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Factors Influencing Farmers' Intention to Adopt the Integrated Rice Sowing and Fertilizer Incorporation Technique in the Mekong Delta

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Abstract

This study aims to identify the factors influencing farmers' intention to adopt the integrated rice sowing and fertilizer incorporation technique in three representative upstream provinces of the Mekong Delta (An Giang, Dong Thap, and Kien Giang). Based on Rogers' (2003) Diffusion of Innovation (DOI) theory, the research focuses on five independent variables: Relative Advantage, Compatibility, Complexity, Trialability, and Observability.

Data were collected from 200 farmers and analyzed using Cronbach's Alpha, Exploratory Factor Analysis (EFA), and multiple linear regression. The results show that the model has good explanatory power (Adjusted $R^2 = 0.503$). Among the factors, Compatibility ($\beta = 0.323$) has the strongest influence, followed by Relative Advantage ($\beta = 0.240$), Trialability ($\beta = 0.188$), and Observation ($\beta = 0.158$). Complexity was not found to be statistically significant.

This study contributes to understanding the key drivers of technology adoption behavior in agriculture and provides policy implications to enhance the implementation of the national program on one million hectares of high-quality, low-emission rice in the Mekong Delta.

Keywords: intention to adopt, integrated rice sowing, fertilizer incorporation technique, diffusion of innovation, Mekong Delta.

1. Introduction

The Mekong Delta is Vietnam's largest rice-producing region, contributing over 50% of its total rice output and more than 90% of its rice exports (Ministry of Agriculture and Rural Development, 2022). However, this region is currently facing a range of serious challenges, including climate change, saltwater intrusion, irregular flooding, and the degradation of land and water resources. In particular, the intensive triple-cropping rice system within fully enclosed dike areas—once crucial for national food security—has now become a hindrance to sustainable development due to its role in eliminating flood retention space, increasing input costs, and reducing overall economic efficiency (Nguyen Huu Thien, 2020).

In response, the Vietnamese Government issued Resolution No. 120/NQ-CP (Government, 2017) on sustainable development of the Mekong Delta in the context of climate change. The resolution calls for a shift from traditional agricultural production to a climate-adaptive, sustainable agricultural economy that follows the principle of "living with nature" and reducing greenhouse gas emissions. In implementing this directive, the Ministry of Agriculture and Rural Development and upstream provinces such as An Giang, Dong Thap, and Kien Giang have launched the national initiative "One Million Hectares of High-Quality, Low-Emission Rice" with the introduction of several innovative farming techniques.

Among these innovations, the integrated rice sowing and fertilizer incorporation technique has emerged as a key solution. According to the report by Dittmer et al. (2024), this method can reduce seed use by 30–50%, save 30–70 kg of fertilizer per hectare, decrease water use by 30–40%, reduce pesticide applications by 1–4 times per season, and lower greenhouse gas emissions by 2–12 tons CO_2eq/ha per crop. Additionally, it improves yields and increases profits by 4 to 7.6 million VND per hectare.

Nevertheless, the widespread adoption of this technique still faces numerous barriers, including the lack of suitable machinery, limited technical capacity among farmers, reluctance to change long-standing cultivation practices, and insufficient community-based evidence (Nguyen Bao, 2024). A recent study by CGIAR also emphasizes that the lack of coordination between communication, technical assistance, and financial incentive mechanisms is a major factor impeding the broader diffusion of the technique (Dittmer et al., 2024).

Therefore, it is essential to conduct a study on the factors influencing farmers' intention to adopt the integrated rice sowing and fertilizer incorporation technique in the Mekong Delta. Such research will help identify key drivers and barriers, thereby informing policies that can support and enhance the implementation of the One Million Hectares Program in line with the vision of Resolution 120/NQ-CP.

