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Digital Marketing In Agriculture: Perception And Decision Making Of Apple Farmers In Bumiaji, Batu City

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ABSTRACT

The difference in farmers' perceptions of using digital marketing as a marketing strategy indicates that not all farmers share the same views, understanding, and readiness to adopt such technology. This study aims to analyze the perceptions of farmers who use and do not use digital marketing, and to examine the factors influencing farmers' decision-making in adopting digital marketing. The research was conducted in Tulungrejo Village, Bumiaji District, Batu City. The research method used was a quantitative approach. The sample consisted of 90 farmers, divided into two categories: 54 farmers who use digital marketing and 34 who do not. The first objective was analyzed using descriptive quantitative analysis with a Likert scale, while the second objective was examined using binary logistic regression. The results showed that farmers' perception of digital marketing scored an average of 4.15, categorized as high. The variables of age, motivation, social support, and access to technology significantly influenced farmers' decisions to use digital marketing, each with a significance value below 0.05. Meanwhile, the variables of education level, farming duration, farming experience, cost, and resource availability did not significantly affect the decision to use digital marketing.

1. Introduction

The Tulungrejo Village, located in Bumiaji District, Batu City, is one of the main apple-producing centers in Indonesia. Beyond its vast apple orchards and the growing agro-tourism sector, farmers in this village face significant challenges in marketing their products in the digital era. Many still rely on traditional methods such as selling through intermediaries or local markets, while opportunities in digital marketplaces are increasingly open. This raises an important question: what factors drive or hinder apple farmers in adopting digital marketing to improve the competitiveness of their products.

Several previous studies in Batu City have highlighted the factors influencing farmers' decision-making. For instance, Talitakum *et al*. (2025) examined farmers' decisions to shift from apple to citrus farming in Bulukerto Village, Bumiaji, revealing that economic, social, and environmental factors play critical roles in shaping farming strategies. Similarly, Azmi, Hadiguna, and Jonrinaldi (2025) emphasized the importance of supply chain innovation and direct marketing in horticultural commodities, which is relevant to understanding how digital marketing can extend traditional marketing systems.

Research on digital technology adoption in agriculture has shown diverse results. A Hu *et al*. (2024) meta-analysis found that the adoption rate of agricultural digital technologies remains at only around 39%, with key determinants including age, education, and income. A study in China identified 19 factors influencing digital adoption, spanning social, psychological, institutional, and agro-ecological dimensions (Zhou *et al*., 2023). Meanwhile, research in the United States highlighted perceived profitability, trust in technology, and extension services as critical factors driving farmers' digital innovation adoption (Wolfert *et al*., 2024).

The rapid advancement of information technology has significantly transformed the business landscape, including the agricultural sector. As part of the fruit farming community, Apple farmers are now facing various challenges in marketing their products in the digital era. Increasing competition, market price fluctuations, and rising consumer demands have prompted apple farmers to seek innovations in their marketing strategies. Digital marketing has emerged as a promising solution to address these challenges, enabling farmers to reach broader markets, increase the added value of their products, and build stronger relationships with consumers. According to the American Marketing Association (AMA), digital marketing is a set of activities, institutions, and processes supported by digital technology to create, communicate, and deliver value to consumers and other stakeholders (Kannan, 2016). Digital marketing is a strategy to promote products or services by utilizing digital technologies such as the internet, social media, search engines, email, and mobile devices (Utami *et al*., 2020). Social media has become one of the most commonly used elements of digital marketing, with platforms such as Instagram, TikTok, YouTube, WhatsApp Business, and e-commerce platforms like Shopee and Tokopedia being widely used for product promotion (Mia Nurmiarani *et al*., 2023).

The development of digital technology has driven transformation in agricultural marketing systems, including in apple commodities. E-commerce usage in Indonesia continues to grow, with more than 58 million users in 2023 and projected to reach 99 million by 2029. This trend presents a significant opportunity for farmers to utilize digital platforms to expand market reach and increase income. A study by Toruan (2023) noted that nearly 60% of consumers have tried purchasing fresh products online, while Ormsley (2017) and Sulistyani & Pratama (2020) emphasized that social media can strengthen the relationship between farmers and consumers, and serve as a tool for product and agro-tourism promotion.

