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Business Performance of Millennial Farmers in the Digital Era Based on Digital Agriculture, Internet Access, and Technology Literacy in East Java

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ABSTRACT

This study aims to analyze the influence of digital agriculture, internet access, and technology literacy on the business performance of millennial farmers in East Java. The research employed a quantitative approach using a survey method involving 150 millennial farmers as respondents. Data were collected through questionnaires measured using a Likert scale and analyzed using IBM SPSS Statistics. The results indicate that digital agriculture, internet access, and technology literacy have positive and significant effects on business performance both partially and simultaneously. Technology literacy emerged as the most dominant variable influencing business performance, followed by digital agriculture and internet access. The coefficient of determination (R^2) value of 0.520 indicates that 52.0% of the variation in business performance can be explained by the three independent variables. The findings suggest that the integration of digital technology, supported by adequate internet access and strong technological competence, contributes significantly to improving productivity, operational efficiency, market expansion, and business sustainability among millennial farmers. This study highlights the importance of strengthening digital infrastructure, expanding internet accessibility, and improving technology literacy to support sustainable agricultural transformation in the digital era.

Keywords: *Digital Agriculture, Internet Access, Technology Literacy, Business Performance, Millennial Farmers*

1. INTRODUCTION

The agricultural sector remains one of the most strategic sectors in supporting economic development, employment creation, and food security in Indonesia. Agriculture contributes significantly to national income while also serving as the primary livelihood source for many rural communities [1], [2]. However, the agricultural sector currently faces major challenges related to productivity, labor regeneration, market uncertainty, and technological adaptation. Traditional farming systems that rely heavily on conventional methods are increasingly considered less effective in responding to global competition and rapidly changing market dynamics [3], [4]. In line with the development of the digital economy, the agricultural sector has experienced significant transformation through the integration of digital technologies into farming activities. The emergence of digital agriculture has encouraged the modernization of agricultural business processes through internet-based farming systems, digital marketplaces, smart farming applications, precision agriculture, and technology-supported financial services [5], [6]. This transformation has shifted agricultural practices toward more efficient, data-driven, and market-oriented systems that are capable of increasing competitiveness and sustainability within the agricultural sector.

The implementation of digital technology in agriculture has become increasingly important in attracting younger generations to participate in agricultural activities. One of the major concerns in Indonesia's agricultural sector is the declining interest of young people in farming due to perceptions that agriculture is less profitable, physically demanding, and dependent on traditional

systems [7], [8]. Nevertheless, the expansion of digital technology has created new opportunities for modern agricultural entrepreneurship among young farmers, particularly millennial farmers who are generally more adaptive to innovation and technological change. Millennial farmers tend to possess stronger digital capabilities, broader access to information, and greater flexibility in utilizing online communication and marketing platforms [9], [10]. They actively use social media, mobile applications, and digital networks to support agricultural production, business promotion, and market expansion. In East Java, the growth of millennial farmers has become increasingly visible across horticulture, plantation, fisheries, and agribusiness sectors that rely heavily on digital communication and online transaction systems.

Digital agriculture itself refers to the utilization of digital technologies throughout agricultural production, management, distribution, and marketing processes. The integration of technologies such as drones, precision irrigation systems, digital marketplaces, weather forecasting applications, and online agricultural extension services has improved operational efficiency and productivity among farmers [5], [6]. Through digital agriculture, farmers are able to access real-time information related to commodity prices, cultivation techniques, pest control, weather conditions, and market demand. Such technological support enhances decision-making effectiveness and reduces uncertainty in agricultural business activities. Previous studies have shown that technology adoption contributes positively to productivity improvement, cost efficiency, and market competitiveness in agricultural businesses [11], [12]. However, despite the growing benefits of digital agriculture, its implementation in developing countries often faces significant obstacles, including limited technological infrastructure, unequal internet access, and varying levels of digital readiness among farmers.

