



## APPROACHES TO CREATING ADDED VALUE OF AGRO-INDUSTRIAL PRODUCTS FOR SUSTAINABLE COMPETITION

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### Abstract

This research aimed to study the structure and operational characteristics of agro-industry and investigate the components of approaches to creating added value of agro-industrial products for sustainable competition, and 3) To develop a structural equation model of approaches to creating added value of agro-industrial products for sustainable competition. The sample group of this research was 300 entrepreneurs or agro-industry business executives registered with the Department of Industrial Works, separated into 150 entrepreneurs from large industries and 150 from medium and small enterprises. The data was collected using questionnaires, analyzed by descriptive statistics, reference statistics, and multiple statistics, and tested the hypothesis using structural equation model analysis with AMOS Advanced Statistical Analysis Program. The finding revealed that the approaches to creating added value for agro-industrial products or sustainable competition included information technology, organization management, innovation management, and market orientation. Regarding the testing result about difference separating with industrial size, it was found that large industries realized the importance of approaches to creating added value of agro-industrial products for sustainable competition more than medium and small industries, with statistically significant at the 0.05 level. From the result of the structural equation model analysis, it was found that there was the probability of chi-square (CMIN- $\rho$ ) (0.161), relative chi-square (CMIN/DF) (1.085), the goodness of fit index (GFI) (0.941) and root mean square error of approximation (RMSEA) (0.061). All of the value was consistent with empirical data.

**Keywords:** agro-products, sustainability, agro-industry, agricultural business, innovation management

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## 1. Introduction

Agro-products are essential to the economy of Thailand. The Ministry of Industry, therefore, has driven the policy of the agricultural processing industry into practice by defining approaches for promoting investment in agro-industry based on the spatial balance in the production of farm products, both food, non-food, and energy, including keeping the industry stable and achieving sustainability by promoting research and product development, raising product standards to international standards. Moreover, The Ministry of Industry also promotes Thai products that focus on creative Thai identity along with the development of marketing channels at various levels to encourage and develop the agro-processing industry by using knowledge, creativity, as well as local wisdom, which is an essential factor in the country's economy that Thailand's agricultural processing industry will be able to compete if it faces countries with higher technology or lower raw

material and labor costs (Office of Small and Medium Enterprise Promotion, 2018). Therefore, advancement in science and technology is another channel that creates opportunities for creative development that can be used to make a difference and create added value. The advancement of science and technology has improved products with no demands and products with a simple production process into the endless expectations and needs for new products and services. In line with the changing era, technology and creativity have been used to help develop ideas, production, and marketing and meet Thailand's vision (Department of Industrial Promotion, 2019).

Each year, agricultural exports generate a large amount for the country. In 2020, Thailand exported agricultural products worth 21,095 million US dollars, which is a 3% contraction compared to exports before 2020, as shown in Figure 1 (International Trade Negotiation Information Center, 2021).

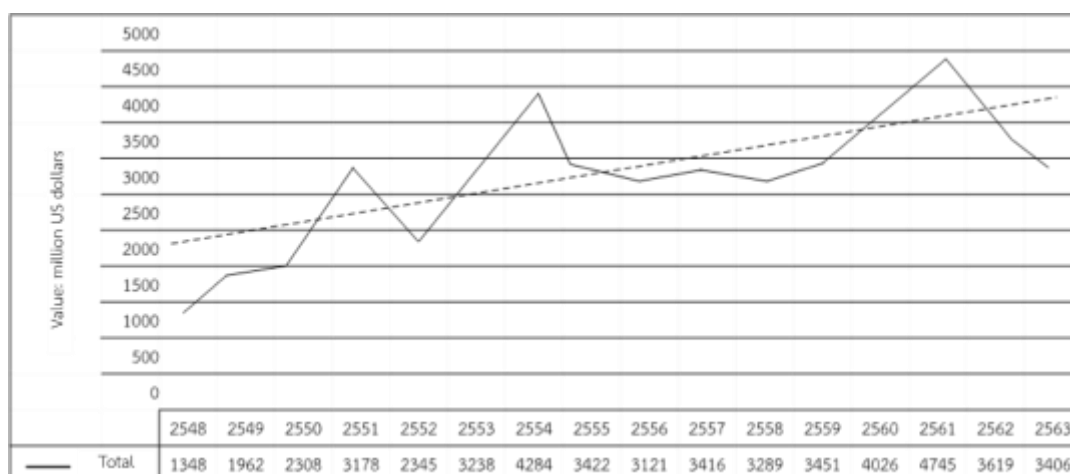


Figure 1 Thailand exports agricultural products. Source: International Trade Negotiation Information Center (2021).

