

STRUCTURAL EQUATION MODELING OF GUIDELINES TO ENHANCE THE POTENTIAL OF TAPIOCA STARCH EXPORT PROCESSING INDUSTRY

Noppadon Kuntamas, King Mongkut's University of Technology
Porntip Shoosmuangpak, King Mongkut's University of Technology

ABSTRACT

Tapioca products are considered one of Thailand's top-ranking agricultural exports by value and are of significant economic value by generating income into Thailand approximately amounting more than a hundred billion baht. More than 50% of this income comes from the export of starches alone. However, when comparing data between Thailand's exports of tapioca starch relative to Vietnam's exports, the statistics revealed that Vietnam's tapioca starch exports during 2013-2015 substantially increased, while Thailand's exports remained relatively constant even beginning to trend downward slightly. The objective of this thesis was to study guidelines to enhance the potential of tapioca starch export processing industry by analysing data both qualitatively and quantitatively. In carrying out this thesis, the researcher surveyed quantitative data from interviews with 520 business owners/entrepreneurs and high-level management of exporting tapioca starch processing companies using descriptive statistics, reference statistics and plural statistics. The thesis revealed that guidelines to enhance the potential of the tapioca starch processing export industry includes: Entrepreneurship which is having a broad vision and being able to project future trends and directions; Marketing Capability which is being able to analyse the competitive landscape among other competitors within the industry; Operation Manufacturing which is being able to define strategies for production processes in order to meet customers' requirements and demands; and Financial Performance which is consistent monitoring and improvement of financial plans. It also revealed that both large industrial businesses and small and medium-sized businesses regardless of size give importance to guidelines to enhance the potential of the tapioca starch processing export industry, which was not different at the 0.05 statistical significance level.

The analysis showed that the developed guidelines to enhance the potential of the tapioca starch processing export industry passed the evaluation criteria and were in accordance with the empirical data where the chi-square probability level, relative chi-square, goodness of fit index, and root mean square error of approximation values were 0.085, 1.164, 0.966, and 0.018 respectively.

Keywords: Guidelines to Enhance, Potential Tapioca Starch Processing, Export Industry.

INTRODUCTION

The United Nations Food and Agriculture Organization (FAO) reported that the global tapioca production in 2015 was 288.85 million tons, which included Nigeria (57 million tons), Thailand (31.81 million tons), Indonesia (28.4 million tons), Brazil (24.20 million tons), and Congo (15.3 million tons), with Thailand as the number 1 export country in the world while the

African countries primarily produce tapioca for their domestic human and animal consumption. For tapioca in ASEAN we will focus on production for export in the form of starch and tapioca chips used primarily in industries such as ethanol, bio-plastics, sweeteners, pharmaceuticals and animal feeds. In the ASEAN region, the amount of tapioca production in 2015/16 was 87.42 million tons, an increase of 1.82%, which Thailand is the number 1 producer, with 31.81 million tons of production. Other major producers are Cambodia, 13.22 million tons and Vietnam 9.70 million tons. In terms of export, Vietnam's tapioca is an important exporting competitor among ASEAN. For Thailand, tapioca products are an important agricultural commodity with high economic value. Data from the Ministry of Commerce reported that in 2015, tapioca products had the highest export value, ranked third after rubber and rice. By export value, tapioca can generate more than 1.18 billion baht in revenue per year, accounting for 18.90 percent of the total agricultural export value of Thailand (Ministry of Commerce, 2016).

Tapioca is considered an economic crop that is related to the lives of over 500,000 Thai farmers (Office of Agricultural Economics, 2558), including yard operators, pellet mill / starch factories, exporters and labourers in many other downstream industries. Approximately 55 percent of Thailand's tapioca production will be processed into tapioca starch, with 40 percent processed into tapioca chips, and the remaining 5 percent used for the production of ethanol (Working Group on Tapioca and Product Strategy, 2014). Considering the trade situation, the exports of tapioca products generated income into Thailand in 2015 of more than 118,000 million and it was found that the export of tapioca starch alone was worth more than 62,209 million baht, accounting for 52.72 percent of revenue entering Thailand when compared to other tapioca products. Although from the Thai tapioca starch export statistics, it is highly valued and can generate a lot of income into Thailand, but when comparing data on Thai exports of tapioca starch relative to Vietnamese exports, the statistics for the amount of tapioca starch of Vietnamese exports during 2013-2015 demonstrate a substantial increase, while Thailand's exports remain constant, beginning to trend downward slightly.

