JAMBURA AGRIBUSINESS JOURNAL
VOLUME 6 ISSUE 1 JULY 2024
E-ISSN: 2685-5771 | **P-ISSN:** 2685-5860
Publisher: Agribusiness Department
Agriculture Faculty State University of Gorontalo
DOI: 10.37046/jaj.v6i1.32913

ANALYSIS OF THE INFLUENCE OF DIGITAL LITERACY, GOVERNMENT POLICY, AND INFRASTRUCTURE ON COFFEE PRODUCTIVITY IN KERINCI REGENCY

Heppi Syofya [*)1)], Haryadi [1)], Junaidi [1)], Siti Hodijah [1)]
[1)] Universitas Jambi, Jambi, Indonesia
[*)] Corresponding author, Email: heppisyofya@gmail.com

(Received: June 22, 2025 | Accepted: October 12, 2025 | Published: October 19, 2025)

ABSTRACT

This study aims to analyze the influence of digital literacy, government policy, and infrastructure on coffee productivity in Kerinci Regency. A descriptive and explanatory research design was applied using a quantitative approach. The study population consisted of 117 registered coffee farmers, and a sample of 90 respondents was determined using the Slovin formula with a 5% margin of error. Data were collected through questionnaires, interviews, and field observations, complemented by secondary sources. The findings show that all three factors significantly affect coffee productivity. Digital literacy enables farmers to access agricultural information, adopt modern technologies, and expand market opportunities. Infrastructure improves efficiency by reducing production and distribution costs while enhancing connectivity. Among the factors, government policy has the strongest effect, particularly through training, certification, subsidies, and market promotion. These findings highlight that government policy, digital literacy, and infrastructure collectively play a crucial role in enhancing the productivity and competitiveness of coffee farmers.

Keywords: Coffee productivity; Digital literacy; Government policy; Infrastructure

INTRODUCTION

Coffee is a product with strong market potential both domestically and internationally. As a source of foreign exchange earnings from export commerce, as well as a source of revenue for the community and to meet domestic coffee consumption needs, coffee commodities are a significant part of Indonesia's economy (Leo *et al*., 2023). Jambi Province's Kerinci Regency is renowned for producing some of Indonesia's best coffee, especially the Arabica kind cultivated in the highlands of Mount Kerinci. The coffee sector not only serves as an export commodity but also as a key driver of rural development, improvement of farmers' welfare, job creation, and poverty alleviation.

However, coffee productivity in Kerinci Regency is still not optimal. In 2022, the average productivity of Arabica coffee in Kerinci reached only 0.8–1.0 tons/ha, whereas the potential yield under optimal cultivation conditions is 1.5–2.0 tons/ha (Central Bureau of Statistics of Jambi province, 2023; Directorate General of Plantations, 2022). This disparity highlights the gap between land potential and actual production yields per hectare, indicating the urgent need for initiatives to boost productivity. By applying technology in compliance with appropriate crop management recommendations, coffee productivity can be increased while product quality is improved, thereby strengthening competitiveness in both domestic and international markets (Handiyanto *et al*., 2024). In addition, previous studies suggest that digital literacy, government policy, and infrastructure are among the critical factors influencing agricultural and coffee productivity (Ikhsan *et al*., 2023; Kusnari *et al.*, 2023; Sugihono *et al.*, 2024).

Digital literacy refers to the ability of individuals to access, understand, and use digital technologies effectively, including evaluating online information (Noprieka Suriadiman *et al*., 2023). In rural areas, such as Kerinci Regency, limited access to technology results in relatively low levels of digital literacy, which in turn reduces farmers' productivity and weakens the competitiveness of Kerinci coffee in domestic and international markets. Strengthening digital literacy is therefore not only about adopting technology but also about enabling farmers to innovate, improve decision-making, and integrate into wider value chains. This makes it essential to study the role of digital literacy together with government policy and infrastructure, in improving coffee productivity, as findings from this research can guide targeted strategies to enhance both farmer welfare and regional competitiveness.

Government policy refers to a set of actions or decisions made by the government to achieve certain goals in socio-economic development. Central and regional government policies are essential to establishing an ecosystem that promotes economic inclusion and productivity growth. The government has introduced a number of policies pertaining to Kerinci coffee, including the supply of superior seedlings, training initiatives for farmers, marketing of Kerinci coffee internationally, and assistance with certification systems. The sustainability of these policies, their influence on raising farmers' incomes, the fair distribution of economic gains, and their contributions to regional economic growth must all be taken into consideration when assessing their efficacy.

Infrastructure refers to the facilities and systems that are strategically important for the mobility of the population, connecting one region to another, and for facilitating the distribution of goods and production factors between regions so that public needs can be met, ultimately accelerating economic activity (Nuritasi, 2013). However, the condition of infrastructure in Kerinci Regency remains a major obstacle to the development of the coffee sector. Damaged roads, limited market access, and the lack of post-harvest facilities result in high production costs and low selling prices. Therefore, investment in infrastructure is essential not only to directly increase productivity but also to stimulate growth in underdeveloped areas, reduce logistics costs, and open up new business opportunities within the coffee value chain.

