

INNOVATIVE COMPETENCY, NETWORK PROFICIENCY AND TACTICAL AGILITY AFFECTING PROCESSED FRUIT BUSINESS PERFORMANCE IN THAILAND

Received Date: 2025, March 18

Tharanut Toh-Adam*

Revised Date: 2025, April 7

Piyada Dasri*

Accepted Date: 2025, May 16

Wissawa Aunyawong**

ABSTRACT

This research examines the critical factors influencing business performance in Thailand's processed fruit industry, focusing on innovative competency, networking proficiency, and tactical agility. This research employed a quantitative method. The participants were approximately entrepreneurs and managers in the processed fruit business sector in Thailand. The sample consisted of 500 entrepreneurs and managers from this sector. The researchers used questionnaires as the data collection tool. The data analysis involved Structural Equation Modeling (SEM). The research result found that tactical agility was the most influential factor in enhancing business performance. Tactical agility enabled businesses to stay ahead of competitors, capitalize on emerging opportunities, and navigate challenges effectively. Innovative competency had a significant positive impact on business performance. Organizations that emphasized innovation, whether through new products or services, tended to perform better. Networking capability also played a key role in driving business performance, though its impact was somewhat less pronounced compared to innovation. Effective networking allows organizations to access valuable resources, reduce operational costs, and form strategic partnerships. Together, these capabilities—innovative competency, networking capability, and tactical agility—form a comprehensive framework that contributes to high levels of business performance.

Keywords: Innovative, Networking, Tactical Agility, Business Performance, Fruit Business.

* Faculty of Business and Technology, Stamford International University

** College of Logistics and Supply Chain, Suan Sunandha Rajabhat University

Corresponding author e-Mail: piyada.dasri@stamford.edu

INTRODUCTION

Processed fruit exports remain a critical component of Thailand's agri-food economy, especially in sustaining rural employment and generating foreign revenue. In 2024, Thailand maintained its position as one of the world's top five exporters of canned and processed tropical fruits, with key markets including China, Japan, the United States, and the European Union (Thai Ministry of Commerce, 2024, p. 15). Despite strong demand for tropical products, exporters are facing multiple headwinds. These include rising logistics costs, tightening food safety regulations—especially non-tariff measures under EU Green Deal policies—and weakening consumer demand in some high-income countries due to inflationary pressures. Moreover, the increased adoption of sustainability standards, such as carbon footprint labeling and deforestation-free certification, has forced Thai fruit processors to adapt quickly to international compliance (World Bank, Online, 2025).

In response, Thai exporters are investing in value-added innovation, such as freeze-dried fruit, plant-based snacks, and functional foods infused with local ingredients. These innovations not only cater to changing consumer preferences for health and sustainability but also improve shelf life and export feasibility. According to the National Food Institute (2024, pp. 12-13), Thailand's processed fruit export value reached approximately USD 3.4 billion in 2024, representing a 4.1% growth from the previous year, driven largely by new product categories and increased exports to Southeast Asia and the Middle East. Looking ahead, the shift to bio-circular-green (BCG) economic strategies—backed by national policy—aims to enhance Thailand's global competitiveness in the agri-food sector. Integrating smart farming, traceability systems, and digital trade platforms will be essential to sustaining growth in processed fruit exports amid an increasingly fragmented global market.

Although Thailand is a major exporter of processed tropical fruits (Soonthornpipit, Kortana & Aunyawong, 2020, pp. 86-97), there remains a significant research gap in understanding how exporters are adapting to emerging non-tariff measures (NTMs), particularly those related to environmental and sustainability standards such as the EU Green Deal and carbon labeling. Existing studies often emphasize raw agricultural commodities or overall trade performance, overlooking the unique challenges and innovations within the processed fruit sector. There is limited empirical evidence on how exporters develop value-added products—such as freeze-dried fruits, plant-based snacks, and functional foods—to meet changing consumer demands and sustainability expectations in global markets.

Furthermore, the integration of Thailand's Bio-Circular-Green (BCG) economic strategy into export-oriented agri-food businesses has received minimal academic attention. This study aims to bridge these gaps by examining the strategic responses and innovation practices of Thai processed fruit exporters under evolving global trade conditions. It contributes to theory by extending knowledge on export adaptation in sustainability-driven markets, to policy by offering insights for government initiatives that support SME innovation and compliance, and to practice by guiding exporters in aligning product development with international market trends. Therefore, this study aims to analyze the current business performance of SMEs in the processed fruit industry and propose strategies to enhance their operational effectiveness and competitiveness.

RESEARCH OBJECTIVE

The research aims to examine the critical factors influencing business performance in Thailand's processed fruit industry, focusing on innovative competency, networking proficiency, and tactical agility.

