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Analysis of Farmer's Intention to Adopt The I-Pubers Application for Redemption of Subsidized Fertilizer in Madiun Regency

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KEYWORDS
attitude toward use, government support, intention to adopt, Platform Support, perceived ease of use, perceived usefulness, social learning, TAM

ABSTRACT This Subsidized fertilizer is crucial for food self-sufficiency, but faces challenges in transparency, distribution accuracy, and digitalization. This study analyzed farmer's intentions in Madiun Regency to use the i-Pubers application using the Technology Acceptance Model (TAM) approach. The quantitative-associative method was used, with primary data collected from 197 respondents using a Likert scale questionnaire, analyzed using SEM-PLS. The results had shown that government support and social learning did not affect perceived ease of use, but significantly affect perceived usefulness, while platform support influences both. Perceived ease of use and perceived usefulness influence attitudes toward use, which in turn impacts adoption intentions. This study contributes to improving the transparency and efficiency of fertilizer distribution and supports SDGs 9 through agricultural digitalization.

1. INTRODUCTION

The agricultural sector is a vital foundation in national economic development, contributing 13.71% to Indonesia's Gross Domestic Product (GDP) in 2024 and absorbing around 27.99% of the national workforce (Central Statistics Agency, 2024, 2026). At the regional level, Madiun Regency shows significant dependence on this sector with the agricultural sector contributing 25.85% to the region's GRDP (Central Statistics Agency of Madiun Regency, 2026). However, this sector faces structural challenges in the form of stagnant rice production and complexities in the distribution of production inputs, as shown by rice production in the last two years, 2023 and 2024, at 437.59 thousand tons and 437.46 thousand tons, respectively.(Central Statistics Agency of Madiun Regency, 2025)The main problem that often arises is the inefficiency of subsidized fertilizer distribution management, which often experiences problems with inaccurate targeting and distribution delays. If not addressed, this will threaten farmer productivity widely.

As a solution to this problem, the government, through PT Pupuk Indonesia, is undertaking a digital transformation by implementing the i-Pubers (Subsidized Fertilizer Integration) application. This digitalization is designed to ensure the 7T principle (correct type, quantity, price, place, time, quality, and recipient) in the distribution of subsidized fertilizer. In a study of digital agricultural technology adoption, the

Technology Acceptance Model (TAM) explains that technology acceptance is influenced by perceptions of ease and benefits (Taherdoost et al., 2024). In this context, Government Support (GOS) is important because policies, training, and infrastructure can encourage the use of technology and strengthen the perception of benefits (Chen et al., 2024; Sudarwati & Nasution, 2024). Meanwhile, Platform Support (PLS) plays a role in increasing convenience and ease of access through digital services and features (Chen et al., 2024). Social Learning (SLR) is also crucial because interaction and sharing of experiences between farmers can accelerate understanding and reduce barriers to technology use.(Amalia & A'zdom, 2025; Chen et al., 2024). Furthermore, Perceived Ease of Use (PEOU) reflects the ease of use that is influenced by digital literacy (Muromba et al., 2025). Perceived Usefulness (PEU) is a major factor because it is directly related to increased efficiency and productivity (Nookhao et al., 2025). These two perceptions form Attitude Toward Use (ATT) which influences technology acceptance, and ultimately determines Intention to Adopt (ITA) as the main indicator of intention to use technology (Bakhshoudehnia et al., 2026). This finding provides a theoretical basis that the adoption of agricultural technology is not only influenced by internal factors, but also external support and the social environment.

Although theoretically, factors such as government support, platform support, and social learning are believed to be able to encourage the adoption of agricultural technology, several studies have shown inconsistent results. Government support does not always have a significant effect on perceived ease of use because it is more influenced by user skills and experience (Muromba et al., 2025). In addition, government policies do not automatically increase technology adoption if they are not followed by user readiness in the field (Dwivedi et al., 2022). The availability of digital platforms and social factors do not always guarantee adoption, as farmers tend to rely more on personal experience (Cerjak et al., 2025). The adoption rate of agricultural technology is still low despite various initiatives being undertaken, which is caused by limited understanding and low perception of real benefits (Keefe et al., 2025; Pandeya et al., 2025). Meanwhile, perceived usefulness is more dominant than perceived ease of use in influencing adoption decisions (Nookhao et al., 2025). These findings indicate a gap between theoretical approaches and empirical conditions in the field, necessitating further research to specifically examine the factors influencing farmers' readiness and behavior in adopting digital technologies such as i-Pubers.

The novelty of this research lies in the empirical testing of the adoption of the i-Pubers application in the context of subsidized fertilizer distribution by integrating external factors such as government support, platform support, and social learning into the technology acceptance model (TAM) framework. Chen et al. (2024) examines the adoption of agricultural technology by integrating external factors such as government support, platform support, and social learning within the TAM framework, but has not specifically examined the context of digital-based subsidized fertilizer distribution. Parmaksiz & Cinar (2023) examines the adoption of digital agricultural technology in general without focusing on the agricultural input distribution system regulated by government policy. Taherdoost et al. (2024) emphasized that perceived usefulness and perceived ease of use are the main determinants in technology acceptance, but have not yet linked them to contextual factors in the agricultural sector at the rural farmer level. On the other hand, Keefe et al. (2025) and Pandeya et al. (2025) shows that the level of adoption of agricultural technology is still low even though various innovations have been developed, but has not specifically examined behavioral factors in the implementation of the subsidized fertilizer distribution system.

To strengthen the research phenomenon, the author conducted a pre-survey of 140 farmer respondents in Madiun Regency, with an average age of 50-60 years. The pre-survey results showed that most farmers still redeem subsidized fertilizer through farmer groups and therefore have not fully utilized direct redemption at official kiosks. This condition causes several problems, such as fertilizer prices that do not always align with the HET (Highest Retail Price), the amount of fertilizer received does not match the quota, and distribution that does not reflect land needs evenly. On the other hand, although the government has provided the i-Pubers system to improve distribution governance, its use is still not optimal due to limited understanding of the technology, lack of socialization, and minimal assistance. Nevertheless, farmers generally see this system as having the potential to improve transparency, distribution fairness, and accuracy of fertilizer distribution, and are willing to use it if existing obstacles can be overcome.

The purpose of this study is to analyze the factors influencing farmers' perceptions, attitudes, and intentions in adopting the i-Pubers application for subsidized fertilizer redemption in Madiun Regency. This research is expected to provide evaluation material for the government and related parties in refining agricultural digitalization strategies. Academically, this research is expected to contribute to the development of technology acceptance theory, particularly in the context of modernizing agricultural administration in rural Indonesia.

2. LITERATURE STUDY

Technology Acceptance Model (TAM)

The main theoretical reference that forms the basis of this research is the Technology Acceptance Model (TAM) developed by (Davis, 1989). TAM is used to explain individual acceptance of information technology through two main constructs: perceived ease of use and perceived usefulness. This theory assumes that a person's behavior in using technology begins with an intention formed by an attitude, where this attitude is influenced by the extent to which the technology is perceived as easy and useful in supporting work effectiveness (Davis, 1989). In the agricultural sector, the application of TAM has proven effective in explaining the technology adoption behavior of farmers who generally have varying levels of digital literacy, where the perception of usefulness often has a stronger influence because farmers are more oriented towards tangible benefits in farming activities (Hendrawan et al., 2023).

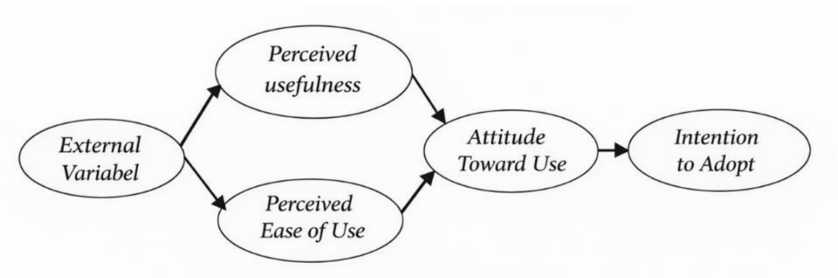

Figure 1. Theoretical Framework of the Technology Acceptance Model (TAM)

Government Support (GOS)

Government supportis a form of support from the government in the form of policies, regulations, training, subsidies, and provision of infrastructure that aims to encourage the adoption of technology by the community or business actors. Chen et al. (2024) stated that government support can increase the perception of technology's usefulness through digital program policies and facilitation. In addition,Sudarwati & Nasution (2024) explained that government intervention in the form of extension services and the provision of production facilities can improve farmer welfare and technology adoption. Pandeya et al. (2025) emphasized that government policies and programs are important factors in reducing barriers to technology adoption in the agricultural sector.