From the above statistics, Thailand must consider ways to increase the potential of Thai tapioca starch processing industry operators. To be able to compete in the global market and with competitors, Thailand must be able to improve its ability in all aspect of business practices because at present Thailand has stepped into being a member of the ASEAN Economic Community. To respond to the goal of being the ASEAN market and production base, and to support the situation of trade expansion, a practical model is needed. Therefore, this study aims to accelerate the development of the tapioca starch processing industry focusing on middle stream of operators. As a result, the proposed model would increase the business potential of the tapioca starch processing industry, and positively impact the Thai tapioca industry in the overall picture. Moreover, related government agencies can use the data findings in developing appropriate policies to aid Thai tapioca industry to better compete in the global arena.

LITERATURE REVIEW

The researcher reviewed literature streams in the potential of the tapioca starch processing industry for export. The researcher collected data from documents, texts and research related to the study of business potential, competency of the organization or entrepreneur as well as business management theory guidelines to formulate a conceptual framework about increasing the potential of Thai tapioca processing industry operators.

Organizational Capability Development and Competitiveness (Entrepreneurs)

Procter (1991) says that potential is something that may have happened or may not be present or possible to develop or have a way to grow. Jackson & Shuler (2005) gives meaning as skills, knowledge, abilities and other features that the person must work to achieve efficiency. Marrelli (1998) states that competency is an effective measure of performance. David McClelland (1973) discusses competencies and abilities as the hidden personality within an individual which can motivate an individual to perform well or in accordance with the responsibilities set forth. Fotis Draganidis & Gregoris Mentzas (2006) defines the term competency as the combination of latency and the outstanding behaviour and skills that will help people have the potential to achieve operational efficiency. Michael E. Porter (1980) proposed a concept that would create a competitive advantage in order to solve the problems caused by five forces in the five business practices.

Operation Theories

Ricky W Griffin (2013) defines Management as a group of activities, including: planning, decision making, organization, leadership, and control that leads to efficient and effective use of resources; efficient use of resources means being able to maximize the utility of limited resources (Cost-effective) while effective use of resources means strategically planning how to use resources in the most effective way (Right decision). Katz (1974) explains management skills as: technical skill, human skill, conceptual skill, and design skill. Henry Mintzberg (1990) defines management roles as interpersonal, informational, and decisional. The system concepts include: Goals, Resources, Organization, Coordination, Solutions, and Perspectives. In addition, systemic theoretical leaders such as Fremon Kast & James Rosenzweig (1963) have given the meaning of the organization's system as an open system that has a collection or merging of things or parts that consist of 2 or more parts that cannot be separated completely. Therefore, the system concept is dependent on various components both inside and outside the organization.

Marketing and Modern Management Theory

The theories in the approach to increase entrepreneurial potential for modern management are critical for today's organizations. Porter (1980) invented one of the most commonly used, the five forces model, which consists of: new entrants, rivalry among existing competitors, threat of substitutes, bargaining power of buyers, and bargaining power of suppliers.

John Kotter (1947) introduced the concept of organizational change management, which identified eight steps for change management. This is a concept that can be used to upgrade the potential of entrepreneurs in the management of an organization by focusing on the factors that cause change (Change Drivers), which is a factor that executives must be aware of in order to support the organization to adjust to changes. Peter Senge (1990) has suggested the idea of learning as a core for the team, which is like a chair with three legs as the main axis so that it can be placed. The concept focuses on the development of organizational change in 5 areas: 1) Systems Thinking 2) Personal Mastery 3) Mental Models 4) Shared Vision (Shared Vision) and 5) Learning together (Team Learning). This conceptual framework focuses on personal learning and therefore, it is suitable for organizations aimed at personnel development and those that want change to occur at the individual level before expanding to the organizational level.

Nevertheless, the concept of Value Chain is the concept of Michael Porter (1985) that describes the components of activities in the supply chain which add value to products and services, focusing on adding value from activities. Michael Porter's value chain idea focuses on building business competitiveness by taking into account two main factors: 1) lowering production and service costs than competitors, and 2) making their products and services different from competitors in order to set high prices.