Increasing coffee productivity includes more than just raising output volume; it also entails improving product quality, streamlining the supply chain, raising farmer incomes, and strengthening the agricultural sector's role in local economic development. Previous research shows that infrastructure and farmer institutions significantly affect coffee farmers' incomes and regional development (Gulo *et al.*, 2024), while the adoption of smart farming and IoT technologies has great potential to increase coffee productivity in Indonesia, provided that infrastructure and digital readiness are adequate (Mulyono *et al*., 2022). In addition, the level of digital literacy among agricultural actors, including extension agents, remains moderate in many rural areas, which influences their ability to utilize technology to support farmer productivity (Sugihono *et al.*, 2024). Furthermore, innovations in the coffee supply chain have been found to improve process efficiency and market competitiveness (Irjayanti *et al*., 2025). By comprehending how infrastructure, government policy, and digital literacy interact, this study aims to examine how infrastructure, government policy, and digital literacy affect coffee productivity in Kerinci Regency.

Land size influences the productivity and welfare of coffee farmers in Jambi Province. This is because the larger the land used by coffee farmers, the greater the amount of coffee produced. The resulting coffee production determines the level of income enjoyed by farmers and will improve their welfare. Capital influences the productivity and welfare of coffee farmers in Jambi Province. The amount of capital used by farmers will affect the amount of coffee produced. Larger capital allows for a larger inventory of goods to be produced. Labor affects the productivity and welfare of coffee farmers in Jambi Province. The availability of sufficient labor ensures that each stage of production is carried out on time and with high quality. The more labor employed in the production process, the greater the output produced. Technology influences the productivity and welfare of coffee farmers in Jambi Province. Coffee farmers who adapt farming technologies, such as using coffee hulling machines, automatic irrigation systems, or applications to monitor plant conditions, can save time and energy while increasing yields. Training impacts the productivity and well-being of coffee farmers in Jambi Province. Training is a crucial investment in increasing the capacity of coffee farmers. Furthermore, training also paves the way for farmers to become more prosperous, independent, and competitive in the global coffee market (Syofya & Widayat, 2025).

Although previous studies have separately examined the impact of government policy (Ikhsan *et al.*, 2023), infrastructure (Gulo *et al.*, 2024), or digital literacy (Sugihono *et al.*, 2024) on agricultural outcomes, there is still a lack of comprehensive research that simultaneously analyzes these three factors in the context of coffee productivity, particularly at the farmer level in Kerinci Regency. Most existing studies focus either on policy evaluation, infrastructure readiness, or digital adoption in general agriculture, without integrating them into a single analytical framework for coffee as a strategic commodity. This study therefore offers novelty by combining these three determinants, government policy, infrastructure, and digital literacy, into one empirical model, providing a more holistic understanding of their interrelationship and their collective influence on coffee productivity in Kerinci. The findings are expected to contribute not only to academic discourse but also to practical policymaking for regional development and farmer empowerment.

METHOD

This study employed a descriptive and explanatory quantitative research designs to investigate the impact of infrastructure, government regulations, and digital literacy on coffee productivity in Kerinci Regency. The descriptive component aimed to provide a comprehensive overview of the current conditions experienced by coffee farmers, while the explanatory component sought to analyze causal relationships among the studied variables. A quantitative approach was primarily used to measure and assess the influence of the selected factors on coffee productivity. In addition, the study integrated some qualitative insights to enrich the interpretation of quantitative data and capture contextual factors that may not be fully represented by numerical data.

The data used in this study were obtained from both primary and secondary sources. Primary data were collected directly from respondents through structured questionnaires, interviews, and field observations. These instruments were designed to capture detailed information on the farmers' access to infrastructure, their understanding of relevant government regulations, and their level of digital literacy. Secondary data were gathered from relevant institutional reports, agricultural statistics, and academic publications to support and contextualize the findings. The population of this study consisted of 117 registered coffee growers in Kerinci Regency. The sample size was calculated using the Slovin formula at a 5% margin of error to maintain statistical validity:

$$\boldsymbol{n} = \frac{\boldsymbol{N}}{\mathbf{1} + \boldsymbol{N}(\boldsymbol{e})^{\mathbf{2}}}$$

where:
n is the sample size,
N is the population size, and
e is the margin of error.

Substituting the values:

$$= \frac{117}{1 + 117(0.05)^2} = \frac{117}{1 + 0.2925} = \frac{117}{1.2925} = 90.55$$

Thus, the required sample size was rounded to 90 respondents. Sampling was conducted to capture variations in farm size, access to infrastructure, and exposure to digital tools among coffee producers, ensuring adequate representation of the population.

Data Analysis Procedure

Data analysis was conducted using SPSS software. Several stages of quantitative analysis were performed, including instrument testing, classical assumption testing, and multiple linear regression. These analytical steps were carried out sequentially to obtain valid, reliable, and interpretable results that align with the research objectives.

Instrument testing was conducted to verify the accuracy and consistency of the measurement tools used in this study. The validity test was performed using the corrected item-total correlation, where all items with correlation values greater than r-table (0.205) were declared valid, confirming that the items effectively measured their intended constructs. The reliability test was carried out using Cronbach’s Alpha, and all variables demonstrated α values above 0.60, indicating acceptable internal consistency and stability across measurements.

