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INNOVATION APPLIED TO THE COMPETITIVE PERFORMANCE OF THE FOOD INDUSTRY

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Abstract

This research aims to 1) study the patterns of innovation applied to the competitive performance of the food industry and 2) investigate the components of innovation applied to the competitive performance of the food industry. The population used in this study consists of entrepreneurs in the food industry, divided into 2 groups: large-scale entrepreneurs and medium and small-scale entrepreneurs, with a total of 500 samples. The research tool used is a questionnaire, and the statistics for data analysis include Confirmatory Factor Analysis (CFA) and Second-Order Confirmatory Factor Analysis. Innovation applied to the competitive performance of the food industry consists of 4 components: Knowledge Management Process, Information Literacy, Competitiveness, and Innovation Development. The results of the first-order confirmatory factor analysis are consistent with empirical data (p = .057, CMIN/DF = 1.307, GFI = .977, RMSEA = .025) with factor loadings ranging from .57 to .77, which are statistically significant at the .001 level. The results of the second-order confirmatory factor analysis are also consistent with empirical data (p = .607, CMIN/DF = .938, GFI = .984, RMSEA = .000) with factor loadings ranging from .88 to 1.00, significant at the .001 level.

Keywords: Knowledge Management Process, Information Literacy, Competitiveness, Innovation Development.

1. INTRODUCTION

Currently, many countries around the world are experiencing an increased demand for food, a consequence of severe climate change and global warming. According to Lineman, M., Do, Y., Kim, J. Y., & Joo, G. J. (2015), the "hunger crisis" situation will alleviate the negative impacts from the COVID-19 pandemic outbreak. Other factors impacting the economy, particularly climate changes resulting from global warming, wars leading to trade sanctions, energy crises, the slowdown of the Chinese economy, and the El Nino and La Nina phenomena, have led to a decrease in agricultural and fishery production (Food and Agriculture Organization of the United Nations: FAO, 2017). This has resulted in many countries that lack the capability to produce sufficient food facing an increased need to import food for consumption and to reserve for domestic shortages. In response, several producing countries have implemented self-protection policies for food security (Food Protectionism) (Espitia, A., Rocha, N., & Ruta, M. (2020) to reserve food materials and energy for domestic consumption before exporting. This includes the adoption of technology to achieve the goal of food security through precise agricultural production (Office of Trade Promotion Abroad, 2023), emphasizing the importance of food security in the future.

Thailand is located in an area with diverse biodiversity, rich in natural resources, agriculture, livestock, and fisheries. According to data, there are more than 149 million rai of agricultural land, ranking the country 45th in the world in terms of food security,

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measured by its ability to produce and sustain its population (Office of the National Science and Technology Development Agency, 2019). Thailand is known as the "Kitchen of the World" due to its fertility and as a significant producer of various agricultural products, demonstrating that Thailand's area is a crucial zone capable of global food production (Suradinkura, N. (2022). Coupled with policy initiatives from the government under the National Strategy 2018-2037 (National Strategy, 2018), focusing on enhancing agricultural competitiveness and value creation, along with the 13th National Economic and Social Development Plan (highlighting agriculture and high-value agricultural processing), it plays a vital role in the country's economy. It adds value to agricultural raw materials, generates national income, creates jobs, and is an industry linked with many other downstream industries (Digital Economy Promotion Agency, 2023).

At the same time, although the production volume of Thailand's food industry tends to increase (Office of Small and Medium Enterprises Promotion, 2020), the export value of food products has been continuously decreasing (Office of Industrial Economics, 2021). This indicates that the competitive and export potential of the food industry is facing problems that need urgent resolution. The trend of global food import demand continues to rise (SME Social Planet, Bangkok Bank, 2021), but Thailand's food exports have declined, resulting in a missed trade opportunity. Furthermore, the current increase in trade competitors in the global market, the opening of trade liberalization, and the tariff barrier elimination policies of AEC member countries inevitably lead Thailand into the intensifying competition of the food industry among agricultural countries.

