

# THE ROLE OF VALUE CHAIN IN ENHANCING COMPETITIVENESS AND OPERATIONAL EFFICIENCY OF ORGANIC RICE BUSINESS

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## ABSTRACT

*This research aims to study the role of value chain in the model of enhancing the competitiveness and operational efficiency of the organic rice business. Data was collected and analyzed from a sample of 400 organic rice entrepreneurs in Thailand using a 4-step statistical package, including corroborative component analysis, Confirmatory Factor Analysis (CFA), Structural Equation Model Analysis (SEM), and Sobel's test. The results showed that value chain factor significantly influenced operational efficiency through enhancing competitiveness. Moreover, the combined model developed from the study was harmonious with the empirical data by the statistical values that have passed the specified criteria for every item. From the research results obtained, the information can be applied to the organic rice industry and also useful in the study and development of value chain factors and model to increase competitiveness and operational efficiency further.*

**Keywords:** Value Chain, Competitive Competency, Operational Efficiency, Organic Rice, Thailand

## INTRODUCTION

Value chain is a group of activities that offer a product or service from an idea through the production process until final delivery to the consumer, including disposing of the product after use. An organization's value chain is connected to the supplier's value chain and the customer's value chain, forming a larger relationship system. Value chain revolves around making the organization understand the whole organization's process to reduce costs, optimize all operations, and increase revenue by creating value to various functions and products or services that create value for the organization. Improving efficiency will help enterprises to create a competitive advantage. We can also use value chain to analyze competitor processes; this covers all the methods employed by competitors, what they do, how they do it, where they can do better, and where adjustments are needed in order to create value above the competition (Chaveesuk, Khalid & Chaiyasoonthorn, 2019; Khalid et al., 2021; Helmold et al., 2021).

Enhancing competitiveness to increase operational efficiency is the main goal of developing an organization's work, which in turn helps it to achieve its goals. When an organization can improve its operational efficiency, it gives the organization the ability to allocate resources more efficiently and this continually enhances its progress (Fisher, Wisneski & Bakker, 2020; Khalid, Chaveesuk & Chaiyasoonthorn, 2021; Muangmee et al., 2021). Enhancing operational efficiency requires many factors that will enable an organization to compete with its

competitors. Today, many technology-driven ideas are attractive alternatives to already existing operations and are designed to increase productivity as well as competitiveness. The application of technology affects the operational capability and efficiency of an organization, and this comes from knowledge about operations. Sánchez, García & Rojas (2018) state that knowledge management processes that impact operational efficiency make organizations more comfortable and efficient in building networks. Al-Sa'di, Abdallah & Dahiyat (2017) are of the view that network capabilities on the other hand increase competitiveness in any sector. Rice, et al., (2015) opine that the market is focused on enhancing competitiveness and can drive product awareness and increase sales for the organization. Phi, et al., (2018) in their opinion highlighted that product processing potential extends shelf life of the products concerned, creates added value for agricultural products, and gives farmers enough potential to compete with major competitors (Kuntamas & Shoommuangpak, 2020), in this case, the product being discussed is organic rice.

Organic rice is the cultivation of rice that supports the ecosystem, including biodiversity by focusing on natural materials, and avoiding the use of synthetic raw materials in their cultivation. Organic rice maintains the condition of being 'organic' and the quality of the products at every step is naturally cultivated using organic materials. Organic rice cultivation must avoid using chemical fertilizers or other additives not naturally occurring and adopts a natural soil fertility management process (Rice Research and Development Bureau Department of Rice Science, 2019). Today, however, the process of growing organic rice in Thailand has led to many sectors cooperating to encourage farmers to widely grow organic rice. The government has a program to promote organic rice production and develop and promote the organic rice production system in 2017. Although many agencies promote organic rice cultivation for farmers, there are still problems and obstacles in developing and promoting organic rice production in Thailand. Therefore, the development or the search for new strategies that enhances competitiveness in the organic rice industry is essential and cannot be delayed any further (Chaveesuk, Chaiyasoonthorn & Khalid, 2020; Department of Rice, 2021). From the background and importance of the problems mentioned above, the researchers are interested in studying the model of enhancing competitiveness and operational efficiency to improve the efficiency of organic rice cultivation and entrepreneurship in Thailand, as well as benefit those in the academia.