Agro-industry can compete if the organization pays attention to organizational organizing by focusing the efficiency in the whole system to increase competitiveness and bring new agricultural innovations into modern farming practices to reduce production losses and help develop high-value products by creating uniqueness to meet market demands of both at home and abroad. In addition, innovation and efficient information technology must be applied for job development, human development, organization development, and market orientation for developing products and services to be up-to-date and meet international standards. It can be seen that the factors mentioned above will help to create agro-processing industry entrepreneurs to have the potential and be able to

operate their businesses sustainably. The objectives of this study were to examine the structure and operational characteristics of agro-industry for sustainable competition, to investigate the components of approaches to creating added value of agro-industrial products for sustainable competition, and to develop a structural equation model of approaches to creating added value of agro-industrial products for sustainable competition.

## 2. Materials and Methods

### Population and samples

The population was entrepreneurs or agro-industry business executives registered with the Department of Industrial Works in 2020, a reliable database of

2,500 registered companies (Department of Industrial Works, 2021). It could separate into large industrial businesses (industries with fixed asset value over 200 million baht or more than 200 employees) and small and medium industrial businesses (industries with a value of not more than 200 million baht or employment of not more than 200 people), that were in line with Industry Ministerial Regulations, Subject: Employment Schedule and Fixed Asset Value, B.E. 2545. The sample groups were formulated with the Table of Taro Yamane (1973); the population size (N) was 2,500 businesses, and the acceptable error of population (e) was 0.05, there were, therefore, 345 samples. Comrey and Lee (1992) suggested that the suitable sample size for the analysis of 300 structural equation models was considered good. Consequently, we considered determining the sample size of 300 samples by using multi-stage sampling (Babbie, 2010), which included cluster sampling. Using probability sampling, industry businesses were separated into 2 sizes, such as 150 large industry businesses and 150 small and medium industry businesses. The data was collected from these sample groups.

#### Designing research instrument

We designed questionnaires by studying the principles of questionnaire construction according to the conceptual research framework from books, documents, articles, and research results of these researchers, such as Wan and Liu (2021), Rambe and Khaola (2021), Wei et al., (2021), Kraus et al., (2018), Garcez et al., (2022), and Borazon et al., (2021). The research instrument was separated into three sections, which were as follows: The first section was the questionnaire on the general status of agribusiness, and the nature of the questionnaire was a checklist of 5 items. The second section was the 80-item value-added questions about approaches to creating added value of agro-industrial products for sustainable competition, it was a 5-point Likert's scale assessment questionnaire, in order of importance from 1 (least priority) to 5 (highest priority). The third section was the recommendation. Content validity was done by 3 experts who had the knowledge and experience in the field to study the questionnaire, to perform the tool quality assessment, the index of the item-Objective Congruence (IOC) was found to be between 0.70–1.00, which was greater than 0.50. It showed that the question was objectively measured or followed the criteria of Rovinelli & Hambleton (1977). Reliability was found by bringing questionnaires to try out with a sample group similar to the sample group that wanted to study, amounting to 30 businesses. Then, Cronbach's Alpha Coefficient was found to be between 0.95, passed the standard, and

had high confidence, which was accepted by Nunnally and Bernstein (1994).

#### Statistical analysis

The data were analyzed by descriptive statistics with the checklist questionnaire using the frequency method and summing it up as a percentage. The mean and standard deviation were used for the estimation scale, and the open-ended questionnaires were analyzed for content and summarized as frequency. Additionally, there was a comparative analysis of the business characteristics of the 2 sample groups, such as 150 questionnaires for large industrial businesses and 150 questionnaires for small and medium industrial businesses using t-test statistics for the difference in average values for both groups, The statistical significance was determined at the 0.05 level. Multivariate Statistics and Structure Equation Model (SEM) were also added to the analysis by using the advanced statistical analysis program AMOS to obtain relevant statistical data and interpret research hypothesis testing.

### 3. Results

The general status of the agro-industry business organization found that the respondents were small and medium industrial businesses equaled to large industrial businesses (50.00%). Most types of business establishments of the organization were limited companies (45.00%). The most open period of business was 10 - 20 years (40.20%). There was a business model invested by the Thai people (40.60%), and most of them were located in the provinces (52.50%)

The analysis results of importance level classified by business size found that small and medium industrial businesses emphasized approaches to creating added value of agro-industrial products for sustainable competition, overall, it was of high importance and had a mean of 3.61. When considering each aspect, it was found that all aspects were of high importance level, arranged in descending order of importance as follows: 1) Mean for the information technology was 3.77, 2) Mean for the organization management was 3.71, which was high importance level, 3) Mean of innovation management was 3.70, which was a high importance level, 4) Mean of market orientation was 3.65, which was a high importance level, respectively. Large industry businesses emphasized approaches to creating added value of agro-industrial products for sustainable competition; overall, it was of high importance and had a mean of 4.09.