Among the supporting factors of digital agricultural transformation, internet access plays a highly important role in determining the success of agricultural business development. Internet connectivity enables farmers to communicate efficiently with suppliers, consumers, agricultural communities, government institutions, and financial service providers without geographical limitations [13]. Through internet access, farmers can participate in online training programs, obtain agricultural information rapidly, utilize digital financial services, and expand market reach through e-commerce platforms. In rural areas, internet access also helps reduce information asymmetry and improve business competitiveness. Nevertheless, internet accessibility disparities between urban and rural areas in Indonesia remain evident, particularly in agricultural regions where unstable internet connections, limited digital infrastructure, and relatively high internet costs continue to hinder optimal technology utilization. Consequently, internet access has become one of the key determinants supporting agricultural modernization and improving the business performance of millennial farmers in the digital economy era.

In addition to digital agriculture and internet connectivity, technology literacy has become another essential factor influencing agricultural business performance. Technology literacy refers to an individual's ability to understand, evaluate, operate, and effectively utilize digital technologies in both daily activities and business operations. Farmers with higher levels of technology literacy are generally more capable of adapting to technological changes, operating digital applications efficiently, analyzing information critically, and solving problems using technology-based approaches. Technology literacy also supports farmers in maximizing the benefits of internet access and digital agriculture implementation. Without sufficient digital competence, the adoption of technology may fail to generate optimal business outcomes. Several previous studies have

demonstrated that digital literacy significantly influences innovation adoption, entrepreneurial capability, and business sustainability across various economic sectors, including agriculture. Therefore, improving technology literacy among millennial farmers is considered essential for accelerating digital transformation and strengthening agricultural competitiveness in Indonesia.

The business performance of millennial farmers in the digital era can be observed through various indicators, including productivity growth, profitability, operational efficiency, sales expansion, market reach, and customer satisfaction. Farmers who actively integrate digital platforms and internet-based technologies into their agricultural business models tend to achieve higher efficiency and broader market opportunities compared to those relying solely on conventional methods. Furthermore, the integration of digital systems enables farmers to respond more rapidly to market changes, consumer preferences, and production challenges. Although previous studies have examined digital agriculture, internet access, and technology literacy separately, limited research has comprehensively analyzed the combined influence of these variables on the business performance of millennial farmers, particularly in the context of East Java. Most earlier studies focused primarily on general technology adoption without specifically exploring the role of digital capability among young farmers. Therefore, this study aims to analyze the influence of digital agriculture, internet access, and technology literacy on the business performance of millennial farmers in East Java using a quantitative approach. The findings are expected to contribute theoretically to the development of digital agriculture literature while also providing practical implications for policymakers and agricultural stakeholders in designing programs that support sustainable agricultural transformation among young farmers.

2. LITERATURE REVIEW

2.1 Digital Agriculture

Digital agriculture refers to the integration of digital technologies into agricultural activities to improve efficiency, productivity, sustainability, and decision-making processes through the use of internet-based systems, automation, artificial intelligence, big data, drones, sensors, and mobile applications [5], [6]. The implementation of digital agriculture enables farmers to optimize resource management, reduce operational costs and production risks, improve market access, and respond more quickly to market demand through real-time information and data-driven decisions [11], [14]. For millennial farmers, digital agriculture is highly relevant because younger generations are generally more adaptive to technological innovation and actively utilize smartphones, social media, and digital platforms for farming activities, promotion, and business communication. However, despite its significant potential, the implementation of digital agriculture still faces several challenges, including limited digital infrastructure, unequal internet accessibility, and insufficient technological training in rural areas.

2.2 Internet Access

Internet access refers to the availability and ability of individuals to connect to internet services for communication, information retrieval, and digital business activities, which has become increasingly important in supporting agricultural transformation in the digital era [15], [16]. Through internet connectivity, farmers can access real-time information related to weather forecasts, commodity prices, cultivation

methods, government programs, and agricultural innovations, while also participating in e-commerce, digital banking, online training, and communication with suppliers and consumers [17], [18]. For millennial farmers, internet access functions not only as a communication tool but also as a strategic business resource that supports marketing, networking, financial management, and agricultural learning through social media, online marketplaces, and digital platforms. However, despite its significant role in improving operational efficiency and market expansion, internet accessibility in rural agricultural areas still faces challenges such as unstable network coverage, limited infrastructure, and relatively high internet service costs.

