Responsiveness and Attitudinal Change of Agricultural Cooperative Firm's Officers (ACOs) to Technological Disruption of Jasmine Rice Business of Thailand

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Received: 31 March 2025 | Revised: 28 May 2025 | Accepted: 1 June 2025
DOI: 10.60101/rmuttgber.2025.287828

Abstract

This study investigates the responsive strategies and attitudinal changes of Agricultural Cooperative Firm's Officers (ACOs) to technological disruption in the Jasmine Rice business in Northeastern Thailand. The research aims to understand how ACOs perceive and respond to technological advancements and how their attitudes towards organizational intangible capital affect the business performance. The study employs a mixed-methods approach, combining quantitative analysis of survey data from 180 ACOs with qualitative insights from focus group discussions. The result shows that the ACOs have a positive attitude toward technological change, yet experience constraints in accessing and utilizing data. Regarding other intangible capitals (human, information, organization and management), they have positive viewpoints varying by their job positions. However, information capital is a mere factor affecting Asset Turnover Ratio (ATO) at a statistically significant level. The findings underscore the importance of information literacy and data-driven decision-making. To aid cooperatives, the 5D model (Dream, Discover, Define, Design, Develop) is presented as a framework for developing strategic business plans,

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enabling systematic resource assessment, challenge identification, and targeted interventions. This could conclude that information capital is a significant factor affecting the performance of agricultural cooperatives in the technologically disruptive era.

Keywords: Information Capital, Asset Turnover, Agricultural Cooperatives, Technological Disruption

Introduction

Thailand is one of the world largest exporters of Jasmine rice, of which presents highest value among rice production of Thailand. Therefore, agricultural cooperatives are a crucial mechanism that enables farmers to trade rice both domestically and internationally.

Technological advancements and disruptions are reshaping business, altering consumer behavior and operational models. Agricultural cooperatives face significant pressures from these changes, particularly concerning managerial capacity for digital technology integration, as evidenced by declining rice cooperative numbers in Thailand. Understanding cooperative adaptation is thus crucial for their sustainability and rural impact. This research identifies pathways to enhance cooperative resilience and performance in this evolving digital landscape.

This study explores cooperative adaptive behaviors by assessing responsiveness to digital disruption through two key dimensions: (1) proactive responsive strategies (marketing, market intelligence, logistics) as direct adaptation measures; and (2) staff attitudes towards intangible capital (human, information, organizational, management), recognized in literature as key enablers for leveraging technological change. Analyzing these dimensions' effects on cooperative performance will inform technology adoption recommendations for the sustainability of Thai agricultural cooperatives.

Objectives of the study

1. To understand the current status of agricultural cooperatives concerning ACOs' perceptions of responsive strategies (marketing strategies, market intelligence, logistics & distribution) and their attitudes toward organizational intangible capital (human capital, information capital, organizational capital, and management).
2. To investigate the extent to which ACOs' perceptions of responsive strategies (including marketing strategies, market intelligence, and logistics & distribution) and their attitudes

toward organizational intangible capital (human capital, information capital, organizational capital, and management) affect cooperative business performance (measured by ATO, ROA, and NPM).

3. To develop appropriate policy recommendations in response to findings which might contribute to ACO development.

Literature Review

Businesses employ responsive strategies to navigate digital disruption (Osano, 2019), adapting to market shifts and customer demands. Effective response transcends mere technology application, requiring an understanding of consumer behavior and operational adaptation (Donthu & Gustafsson, 2020).

For agricultural cooperatives, this study conceptualizes responsive strategies via three critical dimensions: Marketing Strategies (adapting to consumer preferences and new channels), Market Intelligence (data-driven decision-making), and Logistics & Distribution (optimizing operations and market access).

The study also examines staff attitudinal changes towards technological shifts, as attitudes influence technology adoption (Mueller et al., 2017). Intangible capital encompassing human, information, and organizational capital is critical for organizational performance and competitiveness (Kaplan & Norton, 2004; Chareonsuk & Chansa-ngavej, 2008; Saddam & Jaafar, 2021). Effective management in leveraging these assets is also emphasized (e.g., Kinicki & Williams, 2016; Das & Mishra, 2019).

Based on this literature, a research framework is developed to investigate how responsive strategies and attitudes towards intangible capital affect cooperative performance, leading to testable hypotheses.

