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Technology Adoption Among Thai Farmers: The Mediating Role of Resistance to Change in a UTAUT2 Framework

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Abstract

This study investigates the mediating role of Resistance to Change (RTC) in the relationship between UTAUT2 factors and behavioral intention to adopt business-to-business (B2B) agricultural marketplace platforms among smallholder farmers in Kamphaeng Phet Province, Thailand. Using purposive sampling, a quantitative survey was conducted with 400 smallholder farmers. Mediation analysis was performed using PROCESS Macro (Model 4) with 5,000 bootstrap resamples. The total effect of UTAUT2 on behavioral intention was significant ($\beta = 0.8858$, $p < .001$, 95% CI [0.8050, 0.9667]). When RTC was included in the model, the direct effect remained significant ($\beta = 0.7366$, $p < .001$), while the indirect effect through RTC was also significant ($\beta = 0.1493$, 95% CI [0.0897, 0.2175]), confirming partial mediation. Additionally, UTAUT2 negatively predicted RTC ($\beta = -0.4848$, $p < .001$), and RTC negatively predicted behavioral intention ($\beta = -0.3056$, $p < .001$). These findings indicate that stronger UTAUT2 factors reduce psychological resistance, thereby increasing the likelihood of technology adoption. The study provides empirical evidence for integrating behavioral resistance factors into UTAUT2 and offers actionable insights for policymakers and platform developers to design interventions that reduce resistance and accelerate digital agriculture adoption.

Keywords: Technology Adoption, Farmer, UTAUT2, Resistance to Change, Behavioral Intention

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1. INTRODUCTION

In recent years, digital platforms have played an important role in transforming traditional agricultural practices. One key development is the introduction of business-to-business (B2B) agricultural marketplace applications. These mobile platforms allow farmers to connect directly with buyers, reducing their reliance on middlemen and improving transparency in agricultural supply chains.

In Thailand, where smallholder farmers dominate the agricultural sector, this innovation has the potential to reduce marketing costs and improve income for farmers. By matching supply and demand directly, these platforms can enhance supply chain efficiency and support sustainable agricultural practices (Jain et al., 2023; Xie et al., 2022).

Despite the advantages, the adoption of these digital platforms among farmers remains limited. Understanding the reasons behind this slow adoption is critical. Technology adoption in agriculture is often influenced by several factors, such as ease of use, social influence, and infrastructure. Models like the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) have been widely used to explain why individuals adopt or resist new technologies (Venkatesh et al., 2012).

However, one often overlooked factor in technology adoption is resistance to change (RTC). In rural and agricultural contexts, farmers may hesitate to adopt new tools due to fear of risk, unfamiliarity with digital interfaces, or satisfaction with traditional methods (Fox et al., 2018; Donmez-Turan, 2020). Resistance can create psychological barriers that prevent even the most beneficial technologies from being used. Studies have shown that high resistance to change can negatively affect behavioral intention to adopt agricultural technologies, even when the technology is considered useful (Secretaria, 2019).

This study aims to explore the mediating role of resistance to change in the relationship between UTAUT2 factors and behavioral intention to use B2B agricultural marketplace platforms. Unlike previous research that focuses only on direct factors influencing adoption, this study proposes that RTC plays a central role in determining whether farmers will accept or reject digital tools. It focuses on smallholder farmers in Kamphaeng Phet Province, Thailand, where B2B agricultural platforms are being piloted.

By including RTC as a mediating variable, this research provides a deeper understanding of how farmers approach new technologies. The findings will support policy makers, platform developers, and agricultural stakeholders in designing strategies to reduce resistance and encourage technology use in agriculture. This is especially important as Thailand moves toward digital agriculture under the Thailand 4.0 initiative.

Despite many studies using UTAUT2 to explain technology adoption in agriculture, several gaps remain. Most research looks only at direct factors and pays little attention to psychological barriers like resistance to change. Very few studies test RTC as a mediator in the UTAUT2 model, especially among smallholder farmers in Thailand. There is also limited evidence showing how UTAUT2 factors might influence farmers' intentions indirectly by reducing resistance.

Therefore, this study extends UTAUT2 by including RTC as a mediating variable and examines four hypotheses about its role in the adoption of B2B agricultural marketplace platforms. This helps offer a more complete understanding of farmers' adoption behavior and supports more practical policy and platform design decisions.