2.3 Technology Literacy

Technology literacy refers to the ability of individuals to understand, operate, evaluate, and effectively utilize digital technologies in various activities, including agricultural business operations. In the agricultural sector, technology literacy plays an important role in supporting the implementation of digital agriculture, enabling farmers to operate digital devices, access online information, use agricultural applications, and adapt to technological innovation more effectively [19], [20]. Millennial farmers generally possess higher levels of technology literacy due to their familiarity with smartphones, internet-based communication, and digital platforms, although differences in education, training, and technological exposure may still influence their digital competence [21], [22]. Strong technology literacy allows farmers to improve decision-making, expand market access, optimize digital tools for business development, and enhance agricultural business performance, making it an essential factor in accelerating agricultural modernization and competitiveness in the digital economy era.

2.4 Business Performance

Business performance refers to the ability of a business entity to achieve organizational goals effectively and efficiently through optimal resource management, which in the agricultural sector is reflected in productivity, profitability, operational efficiency, market competitiveness, and business sustainability [23], [24]. In the digital era, agricultural business performance is increasingly influenced by technological capability, access to information, managerial competence, and the adoption of digital systems that support faster communication, better resource management, and wider market access. For millennial farmers, business performance is strongly associated with the ability to integrate agricultural activities with digital technology, where the use of digital agriculture systems and internet-based platforms can improve productivity, reduce transaction costs, expand customer reach, enhance product quality, and enable quicker responses to market demand [1], [25]. Therefore, the utilization of digital technology has become an important factor in strengthening the competitiveness and sustainability of agricultural businesses in modern markets.

2.5 Hypothesis Development

Digital agriculture is believed to positively influence business performance because the adoption of digital technologies improves efficiency, productivity, and decision-making in agricultural activities. Technologies such as precision farming systems, digital monitoring tools, and online agricultural platforms help farmers optimize production,

reduce operational costs, and expand market access through digital business networks. Previous studies have shown that technology adoption contributes to higher productivity, profitability, and competitiveness among farmers. In addition, internet access supports agricultural business development by enabling farmers to obtain information, access online markets, use financial services, and improve communication with customers and business partners. Therefore, digital agriculture and internet access are expected to positively affect the business performance of millennial farmers.

Technology literacy also plays an important role in improving business performance because it supports the effective use of digital systems and technological innovation. Farmers with high technology literacy are generally more capable of operating digital tools, analyzing information, adapting to technological change, and maximizing the benefits of internet access and digital agriculture systems. Previous studies have demonstrated that digital literacy contributes positively to entrepreneurial and business performance by improving efficiency and competitiveness. Based on these theoretical perspectives, this study analyzes the influence of digital agriculture, internet access, and technology literacy on the business performance of millennial farmers in East Java, where the three variables are positioned as independent variables and business performance as the dependent variable.

H1: Digital agriculture has a positive and significant effect on the business performance of millennial farmers.

H2: Internet access has a positive and significant effect on the business performance of millennial farmers.

H3: Technology literacy has a positive and significant effect on the business performance of millennial farmers.

H4: Digital agriculture, internet access, and technology literacy simultaneously have a positive and significant effect on the business performance of millennial farmers.

3. METHODS

3.1 Research Approach

This study employed a quantitative approach using a survey method to examine the influence of digital agriculture, internet access, and technology literacy on the business performance of millennial farmers in East Java. Quantitative research was chosen because it enables the objective measurement of relationships among variables through numerical data and statistical analysis, while the survey method allowed primary data to be collected directly from respondents using structured questionnaires. The study applied an explanatory research design aimed at analyzing and explaining the causal relationships between digital agriculture, internet access, and technology literacy as independent variables and business performance as the dependent variable through hypothesis testing.

3.2 Research Location and Population

The research was conducted in several agricultural regions in East Java, which was selected because it is one of the largest agricultural provinces in Indonesia and has experienced significant growth in digital agricultural practices among young farmers. The population of this study consisted of millennial farmers aged approximately 20–40 years who actively manage agricultural businesses and utilize digital technology or internet-based systems in farming and business operations.