On the other hand, apple farmers in Tulungrejo Village, the largest apple production center in Batu City, face challenges such as limited land, price volatility, and dependence on conventional distribution channels (BPP Bumiaji, 2021). Innovation through digital marketing has become a potential solution, yet its implementation remains uneven. Younger farmers tend to be more open to digital technologies. In comparison, older farmers often stick to traditional methods due to limited digital literacy, lack of access to technology, and concerns about the risks of online transactions. This is consistent with the Diffusion of Innovations Theory (Rogers, 2003) and findings by Sihombing *et al*. (2024), which show that age and farming experience influence technology adoption.

In this context, perception plays a crucial role in farmers' decision-making regarding digital marketing. Based on the Technology Acceptance Model (TAM) by Davis (1989), perceived usefulness and ease of technology shape attitudes and adoption intentions. This study adopts a comprehensive approach that includes technological, psychological, and social factors such as age, education, experience, motivation, access to technology, and social support to examine farmers' perceptions and decision-making regarding digital marketing. The

novelty of this study lies in its focus on millennial horticultural farmers in Indonesia and the specific application of the TAM framework, which has received limited attention in previous literature.

This study aims to analyze the perceptions and factors influencing apple farmers' decisions to adopt digital marketing in Tulungrejo Village, Bumiaji District, Batu City. This research considers various aspects, including farmers' perceptions of the usefulness and ease of using digital technology and internal and external factors affecting their decisions, such as age, education, experience, access to technology, motivation, and social support. The findings are expected to provide a more comprehensive understanding of farmers' readiness and barriers to adopting digital marketing as a marketing strategy.

2. Methodology

This research was conducted in Tulungrejo Village, Bumiaji District, Batu City. The research location was determined purposively, considering that Tulungrejo Village is one of the largest apple production centers in Batu City, with a high number of apple farmers totaling 938 individuals (BPP Bumiaji, 2022). Additionally, some farmers in this village have started utilizing digital marketing in their agricultural marketing activities, using social media platforms such as Instagram, Facebook, WhatsApp Business, and e-commerce platforms. The area's good accessibility and the diverse characteristics of farmers in terms of technology adoption further supported the selection of this location.

The population in this study included all apple farmers in Tulungrejo Village, Bumiaji District, Batu City, totaling 938 individuals. This population consisted of farmers who use digital marketing and those who do not. According to Sugiyono (2019), a sample is a subset of the population with specific characteristics that can represent the whole and serve as the data source in the research. The sampling technique used in this study was probability sampling with the cluster random sampling method. This technique involves dividing the population into several groups or clusters and selecting samples randomly from each cluster. The clusters in this study were divided based on digital marketing usage: users and non-users. Based on a preliminary survey conducted by the researcher, the population was divided into two groups, and samples were taken proportionally from each group.

$$
\begin{aligned}
n &= \frac{N}{1+N\,(e)^2} \\
&= \frac{938}{1+938\,(0{,}1)^2} \\
&= \frac{938}{10{,}38} \\
&= 90{,}3 \\
n &= 90
\end{aligned}
$$

Keterangan:
n = Sample
N = Population
e = 10%

The total sample was divided into two categories: farmers using digital marketing and those not. Based on the proportion, 60% of the sample consisted of digital marketing users, amounting to 54 apple farmers, while 40% were non-users, totalling 36 apple farmers from Tulungrejo Village, Bumiaji District, Batu City.

This study used a quantitative descriptive method to describe the perceptions of apple farmers regarding digital marketing and to analyze the factors influencing their decision-

making in adopting digital marketing in Tulungrejo Village. The data used in this study included both primary and secondary data. Primary data were obtained through direct observation, interviews, and questionnaire distribution to apple farmers as research respondents. Secondary data were collected from various sources such as government reports, books, scientific journals, and other relevant documents related to the research topic.

Data analysis in this study was conducted in two stages. First, quantitative descriptive analysis measured and described farmers' perceptions of digital marketing use. These perceptions were measured using specific indicators through a questionnaire instrument based on a Likert scale. Each item in the questionnaire provided five response options indicating the respondent's level of agreement. The collected perception data were then tested for validity and reliability, followed by calculating average scores and classifying perception categories based on score intervals, such as very high, high, moderate, low, and very low.