2. Theoretical Framework and Research Model

2.1. Diffusion of Innovation (DOI) Theory

The Diffusion of Innovation (DOI) theory, first introduced by Everett M. Rogers in 1962 and refined in its fifth edition in 2003, provides a widely applied analytical framework for explaining how innovations are communicated and adopted within a social system over time. According to Rogers (2003), diffusion is "the process by which an innovation is communicated through certain channels over time among the members of a social system." A core contribution of the DOI

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theory lies in identifying five key characteristics of an innovation that significantly influence potential users' adoption decisions:
(1) Relative advantage – the degree to which an innovation is perceived as better than the existing method;
(2) Compatibility – the consistency of the innovation with users' values, experiences, needs, and current conditions;
(3) Complexity – the perceived difficulty in understanding and using the innovation;
(4) Trialability – the degree to which an innovation can be tested on a limited basis and with low risk; and
(5) Observability – the extent to which the results of the innovation are visible and easily evaluated by others (Rogers, 2003).
In the context of agricultural production, this theory has been frequently employed to understand how farmers adopt new techniques through informal communication channels, such as peer interaction, model demonstration farms, and word-of-mouth learning within local networks (Bandiera & Rasul, 2006).

The applicability of DOI in agriculture has been well demonstrated in numerous studies across developing countries, where adoption decisions are often shaped by considerations such as cost, risk perception, and social networks. For example, Adnan et al. (2017) in Pakistan found that relative advantage, trialability, and observability were decisive in farmers' adoption of water-saving irrigation technology.

In Kenya, Mignouna et al. (2011) showed that compatibility and complexity significantly affected farmers' willingness to adopt genetically modified maize varieties. In Vietnam, Tran Van Hanh et al. (2020) applied the DOI framework to study farmers' adoption of climate-smart agricultural practices in the Mekong Delta, concluding that relative advantage and access to information were the most influential factors driving adoption behavior.

Taken together, the DOI theory offers a robust theoretical foundation for analyzing farmers' intention to adopt the integrated rice sowing and fertilizer incorporation technique, especially in the context of climate change adaptation and the transition toward sustainable agriculture in the Mekong Delta.

2.2. Research Model

Based on the Diffusion of Innovation (DOI) theory and supporting empirical findings, this study proposes a theoretical model comprising five independent variables hypothesized to influence farmers' intention to adopt the integrated rice sowing and fertilizer incorporation technique in the Mekong Delta region. These variables include: Relative Advantage (RA), Compatibility (COMP), Complexity (COMPLX), Trialability (TRIAL), and Observability (OBSERV). The dependent variable is the Intention to Adopt (INT), which refers to the degree of farmers' readiness, determination, and willingness to apply the technique in actual production.

The model assumes that RA, COMP, TRIAL, and OBSERV positively affect INT, while COMPLEX is hypothesized to have a negative influence. The rationale behind this structure is that innovations that are easy to understand, compatible with existing practices, and visibly effective are more likely to be accepted by farmers. Conversely, overly complex techniques may discourage adoption due to perceived risk or operational difficulty (Rogers, 2003; Ajzen, 1991).