## LITERATURE REVIEW

In understanding the role of competitiveness in business, Porter (1985) defined competition as the ability to meet consumer demand for goods or services with better price and quality than other manufacturers or service providers and have a profitable return that is sufficiently cost-effective on inputs. It stems from the concept of economic theory that resources are limited, but human needs are endless. In the era of free trade, there are more competitors and trading partners for organic rice, so it cannot be avoided to increase competitiveness so that farmers groups can produce and develop products to be equal or better than competitors.

Essuman, Boso & Annan (2020) define operational efficiency as the performance resulting from any action that leads to the successful use of resources through a structured process for maximum benefit. However, any action depends on the resources at that time as well as the quality and quantity. If the quality is high, it must be used in small amounts to be considered effective to use it to its fullest potential. Unlike high-volume but low-quality resources, it is

necessary to choose how to maximize the resource's potential to be considered efficient (Meekaewkunchorn et al., 2021; Puchkova et al., 2020; Wall, 2021).

Porter (2011) claims that value chain is an activity that takes place both internally and externally with any given product and organization. From sourcing for raw materials, processing, to the delivery process of goods and services with all being affected by competitiveness. Ferdous & Ikeda (2018) argue that value chain analysis contributes to the advancement of competitive advantage for any given product. Abdul & Kishore' (2018) also add that value chain is a set of activities and achievements that organizations undertake to create value for their customers. It can be said that value chain is the process from sourcing raw materials to making the products reach the end users. Value chain is creating value for customers by creating a competitive advantage which can be leveraged on in market analysis.

A similar study by Strakova, et al., (2020) showed that value chain contributes to procurement, material handling, export, corporate infrastructure, marketing, sales, and other services, and helps to increase the organization's competitiveness in its market segment. Consistent with research by Velasco, et al., (2015), which found that integration between value chain and farmers' operations results in better operational efficiency which allows farmers to produce more products and is important for competitiveness. Also, Quédeville, et al., (2018) stated that value chain was central to farmers' operations, enhancing competitiveness and consistent efficiency. Based on the literature review that has been studied above, the research proposed the following hypothesis (H1) to guide this research:

*H1 Value chain is positively correlated with enhancing competitiveness in organic rice production.*

The application of technology in in enhancing a brand's competitiveness has been discussed in a number of studies. Zhang, Kandampully & Bilgihand (2015) are of the view that a quality application of technology can lead to sustainable competitive advantage for the organization over its competitors. Because technology can help create, store, transfer and use information easily and conveniently, this will increase the competitive advantage. Sánchez et al. (2018) add credence to this when they opined that encouraging employee to use new technologies positively influences organizational performance, allowing the company to increase its ability to compete even at a higher level than normal. In justification, Panpluem, et al., (2019) found that the application of technology enhances the competitive efficiency of organic farming. Suharyati Hartono & Waluyati (2016) analyzed the advantages of applying technology for improving competitiveness in organic rice production in Java; their findings were consistent with the work of Ueasangkomsate, Suthiwartnarueput & Chaveesuk (2018), whose result showed that application of technology has a positive influence on enhancing competitiveness. Based on the literature review that has been studied above, research hypothesis (H2) is formulated thus:

*H2 Technology application is positively correlated with enhancing competitiveness*