Platform Support (PLS)

Platform Support is support provided by digital platform providers in the form of features, services, ease of access, and user-friendly systems to help users utilize technology. Chen et al. (2024) stated that platform support has an impact on increasing perceived ease of use and usefulness of technology. Keefe et al. (2025) also emphasized that government support and digital platforms play a role in increasing technology adoption by improving user experience. Aranguri et al. (2025) explained that access to adequate technology and digital systems is an important factor in the successful implementation of agricultural technology.

Social Learning (SLR)

Social learning is a learning process that occurs through social interaction, sharing experiences, and communication between individuals in a community. Amalia & A'zdom (2025) stated that social learning in farmer communication networks can accelerate the diffusion of innovation and increase trust in technology. Chen et al. (2024) also found that social learning influences perceived ease of use through shared experiences. In addition,Yuan et al. (2025) explained that the exchange of information and experience between farmers is an important factor in increasing technology adoption.

Perceived Ease of Use (PEOU)

Perceived ease of use is the level of confidence a person has that a technology is easy to use without requiring a great deal of effort. Taherdoost et al. (2024) explains that ease of use is one of the main factors in the TAM model that influences technology acceptance. Muromba et al. (2025) added that perceived ease of use is influenced by factors such as user-friendliness and access to infrastructure. Aung et al. (2025) stated that the perception of ease of use is related to the level of digital literacy and user experience in using technology.

Perceived Usefulness (PEU)

Perceived usefulnessis a person's level of belief that using technology will improve their performance or productivity. Taherdoost et al. (2024) stated that Perceived usefulness is the main determinant in technology adoption. Nookhao et al. (2025) found that perceived usefulness had the strongest direct influence on the adoption of agricultural technology. In addition, Muromba et al. (2025) explains that tangible benefits such as increased productivity and efficiency are the main motivations for using technology.

Attitude Toward Use (ATT)

Attitude toward useis an individual's attitude or evaluation of the use of a technology, whether positive or negative. Nookhao et al. (2025) explains that a positive attitude toward use of technology will increase the likelihood of individuals adopting it. Taherdoost et al. (2024) also states that attitude toward use is an important variable in the technology adoption model that links perception with behavior. Far et al. (2025) found that attitude toward use has a significant role in shaping technology adoption intentions.

Intention to Adopt (ITA)

Intention to adopt is an individual's intention or desire to use or adopt a technology within a certain time. Bakhshoudehnia et al. (2026) stated that intention to adopt is the main factor that determines technology usage behavior. Taherdoost et al. (2024) also confirmed that behavioral intention is the strongest predictor of actual technology use. In addition, Chen et al. (2024) shows that the intention to adopt is influenced by users' perceptions and attitudes towards technology.

Relationship Between Variables

The Influence of Government Support, Platform Support and Social Learning on Perceived Ease of Use of the i-Pubers Application

Government Support (GOS) is an important factor because the existence of policies, training programs, and government facilitation can help users better understand technology and reduce difficulties in using it. Research Chen et al. (2024) shows that government support is related to increased perceived ease of use, especially for users with limited technological experience. This finding is in line withAung et al. (2025) which identifies that government support is part of the external factors that influence perceived ease of use, and is strengthened by Sudarwati & Nasution (2024) which emphasizes that government intervention through outreach and training can improve users' abilities in utilizing technology.

Platform Support (PLS) also plays a role in shaping perceived ease of use. Platform support, such as a simple interface, easy to understand features, and responsive service, can help users adapt to technology more quickly. Chen et al. (2024) found that platform support has a direct influence on increasing perceived ease of use. This is supported byKeefe et al. (2025) which states that support from digital systems and stakeholders can improve user experience so that technology feels easier to use. Another finding from Aranguří et al. (2025) also shows that the availability of systems that are easily accessible and suited to user needs is an important factor in reducing the complexity of technology use.

Social Learning (SLR) contributing to perceived ease of use through social interaction based learning processes. Users who gain information from others' experiences tend to understand how technology works more quickly. Chen et al. (2024) shows that social learning has a positive influence on perceived ease of use. This finding is in line with Amalia & A'zdom (2025) which explains that interactions in farmer communication networks can accelerate understanding of innovation, and is strengthened by Yuan et al. (2025) which emphasizes that the exchange of information between users helps improve the ability to utilize technology.

Thus, government support, platform support, and social learning play a crucial role in improving Perceived Ease of Use, as they reduce technical barriers, enhance user understanding, and accelerate the process of adapting to technology, including the use of the i-Pubers application.

H1: Government support has a significant influence on the perceived ease of use of the i-pubers application.

H3: Platform Support has a significant influence on the perceived ease of use of the i-pubers application.

H5: Social Learning has a significant influence on the perceived ease of use of the i-pubers application

The influence of Government Support (GOS),

Platform Support (PLS), Social Learning (SLR) on the Perceived Usefulness (PEU) of the i-Pubers application

Government support (GOS) proven to play a role in shaping perceived usefulness. Chen et al. (2024) shows that government support through policies, facilitation, and digital programs has a positive effect on perceived usefulness because it helps users see the real benefits of technology. This finding is in line with Aung et al. (2025) which identified that public support is one of the factors that correlates with the perception of the benefits of agricultural technology, and is strengthened by Sudarwati & Nasution (2024) which emphasizes that government intervention through extension and support facilities increases the utility value of technology for farmers.

Platform Support (PLS)also has an important contribution in increasing perceived usefulness. Chen et al. (2024) found that platform support directly influences perceived usefulness because the features and services provided can increase the efficiency of user activities. This is supported by Keefe et al. (2025) which states that digital system and stakeholder support increases the perceived benefits of users in the context of the agricultural supply chain. Similar findings were also expressed by Arangurí et al. (2025) which shows that access to adequate technology and integrated systems helps users gain greater benefits from using technology.

Social Learning (SLR) also influences perceived usefulness through the process of exchanging knowledge and experience between users. Chen et al. (2024) shows that social learning contributes to increasing perceived usefulness because users can understand the potential of technology through the experiences of others. This is in line with Amalia & A'zdom (2025) which explains that communication networks and knowledge sharing between farmers strengthen understanding of the benefits of innovation, and is supported byArangurí et al. (2025) which emphasizes that social interaction and digital literacy play a role in increasing the optimal use of technology.

Thus, government support, platform support, and social learning are external factors that play an important role in shaping perceived usefulness because all three help users recognize the benefits of technology more clearly, increase efficiency of use, and strengthen confidence in the added value of technology such as the i-Pubers application.

H2: Government support has a significant influence on the perceived usefulness of the i-pubers application

H4: Platform Support has a significant influence on the perceived usefulness of the i-pubers application

H6: Social Learning has a significant influence on the perceived usefulness of the i-pubers application

The influence of Perceived Ease of Use (PEOU) and Perceived Usefulness (PEU) on Attitude Toward Use (ATT) of the i-Pubers application

Perceived Ease of Use (PEOU) plays an important role in shaping attitudes toward use, because easy-to-use technology creates positive experiences and reduces technical barriers (Aung et al., 2025; Taherdoost et al., 2024). Ease of understanding and operating technology also increases positive user perception (Chen et al., 2024), so that the higher the perceived convenience, the more positive the user's attitude.