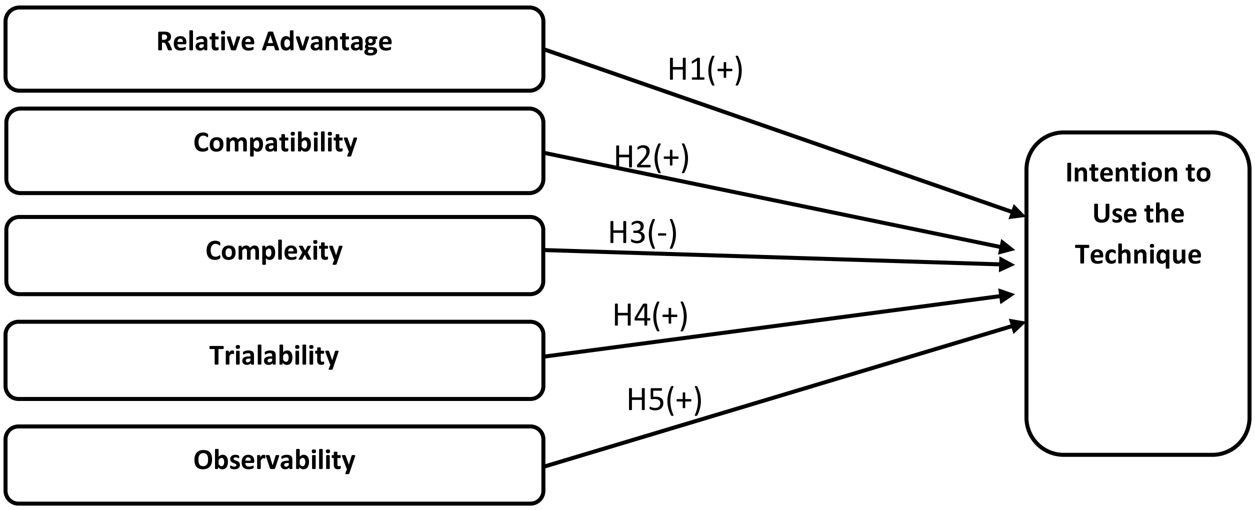

Figure 1: Proposed Research Model

H1 (+): Relative Advantage (RA) has a positive impact on the intention to adopt the deep-furrow rice sowing technique.
H2 (+): Compatibility (COMP) has a positive impact on the intention to adopt the technique.
H3 (−): Complexity (COMPLX) hurts the intention to adopt the technique.
H4 (+): Trialability (TRIAL) has a positive impact on the intention to adopt the technique.
H5 (+): Observability (OBSERV) has a positive impact on the intention to adopt the technique.

Table 1: Operationalization of Observed Variables

Code	Item Statement
Relative Advantage (RA)	
RA1	The integrated seed-drill and fertilizer-burying technique helps me save on fertilizer costs.
RA2	Using this technique reduces my labor input.
RA3	This technique increases rice yield compared to traditional methods.
RA4	The technique improves the quality of rice produced.

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RA5	I find this technique significantly more effective than previous methods.
Compatibility (COMP)	
COMP1	This technique suits the production conditions of my household.
COMP2	The technique does not drastically alter my current farming practices.
COMP3	It aligns well with my values and farming habits.
COMP4	This technique is compatible with my existing production plans.
COMP5	I can easily integrate this technique into my current cultivation process.
Complexity (COMPLX)	
COMPLX1	I find this technique easy to understand and access.
COMPLX2	I can apply this technique easily in farming practices.
COMPLX3	I do not face difficulties operating the integrated seeding machine.
COMPLX4	I do not need many new skills to use this technique.
COMPLX5	I do not need to change many tools or equipment to apply this technique.
Trialability (TRIAL)	
TRIAL1	I can trial this technique on a small plot before applying it broadly.
TRIAL2	It is easy for me to experiment with this technique before official use.
TRIAL3	I have the resources to trial this technique without significant risk.
TRIAL4	I can easily access support to test this technique.
TRIAL5	I have sufficient information to effectively conduct a trial of this technique.
Observability (OBSERV)	
OBSERV1	I have seen positive results from others who have used this technique.
OBSERV2	There are many demonstration models of this technique in my locality.
OBSERV3	I can clearly observe the benefits of this technique through field demonstrations.
OBSERV4	Many farmers around me have successfully adopted this technique.
OBSERV5	I frequently exchange experiences with others who have implemented this technique.
Intention to Use the Technique (INT)	
INT1	I plan to adopt this technique in upcoming crop seasons.
INT2	I intend to use this technique long-term if it proves effective.
INT3	I would recommend this technique to other farmers if I find it beneficial.
INT4	I am very eager to apply this technique in the next crop cycle.
INT5	I am determined to adopt this technique due to its long-term benefits.

3. Research Methodology

3.1. Data Collection Method

Sampling unit: The study targets rice farmers in three upstream provinces of the Mekong Delta—An Giang, Đồng Tháp, and Kiên Giang—where the pilot implementation of the One Million Hectare Program for high-quality, low-emission rice production is underway. In each province, two representative districts were selected, focusing on areas with large rice cultivation areas and high levels of mechanization. All surveyed farmers had prior exposure to or knowledge of the integrated seed-drilling and fertilizer-burying technique.