Knowledge Management refers to the collection of knowledge contained in an organization that is distributed among individuals. Alternatively, knowledge management is the embodiment of knowledge contained in a document that is developed into a system for effective operations that results in the organization's competitiveness (Quality Assurance Office Faculty of Engineering Mahidol University, 2019) Knowledge management is a tool to increase the capacity

and efficiency of an organization. Knowledge management creates a competitive advantage that enhances the operations of an organization (Di Ciccio, Marrella & Russo, 2015). Similar findings were found in a study by Al-Sa'di, Abdallah & Dahiyat (2017), they found that knowledge management processes affect competitiveness, enabling organizations to operate more easily and more efficiently. Ferraris, et al., (2019) alluded how effective knowledge management enhances agricultural companies' competitiveness, quality, and operational efficiency. Zecca & Rastorgueva (2017) found that knowledge management was a tool for facilitating group farming operations, and this aligns with our study about the role of value chain in organic rice farming. Knowledge management makes farming a sustainable form of knowledge management where knowledge is stored in the processes and increases the competitiveness of the agricultural sector. Based on the literature review that has been studied above, the research hypothesis three is formulated thus:

*H3 Knowledge management is positively correlated with enhancing competitiveness.*

Networking refers to the coordination between individuals or groups of people with similar activities and linking work or ideas to other groups to strengthen problem-solving leading to achievement of goals and improved methods of working together to achieve the same objectives. Smyrnova-Trybulska (2017) discussed the capability and application of networks in organic rice cultivation. The importance of having an organic rice network is important in fostering organic rice business. Rice, et al., (2015) found that entrepreneurial partner networks where organic rice works together contribute to enhancing competitiveness and reduce opportunism from competitors. The study by Arellano & Reyes (2019) stresses that competence and behavior of network farmers are important in driving competitiveness, resulting in desirable operational efficiency. Similarly, Arcuri (2015); Kuosmanen, Yli-Heikkilä & Väre (2021), Candra & Ma'moen (2021); Dara, et al., (2021) found that organic rice chains and networks had a positive influence on enhancing competitiveness among organic rice farmers, and these are the basis for the formulation of hypotheses four.

*H4 The ability of the organic rice network is positively correlated with enhancing competitiveness.*

Kotler, Armstrong & Opresnik (2019) explain that market focus affects managing marketing to develop and maintain performance as the pressure for a business to run. Market focus has a very positive influence on competitive advantage and operational efficiency. Talaja, et al., (2017) makes emphasis on import of agricultural marketing in promoting farm crops. Phi, et al., (2018) found a significant correlation between marketing activities and the efficiency of farm livestock operations. More recently, Sahi, Gupta & Cheng (2020) found that a specific market focus affects competitiveness in the organic rice industry and increases operational efficiency. The findings were seen to be consistent with previous studies by Josephson, Johnson & Mariadoss (2016); Udriyah, Tham & Azam (2019). Situating this to Thailand, Boonmalert, et al., (2020) found that niche marketing orientation positively affected customer loyalty, making rice producers more competitive, affecting efficiency in further operations. Based on the literature review, research hypothesis five was proposed:

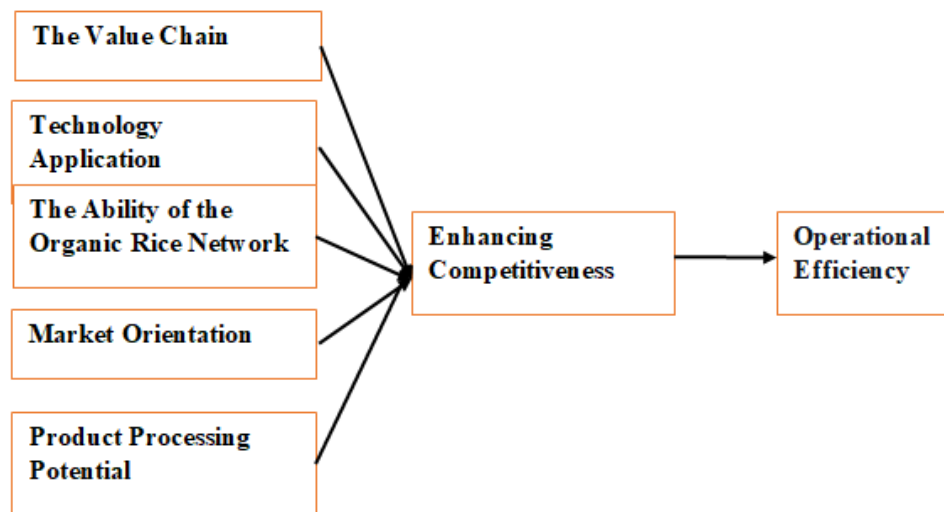
*H5 The market focus is positively correlated with enhancing competitiveness.*