2. Objectives

2.1 To examine the influence of UTAUT2 factors on smallholder farmers' behavioral intention to adopt B2B agricultural marketplace platforms.

2.2 To investigate the mediating role of resistance to change (RTC) in the relationship between UTAUT2 constructs and behavioral intention.

3. LITERATURE REVIEW

3.1 Technology Adoption in Agriculture

The adoption of digital technologies in agriculture has become increasingly important for improving productivity, enhancing supply chain efficiency, and providing direct market access for smallholder farmers. Research shows that innovations such as mobile platforms, IoT-based monitoring, drones, and blockchain systems can significantly increase farmers' access to resources, reduce costs, and improve transparency in agricultural markets (Xie et al., 2022; Jain et al., 2023). However, despite their potential, adoption rates remain uneven, especially in developing countries, due to challenges related to digital literacy, infrastructure, and behavioral resistance.

The UTAUT and UTAUT2 frameworks have been widely used to understand technology adoption in agriculture. Studies across multiple contexts highlight the importance of performance expectancy, effort expectancy, social influence, and facilitating conditions in influencing adoption decisions (Ravindran et al., 2024; Markovits, 2023). For instance, in Malaysia, performance expectancy and facilitating conditions were found to be critical in farmers' intention to adopt smart farming technologies (Ravindran et al., 2024). Similarly, research in Romania shows that social influence and perceived benefits strongly motivate digital agriculture adoption (Markovits, 2024).

Technology adoption in agriculture is not limited to production practices but extends to financial and market platforms as well. Omar et al. (2022) demonstrated that UTAUT-based factors strongly predict farmers' intention to adopt mobile agricultural finance applications, highlighting the role of social influence and technology readiness. In Bangladesh, IoT adoption studies show that trust, hedonic motivation, and government support are equally important drivers of adoption in rural contexts (Shi et al., 2022). These findings reinforce the adaptability of UTAUT2 in different agricultural domains.

Emerging technologies such as artificial intelligence, drones, and blockchain also show promise in transforming agricultural supply chains. Ahadzadeh et al. (2021) found that performance expectancy and social influence were strong predictors of AI adoption in agricultural operations. Salleh et al. (2024) reported that trust and facilitating conditions were essential in sustaining drone adoption in Malaysian paddy farming. Blockchain adoption studies similarly emphasize the role of perceived value and government support in overcoming farmer hesitancy (Shih & Chiu, 2023).

Despite these advances, studies continue to highlight significant barriers to adoption. Yeo and Keske (2024) argue that profitability and trust remain dominant concerns for farmers, often outweighing theoretical advantages of new tools. Fox et al. (2018) also found that while social influence helps initial adoption of mobile farming applications, sustained use depends on perceived usefulness and ease of use. This suggests that adoption in agriculture is a dynamic process, requiring both structural support (infrastructure, training, financial access) and behavioral enablers (trust, reduced resistance, habit formation).

Overall, the literature shows that while agricultural technology adoption is advancing, its success depends on addressing not only structural factors but also farmers' perceptions, readiness, and psychological barriers. UTAUT2 and its extensions provide a robust foundation to explain this adoption process across contexts.

3.2 UTAUT2 Framework in Technology Adoption

The Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. (2003), is one of the most widely used models to explain user adoption of technology. It integrates elements from eight earlier theories of technology acceptance, including TAM, TRA, and TPB. The model proposes that performance expectancy, effort expectancy, social influence, and facilitating conditions directly influence behavioral intention and use behavior.

Building on this foundation, UTAUT2 was introduced to extend the original model to consumer and voluntary contexts. UTAUT2 incorporates three new constructs: hedonic motivation, price value, and habit, in addition to the original four (Venkatesh et al., 2012). This makes UTAUT2 more applicable for consumer technologies, such as mobile applications, where personal enjoyment, cost considerations, and habitual behavior play important roles.

Numerous studies have validated UTAUT2 in the agricultural sector. For example, Septiani et al. (2020) applied UTAUT2 to explore Indonesian farmers' adoption of peer-to-peer (P2P) lending platforms. Their findings showed that performance expectancy, price value, and habit significantly influenced farmers' behavioral intention. Similarly, Omar et al. (2022) found that social influence and technology readiness were strong predictors of farmers' intention to adopt mobile agricultural finance applications, confirming the robustness of UTAUT2 in rural contexts.