Sample size: This study employs Exploratory Factor Analysis (EFA), and according to Hair et al. (2010), the minimum required sample size for EFA is 50, preferably 100 or more, with an ideal sample-to-variable ratio of at least 5:1. Given the 30 observed variables in the model, the minimum required sample is $n = 30 \times 5 = 150$. To enhance reliability and representation, the study used a final sample size of 200 respondents.

Sampling method: A stratified sampling technique was applied based on geographical location, stratified by province and district. Then, convenience sampling was used to select farmers from cooperatives, demonstration models, or production groups that had either implemented or been exposed to the integrated seeding technique. Questionnaires were administered through face-to-face interviews to ensure the accuracy and clarity of responses.

3.2. Data Analysis Methods

To address the study's objectives and test the proposed hypotheses, the following analytical techniques were employed:
Descriptive statistics to summarize respondent characteristics and variable distributions;
Exploratory Factor Analysis (EFA) to validate the construct validity of measurement scales; and
Multiple Linear Regression Analysis to assess the influence of independent variables on the intention to adopt the technique.

4. Results and Discussion

4.1. Reliability Analysis of Measurement Scales using Cronbach's Alpha

To assess the reliability of the measurement scales used in the research model, the authors applied Cronbach's Alpha coefficient, which indicates the internal consistency among observed variables within the same conceptual construct. According to the criteria set by Nunnally & Bernstein (1994), a scale is considered reliable if Cronbach's Alpha ≥ 0.7 and all Corrected Item–item–total correlations exceed 0.3. The analysis results show that all measurement scales in the model satisfy the required reliability thresholds. Specifically:

The Relative Advantage (RA) scale, consisting of 5 observed items (RA1–RA5), has a Cronbach's Alpha of 0.85. The corrected item-total correlations range from 0.618 to 0.722.

None of the items would improve the alpha if removed, indicating that all are retained in the scale.

The Compatibility (COMP) scale achieves a Cronbach's Alpha of 0.862, with item-total correlations ranging from 0.755 to 0.820. This reflects strong internal coherence among items in measuring the construct of compatibility with existing farming conditions.

The Complexity (COMPLX) scale demonstrates very high reliability, with Cronbach's Alpha of 0.907—the second highest in the model. All five items (COMPLX1–COMPLX5) have corrected item-total correlations above 0.72, indicating they effectively capture farmers' perceptions regarding the simplicity and ease of using the new technique.

Notably, the Trialability (TRIAL) scale records the highest Cronbach's Alpha of 0.920, signifying excellent internal consistency. This suggests farmers perceive the ability to trial the technique on a small scale with minimal risk very clearly and consistently.

The Observability (OBSERV) scale also achieves a strong alpha of 0.90, with item-total correlations between 0.712 and 0.818, reinforcing the importance of visibly observing others' successful adoption in the diffusion of innovation.

Lastly, the Intention to Use (INT) scale—representing the model's dependent variable—achieves a Cronbach's Alpha of 0.895, demonstrating the scale's appropriateness for measuring farmers' intentions and willingness to adopt the technique in future practices.

In summary, all scales exceed the 0.85 threshold for Cronbach's Alpha, reflecting high reliability. Moreover, no item was removed, as all met the requirement of Corrected Item–Total Correlation > 0.3 and "Alpha if item deleted" values lower than the overall Alpha, validating the retention of all 30 observed variables for subsequent Exploratory Factor Analysis (EFA) and Multiple Regression Analysis.

Additionally, the scale measuring farmers' intention to transition to adaptive farming models yields a total Cronbach's Alpha of 0.873. All variables in this group demonstrate item-total correlations above 0.3, and removing any item would not enhance overall reliability. Therefore, the measurement scales are deemed appropriate for the research context (Nunnally & Bernstein, 1994).