LITERATURE REVIEW

Innovative competency Innovative competency reflects a firm's ability to drive success through new products, services, or processes (Khraim, 2022, pp. 459-470). It enhances adaptability and enables firms to capitalize on innovation investments (Tidd & Bessant, 2014, p. 70). Product innovation—through changes in design, materials, and features—boosts market competitiveness (OECD, 2005, pp. 45-47), while process innovation improves efficiency and quality (Schilling, 2017, pp. 100-102). Marketing innovation, involving new strategies and practices, enhances market share and loyalty (Kotler, Armstrong & Opresnik, 2017, pp. 233-234). Managerial innovation focuses on leadership, decision-making, and engagement strategies (Hamel, 2006, pp. 72-84). Both product and management innovation significantly improve operational, financial, and marketing performance (Donkor, Donkor, Kankam-Kwarteng & Aidoo, 2018, pp. 238-254; Aunyawong, Waiyawuththanapoom, Setthachotsombut & Wisedsin, 2020, pp. 12220-12229). Innovative competency also involves acquiring new skills and knowledge (Waiyawuththanapoom, Tirastittam, Pintuma & Aunyawong, 2020, pp. 333-340). In service sectors, leveraging strategic resources enhances adaptability and growth in volatile environments (Sommanawat, Hotrawaisaya, Waiyawuththanapoom, Srisawat, Aunyawong & Jermittiparsert, 2021, pp. 1-13). Technological

adoption supports HR practices and business performance (Yildiz & Aykanat, 2021, pp. 765-786; Wisedsin, Jermitsittiparsert, Thitrat & Aunyawong, 2020, pp. 411-418; Waiyawuththanapoom et al., 2022, pp. 517-526). Innovations must be significantly different from prior practices and ready for implementation (YuSheng & Ibrahim, 2020, pp. 324-335). Integrating innovation and technology helps meet customer expectations (Hiranphaet, Sooksai, Aunyawong, Poolsawad, Shaharudin & Siliboon, 2022, pp. 431-437), fosters trust, and strengthens competitive advantage through loyalty (Waiyavat, Wararatchai & Aunyawong, 2022, pp. 360-369; Wararatchai, Aunyawong & Jantamaneechot, 2022, pp. 123-136; Nopphakate & Aunyawong, 2022, pp. 356-366).

Although previous studies have examined the impact of innovative competency and tactical agility in sectors such as technology, or tourism, these constructs are highly relevant to Thailand's processed fruit industry, which is increasingly innovation-driven and export-oriented. Given the sector's growing exposure to global competition, non-tariff trade barriers, and sustainability requirements, the theoretical relationships identified in prior studies can reasonably be applied and tested in this context. The study, therefore, hypothesizes :

H1 : Innovative competency has a positive direct influence on business performance.

H2 : Innovative competency has a positive direct influence on tactical agility.

Network proficiency refers to a business's ability to build and sustain effective networks, shaped by entrepreneurial traits and strategic goals. Entrepreneurs who recognize opportunities in innovation often engage in collaborative networks to access resources (Kerdpitak, Kerdpitak, Tirastittam, Aunyawong & Chantranon, 2023, pp. 224-238). Networking fosters meaningful exchanges among firms, entrepreneurs, and organizations (Garousi Mokhtarzadeh, Amoozad Mahdiraji, Jafarpanah, Jafari-Sadeghi & Cardinali 2020, pp. 1009- 1034), enabling better communication, collaboration, and knowledge sharing (Villegas-Puyod, Phungsoonthorn, Sitthipo & Aunyawong, 2022, pp. 367-384; Hiranphaet, Sooksai, Aunyawong, Poolsawad, Shaharudin & Siliboon, 2022, pp. 431-437). International partnerships further support resource-sharing, reduce operational costs, and improve market understanding (Pintuma, Khaengkhan, Waiyawuththanapoom, Aunyawong, 2020, pp. 341-351; Pintuma & Aunyawong, 2021, pp. 33-48). These collaborations help expand markets and enhance competitiveness (Human & Naudé, 2009, pp. 2-14).

Although prior research on innovative competency and network proficiency has focused on manufacturing or general business, these concepts remain relevant to processed fruit exporters. Facing similar pressures—competition, market volatility, and global sustainability—such firms must innovate, adapt, and collaborate to stay competitive. This study thus applies established

theories to examine their applicability in Thailand's processed fruit sector and proposes hypotheses based on those frameworks :

H3 : Network proficiency has a positive direct influence on business performance.

H4 : Network proficiency has a positive direct influence on tactical agility.