Markovits (2023, 2024) emphasized that UTAUT2 is well-suited for analyzing agricultural digitalization in Romania, as it accounts for both traditional motivators (usefulness and ease of use) and modern drivers such as hedonic value. Ahadzadeh et al. (2021) further applied UTAUT2 to AI adoption in agriculture, where performance expectancy, social influence, and hedonic motivation emerged as significant predictors. In Malaysia, Ravindran et al. (2024) used UTAUT to study smart farming technologies, finding that facilitating conditions and performance expectancy remain the strongest adoption drivers.

Other extensions of UTAUT2 highlight its flexibility. Xie et al. (2022) extended UTAUT2 with perceived value to explain tea farmers' adoption of ecological agriculture, showing that value perceptions mediated the effects of performance expectancy and social influence. Putra et al. (2023) also applied UTAUT2 to adoption of agricultural apps in Indonesia, finding that user experience and community behavior moderated adoption outcomes. Similarly, Dudás and Dávid (2024) examined UTAUT2 in the context of self-driving tractors, showing its applicability in evaluating cutting-edge technologies in agriculture.

Systematic reviews also support UTAUT2's relevance. Alghatrifi & Khalid (2019) analyzed dozens of UTAUT/UTAUT2 studies and concluded that the extended model provides greater explanatory power, especially in voluntary adoption scenarios. A meta-analysis by Siregar & Anggoro (2022) also identified performance expectancy, social influence, and facilitating conditions as consistently strong predictors across agricultural adoption studies.

Even though UTAUT2 has seven constructs, past research has shown that they can be tested either individually or as a combined predictor, depending on what the study aims to explore (Alghatrifi & Khalid, 2019).

Together, these findings demonstrate that UTAUT2 is a robust framework to explain technology adoption in agriculture, particularly for digital platforms and applications where behavioral, social, and cost-related factors strongly influence farmers' adoption decisions.

3.3 Resistance to Change (RTC) in Technology Adoption

While models such as UTAUT2 explain the drivers of technology adoption, they often underplay the importance of barriers to adoption. One critical barrier is Resistance to Change (RTC), which refers to psychological, cultural, or structural reluctance to embrace new technologies (Oreg, 2003). RTC is particularly relevant in agriculture, where many farmers have longstanding reliance on traditional practices and may be skeptical of digital platforms, even when potential benefits are clear (Fox et al., 2018).

Several studies have explored RTC as a mediator or moderator in technology adoption. Donmez-Turan (2020) showed that resistance and anxiety negatively affect technology adoption, but these effects can be mitigated through readiness factors within the UTAUT framework. In construction technology, Sargent et al. (2012) also found that resistance to change can reduce adoption intentions unless strong managerial and technical support is in place.

In agriculture, the role of RTC is increasingly highlighted in UTAUT-based studies. For example, Zamil et al. (2024) integrated innovation resistance theory (IRT) into UTAUT to study IoT adoption in farming, finding that functional and psychological barriers significantly reduced farmers' willingness to adopt. Similarly, Xie et al. (2022) reported that even when ecological agricultural practices promised high value, perceived risks and RTC reduced adoption intention among tea farmers in China. These findings suggest that resistance factors must be explicitly accounted for when applying UTAUT2 to agriculture.

Recent works also show how RTC interacts with behavioral intention. Migliore et al. (2022) combined UTAUT2 and innovation resistance theory in mobile payments and found that tradition-related resistance acted as a strong barrier in cultures with high uncertainty avoidance. Shahid et al. (2024) tested RTC in higher education adoption of AI, concluding that while anxiety strongly reduced readiness, RTC played a smaller but still relevant role in shaping attitudes toward adoption. Together, these findings show that RTC functions differently across contexts but consistently influences adoption outcomes.

For agricultural innovation, where digital literacy is often low, resistance may stem not only from fear of complexity but also from social norms and trust issues. Markovits (2024) notes that in Romania, cultural attachment to traditional farming methods can delay digital adoption. Similarly, Ravindran et al. (2024) suggest that without clear facilitating conditions, resistance may remain a dominant barrier, even when performance expectancy is high.

In summary, RTC plays a central role in technology adoption, especially in agriculture. Integrating RTC into UTAUT2 provides a more complete understanding of farmers' behavior by accounting for not only positive adoption drivers but also negative barriers that mediate adoption intention.