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Table 2. Final Cronbach's Alpha Analysis Results

Biến quan sát	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Relative Advantage Cronbach's Alpha Total = 0,85				
RA1	13.045	11.169	0.722	0.802
RA2	12.96	11.355	0.675	0.815
RA3	12.995	11.703	0.641	0.824
RA4	12.96	12.039	0.618	0.83
RA5	13.00	11.739	0.641	0.824
Compatibility Cronbach's Alpha Total = 0,862				
COMPLX1	13.23	8.479	0.589	0.856
COMPLX2	13.35	8.138	0.7	0.829
COMPLX3	13.34	7.733	0.764	0.812
COMPLX4	13.375	7.944	0.721	0.823
COMPLX5	13.325	8.08	0.637	0.845
Complexity Cronbach's Alpha Total = 0,907				
COMP1	13.6	10.161	0.805	0.878
COMP2	13.595	10.162	0.799	0.88
COMP3	13.57	10.528	0.819	0.876
COMP4	13.57	11.201	0.708	0.899
COMP5	13.585	11.189	0.706	0.899
Trialability Cronbach's Alpha Total = 0,920				
TRIAL1	14.075	12.15	0.75	0.91
TRIAL2	14.01	12	0.774	0.906
TRIAL3	14.03	11.235	0.822	0.896
TRIAL4	14.065	11.709	0.802	0.9
TRIAL5	14.08	11.25	0.819	0.897
Observability Cronbach's Alpha Total = 0,90				
OBSERV1	13.56	13.102	0.712	0.887
OBSERV2	13.595	12.735	0.818	0.865
OBSERV3	13.55	12.771	0.731	0.883
OBSERV4	13.565	12.719	0.774	0.873
OBSERV5	13.49	12.874	0.729	0.883
Intention to Use Cronbach's Alpha Total = 0,895				
INT1	14.02	10.623	0.788	0.862
INT2	13.975	10.869	0.736	0.873
INT3	13.95	10.369	0.727	0.876
INT4	13.895	10.537	0.786	0.862
INT5	13.96	10.702	0.680	0.886

4.2. Exploratory Factor Analysis (EFA)

4.2.1. Independent Variables

To examine the structural validity of the measurement scales for the independent variables, Exploratory Factor Analysis (EFA) was conducted using the principal component extraction method with Varimax rotation.
The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy yielded a value of 0.855, which exceeds the recommended threshold of 0.5, indicating that the sample size was sufficient for factor analysis. Furthermore, Bartlett's Test of Sphericity was statistically significant with Sig. = 0.000, rejecting the null hypothesis that the correlation matrix is an identity matrix. This result confirms that the variables are significantly correlated and suitable for factor analysis.

The EFA results extracted five factors with eigenvalues greater than 1, which collectively explained 70.88% of the total variance. These five factors align well with the theoretical constructs derived from the Diffusion of Innovation (DOI) framework by Rogers (2003), including:

Table 3. Rotated Factor Matrix - Final Version

Component	**1**	**2**	**3**	**4**	**5**
TRIAL3	0.861				
TRIAL5	0.847				
TRIAL4	0.829				
TRIAL2	0.781				
TRIAL1	0.748				
OBSERV2		0.86			
OBSERV4		0.841			
OBSERV1		0.774			
OBSERV3		0.771			
OBSERV5		0.742			
COMP3			0.82		
COMP2			0.799		
COMP1			0.796		
COMP4			0.772		
COMP5			0.755		
COMPLX2				0.815	
COMPLX4				0.812	
COMPLX3				0.805	
COMPLX1				0.734	
COMPLX5				0.72	
RA1					0.792

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RA2					0.764
RA3					0.747
RA4					0.732
RA5					0.703
Eiginvalue	**8,557**	**3,508**	**2,144**	**1,792**	**1,720**
Cumulative (%)	**34,23**	**48,26**	**56,84**	**64,01**	**70,88**

The results of the Exploratory Factor Analysis (EFA) on 25 observed variables across five theoretical constructs demonstrate a high level of model suitability, with a KMO value of 0.855 and a Bartlett's Test of Sphericity significance level of 0.000. Five distinct factors were extracted, aligning well with the theoretical groupings: Trialability, Observability, Compatibility, Complexity, and Relative Advantage. The cumulative variance explained reached 70.88%, indicating that the factor structure explains a substantial portion of the total variance. All observed variables loaded strongly on their respective factors (factor loadings > 0.7) and were grouped, confirming that the measurement constructs exhibit good convergent and discriminant validity, consistent with the theoretical framework of Rogers' Diffusion of Innovation theory (2003).