Tactical agility refers to an organization's capability to swiftly respond to emerging market opportunities. It is defined as the organization's ability to adapt to both external and internal changes while quickly addressing customer needs and expectations. This adaptability fosters improvements in organizational culture, operational processes, and competitiveness (Ashrafi, Ravasan, Trkman & Afshari, 2019, pp. 1-15; Shoham, Rose & Kopp, 2005, pp. 435-454). The ability to generate business value, such as through big data analysis, enhances agility via effective knowledge management, which in turn impacts business processes and competitiveness in an evolving market landscape (Nualkaw, Wararatchai, Sommanawat & Aunyawong, 2021, pp. 2016-2023). Rapid shifts in customer demands compel businesses to embrace organizational agility as a means to enhance operational efficiency. A strong focus on sustainability, market expansion, innovative business models, and the introduction of new products enables organizations to penetrate new customer segments (Prachayapipat, Wararatchai, Aunyawong & Panjakajornsak, 2022, pp. 184-190; Waiyawuththanapoom et al., 2022, pp. 517-526; Aunyawong, Wararatchai, Shaharudin, Hirunpat & Rodpangwan, 2021, pp. 170-181). Organizations that exhibit tactical agility through innovation, creative thinking, and swift market entry tend to achieve higher profitability and returns compared to competitors in the same industry (Doz, 2020).

Business performance encompasses four core dimensions : financial perspective, innovation and technology, internal business processes, and learning and growth (Acosta, Crespo & Agudo, 2018, pp. 1128-1140). Evaluating business performance is essential in modern management, as it provides critical insights for decision-making, strategy formulation, and competitive positioning. Managers must continuously monitor their organization's status and performance to guide strategic decisions and assess managerial effectiveness (Phrapratanporn, Wararatchai, Aunyawong & Rashid, 2019, pp. 176-186; Srisawat & Aunyawong, 2021, pp. 1-10). Furthermore, assessing business performance ensures that an organization's operations align with its strategic objectives and helps establish future directions (Lievchalermwong & Aunyawong, 2022, pp. 385-396). According to management theories, performance evaluation involves comparing actual performance against predefined goals or standards (Tirastittam, Jermsittiparsert, Waiyawuththanapoom & Aunyawong, 2020, pp. 291-299). This evaluation process also provides

recommendations for improving business operations to align with strategic targets and performance benchmarks (Chuwiruch, Jhundra-Indra & Boonlua, 2016, pp. 144-160; Clauss, Abebe, Tangpong & Hock, 2019, pp. 767-784).

Although much of the existing literature on tactical agility has been developed in other industrial contexts, this concept is highly relevant to the processed fruit export sector. Businesses in this industry must frequently deal with unpredictable weather patterns, seasonal harvest cycles, changes in international trade policies, and shifting consumer preferences. In such a dynamic setting, firms that possess greater tactical agility are more likely to adjust their operations promptly, manage disruptions efficiently, and seize emerging market opportunities. This capacity to act swiftly and decisively enhances their ability to maintain consistent performance, reduce losses, and stay competitive in the global market. Based on this reasoning, it is hypothesized that :

H5 : Tactical agility has a positive direct influence on business performance.

H6 : Tactical agility mediates the influence of innovative competency on business performance.

H7 : Tactical agility mediates the influence of networking proficiency on business performance.

From the literature review, the conceptual framework can be drawn as shown in Figure 1.