Financial Performance Theories

Luther Gulick & Urwick (1937) proposed management principles for organizational leaders called PODSCORB where there are seven important functions as follows: Planning, Organizing, Staffing, Directing, Coordinating, Reporting, and Budgeting. Of the seven functions, though of equal importance, budget management is core to achieving good corporate health. The theory stipulates that the primary responsibility of budget management is to efficiently utilize the organization's budget that would result in creating more while also achieving optimal value.

METHODOLOGY

The methodology used contains data collection and gathering procedures, respondents, research instruments, and data analysis tools by using integrated research consisting of qualitative research using in-depth interviews and focus group techniques and quantitative research.

The population used in the qualitative research with in-depth interviews are experts who are recognized in the Thai industry and have clearly defined qualifications in the criteria for Tapioca trading experience. The population used in the quantitative research are persons responsible for creating mutual value of the industrial business organization. The researcher then determined the sample size usage, composition analysis, and structural equation model. The statistical significance determined the size of the sample that is very good in the amount of 500 samples (Comrey & Lee, 1992) using the Multi-Stage Sampling (Babbie, 2011) which consists of sampling procedures like Cluster Sampling and Systematic Sampling. The tools used in this research were created questionnaires. The population used in the qualitative research with group discussion techniques where 7 experts were selected using specific sample selection methods.

RESEARCH METHOD AND DESIGN

This paper used a mixed method of qualitative and quantitative work. The purpose of this study is to investigate factors toward an exporters' performance, discover obstacles, and develop new knowledge of Tapioca starch processing in Thailand.

In collecting primary qualitative data, reviews of related literature were first conducted to compile information to formulate the theoretical concepts to design the appropriate qualitative approach. In this case, the tools used for collecting data were in the form of interviews with 9 experts in order to develop questions for the research questionnaire. The 9 experts consisted of 3 executives in the tapioca starch processing business organization with the top 10 export values in Thailand, 3 Government experts on international trade, and 3 lecturers in educational institutions who have taught at the graduate level in subjects related to management or international trade for at least 10 years. In-depth interviews were conducted to assess the significant factors for business operations and potential barriers. A focus group discussion with 7 experts in the related fields was

held after the questionnaires were conducted and research model formulated to obtain a more comprehensive feedback in order to further refine the research model.

The primary quantitative method part in this research sampled companies from the Federation of Thai Industries (FTI), tapioca starch processing business organizations, and relevant business associations concerned. The sampling used a random selection method. Expert Choice Sampling is a purposive sampling based on the qualifications of experts. There were 520 business owners and executives at or above the manager level or those who were involved with the company's policy formulation in the production of starch processing products for export.

Secondary data sources were used to assist in the analysis and are expected to be accessible. Examples include, but are not limited to, government laws and regulations of tapioca export, research documents and academic journals that have been studied and are related to the research being conducted by the researcher, and other sources from libraries, books, and websites.

Conceptual Framework

From the literature stream, results have been constructed into the conceptual framework for guidelines to enhance the potential of tapioca starch export processing industry. It can be summarized as in Figure 1.