Another aspect that requires focus in the value chain discourse is product processing potential of organic rice. The processing of organic rice products will help extend the shelf life and create added value to agricultural products. Product processing potential also gives farmers enough potential to compete with major competitors. Postulations by Kuntamas & Shoommuangpak (2020) is consistent with findings in Buena & Whitney (2017); Srivastava, Sultan & Chashti (2017); My Nguyen, et al., (2018) found that the ability to innovate in product processing affects the industry's competitiveness, thereby increasing sales and motivating consumers to buy a product. The above literature necessitated hypothesis six which is stated thus:

*H6 Product processing potential is positively correlated with enhancing competitiveness.*

Enhancing competitive competency and operational efficiency is vital for enhancing value chain (Andria et al., 2020; Noormansyah & Cahrial, 2020) When farmers develop their production potential to advance their operational capabilities especially in terms of modernizing their farms to gain acceptance, this allows them to compete at a higher level. They will in the process increase their efficiency, income and give room for expansion of operations. The study by Kinoshita (2019) was consistent in its findings where it stated that higher competitiveness positively affected increased operational efficiency. It is also compatible with Mataia et al., (2020), and Beltran, Bordey & Moya (2016) which found that enhancing competitiveness influences operational efficiency. These findings serve as the foundation for the formulation of hypothesis seven:

*H7 The increase in competitiveness is positively correlated with operational efficiency.*



**FIGURE 1  
CONCEPTUAL FRAMEWORK**

### HYPOTHESES

- H1 The value chain is positively correlated with enhancing competitiveness.*  
*H2 Technology application is positively correlated with enhancing competitiveness.*  
*H3 Knowledge management is positively correlated with enhancing competitiveness.*

- H4 The ability of the organic rice network is positively correlated with enhancing competitiveness.*
- H5 The market focus is positively correlated with enhancing competitiveness.*
- H6 Product processing potential is positively correlated with enhancing competitiveness.*
- H7 The increase in competitiveness is positively correlated with operational efficiency.*

## METHODS

The section deals with the methodology of the research. The study was conducted using primary data. The data was collected using self-administered questionnaire on a 5-point Likert scale where 1=strongly disagree and 5=strongly agree. The data was collected from a sample of 495 organic rice farmers in the Northeastern region of Thailand. The Northeast is the most agricultural region in Thailand, accounting for 46.2% of the total farming in the country. There is a large number of quality certified organic rice production areas and using enhanced techniques to optimize production. Convenience sampling technique was adopted to target organic rice farmers in Northeast Thailand for the study. The data was collected between 12th January 2021 and 12th June 2021. The researcher presented the questionnaire structure to three experts to test the reliability and validity of the content before it was pretested on 36 respondents. Along with evaluating the IOC (Item objective congruence), it was found that the Alpha Coefficient of the questionnaire exceeded 0.70, all of which were considered valid and reliable (Rovinelli & Hambleton, 1977).

The questionnaire was divided into 11 parts as follows; Part 1 General information of the respondents consisted of 6 questions. Part 2 Agricultural information consists of 6 questions. Part 3 Information for the establishment consists of 9 questions. Part 4 Value Chain Opinions contains 8 questions. Part 5 Opinions on Technology Applications contains seven questions. Part 6 Opinions on Knowledge Management contains seven questions. Part 7 Opinions on the ability of organic rice networks consists of seven questions. Part 8, Market Focus Opinions, contains five questions. Part 9 Opinions on Product Processing Potential contains five questions. Part 10 Opinions on Enhancement of Competitiveness includes six questions. Part 11 Opinion on Operational Efficiency consists of 6 questions.