Perceived Usefulness (PEU) also be a major determinant of attitudes, where tangible benefits such as increased efficiency drive positive evaluations of technology (Taherdoost et al., 2024). This is supported by the finding that perceived usefulness has a significant influence on user attitudes Nookhao et al. (2025) and strengthen technology acceptance (Bakhshoudehnia et al., 2026).

Overall, both perceived ease of use and perceived usefulness are important factors in shaping attitudes toward use, as both influence how users assess the experience and benefits of technology before deciding to use it.

H7: Perceived Ease of Use has a significant influence on attitudes toward using the i-pubers application.

H8: Perceived Usefulness has a significant influence on attitudes toward using the i-pubers application.

The Influence of Attitude Toward Use (ATT) on Intention to Adopt (ITA) of the i-Pubers application

Attitude Toward Use (ATT) is a key factor influencing technology adoption intentions. Attitudes formed from user experience and evaluation act as a link between perceptions of technology and behavioral intentions (Taherdoost et al., 2024). Research shows that positive attitudes significantly increase the intention to adopt, including in the context of agricultural technology (Nookhao et al., 2025), even being the strongest predictor and mediating variable between external factors and usage decisions (Keefe et al., 2025).

Another finding confirms that attitudes directly reflect an individual's level of acceptance and readiness to adopt technology (Bakhshoudehnia et al., 2026), and influenced by positive user perceptions (Chen et al., 2024). Thus, the more positive attitudes toward the i-Pubers application, the more likely the technology will be adopted.

H9: Attitude Toward Use has a significant influence on the intention to adopt the i-pubers application.

Research Framework

Based on the research study and development of the research model, a theoretical framework has been developed that explains the influence between variables in the research as in Figure 2 below.

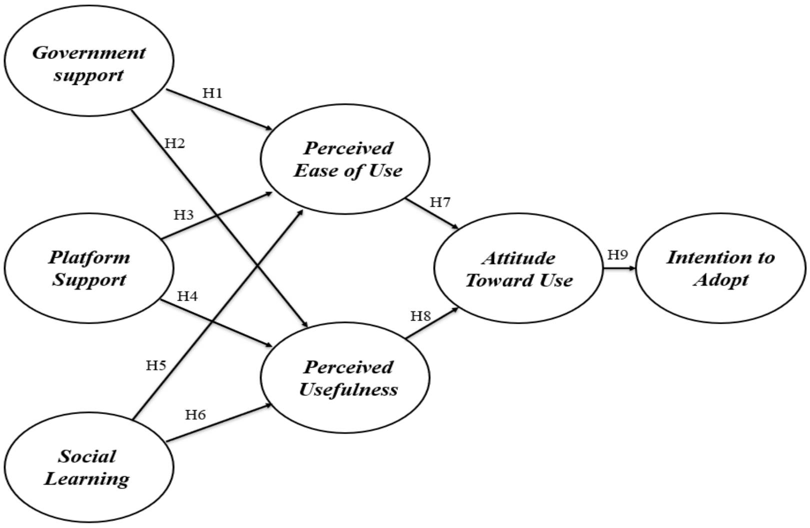

Figure 2. Research Framework

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3. METHODS

A quantitative approach was used for this research with an explanatory research type. Quantitative research is a research method that uses numerical data and statistical analysis to test hypotheses (Sugiyono, 2022). Explanatory research is a type of research that aims to explain the causal relationship between variables through testing previously formulated hypotheses (Sugiyono, 2022). The unit of analysis in this study is the individual, namely farmers registered in the subsidized fertilizer redemption system through i-Pubers in the research area. The time horizon used in data collection is cross-sectional, where data is collected at a specific point in time from actual i-Pubers users to obtain a picture of their direct experiences (Sekaran & Bougie, 2016).

The data used in this research comes from primary data, namely data obtained directly from the first source by the researcher without going through an intermediary (Sugiyono, 2022). Data were collected using a questionnaire with a Likert scale of 1-5. This scale was used because it is simple, easy for respondents to understand, and is able to produce valid data for statistical analysis (Sekaran & Bougie, 2016). Determination of the number of samples in this study used the inverse square root method, this method is used to calculate the sample size in PLS-SEM research.(Kock & Hadaya, 2018). The following formula is used in this study:

$$n_{min} > \left(\frac{z}{|\beta_{min}|}\right)^2$$

Where:

- n_{min} = minimum sample size
- z = critical value according to significance level
- β_{min} = minimum expected path coefficient is significant

For a significance level of 5% (α = 0.05), the constant used is 2.486, the minimum path coefficient expected to be significant is 0.20, so that the minimum number of samples for this study is 155 samples. The sampling technique used is non-probability sampling, which is a sampling technique that does not provide equal opportunities or chances for each member of the population to be selected as a sample (Sugiyono, 2022). With a purposive sampling type that selects respondents based on certain criteria, namely (1) Farmers registered in the i-Pubers application and (2) Farmers domiciled in Madiun Regency. This technique was chosen because the research focuses on actual users of the system, so that the selected respondents truly have direct experience in using the i-Pubers application (Sugiyono, 2022).

The data analysis method in this study used Partial Least Squares–Structural Equation Modeling (PLS-SEM) with the help of SmartPLS software. PLS-SEM was chosen because it can analyze the relationship between latent variables simultaneously and is suitable for use in complex, prediction-oriented research models (Hair et al., 2022). The PLS-SEM method is able to measure latent variables that cannot be observed directly through their indicators (Ghozali, 2018). The analysis was conducted in two stages: evaluation of the outer model (measurement model) and the inner model (structural model). The outer model serves to test the relationship between indicators and latent variables through a reflective model approach that includes convergent validity, discriminant validity, and reliability tests. Convergent validity is assessed based on the outer loading value (>0.7) and Average Variance Extracted (AVE) (>0.5), while discriminant validity testing uses the test score and HTMT (Heterotrait-Monotrait Ratio) (Hair et al., 2022). Discriminant validity is declared fulfilled if the HTMT value is < 0.90, or < 0.85 for stricter criteria (Hair et al., 2022). Questionnaire reliability testing was conducted by examining Cronbach's alpha and composite reliability values. A construct is considered reliable if its Cronbach's alpha and composite reliability values are >0.70 (Hair et al., 2022). Inner model It functions to assess the direct, indirect, and total influence between constructs or latent variables. The inner model evaluation includes testing the coefficient of determination R^2 (0.75) strong; (0.50) moderate; (0.25) weak, predictive relevance ($Q^2 > 0$), effect size f^2 (0.02) small; (0.15) moderate; (0.35) large. Hypothesis testing is carried out by looking at the path coefficient t-statistic and p-value. A positive path coefficient value indicates a positive relationship between two variables, and conversely, a negative value indicates a negative relationship between variables (Sarstedt et al., 2021). The path coefficient is statistically significant and reliable if the t-statistic value is > 1.96 and the value is < 0.05 at a significance level of 5% (Hair et al., 2020).

4. RESULT AND DISCUSSION

Respondent Profile

Based on the data collection results, 214 respondents completed the questionnaire, but only 197 respondents met the criteria, while the remaining 17 were eliminated from the sample because they did not meet the requirements for inclusion. The following is a demographic table of the study respondents:

Table 1. Research Respondent Profile

Characteristics	Frequency	Percentage (%)
Age		
30-39 years	22	11,0
40-49 years	49	25,0
50-60 years	64	32,5
More than 60 years	62	31,5
Amount	197	100,0
Gender		
Man	170	86,0
Woman	27	14,0
Amount	197	100,0
Level of education		
No school	3	1,5
Elementary school/equivalent	73	37,1
Junior high school/equivalent	43	21,8
High school/equivalent	63	32,0
Diploma/Bachelor's Degree	15	7.6
Amount	197	100,0

Source: Questionnaire results

The research results, as presented in Table 1, showed that the majority of respondents were aged between 30 and 60, with the age range 50 to over 60 years being the most dominant. Furthermore, respondents were predominantly male (86%), with education levels ranging from elementary school (37.1%) to high school (32.0%). This indicates that the respondents were predominantly older farmers, with primary to secondary education.