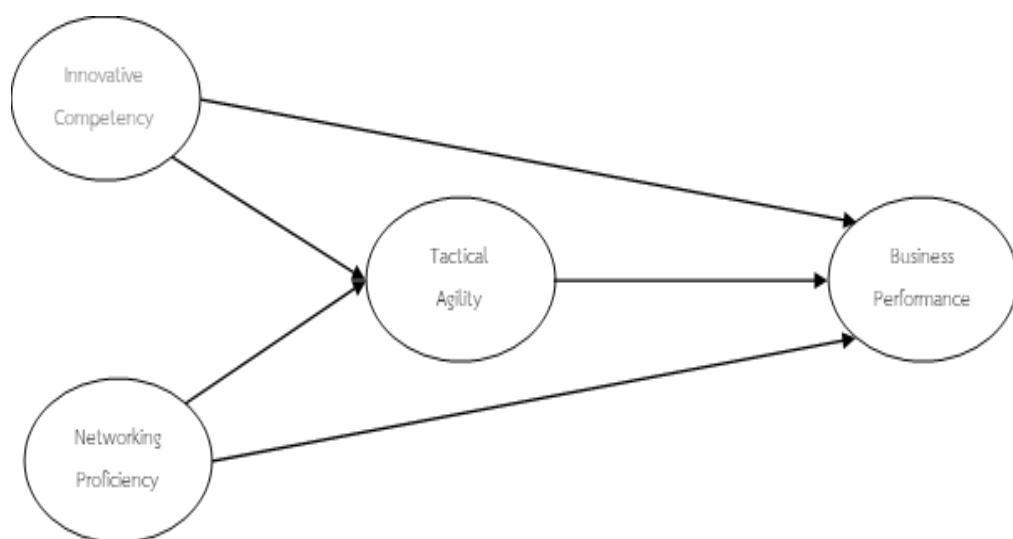


Figure 1 : Conceptual Framework

METHODOLOGY

This research employed an explanatory quantitative approach. The population consisted of entrepreneurs and managers in the processed fruit business sector in Thailand. A total of 500 respondents were selected using a simple random sampling technique, ensuring that each unit had an equal chance of being chosen. This sample size aligns with Comrey & Lee (1992, pp. 206-209) recommendation, indicating that a sample of 500 is considered “very good” for Structural Equation Modeling (SEM). Data were collected using a structured questionnaire developed from existing literature. Each construct was assessed using multi-item Likert-scale questions ranging from 1 (strongly disagree) to 5 (strongly agree). Items were adapted from previously validated instruments and reviewed by five academic experts to ensure content validity. The reliability test showed that Cronbach’s alpha coefficients for all constructs were above 0.70, indicating acceptable internal consistency. In the full study, Confirmatory Factor Analysis (CFA) was employed to verify the measurement model before testing the structural relationships. Data analysis was conducted using SEM to examine the direct effects among the variables.

RESULTS

The normal distribution of the 16 observed variables studied in the structural equation model (n=500) was examined, using the chi-square test (χ^2). The statistical significance at the .05 level represented non-normally distribution of such variables. On the other hand, if it was found to be not statistically significant (P-value > .50), it revealed normal distribution of such variables, as shown in Table 1.

Table 1. Descriptive statistics of observed variables ($n=500$)

Variable	\bar{x}	SD	%CV	Sk	Ku	χ^2	P
Innovative competency	4.23	.69	-----	-----	-----	-----	-----
Product innovation	4.30	.66	15.50	-2.500	-2.300	12.500	.003
Process innovation	4.20	.64	15.20	-2.400	-2.250	11.600	.004
Marketing innovation	4.28	.68	16.40	-3.100	-2.650	17.900	.001
Management innovation	4.15	.77	18.90	-2.550	-1.480	9.150	.012
Networking proficiency	4.10	.67	-----	-----	-----	-----	-----
Sharing knowledge	4.07	.89	22.10	-2.600	-3.100	17.100	.001
Networking culture	4.00	.91	22.80	-2.580	-2.400	12.700	.003
Joint power	4.08	.88	22.00	-3.100	-2.900	18.800	.001
Independence	3.85	.94	24.30	-2.100	-2.100	9.000	.011
Tactical agility	4.00	0.91	-----	-----	-----	-----	-----
Responsiveness	4.12	.63	15.40	-1.500	-0.080	2.300	.310
Performance	4.13	.66	16.00	-1.750	-2.100	7.700	.022
Flexibility	4.05	.71	17.70	-1.780	-0.750	3.900	.140
Quickness	4.09	.67	16.50	-1.720	-0.950	4.050	.130
Business performance	4.16	0.64	-----	-----	-----	-----	-----
Financial capability	4.06	.66	16.40	-1.350	-0.950	2.900	.240
Innovation and technology	4.17	.69	16.70	-2.280	-2.600	12.400	.003
Internal process	4.18	.58	14.00	-1.180	0.350	1.550	.460
Learning and development	4.22	.64	15.30	-2.650	-2.480	13.400	.002

Note : chi-square (χ^2) with statistical significance (P -value <0.05) indicates a non-normal distribution

The suitability of the data for factor analysis was assessed using the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity. The KMO value was 0.844, indicating sampling adequacy. Bartlett's test of sphericity was significant ($\chi^2=1258.56$, $df=104$, $p<0.001$), supporting the factorability of the correlation matrix. The researchers have checked the quality of the variables studied in the model by testing construct validity of each latent variable using the

Confirm Factor Analysis technique by considering the greater than .30 standardized factor loadings to confirm a good observed variable. Learning and development had a highest factor loadings (.86), while Sharing knowledge had a lowest factor loadings (.72). It was considered from the R^2 to check reliability of the empirical variables as well as directly examining the Construct Reliability ($\rho_c > .60$) of the latent variables and Average Variable Extracted ($\rho_v > 0.50$), as shown in Table 2.