Amidst the constantly changing global consumption trends (Chatzoudes, D., & Chatzoglou, P. (2023)), the phenomenon of Digital Disruption has led to the emergence of new businesses. Innovations and automation systems to enhance production productivity, the development of commercial agricultural machinery and tools, and the development of technologies to create products that meet market demands are on the rise. Personalized diets (German, J. B., Zivkovic, A. M., Dallas, D. C., & Smilowitz, J. T. (2011)) or functional foods (Smith, J., & Charter, E. (Eds.). (2011)), and zero-waste cooking innovations (Johnson, B. (2013)) are examples of how production models have evolved by integrating modern innovations and technologies to reduce costs and improve production processes (Office of Digital Economic Promotion, 2023). This requires the industry to adapt quickly to new competitors, implementing measures to develop production quality by using new innovations in the food industry (Trienekens, J., & Zuurbier, P. (2008)) to generate new knowledge and industrial business approaches that can enhance Thailand's competitive efficiency, leading it to become a sustainable leader in the global food industry market.

The data also reveals that the food industry plays a significant role in the socio-economic system, contributing to the Gross Domestic Product (GDP) with a value of 645,152 million baht (Office of Industrial Economics, 2020). It adds value to agricultural produce and is linked to many downstream industries, distributing income to small and medium-sized enterprises (SMEs). In terms of the food product sector, it accounts for 14.2% of all enterprises, totaling 440,924 businesses, and employing 1,712,572 individuals in 2019 (Office of Small and Medium Enterprises Promotion, 2020). Studies have identified

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several limitations affecting the barrier to innovation use in the food industry to enhance competitive efficiency, including

1) Lack of efficiency in information management and the skills to apply it for decision-making by entrepreneurs,
2) Knowledge management processes where entrepreneurs lack understanding and processes for knowledge management, lack of actual practices to respond to indicators, and lack of defined objectives for knowledge management,
3) Lack of innovation development where entrepreneurs should focus on developing innovations and technologies to solve problems and improve processes, not only to elevate production standards but also to add value to products and services, thereby enhancing sustainable competitive capability for the business sector, and
4) Lack of competitive ability where entrepreneurs must select markets that are more capable than their competitors (Bigliardi, B., & Galati, F. (2013); Muscio, A., Nardone, G., & Dottore, A. (2010)), showing competitors that the business sector can continuously change its goals and positions for the better. (Bua-In, N. (2023).

From the above points, it can be said that Thailand has strengths in food resources and a diversity of agricultural products. However, due to the global economic recovery trend, high production cost conditions, and competitive abilities, it is crucial for Thai entrepreneurs to urgently create food innovations to ensure Thai products can compete globally. Therefore, this study focuses on the use of innovation in the food industry to enhance competitive efficiency by examining four components: Information Literacy, Knowledge Management Process, Innovation Development, and Competitiveness, to apply in mitigating the impacts of the declining export trend in the Thai food industry and to enhance future global market competitiveness.

2. LITERATURE REVIEW

Information Literacy involves managing information sources that have been collected to respond efficiently to usage needs, reducing data redundancy. It serves as data mining and a technique for analytical data search, managing vast amounts of data in databases (Laudon, K. C., & Laudon, J. P. (2017)). It includes searching, categorizing data groups, market research to select valuable information for explaining past data and forecasting future data, using facts that represent various events occurring within an organization or its environment before processing them into an easily understandable format (Leung, B. T. H., et al. (2019). It operates through a systematic information system, comprising hardware, software, personnel, practices, data, and connectivity, working in harmony to provide essential information for organizational operations. Information is crucial in producing goods and services that generate profit and success for the organization (Rader, H. B. (2002)) and disseminating information useful for organizational operations.