Table 1. Score Interval Category

Interval Skor	Kriteria
0,6 – 1,4	Very Low
1,5 – 2,3	Low
2,4 – 3,2	Moderate
3,3 – 4,1	High
4,2 - 5	Very High

2.1 Binary Logistic Regression Analysis

This method is a statistical analysis technique used to examine the relationship between dependent variables that have two or more categories and one or more categorical independent variables (Hosmer, 2012). In other words, binary logistic regression analysis identifies the relationship between dependent and independent variables, where the dependent variable is categorical:

2.1.1 *Model Formation*

The initial stage carried out in binary logistic regression is the formation of a logistic regression model which takes the following form:

$$x = \frac{exp\ (g(x))}{1\ +\ exp\ (g(x))}$$

$g(x) = \beta_{\circ} + \beta 1x1 + \beta 2x2 + \beta 3x3 + \beta 4x4 + \beta 5x5 + \beta 6x6 + \beta 7x7 \ldots.$

Information:

$g(x)$ = Logic μ (x)
$\beta_{\circ}$ = Regression parameter estimation
$\beta 1 \ldots\ldots \beta 7$ = Estimation of parameter values or regression coefficients
$x1 \ldots\ldots x7$ = Independent variables
$x1$ = Age
$x2$ = Education Level
$x3$ = Years of Farming Experience
$x4$ = Access to Technology
$x5$ = Social Support
$x6$ = Motivation
$x7$ = Availability of Resources

2.1.2 *Goodness of Fit Testing*

The Goodness of Fit test is used to determine whether the model used in the research is appropriate to explain the use of digital marketing in marketing activities.

H0: The model formed is fit (there is no difference between the observation results and the model prediction results).

H1: The model formed is not fit (there is a difference between the observation results and the model prediction results).

2.1.3. *Simultaneous Parameter Testing*

Simultaneous test is used to simultaneously test independent variables against the dependent variable by calculating the G test statistic value. The following are the hypotheses used:

H0: $\beta 0 = \beta 1 = \beta 2 = \beta 3 = \beta 4 = \beta 5 = \beta 6 = \beta 7 = 0$ (There is no simultaneous influence of independent variables on the use of digital marketing).

H1: There is at least one $\beta j \neq 0$ (there is at least one independent variable that significantly affects the value of digital marketing use).

2.1.4 *Partial Parameter Testing*

Partial testing is used to test the influence of each independent variable on the dependent variable. The following hypotheses are used:

H0: $\beta j = 0$ (There is no significant influence between the independent variables on the use of digital marketing).

H1: $\beta j \neq 0$ (There is a significant influence between the independent variables on the use of digital marketing) $j = 1,2,3,4,5,6,7$

2.1.5 *Odds Ratio*

The odds ratio is a measure to see the level of tendency of the independent variable towards the dependent variable. The odds ratio value is the value of exp (βj) on the independent variable that significantly influences the use of digital marketing during marketing. If the βj value is greater, the level of tendency of the independent variable is higher towards the use of digital marketing during marketing.

3. Results and Discussion

3.1 Farmers' Perceptions of the Usefulness of Digital Marketing

Farmers' perceptions of the use of digital marketing were analyzed based on the Technology Acceptance Model (TAM), which includes four main aspects: Perceived Usefulness, Perceived Ease of Use, Attitude towards Using, and Acceptance. This model is used to understand how farmers' perceptions can influence their decisions in adopting digital marketing technology in farming activities. This perception measurement was carried out on all farmers, both those who have used and those who have not used digital marketing in their agricultural product marketing activities. In this section, the author explains the research results that have been carried out thoroughly and clearly. The explanation in this section can be a narrative with a combination of tables, graphs, or figures to be more informative. Research results must be able to answer the research objectives in the introduction.