Before performing multiple linear regression analysis, several classical assumption tests were conducted to ensure that the regression model met statistical requirements. These tests were essential to confirm that the data fulfilled the necessary conditions for producing unbiased and efficient estimators. The assumption tests included normality, multicollinearity, autocorrelation, heteroskedasticity, and linearity assessments. The normality test was used to verify whether the residuals in the regression model followed a normal distribution. This assumption ensures that the estimated parameters and hypothesis testing are valid under the ordinary least squares (OLS) approach. The normality of residuals was evaluated using both graphical methods (histogram and Q–Q plot) and the Kolmogorov–Smirnov significance test. Multicollinearity test was conducted to examine whether strong correlations existed among independent variables. Multicollinearity can inflate standard errors and reduce the reliability of the estimated coefficients. To detect it, the Variance Inflation Factor (VIF) and tolerance values were analysed, where VIF values below 10 and tolerance values above 0.10 indicated an acceptable level of multicollinearity. Autocorrelation test aimed to identify whether there was correlation between residuals from different observations. The presence of autocorrelation can bias statistical inference and lead to inefficient estimates. The Durbin–Watson statistic was applied, and values around 2 indicated that the model was free from autocorrelation problems. Heteroskedasticity test was used to ensure that the variance of the residuals remained constant across all observations. When heteroskedasticity is present, the regression coefficients remain unbiased but their standard errors become inconsistent. This assumption was examined through visual inspection of scatterplots between standardized residuals and predicted values.

Finally, the linearity test was carried out to confirm that the relationship between each independent variable and the dependent variable was linear. This step guarantees that the linear regression model is appropriate for representing the actual relationships within the data. Linearity was assessed using partial regression plots and statistical verification through curve estimation procedures.

After verifying that all classical assumptions were satisfied, multiple linear regression analysis was conducted to test the effect of the three independent variables Digital Literacy (X1), Government Policy (X2), Infrastructure (X3) on Coffee Productivity (Y). The regression model was specified as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

The regression analysis produced both unstandardized coefficients (B) and standardized coefficients (β), along with t-values, significance levels (p), and the coefficient of determination (R^2 and adjusted R^2). Statistical significance was tested at a 5% confidence level ($\alpha = 0.05$), ensuring that only meaningful relationships were interpreted. This analytical approach provided empirical evidence on how digital literacy, government policy, and infrastructure collectively affect coffee productivity in Kerinci Regency.

RESULT AND DISCUSSION

Characteristics of Respondents

The respondents in this study consisted of 90 registered coffee farmers in Kerinci Regency, selected through the Slovin formula to ensure adequate representation of the total population. Based on the calculation results, the sample size was 48 from Kayu Aro, 27 from West Kayu Aro, and 15 from Gunung Tujuh. The samples were randomly selected from each village with the largest number of Arabica coffee farmers The respondents varied in terms of farm size, cultivation experience, and exposure to agricultural technologies, enabling the study to capture diverse conditions across coffee-producing areas. Most farmers operate smallholder farms, typically managed by family labor, reflecting the dominant agricultural structure in rural Kerinci. The age of respondents generally ranged from productive middle-aged farmers to older farmers who have been engaged in coffee cultivation for decades, indicating a wide distribution of farming experience. Educational backgrounds also differed, with some respondents having completed only primary or secondary schooling, while others had attained higher levels of formal education, influencing their level of digital literacy.

Access to infrastructure varied across respondents; some farmers were located in areas with relatively good road access and post-harvest facilities, while others cultivated in remote areas with limited infrastructure support. Differences were also found in terms of exposure to government policy programs, such as training, certification, and subsidies, where certain respondents had participated actively while others had limited access. Digital literacy levels among farmers were diverse as well, ranging from individuals familiar with smartphones and agricultural information platforms to those who still rely on traditional knowledge. These variations in demographic and contextual characteristics provide a comprehensive representation of coffee farmers in Kerinci Regency, strengthening the validity of the findings and ensuring that the results reflect real field conditions.

Research Instrument Test

From the validity test conducted on the score of each item with the total score of each attribute in the study, the results of all items of the independent variables and dependent variables showed validity, with a positive corrected item total correlation value above the r table $n = 90$; $\alpha = 0{,}05$ (Table 1).

Each statement item from the variables used in the study is valid, according to the validity test results, which indicate that the digital literacy, government policy, infrastructure, and coffee productivity variable instruments obtained total correlation value (r_{count}) for corrected items > r_{table} 0.205.

Similarly, the reliability test results, every variable related to government policy (x_2) as 0,810, infrastructure (x_3) as 0,740, digital literacy (x_1) 0,777 and coffee productivity (Y) has a Cronbach Alpha value of at least 0.729. As a result, all variables' reliability test results are trustworthy (Table 1).