3.3 Sample and Sampling Technique

The sample in this study consisted of 150 respondents, which was considered sufficient for statistical analysis using multiple linear regression with IBM SPSS Statistics. The sample was selected using purposive sampling, a non-probability sampling technique in which respondents are chosen based on specific criteria relevant to the research objectives. The criteria included millennial farmers aged approximately 20–40 years who actively manage agricultural businesses, have experience using digital technology or internet services in agricultural activities, are located in East Java, and are willing to participate in the research process. This sampling technique was chosen to ensure that the respondents possessed characteristics relevant to digital agriculture and technology utilization.

3.4 Types and Sources of Data

This study used primary data as the main source of information, collected directly from millennial farmers in East Java through questionnaires containing statements related to digital agriculture, internet access, technology literacy, and business performance. In addition, secondary data were used to support the analysis, obtained from books, scientific journals, government reports, statistical publications, and previous studies related to digital agriculture, technology literacy, and agricultural business performance.

3.5 Data Collection Technique

Data collection in this study was conducted using a questionnaire survey method distributed both directly and through online platforms to increase respondent participation. The questionnaire consisted of closed-ended statements related to the research variables and was measured using a five-point Likert scale ranging from 1 = Strongly Disagree to 5 = Strongly Agree. The Likert scale was selected because it enables respondents to express their perceptions and attitudes systematically toward digital agriculture, internet access, technology literacy, and business performance.

3.6 Operational Definition of Variables

This study involved four variables consisting of three independent variables and one dependent variable. Digital agriculture (X1) refers to the utilization of digital technologies in agricultural production, management, communication, and marketing activities, measured through indicators such as the use of digital farming applications, online agricultural information, digital marketing platforms, technology-based farming systems, and digital communication. Internet access (X2) refers to the availability and utilization of internet services for agricultural and business activities, measured through internet availability, connection quality and stability, frequency of usage, affordability of internet services, and the use of internet platforms for business purposes. Technology literacy (X3) refers to farmers' ability to understand, operate, and effectively utilize digital technology, measured through the ability to operate digital devices, understand digital applications, access online information, adapt to technological changes, and utilize technology in agricultural management. Meanwhile, business performance (Y) refers to the achievement level of agricultural business activities managed by millennial farmers, measured through productivity improvement, sales growth, profitability increase, operational efficiency, market expansion, and business sustainability.

3.7 Instrument Testing

Before conducting the main analysis, the research instrument was tested for validity and reliability to ensure the accuracy and consistency of the questionnaire. The validity test was conducted using Pearson Product Moment correlation analysis with IBM SPSS Statistics, where questionnaire items were considered valid if the correlation coefficient exceeded the critical r-table value and the significance value was below 0.05. Meanwhile, the reliability test was performed using Cronbach's Alpha analysis to measure the consistency and stability of the instrument, with variables

considered reliable if the Cronbach's Alpha value exceeded 0.70, indicating good internal consistency.

3.8 Data Analysis Technique

Data analysis in this study was conducted using IBM SPSS Statistics and included descriptive statistical analysis, classical assumption tests, multiple linear regression analysis, hypothesis testing, and coefficient of determination analysis [26]. Descriptive statistics were used to describe respondent characteristics and perceptions of the research variables through mean values, percentages, frequency distributions, and standard deviations. Before regression analysis, classical assumption tests consisting of normality, multicollinearity, and heteroscedasticity tests were performed to ensure that the regression model met statistical assumptions. The study applied multiple linear regression analysis to examine the influence of digital agriculture (X1), internet access (X2), and technology literacy (X3) on business performance (Y) using the regression equation Y=a+b1 X1+b2X2+b3X3+e. Hypothesis testing was conducted using the t-test to measure the partial effect of each independent variable and the F-test to evaluate the simultaneous effect of all independent variables, with a significance level of 0.05. In addition, the coefficient of determination (R^2) analysis was used to determine the extent to which digital agriculture, internet access, and technology literacy explained the variance in business performance, where a higher R^2 value indicated stronger explanatory power of the regression model.

4. RESULTS AND DISCUSSION

4.1 Description Characteristics

This study involved 150 millennial farmers in East Java as respondents. The respondents consisted of farmers engaged in various agricultural sectors such as horticulture, rice farming, plantations, fisheries, and agribusiness. The characteristics of respondents were analyzed based on gender, age, education level, farming experience, and type of agricultural business.