4.2.2 Dependent Variable

The results of the factor suitability tests indicate that the Kaiser-Meyer-Olkin (KMO) measure is 0.795, which exceeds the minimum acceptable threshold of 0.5. Furthermore, Bartlett's Test of Sphericity yields a significance level of 0.000, confirming that the null hypothesis is rejected at the 5% significance level. These results suggest that the observed variables are sufficiently correlated and therefore suitable for Exploratory Factor Analysis (EFA). Additionally, all five observed variables exhibit factor loadings greater than 0.5, meeting the criteria for retention in the factor model and reinforcing the appropriateness of the measurement structure.

4.3. Multiple Linear Regression Analysis

4.3.1. Model Fit Assessment

To evaluate the explanatory power of the proposed model for the dependent variable—farmers' intention to adopt the integrated broadcasting and fertilizer incorporation technique—the authors conducted a multiple linear regression analysis using five independent variables: Relative Advantage (RA), Compatibility (COMP), Complexity (COMPLX), Trialability (TRIAL), and Observability (OBSERV).

The analysis revealed that the coefficient of determination (R^2) was 0.516, indicating that 51.6% of the variance in the dependent variable could be explained by the set of independent variables in the model. When adjusted for the number of predictors, the adjusted R^2 value was 0.503, suggesting a good and stable model fit (Field, 2009). This result confirms that the theoretical

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constructs included in the model are practically relevant within the context of rice farming in the Mekong Delta.

Furthermore, the ANOVA test indicated a statistically significant regression model, with F = 41.297 and p-value = 0.000 (< 0.05). This implies that at least one independent variable has a significant effect on the dependent variable and that the overall model fits the data well.
Additionally, the Durbin–Watson statistic was 1.848, falling within the acceptable range of [1.5–2.5], indicating no autocorrelation in the residuals, thereby confirming the independence assumption of the linear regression model.

Table 4. ANOVA Table of the Model

	Sum of Squares	df	Mean Square	F	Sig.
Regression	66.356	5	13.271	41.297	.000b
Residual	62.344	194	0.321		
Total	128.7	199			

Table 4, Sig, = 0,00 nhỏ hơn 0,05 nên mô hình hồi quy tuyến tính được xây dựng phù hợp với tổng thể.

4.3.2. Analysis of the Impact of Independent Variables

To determine the magnitude and direction of influence of each independent factor on the intention to adopt the technique (INT), a multiple linear regression analysis was performed using five independent variables: Relative Advantage (RA), Compatibility (COMP), Complexity (COMPLX), Trialability (TRIAL), and Observability (OBSERV). The table below presents the unstandardized and standardized regression coefficients, significance values (Sig.), as well as multicollinearity diagnostics (Tolerance and Variance Inflation Factor – VIF):

Table 5. Regression Coefficients Table

Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**T**	**Sig.**	**Collinearity Statistics**	
	B	**Std. Error**	**Beta**			**Toleran ce**	**VIF**
(Constant)	0.218	0.252		0.863	0.389		
RA	0.23	0.056	0.24	4.101	0	0.732	1.366
COMPLX	0.094	0.064	0.081	1.473	0.143	0.816	1.225
COMP	0.323	0.063	0.323	5.148	0	0.634	1.578
OBSERV	0.143	0.055	0.158	2.6	0.01	0.678	1.475
TRIAL	0.179	0.059	0.188	3.041	0.003	0.653	1.532

Based on the regression coefficients presented in **Table 5**

INT=0.218+0.230·RA+0.094·COMPLX+0.323·COMP+0.179·TRIAL+0.143·OBSERV

Compatibility (COMP) was found to be the most influential factor on the intention to adopt the technique, with a standardized coefficient β = 0.323 and significance level Sig. = 0.000. This suggests that when the technique aligns well with existing farming conditions, production practices, and available infrastructure, farmers are more likely to adopt it.