Table 1. Validity and Reliability Test Results

Variabel	Code	(r count)	(r table) (n=90; α=0,05)	Description	Alfa Cronbach's
Coffee Productivity (Y)	Y1.1	0.376	0.205	Valid	0,729 > 0,6 Reliable
	Y1.2	0.450		Valid	
	Y1.3	0.602		Valid	
	Y1.4	0.606		Valid	
	Y1.5	0.315		Valid	
	Y1.6	0.302		Valid	
Digital Literacy (X1)	X1.1	0.550	0.205	Valid	0,777 > 0,6 Reliable
	X1.2	0.506		Valid	
	X1.3	0.282		Valid	
	X1.4	0.620		Valid	
	X1.5	0.465		Valid	
Government policy (X2)	X2.1	0.599	0.205	Valid	0,810 > 0,6 Reliable
	X2.2	0.586		Valid	
	X2.3	0.549		Valid	
	X2.4	0.529		Valid	
	X2.5	0.646		Valid	
	X2.6	0.553		Valid	
Infrastruc-ture (X3)	X3.1	0.666	0.205	Valid	0,740 > 0,6 Reliable
	X3.2	0.619		Valid	
	X3.3	0.509		Valid	
	X3.4	0.296		Valid	
	X3.5	0.309		Valid	
	X3.6	0.496		Valid	
	X3.7	0.400		Valid	

Source: Data processed by researchers, 2025

Assumption Tests for Multiple Linear Regression

Before testing the research hypotheses, a series of classical assumption tests were conducted to ensure that the regression model met the necessary statistical criteria. These included the normality test, multicollinearity test, autocorrelation test, heteroskedasticity test, and linearity test. The results of each test are presented and interpreted below.

The normality of residuals was tested using the Kolmogorov–Smirnov (K–S) method. The results are shown in Table 2. The Kolmogorov–Smirnov test yielded a statistic value of 0.081 with a significance level of 0.200 (> 0.05) and df = 90. This result indicates that the residuals follow a normal distribution pattern. The histogram and Q–Q plot also show that the data points align closely with the diagonal line, confirming that the normality assumption is satisfied.

Table 2. Normality Test Results (Kolmogorov–Smirnov Test)

Variable	Statistic	df	Sig.
Unstandardized Residual	0.081	90	0.200

Source: Data processed by researchers, 2025

Multicollinearity Test

The multicollinearity test was carried out to assess the degree of correlation among independent variables using tolerance and Variance Inflation Factor (VIF) values. The results are displayed in Table 3. All VIF values are below 10 and tolerance values are above 0.10, which indicates that there is no multicollinearity between independent variables. This means that each variable contributes uniquely to explaining coffee productivity without overlapping information. Hence, the regression model fulfills the multicollinearity assumption.

Table 3. Multicollinearity Test Results

Variable	Tolerance	VIF
Digital Literacy	0.686	1.152
Government Policy	0.695	1.438
Infrastructure	0.721	1.387

Source: Data processed by researchers, 2025

Autocorrelation Test

The autocorrelation test was conducted using the Durbin–Watson (DW) statistic to determine whether residuals were correlated across observations. The results are shown in Table 4. The Durbin–Watson value of 2.055 lies within the acceptable range of 1.5 to 2.5, indicating no autocorrelation problem. This result shows that the residuals are independent from one another, which is crucial for ensuring valid statistical inference. Therefore, the autocorrelation assumption was fulfilled.

Table 4. Autocorrelation Test Result

Test	Statistic	Range
Durbin-Watson	2.055	1.5-2.5

Source: Data processed by researchers, 2025

Heteroskedasticity Test

The heteroskedasticity test was analyzed through a scatterplot of standardized residuals against predicted values. The visual output from SPSS is presented in Figure 1. The scatterplot shows that the residual points are randomly dispersed around the zero line without any specific pattern. This indicates that the variance of residuals is constant across all predicted values, fulfilling the assumption of homoscedasticity. Therefore, the regression model does not exhibit heteroskedasticity issues and remains statistically reliable.

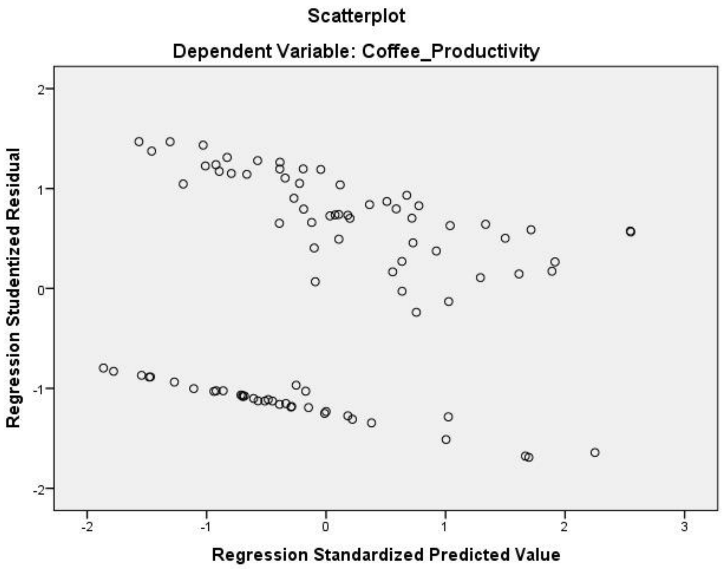

Figure 1. Scatterplot of Standardized Residuals

Linearity Test

The linearity test was conducted to confirm whether the relationship between the predicted and actual values of coffee productivity follows a linear pattern. The test was performed using a scatterplot between unstandardized predicted values and studentized residuals, as shown in Figure 2.