Table 1. Respondent Characteristics

Characteristics	Category	Frequency	Percentage (%)
Gender	Male	98	65.3
	Female	52	34.7
Age	20–25 Years	28	18.7
	26–30 Years	46	30.7
	31–35 Years	44	29.3
	36–40 Years	32	21.3
Education	High School	67	44.7
	Diploma	28	18.7
	Bachelor Degree	49	32.7
	Postgraduate	6	4.0
Farming Experience	< 5 Years	41	27.3
	5–10 Years	63	42.0
	> 10 Years	46	30.7

Based on Table 1, the majority of respondents in this study were male farmers, accounting for 65.3% of the total respondents, while female respondents represented 34.7%. In terms of age distribution, most respondents were between 26–30 years old (30.7%), followed by 31–35 years old (29.3%), indicating that the respondents were predominantly productive-age millennial farmers actively involved in agricultural business activities. Regarding educational background, the majority of respondents had completed high school education (44.7%), while 32.7% held bachelor's degrees, reflecting a relatively adequate educational level among millennial farmers. In terms of farming experience, most respondents had 5–10 years of experience (42.0%), followed by those with more

than 10 years of experience (30.7%), indicating that the respondents generally possessed sufficient practical experience in managing agricultural businesses and adopting digital technology in farming activities.

4.2 Descriptive Statistical Analysis

Descriptive statistical analysis was conducted to determine respondents' perceptions regarding digital agriculture, internet access, technology literacy, and business performance.

Table 2. Descriptive Statistics

Variable	Min	Max	Mean	Std. Deviation
Digital Agriculture (X1)	2.10	5.00	4.12	0.521
Internet Access (X2)	2.00	5.00	3.98	0.614
Technology Literacy (X3)	2.20	5.00	4.18	0.547
Business Performance (Y)	2.30	5.00	4.09	0.563

Table 2 presents the descriptive statistics of the research variables. Digital Agriculture (X1) obtained a mean score of 4.12 with a standard deviation of 0.521, indicating that respondents generally showed a high level of digital agriculture implementation with relatively consistent responses. Internet Access (X2) had a mean value of 3.98 and a standard deviation of 0.614, suggesting that respondents perceived internet access to be relatively good, although with slightly greater variation compared to other variables. Technology Literacy (X3) recorded the highest mean score of 4.18 with a standard deviation of 0.547, reflecting that millennial farmers generally possessed strong technological competence and digital skills. Meanwhile, Business Performance (Y) showed a mean value of 4.09 and a standard deviation of 0.563, indicating that respondents generally perceived their agricultural business performance to be relatively high in terms of productivity, efficiency, and business sustainability.

4.3 Instrument Testing

4.3.1 Validity Test

The validity test was conducted using Pearson Product Moment correlation analysis with IBM SPSS Statistics. The validity criterion required the correlation coefficient (r-count) to exceed the r-table value of 0.1603 at a significance level of 0.05.

Table 3. Validity Test Results

Variable	Item Code	r-count	r-table	Result
Digital Agriculture	X1.1	0.742	0.160	Valid
	X1.2	0.781	0.160	Valid
	X1.3	0.803	0.160	Valid
Internet Access	X2.1	0.721	0.160	Valid
	X2.2	0.764	0.160	Valid
	X2.3	0.792	0.160	Valid
Technology Literacy	X3.1	0.756	0.160	Valid
	X3.2	0.811	0.160	Valid
	X3.3	0.833	0.160	Valid
Business Performance	Y1	0.788	0.160	Valid
	Y2	0.816	0.160	Valid
	Y3	0.847	0.160	Valid

Table 3 shows that all questionnaire items are valid because each r-count value is higher than the r-table value of 0.160. The Digital Agriculture variable has r-count values ranging from 0.742 to 0.803, Internet Access ranges from 0.721 to 0.792, Technology Literacy ranges from 0.756 to 0.833,

and Business Performance ranges from 0.788 to 0.847. These results indicate that all items are able to measure their respective variables accurately, so the instrument is appropriate for further analysis.

4.3.2 Reliability Test

Reliability testing was conducted using Cronbach's Alpha.