Table 2. Factor loadings ($n=500$)

Variables	Factor Loading (λ)	Error (θ)	t	R^2
Innovative competency				
Product innovation	0.75	0.42	12.35	0.56
Process innovation	0.82	0.33	14.22	0.67
Marketing innovation	0.79	0.38	13.10	0.62
Management innovation	0.85	0.28	15.40	0.72
Networking proficiency				
Sharing knowledge	0.72	0.48	11.80	0.52
Networking culture	0.80	0.36	13.75	0.64
Joint power	0.78	0.39	12.95	0.61
Independence	0.83	0.31	14.90	0.69
Tactical agility				
Responsiveness	0.77	0.41	12.85	0.59
Performance	0.84	0.29	15.10	0.71
Flexibility	0.81	0.34	14.00	0.66
Quickness	0.79	0.37	13.20	0.63
Business performance				
Financial capability	0.74	0.45	12.10	0.55
Innovation and technology	0.82	0.32	14.30	0.67
Internal process	0.80	0.35	13.60	0.64
Learning and development	0.86	0.27	15.60	0.74
$\rho_c = .82$ $\rho_v = .61$				
Chi-Square=0.01, df=1, P-value=0.90154, RMSEA=0.000				

Table 3. Direct effect, indirect effect, and total effect (n=500)

Dependent variables	R ²	Effect	Tactical agility	Innovative competency	Networking proficiency
Tactical agility	.76	DE	-	.85*	.68*
		IE	-	-	-
		TE	-	.85*	.68*
Business performance	.85	DE	.62*	.58*	.34*
		IE	-	.29*	.52*
		TE	.62*	.87*	.86*

$\chi^2=251.24$, $df=138$, $p\text{-value}=.00000$, $\chi^2 / df=1.79$, RMSEA=.048, RMR=.036, SRMR=.042, CFI=.98, GFI=.95, AGFI=.93, CN=227.37

*Statistical significance at the .05 level

Note : In parentheses, they were the *t*-value. If the value was not between -1.96 and 1.96, it was statistically significant at the .05 level. DE=Direct Effect, IE=Indirect Effect, TE=Total Effect

The results of the data analysis indicated that the model was fit with the observational data by allowing the variance of standard errors (Θ) of the 22 pairs of observed variables to have a relationship, with degrees of freedom (df) after adjustment being 136, it was found that the adjusted model fitted well with the observational data. This conclusion was based on fit indices as follows : $\chi^2=251.24$, $df=138$, $p\text{-value}=.00000$, $\chi^2 / df=1.79$, RMSEA=.048, RMR=.036, SRMR=.042, CFI=.98, GFI=.95, AGFI=.93, CN=227.37, as shown in Table 3.

The results of the goodness-of-fit index revealed that $\chi^2=253.16$, $df=138$, $p\text{-value}=.00000$, not meeting the statistical significance criterion ($P\text{-value}>.05$). However, the χ^2 was sensitive to sample size. The χ^2 / df of $1.79 < 2.00$ within an acceptable range was considered. Other acceptable fit indices are as follows : RMSEA=.048<.05, RMR=.036<.05, SRMR=.042<.05, CFI=1.00>.98, GFI=.95>.90, AGFI=.93>.90, and CN=227.37>200.00. Based on these goodness-of-fit indices, it concluded that the adjusted structural equation model fitted well with the observational data. The parameter estimates in the model were considered acceptable.

The model's estimates are presented as follows :

1. Innovative competency has a direct influence on Business performance with an effect coefficient of .85* and statistical significance at the .05 level. As a result, hypothesis 1 is supported.

2. Innovative competency has a direct influence on Tactical agility with an effect coefficient of .85* and statistical significance at the .05 level. As a result, hypothesis 2 is supported.

3. Networking proficiency has a direct influence on Business performance with an effect coefficient of .34* and statistical significance at the .05 level. As a result, hypothesis 3 is supported.

4. Networking proficiency has a direct influence on Tactical agility with an effect coefficient of .68* and statistical significance at the .05 level. As a result, hypothesis 4 is supported.

5. Tactical agility has a direct influence on Business performance with an effect coefficient of .62* and statistical significance at the .05 level. As a result, hypothesis 5 is supported.

6. Tactical agility mediates the influence of innovative competency on business performance with an effect coefficient of .53* and statistical significance at the .05 level. As a result, hypothesis 6 is supported.

7. Tactical agility mediates the influence of networking proficiency on business performance with an effect coefficient of .42* and statistical significance at the .05 level. As a result, hypothesis 7 is supported.