When considering each aspect, it was found that all elements were of high importance, arranged in descending order of importance as follows: 1) Mean

of the for information technology was 4.11, 2) Mean for innovation management was 4.09, which was a high importance level, 3) Mean of market orientation was 4.08, which was a high importance

level, respectively, and 4) Mean of the organization management was 4.07, which was a high importance level, as shown in Table 1.

Table 1 Mean and Standard Deviation Classified by Industry Size as an Overall and by Aspect

| Approaches                 | Small and medium industry business |      |                  | Large industry Business |      |                  |
|----------------------------|------------------------------------|------|------------------|-------------------------|------|------------------|
|                            | $\bar{x}$                          | S.D. | Importance Level | $\bar{x}$               | S.D. | Importance Level |
| Overall Importance Level   | 3.61                               | 0.50 | High             | 4.09                    | 0.23 | High             |
| 1. Information Technology  | 3.77                               | 0.45 | High             | 4.11                    | 0.26 | High             |
| 2. Organization Management | 3.71                               | 0.59 | High             | 4.07                    | 0.28 | High             |
| 3. Innovation Management   | 3.70                               | 0.46 | High             | 4.09                    | 0.29 | High             |
| 4. Market Orientation      | 3.65                               | 0.64 | High             | 4.08                    | 0.32 | High             |

**Approaches:** approaches to creating added value of agro-industrial products for sustainable competition. For a comparison of importance classified by industry size using a t-test, the statistical significance was set at the 0.05 level. It was found that the overall importance level classified by industrial business size was statistically significant at the 0.05 level, with large industrial businesses emphasizing approaches to creating added value of agro-industrial products for sustainable competition

more than small and medium industry businesses. When analyzing the differences in each aspect, such as organization management, information technology, innovation management, and market orientation, it was found that all elements were significantly different at the 0.05 level, with large industrial businesses emphasizing approaches to creating added value of agro-industrial products for sustainable competition more than small and medium industry businesses.

Table 2 Comparison of differences in importance classified by business size, the industry overall, and by aspect.

| Approaches                 | t-value | p-value |
|----------------------------|---------|---------|
| Overall Importance Level   | -9.36   | 0.00*   |
| 1. Information Technology  | -7.07   | 0.00*   |
| 2. Organization Management | -10.87  | 0.00*   |
| 3. Innovation Management   | -8.08   | 0.00*   |
| 4. Market Orientation      | -8.05   | 0.00*   |

**Approaches:** approaches to creating added value of agro-industrial products for sustainable competition. \*Statistically significant at 0.05 level.

The structural equation model analysis result of approaches to creating added value of agro-industrial products for sustainable competition found that the chi-square probability (CMIN- $\rho$ ) of 0.161 was greater than 0.05, indicating that the

model was statistically insignificant, the relative chi-square (CMIN/DF) of 1.085 was less than 2.00, the goodness of fit index (GFI) of 0.941 was greater than 0.90, the root means square error of approximation (RMSEA) of 0.061 was less than 0.08. Therefore, it could be concluded that all 4 statistics passed the assessment criteria and it was consistent with empirical data. The results are shown in Figure 2.

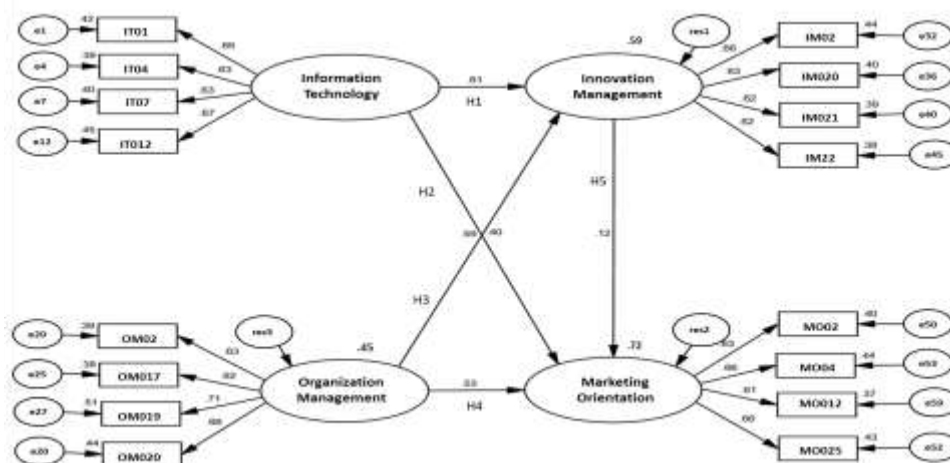


Figure 2 Structural equation model

The hypothesis testing result of 5 hypotheses to analyze the causal influence between the latent variables in the structural equation model for approaches to creating added value of agro-

industrial products for sustainable competition was consistent with the set assumptions. The results are shown in Table 3.