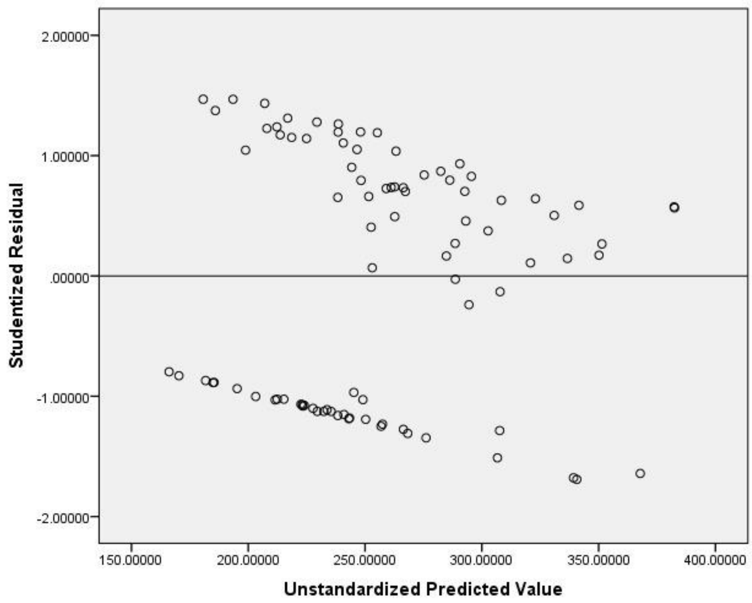

Figure 2. Scatterplot of Unstandardized Predicted Values and Studentized Residuals

The scatterplot demonstrates that the residual points are randomly dispersed above and below the zero line without forming any distinct curve or systematic pattern. This indicates that the relationship between the independent variables (digital literacy, government policy, and infrastructure) and coffee productivity is linear. Therefore, the linearity assumption in the multiple regression model is considered fulfilled, and the analysis proceeded with multiple linear regression to examine the effects of each independent variable on coffee productivity.

Multiple Linear Regression Analysis

Table 5. Results of Multiple Linear Regression Analysis

Model	Unstandardized Coefficients (B)	Standardized Coefficients (β)	Sig.
Constant	1.097		0.001
Digital Literacy	0.207	0.237	0.014
Government Policy	0.338	0.421	0.000
Infrastructure	0.207	0.254	0.013
Dependent Variable: Coffee Productivity			

Source: Data processed by researchers, 2025

Table 5 displays the outcomes of processing regression data on infrastructure, government policy, and digital literacy. The following are the outcomes of this study model's multiple linear regression equation:

$$Y = 1{,}097 + 0{,}207\ (X1) + 0{,}338\ (X2) + 0{,}207\ (X3)$$

The regression analysis indicates that Digital Literacy (X1) has a significant and positive influence on coffee productivity (β = 0.237, Sig. = 0.014). This finding implies that farmers with higher digital literacy can effectively use digital platforms to access agricultural information, adopt modern technologies, and manage farming operations more efficiently, which in turn improves productivity. Government Policy (X2) emerges as the most influential factor affecting coffee productivity (β = 0.421, Sig. < 0.001). This result emphasizes the critical role of government interventions, including training programs, certification schemes, financial support, and marketing facilitation, in enhancing farmers' capabilities and strengthening the overall performance of the coffee sector. Infrastructure (X3) also shows a positive and significant effect on coffee productivity (β = 0.254, Sig. = 0.013). Adequate infrastructure improves production and distribution efficiency by reducing logistical constraints, lowering operational costs, and enhancing connectivity between production centers and markets.

Furthermore, the regression model demonstrates an R^2 value of 0.539, indicating that these three variables collectively explain 53.9% of the variation in coffee productivity in Kerinci Regency, suggesting that other factors beyond the model may also influence farmers' performance. Overall, these results confirm that all three factors significantly contribute to improving coffee productivity, with government policy being the dominant determinant. This underscores the importance of integrated development strategies that combine policy support, digital empowerment, and infrastructure investment to sustainably enhance the productivity and competitiveness of coffee farmers in Kerinci Regency.

The Influence of Digital Literacy on Coffee Productivity

The findings confirm that digital literacy has a significant positive effect on coffee productivity (β = 0.237, $p < 0.05$). This result supports prior studies showing that digital competencies improve decision-making, adoption of technology, and market access in rural agriculture (Makyanie & Witjaksono, 2022; Sugihono *et al*., 2024). Importantly, the effect size, while smaller than that of government policy, indicates that digital literacy is not merely a supporting factor but a strategic enabler of modern farming practices. Farmers with higher digital literacy can optimize resource use, adopt precision farming, and expand market reach through e-commerce platforms. These mechanisms directly contribute to productivity and indirectly improve farmers' income stability. However, the relatively modest β coefficient also suggests that without supportive policy and infrastructure, digital literacy alone may not fully transform productivity outcomes. This highlights the need for integrated interventions where digital skills are complemented by government programs and adequate infrastructure.