Overall, the existing literature shows that both UTAUT2 and RTC are important for understanding technology adoption. However, most studies look at them separately instead of examining how they work together. Only a small number of agricultural studies consider psychological resistance within the UTAUT2 framework, and research that focuses specifically on smallholder farmers in Thailand is still limited. These gaps highlight the need to test RTC as a mediating factor within an extended UTAUT2 model to better explain farmers' intention to adopt B2B agricultural marketplace platforms.

3.4 Hypotheses and conceptual framework

Based on the UTAUT2 framework and the literature on resistance to change, this study proposes that UTAUT2 factors shape farmers' behavioral intention both directly and indirectly through psychological resistance. Although UTAUT2 includes seven constructs, prior studies have shown that these can be analyzed either individually or as a combined predictor depending on the purpose of the research (Alghatrifi & Khalid, 2019). In this study, the seven UTAUT2 constructs are treated as a composite predictor to examine their overall influence on behavioral intention and RTC.

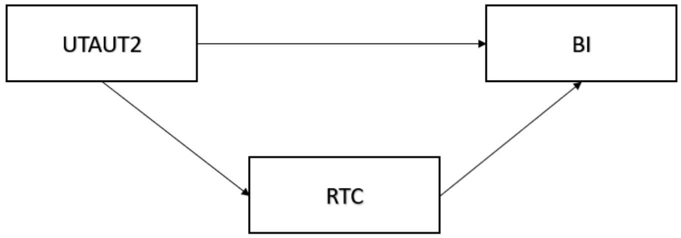

Figure 1 Conceptual Framework

H1: UTAUT2 factors have a positive effect on farmers' behavioral intention to adopt B2B agricultural marketplace platforms.

H2: UTAUT2 factors have a negative effect on resistance to change.

H3: Resistance to change has a negative effect on behavioral intention.

H4: Resistance to change mediates the relationship between UTAUT2 factors and behavioral intention.

4. Research Methodology

This study employed a quantitative survey research design to examine the mediating role of resistance to change (RTC) in the adoption of agricultural B2B marketplace platforms. The analysis focused on testing a mediation model based on the UTAUT2 framework, in which RTC was hypothesized to mediate the effects of UTAUT2 constructs on behavioral intention. To achieve this, path analysis was conducted using the PROCESS Macro for SPSS (Model 4) with bootstrapping procedures. This regression-based approach allowed the study to estimate both direct and indirect effects, providing a comprehensive understanding of how UTAUT2 factors influence behavioral intention through RTC.

The population of this study consisted of smallholder farmers in Kamphaeng Phet Province, Thailand, who are potential users of B2B agricultural marketplace platforms. As most farmers in the area have not yet adopted such platforms, purposive sampling was used, targeting farmers engaged in the production of crops commonly traded in local and regional markets. This sampling method was considered appropriate because platform adoption is still emerging, and farmers with relevant production activities are the ones most likely to adopt.

Sample size was determined based on two criteria: Green's (1991) rule of thumb for multiple regression ($N \geq 50 + 8m$), which indicated at least 106 participants for a model with seven independent variables. And Hair et al. (2010), which suggests at least 200 cases (preferably 300–400) for SEM and mediation analysis. To ensure robustness, the study collected 400 valid responses, exceeding minimum requirements.

The main data collection instrument was a structured questionnaire based on the UTAUT2 model (Venkatesh et al., 2012) and extended with Resistance to Change (Oreg, 2003). Each construct was measured with multiple items adapted from validated studies. Responses were collected using a 5-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. To ensure content validity, the questionnaire was translated and back-translated between English and Thai. A pilot test with 30 farmers was conducted, and items were refined for clarity and comprehension.

Data were collected onsite in which the research team coordinated with village leaders to identify farming households. Enumerators then visited villages and conducted face-to-face interviews using the structured questionnaire. Participation was voluntary, and respondents were informed about the objectives of the study before answering. To reduce bias, respondents were assured of anonymity and confidentiality.

The data analysis was conducted in several stages. First, descriptive statistics such as means, standard deviations, and frequency distributions were calculated to summarize respondents' demographic characteristics. Reliability and validity tests were then performed to ensure the quality of the measurement instrument. Internal consistency was assessed using Cronbach's alpha, with values above 0.70 considered acceptable (Nunnally, 1978). Construct validity was evaluated using the Kaiser–Meyer–Olkin (KMO) measure and Bartlett's test of sphericity. Exploratory and confirmatory factor analyses were also conducted to verify the factor structure. Multicollinearity diagnostics were performed using Variance Inflation Factor (VIF). Common method bias was assessed using Harman's single-factor test.