8. Innovative competency, Networking Capability and Tactical agility can together predict Business Performance by 85%.

9. Innovative competency and Networking Capability can together predict Tactical agility by 76%

The findings highlight the critical role of innovative competency and networking proficiency in enhancing business performance both directly and indirectly through tactical agility. The strong direct effect of innovative competency (.85) suggests that firms capable of innovation are more likely to achieve higher performance outcomes. Similarly, the substantial effect of networking proficiency on tactical agility (.68) and business performance (.34) reflects the strategic value of collaborative networks. The mediating role of tactical agility further emphasizes its importance in translating capabilities into performance outcomes. With 85% of business performance variance explained by the model, the results demonstrate high predictive

power. These findings underscore the need for firms, especially in the processed fruit sector, to cultivate innovation and agile capabilities to remain competitive.

CONCLUSION AND DISCUSSION

This study highlights the crucial roles of Innovative competency, networking capability, and Tactical agility in influencing business performance. It provides valuable insights into how these organizational capabilities interact to drive success, offering empirical evidence supporting the relationships between these variables. Innovative competency is found to have a significant positive impact on business performance. Organizations that emphasize innovation, whether through new products or services, tend to perform better. This finding aligns with previous research, which shows that innovation is a key driver of organizational success (Khraim, 2022, pp. 459-470). Companies that invest in developing innovative capabilities can better meet market demands, maintain competitiveness, and achieve growth (Sommanawat, Hotrawaisaya, Waiyawuththanapoom, Srisawat, Aunyawong & Jermitsittiparsert, 2021, pp. 1-13). Networking capability also plays a key role in driving business performance, though its impact is somewhat less pronounced compared to innovation. Effective networking allows organizations to access valuable resources, reduce operational costs, and form strategic partnerships (Garousi Mokhtarzadeh, Amoozad Mahdiraji, Jafarpanah, Jafari-Sadeghi & Cardinali, 2020, pp. 1009-1034).

Tactical agility, in addition emerges as the most influential factor in enhancing business performance. Companies that are strategically agile can quickly adapt to changes in the market and respond to customer needs with flexibility. Tactical agility enables businesses to stay ahead of competitors, capitalize on emerging opportunities, and navigate challenges effectively. It allows organizations to continuously improve their processes, ensuring long-term success in dynamic and competitive environments (Ashrafi, Ravasan, Trkman & Afshari, 2019, pp. 1-15; Nualkaw, Wararatchai, Sommanawat & Aunyawong, 2021, pp. 2016-2023). Together, these capabilities—innovative competency, networking capability, and Tactical agility—form a comprehensive framework that contributes to high levels of business performance (Doz, 2020). Organizations that integrate these capabilities into their strategies are better positioned to succeed in a fast-paced, ever-changing business environment.

In terms of practical implications, the results can be applied at three levels :

1. Entrepreneurial level – Business owners and managers can use the findings to enhance innovation practices by investing in research and development and fostering a company

culture that values creativity and continuous improvement. Additionally, they should build more strategic partnerships to access resources, reduce operational costs, and strengthen collaboration networks.

2. Local level (e.g., local governments and municipalities) – Policymakers and local development agencies can support SMEs by facilitating capacity-building programs, establishing innovation hubs, and promoting collaborative platforms that help businesses strengthen their networking relationships and develop tactical agility in response to changing local market conditions.

3. National/public policy level – Government agencies can design policies that cultivate national innovation ecosystems, encourage cross-border trade, and integrate innovation and networking strategies into broader export development plans. Promoting tactical agility at the policy level will also help industries adapt rapidly to global market dynamics and technological disruptions.

However, this study is limited by its focus on processed fruit exporters in Thailand, which may restrict the generalizability of the findings to other industries or geographic contexts. Additionally, data were collected at a single point in time, limiting the ability to observe changes or trends over time. Future research should be conducted in other industries or context and explore the role of other mediating or moderating factors—such as organizational culture, digital readiness, or supply chain integration—that may influence the relationship between innovative competency, network proficiency, and business performance. Comparative studies across different sectors or longitudinal studies could also deepen the understanding of these dynamic capabilities.

BIBLIOGRAPHY

Acosta, A. S., Crespo, Á. H., & Agudo, J. C. (2018). Effect of market orientation, network capability and entrepreneurial orientation on international performance of small and medium enterprises (SMEs). *International Business Review*, 27(6), pp. 1128-1140.

Ashrafi, A., Ravasan, A. Z., Trkman, P., & Afshari, S. (2019). The role of business analytics capabilities in bolstering firms' agility and performance. *International journal of information management*, 47, pp. 1-15.