The Knowledge Management Process is about managing to create new knowledge, using existing knowledge and experience systematically to gain a competitive advantage. It is a process where each individual creates new knowledge, skills, and capabilities (Bua-

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In, N. (2021). In contrast, training provides general outcomes that the organization will use to lead to learning (Turban, E., Leidner, D., McLean, E., & Wetherbe, J. (2008)). It also helps organizations identify, select, organize, disseminate, and transfer important information and expertise. Knowledge management is a process or method of creating, acquiring, storing, sharing, and using knowledge to enhance learning and improve organizational performance (McAdam, R. (2000)). The knowledge management model for innovation is the Organization Knowledge Management System (OKMS) with five factors: knowledge, technological infrastructure, organizational structure, human resources, and culture. These five factors lead to organizational learning that involves the exchange between tacit and explicit knowledge (Meso, P., & Smith, R. (2000)), resulting in new knowledge essential for creating innovation and sustainable competitive ability.

Innovation Development involves integrating new technologies, processes, and approaches to create and develop new innovations, enhancing an organization's competitive capability. It includes invention, development, and practical implementation using methods that differ from the past (Sofiyabadi, J., & Valmohammadi, C. (2020)). This affects the ability to transform production factors into superior products and services, driven entirely by technology (Kamboj, S., & Rahman, Z. (2018)). Innovations and technology are crucial in linking leaders through knowledge management in business operations or product and service production, altering the working approach, enabling operations, and designing new work methods or new approaches for practical implementation (Chatzoudes, D., & Chatzoglou, P. (2017,2023)). This results in a competitive advantage by utilizing technology to become a market leader, using technology strategies to lay out a path for managing technology and innovation by applying technology and the experience of executives to enable the organization to adapt effectively and enhance its potential to achieve organizational goals.

Competitiveness is influenced by industrial structures on organizational competition behaviors and affects organizational performance within that industry. The foundation of business is creating value for customers and stakeholders, especially maximizing shareholder value from the business value (Beheshti, H. M. (2004)). Competitive advantage must arise from the organization creating and offering what is known as value or worth, both in terms of products or services and the organization to customers. The organization must select or penetrate markets more strategically than its competitors and show competitors that it can continuously change its goals and stance for the better (Porter, M. E. (2008)). Organizational analysis to understand resources, capabilities, and core competencies can create value aligned with customer needs, leading to eventual competitive advantage. Knowing the organization's resources alone cannot create value and does not affect competitive advantage; thus, organizational capabilities and core competencies are used to create value for customers. Another consideration is the foundational resources that lead to the development of organizational capabilities and core competencies to create customer value superior to competitors (Minto-Coy, I. D., Cowell, N. M., & McLeod, M. (2016)).

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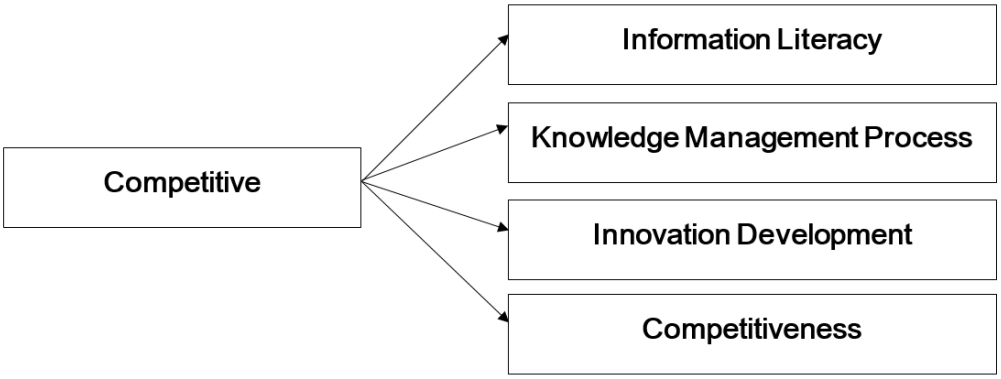
3. METHODOLOGY

3.1 Research Objective

1) To study the patterns of innovation applied to the competitive performance of the food industry.
2) To investigate the components of innovation applied to the competitive performance of the food industry.

3.2 Conceptual Framework



3.3 Research Hypothesis

The structural model of confirmatory factor analysis for innovation applied to the competitive performance of the food industry is consistent with empirical data.

3.4. Research Population

This research generates new knowledge (Inductive Research) using a mixed-methodology research approach. Therefore, the population and sample groups used for the research are defined as follows:

For qualitative research with in-depth interview techniques, the research population consists of 9 experts, selected through purposive sampling based on predefined expert qualifications.