The Influence of Government Policy on Coffee Productivity

Government policy emerges as the most dominant predictor of coffee productivity (β = 0.421, $p < 0.001$), confirming its decisive role in shaping agricultural outcomes. This effect size is substantially larger than digital literacy (β = 0.237) and infrastructure (β = 0.254), meaning that policy interventions account for the greatest share of explained variance in productivity. In practical terms, this implies that targeted policy actions, such as provision of subsidies, certification support, farmer training, and export promotion can generate disproportionately large improvements in productivity relative to other factors. Previous studies also demonstrate the strong influence of government interventions on agricultural performance and rural economic growth (Ikhsan *et al*., 2023; Kusnari *et al*., 2023). The present findings extend this literature by showing that in the context of Kerinci coffee, policy is not only statistically significant but also the most impactful driver. The practical implication is clear: sustained and well-coordinated government programs are essential for enabling farmers to capitalize on digital tools and infrastructure investments. Without policy support, the effectiveness of other factors may remain limited.

The Effect of Infrastructure on Coffee Productivity

Infrastructure also shows a positive and significant relationship with productivity ($\beta = 0.254$, $p < 0.05$). This aligns with previous evidence that infrastructure enhances market access, reduces transaction costs, and facilitates the flow of goods and services in agricultural supply chains (Gulo *et al*., 2024; Mulyono *et al*., 2022). Although its effect size is smaller than government policy, infrastructure remains a critical enabler, particularly in rural areas where poor road access, limited electricity, and weak communication networks constrain productivity. Practically, the coefficient implies that improvements in infrastructure, such as upgrading rural roads and expanding post-harvest facilities would contribute to measurable increases in coffee output and farmers' competitiveness. Moreover, infrastructure investments create synergies with government policy and digital literacy. For instance, training programs (policy) and mobile applications (digital literacy) can only be effective if supported by reliable connectivity and logistics systems.

Taken together, the three variables digital literacy, government policy, and infrastructure explain 53.9% of the variance in coffee productivity ($R^2 = 0.539$). This demonstrates that while individual factors are important, their combined effect provides a more holistic explanation of productivity dynamics in Kerinci Regency. The key contribution of this study is twofold. First, it empirically validates the critical role of government policy as the strongest determinant, showing that institutional interventions carry greater weight than individual or infrastructural factors. Second, it highlights the interplay between digital literacy and infrastructure as complementary enablers that amplify the effectiveness of policy support. This combination advances prior literature by offering an integrated model tailored to a developing-country, smallholder coffee-farming context.

In conclusion, this study provides new insights into how digital capacity, supportive policies, and infrastructure improvements jointly enhance agricultural productivity. The novelty lies in demonstrating that while digital skills and infrastructure are enablers, government policy acts as the primary driver in the Kerinci coffee sector. These findings emphasize the importance of designing policies that simultaneously strengthen digital literacy and infrastructure, thereby creating a synergistic framework for sustainable agricultural transformation and rural development.

CONCLUSION

This study demonstrates that digital literacy, government policy, and infrastructure jointly and significantly influence coffee productivity in Kerinci Regency. Among the three, government policy emerges as the strongest determinant, underscoring the pivotal role of training, certification, subsidies, and market promotion in boosting farmers' performance. Digital literacy acts as an important enabler, allowing farmers to access agricultural information, adopt modern technology, and expand market opportunities. Infrastructure contributes by reducing production and distribution costs, improving product quality, and strengthening connectivity with wider markets.

The integrated effect of these factors explains more than half of the variance in coffee productivity, highlighting the need for coordinated strategies. The novelty of this study lies in its empirical evidence that policy effectiveness is amplified when complemented by farmers' digital capacity and adequate infrastructure. Therefore, sustainable improvement of the coffee sector requires not only strong and consistent government interventions but also investments in human capital and rural infrastructure. This synergy provides a pathway for enhancing farmer welfare, increasing regional competitiveness, and supporting inclusive rural development.

REFERENCES

Central Bureau of Statistics of Jambi province. (2023). *Statistik Kopi Provinsi Jambi 2022*. Badan Pusat Statistik Provinsi Jambi. https://jambi.bps.go.id/id

Dhea Adinda Syafitri, Sutiawati Sutiawati, & Ichsan Fauzi Rachman. (2024). Menghadapi Tantangan Digital: Peran Literasi Digital Dalam Mewujudkan Tujuan Pembangunan Berkelanjutan. *WISSEN: Jurnal Ilmu Sosial Dan Humaniora, 2*(2), 145–156. https://doi.org/10.62383/wissen.v2i2.106

Directorate General of Plantations. (2022). *Statistik Perkebunan Indonesia: Kopi 2020–2022*. Kementerian Pertanian RI. http://ditjenbun.pertanian.go.id/