Aunyawong, W., Waiyawuththanapoom, P., Setthachotsombut, N., & Wisedsin, T. (2020). Roles of 7R logistics management and consumer satisfaction on marketing performance of local bottled water SMEs in Thailand. *Test Engineering and Management Journal, 83*, pp. 12220-12229.

Aunyawong, W., Wararatchai, P., Shaharudin, M. R., Hirunpat, A., & Rodpangwan, S. (2021). The mediating role of transportation practices during the COVID-19 crisis in Thailand. *The Open Transportation Journal, 15*(1), pp. 170-181.

Chuwiruch, W., Jhundra-Indra, P., & Boonlua, S. (2016). Service excellence strategy and firm performance: A study on hotel businesses in Thailand. *BU Academic Review, 15*(2), pp. 144-160.

Clauss, T., Abebe, M., Tangpong, C., & Hock, M. (2019). Tactical agility, business model innovation, and firm performance: An empirical investigation. *IEEE Transactions on Engineering Management, 68*(3), pp. 767-784.

Comrey, A. L., & Lee, H. B. (1992). *A first course in factor analysis* (2nd ed.). New York, NY: Psychology Press.

Donkor, J., Donkor, G. N. A., Kankam-Kwarteng, C., & Aidoo, E. (2018). Innovative capability, strategic goals and financial performance of SMEs in Ghana. *Asia Pacific Journal of Innovation and Entrepreneurship, 12*(2), pp. 238-254.

Doz, Y. (2020). Fostering strategic agility: How individual executives and human resource practices contribute. *Human Resource Management Review, 30*(1), 100693.

Garousi Mokhtarzadeh, N., Amoozad Mahdiraji, H., Jafarpanah, I., Jafari-Sadeghi, V., & Cardinali, S. (2020). Investigating the impact of networking capability on firm innovation performance: using the resource-action-performance framework. *Journal of Intellectual Capital, 21*(6), pp. 1009-1034.

Hamel, G. (2006). The why, what, and how of management innovation. *Harvard business review, 84*(2), pp. 72-84

Hiranphaet, A., Sooksai, T., Aunyawong, W., Poolsawad, K., Shaharudin, M. R., & Siliboon, R. (2022). Development of value chain by creating social media for disseminating marketing content to empower potential of participatory community-based tourism enterprises. *International Journal of Mechanical Engineering, 7*(5), pp. 431-437.

Human, G., & Naudé, P. (2009). Exploring the relationship between network competence, network capability and firm performance: A resource-based perspective in an emerging economy. *Management Dynamics. Journal of the Southern African Institute for Management Scientists, 18*(1), pp. 2-14.

Kerdpitak, C., Kerdpitak, N., Tirastittam, P., Aunyawong, W., & Chantranon, S. (2023). Innovation performance of Thai drugs making industry in Thailand. *International Journal of Multicultural Education, 25*(2), pp. 224-238.

Khram, H. (2022). The influence of technological innovative capabilities on firm performance: Moderating effect of strategic agility. *Problems and Perspectives in Management, 20*(2), pp. 459-470.

Kotler, P. T., Armstrong, G., & Opresnik, M. O. (2017). *Principals of marketing* (17th ed.). London: Pearson Education.

Lievchalermwong, T., & Aunyawong, W. (2022). The mediation effect of inventory management practices on operational performance in public university. *International journal of health sciences, 6*(S5), pp. 385-396.

National Food Institute. (2024). *Thailand's processed food industry report 2024*. Bangkok: Ministry of Industry.

Nopphakate, K., & Aunyawong, W. (2022). The relationship of tourism logistics management and destination brand loyalty: The mediating role of Thailand tourist satisfaction. *International Journal of Health Sciences, 6*(S5), pp. 356-366.

Nuankaw, S., Wararatchai, P., Sommanawat, K., & Aunyawong, W. (2021). Service value of transportation service providers for e-commerce products in the new economy era: Creativity, society and environment. *Psychology and Education Journal, 58*(4), pp. 2016-2023.

OECD, E. (2005). *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data* (3rd ed.). Paris, Ile De France: Organisation for Economic Co-operation and Development.

Phrapratanporn, B., Wararatchai, P., Aunyawong, W., & Rashid, N. R. N. A. (2019). Enhancing supply chain performance of SMEs in Thailand using the integrated personnel development model. *International Journal of Supply Chain Management, 8*(5), pp. 176-186.

Pintuma, S., & Aunyawong, W. (2021). The effect of green supply chain management practices on environmental, operational and organizational performances of seafood manufacturers in Thailand. *International Journal of eBusiness and eGovernment Studies*, 13(2), pp. 33-48.