Relative Advantage (RA) also showed a significant positive impact on the intention to adopt, with β = 0.240 and Sig. = 0.000. When farmers perceive that the technique reduces costs, increases yields, or minimizes labor input, they are more inclined to implement it.
Trialability (TRIAL) had a coefficient of β = 0.188 and Sig. = 0.003, indicating that the ability to experiment with the technique on a small scale and with minimal risk serves as an encouraging factor for adoption.

Observability (OBSERV) also exerted a positive influence (β = 0.158, Sig. = 0.010), suggesting that when farmers can see the benefits of the technique demonstrated by others, their trust and willingness to adopt the technique increase.
Conversely, Complexity (COMPLX) had a low and statistically insignificant effect (β = 0.081, Sig. = 0.143), implying that the technique was not perceived as overly difficult or complex enough to negatively influence farmers' adoption decisions.

5. Conclusion and Managerial Implications

5.1. Conclusion

This study aimed to identify the factors influencing farmers' intention to adopt the rice sowing technique combined with fertilizer incorporation in three upstream provinces of the Mekong Delta (An Giang, Dong Thap, and Kien Giang), in the context of the implementation of the One-Million-Hectare Program for high-quality, low-emission rice production. Based on Rogers' Diffusion of Innovation (DOI) Theory (2003), the proposed model includes five independent variables: Relative Advantage (RA), Compatibility (COMP), Complexity (COMPLX), Trialability (TRIAL), and Observability (OBSERV). Data were collected from 200 farmers and analyzed using Cronbach's Alpha, Exploratory Factor Analysis (EFA), and Multiple Linear Regression.

The findings indicate that the model has good explanatory power, with an adjusted R^2 of 0.503. Among the predictors, Compatibility (β = 0.323) emerged as the strongest factor, followed by Relative Advantage (β = 0.240), Trialability (β = 0.188), and Observability (β = 0.158). On the other hand, Complexity did not have a statistically significant effect (Sig. > 0.05), suggesting that the technique is not perceived as too difficult to hinder adoption.

These results confirm that the adoption of new agricultural techniques by farmers largely depends on the degree of alignment with existing farming conditions, the perceived benefits, the ability to experiment on a small scale, and the visibility of successful applications among peers.

5.2. Managerial Implications

Based on the research results, several policy and managerial implications are proposed to enhance the adoption of the rice sowing and fertilizer incorporation technique:
Enhance communication about compatibility and economic benefits: Local governments and extension agencies should provide clear information emphasizing how the technique aligns with existing practices and infrastructure, requiring minimal changes. This will help build farmers' confidence and readiness to adopt.

Establish on-site demonstration models: Visual demonstrations allow farmers to witness tangible benefits in yield, cost savings, and product quality. Such demonstrations also encourage peer-to-peer learning, which is crucial for the diffusion of innovation in rural contexts.
Facilitate small-scale trial opportunities: Policy support should prioritize pilot trials at the household or cooperative level, accompanied by technical assistance. This approach reduces psychological and financial risks associated with innovation.

Strengthen training and technical support for machinery operation: Although complexity did not show a significant effect in this study, enhancing farmers' skills in using sowing and fertilizer-incorporating machinery can further boost confidence and accelerate adoption.
Integrate financial incentives: Policies such as subsidized interest rates for equipment purchase, support for organic fertilizers, or carbon credit rewards for low-emission farming models can serve as strong motivators for wider adoption.

The findings from this study provide scientific and practical foundations for policymakers, agricultural extension services, and farmer organizations to design strategies for adaptive agricultural transformation, particularly in alignment with the implementation of Resolution 120/NQ-CP on sustainable development of the Mekong Delta under climate change.

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