Gulo, T., Lubis, S. N., & Lubis, A. A. R. D. (2024). Income analysis of coffee farmers and its impact on regional development (Case study: Pematang Sidamanik District, Simalungun Regency, Indonesia). *Asian Multidisciplinary Research Journal of Economy and Learning, 1*(1), 20-26. Retreived from: https://argaelpublisher.com/index.php/amjel/article/view/4

Handiyanto, T. T., Suandi, & Muchlis, F. (2024). Digital-based performance model for the Arabica coffee supply chain: A case study of the Koerintji Barokah Bersama Cooperative in Kerinci, Indonesia. *Jurnal Perspektif Pembiayaan dan Pembangunan Daerah, 12*(4), 383–402. https://doi.org/10.22437/ppd.v12i4.34483

Ikhsan, I., Marefanda, N., Husna, C. A., Hajad, V., & Herizal, H. (2024). The Effectiveness of Local Government Policies in Gayo Coffee Farmers' Welfare during the COVID-19 Pandemic. *Journal of Governance and Public Policy, 11*(1), 71-85. https://doi.org/10.18196/jgpp.v11i1.18619

Intan Suswita, Darwin Damanik, & Pawer Darasa Panjaitan. (2020). Pengaruh Infrastruktur terhadap Pertumbuhan Ekonomi di Kabupaten Simalungun. *Jurnal Ekuilnomi, 2*(1), 1–11. https://doi.org/10.36985/ekuilnomi.v2i1.346

Irjayanti, M., Azis, A. M., Susilawati, & Sobari, A. R. (2025). Transformative innovations igniting coffee supply chain process efficiency. *Journal of Innovation and Entrepreneurship, 14*(1), 44. https://doi.org/10.1186/s13731-025-00486-9

Isabella, I., Iriyani, A., & Puji Lestari, D. (2023). Literasi Digital sebagai Upaya Membangun Karakter Masyarakat Digital. *Jurnal Pemerintahan Dan Politik, 8*(3), 167–172. https://doi.org/10.36982/jpg.v8i3.3236

Kamilla, S., & Hutajulu, D. M. (2020). Pengaruh Infrastruktur terhadap Pertumbuhan Ekonomi di Provinsi Jawa Tengah. *JUSIE (Jurnal Sosial Dan Ilmu Ekonomi), 5*(02), 169–179. https://doi.org/10.36665/jusie.v5i02.330

Kurniati, P. S., Zakiyani, S. N., Yuwono, F. A. N., & Munigar, W. (2023). Kebijakan Pemerintah Dalam Pembangunan Dan Pengembangan Pariwisata Di Wilayah Kota Bandung. *Jurnal Caraka Prabu, 7*(2), 1–16. https://doi.org/10.36859/jcp.v7i2.1723

Kusaeri, K., Hamdani, A. S., &, & Suprananto, S. (2019). Student Readiness and Challenge in Completing Higher Order Thinking Skill. *Infinity*, *8*(1), 75–86. https://doi.org/10.22460/infinity.v8i1.p75-86

Kusnari, T., Daris, E., & Aminuddin, I. (2023). Policy Impact of Coffee Plant Development Program in Garut Regency. *Agribusiness Journal, 17*(1), 171-178. https://doi.org/10.15408/aj.v17i1.36670

Lara Siska, Lestary Fitriayany, & Khairul Azmi. (2021). Pengaruh Kualitas Pelayanan dan Kebijakan Pemerintah Terhadap Keputusan Muzakki Berzakat di Baznas Kota Dumai. *Al-Hisbah Jurnal Ekonomi Syariah, 2*(2), 16–27. https://doi.org/10.57113/his.v2i2.54

Leo, G. A. P., Wirianata, H., & Santosa, T. N. B. (2023). Analisis Pengaruh Curah Hujan Terhadap Produktivitas Kopi (Coffea Sp.) Kec. Gemawang, Kab. Temanggung, Jawa Tengah. *Agroforetech, 1*(01), 95–102. Retreived from: https://jurnal.instiperjogja.ac.id/index.php/JOM/article/view/342

Mabrur, I., & Agustina, A. (2025). Peran Media Sosial dalam Memediasi Pengaruh Literasi Digital terhadap Produktivitas Ekonomi Mahasiswa. *Jurnal Ulul Albab, 29*(1), 10. https://doi.org/10.31764/jua.v29i1.30313

Makyanie, Y. T. M., & Witjaksono, A. (2022). Strategi Literasi Digital Mendorong UMKM Elektronik Go Online. *Jurnal EMT KITA, 6*(2), 390–398. https://doi.org/10.35870/emt.v6i2.737

Mulyono, A. E., Apnitami, P., Wangi, I. S., Wicaksono, K. N. P., & Apriono, C. (2022). The potential of smart farming IoT implementation for coffee farming in Indonesia: a systematic review. *Green Intelligent Systems and Applications, 2*(2), 53-70. https://doi.org/10.53623/gisa.v2i2.95

Noprieka Suriadiman, Dwi Anindya Harimurti, & Andry. (2023). Pemanfaatan Literasi Digital Marketing Untuk Meningkatkan Umkm Penjualan Es Teh Anak Rantau Kota Pekanbaru. *Jdistira, 3*(2), 205–211. https://doi.org/10.58794/jdt.v3i2.600