The data collected from the returned questionnaires were evaluated for accuracy and analyzed by using the SPSS software package to obtain statistics and used them in four different aspects:

1. Analyze measurement models for accuracy and reliability by using Confirmatory Factor Analysis (CFA) to find factor loadings and influences that enhancing competitiveness.
2. Analyze paths (path analysis) to find influences or causes of independent variables that affect the dependent variable.
3. Analyze structural relationships using the structural equation modeling (SEM), a multivariate statistical analysis technique used to analyze multiple variables that mediate dependent variables.
4. Analyze mediates by using the mediation test (Sobel's Test) to determine if enhancing competitiveness is a good mediator.

After the data was collected, it was evaluated for missing values and outliers. A total of 495 responses were collected, after cleaning the data, a total of 400 responses were considered valid for analysis.

## RESULTS

The demographic information revealed that most of the respondents was male (89%). 128 of the respondents were aged between 31-35 years representing 32%, the highest level of

education was High school or equivalent accounting for 42.7%. The highest monthly income of the group was recorded for those earning between 15,001-25,000 baht (57.3%).

**Table 1**  
**CHARACTERISTICS OF CAUSAL RELATIONSHIP INFLUENCE BETWEEN VARIABLES AND HYPOTHESIS TESTING FROM ORGANIC RICE OPERATORS**

Hypothesis	Result		
	Influence	Total	Hypothesis Test
H1: The value chain is positively correlated with enhancing competitiveness.	DE=0.486*	TE=0.890*	Accept
	IE=0.404*		
H2: Technology application is positively correlated with enhancing competitiveness.	DE=0.236*	TE =0.733**	Accept
	IE=0.497**		
H3: Knowledge management is positively correlated with enhancing competitiveness.	DE=0.796**	TE=0.809**	Accept
	IE=0.213*		
H4: The ability of the organic rice network is positively correlated with enhancing competitiveness.	DE=0.433*	TE=0.857**	Accept
	IE=0.424*		
H5: The market focus is positively correlated with enhancing competitiveness.	DE=0.511**	TE=0.818**	Accept
	IE=0.307*		
H6: Product processing potential is positively correlated with enhancing competitiveness.	DE=0.355*	TE=0.852**	Accept
	IE=0.497**		
H7: The increase in competitiveness is positively correlated with operational efficiency.	DE=0.751**	TE=0.751**	Accept

Remark \* $p < 0.05$  is statistically significant at the level of 0.05

Table 1 found that the value chain variable had the greatest influence with an influence of 0.89, followed by the ability of the organic rice network with an influence of 0.85 and a lower influence of the organic rice network. The most subordinate variable, technology application, influenced 0.73. It can be concluded that the value chain, technology application, knowledge management, the ability of the organic rice network, market focus and product processing potential have a causal relationship with operational efficiency and enhancing competitiveness. Thus, test results accept all established assumptions.

### Structural Equation Modeling

The results showed that  $\chi^2/df$  was equal to 2.41, and the p-value of the model's variance matrix test and empirical data was higher than 0.05 ( $p > 0.05$ ). Therefore, the model and data were consistent. According to an index of fit, the Goodness of Fit Index (GFI) needs to be higher than 0.90, and in this case, the GFI was 0.948, while the Comparative Fit Index (CFI) was 0.996. On the other hand, the ideal value for residuals must be less than 0.08, and in this case, the Root Means Square Error of Approximation (RMSEA) was 0.059, and the Standardized Root Means Squared Residual (SRMR) was 0.056. The result also showed that the variable relationship model and the empirical data were consistent, and the statistical values passed all the criteria. The SEM results are summarized on Table 2.

Statistics	Criteria	Values	Results
$\chi^2$	-	2.47	-
df	-	1	-
$\chi^2/df$	should be less than 3.00	2.47	Passed
p	higher than 0.05	0.12	Passed
CFI	higher than 0.90	0.976	Passed
GFI	higher than 0.90	0.986	Passed
RMSEA	less than 0.08	0.046	Passed
SRMR	less than 0.08	0.019	Passed

Remark \* $p < 0.05$  is statistically significant at the level of 0.05

### Sobel's Test

Use the Indirect effect test using Sobel's test. When there is an increase in competitiveness it can be demonstrated through Sobel's test. The results are presented in Table 3.