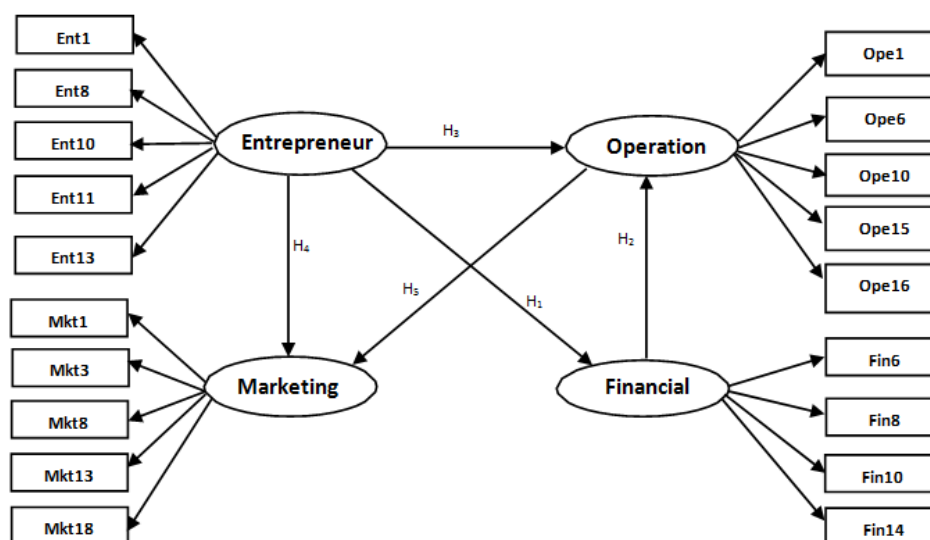


FIGURE 1
CONCEPTUAL FRAMEWORK

In examining the significance of casual relationships stated in the hypotheses, the independent and dependent variables are synthesized into a conceptual framework of descriptive statistics, path analysis, confirmatory factor analysis, and SEM. The hypothesis testing analyses the causal influences between latent variables in the structural equation modelling of guidelines to enhance the potential of tapioca starch export processing industry as follows:

H₁: Entrepreneurship directly influences Financial Performance.

H₂: Financial Performance directly influences Operation Manufacturing.

H₃: Entrepreneurship directly influences Operation Manufacturing.

H₄: Entrepreneurship directly influences Marketing Capability.

H₅: Operation Manufacturing directly influences Marketing Capability

H₆: No differences exist in the Guidelines to enhance the potential of tapioca starch export processing industry between the 2 groups of population.

Data Analysis

The researcher analysed to find the quality of the tool by using the IBM SPSS Statistics computer program. As for the questions that are characterized as a rating scale, the Corrected Item-Total Correlation value is between 0.065-0.853. The reliability of the questionnaire by finding the Cronbach's Alpha Coefficient was 0.988.

For collecting quantitative data, the researcher distributed the questionnaire to the full amount that was defined as 520 cases. Then, the general basic data were analysed including descriptive statistics, statistics, references and analysis. Structural equation model consists of finding the frequency, percentage, mean, standard deviation analysis of the relationship between elements. The test will be used to test the differences between the average population of 2 groups independently with each other by t-test, which determines the significance of statistics at the level of .05 and the development of structural equation models statistical data analysis is analysed by computer program, IBM SPSS Statistics and IBM SPSS AMOS.

For latent variability adjustment in all research subjects, the researcher conducted an evaluation through a data-model fit until each element or every latent variable had corresponding values with the empirical data and were in accordance with all criteria. In improving the variable values to be consistent with the empirical data and in accordance with the criteria, the researcher considered making adjustments from observed variables, which were variables from rating scale questions that the researcher obtained from actual data collection.

The researcher proceeded to improve the model by considering the Modification Indices according to Arbuckle's (2011) recommendations by considering the value of the program with theoretical principles. In order to cut out some inappropriate observations, variables one by one were examined and then processed using the new model. This was done until a model that met all 4 statistical criteria was obtained (Thanin Silpcharu, 2014). Therefore, the model of the structural equation model is considered complete and consistent with the relevant information.

The analysis of differences in the T-Test values between the 2 groups of population through the 4 latent variables (Entrepreneurship, Marketing Capability, Operation Manufacturing and Financial Performance) revealed that there were 21 items with the statistically significant differences at the level of 0.05 comprising 3 items from Entrepreneurship, 11 items from Marketing Capability and 17 items from Operation Manufacturing. However, the overall picture had no statistically significant differences at the level of 0.05 with the P-value of 0.164.

The statistical analysis results from the structural equation model of guidelines to enhance the potential of tapioca starch export processing industry in Unstandardized Estimates mode and Standardized Estimates after model improvement were shown in Table 1.