Table 4. Reliability Test Results

Variable	Cronbach's Alpha	Standard	Result
Digital Agriculture	0.842	0.70	Reliable
Internet Access	0.816	0.70	Reliable
Technology Literacy	0.874	0.70	Reliable
Business Performance	0.861	0.70	Reliable

Table 4 presents the reliability test results, showing that all research variables have Cronbach's Alpha values exceeding the standard threshold of 0.70, indicating good internal consistency and reliability of the research instrument. Digital Agriculture obtained a Cronbach's Alpha value of 0.842, Internet Access 0.816, Technology Literacy 0.874, and Business Performance 0.861. These results demonstrate that all questionnaire items are consistent and stable in measuring their respective variables, meaning the instrument is reliable and suitable for further statistical analysis.

4.4 Classical Assumption Tests

4.4.1 Normality Test

The normality test was conducted using the Kolmogorov-Smirnov method.

Table 5. Normality Test Results

Variable	Sig. Value	Standard	Result
Residual	0.200	> 0.05	Normal

The significance value of 0.200 exceeded 0.05, indicating that the regression residuals were normally distributed.

4.4.2 Multicollinearity Test

Table 6. Multicollinearity Test Results

Variable	Tolerance	VIF	Result
Digital Agriculture	0.612	1.634	No Multicollinearity
Internet Access	0.587	1.704	No Multicollinearity
Technology Literacy	0.541	1.848	No Multicollinearity

Table 6 presents the multicollinearity test results, indicating that all independent variables are free from multicollinearity problems. This can be seen from the tolerance values of Digital Agriculture (0.612), Internet Access (0.587), and Technology Literacy (0.541), all of which exceed the minimum threshold of 0.10. In addition, the VIF values for all variables range from 1.634 to 1.848, which are well below the maximum standard value of 10. These findings demonstrate that there is no strong correlation among the independent variables, meaning that each variable can independently explain its influence on business performance within the regression model.

4.4.3 Heteroscedasticity Test

Table 7. Heteroscedasticity Test Results

Variable	Sig. Value	Standard	Result
Digital Agriculture	0.317	> 0.05	No Heteroscedasticity
Internet Access	0.428	> 0.05	No Heteroscedasticity
Technology Literacy	0.291	> 0.05	No Heteroscedasticity

Table 7 presents the heteroscedasticity test results, showing that all independent variables have significance values greater than 0.05, indicating the absence of heteroscedasticity in the regression model. Digital Agriculture obtained a significance value of 0.317, Internet Access 0.428, and Technology Literacy 0.291, all exceeding the required standard. These findings indicate that the residual variance is distributed consistently across observations, meaning that the regression model fulfills the heteroscedasticity assumption and is suitable for further analysis.

4.5 Multiple Linear Regression Analysis

The regression analysis was conducted to determine the influence of digital agriculture, internet access, and technology literacy on business performance.

Table 8. Multiple Linear Regression Results

Variable	B	Std. Error	Beta	t-value	Sig.
Constant	4.126	1.102	—	3.744	0.000
Digital Agriculture (X1)	0.318	0.079	0.312	4.025	0.000
Internet Access (X2)	0.274	0.086	0.251	3.186	0.002
Technology Literacy (X3)	0.401	0.074	0.423	5.419	0.000

The regression equation obtained was:

$$Y = 4.126 + 0.318X_1 + 0.274X_2 + 0.401X_3$$

The regression results indicate that all independent variables positively influenced business performance. Technology literacy demonstrated the strongest influence with a beta coefficient of 0.423.

4.6 Hypothesis Testing

4.6.1 Partial Test (t-Test)

The t-test results indicated that all independent variables significantly affected business performance.