Outer model testing

Outer model is a measurement model that describes the relationship between indicator blocks and their latent variables. The outer model is a test to measure the validity and reliability of data. In testing the outer model, a reflective measurement model is used, consisting of convergent validity, discriminant validity, and reliability (Ghozali, 2018).

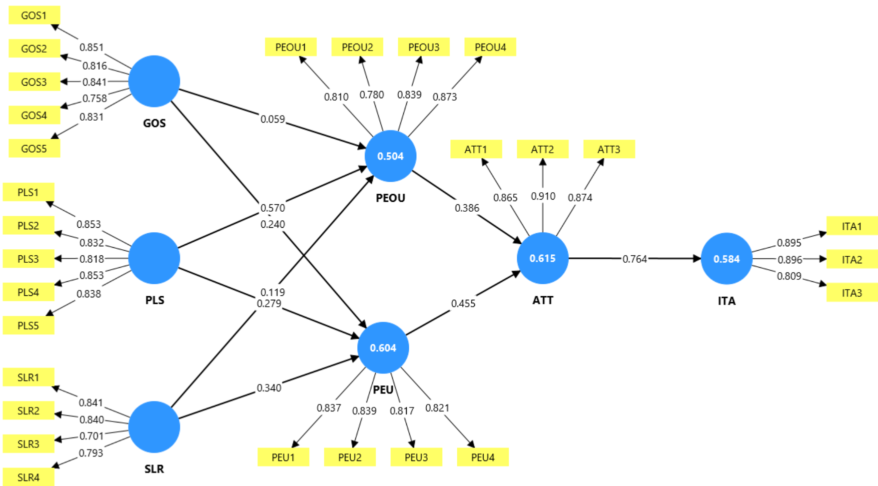

Figure 3. Test Results Outer model

Validity and Reliability Test

Table 2. Mark *Outer Loading*

Variables	Indicator	*Outer loadings*
Attitude Toward Use (Chen et al., 2024) *AVE : 0.780CR : 0.859CA: 0.859*	ATT1: Using i-Pubers is a good idea.	0.865
	ATT2: The application of i-Pubers is suitable for use in redeeming subsidized fertilizer.	0.910
	ATT3: I consider fertilizer redemption through i-Pubers as a positive thing.	0.874
Government Support (Chen et al., 2024) *AVE : 0.672 CR : 0.878 CA : 0.878*	GOS1: The government supports the use of i-Pubers in the distribution of subsidized fertilizer.	0.851
	GOS2: The government provides an explanation or information regarding the use of i-Pubers.	0.816
	GOS3: Subsidized fertilizer policy is easier to understand through i-Pubers.	0.841
	GOS4: Official kiosks now serve subsidized fertilizer redemptions in accordance with government regulations through i-Pubers.	0.758
	GOS5: The government and PT Pupuk Indonesia are collaborating in implementing the i-Pubers system.	0.831
Intention to Adopt (Chen et al., 2024) *AVE : 0.753 CR : 0.845 CA : 0.835*	ITA1: I am willing to redeem subsidized fertilizer through i-Pubers.	0.895
	ITA2: I intend to continue using i-Pubers in the future.	0.896
	ITA3: I am willing to recommend i-Pubers to other farmers.	0.809
Perceived Ease of Use (Chen et al., 2024; Davis, 1989)	PEOU1: How to redeem subsidized fertilizer through i-Pubers is easy to understand.	0.81
	PEOU2: The signature process for i-Pubers transactions was not difficult for me.	0.78
	PEOU3: The process of verifying the redemption of subsidized fertilizer through i-Pubers did not make things difficult for me.	0.839

Variables	Indicator	*Outer loadings*
AVE : 0.683 *CR : 0.852* *CA : 0.845*	PEOU4: The process of redeeming subsidized fertilizer through i-Pubers is easy for me to do.	0.873
Perceived Usefulness (Chen et al., 2024; Davis, 1989) *AVE : 0.687CR : 0.849CA : 0.848*	PEU1: Using i-Pubers helps ensure that the subsidized fertilizer I receive is in accordance with the allocated quota.	0.837
	PEU2: The use of i-Pubers makes the process of redeeming subsidized fertilizer more transparent.	0.839
	PEU3: The use of i-Pubers helps ensure the distribution of subsidized fertilizer in accordance with applicable regulations.	0.817
	PEU4: Using i-Pubers makes it easier for me to obtain subsidized fertilizer at official kiosks.	0.821
Platform Support (Chen et al., 2024) *AVE : 0.704CR : 0.897CA : 0.895*	PLS1: The i-Pubers application helps kiosks serve farmers when redeeming subsidized fertilizer.	0.853
	PLS2: The i-Pubers application provides clear proof of redemption in the form of a note.	0.832
	PLS3: The i-Pubers application records farmer data correctly.	0.818
	PLS4: The i-Pubers application helps prevent irregularities in the distribution of subsidized fertilizer.	0.853
	PLS5: The i-Pubers application provides a structured process flow for distributing subsidized fertilizer.	0.838
Social Learning (Chen et al., 2024) *AVE : 0.633CR : 0.826CA : 0.807*	SLR1: PT Pupuk Indonesia field officers provide an explanation of how to redeem subsidized fertilizer through i-Pubers.	0.841
	SLR2: The kiosk officer explains how to redeem subsidized fertilizer through i-Pubers.	0.84
	SLR3: Another farmer explained how to redeem subsidized fertilizer through i-Pubers.	0.701
	SLR4: Agricultural extension workers provide an explanation of how to redeem subsidized fertilizer through i-Pubers.	0.793

Source: Data Processing Results

Based on the results of the standardization test in Table 2, it shows that all indicators in this study have an outer loading value > 0.7. Furthermore, the results also show that all variables have an AVE value > 0.5. Therefore, it can be concluded that this study meets the requirements for convergent validity and is declared valid.

The results of reliability testing in the research model showed that all variables had Cronbach's Alpha and Composite Reliability values >0.7 and <0.95, respectively. Therefore, it can be concluded that all variables in this study are reliable.

Discriminant Validity Test - HTMT

The HTMT is the mean of all indicator correlations across constructs measuring different constructs (i.e., heterotrait-heteromethod correlations) relative to the (geometric) mean of the average correlations of indicators measuring the same construct. HTMT values above 0.90 indicate a lack of divergent validity. When constructs in a path model are conceptually more distinct, a lower and thus more conservative threshold value of 0.85 appears to be necessary (Henseler et al., 2016).

Table 3. HTML Value

Variables	ATT	GOS	ITA	PEOU	PEU	PLS	SLR
ATT							
GOS	0.745						
ITA	0.897	0.665					
PEOU	0.845	0.671	0.840				
PEU	0.866	0.792	0.789	0.863			
PLS	0.777	0.895	0.731	0.793	0.824		
SLR	0.689	0.766	0.632	0.685	0.831	0.859	

Source: Data Processing Results

Based on the results of the standardization test, as seen in Table 3, all variables have an HTMT value of <0,9. Therefore, it can be concluded that all variables in this study have met the HTMT requirements and are declared valid.

Inner Model Testing

Inner model is a structural model used to predict causal relationships (cause-and-effect relationships) between latent variables or variables that cannot be measured directly. The structural model (inner model) describes the causal relationships between latent variables that have been constructed based on theoretical substance. In testing the structural model (inner model), the Standardize and Blindfolding procedures in SmartPLS are used. Tests on the structural model are conducted to examine the relationships between latent constructs.(Ghozali & Latan, 2015).

Bias Test Results

Table 4. Collinearity Test Results

VARIABLES	VIF
ATT→ITA	1,000
GOS→PEOU	2,776
GOS→PEU	2,776
PEOU→ATT	2,203
PEU→ATT	2,203
PLS→PEOU	3,448
PLS→PEU	3,448
SLR→PEOU	2,237
SLR→PEU	2,237

Source: Data Processing Results

A collinearity test was conducted to ensure there was no multicollinearity between the predictor variables in the structural model. Based on the results of the collinearity statistics (VIF) test on the inner model (Table 4), all VIF values were below the threshold. Therefore, it can be concluded that there are no collinearity issues in the research model, making it suitable for further testing.