TABLE 1						
STATISTICAL ANALYSIS RESULTS						
Estimate						
Variable	Standardized	Unstandardized	R2	Variances	C.R.	p
Entrepreneurship				0.12		
Marketing Capability	0.37	0.61	0.87	0.04	4.23	***
Operation Manufacturing	0.55	0.91	0.76	0.08	7.13	***
Financial Performance	0.61	1.08	0.37	0.24	7.88	***
Financial Performance						
Operation Manufacturing	0.42	0.39	0.76	0.08	6.89	***
Operation Manufacturing						
Marketing Capability	0.61	0.6	0.87	0.04	6.71	***
Entrepreneurship						
ENT 1	0.47	1	0.22	0.44		***
ENT 8	0.65	1.88	0.42	0.58	9.39	***
ENT 10	0.7	1.8	0.49	0.41	9.71	***
ENT 11	0.75	1.98	0.56	0.37	9.97	***
ENT 13	0.69	1.7	0.48	0.39	9.63	***
Marketing Capability						
MKT 1	0.64	1	0.4	0.48		
MKT 3	0.64	0.97	0.42	0.43	12.34	***
MKT 8	0.62	0.97	0.39	0.48	12.01	***
MKT 13	0.63	0.98	0.39	0.48	12.08	***
MKT 18	0.68	1.08	0.46	0.44	12.87	***
Operation Manufacturing						
OPE 1	0.66	1	0.43	0.44		***
OPE 6	0.7	1.04	0.49	0.37	13.64	***
OPE 10	0.61	1.01	0.37	0.59	12.06	***
OPE 15	0.67	0.97	0.45	0.39	13.08	***
OPE 16	0.66	0.98	0.43	0.43	12.89	***
Financial Performance						
FIN 6	0.7	1	0.49	0.41		***
FIN 8	0.71	0.98	0.51	0.36	13.65	***
FIN 10	0.71	1.04	0.51	0.41	13.66	***
FIN 14	0.65	0.95	0.42	0.47	12.65	***

The results of the analysis of the structural equation model of guidelines to enhance the potential of tapioca starch export processing industry in the Unstandardized Estimate mode after model improvement are as follows Figure 2:

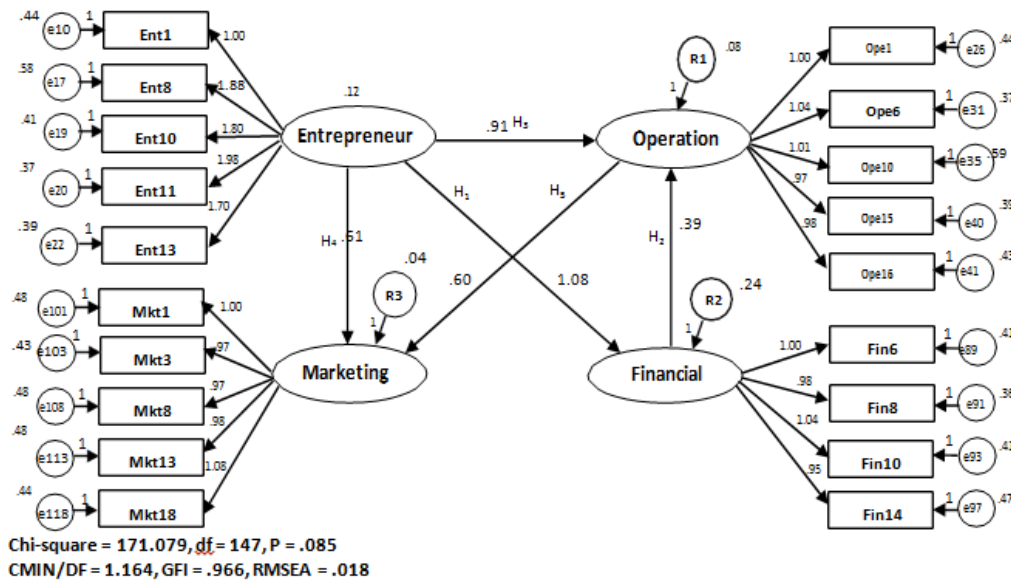


FIGURE 2
STRUCTURAL EQUATION MODEL IN UNSTANDARDIZED ESTIMATE MODE
AFTER MODEL IMPROVEMENT

The results of the analysis of the structural equation model of guidelines to enhance the potential of tapioca starch export processing industry in the Standardized Estimate mode after model improvement are as follows Figure 3:

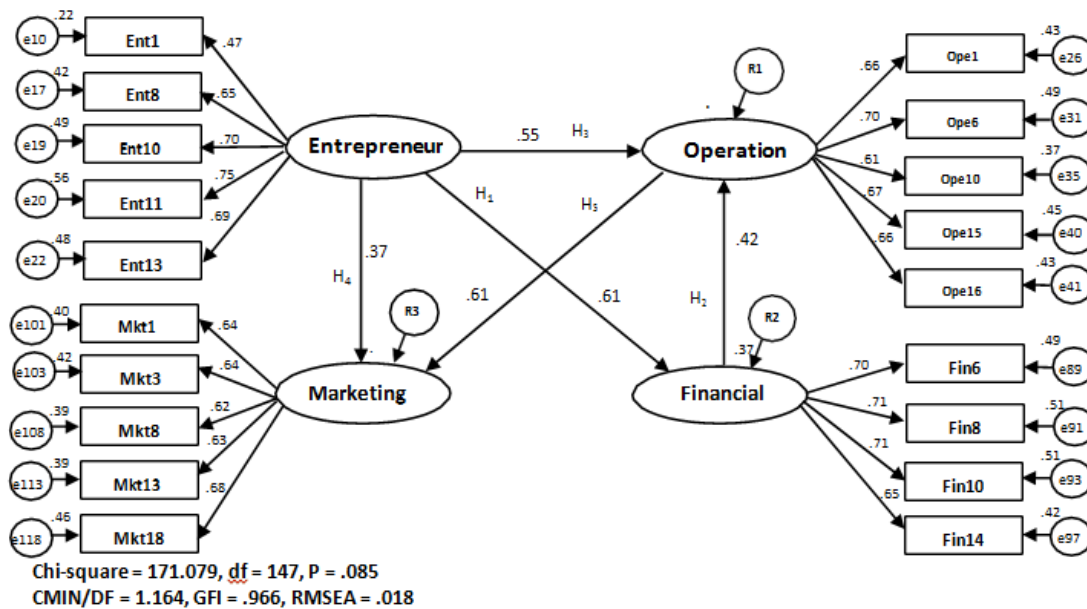


FIGURE 3
STRUCTURAL EQUATION MODEL IN THE STANDARDIZED ESTIMATE MODE
AFTER MODEL IMPROVEMENT

The following results as shown in Figure 3 were obtained: Chi-square=171.079, df=147, $p=0.085$, CMIN/DF=1.164, GFI=0.966, RMSEA=0.018, all the fit indices met the recommended level; therefore, the hypothesized model was chosen as the final model for the research.

The composition of the operator's characteristics (Entrepreneurship) consists of 5 indicators. The weight of the indicators measured from descending order include (1) the idea to create values and culture in the organization (Ent11) with the highest weight (Factor Loading) equal to 0.75, followed by (2) risk management capability (Ent 10) with the weight (Factor Loading) of 0.70, (3) environment and human rights (CSR) (Ent13) with the weight (Factor Loading) of 0.69, (4) courage to make decisions and initiate new things (Ent 8) with the weight (Factor Loading) of 0.65 and (5) a broad vision to be able to predict the direction of the business (Ent1) with the weight (Factor Loading) equal to 0.47

Marketing Capability consists of 5 indicators. The weight of the indicator in descending order are (1) indicators focusing on wholesale trading as it can be produced to save further economy of scale (Mkt18) had the highest factor weight of 0.68, followed by (2) indicators to analyse culture, presentation of products, and behaviour of buyers in foreign markets (Mkt3) had a factor weight of 0.64 (0.644), (3) indicators in analysis such as SWOT Analysis, Porter's Five Forces Analysis, Value Proposition (VP) and others used to set marketing strategies (Mkt 1) had a factor weight of 0.64 (0.636), (4) indicators providing incentives for customers to assist in decision-making, such as discounts etc. (Mkt13) had a factor weight of 0.63 and (5) indicators having a wide variety of products that meets the needs of customers (Mkt8) had a factor weight of 0.62.

Operation Manufacturing elements consist of 5 indicators, which are sorted by the weight of the indicators from descending order include (1) indicators for importing raw materials according to international standards (Ope6) with the highest weight (Factor Loading) is equal to 0.70, followed by (2) measure of productivity for the highest efficiency (Ope15) with the factor loading equal to 0.67, (3) indicators for bringing the production standard system such as ISO HACCP GMP to check the production to be effective and maintain product quality according to international standards (Ope16) with the factor loading equal to 0.66 (0.657), (4) indicators for production process in order to clearly meet the needs of customers (Ope1) with a factor loading of 0.66 (0.656) and (5) indicators for the transportation of raw materials throughout the harvest season and off-harvest season in order to reduce the risk of stopping production (Ope10) with the factor loading equal to 0.61

Financial Composition consists of 4 indicators are arranged in descending order of the weight values of the indicators and include (1) indicators for financing sources with the least cost (Fin10) with weight values (Factor Loading) is 0.71 (0.712), followed by (2) indicators for using technology to develop accounting systems, management systems to be effective (Fin8) with the highest weight value (Factor Loading) of 0.71 (0.711), (3) indicators to analyze data on costs and ongoing operations (Fin6) with the weight value (Factor Loading) of 0.70 and (4) indicators for customer debt repayment and reliable screening (Fin14) with the weight value (Factor Loading) equal to 0.65.