Table 2. Farmers' Perceptions of the Usefulness of Digital Marketing

No	Variable	Average Score	Criteria
1.	Perceived Usefulness	4,229	Very High
2.	Perceived Ease of Use	4,095	High
3.	Attitude towards Using	4,135	High
4.	Acceptance	4,127	High

Source: Primary Data (2025)

Based on the study's results on farmers' perceptions regarding digital marketing, the average score obtained was 4.127, categorized as high. This indicates that, in general, farmers have a positive perception of the use of digital marketing in their agricultural activities. The "very high" rating of Perceived Usefulness shows that farmers experience tangible benefits from digital marketing, such as expanded market reach, promotional efficiency, and potential income increase. Meanwhile, the "high" score in Perceived Ease of Use suggests that farmers generally find digital platforms relatively easy to learn and operate, although some still require technical assistance. A positive attitude reflected in the Attitude Toward Using variable indicates farmers' intense interest and tendency to utilize this technology for marketing. This is further reinforced by the high score in Acceptance, indicating that farmers are generally willing to adopt and integrate digital marketing into their agricultural marketing strategies.

Apple farmers in Tulungrejo Village show a very positive perception toward the usefulness of digital marketing in their farming enterprises. They recognize the real benefits of technology in promoting products, building brand identity, expanding market reach, and improving communication with consumers. Many farmers reported increased orders, customers from outside the city, and reduced dependency on intermediaries after using platforms such as WhatsApp Business, Shopee, Instagram, TikTok, and Google Maps. Their understanding of digital marketing's usefulness also includes its role in identifying consumer preferences and targeting promotional strategies more effectively. This reflects that farmers do not merely use technology as a supplementary tool but consider it a strategic asset to enhance profitability. In the Technology Acceptance Model (TAM) framework, this aligns with the concept of perceived usefulness as a crucial factor in shaping behavioral intention and sustained use. Studies by Juswadi *et al*. (2020) and Sasmita *et al*. (2024) also support that perceptions of the usefulness of digital marketing significantly influence efficiency and productivity, especially in horticultural agriculture.

In terms of Perceived Ease of Use, farmers found digital marketing to be user-friendly, even among those with limited formal education. This is evident from their ability to use various features such as WhatsApp Business catalogs, social media uploads, marketplace order tracking, and business location registration on Google Maps. This perceived ease is crucial in building farmers' confidence to adopt the technology independently. Nevertheless, some obstacles remain, such as poor internet access and psychological pressure due to a lack of experience. However, overall, the user-friendliness of technology has paved the way for broader adoption. This aligns with Davis's (1989) TAM model, where perceived ease of use is a key determinant of technology acceptance. Research by Baliawan *et al*. (2024) and Putri *et al*. (2024) concludes that ease of use encourages farmers to integrate digital marketing into their marketing strategies.

Farmers expressed enjoyment, confidence, and a preference for digital marketing over conventional methods. They believe that the technology is effective and capable of addressing marketing challenges. This attitude is shaped not only by personal belief but also by social influences, such as peer recommendations and the success stories of other farmers. These findings are consistent with TAM, which states that positive attitudes are a critical prerequisite for technology adoption. Studies by Yulida *et al*. (2023) and Nurcahyo *et al*. (2025) affirm that attitudes shaped by positive experiences and successful examples can significantly drive technology adoption in the agricultural sector. The Acceptance variable demonstrates that apple farmers are highly committed to adopting digital marketing. All indicators scored above 3.90, with the highest at 4.30 for the statement regarding the willingness to share positive experiences with fellow farmers. This reflects acceptance and an active role in promoting the benefits of digital marketing within their community. Their commitment is evident in their intention to continue using, learning, and recommending this technology. This high level of acceptance indicates strong confidence in the effectiveness of digital marketing in boosting sales. Once again, TAM is relevant here, as perceived usefulness and ease of use influence technology acceptance. Studies by Rupnik (2024) and Bashiru *et al*. (2024) show that high acceptance levels correlate with the sustainable use of digital technologies, particularly when supported by economic benefits and social influence.

These findings are consistent with Davis's (1989b) theory, which posits that perceived usefulness and ease of use are critical in shaping attitudes and levels of technology acceptance. They also align with the findings of Wong *et al*. (2021), who showed that in digital agriculture, perceptions of usefulness and ease of use are essential in driving technology adoption among farmers, especially in developing countries. Given this study's high level of perception, the potential for expanding digital marketing among farmers is highly promising, particularly when supported by accessible and appropriate training and technological support.

