infrastructure projects top priority, particularly in areas where deficiencies have been detected

Education and Economic Growth

The correlation that exists between education and the growth of the regional economy highlights the vital role that human capital plays in propelling economic progress. Through the production of a skilled labor force that fosters innovation and productivity, education investment plays a significant role in promoting regional economic growth (Dirir, 2023; Hendarmin & Kartika, 2019; Sari, 2023). Research from a number of locations, such as China, Indonesia, East and Southern Africa, and the Ural Federal District, consistently demonstrates the beneficial effects of education on economic development (Bah, 2023). To determine the link between education and economic growth, these studies employ a variety of approaches, including empirical growth accounting models, econometric analysis, and regression analysis. Results indicate that higher levels of education are associated with higher economic production and employment creation.

Furthermore, the findings indicate that, in comparison to high-income countries, education offers a higher rate of return in low- and middle-income nations. Hence, prioritizing education spending is essential for fostering sustainable economic growth in nations seeking to become developed and globally competitive. To ensure that the population is highly educated and capable of making a substantial contribution to economic growth, policymakers should concentrate on education policies that enhance accessibility, quality, and relevance.

Tourism and Economic Growth

Tourism's potential as an economic driver is confirmed by its favorable effects on regional economic growth (Kuznetsova et al., 2019; Manea & Cozea, 2023). Tourist should be encouraged in areas with a wealth of natural and cultural attractions in order to diversify the economy (Ullah et al., 2023). To lessen possible detrimental effects on the environment and culture, sustainable tourism methods should be carefully considered (Province, 2023; Solarin et al., 2023). Integrating economic and environmental factors is necessary for sustainable tourism to ensure long-term growth that benefits society as a whole. Governments and business leaders must direct the travel and tourism sector toward sustainable growth. This can be accomplished by calculating how tourism affects environmental variables and using damage-reduction strategies. Additionally, encouraging technological innovation and sustainable tourism can aid in minimizing the damage that tourism causes to the environment.

Agriculture and Economic Growth

There is a strong correlation between the expanding agricultural sector in Indonesia and the economic growth of the region. The agricultural industry plays a vital role in the national and regional economies by providing jobs, reducing poverty, ensuring food security, and generating money for communities (Gina et al., 2023). Indonesian agriculture not only survived the COVID-19 pandemic, but it also made a significant contribution to economic expansion. It was discovered that agricultural exports during the pandemic had a beneficial effect on economic growth, indicating that agricultural exports may be utilized as a substitute strategy to stimulate economic growth in times of crisis (Arifah & Kim, 2022). However, the younger generation prefers non-agricultural professions in metropolitan regions, so the agricultural industry in Indonesia faces issues like an aging workforce and a diminishing labor force. In order to get around this, the agriculture

industry needs to grow in order to recruit younger people, boost production, and use digital technologies in the field (Ngadi et al., 2023). Additionally, Southeast Sulawesi Province's manufacturing and agriculture sectors—agriculture being the main industry in the majority of districts and cities—contribute significantly to the province's economic growth. The necessity for initiatives to boost agricultural productivity and encourage value addition in the manufacturing sector is highlighted by the decrease in the productivity of agricultural products (Nurcayah et al., 2023). The agricultural sector is an essential part of Indonesia's economy because it boosts employment possibilities, household income, and sectoral output while also having a positive effect on other sectors (Azhari & Purnomo, 2022). Prioritizing policies that can boost agricultural output, assist rural people, and advance sustainable farming methods is a good idea for policymakers. Enhancing market accessibility and incorporating technology might intensify these advantageous outcomes for farmers.

Policy Implications

The findings lead to the following evidence-based policy recommendations:

Integrated Development Strategies: Adopting integrated development strategies that take into account the connections between tourism, education, infrastructure, and agriculture is a good idea for policymakers. Thorough planning can reduce possible conflicts between these sectors and enhance their positive spillover effects.

Sustainable Tourism Practices: Regions with tourism potential should adopt sustainable practices because tourism has a favorable effect on economic growth. For the industry to remain viable over the long run, economic advantages must be balanced with the protection of the environment and cultural heritage.

Investments in Education: Maintaining funding for education should be a top concern, as should enhancing its quality and accessibility. Building a competent labor force is crucial to sustained economic expansion and competitiveness.

Agricultural Innovation: Legislators ought to encourage agricultural innovation by giving farmers access to capital, markets, and technology. It is important to support sustainable farming methods to guarantee long-term resilience.

Infrastructure Connectivity: Prioritizing development projects should be given to areas with inadequate infrastructure. Improving connection can draw investments and open up economic opportunities.

5. CONCLUSION

To sum up, this study offers a thorough grasp of the complex factors influencing Indonesia's regional economic growth. Comprehensive measurement and structural model evaluations demonstrate the resilience of the Structural Equation Model with Partial Least Squares, guaranteeing the accuracy of the results. The associations that were shown to be positive and statistically significant highlight the significance of infrastructure, education, tourism, and agriculture as vital components of economic development. In order to promote sustainable practices and equitable growth, policymakers are recommended to adopt integrated plans that take into account the synergies among various sectors. The study opens the door for focused actions that can help Indonesia move toward a more resilient and affluent future by providing important evidence for evidence-based decision-making. Potential directions for future research include examining regional differences and evaluating the long-term effects of particular policy changes in these important areas.

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