For quantitative research, the research population consists of food industry entrepreneurs in Thailand who have received awards for food products or participated in food product contests.

According to the statistics of the number of entrepreneurs licensed under the Factory Act, B.E. 2535, there are 549,380 cases (Department of Industrial Works, 2019).

The sample size was determined based on the criteria for specifying the sample size for research works of confirmatory factor analysis, which ideally should have 500 samples (Comrey, A. L., & Lee, H. B. (2013)).

A multi-stage random sampling method was used, starting with simple random sampling and followed by stratified random sampling.

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3.5 Research Instrument

The research instruments used in this study are divided into two types according to the research methods: For Qualitative Research, the instrument is an in-depth interview technique with a structured interview format.

The researcher has set interview guidelines on 4 components: Information Literacy (Laudon, K. C., & Laudon, J. P. (2015), Leung, B. T. H., et al. (2019), Rader, H. B. (2002)); Knowledge Management Process (Turban, E., Leidner, D., McLean, E., & Wetherbe, J. (2008), McAdam, C. (2000), Meso, P., & Smith, R. (2000), Bua-In, N. (2021)); Innovation Development (Sofiyabadi, J., & Valmohammadi, C. (2020), Kamboj, S., & Rahman, Z. (2018), Chatzoudes, D., & Chatzoglou, P. (2017,2023)); and Competitiveness (Beheshti, H. M. (2004), Porter, M. E. (2008), Minto-Coy, I. D., Cowell, N. M., & McLeod, M. (2016)).

For Quantitative Research, the instrument is a questionnaire about the innovation applied to the competitive performance of the food industry. The questionnaire is designed with rating scales, consisting of 80 items rated on a 5-point Likert scale.

The researcher took the draft questionnaire along with the evaluation form to 3 experts with knowledge and experience in the study area to assess the quality of the instrument through the Index of Item-Objective Congruence (IOC). The results of the IOC were between 0.60-1.00. The researcher used these values along with the expert evaluation to revise the questionnaire. Then, the questionnaire was tested (Try-Out) with a group of 30 individuals similar to the study population to analyze the item-total correlation and determine the questionnaire's reliability using Cronbach's Alpha (Brown, J. D. (2002)) in SPSS.

The discrimination power of the items ranged from 0.33-0.78, and the overall questionnaire reliability was 0.972.

3.6 Data Collection

1. For Qualitative Research, the researcher contacted experts to request their cooperation in providing information and conducted interviews with the experts following the predefined structure. During the interviews, the researcher continuously recorded the information.
2. For Quantitative Research, the researcher sought cooperation from a sample group of food industry entrepreneurs across Thailand to complete the questionnaire. If in-person meetings were not feasible, questionnaires were sent and returned via mail and electronic media.
3. The researcher verified the completeness and accuracy of the questionnaires before using the data for further statistical analysis.

3.7 Data Analysis

The researcher analyzed the qualitative research data using in-depth interview techniques and content analysis to develop the questionnaire. For quantitative research, the researcher analyzed the personal data of the respondents and conducted a first-order

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Confirmatory Factor Analysis (CFA) and a second-order Confirmatory Factor Analysis (S-CFA) to check the consistency of the developed component model with the empirical data, using the AMOS software.

4. RESULTS AND DISCUSSION

The analysis of the first-order Confirmatory Factor Analysis (First Order CFA) was conducted to test the consistency of the components of innovation applied to the competitive performance of the food industry with empirical data.

The second-order Confirmatory Factor Analysis (Second Order CFA) was performed to test the properties of each indicator of the components to accurately represent the latent variables studied and confirm the relationships between the indicators (observed variables) (Hair, et al., 2010).

It was found that the structural accuracy of innovation applied to the competitive performance of the food industry is significantly consistent with the theoretical concept and empirical data.