RESULTS AND DISCUSSION

The results of the conformity assessment of the structural equation modelling of guidelines to enhance the potential of tapioca starch export processing industry before and after model adjustment are shown in the Table 2.

TABLE 2			
STATISTICAL VALUES ASSESS THE CONSISTENCY OF THE STRUCTURAL EQUATION MODEL COMPARING BEFORE AND AFTER THE MODEL IMPROVEMENT			
Statistical Value	Criteria	Before Modification	After Modification
CMIN- <i>P</i>	> .05	0	0.085
CMIN\DF	< 2	1.991	1.164
GFI	> .90	0.753	0.966
RMSEA	< .08	0.044	0.018

Table 2 shows the conformance statistics for the structural equation model before the model adjustment, it was found that the root index of the mean square of error estimation (RMSEA) was 0.044 and CMIN\DF was 1.991, passing the evaluation criteria and consistent with the empirical data of the model. But for Chi-Square Probability Level: CMIN-*P* and the consistency index (GFI) did not pass the evaluation criteria and inconsistent with the empirical data of the model as the values were 0.000 and 0.753 accordingly.

Therefore, the researcher proceeded to improve the model by considering the Modification Indices Arbuckle (2017) and by considering the value of the results from the finished program with theoretical principles in order to eliminate some inappropriate variables one by one and proceed to evaluate the new model. The procedure was repeated until the model met all 4 statistical criteria, so that the structural equation model is perfectly consistent with the empirical data. After the model was revised and completed, it was found that the Chi-Square Probability Level (CMIN-*P*) was 0.085, greater than 0.05, indicating that the model was not statistically significant. The chi-square relationship (CMIN/DF) was 1.164, which is less than 2. The consistency index (GFI) was 0.966, which is greater than 0.90 and the root index of the mean square of the error estimation (RMSEA) was 0.018 which is less than 0.08. Therefore, it can be concluded that all 4 test statistics have passed the model consistency evaluation criteria and the structural equation modelling of guidelines to enhance the potential of tapioca starch export processing industry after the revision is consistent with the empirical data.

TABLE 3	
HYPOTHESIS FINDINGS	
H1	The hypothesis testing found Entrepreneurship has a direct influence on Marketing Capability with the statistically significant level of 0.001 and the standard regression weight of 0.37.
H2	The hypothesis test found that Entrepreneurship has a direct influence on Operation Manufacturing with the statistically significant of 0.001 and the standard regression weight of 0.55.
H3	The hypothesis testing found that Operation Manufacturing has a direct influence on Marketing Capability with the statistically significant of 0.001 and the standard regression weight of 0.61.

H4	The hypothesis testing found that Entrepreneurship has a direct influence on Financial Performance with the statistically Significant level of 0.001 and the standard regression weight of 0.61.
H5	The hypothesis testing found that Financial Performance has a direct influence on Operations Manufacturing with the statistically significant level of 0.001 and the standard regression weight of 0.42.
H6	The hypothesis testing found no differences in the Guidelines to enhance the potential of tapioca starch export processing industry between the 2 groups of population with the statistically significant level of 0.05.

From the findings, all hypotheses (Table 3) are accepted. The researcher further conducted content analysis through focus group with experts to confirm the hypothesis results. Then, the expert opinions obtained from the focus group discussions were later incorporated to develop a complete structural equation model.

CONCLUSION AND RECOMMENDATIONS

This research is intended to create new knowledge by using a mix of integrated research methodologies consisting of qualitative research through in-depth interview techniques, quantitative research through questionnaires, and group conversation techniques. The objectives of the research were (1) to study the current operational structure of the tapioca starch processing industry (2) to study ways to increase the export capability of the tapioca starch processing and (3) to develop the structural equation model guidelines for enhancing the potential of tapioca starch processing industry for export.