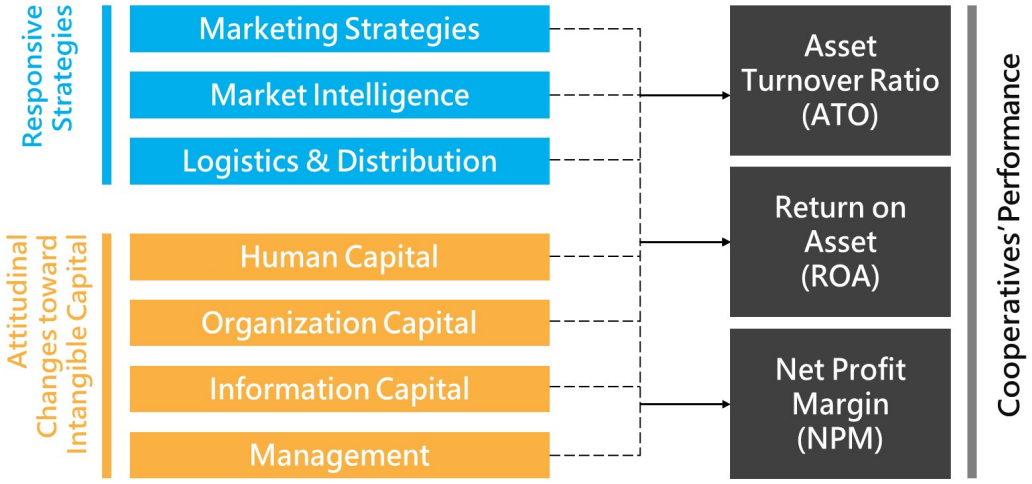

Figure 1 Research Framework

Research Hypotheses

H1: ACOs demonstrate measurable levels of perception regarding responsive strategies (Marketing strategies, Market Intelligence, and Logistics & Distribution).

H2: ACOs demonstrate measurable levels of attitude toward key organization's intangible capitals (Human Capital, Information Capital, Organizational Capital, and Management).

H3: ACOs' perceptions of responsive strategies (Marketing strategies, Market Intelligence, and Logistics & Distribution) have a significant effect on cooperative business performance.

H4: ACOs' attitudes toward key organization's intangible capitals (Human Capital, Information Capital, Organizational Capital, and Management) have a significant effect on cooperative business performance.

Methodology

This study employed a mixed-methods approach. The quantitative phase surveyed 180 Agricultural Cooperative Firm's Officers (ACOs) using a structured questionnaire. This instrument, assessing perceptions of responsive strategies (marketing, market intelligence, logistics & distribution) and attitudes towards intangible capital (human, information, organizational, management) via a 5-point Likert scale, demonstrated strong content validity (expert panel, Item-Objective Congruence average: 0.91) and reliability (Cronbach's Alpha > 0.80 for all constructs). Data were analyzed using descriptive

statistics and multiple regression to examine effects on cooperative business performance, measured by Asset Turnover (ATO), Return on Assets (ROA), and Net Profit Margin (NPM).

The qualitative phase involved focus group discussions (FGDs) with two purposively selected groups (5 management personnel, 5 committee members) from Northeastern Thailand's Jasmine Rice cooperatives, chosen for their extensive experience and leadership roles. FGDs aimed to explore quantitative findings further. Transcribed data were thematically analyzed to identify key themes and patterns, helping to triangulate results and provide richer context.

Results

The results of this study are presented in three main sections, structured to systematically address the research objectives. First, descriptive statistics are provided to address the first objective by illustrating the general characteristics of the respondents (ACOs), their perceptions toward responsive strategies (marketing strategies, market intelligence, and logistics & distribution), their attitudes toward organizational intangible capital (human capital, information capital, organizational capital, and management), and the current status of the cooperative's business performance. Next, to address the second objective, the results of the multiple regression analysis are presented, examining the effects of ACOs' perceptions of responsive strategies and their attitudes toward organizational intangible capital on cooperative business performance. Finally, the insights from the focus group discussions are provided to support and contextualize the quantitative findings, offering deeper understanding related to both the current status and the investigated effects.

Respondent Characteristics

Data were gathered from 180 Agricultural Cooperative Firm's Officers (ACOs). Demographics revealed a balanced gender distribution (52.22% male, 47.78% female). The largest age groups were 41-50 years (30.56%) and 31-40 years (28.33%), representing a notable middle-aged cohort. Educationally, most respondents (78.89%) held bachelor's degrees or vocational certificates.