The results of the first-order confirmatory factor analysis showed the following statistics: Chi-square (CMIN) = 77.135, Chi-square/degree of freedom (CMIN/DF) = 1.307, p-value = .057, Comparative Fit Index (CFI) = .992, Goodness of Fit Index (GFI) = .977, Adjusted Goodness of Fit Index (AGFI) = .964, Root Mean Square Residual (RMR) = .011, Standardized Root Mean Square Residual (SRMR) = .250, and Root Mean Square Error of Approximation (RMSEA) = .025.

Using the evaluation criteria of Schumacker and Lomax (2010), it was found that the indices meet all criteria, indicating that the model is consistent with empirical data.

The results are presented in Table 1 and illustrated in Figure 1.

Table 1: Results of the First Order Confirmatory Factor Analysis (First Order CFA)

Fit Index Evaluation	Criteria	Criteria Index Value from Second Order Confirmatory Factor	Analysis Evaluation Result
CMIN	Not statistically significant	77.135	-
CMIN/DF	<2	1.307	Pass
p-value	>0.05	.057	Pass
CFI	>0.90	.992	Pass
GFI	>0.90	.977	Pass
AGFI	>0.90	.964	Pass
RMR	<0.05	.011	Pass
SRMR	<0.05	.250	Pass
RMSEA	<0.05	.025	Pass

*Statistically significant level at the .001

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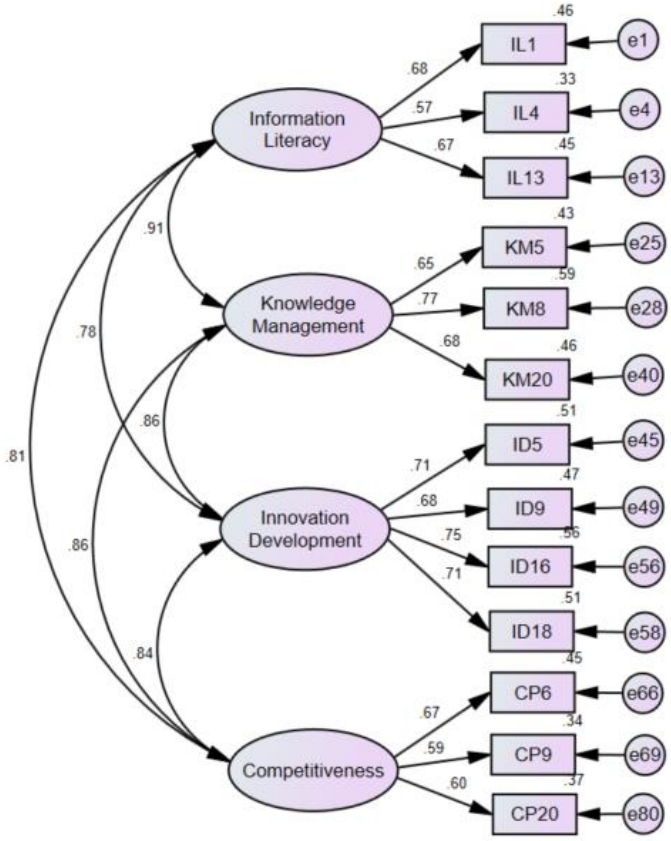

Figure 1: Results of the First Order Confirmatory Factor Analysis (First Order CFA) In the Standardized Estimate Mode after Model Modification

When considering the weight of the components in the standardized score of the observed variables in the confirmatory factor model for the innovation applied to the competitive performance of the food industry, it was found that all component weights are positive, ranging from 0.88 to 1.00, with statistical significance at the .001 level. Generally, an acceptable component weight is ±.5 or higher (Hair and Anderson, 2010). Component 1, Information Literacy, had component weights ranging from 0.59 to 0.68. Component 2, Knowledge Management Process, had component weights ranging from 0.63 to 0.75. Component 3, Innovation Development, had component weights ranging from 0.68 to 0.75. And Component 4, Competitiveness, had component weights ranging from 0.61 to 0.67. This indicates that all 13 questions can be used to measure the confirmatory components of the innovation applied to the competitive performance of the food industry.

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The results of the second-order confirmatory factor analysis are presented in Table 2.