For hypothesis testing, the study employed the PROCESS Macro v4.2 for SPSS developed by Hayes (2018). Given that PROCESS requires observed variables, a composite UTAUT2 score was computed by averaging all items from the seven UTAUT2 constructs. This composite score was used as the independent variable (X), RTC was included as the mediator (M), and behavioral intention served as the dependent variable (Y). Bootstrapping with 5,000 resamples and 95 percent confidence intervals was used to determine the significance of indirect effects. Mediation was considered significant if the confidence interval did not include zero.

5. Result

5.1 Descriptive Statistics of Respondents

A total of 400 valid responses were obtained from smallholder farmers in Kamphaeng Phet Province, Thailand. Most respondents were male (65%) with an average age of 46 years. The majority had primary or secondary education, and more than 70% reported regular smartphone use, indicating a moderate level of digital readiness. Table 1 presents the descriptive statistics for the study variables. UTAUT2 showed a relatively high mean (M = 3.72, SD = 0.86), reflecting generally positive perceptions toward the platform. RTC had a moderate mean (M = 3.26, SD = 1.02), while Behavioral Intention was also positive (M = 3.64, SD = 1.11). Skewness and kurtosis values were within acceptable ranges, indicating that the data were suitable for regression and mediation analysis.

Table 1 Descriptive Statistics of Study Constructs (N = 400)

Construct	Mean	SD	Min.	Max.	Skewness	Kurtosis
UTAUT2	3.72	0.86	1.18	4.73	–0.29	–0.92
RTC	3.26	1.02	1.25	4.83	–0.28	–1.23
BI	3.64	1.11	1.00	5.00	–0.76	–0.44

Remark: SD = Standard Deviation

5.2 Reliability and Validity of Constructs

All constructs were tested for reliability and validity. Cronbach's alpha values ranged from 0.76 to 0.85, exceeding the 0.70 threshold recommended by Nunnally (1978). Factor loadings were above 0.60, and Average Variance Extracted (AVE) values exceeded 0.50, demonstrating convergent validity. Discriminant validity was confirmed, as the square root of each construct's AVE was greater than its correlations with other constructs.

5.3 Correlation Analysis

Pearson correlation analysis showed that UTAUT2 constructs were positively correlated with Behavioral Intention ($r = 0.58$, $p < 0.001$). Resistance to Change (RTC) was negatively correlated with Behavioral Intention ($r = -0.41$, $p < 0.001$), suggesting its role as a potential barrier to adoption.

5.4 Mediation Analysis Using PROCESS Macro

Mediation analysis was conducted using PROCESS Macro (Model 4) with 5,000 bootstrap resamples and 95% confidence intervals (Hayes, 2018). UTAUT2 was entered as the independent variable (X), RTC as the mediator (M), and Behavioral Intention (BI) as the dependent variable (Y).

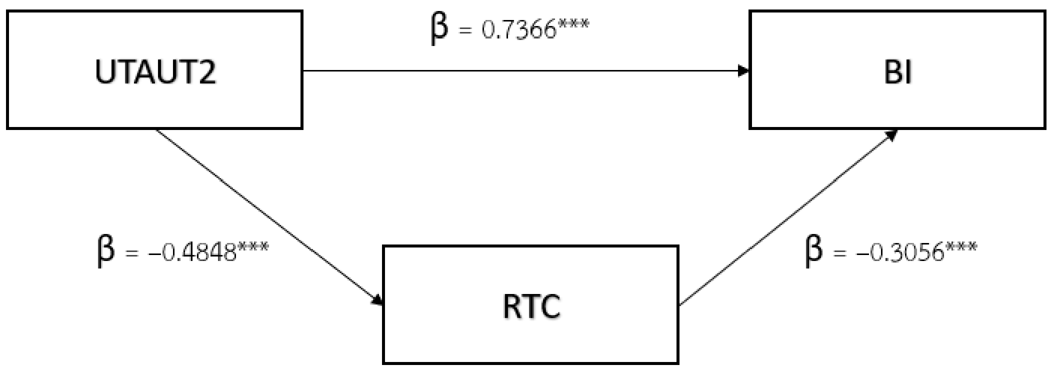

Figure 2 Mediation model showing the direct and indirect effects of UTAUT2 on Behavioral Intention through Resistance to Change (RTC). All paths are significant at $p < .001$.