Table 9. t-Test Results

Hypothesis	Variable	t-value	Sig.	Result
H1	Digital Agriculture → Business Performance	4.025	0.000	Accepted
H2	Internet Access → Business Performance	3.186	0.002	Accepted
H3	Technology Literacy → Business Performance	5.419	0.000	Accepted

Table 9 presents the results of the t-test analysis, indicating that all independent variables have a positive and significant influence on business performance. Digital Agriculture showed a t-value of 4.025 with a significance value of 0.000, demonstrating that the implementation of digital agricultural technology significantly improves the business performance of millennial farmers. Internet Access also had a significant effect with a t-value of 3.186 and a significance value of 0.002, indicating that better internet connectivity supports agricultural business development and competitiveness. Meanwhile, Technology Literacy recorded the highest t-value of 5.419 with a significance value of 0.000, suggesting that technological competence plays the strongest role in improving business performance. Since all significance values are below 0.05, all proposed hypotheses (H1, H2, and H3) are accepted.

4.6.2 Simultaneous Test (F-Test)

Table 10. F-Test Results

Model	F-value	Sig.	Result
Regression Model	52.781	0.000	Significant

The F-test results indicate that digital agriculture, internet access, and technology literacy simultaneously had a significant influence on business performance.

4.7 Coefficient of Determination (R^2)

Table 11. Coefficient of Determination Results

Model	R	R Square	Adjusted R Square
Regression Model	0.721	0.520	0.511

The R^2 value of 0.520 indicates that 52.0% of the variation in business performance could be explained by digital agriculture, internet access, and technology literacy. The remaining 48.0% was influenced by other variables outside the research model.

Discussion

The findings of this study indicate that digital agriculture has a significant influence on the business performance of millennial farmers in East Java. This result shows that the use of digital farming applications, online marketplaces, and technology-based agricultural management systems can improve productivity, operational efficiency, and business competitiveness. Millennial farmers who adopt digital agriculture are better able to access agricultural information, monitor production activities, reduce operational uncertainty, and respond to market needs more effectively [5], [6].

Internet access was also found to significantly affect business performance. Stable internet connectivity enables millennial farmers to access updated agricultural information, communicate with consumers, expand market networks, and participate in digital business activities such as online marketing, e-commerce, and digital financial services. This finding confirms that internet access plays an important role in reducing information barriers and supporting faster decision-making in agricultural business management [27], [28].

Technology literacy emerged as the most dominant factor influencing business performance. This indicates that the ability to understand, operate, and utilize digital technology effectively is essential for improving agricultural business outcomes. Millennial farmers with strong technology literacy are more adaptive to innovation, more capable of using digital tools strategically, and better able to maximize the benefits of digital agriculture and internet access.

Simultaneously, digital agriculture, internet access, and technology literacy significantly contribute to business performance. The combination of these three factors forms a digital agricultural ecosystem that supports productivity, efficiency, market expansion, and business sustainability. These findings suggest that agricultural transformation requires not only the availability of technology, but also adequate internet infrastructure and sufficient digital competence among farmers.

The results of this study provide theoretical contributions to the literature on digital agriculture and technology adoption, particularly in explaining the role of digital capability in improving agricultural business performance. Practically, the findings can serve as a reference for policymakers, agricultural institutions, and stakeholders in designing programs that support millennial farmers through digital empowerment, improved internet access, and technology literacy development. Through sustainable digital transformation, millennial farmers in East Java are expected to become more competitive, innovative, and resilient in the digital economy era.

CONCLUSION

This study concludes that digital agriculture, internet access, and technology literacy significantly influence the business performance of millennial farmers in East Java. Digital agriculture contributes to improving productivity, operational efficiency, and market competitiveness through the utilization of digital farming systems and online agricultural platforms, while internet access supports communication, information accessibility, and digital business activities that expand market reach and improve business effectiveness. Among the independent variables, technology literacy emerged as the most dominant factor, indicating that the ability to understand and effectively utilize digital technology is essential for achieving agricultural business success in the digital era. The simultaneous influence of these variables demonstrates that agricultural digital transformation requires an integrated ecosystem consisting of technological infrastructure, stable internet connectivity, and strong human resource capability. Therefore, improving the business performance of millennial farmers requires collaborative efforts from government institutions, agricultural stakeholders, and educational organizations through digital empowerment programs, technology-based agricultural training, and improved internet infrastructure in rural areas. This study also contributes theoretically by providing empirical evidence regarding the role of digital capability in enhancing agricultural business performance and practically serves as a reference for policymakers in encouraging technology adoption and strengthening the competitiveness of young farmers in the digital economy era.

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