Relation	$\beta$	Sobel's test(z)	Influence of the mediator
H1: The value chain is positively correlated with enhancing competitiveness.	0.040**	4.139	Partially
H2: Technology application is positively correlated with enhancing competitiveness.	0.008**	3.892	Partially
H3: Knowledge management is positively correlated with enhancing competitiveness.	0.009**	2.456	Partially
H4: The ability of the organic rice network is positively correlated with enhancing competitiveness.	0.007**	3.17	Partially
H5: The market focus is positively correlated with enhancing competitiveness.	0.003**	3.532	Partially
H6: Product processing potential is positively correlated with enhancing competitiveness.	0.002**	3.655	Partially
H7: The increase in competitiveness is positively correlated with operational efficiency.	0.005**	3.362	Partially

Remark \* $p < 0.05$  is statistically significant at the level of 0.05

The results revealed that all variables (the value chain, technology application, the ability of the organic rice network, market focus and product processing Potential) had indirect effects on operational efficiency through the mediating variable (enhancing competitive) at the statistical significance of 0.05. However, the most important variable was the value chain ( $z=4.139$ ). The value chain is positively correlated with enhancing competitiveness.

## DISCUSSIONS

According to research findings, the value chain variables greatly influence operational efficiency by enhancing competitiveness. The aim focuses on the proper allocation of resources



in the value chain model. The study also submits that organic rice value chain model has the capacity to enhance competition and competitiveness in the organic rice market and business model. In addition, the value chain can also increase profitability for the business venture, strengthening the value chain model at every step can create competitiveness for organic rice operators. Subarna & Mitsuru (2018) found that value chain is an activity that takes products and services from initiation to delivery to the final consumer through various stages. The goal of the value chain is to deliver the highest value at every step to consumers by enhancing their competitiveness resulting in greater operational efficiency. The findings support findings by Abdul & Kishore (2018) who found that value chain is a set of activities that increases competitiveness. It can be said that the value chain from sourcing raw materials to making the products reach the best customers creates value for customers and creates a competitive advantage. A similar study by Strakova, et al., (2020) found that value chains contribute to purchasing raw materials, material handling, export; corporate infrastructure marketing and sales, and other services and support help increase the organization's competitiveness. It is also consistent with Quiédeville, et al., (2018) on the sustainability system of French organic rice and the value chain. The results show that the operation of farmers' groups affects increasing competitiveness. Leading to the outcome by Velasco, et al., (2015) who investigated the application of value chain concepts in the Thai rice industry and found that farmers can improve operational efficiency, allowing farmers to produce more products and have a more standardized quality.

The findings also showed that technological applications influence operational efficiency through increasing competitiveness. Various applications of technology have demonstrated the ability of technology to help create, store, transfer and use information when required especially with regard to organic rice cultivation. It is easy and convenient, which will help farmers to build and maintain a competitive advantage—resulting in higher competitiveness in line with the views of previous authors (Ueasangkomsate, Suthiwartnarueput & Chaveesuk, 2018; Suharyati, et al., 2016; Bilgihan & Wang, 2016) who opined about the relevance of technology and how it can improve organizational performance. The quality use of technology by the organization can lead to sustainable competitive advantages in the present and future shelf life of the organization and its competitiveness in the organic rice industry.

Reechoing similar sentiments, Sánchez, et al., (2018) found encouraging employees to use new technologies enhances productivity. The development of personnel's technological skills and personnel's technological competence has a positive influence on the performance of an organization as a tool that helps people increase their ability to make the company competitive. It can increase the ability for the organization to rise even higher because it is operating at an optimum level. This view was also supported by Panpluem, et al., (2019). They asserted that the application of the technology enhanced the competitive efficiency of organic farming and the efficiency of organic agriculture. Thus, technology is indispensable towards enhancing productivity and competitiveness for organic rice farmers and their employees.