Table 2 Total, Direct, and Indirect Effects of UTAUT2 on Behavioral Intention (BI)

Outcome Variable	Predictor(s)	R	R^2	F (df1, df2)	*p*
RTC (Mediator)	UTAUT2	0.581	0.338	203.66 (1,398)	< .001
BI (Total Effect)	UTAUT2	0.733	0.538	464.10 (1,398)	< .001
BI (Direct + Mediator)	UTAUT2, RTC	0.753	0.568	261.21 (2,397)	< .001

Remark: $p < .001$

The inclusion of RTC increased the explained variance from 53.8% to 56.8%. Although the increase is modest, it indicates that RTC accounts for a meaningful additional portion of farmers' adoption behavior.

5.4.1 Total, Direct, and Indirect Effects

Mediation analysis results are summarized in Table 3. The results in Table 3 indicate that UTAUT2 had a strong total effect on Behavioral Intention ($\beta = 0.8858$, $p < .001$). When RTC was included as a mediator, the direct effect of UTAUT2 remained significant ($\beta = 0.7366$, $p < .001$), and a significant indirect effect also emerged ($\beta = 0.1493$, 95% CI [0.0897, 0.2175]). This confirms that RTC partially mediates the relationship between UTAUT2 and Behavioral Intention. This means that UTAUT2 influences Behavioral Intention both directly and indirectly through reductions in resistance to change. Because the 95% confidence interval for the indirect effect did not include zero, the mediation effect was statistically significant.

Table 3 Total, Direct, and Indirect Effects of UTAUT2 on Behavioral Intention (BI)

Effect type	**Coefficient (β)**	**SE**	**t**	**p**	**95% CI (LLCI, ULCI)**
Total effect (X → Y)	0.8858	0.0411	21.54	.0000	[0.8050, 0.9667]
Direct effect (X → Y)	0.7366	0.0490	15.05	.0000	[0.6403, 0.8328]
Indirect effect (X → M → Y)	0.1493	0.0323	-	-	[0.0897, 0.2175]

The results in Table 3 indicate that UTAUT2 had a strong total effect on Behavioral Intention (β = 0.8858, p < .001). When RTC was included as a mediator, the direct effect of UTAUT2 remained significant (β = 0.7366, p < .001), and a significant indirect effect also emerged (β = 0.1493, 95% CI [0.0897, 0.2175]). This confirms that RTC partially mediates the relationship between UTAUT2 and Behavioral Intention. This means that UTAUT2 influences Behavioral Intention both directly and indirectly through reductions in resistance to change. Because the 95% confidence interval for the indirect effect did not include zero, the mediation effect was statistically significant.

5.4.2 The path coefficients (Table 4) further confirm the mediation process. UTAUT2 had a significant negative effect on RTC (β = –0.4848, p < 0.001), suggesting that stronger UTAUT2 factors reduce resistance to change. RTC, in turn, had a significant negative effect on Behavioral Intention (β = –0.3056, p < 0.001). Even after controlling for RTC, UTAUT2 still had a positive and significant direct effect on Behavioral Intention (β = 0.7366, p < 0.001).

Table 4 Path Coefficients for Mediation Model (PROCESS Macro, Model 4)

Path	Coefficient (β)	SE	t	p	95% CI (LLCI, ULCI)
UTAUT2 → RTC	-0.4848	0.0342	-14.27	.000	[–0.5557, –0.4211]
RTC → BI	-0.3056	0.0583	-5.24	.000	[–0.4203, –0.1910]
UTAUT2 → BI	0.7366	0.0490	15.05	.000	[0.6403, 0.8328]

These results confirm partial mediation. This means that although UTAUT2 remains the main driver of farmers' intention to adopt the platform, resistance to change explains an additional part of the relationship. Interventions that reduce psychological resistance may therefore enhance the effectiveness of UTAUT2 factors in promoting technology adoption.

6. Summary and Discussion

The present study examined how resistance to change (RTC) mediates the relationship between UTAUT2 constructs and farmers' behavioral intention (BI) to adopt agricultural B2B platforms. Results confirm that UTAUT2 factors significantly predict BI, both directly and indirectly, with RTC acting as a partial mediator. Specifically, performance expectancy, effort expectancy, social influence, and price value showed significant positive effects on behavioral intention, while facilitating conditions, hedonic motivation, and habit did not demonstrate significant influence. Because each UTAUT2 construct was analyzed separately using composite scores, these findings reflect the unique contributions of individual predictors. Overall, the results suggest that farmers prioritize usefulness, ease of use, economic value, and social reassurance over enjoyment, habitual use, or the availability of supporting infrastructure when considering adoption of B2B agricultural marketplace platforms.