3.2 Factors Influencing Farmers on the Use of Digital Marketing

Binary logistic regression is a form of regression used to determine the influence and relationship of independent variables with dependent variables, where the dependent variable is binary. This study used binary logistic regression analysis because the study had two decision-making processes: using digital marketing (Y=1) and not using digital marketing (Y=0). The independent variables in this study included age (X1), education level (X2), years of farming (X3), access to technology (X4), social support (X5), motivation (X6), and resource availability (X7).

3.2.1 Model Development

The regression model obtained from the binary logistic regression analysis regarding the factors influencing farmers' decision-making regarding digital marketing is as follows:

$g(x) = \beta_{\circ} + \beta 1x1 + \beta 2x2 + \beta 3x3 + \beta 4x4 + \beta 5x5 + \beta 6x6 + \beta 7x7$ ….

$g(x) = -18{,}994 + 0{,}161x1 + 1{,}214x2 + 0{,}081x3 + 1{,}046x4 + 0{,}199x5 + 1{,}533x6 + 3{,}238x7$

Interpretation of the Model Results:

The constant value (B) of -18.994 indicates that when all independent variables are equal to zero, the likelihood (logit) of farmers adopting digital marketing is extremely low. This highly negative constant suggests that digital marketing adoption will not occur automatically without supporting factors such as motivation, access to technology, and availability of resources. A study by Prasetyo and Rahmawati (2024), which examined the adoption of e-marketing by horticultural farmers in Central Java, revealed that in the absence of digital

infrastructure and technical training, most farmers remain reluctant to utilize digital media in their marketing activities. They emphasized that combining internal and external factors greatly influences the successful adoption of technology.

The age variable (X1) significantly influences the decision to adopt digital marketing, with a significance value of 0.020 and a negative regression coefficient of -0.161. This indicates that the older the farmer, the lower the likelihood of adopting digital marketing. This finding reflects field observations, where most digital marketing users are young farmers within the productive age range of 19-44 years, while older farmers rely on conventional methods. This aligns with the findings of Kurniawan and Prabowo (2023), who stated that younger generations are more open to digital innovations in the agricultural sector than older farmers. Theoretically, this supports Rogers' (2003) Diffusion of Innovation theory, which identifies age as one of the individual characteristics influencing innovation adoption.

The education level variable (X2) shows a positive regression coefficient of 1.214 but is not statistically significant (p-value = 0.154). This suggests that although farmers with higher education levels may be more open to technology, formal education alone does not significantly determine the decision to adopt digital marketing. In practice, many farmers with secondary education (junior and senior high school) are capable and active digital users, while some university graduates still prefer traditional marketing approaches. This indicates that formal education alone is insufficient without motivation and technological support. This finding is consistent with Sulaiman *et al*. (2022), who argued that practical digital skills and motivation play a more decisive role in technology adoption than formal educational attainment.

The farming experience variable (X3) also shows no significant influence on digital marketing usage, with a coefficient of 0.081 and a significance value of 0.387. This implies that long or short farming experience does not determine digital marketing adoption. Field data indicate that some younger farmers with less than 10 years of experience are more active in using digital marketing compared to more senior farmers. This reinforces that farming experience does not automatically correlate with technological adoption. A study by Hendra *et al*. (2025) supports this result, suggesting that farming experience does not significantly influence the intention to adopt digital technology unless supported by adequate training and access to information.

The technology access variable (X4) has a coefficient of 1.046 and a significance value of 0.125, indicating it is not statistically significant. However, the results suggest that easier access to digital devices and internet connectivity can encourage digital marketing usage. In practice, not all farmers with smartphones and internet access utilize them optimally for marketing. Some farmers can access these technologies, but do not actively promote their products online. Aziz *et al*.'s (2024) study in Malaysia also found that access to technology must be accompanied by digital literacy to encourage effective utilization.