Table 3 Hypothesis test results

| Research hypothesis  | Result |
|--|--------|
| H1: Information technology directly affected organizational innovation.  | Accept |
| H2: Information technology directly affected market orientation.         | Accept |
| H3: Organization management directly affected organizational innovation. | Accept |
| H4: Organization management directly affected market orientation.        | Accept |
| H5: Organizational innovation directly affected market orientation.      | Accept |

#### 4. Discussion

The findings of approaches to creating added value of agro-industrial products for sustainable competition can be discussed as follows. First, regarding information technology, the organization had defined access rights to information security information such as view-only, having a backup storage system to prevent data loss, and modifying the storage system from paper to electronic files to reduce the working process and cost savings (Sawangrat, 2021). Additionally, it was possible to link the collaboration of different departments within the organization with the effective sharing of information could reduce the time spent working, according to a study by Soto et. al., (2018), which found that the ability of technology could help work in the organization to be more efficient, personnel were creative in creating innovation for the organization. Information technology was, therefore, easy to manage information to make it easier to find, use and utilize. It was consistent with a study by Ben Zammel and Najjar (2022); the adoption of information technology allowed the organization to systematically store information in an organization's knowledge repository to prevent

data loss and make it easier to utilize. It was a source of knowledge to share information within the organization. Secondly, it is the issue of organization management. The organization promoted personnel to have the courage to think about creating an organization being sustainable. There was a promotion of new ideas or new creativity to develop the organization and learning to solve problems together with personnel from the operational level up to the executive level. It was consistent with a study by Traode and Shrivastava (2022), which found that effective organizational management would help standardize operations, teamwork, and procedures following the policies the organization had set. This was also consistent with the study of Cote et. al., (2022), which found that effective organizational management was caused by the organization's use of technology to improve work processes, resulting in new knowledge for practice. Additionally, it also resulted in employees being able to work more effectively, it was creating a competitive advantage as well. Thirdly, it is important to mention an organization's innovation. The organization brought innovations to develop tools/machines to be more efficient and consistent with their use. There was always improvement and



development of product styles according to customer recommendations. Management innovations had been used to develop products and services to be up-to-date to meet the demands of customers. It was consistent with the study of Rambe and Khaola (2022), organizational innovation could increase productivity and enable successful organizational operations. It was also consistent with the study of Tang et. al., (2022) which found that innovation was an important factor that helped create opportunities for organizations to build stability for their own business. The study of Abubakre et. al., (2022) found that If any organization did not use innovation, it would result in the organization was not modern, there being more weaknesses than strengths, and having more obstacles than organizations that adopted the innovation. Lastly, the final point is market orientation. The market orientation was focusing on product development to best meet customer or market demands. There was the promotion of changes in marketing methods. Additionally, it was also meaning the production process of products and services focused on being a leader above competitors. It was consistent with the study by Royo et. al., (2021), which found that the market orientation focused on learning, competition, and coordination results in higher marketing efficiency of the organization. The study of Borazon et. al., (2021) found that market orientation was very important to the internal environment of organizations such as employees, shareholders, and entrepreneurs and provides economic efficiency, for example, reducing pressure from competitors, customers, and regulations for business. The study of Akgun and Polat (2021) found that market orientation on branding, customer relationship management, pricing management, and distribution channel management would help deliver fast delivery to the market.

## 5. Conclusion

Since an approaches for entrepreneurs to realize the importance of each component for the development of the agro-industry to be successful in marketing with an emphasis on organizational management for personnel development, job development, and organizational development, leading to an innovative organization by focusing on improving the development of existing products to developing into new products that meet international standards to meet market demands and create competitive advantages. Additionally, if wanting to upgrade the agricultural industry to be more efficient, the organization would increase skills and promote employees to have the knowledge and information technology capability for the practical operation to

help reduce unnecessary performance. This resulted in fast for every step of the operation. Additionally, the factors that create success for the organization should also be studied in addition to this study, to help the agro-industry have excellence in organizing, create a competitive advantage and be a leader in technology and innovation. This research conceptual framework should be adopted to study with other industry groups to get approaches for organization development, personnel, and products or services to have the potential to compete and be ready to support the changes that will occur in the future that will lead to sustainability.

## Conflict of Interest

The authors have no conflicts of interest to declare.

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