Work experience varied: 43.89% had 10-20 years of experience in agricultural cooperatives, while 28.33% had less than 10 years. In their current positions, 56.67% had under 10

years of experience, and 33.89% had 10-20 years. In summary, participants were diverse in age and experience, with most holding bachelor's degrees or vocational certificates.

Perceptions and Attitudes

This section presents findings on ACOs' perceptions of responsive strategies and attitudes toward intangible capital.

Perceptions of Responsive Strategies

ACOs showed moderate agreement on developing market strategies (mean=3.16), with high agreement on improving product quality (mean=3.99) and brand recognition (mean=3.56), but less on enlarging product size (mean= 2. 21). Perceptions of market intelligence were low (mean= 2. 29), with limited views on managing information for market insights (mean= 2. 76) or adjusting data input (mean= 2. 31). Perceptions of logistics and distribution were moderate (mean= 2. 67), agreeing on adjusting product transportation (mean= 2. 77) and distribution (mean=2.60).

Attitudinal Change Toward Intangible Capital

Attitudes toward human capital were moderate (mean=3.21), agreeing on developing staff skills (mean= 3. 14), reskilling (mean= 3. 20), and recruiting new staff (mean= 3. 28). Attitudes toward information capital were also moderate (mean= 3. 06), with agreement on data-driven organizational improvement (mean= 2. 61), utilizing customer data (mean= 3. 26), and improving infrastructure (mean=3.32). Organizational capital attitudes were moderate (mean=3.26), agreeing on prioritizing organization management (mean=3.18), digital leadership (mean=3.32), and digital-related policies (mean= 3. 28), with perceptions varying by staff positions. Attitudes toward management were low (mean=2.71).

Cooperatives' Business Performance

Cooperative business performance, reflecting effectiveness in achieving objectives beyond financial gains, was assessed using key financial indicators. Asset Turnover Ratio (ATO), indicating asset management efficiency, averaged 0. 38 for sampled cooperatives, lower than the 2022 agricultural business average (0. 52), suggesting lower efficiency. Return on Assets (ROA), measuring earnings generation from assets, averaged 0. 77%, also below the industry average (1.14%), indicating lower asset management efficiency. Net Profit Margin (NPM), the percentage of

revenue remaining as profit, averaged 3.15%, outperforming the industry average (2.20%), indicating higher proficiency.

Multiple Regression Analysis

Multiple regression analysis examined the relationships between seven independent variables perceptions of three responsive strategies (marketing, market intelligence, logistics & distribution) and attitudes toward four intangible capital components (human, information, organizational, management) and three dependent performance variables: Asset Turnover (ATO), Return on Assets (ROA), and Net Profit Margin (NPM). Detailed statistical outputs are summarized in Table [X] (Note: Insert table number here).

The model for ATO was statistically significant ($p = 0.041$), explaining 8% of its variance ($R^2 = 0.080$). Information Capital was the sole significant positive predictor of ATO ($p = 0.002$); the other six independent variables (perceptions of marketing strategy, market intelligence, logistics & distribution, and attitudes toward human capital, organizational capital, and management) showed no significant effect.

$$ATO = 0.183 + 0.026Avg\_MS - 0.41Avg\_MI - 0.035Avg\_LD - 0.026AC.HC + 0.122AC.IC - 0.013AC.OC + 0.010AC.MN$$

Conversely, the regression models for ROA ($p = 0.394$) and NPM ($p = 0.603$) were not statistically significant. This indicates that the combined set of seven predictor variables did not demonstrably affect these broader performance measures in this study.

Consequently, H1 and H2 (regarding measurable levels of perceptions and attitudes) were supported. H3 (responsive strategies affecting performance) was rejected. H4 (intangible capital affecting performance) was partially supported, with only Information Capital significantly impacting ATO.

Focus Group Discussions

Focus group discussions (FGDs) with two distinct groups, each comprising 10 purposively selected participants management personnel and committee members from Northeastern Thailand's Jasmine Rice cooperatives explored their views on technological disruption and factors influencing cooperative performance.

Management personnel highlighted challenges from disruptions, changing consumer preferences, and competition, acknowledging the need to adapt and innovate. They discussed effective marketing (including online platforms), the need for market intelligence (admitting a lack of systems/expertise), efficient logistics (e-commerce potential), human capital development, effective information management, strong organizational structure, and crucial management roles (leadership, strategic vision, innovation culture).

Committee members echoed many points, but with a stronger emphasis on trade networks over marketing strategies and unanimously agreed on the lack of systems and expertise for market intelligence. They also stressed efficient logistics, and the importance of human, information, organizational capital, and management.