The social support variable (X5), which reflects encouragement from family, peers, or farmer groups, also does not significantly influence the decision to use digital marketing, with a coefficient of 0.199 and a significance value of 0.747. This indicates that while social support may be present, it is insufficient to drive adoption without strong personal motivation or adequate technical assistance. This result is consistent with the findings of Handayani *et al*. (2016), who concluded that social support only has a significant impact when accompanied by training and technical assistance.

The motivation variable (X6) shows a significant influence, with a regression coefficient of 1.533 and a significance value of 0.045. This means that the higher the farmer's motivation,

the greater the likelihood of adopting digital marketing. Such motivation may arise from increasing income, expanding market reach, or aligning with modern agricultural marketing trends. This finding is supported by the Self-Determination Theory of Deci & Ryan (2000), which emphasizes the importance of intrinsic motivation in technology-related decision-making. Furthermore, research by Wijaya *et al*. (2023) confirmed that personal motivation strongly influences farmers' intentions to use digital platforms for marketing their products.

The availability of resources variable (X7) has the most decisive influence, with a regression coefficient of 3.238 and a significance value of 0.009. This finding confirms that the availability of tools, internet connectivity, and capital plays a crucial role in adopting digital marketing. Farmers with sufficient supporting infrastructure are more prepared and actively use digital platforms to market their apples, making this a key factor in their decision-making process. Research by Nugroho *et al*. (2024) further supports this conclusion, showing that farmers equipped with adequate infrastructure and tools are more likely to adopt modern marketing technologies.

3.2.2 Goodness of Fit

Testing is done by looking at the chi square value, if the chi square value < the chi square table value then H0 is accepted which means that the model formed is fit or appropriate. Conversely, if the chi square value> the chi square table value then H1 is accepted which means that the model formed is not fit or appropriate.

Table 3. Hosmer and Lemeshow Test Results

Information	Value
Chi Square	2,050
Df	8
Sg.	0,961

Source: Primary Data (2025)

Based on the results above, the Chi Square Hosmer ans Lemeshow test value is 1.038 < the chi square table value χ2 (0.05.8) 15.507 with a significance level of 0.961> 0.05 so that H0 is accepted which means that the model is fit and appropriate in explaining the use of digital marketing.

3.2.3 Nagelkerke R Square Test Results

The Nagelkerke R square test is used to determine the effect of independent variables on the dependent variable, namely farmers' decisions in using digital marketing. The value measurement used is the Nagelkerke R square value in the model summary table.

Table 4. Nagelkerke R Square Test Results

Model Summary		
-2 Log likehood	Cox & Snell R Square	Nagelkerke R Square
19,859[a]	0,686	0,917

Source: Primary Data (2025)

The table above shows that the Nagelkerke R Square value is 0.917, which means that the independent variables used in this study, namely age (X1), education level (X2), length of farming (X3), access to technology (X4), social support (X5), motivation (X6), and availability of resources (X7) can explain the model by 91.7%. This means that these seven variables can explain 91.7% of the farmer's decision variables in using digital marketing, while other variables outside this model explain the remaining 8.3%.

3.2.4 Simultaneous Test (G Test)

Simultaneous testing is a test conducted to determine the effect of independent variables on dependent variables together in making decisions on the use of combine harvesters during harvesting.

Table 5. Omnibus Test of Model Coefficient (f) Test Results

Chi Square	df	Sig.
104,195	7	0,000
104,195	7	0,000
104,195	7	0,000

Source: Primary Data (2025)

Based on the Omnibus Test of Model Coefficients results, a Chi-square value of 104.195 was obtained with a significance of 0.000 (<0.05). This shows that the logistic regression model built is statistically significant, which means that simultaneously the independent variables, namely age (X1), education level (X2), length of farming (X3), access to technology (X4), social support (X5), motivation (X6), and availability of resources (X7) influence farmers' decisions in using digital marketing.

3.2.5 Wald Test

This test uses the Wald statistical approach by considering each variable's significance value (Sig.). The decision-making criteria are that if the significance value <0.05, then H_0 is rejected, meaning that the variable significantly affects farmer decisions. Conversely, if the significance value> 0.05, then H_0 is accepted, meaning that the variable does not have a significant effect.