Knowledge management influences operational efficiency through increasing competitiveness. It explains that having good knowledge management leads to efficient and sustainable operations resulting in higher competitiveness. This result is supported by the studies of Al-Sa'di, Abdallah & Dahiyat (2017), which examined how knowledge management processes affect operational efficiency and how organizations operate. The result is consistent with findings by Ferraris, et al., (2019) studying effective knowledge management. It affects the quality and

efficiency of the company's operations. Zecca & Rastorgueva (2017) assented that knowledge management was a vital tool for facilitating group farming operations. It gives farmers a sustainable form of knowledge management and increases the competitiveness of the agricultural sector. Also, knowledge management can influence the organization's longevity and increase their capabilities, efficiency and will help to keep work flowing and ability to compete with in the business.

The findings show that the ability of the organic rice network influences operational efficiency through increasing competitiveness. Thus, focusing on the skills of the organic rice network will result in higher competitiveness, whether it is cooperation from trade partners or assistance from the network of organic rice farmers. The exchange of knowledge from group leaders and enterprise members contributes to product development which allows the business to compete with competitors on an equal footing. This agrees with the assessment of Lu, Liu & Fang (2016), who found that the ability of network operators and partners plays a very important role in the survival of a business, increased profits and giving the business a competitive advantage over its competitors. Arellano & Reyes (2019) in agreeing with the positive influence of a farming network stated that farmers' abilities and behaviors are important in driving the effectiveness of the desired operations that contribute to their competitiveness. Tu further accentuates the point, other studies found that organic rice networks help build new capabilities to increase competitiveness in the market on a par with competitors (Arcuri, 2015; Candra & Ma'moen, 2021; Dara et al., 2021; Kuosmanen et al., 2021). What this entails is that the ability of the organic rice chain was found to have a positive influence on the competitiveness based on the results and literature.

Market focus influences operational efficiency through increasing competitiveness by enabling them to improve and develop marketing strategies that optimizes market performance, which leads to an increase in market share, and results in a positive effect on operational efficiency. In congruence with findings by Talaja, et al., (2017), that looked at how marketing focus provides a competitive advantage and improved business results. The study findings show that marketing focus has a positive influence on the competitive edge and operational efficiency. This was reinforced by Phi, et al., (2018) who found a significant correlation between marketing activities and the efficiency of farm livestock operations in Thailand. Boonmalert, et al., (2020) similarly examined the competition level in the Thai rice industry and found that niche marketing orientations positively affected customer loyalty, enabling rice producers to compete. The competition affects the efficiency of further operations. In agreement, a study by Sahi, et al., (2020) added that a specific market focus affects the competitiveness of the organic rice industry and increases operational efficiency. This claim was consistent with views in Josephson et al. (2016); Udriyah, et al., (2019).

The study findings highlight that product processing potential influences operational efficiency by increasing competitiveness. The respondents who are organic rice operators thinks that the potential is good enough in product processing and will give organic rice entrepreneurs a competitive edge in the rice industry. When organic rice operators design and process organic rice under market demand, it will increase sales and add value to products, resulting in higher operational efficiency. This has been validated by Srivastava, et al., (2017), who found that innovation in product processing affects the industry's competitiveness, increasing sales and further motivating consumers to buy. Therefore, the rice processing process takes place to meet the psychological needs of consumers. Furthermore, consistent with results in My Nguyen, et al.,

(2018) who found that innovation capacity In product processing affects the competitiveness of the industry by increasing sales and motivating consumers to buy. Therefore, the rice processing process takes place to meet the psychological needs of consumers. Moreover, rice processing is a process that increases the value of rice as opined by Buena & Whitney (2017).