Hypothesis Test Results

The significance test for the relationship between variables was conducted using the bootstrapping method by examining the path coefficient (original sample), t-statistic, and p-value. A relationship is considered significant if the t-statistic is > 1.96 and the p-value is < 0.05.

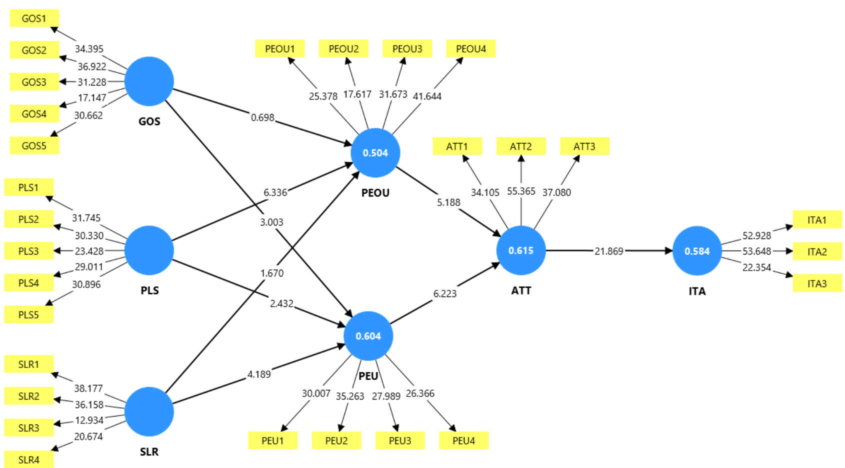

Figure 4. Bootstrapping Test Results

Table 5.Test results significance of the relationship between variables

Variable Relationship	Original sample (O)	T statistics (|O/STDEV|)	P-Values	Information
GOS -> PEOU	0.059	0.698	0.485	Rejected
GOS -> PEU	0.240	3,003	0.003	Accepted
SLR -> PEOU	0.119	1,670	0.095	Rejected
SLR -> PEU	0.340	4,189	0.000	Accepted
PLS -> PEOU	0.570	6,336	0.000	Accepted
PLS -> PEU	0.279	2,432	0.015	Accepted
PEOU -> ATT	0.386	5,188	0.000	Accepted
PEU -> ATT	0.455	6,223	0.000	Accepted
ATT -> ITA	0.764	21,869	0.000	Accepted

Source: Data Processing Results

Based on the results in table 5, below are the results of testing the research hypothesis:

The test results show that the variables government support (β = 0.059; t = 0.698; p = 0.485) and social learning (β = 0.119; t = 1.670; p = 0.095) do not significantly influence perceived ease of use. This indicates that government support and social learning do not significantly increase the perception of ease for farmers in using the i-Pubers application, because ease of use is more influenced by the technical aspects of the system and direct user experience. In contrast, platform support (β = 0.570; t = 6.336; p = 0.000) has a positive and significant effect on perceived ease of use, this indicates that platform support such as ease of access, user-friendly features, and system quality play an important role in increasing the perception of ease of use of the i-Pubers application.

Furthermore, the analysis results showed that government support (β = 0.240; t = 3.003; p = 0.003), social learning (β = 0.340; t = 4.189; p = 0.000), and platform support (β = 0.279; t = 2.432; p = 0.015) had a positive and significant effect on perceived usefulness. This indicates that government support can increase farmers' confidence in the benefits of i-Pubers, while social interaction and sharing of experiences between farmers also strengthen the perception of these benefits. In addition, platform quality, including ease of access and available features, also plays an important role in increasing perceived usefulness felt by users.

Further testing results showed that perceived ease of use (β = 0.386; t = 5.188; p = 0.000) and perceived usefulness (β = 0.455; t = 6.223; p = 0.000) had a positive and significant effect on attitude toward use. This indicates that the easier the i-Pubers application is to use and the greater the perceived benefits, the more positive the user's attitude toward the technology.

Finally, Attitude Toward Use had a positive and significant effect on Intention to Adopt (β = 0.764; t = 21.869; p = 0.000). This indicates that a positive attitude toward using i-Pubers will increase farmers' intention to adopt and use the system sustainably.

Inner Model Test Results

Table 6. R-Square test results,Q-Square, F-Square

Variables	*R-Square*	*Q-Square*	*F-Square*			
			ATT	ITA	PEOU	PEU
ATT	0.615	0.481		1,405		
GOS					0.002	0.052
ITA	0.584	0.367				
PEOU	0.504	0.481	0.176			
PEU	0.604	0.581	0.244			
PLS					0.19	0.057
SLR					0.013	0.131

Source: Data Processing Results

Based on the analysis results in table 6 of the inner model evaluation, the R-Square value obtained for the intention to adopt (ITA) variable is 0.584. This value indicates that the attitude toward use (ATT) variable is able to explain 58.4% of the variation in Intention to Adopt (ITA) in the moderate category, while the remaining 41.6% is influenced by other variables outside the research model. Furthermore, the attitude toward use (ATT) variable has an R-Square value of 0.615, which means that the perceived ease of use (PEOU) and perceived usefulness (PEU) variables are able to explain 61.5% of the variation in attitude toward use (ATT) in the moderate category, while the remaining 38.5% is explained by other factors outside the model. The perceived ease of use (PEOU) variable has an R-Square value of 0.504, which indicates that the government support (GOS), platform support (PLS), and social learning (SLR) variables are able to explain 50.4% of the variation in perceived ease of use (PEOU) in the medium category, while the remaining 49.6% is influenced by other variables outside the model. In addition, the perceived usefulness (PEU) variable has an R-Square value of 0.604, which means that the government support (GOS), platform support (PLS), and social learning (SLR) variables are able to explain 60.4% of the variation in perceived usefulness (PEU) in the medium category, while the remaining 39.6% is explained by other factors. Based on these values, it can be concluded that the model's ability to explain endogenous variables as a whole is in the medium category.

In addition to using R-Square, model evaluation is also conducted by examining the Q-Square (Q^2) value, which is used to measure the model's predictive relevance. If the Q^2 value is greater than zero, the research model has good predictive ability.(Hair et al., 2022). Based on the analysis results, the Q-Square value for the intention to adopt (ITA) variable was 0.367, attitude toward use (ATT) was 0.481, perceived ease of use (PEOU) was 0.481, and perceived usefulness (PEU) was 0.581. All Q-Square values were > 0, so it can be concluded that the research model has good predictive ability in explaining the endogenous variables studied.

Based on the analysis results, the relationship between attitude toward use (ATT) and intention to adopt (ITA) has an f^2 value of 1.405, which is categorized as a large influence. Furthermore, the relationship between perceived ease of use (PEOU) and attitude toward use (ATT) is 0.176 and perceived usefulness (PEU) and attitude toward use (ATT) is 0.244, both of which are categorized as a medium influence. In the perceived ease of use (PEOU) variable, the influence of government support (GOS) has an f^2 value of 0.002, which is categorized as no influence, platform support (PLS) is 0.190, which is categorized as a medium influence, and social learning (SLR) is 0.013, which is categorized as a small influence. Meanwhile, in the perceived usefulness (PEU) variable, the influence of government support (GOS) is 0.052 and platform support (PLS) is 0.057, which is categorized as a small influence, while social learning (SLR) is 0.131, which is categorized as a small to medium influence. Based on these results, it can be concluded that the attitude toward use (ATT) variable has the strongest influence on intention to adopt (ITA), while external variables such as government support (GOS), platform support (PLS), and social learning (SLR) show varying influences from no influence, small, to moderate on the constructs in the research model.

PLS Predict

PLS-predictis a function used to assess the predictive ability of a model created with Partial Least Squares Structural Equation Modeling (PLS-SEM) in SmartPLS. PLS-predict assessment can be done by comparing the MAE (Mean Absolute Error) and RMSE (Root Mean Squared Error) values in PLS-SEM with LM (Regression Model) (Hair et al., 2021).