Table 6. Wald Test Results

Variabel	B	SE	Wald	df	Sig	Exp (B)
Age	-0,161	0,069	5,423	1	0,020	0,851
Education Level	1,214	0,852	2,030	1	0,154	3,367
Years of Farming Experience	0,081	0,094	0,747	1	0,387	1,085
Access to Technology	1,046	0,0682	2,350	1	0,125	2,846
Social Support	0,199	0,616	0,104	1	0.747	1,220
Motivation	1,533	0,765	4,022	1	0,045	4,633
Availability of Resources	3,238	1,236	6,867	1	0,009	25,495
Constant	-18,994	7,057	7,245	1	0,007	0,000

Source: Primary Data (2025)

Based on the table above, it is evident that three independent variables, age, motivation, and availability of resources, have a partial and statistically significant effect on farmers' decisions to adopt digital marketing. Meanwhile, variables such as education level, years of farming experience, access to technology, and social support do not significantly influence farmers' decisions to adopt digital marketing. The hypothesis testing results can be interpreted as follows:

Age (X1) has a significant influence on the decision to adopt digital marketing, as indicated by a p-value of 0.020 (< 0.05) and a Wald test value of 5.423. The negative coefficient (-0.161) indicates that their likelihood of adopting digital marketing decreases as farmers age. This finding reflects the condition in Tulungrejo Village, where most digital

marketing users are younger farmers in the productive age range (19-44 years). In contrast, farmers over 45 tend to continue using traditional marketing methods due to the perception that digital technology is complex and inefficient. This decline is consistent with Rogers' (2003) Diffusion of Innovation Theory, which posits that age affects the rate of innovation adoption, with younger individuals generally more open and adaptive to new technologies. This is supported by Setiawan (2022), who found that millennials are more active in using digital platforms to market their agricultural products than older farmers.

Education level (X2) is not statistically significant in influencing the use of digital marketing, with a p-value of 0.154 (> 0.05) and a Wald test value of 2.030. Although education is generally assumed to enhance understanding and skills, formal education alone is not a decisive factor in adopting digital marketing. Field observations confirm that education level does not always determine technology adoption. Many farmers with secondary education (junior/senior high school) actively use digital tools, while some college graduates still rely on traditional marketing methods. This indicates that formal education alone is insufficient without supporting factors such as motivation and access to technology. Many farmers acquire digital knowledge through non-formal training, peer learning, or agricultural extension services. This aligns with findings by Laksamana and Nasution (2024), who found that farmers with low levels of formal education can still develop digital skills through hands-on experience and community-based training.

Years of farming experience (X3) also shows no significant effect, with a p-value of 0.387 and a Wald test of 0.747. This indicates that farmers with long farming experience tend to retain conventional methods. In the field, some farmers with less than 10 years of experience actively use digital marketing, while some with more than 20 years of experience continue to rely on traditional approaches. This shows that farming experience does not necessarily correlate with adopting digital technology. Ayunda *et al*. (2024) found that older, more experienced farmers often resist change due to deep familiarity with traditional practices. Likewise, Sari *et al*. (2021) observed that long farming experience does not always promote openness to digital tools.

Access to technology (X4) shows a positive direction of influence but is not statistically significant (p-value = 0.125; Wald test = 2.350). Although access is a necessary precondition, it does not guarantee the use of digital marketing. Astari *et al*. (2024) emphasized that digital skills and mental readiness are also required to utilize technology effectively. Observations in Tulungrejo Village revealed that not all farmers with smartphones and internet access use these tools to promote their products. Due to perceived complexity, some farmers use technology only for personal communication or entertainment, and are reluctant to learn digital marketing. This is supported by Astuti *et al*. (2021), who found that internet access does not automatically lead to adopting digital marketing among farmers.

Social support (X5) also shows no significant effect on farmers' decisions to use digital marketing (p-value = 0.747; Wald test = 0.104). In practice, support from family or fellow farmers exists but is more emotional or informal. Farmers who do not receive technical training or direct mentoring still find it challenging to operate digital marketing platforms, despite encouragement from those around them. Some farmers receive support from their children or peers, but ultimately view digital marketing as a personal decision. Abdulai *et al*. (2023) emphasized that emotional or social support alone cannot drive behavioral change without technical guidance and hands-on training. Sari *et al*. (2021) similarly found that farmers are

more likely to adopt technology when supported by technical training rather than just social encouragement.