Results from the study found that there are 4 contributing factors that can increase the potential of entrepreneurs in strengthening their competitive capabilities in the global market namely (1) Entrepreneurship (2) Market Capability (3) Financial Performance and (4) Operation Manufacturing. The study further notes that these 4 factors are not exclusive of one another, but are in fact complimentary and of equal importance regardless of whether the business is a small and medium-sized enterprise or a multinational firm. Therefore, it is imperative for businesses to develop these 4 factors as a complete whole instead of in individual isolations. Such an approach would be key to increasing their participation and presence in the global market, as well as equipping them with the flexibilities to adapt to the ever-changing and evolving trade and investment issues as they arise due to further regional integration and trade liberalization.

This research study is limited to the tapioca starch industry. However, the principles and model developed from this research can be further applied in future studies of other important Thai Agricultural export commodities. Extended research work, especially in the agricultural sector, is highly recommended as Thailand is an agricultural-based country with most of the country's labour force employed and concentrated in the agriculture and agro-industrial sectors. Ironic to this fact, the contribution of Thailand's agricultural sector to the country's GDP growth is marginal. Additionally, agricultural commodities continue to face declining prices. Thailand has a strong competitive advantage in being a source of high-quality agricultural products and having an integrated supply and production chain from upstream industries that provide raw materials to

downstream industries that are able to support other industry clusters and primary end-use markets. Therefore, keeping such strengths and potential of the country in mind, future research studies can be catered towards providing an industry or product-specific market analysis or a broader perspective on policy recommendations. Taking such an approach in future research work may provide a path forward in moving Thailand's agricultural sector up the value chain, sustaining Thailand's agricultural competitiveness, and increasing the share of gains flowing to farmers towards a more equitable income and growth distribution.

REFERENCES

- Arbuckle J. (2011). *Amos 20 user's guide*. Marketing Department, SPSS Incorporated.
- Arbuckle J. (2017). *Amos 25 user's guide*. Marketing Department, SPSS Incorporated.
- Babbie, E. (2011). *The Practice of Social Research (12th Edition)*. USA: Wadsworth Cengage Learning.
- Comrey, A.L., & Lee, H.B. (1992). *A first course in factor analysis*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- David, McClelland. (1973). *Testing for competence rather than for intelligence*. (28,1-14). American Psychologist.
- Draganidis, F., & Mentzas, G. (2006). *Competency based management: A review of systems and approaches*. Information Management & Computer Security.
- Gulick, L., & Urwick L. (1937). *Papers on the Science of Administration: Notes of the Theory of Organization (POSDCORB)*. New York: Institute of Professional Administration.
- Jackson, S., & Schuler R. (2003). *Managing Human Resources Through Strategic Partnerships*. South-Western College. Jackson S, Schuler R. (2005). *Managing Individual Performance: A Strategic Perspective*. Rutgers University.
- Kast, F.E., & Rosenzweig J.E. (1963). *Science, Technology and Management*. McGraw-Hill.
- Katz, R.L. (1974). *Skills of an Effective Administrator*. *Harvard Business Review*, 52(5), 90-102.
- Kotter, J.P. (1947). *Critical Evaluations in Business and Management*. London: Routledge.
- Marrelli, A.F. (1998). *An introduction to competency analysis and modeling*. Performance Improvement, 37, 8-17.
- Mintzberg, H. (1990). *Mintzberg on Management. Inside Our Strange World of Organizations 1989* Hungry Minds Inc.
- Porter, M.E. (1980). *Competitive Strategy: Techniques for Analysing Industries and Competitors*. New York: Free Press.
- Porter, M.E. (1985) *Competitive Advantage: Creating and Sustaining Superior Performance*. New York: Free Press.
- Procter, C. (1991). *A first Course in factor analysis (2nd Edition)*. Hillsdale: Lawrence Erlbaum Associates.
- Ricky, W.G. (2013). *Management (11th Edition)*. Texas: Texas A&M University.
- Senge, P.M. (1990). *The fifth discipline: the art and practice of the learning organization*. New York.
- Thanin, S. (2014). *Statistical data research and analysis using SPSS and AMOS (15th Edition)*. Bangkok: S.R. Printing Mass Product.