Table 2: Results of the Second Order Confirmatory Factor Analysis (Second Order CFA)

Fit Index Evaluation	Criteria	Criteria Index Value from Second Order Confirmatory Factor	Analysis Evaluation Result
CMIN	Not statistically significant	52.523	-
CMIN/DF	<2	.938	Pass
p-value	>0.05	.607	Pass
CFI	>0.90	1.000	Pass
GFI	>0.90	.984	Pass
AGFI	>0.90	.975	Pass
RMR	<0.05	.010	Pass
SRMR	<0.05	.210	Pass
RMSEA	<0.05	.000	Pass

*Statistically significant level at the .001

From Table 4, it is found that the results of the second-order confirmatory factor analysis show the following statistics: Chi-square (CMIN) = 52.523, Chi-square/degree of freedom (CMIN/DF) = .938, p-value = .607, Comparative Fit Index (CFI) = 1.000, Goodness of Fit Index (GFI) = .984, Adjusted Goodness of Fit Index (AGFI) = .975, Root Mean Square Residual (RMR) = 0.010, Standardized Root Mean Square Residual (SRMR) = .210, and Root Mean Square Error of Approximation (RMSEA) = .000.

The indices pass all criteria, indicating that the model is consistent with empirical data.

Considering the weights of each component, it is found that all component weights are positive, ranging from 0.88 to 1.00, with statistical significance at the .001 level.

Component 1, Knowledge Management Process, has the highest component weight, equal to 1.00. Followed by Component 2, Information Literacy, with a component weight of 0.90; Component 3, Competitiveness, with a component weight of 0.90; and Component 4, Innovation Development, with a component weight of 0.88, respectively.

Each component's reliability in measurement (R2) ranges from 0.59 to 0.77, indicating that all four components can measure the innovation applied to the competitive performance of the food industry.

Furthermore, the confirmatory factor model for the innovation applied to the competitive performance of the food industry is consistent with empirical data, as shown in Figure 2.

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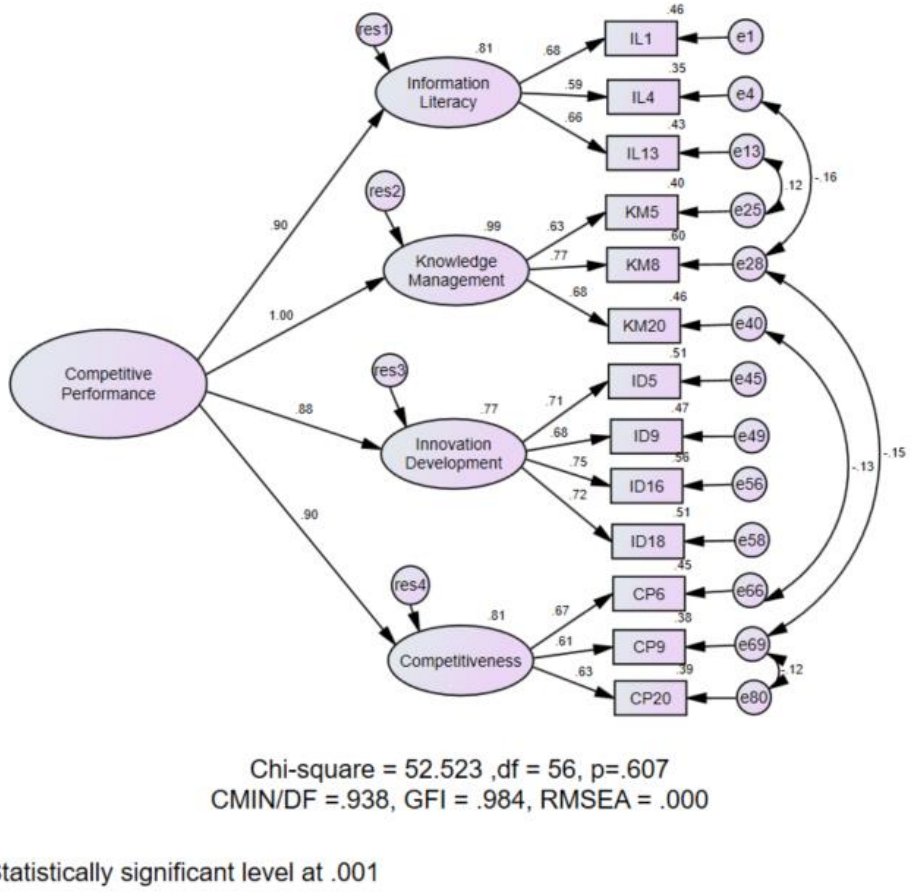