Pintuma, S., Khaengkhan, M., Waiyawuththanapoom, P., & Aunyawong, W. (2020). Moderating effect of information sharing on the relationship of supply chain management capabilities and business performance: A study of the food industry. *International Journal of Supply Chain Management*, 9(2), pp. 341-351.

Prachayapipat, M., Wararatchai, P., Aunyawong, W., & Panjakajornsak, V. (2022). The effect of stakeholders on sustainable supply chain performance of road transportation service providers in Thailand: The mediating role of green supply chain management practices. *Journal of Optoelectronics Laser*, 41(4), pp. 184-190.

Schilling, M. A. (2017). *Strategic management of technological innovation* (5th ed.). New York, NY: McGraw-Hill.

Shoham, A., Rose, G. M., & Kropp, F. (2005). Market orientation and performance: A meta-analysis. *Marketing Intelligence & Planning*, 23(5), pp. 435-454.

Sommanawat, K., Hotrawaisaya, C., Waiyawuththanapoom, P., Srisawat, S., Aunyawong, W., & Jermsittiparsert, K. (2021). The role of technological management, idea implementation, sustainable process innovation and logistic competency. *Journal of Management Information and Decision Sciences*, 24(S1), pp. 1-13.

Soonthornpipit, H., Kortana, T., & Aunyawong, W. (2020). Expansion opportunities of community enterprises in Thailand to China. *Psychology and Education Journal*, 57(8), pp. 86-97.

Srisawat, S., & Aunyawong, W. (2021). Development of business performance under environmental uncertainty: lesson from Thailand's Eastern Economic Corridor. *International Journal of Entrepreneurship*, 25(5), pp. 1-10.

Thai Ministry of Commerce. (2024). *Trade statistics and export highlights: Fruits and vegetables*. Nonthaburi: Thai Ministry of Commerce.

Tidd, J., & Bessant, J. (2014). *Managing innovation: Integrating technological, market, and organizational change* (5th ed.). New Jersey, NJ: John Wiley & Sons.

Tirastittam, P., Jermitsittiparsert, K., Waiyawuththanapoom, P., & Aunyawong, W. (2020). Strategic leadership, organizational innovativeness and the firm supply performance: The mediating role of information technology capability. *International Journal of Supply Chain Management*, 9(2), pp. 291-299.

Villegas-Puyod, J., Phungsoonthorn, T., Sitthipo, P., & Aunyawong, W. (2022). The impact of cultural differences on LINE app communication among Thai and Chinese employees: Its effects on employee engagement. *International Journal of Health Sciences*, 6(S5), pp. 367-384.

Waiyavat, C., Wararatchai, P. & Aunyawong, W. (2022). Transformational leadership and customer loyalty affecting supply chain performance of Thailand logistics service providers. *Journal of Optoelectronics Laser*, 41(5), pp. 360-369.

Waiyawuththanapoom, P., Tirastittam, P., Pintuma, S., & Aunyawong, W. (2020). Moderating effect of innovation on the relationship of supply chain management practices and firm performance: A study of SMEs. *International Journal of Supply Chain Management*, 9(2), pp. 333-340.

Waiyawuththanapoom, P., Thammaboopadee, S., Tirastittam, P., Jermitsittiparsert, K., Wongsanguan, C., Sirikamonsin, P., & Aunyawong, W. (2022). The role of human resource management and supply chain process in sustainable business performance. *Uncertain Supply Chain Management*, 10(2), pp. 517-526.

Wararatchai, P., Aunyawong, W. & Jantamaneechot, T. (2022). Development of Supply Chain Performance of Thailand Juice Manufacturers: The Mediating Role of Customer Loyalty. *Journal of Logistics and Supply Chain College*, 8(1), pp. 123-136.

Wisedsin, T., Jermitsittiparsert, K., Thitrat, P., & Aunyawong, W. (2020). Role of advanced manufacturing technology, human capital and employee empowerment to enhance manufacturing industry supply chain performance. *International Journal of Supply Chain Management*, 9(2), pp. 411-418.

World Bank. (2025). *Thailand Economic Monitor February 2025: Unleashing Growth – Innovation, SMEs and Startups* (Online). Available: <https://www.worldbank.org/en/country/thailand/publication/thailand-economic-monitor-february-2025-unleashing-growth-innovation-smes-and-startups> [2025, January 20].

Yildiz, T., & Aykanat, Z. (2021). The mediating role of organizational innovation on the impact of strategic agility on firm performance. *World Journal of Entrepreneurship, Management and Sustainable Development*, 17(4), pp. 765-786.

YuSheng, K., & Ibrahim, M. (2020). Innovation capabilities, innovation types, and firm performance: Evidence from the banking sector of Ghana. *Sage Open*, 10(2), pp. 324-335.