Motivation (X6) has a significant positive influence, with a p-value of 0.045 (< 0.05) and a Wald test value of 4.022. The regression coefficient 1.533 indicates that higher farmer motivation increases the likelihood of adopting digital marketing. Apple farmers both users and non-users are motivated by increasing income, expanding market reach, and adapting to modern marketing trends. This finding is consistent with Self-Determination Theory (Deci & Ryan, 2000) and research by Rahmawati *et al*. (2022), showing that farmers motivated to increase sales and reach broader markets are likelier to adopt digital tools. This internal motivation is also supported by McClelland's motivation theory and findings by Wahyuddin (2024), who emphasized that intrinsic motivation drives innovation in agriculture.

Availability of resources (X7) also has a significant effect on the decision to use digital marketing, with a p-value of 0.009 (< 0.05) and a Wald test value of 6.867. The high positive coefficient of 3.238 indicates that the availability of internet connectivity, digital devices, and financial capital strongly influences the adoption of digital technologies. In Tulungrejo Village, farmers with smartphones, reliable internet data plans, and sufficient free time tend to be more active in using digital media to market their apples. Those with adequate infrastructure and digital tools are better prepared and more engaged using digital platforms. This is supported by Hapsari & Hartati (2024), who found that digital infrastructure availability significantly enhances the adoption of technological innovations in agriculture.

3.2.6 Odds Ratio

Table 7. Odds Ratio Test Results

Variabel	Exp (B)
Age	0,851
Education Level	3,367
Years of Farming Experience	1,085
Access to Technology	2,846
Social Support	1,220
Motivation	4,633
Availability Of Resources	25,495

The table above shows that four variables significantly influence farmers' decisions to use digital marketing: age, motivation, and availability of resources. Age has a negative influence (OR = 0.851), meaning that the likelihood of adopting digital marketing decreases by 14.9% for every additional year in age. This indicates that younger farmers are more likely to adopt technology due to their greater openness to innovation. Motivation demonstrates a strong positive influence (OR = 4.633), suggesting that farmers with a strong drive to increase income and expand market reach are 4.6 times more likely to adopt digital marketing. Meanwhile, the availability of resources emerges as the most dominant factor (OR = 25.495), indicating that access to digital devices, internet connectivity, and capital significantly increases the likelihood of digital marketing adoption. These findings are supported by Rogers' Diffusion of Innovation theory (2003), Self-Determination Theory (Deci & Ryan, 2000), and the Technology Acceptance Model (Davis, 1989).

On the other hand, variables such as education level, farming experience, access to technology, and social support do not show a statistically significant influence, as indicated by

p-values greater than 0.05, although some present favorable odds ratios. Education has an OR of 3.367, which, while not statistically significant, indicates a tendency for higher education to be associated with greater technology adoption. However, even farmers with lower educational backgrounds are actively engaged in digital marketing. Farming experience (OR = 1.085) and access to technology (OR = 2.846) also show positive trends, but are not strong enough to be deemed statistically significant. Social support, with an OR of 1.220, suggests that influence from the surrounding environment has not yet become a major factor in farmers' decision-making. These findings emphasize that internal factors such as age, motivation, and resource availability play a more critical role than external factors in encouraging the use of digital platforms

4. Conclusion

Based on the research findings, it can be concluded that farmers' perceptions of digital marketing use in agricultural product marketing are categorized as high, with an average score of 4.15 based on the four aspects of the Technology Acceptance Model (TAM): perceived usefulness, perceived ease of use, attitude toward using, and acceptance. This indicates that, in general, apple farmers in Tulungrejo Village have a favorable view of digital marketing. Furthermore, the logistic regression analysis shows that age, motivation, social support, and access to technology significantly influence farmers' decision-making in adopting digital marketing ($p < 0.05$). In contrast, variables such as education level, years of farming experience, costs, and resource availability do not have a statistically significant effect on digital marketing adoption decisions.

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