Figure 2: Results of the Second Order Confirmatory Factor Analysis (Second Order CFA) in Standardized Estimate mode after model modification

The analysis results show that the confirmatory factor model for the innovation applied to the competitive performance of the food industry is consistent with empirical data. From the first and second order confirmatory factor analyses, it was found that the component weights are positive, with first-order confirmatory component weights ranging from 0.57 to 0.77, significant at the .001 level, and second-order confirmatory component weights ranging from 0.88 to 1.00, also significant at the .001 level. The components with the highest weights are Knowledge Management Process, Information Literacy, Competitiveness, and Innovation Development, respectively. The fit indices between the model and empirical data yielded values of CMIN = 52.523, CMIN/DF = .938, p-value = .607, GFI = .984, and RMSEA = .000. This indicates that the confirmatory factor model of innovation applied to the competitive performance of the food industry is structurally accurate, and all 13 variables are significant components of innovation applied to the competitive performance of the food industry. The questions are consistent with empirical data, as shown in Table 3.

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Table 3: Displays the Results of the Second-Order Confirmatory Factor Model Analysis of the Innovation Applied to the Competitive Performance of the Food Industry in Standardized Estimate Mode after Model Modification

Component	Factor Loading	R^2	p	Questions
Knowledge Management Process	1.00	.99	***	**KM5:** Build an online network to exchange knowledge about the food industry.
				KM8: Create research works and a body of knowledge in collaboration with educational institutions or government agencies.
				KM20: Organize a contemporary staff structure that allows for the exchange of knowledge from different perspectives to enhance collaboration.
Information Literacy	.90	.81	***	**IL: 1** Implement information platforms for systematic data storage and processing that are user-friendly.
				IL4: Use data visualization to add value to data, discovering new patterns and identifying future trends.
				IL13: Implement off-the-shelf operation platforms within the organization, establishing usage policies and disseminating them to the staff.
Competitiveness	.90	.81	***	**CP6:** Establish bargaining power with buyers in terms of pricing due to being a sole seller.
				CP9: Build credibility for products by obtaining important international standards that competitors do not have.
				CP18: Create awareness through special offers such as vouchers and coupons that surpass competitors.
Innovation Development	.88	.81	***	**ID5:** Submit innovation works for competitions both domestically and internationally to stimulate and develop creativity in product development for the global market.
				ID9: Seek cooperation in innovation with external agencies.
				ID18: Implement systems to protect against unauthorized access to innovation and technology by unrelated parties or outsiders.

*Statistically significant level at the .001

5. CONCLUSIONS

5.1 Research Results

It was found that the pattern of innovation applied to the competitive performance of the food industry can be measured from 4 components, which are Knowledge Management Process, Information Literacy, Competitiveness, and Innovation Development, respectively. The research results are in accordance with the hypothesis of the pattern of innovation applied to the competitive performance of the food industry, and the researcher presents the details as follows:

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5.1.1. The variables of the pattern of innovation applied to the competitive performance of the food industry obtained from this research consist of 4 components, arranged in order of importance based on the weight of the components from highest to lowest, which are Knowledge Management Process, Information Literacy, Competitiveness, and Innovation Development, respectively. Each component corresponds with the following concepts and theories:

5.1.1.1 Knowledge Management Process is a process that helps organizations identify, select, organize, disseminate, and transfer important information and expertise. Knowledge management is a process or method of creating, acquiring, storing, sharing, and using knowledge to enhance learning and improve the performance of the organization. It consists of knowledge, technological infrastructure, organizational structure, human resources, and culture, leading to the creation of new knowledge that is a crucial part of creating innovation and sustainable competitive ability (Turban, E., Leidner, D., McLean, E., & Wetherbe, J. (2008)).