Nurdyanto, S. D., Ismail, T., & Sapiri, M. (2024). Pengaruh Literasi Keuangan dan Literasi Digital Terhadap Kinerja UMKM Melalui Kemampuan Manajerial: Studi Kasus Kabupaten Mamuju Sulawesi Barat. *Al-Buhuts, 20*(1), 62–102. Retrieved from https://www.journal.iaingorontalo.ac.id/index.php/ab/article/view/4718

Nuritasi, F. (2013). Pengaruh Infrastruktur, PMDN Dan PMA Terhadap Produk Domestik Bruto Di Indonesia. *Economics Development Analysis Journal, 2*(4), 456–467. https://doi.org/https://doi.org/10.15294/edaj.v2i4.3213

Perdana, M. A. C., Sihombing, T. M., Chrisinta, D., Sahala, J., & Budaya, I. (2023). Pengaruh Dukungan Pemerintah, Infrastruktur, dan Akses Pasar terhadap Pertumbuhan Usaha Kewirausahaan di Wilayah Perkotaan. *Sanskara Ekonomi Dan Kewirausahaan, 1*(03), 149–161. https://doi.org/10.58812/sek.v1i03.121

Rahayu, Y., & Soleh, A. (2017). Pengaruh Pembangunan Infrastruktur Terhadap Pertumbuhan Ekonomi Provinsi Jambi (Pendekatan Fungsi Cobb Douglas). *Journal Development, 5*(2), 125–139. https://doi.org/10.53978/jd.v5i2.52

Regif, S. Y., Seran, M. S., Naif, I. Y., Pattipeilohy, A., & Saputri, L. (2023). Literasi Digital Ekonomi Hijau Terhadap Pemberdayaan UMKM Desa di Kabupaten Langkat. *Jurnal Ilmu Politik Dan Pemerintahan, 9*(1), 49–69. https://doi.org/10.37058/jipp.v9i1.6922

Rusdi, M. (2023). Pengaruh Index Pembangunan Manusia Terhadap Kemiskinan di Sulawesi Selatan. *Economics and Digital Business Review*, *4*(1), 971-981. https://doi.org/https://doi.org/10.37531/ecotal.v4i2.703

Sitorus, Y. M., & Yuliana, L. (2018). Penerapan Regresi Data Panel Pada Analisis Pengaruh Infrastruktur Terhadap Produktifitas Ekonomi Provinsi-Provinsi Di Luar Pulau Jawa Tahun 2010-2014. *Media Statistika, 11*(1), 1–15. https://doi.org/10.14710/medstat.11.1.1-15

Sombolayuk, W. (2023). Pengaruh Kebijakan Pemerintah Terhadap Kinerja Perusahaan Ukm. *Simak, 21*(01), 37–55. https://doi.org/10.35129/simak.v21i01.401

Sugihono, C., Hariadi, S. S., & Wastutiningsih, S. P. (2024). Digital literacy among agricultural extension agents in North Maluku, Indonesia. *Asian Journal of Agricultural Extension, Economics & Sociology, 42*(6), 417–429. https://doi.org/10.9734/ajaees/2024/v42i62504

Suhariyanti, Sabrina Aulia Rahmah, Andi Maysarah, & Dewi Wahyuni. (2024). Pemanfaatan Warung Kopi Dalam Meningkatkan Literasi Digital Di Desa Klambir Hamparan Perak. *Jurnal Pengabdian Masyarakat, 3*(1), 65–72. https://doi.org/10.70340/japamas.v3i1.129

Sunanto, S., Salim, S., & Rauf, A. W. (2019). Analisis Kesepakatan Peningkatan Produktivitas Kopi Arabika Pada Pengembangan Kawasan Di Kabupaten Toraja Utara. *Jurnal Sosial Ekonomi Pertanian, 15*(1), 42. https://doi.org/10.20956/jsep.v15i1.6369

Syofya, H., & Widayat, P. (2025). Faktor yang Mempengaruhi Produktivitas dan Kesejahteraan Petani Kopi di Provinsi Jambi. *Arus Jurnal Sosial dan Humaniora*, *5*(1), 927-936. https://doi.org/10.57250/ajsh.v5i1.1208

Wibawa, M. I., & Budiasa, I. G. S. (2018). Pengaruh Kebijakan Pemerintah, Partisipasi Masyarakat Dan Kewirausahaan Terhadap Kualitas Destinasi Wisata Pura Taman Ayun. *E-Jurnal Ekonomi Dan Bisnis Universitas Udayana, 6*, 1667. https://doi.org/10.24843/eeb.2018.v07.i06.p07

Widianti, H. (2021). Strategi Peningkatan Literasi Digital dalam Pembelajaran Matematika (Studi Kasus Peserta Didik di SMAN 1 Kertosono Kab. Nganjuk). *Jurnal Lentera: Kajian Keagamaan, Keilmuan Dan Teknologi, 20*(1), 101–114. https://doi.org/10.29138/lentera.v20i01.441