Table 7. PLS Predict

Indicator	Q^2predict	PLS		LM		PLS VS LM
		RMSE	MAE	RMSE	MAE	
PEOU1	0.495	0.658	0.475	0.680	0.478	-0.022
PEOU2	0.159	0.837	0.588	0.872	0.628	-0.034
PEOU3	0.288	0.707	0.523	0.735	0.528	-0.029
PEOU4	0.326	0.682	0.482	0.689	0.504	-0.007
PEU1	0.395	0.675	0.506	0.700	0.524	-0.024

Indicator	Q^2predict	PLS		LM		PLS VS LM
		RMSE	MAE	RMSE	MAE	
PEU2	0.443	0.722	0.519	0.736	0.517	-0.014
PEU3	0.440	0.647	0.471	0.697	0.490	-0.050
PEU4	0.308	0.727	0.551	0.753	0.557	-0.026
ATT1	0.352	0.742	0.561	0.789	0.586	-0.047
ATT2	0.411	0.694	0.525	0.682	0.516	0.012
ATT3	0.355	0.697	0.534	0.702	0.538	-0.005
ITA1	0.272	0.696	0.524	0.699	0.529	-0.003
ITA2	0.226	0.748	0.580	0.756	0.574	-0.007
ITA3	0.332	0.774	0.612	0.760	0.589	0.014

Source: Data Processing Results

Based on the PLS Predict test results in Table 7, all indicators show a Q^2predict value greater than zero. This indicates that the model has the ability to predict observational data on endogenous variables. Furthermore, when viewed from the comparison of RMSE and MAE values, most indicators show that the prediction error value in the PLS model is lower than that of the linear model (LM). Although there are several indicators such as ATT2 and ITA3 that have slightly lower LM model error values, the difference is relatively small and does not change the general trend of the model. Thus, these results indicate that the PLS-SEM-based model has better predictive ability than the comparison model. Overall, the research model can be said to have good predictive relevance and is able to provide adequate estimates of the endogenous variables in this study.

Research Implications

Theoretical implications

The results of this study indicate that government support does not significantly influence the perceived ease of use of the i-Pubers application. This finding contradicts previous research, which stated that government support significantly influences perceived ease of use through policies, facilitation, and system support for farmers (Chen et al., 2024). Other results are also inconsistent, where research shows that there is a significant influence on perceived ease of use that receives government support due to infrastructure support, training, and access to technology (Dwivedi et al., 2022; Sudarwati & Nasution, 2024). However, research Muromba et al. (2025), supports the findings of this study, which found that government support does not always significantly impact perceived ease of use, as perceived ease of use is more influenced by technical factors such as user interface and user skills. According to the authors, the lack of government support is due to users assessing ease of use based more on direct experience with the application than on external government intervention.

Furthermore, the research results show that government support has a significant effect on perceived usefulness. This finding indicates that government support, whether in the form of policies, outreach, or infrastructure provision, can increase farmers' confidence in the benefits of the i-Pubers application in the process of redeeming subsidized fertilizer. Contextually, farmers tend to evaluate technology based on tangible benefits that can be directly felt, such as ease of obtaining fertilizer, transparency of distribution, and certainty of allocation. Therefore, the active presence of the government can increase trust in the system and strengthen the perception of benefits. These results are in line with research Chen et al. (2024) which states that government support can increase the perception of the benefits of technology through policies, facilitation, and encouragement of the use of digital technology in the agricultural sector. In addition, researchSudarwati & Nasution (2024) also shows that government programs such as extension and infrastructure development are able to increase productivity and the benefits felt by farmers from technology.

The results of the study showed that social learning did not have a significant effect on perceived ease of use. This finding contradicts research Amalia & A'zdom (2025) which states that social interaction, communication and networks between farmers can increase understanding and facilitate the use of technology through the process of sharing knowledge and forming social capital, and is supported byRen et al. (2023)who found that social learning, both through direct and ICT-based learning, can strengthen the understanding and adoption of technology and Mishra et al. (2024) which shows that social influence contributes to increasing the perception of ease of use of technology. However, the results of this study are in line with Cerjak et al. (2025) which reveals that technology adoption is more influenced by experience, familiarity, and economic motivation than social factors, and is supported byKarbo et al. (2024)which states that social factors do not always consistently influence adoption behavior compared to individual and economic factors and Aranguri et al. (2025) which confirms that digital literacy and individual abilities are the main determinants in the ease of use of technology. Analytically, this difference shows that the influence of social learning is contextual, where in conditions where users have limited knowledge, social factors become important, but in the context of this study, i-Pubers users already have basic experience and adequate digital literacy so they rely more on personal experience than social learning, which causes social learning to not play a significant role in shaping perceived ease of use.

On the other hand, the research results show that social learning has a significant effect on perceived usefulness. This result is in line with research Yuan et al. (2025) which states that social interaction and information exchange can increase the perception of the benefits of technology because users gain additional knowledge from various sources. This finding is also supported byAmalia & A'zdom (2025) which emphasizes that communication networks and collective learning between farmers are able to strengthen understanding and the value of the benefits of innovation through the process of sharing experiences and knowledge, as well asMishra et al. (2024) which shows that social influence has a significant impact on perceived usefulness because individuals tend to judge the benefits of technology based on the experiences of other users. Analytically, this finding indicates that social learning acts as a knowledge transfer mechanism that enriches farmers' understanding of the benefits of technology, where through social interaction farmers can observe the real experiences of other users, thus forming the belief that technology provides added value, such as increased efficiency, transparency, and productivity; this also confirms that social factors play a greater role in shaping perceptions of benefits than ease of use, which tends to be influenced by individual experience.

Furthermore, the research results show that platform support has a significant effect on perceived ease of use. This finding aligns with research Aung et al. (2025) which states that system quality, ease of access, and digital infrastructure have a strong influence on the ease of use of agricultural applications. Furthermore, Muromba et al. (2025) also emphasized that ease of use is strongly influenced by user-friendliness and infrastructure support. Analytical findings indicate that the better the platform quality (in terms of interface appearance, ease of navigation, and system stability), the lower the perceived difficulty level of users in operating the application. In the context of i-Pubers, platform support, such as simple design, easy-to-understand features, and stable access, allows farmers to use the application without requiring advanced technical skills. This indicates that perceived ease of use is not solely determined by individual ability but is also strongly influenced by the quality of the system used. Thus, platform support plays a key role in reducing technical barriers and increasing user comfort in adopting digital technology in the agricultural sector.

Platform supportalso proven to have a significant effect on perceived usefulness. This result is supported by research Yuan et al. (2025) which states that the quality of information and systems can increase the perception of the benefits of technology because it helps users in decision-making. This finding is also in line with Mishra et al. (2024) which shows that technological support and the availability of facilities (facilitating conditions) have a significant influence on perceived usefulness because a reliable and easily accessible system can improve user performance, as well as Manzoor et al. (2025) which revealed that digital technology and infrastructure factors are important determinants in increasing the perceived benefits of adopting agricultural technology. Furthermore, Aranguri et al. (2025) also emphasized that access to technology supported by a good system can increase the effectiveness of use and the perceived benefits of the technology. Analytical findings indicate that platform support not only simplifies use but also increases the utility of the technology by providing a reliable system, accurate information, and relevant features, enabling farmers to obtain tangible benefits such as efficiency, transparency, and ease of decision-making, ultimately strengthening the acceptance and sustainable use of the technology.

Further research results show that perceived ease of use has a significant effect on attitude toward use. This finding is consistent with the Technology Acceptance Model (TAM) theory, which states that ease of use will shape a positive attitude toward technology (Taherdoost et al., 2024). In addition, research Mishra et al. (2024) revealed that perceived ease of use has a significant effect on user attitudes in adopting digital agricultural technology because it increases user comfort and trust in the system. Analytically, this finding shows that the easier a technology is to use, the more positive the attitude formed towards the technology, because ease of use can reduce cognitive barriers, increase comfort, and build user trust, so that in the context of i-Pubers, ease of navigation, simple features, and clear processes will encourage the formation of positive attitudes that ultimately strengthen technology acceptance.