These findings are consistent with prior studies showing that performance expectancy and social influence are among the strongest determinants of agricultural technology adoption (Ravindran et al., 2024; Markovits, 2024). The weaker influence of hedonic motivation and habit aligns with the early stage of digital adoption in rural Thailand, where most farmers are still unfamiliar with platform-based trading and have not yet developed routine usage patterns. The lack of significance for facilitating conditions may also reflect uneven digital literacy and support in rural communities, where farmers rely more on peer guidance than formal technical resources.

The mediating role of RTC provides additional theoretical insight. Even when farmers recognize the benefits of the platform, psychological resistance—rooted in fear of complexity, lack of trust, or unfamiliarity with digital processes—can reduce their intention to adopt. This reinforces prior work combining UTAUT2 with innovation resistance theory, which highlights the importance of behavioral barriers alongside motivational drivers (Migliore et al., 2022; Donmez-Turan, 2020). Integrating RTC into UTAUT2 therefore offers a more comprehensive explanation of technology adoption by capturing both enabling and inhibiting forces.

In contrast to some earlier studies, habit did not significantly influence behavioral intention in this study. The weaker effects of *hedonic motivation* and *habit* observed in this study can be explained by Thailand's early stage of digital platform adoption in rural areas. As seen in northern provinces such as Chiang Mai and Phayao, smallholder farmers typically use smartphones for communication and entertainment rather than for online marketing or digital transactions (Saengwong et al. 2025). This may be because most farmers have not yet used B2B agricultural platforms regularly enough to form stable habits. While habit is a strong predictor in mature digital ecosystems, such as FinTech adoption in India (Sharma et al., 2024), farmers in Thailand remain in the early stages of platform exposure. This suggests that platform providers may need to encourage consistent, guided, and repetitive use to build familiarity and reduce psychological resistance over time.

6.1 Contributions

This study contributes to the technology adoption literature in three ways. First, it extends UTAUT2 by incorporating **resistance to change** as a mediating factor, providing a more nuanced understanding of why farmers may hesitate to adopt even beneficial technologies. Second, it validates UTAUT2 in the context of B2B agricultural marketplace platforms, an underexplored area compared to retail or consumer-focused applications. Third, the study provides empirical evidence that hedonic motivation, habit, and facilitating conditions were not significant predictors in this context. This contrasts with findings in more digitally mature agricultural settings, suggesting that early-stage adoption in rural Thailand is driven more by usefulness, ease of use, and economic value rather than enjoyment, routine behaviors, or infrastructure support.

6.2 Practical Implications

For policymakers and platform developers, the results underscore the importance of not only highlighting the usefulness of digital platforms but also actively addressing farmers' resistance, for example:

1. Training and extension activities should emphasize ease of use and gradual learning to help farmers overcome concerns about complexity.
2. Community leaders and peer networks can reinforce social influence, which plays a strong role in rural adoption, as seen in similar agricultural studies in Malaysia (Ravindran et al., 2024).
3. Because habit was not a significant predictor, platform providers should design onboarding features that encourage repeated and guided use, such as simple workflows, reminders, and step-by-step tasks, to help farmers gradually develop usage habits over time.

By adopting these strategies, B2B agricultural platforms can reduce reliance on middlemen and improve transparency and efficiency in agricultural supply chains.

In conclusion, this study shows that UTAUT2 factors significantly influence farmers' intention to adopt B2B agricultural marketplace platforms, and resistance to change partially mediates these relationships. Psychological resistance remains an important obstacle, even when perceived usefulness and social support are high. The weak effects of hedonic motivation, habit, and facilitating conditions highlight that digital agriculture in Thailand is still at an early stage. Addressing these barriers through training, habit-building interventions, and peer influence could accelerate adoption and strengthen agricultural supply chains.

Ethical Considerations

The study was approved by the Institutional Review Board (IRB) of Naresuan University under the project title "A Study of Factors Influencing the Intention to Use Agricultural Product Sales Applications Among Farmers in Kamphaeng Phet Province.", no. P2-0295/2568.

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