Overall, FGDs revealed common challenges and opportunities regarding technological adaptation and intangible capital utilization. Both groups underscored adapting to technological changes and enhancing organizational capitals. Key distinctions included management's focus on broader strategic innovations versus committee members' emphasis on established trade networks and operational efficiencies. However, both converged on the critical need for improved market intelligence and human capital development.

Discussion

This study's findings indicate that while agricultural cooperatives demonstrate some potential for strategic adaptation to technological disruption, internal constraints hinder their full capabilities. ACOs' moderate perception towards developing marketing strategies, as revealed by survey data, aligns with FGD insights where participants acknowledged needing to move beyond traditional approaches towards online platforms (consistent with Osano, 2019, on SME marketing support needs). However, the low perception of market intelligence (survey mean= 2.29) was strongly collaborated by FGDs, where both management and committee members highlighted a lack of understanding and systems for data utilization to derive market insights. This resonates with challenges identified by Chieochan et al. (2000) regarding IT use in Thai agricultural cooperatives and underscores the critical need for improved data analytics for effective market response (Kotler, 2000; Chen & Siau, 2012). Similarly, moderate perceptions of logistics and distribution were nuanced by FGDs, revealing a reluctance to establish collaborative networks due to perceived competition, contrasting

with cooperative principles (Barton, 2000), despite recognizing the importance of efficiency (Baourakis et al., 2002).

Regarding intangible capital, moderate attitudes towards human, information, and organizational capital, and low attitudes towards management, were observed. These quantitative findings were enriched by FGDs, which revealed varying priorities across positions and challenges in skill development, data utilization, and consistent management approaches. This aligns with literature emphasizing intangible capital's role in organizational development (Kaplan & Norton, 2004) and staff attitudes in change adoption (Bhattacherjee & Premkumar, 2004).

The multiple regression analysis provided critical insights. The statistically significant positive effect of Information Capital on Asset Turnover (ATO) was the most notable finding. This suggests cooperatives adept at managing and utilizing information (market, customer, operational data) achieve more efficient asset use to generate revenue. In a data-rich, technologically disruptive era, transforming information into actionable insights likely allows for optimized inventory, better supply chain management, and quicker market responses, enhancing ATO (Chen & Siau, 2012). The moderate attitude towards information capital and FGD-identified data utilization challenges suggest that while Information Capital's potential is high, its full realization is hampered; those leveraging it see tangible benefits.

Conversely, other intangible capital components (human, organizational, management) and perceptions of responsive strategies (marketing, market intelligence, logistics & distribution) did not show statistically significant direct effects on ATO in this model. This doesn't negate their importance; their influence might be indirect, mediated, or longer-term. For instance, human capital development or better marketing might improve market position, eventually impacting financial performance, but their immediate link to asset turnover efficiency may be less pronounced than Information Capital's direct operational advantages. FGDs also pointed to internal constraints and varying readiness, potentially moderating these factors' impact.

Furthermore, the overall regression models for Return on Assets (ROA) and Net Profit Margin (NPM) were not statistically significant. This implies the selected independent variables, as combined, do not sufficiently explain variations in these broader profitability measures. ROA and NPM are complex, influenced by numerous factors beyond this study's scope (e.g., pricing, costs, competition, socio-economic objectives of cooperatives). The finding that average NPM was higher

than the industry average, despite the non-significant model, suggests other unmeasured factors contribute to profitability. These regression results, particularly Information Capital's prominence for ATO, are crucial for policy recommendations.

Key findings: 5D as an ideological framework

Building on findings highlighting Information Capital's critical role for Asset Turnover (ATO) and cooperatives' challenges in market intelligence and strategic adaptation, this study introduces the 5D Model (Dream, Discover, Define, Design, Develop). This practical framework guides agricultural cooperatives in developing robust strategic plans that integrate technological considerations and leverage intangible assets, particularly Information Capital.

The 5D Model, a key finding of this research, is a novel strategic planning framework designed for agricultural cooperatives navigating technological disruption. It integrates Design Thinking (Brown, 2009), Organizational Development (Burke & Litwin, 1992), and Appreciative Inquiry (Cooperrider & Whitney, 2005). This research adapted the original 4D cycle by adding a "Define" stage for clearer problem identification and rephrasing "Develop" for actionable implementation. The 5D model thus offers a context-specific roadmap for cooperatives to innovate amidst digital transformation. Its stages are: (1) Dream (visioning), (2) Discover (resource assessment), (3) Define (problem definition), (4) Design (solution design), and (5) Develop (implementation and action, including monitoring). (Figure 2 illustrates this framework).