In addition, perceived usefulness has a significant influence on attitude toward use. This result is in line with research. Muromba et al. (2025) which shows that perceived benefits are a major factor in shaping user attitudes towards technology. This finding is also supported by Arrang et al. (2025) which proves that perceived usefulness has a significant contribution in shaping farmers' positive attitudes towards adopting IoT technology because it is directly related to increased efficiency and productivity. In addition, the research Cao et al. (2025) also shows that the perception of technological benefits plays a significant role in driving user acceptance and attitudes toward digital agricultural technology. Analytically, these findings suggest that users tend to form positive attitudes toward technology when they perceive tangible benefits, such as improved performance, efficiency, and ease of decision-making. In the context of i-Pubers, when farmers perceive that the application can increase transparency in fertilizer distribution, facilitate access to information, and assist in planning fertilizer needs, they will develop a more positive attitude toward its use. Thus, perceived usefulness is a key factor in shaping user attitudes because perceived benefits provide rational justification for users to accept and use the technology sustainably.

Finally, the results of the study show that attitude toward use has a significant effect on intention to adopt. This finding supports the research Nookhao et al. (2025) which states that a positive attitude towards technology will increase adoption intentions, where attitude is the main determinant in technology usage behavior. This finding is also in line with research Arrang et al. (2025) which shows that attitudes towards technology use play an important role in driving the intention to adopt IoT-based agricultural technology, as well as research Mishra et al. (2024) who found that user attitudes significantly influence technology adoption intentions in the context of digital agriculture. Analytically, these findings suggest that attitudes serve as a link between user perceptions of technology and the decision to adopt it, where positive attitudes formed from user experience, perceived benefits, and ease of use will drive increased adoption intentions. In the context of i-Pubers, when farmers have a positive attitude toward the application, they tend to have a stronger desire to use and utilize the system sustainably, thus strengthening the digital transformation process in subsidized fertilizer distribution.

Practical implications

The results of this study indicate that the implementation of the subsidized fertilizer distribution policy through official kiosks has been quite effective and directly impacted by farmers. The clarity of the distribution mechanism through kiosks not only improves distribution accuracy but also strengthens the kiosks' role as primary service points in the subsidized fertilizer distribution system. Therefore, the government needs to maintain and strengthen the official kiosk based distribution system with ongoing digital monitoring support to maintain transparency and accountability.

In terms of platform support, the i-Pubers application has proven to be a key enabler for kiosk operations through an integrated and systematic system. This indicates that successful policy implementation is determined not only by regulations but also by the readiness of digital infrastructure. Therefore, increased infrastructure support, such as stable internet access and adequate equipment, is needed, particularly in rural areas.

Furthermore, regarding the social learning variable, direct interaction between kiosk staff and farmers is a key factor in the technology adoption process. Interpersonal communication has been shown to help farmers understand system usage and reduce uncertainty about the technology. Therefore, kiosk managers are expected to act not only as fertilizer distributors but also as educational facilitators by providing direct assistance to farmers. Furthermore, the role of agricultural extension workers needs to be optimized as learning agents to improve farmers' digital literacy.

Regarding perceived ease of use, system ease of use is a crucial factor in driving technology acceptance among farmers. A simple and understandable system can reduce barriers to use. Therefore, i-Pubers app developers need to continuously optimize user-friendly interface design and provide simple and accessible user guides.

In the perceived usefulness variable, the direct benefits experienced by farmers reinforce that the implemented technology has provided tangible added value to the subsidized fertilizer distribution process, such as increased efficiency and transparency. This suggests that continued enhancement of features relevant to farmers' needs is necessary to optimize and sustain the perceived benefits.

Furthermore, in the attitude toward use and intention to adopt variables, positive attitudes and high adoption intentions indicate that the i-Pubers system has reached a strong initial acceptance stage. This indicates the potential for long-term sustainability of the system. Therefore, efforts are needed to maintain service quality, improve the user experience, and implement ongoing mentoring programs to maintain user trust and satisfaction.

5. CONCLUSION

The results of this study indicate that farmer acceptance of the i-Pubers application for subsidized fertilizer redemption is influenced by several variables within the Technology Acceptance Model (TAM) framework, namely perceived ease of use, perceived usefulness, attitude toward use, and intention to adopt, as well as external variables such as platform support, government support, and social learning. Of the nine hypotheses tested, seven were accepted and two were rejected.

More specifically, attitude toward use was shown to have the most dominant influence on intention to adopt, making farmers' attitudes a key factor in determining their decision to use the i-Pubers application. Furthermore, perceived ease of use and perceived usefulness significantly influenced attitude toward use, indicating that perceived ease and usefulness shape users' positive attitudes toward the technology.

Regarding external variables, platform support significantly impacts perceived ease of use, indicating that system quality and platform support facilitate application use. Meanwhile, government support and social learning do not significantly impact perceived ease of use, indicating that ease of use is determined more by individual experience than external factors. Conversely, government support and social learning significantly impact perceived usefulness, indicating that government support and social learning processes can increase the perceived usefulness of the application for farmers.

Based on these results, several strategic steps can be taken to improve the effectiveness of i-Pubers implementation. The government and PT Pupuk Indonesia need to further emphasize the system's tangible benefits, such as easy access to fertilizer, distribution transparency, and allocation certainty. Furthermore, improving the platform's quality, particularly in terms of system stability, ease of use, and speed of service, needs to be a priority. Strengthening community-based outreach and training through farmer groups, extension workers, and kiosks is also crucial to improve farmers' understanding of the system's use.

This study has several limitations that need to be considered. First, the study was conducted only on farmers in Madiun Regency, so the results cannot be generalized to other regions with different characteristics. Furthermore, the characteristics of the respondents indicate that the majority are aged 50 years and above (64 respondents (32.5%) and over 60 years (62 respondents (31.5%). This condition indicates a predominance of older respondents who tend to have different levels of digital literacy compared to younger age groups, which can influence perceptions of ease of use and technology adoption. Furthermore, the majority of respondents were male (86%) and had an education level dominated by elementary school and high school/equivalent, which also has the potential to influence the ability to understand and use digital systems. Therefore, further research is recommended to expand the research area, increase the diversity of respondent characteristics, and consider demographic variables such as age, education, and gender to obtain more representative and comprehensive results.

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7. REFERENCES

Amalia, L. A., & A'zdom, M. K. (2025). Agro-Communicative Networks Rural Sociology Perspectives on Knowledge Sharing and Innovation Diffusion in Sustainable Agriculture. *Journal of Agro Complex Development Society*, *2*(2). https://agrocomplex.professorline.com/index.php/journal/index

Aranguri, M., Mera, H., Noblecilla, W., & Lucini, C. (2025). Digital Literacy and Technology Adoption in Agriculture: A Systematic Review of Factors and Strategies. *AgriEngineering*, *7*(9), 296. https://doi.org/10.3390/agriengineering7090296

Arrang, H., Wee, S. Y., Bahaman, N. Bin, & Rusdi, J. F. (2025). Perceived Usefulness and Perceived Ease of Use as Predictors of Attitude Toward IoT Adoption Among Rice Farmers. *International Journal of Advanced Computer Science and Applications*, *16*(9). https://doi.org/10.14569/IJACSA.2025.0160935

Aung, E. D., Sasaki, N., Tsusaka, T. W., & Silpasuwanchai, C. (2025). Investigating farmers' adoption of mobile Agri-Tech: A TAM-Based study of KaseChar in Eastern Thailand. *Global Transitions*, *7*, 441–455. https://doi.org/10.1016/j.glt.2025.07.003

Badan Pusat Statistik. (2024). *Berita Resmi Statistik* (Issue November).

Badan Pusat Statistik. (2026). *Keadaan Ketenagakerjaan Indonesia November 2025*.

Badan Pusat Statistik Kabupaten Madiun. (2025). Luas Panen dan Produksi Padi di Kabupaten Madiun 2024 (Hasil Kegiatan Pendataan Statistik Pertanian Tanaman Pangan Terintegrasi dengan Metode Kerangka Sampel Area). In *Katalog: 5203031* (Vol. 1). Badan Pusat Statistik Kabupaten Madiun.