Increasing competitiveness positively influences operational efficiency. When the ability to develop organic rice products to a competitive level is high, it will correspondingly lead to a high efficiency of operations as well. This aligns with the findings by Andria, et al., (2020), who said that increased competitiveness is also a key factor in farming efficiency. When farmers develop production potential, progress will be assumed to have been made in modernizing the farm especially when it is accepted to compete at a higher level. It will increase operational efficiency and mean more revenue for the farm and improving its long-term viability and sustenance of the business model. This was also consistent with the research by Mataia, et al., (2020), which studied the value chain concept of upgrading infrastructure to increase the competitiveness of the rice industry, and as earlier pointed out, competition directly impacts operational efficiency. The findings also agree with the arguments espoused by Beltran, et al., (2016) about the impact of supply chain capabilities on the performance of the Thai food industry. They revealed that higher competitiveness had a positive effect on increased operational efficiency. Organic rice farmers can leverage on the benefits of competitiveness to improve on their operational efficiency.

## CONCLUSION

This study has shown that value chain factors have the greatest influence on operational efficiency through enhancing competitiveness. From the results of this study, it can be inferred that organic rice operators place importance on value chain as an important factor in improving their ability over their competitors because organic rice operators have many competitors. Increasing competitiveness is a key factor in the development of operational efficiency and the sustenance of the business structure especially with the competitive nature of the organic rice market. The study results showed that the model was consistent with the empirical data by testable statistical values having passed all the specified criteria and met all the assumptions set out. It explains that the competitiveness model consists of value chain variables, technology application, knowledge management, the ability of the organic rice network, market focus and product processing potential influence to operational efficiency, with enhancing competitiveness acting as interstitial variables following the assumptions that have been anticipated in all respects.

## RECOMMENDATIONS

The following recommendations have been proffered in relation to the hypotheses of the study, they include:

**The Value Chain:** Organic rice entrepreneurs should adopt a development approach based on the value chain concept that starts from the beginning, middle, and end to be adapted for further development. Organic rice entrepreneurs should have the ability to source raw materials that must be developed, processing organic rice products, and delivering products from organic rice production to create added value for customers and create competitive advantages in the industry.

**Technology Application:** Organic rice entrepreneurs should initiate and apply modern machinery and technologies. It can help increase agricultural productivity and reduce production costs to make the farmer's organic rice production process more standardized. Because new information and technology can help organic rice operators to develop better organic rice production, and new technology also helps organic rice entrepreneurs gain access to, and better understand the market, increasing sales channels and distribute the product more widely and improve the bargaining power for organic rice operators.

**Knowledge Management:** Organic rice entrepreneurs should develop farmers to become knowledge managers. By joining a group of farmers who have knowledge and expertise in organic rice cultivation to understand potential organic rice producers, encourage demonstration plots to be a source of mutual learning. Both the practice and the exchange of knowledge or experience, and then that knowledge will be put into practice in each farmer's field.

**The Organic Rice Network's Ability:** should establish a network of organic rice entrepreneurs, a network that is united and cohesive so that organic rice entrepreneurs can help solve problems with the help of network groups by providing opportunities for individuals and organizations to share information, including lessons and experiences with individuals or organizations outside their networks.

**Marketing Focus:** Organic rice operators should promote the market to make it a standard accepted by emphasizing safety and free chemical residues in products. Advertising and public relations related to organic products should be included in the marketing because it has the potential to raise awareness on product packaging, distribution, and expansion of the consumer markets. This can be done by adding marketing channels that have the potential to reach new consumers beyond the domestic market and include the regional and international market segments.

**Product Processing:** Potential organic rice entrepreneurs should develop the potential for processing organic rice products, for example, processing organic rice raw materials into organic brown rice or organic germinated brown rice. To respond more to consumption with focus on health groups or engage other processing industries from using different parts of organic rice after husking and milling to get the most health benefits. This can be done in the form of ready-made food, semi-finished ready to eat or ready to cook food and in the form of components for use in the food, health and beauty industries, paper, medicine, and cosmetics.

## ACKNOWLEDGMENT

This paper is part of the Research Project “Value Chain and Blockchain Technology to Enhance the Competitiveness of the Northeastern Organic Rice Industry” funded by the Faculty of Business Administration and Accountancy, Khon Kaen University in the fiscal year 2020.

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