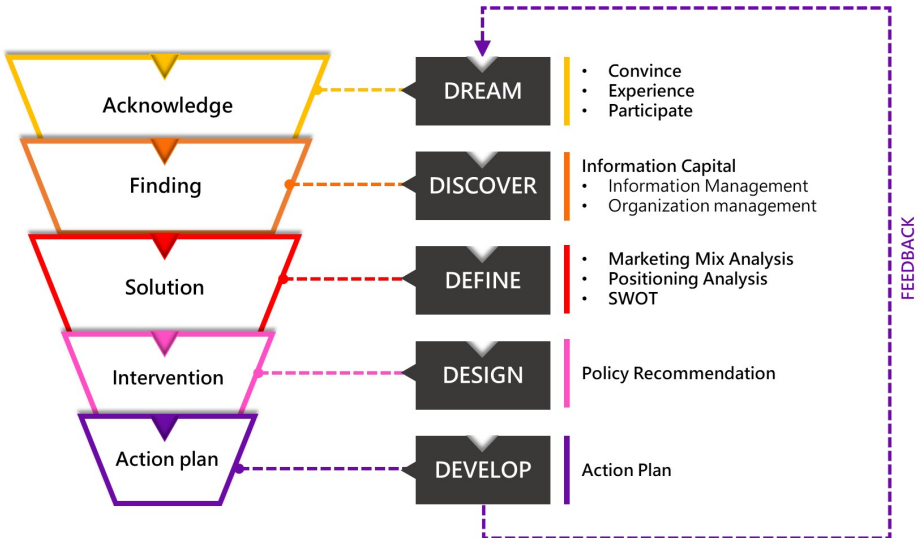

Figure 2 Ideological Framework for Policy Recommendations

Conclusion

This study examined factors influencing cooperative performance in Northeastern Thailand amidst technological disruption. Findings revealed that while Agricultural Cooperative Firm's Officers (ACOs) exhibit positive attitudes towards technological advancements and acknowledge the importance of responsive strategies and intangible capital, they face significant challenges in accessing, interpreting, and strategically utilizing information and market intelligence. These challenges, identified through survey data and corroborated by focus group discussions, highlighted deficiencies in data analysis capabilities and systematic information use.

Quantitative analysis identified Information Capital as a crucial, statistically significant factor enhancing Asset Turnover (ATO). Cooperatives adept at managing information demonstrated more efficient asset utilization. However, the overall regression models for Return on Assets (ROA) and Net Profit Margin (NPM) were not statistically significant, suggesting these broader profitability metrics are influenced by more extensive factors beyond this study's direct scope. While the ATO model was significant, it explained a small variance portion, indicating other unmeasured factors. Perceptions of Marketing Strategy, Market Intelligence, Logistics & Distribution, and attitudes towards Human Capital, Organizational Capital, or Management did not show significant direct effects on ATO in this model, though indirect influences are possible.

The findings underscore the importance of information literacy and data-driven decision-making. To aid cooperatives, the 5D model (Dream, Discover, Define, Design, Develop) is presented as a framework for developing strategic business plans, enabling systematic resource assessment, challenge identification, and targeted interventions.

Recommendations

Practical Recommendations

This study highlights the critical role of information capital in enhancing the efficiency of agricultural cooperatives. To remain competitive in a digital era, cooperatives must go beyond data collection to actively leverage it for strategic decisions. Priorities should include building strong data systems, investing in digital skills, and developing adaptive leadership. Human capacity is as vital as infrastructure staff training and cross-organizational collaboration are essential. The

5D Model (Dream, Discover, Define, Design, Develop) provides a practical guide for driving innovation and sustainable transformation.

Theoretical Implications

The research reframes organizational transformation by emphasizing intangible assets, especially information capital, over traditional structural or financial factors. It validates the use of mixed-methods approaches to understand complex dynamics and encourages cross-sector application. The study also invites interdisciplinary inquiry, linking technology, leadership, and behavioral science, and urges scholars to focus on human adaptability in digital change.

Future Research

Future studies should explore how external forces (e.g., policy, market trends) affect cooperative resilience. Cross-regional comparisons and larger, more diverse samples could offer broader insights. Deeper qualitative methods may reveal cultural resistance to change. There is also scope to test emerging technologies within cooperatives and to validate the 5D Model through longitudinal research.

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