Badan Pusat Statistik Kabupaten Madiun. (2026). *Kabupaten Madiun Dalam Angka 2026* (Vol. 42). Badan Pusat Statistik Kabupaten Madiun.

Bakhshoudehnia, N., Farhadian, H., Saadvandi, M., & Karimi, V. (2026). Adoption of climate-smart agriculture among Iranian farmers based on an extended technology acceptance model. *Discover Sustainability*, *7*(1), 214. https://doi.org/10.1007/s43621-026-02595-1

Cao, A., Guo, L., & Li, H. (2025). Understanding farmer cooperatives' intention to adopt digital technology: mediating effect of perceived ease of use and moderating effects of internet usage and training. *International Journal of Agricultural Sustainability*, *23*(1). https://doi.org/10.1080/14735903.2025.2464523

Cerjak, M., Medici, M., Faletar, I., Sundeep, J. V., & Canavari, M. (2025). Adoption of mobile-based agricultural extension services: evidence from South India. *Journal of Rural Studies*, *120*, 103851. https://doi.org/10.1016/j.jrurstud.2025.103851

Chen, X., Zhang, X. E., & Chen, J. (2024). TAM-Based Study of Farmers' Live Streaming E-Commerce Adoption Intentions. *Agriculture (Switzerland)*, *14*(4), 1–22. https://doi.org/10.3390/agriculture14040518

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *Management Information Systems Quarterly*, *13*(3), 319–340. https://doi.org/10.2307/249008

Dwivedi, Y. K., Hughes, L., Baabdullah, A. M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M. M., Dennehy, D., Metri, B., Buhalis, D., Cheung, C. M. K., Conboy, K., Doyle, R., Dubey, R., Dutot, V., Felix, R., Goyal, D. P., Gustafsson, A., Hinsch, C., Jebabli, I., … Wamba, S. F. (2022). Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management*, *66*, 102542. https://doi.org/10.1016/j.ijinfomgt.2022.102542

Far, T., Rezaei-Moghaddam, K., & Koochak, S. S. (2025). An integrated model for analyzing farmers' behavioral intention towards the acceptance of environmental technologies. *Discover Environment*, *3*(1), 119. https://doi.org/10.1007/s44274-025-00329-0

Ghozali, I. (2018). *Aplikasi Analisis Multivariate dengan Program IBM SPSS 25* (9th ed., pp. xx–490). Badan Penerbit - Undip.

Ghozali, I., & Latan, H. (2015). *Partial Least Squares Konsep, Teknik dan Aplikasi Menggunakan Program SmartPLS 3.0 (Untuk Penelitian Empiris)* (2nd ed.). Badan Penerbit Universitas Diponegoro.

Hair, J. F. ., Hult, G. T. M. ., Ringle, C. M. ., & Sarstedt, M. (2022). *A primer on partial least squares structural* *equation modeling (PLS-SEM)*. SAGE Publications, Inc.

Hair, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business Research*, *109*(November 2019), 101–110. https://doi.org/10.1016/j.jbusres.2019.11.069

Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). *Mediation Analysis* (pp. 139–153). Springer International Publishing. https://doi.org/10.1007/978-3-030-80519-7_7

Hendrawan, S. A., Trihandoyo, A., & Saroso, D. S. (2023). Implementing Technology Acceptance Model to measure ICT usage by smallholder farmers. *SINERGI*, *27*(1), 123. https://doi.org/10.22441/sinergi.2023.1.014

Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: updated guidelines. *Industrial Management & Data Systems*, *116*(1), 2–20. https://doi.org/10.1108/IMDS-09-2015-0382

Karbo, R. T., Frewer, L. J., Areal, F., Jones, G., & Nurudeen, S. (2024). A systematic review of the efficacy of theories used to understand farmers' technology adoption behavior in lower-to-middle-income countries. *Development Studies Research*, *11*(1). https://doi.org/10.1080/21665095.2023.2294696

Keefe, D. H. S., Jang, H., & Ercan, E. N. (2025). Digitalization in sustainable agriculture supply chain: how digital literacy and support affect attitudes and adoption intentions. *International Trade, Politics and Development*, *9*(2), 129–144. https://doi.org/10.1108/ITPD-02-2025-0007

Kock, N., & Hadaya, P. (2018). Minimum sample size estimation in PLS-SEM: The inverse square root and gamma-exponential methods. *Information Systems Journal*, *28*(1), 227–261. https://doi.org/10.1111/isj.12131

Manzoor, F., Wei, L., Siraj, M., Lu, X., & Qiyang, G. (2025). Digital agriculture technology adoption in low and middle-income countries—a review of contemporary literature. *Frontiers in Sustainable Food Systems*, *9*. https://doi.org/10.3389/fsufs.2025.1621851

Mishra, N., Bhandari, N., Maraseni, T., Devkota, N., Khanal, G., Bhusal, B., Basyal, D. K., Paudel, U. R., & Danuwar, R. K. (2024). Technology in farming: Unleashing farmers' behavioral intention for the adoption of agriculture 5.0. *PLOS ONE*, *19*(8), e0308883. https://doi.org/10.1371/journal.pone.0308883

Muromba, P., Keeni, M., & Fuyuki, K. (2025). A systematic review of mobile agricultural service applications for smallholder farmers in sub-Saharan Africa: perspectives from the technology acceptance model. *Agriculture & Food Security*, *14*(1), 34. https://doi.org/10.1186/s40066-025-00563-y

Nookhao, S., Kiattisin, S., & Thananant, V. (2025). The role of technology readiness motivators, positive and negative impact toward smart farming technology adoption: Insight from Thai farmers. *International Journal of Information Management Data Insights*, *5*(2), 100380. https://doi.org/10.1016/j.jjimei.2025.100380

Pandeya, S., Gyawali, B. R., & Upadhaya, S. (2025). Factors Influencing Precision Agriculture Technology Adoption Among Small-Scale Farmers in Kentucky and Their Implications for Policy and Practice. *Agriculture (Switzerland)*, *15*(2), 177. https://doi.org/10.3390/agriculture15020177

Parmaksiz, O., & Cinar, G. (2023). Technology Acceptance among Farmers: Examples of Agricultural Unmanned Aerial Vehicles. *Agronomy*, *13*(8), 2077. https://doi.org/10.3390/agronomy13082077

Ren, Y., Feng, H., & Gao, T. (2023). Risk Cognition, Social Learning, and Farmers' Adoption of Conservation Agriculture Technology. *Agriculture*, *13*(8), 1644. https://doi.org/10.3390/agriculture13081644

Sarstedt, M., Ringle, C. M., & Hair, J. F. (2021). Partial Least Squares Structural Equation Modeling. In *Handbook of Market Research* (pp. 1–47). Springer International Publishing. https://doi.org/10.1007/978-3-319-05542-8_15-2

Sekaran, U., & Bougie, R. (2016). *Research methods for business : a skill-building approach*. John Wiley & Sons.

Sudarwati, L., & Nasution, N. F. (2024). Upaya Pemerintah dan Teknologi Pertanian dalam Meningkatkan Pembangunan dan Kesejahteraan Petani di Indonesia. *Jurnal Kajian Agraria Dan Kedaulatan Pangan (JKAKP)*, *3*(1), 1–8. https://doi.org/10.32734/jkakp.v3i1.15847

Sugiyono. (2022). *Metode PenelitianKualitatif (Untuk penelitian yang bersifat: eksploratif,enterpretif, interaktif dan konstruktif)* (2022nd ed.). Alfabeta Bandung.

Taherdoost, H., Mohamed, N., & Madanchian, M. (2024). Navigating Technology Adoption/Acceptance Models. *Procedia Computer Science*, *237*, 833–840. https://doi.org/10.1016/j.procs.2024.05.172

Yuan, W., Zhao, J., Huo, M., Feng, Y., & Xu, S. (2025). Information Acquisition and Green Technology Adoption Among Chinese Farmers: Mediation by Perceived Usefulness and Moderation by Digital Skills. *Sustainability*, *17*(21), 9712. https://doi.org/10.3390/su17219712