5.1.1.2 The Information Literacy component involves systematic operations through information systems. It is about managing collected information sources to meet usage needs efficiently and ensure interconnected operations to obtain essential information for organizational operations. Information is crucial in producing goods and services that can generate profit and success for the organization Leung, B. T. H., et al. (2019)).

5.1.1.3 The Competitiveness component is about an organization showing competitors that it can continuously change its goals and positions for the better (Porter, M. E. (2008)), leading to eventual competitive advantage. Knowing about organizational resources alone cannot create value and does not affect competitive advantage. Therefore, it is necessary to use organizational capabilities and core competencies to create value for customers and develop into organizational capabilities and core competencies to provide customer value superior to competitors (Minto-Coy, I. D., Cowell, N. M., & McLeod, M. (2016)).

5.1.1.4 The Innovation Development component emphasizes that innovation and technology are crucial in linking leaders through knowledge management, altering, designing, and developing business or product and service production, or new approaches that lead to practical implementation. It results in a competitive advantage from using technology to become a market leader by employing technology strategies as a way to manage technology and innovation through the application of technology and executive experience, enabling the organization to adapt efficiently and enhance its potential to achieve organizational goals (Chatzoudes, D., & Chatzoglou, P. (2017, 2023)).

5.2 Results of the Consistency Check between the Structural Models of Innovation Applied to the Competitive Performance of the Food Industry and Empirical Data

It was found that the structural model of innovation applied to the competitive performance of the food industry is consistent with empirical data. The results of the first and second-

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order confirmatory factor analyses showed that the component weights are positive, with first-order confirmatory component weights ranging from 0.57 to 0.77, significant at the 0.01 level, and second-order confirmatory component weights ranging from 0.88 to 1.00, also significant at the 0.01 level. The fit indices between the model and empirical data yielded values of CMIN = 52.523, CMIN/DF = 0.938, p-value = 0.607, GFI = 0.984, and RMSEA = 0.000. This indicates that the structural model of innovation applied to the competitive performance of the food industry is structurally accurate, and all 80 variables are significant components of the innovation applied to the competitive performance of the food industry.

6. RECMMEMDATION

6.1 The innovation applied to the competitive performance of the food industry is a study aimed at applying it to mitigate the impacts of the declining export issues in the Thai food industry and to enhance global market competitiveness. The researcher has summarized recommendations for applying the research results as follows:

6.1.1 From the research results, it was found that the pattern of innovation applied to the competitive performance of the food industry consists of 4 components: Knowledge Management Process, Information Literacy, Competitiveness, and Innovation Development, in that order. Based on the importance ranking of each component from the study, the government should use these results as information to promote innovation usage among food industry operators and to be aware of promoting and supporting innovation creation in various areas such as process innovation, service innovation, and business models, etc.

6.1.2 The National Innovation Agency Public Organization acts as a central unit in conducting networking activities, supporting Food Innopolis, supporting comprehensive food research, development, and innovation.

This involves collaboration with government agencies, private sectors, and universities to create an appropriate research ecosystem, offering a one-stop service to enhance the competitiveness of operators in the food industry and related industries.

It also helps operator’s access research resources and various services from both domestic and international universities and government agencies more conveniently and quickly.

6.1.3 The National Food Institute, under the Ministry of Industry, operates as a network organization to become a leading entity in creating value for the Thai food industry, recognized internationally.

It plays a role in developing and enhancing competitiveness, promoting and supporting research to create value-added products for agricultural goods and comprehensive food products.

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This includes researching and developing methods to extend the shelf life and preserve food products, consulting, researching and developing packaging suitable for food, and compiling, analyzing, and disseminating in-depth information in the food industry, etc.

6.2 Recommendations for Future Research

Future studies should explore other topics, including studying the food industry to cater to the growth of digital-era consumers, exploring food innovation models with digital technology, defining innovation strategies in the food and service industry to develop the capabilities of Thai entrepreneurs, and studying marketing communications that keep up with the changing lifestyles of consumers in the future.

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