IDENTIFICATION OF FACTORS AFFECTING FARMERS, PROCESSORS, AND EXPORTERS IN THE THAI FOOD INDUSTRY: A CASE STUDY IN JAPAN

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ABSTRACT

The objective of this research is to identify the factors affecting farmers, processors, and exporters in the Thai food industry. Questionnaires were used as research tools for opinion survey of 139 food processors and exporters from Thailand to Japan; 146 chicken farmers and 234 marine farmers. Data was collected from processors and exporters from August to October, 2011. In addition, data was collected from chicken farmers and marine farmers from September to November, 2011. The data was analyzed by using statistical methods such as percentage, mean, standard derivation, and hypothesis testing (Mann-Whitney U Test and Kruskal Wallis Test) at a significance level of 0.05. The results of this study indicated that both the chicken farmers and the different categories of marine farmers with different sales volumes of products to factories for processing and exporting to Japan have different problems/obstacles including the lack of broodstock, the lack of knowledge and technology for farming, and chemical residues due to the use of drugs and chemicals in high doses. Furthermore, the different types of entrepreneurs in the food industry with different export volumes of Thai food to Japan have different problems/ obstacles including the lack of raw materials, contaminated raw material, insufficient capital for improving and managing efficient production, and sanitary and phytosanitary standards. The problems of the chicken farmers and the marine farmers cause the processors and exporters of food products from Thailand to Japan to face many problems. Because of the mentioned problems, the public sector should determine guidelines for the development of agriculture and the Thai food industry in order to solve problems and increase the ability to compete with others in global markets. In addition, the sustainable development of the supply chain for Thai food exports to Japan should consider these factors, and relevant sectors should determine the appropriate guidelines for the development of the Thai food supply chain.

KEY WORDS: FACTORS / FARMERS / PROCESSORS / EXPORTERS / THAI FOOD

226 pages

การระบุปัจจัยที่ส่งผลต่อเกษตรกร ผู้แปรรูป และผู้ส่งออกในอุตสาหกรรมอาหารไทย กรณีศึกษาประเทศญี่ปุ่น
IDENTIFICATION OF FACTORS AFFECTING FARMERS, PROCESSORS, AND EXPORTERS IN THE THAI FOOD INDUSTRY: A CASE STUDY IN JAPAN

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บทคัดย่อ

งานวิจัยนี้มีวัตถุประสงค์เพื่อระบุปัจจัยที่ส่งผลกระทบต่อเกษตรกร ผู้แปรรูป และผู้ส่งออกในอุตสาหกรรมอาหารไทย ซึ่งใช้แบบสอบถามเป็นเครื่องมือในการวิจัย โดยเก็บรวบรวมข้อมูลจากกลุ่มตัวอย่างผู้แปรรูป/ผู้ส่งออกสินค้าอาหารไทยไปยังประเทศญี่ปุ่น จำนวน 139 กลุ่มตัวอย่าง กลุ่มตัวอย่างเกษตรกรผู้เลี้ยงไก่ จำนวน 146 กลุ่มตัวอย่าง และกลุ่มตัวอย่างเกษตรกรผู้เลี้ยงสัตว์น้ำ จำนวน 234 กลุ่มตัวอย่าง ซึ่งระยะเวลาการเก็บรวบรวมข้อมูลของกลุ่มตัวอย่างผู้แปรรูป/ผู้ส่งออกคือตั้งแต่เดือนสิงหาคมถึงตุลาคม พ.ศ. 2554 และระยะเวลาการเก็บรวบรวมข้อมูลของกลุ่มตัวอย่างเกษตรกรคือตั้งแต่เดือนกันยายนถึงพฤศจิกายน พ.ศ. 2554 ทำการวิเคราะห์ข้อมูลด้วยวิธีทางสถิติ ได้แก่ ค่าร้อยละ ค่าเฉลี่ย ส่วนเบี่ยงเบนมาตรฐาน และสถิติที่ใช้ทดสอบสมมติฐานคือ Mann-Whitney U Test และ Kruskal Wallis Test ผลการวิจัยพบว่า เกษตรกรผู้เลี้ยงไก่และเกษตรกรผู้เลี้ยงสัตว์น้ำประเภทต่างๆ ที่มีปริมาณการจำหน่ายผลผลิตให้กับโรงงานที่แปรรูปและส่งออกไปยังประเทศญี่ปุ่นต่างกัน ประสบปัญหาแตกต่างกัน คือ ปัญหาการขาดแคลนพ่อแม่พันธุ์ ปัญหาการขาดความรู้และเทคโนโลยีการเลี้ยงสัตว์ ปัญหาการใช้ยาและเคมีภัณฑ์ในปริมาณสูง จึงทำให้เกิดปัญหาสารเคมีตกค้าง และลักษณะของกิจการของผู้ประกอบการในอุตสาหกรรมอาหารที่มีปริมาณการส่งออกสินค้าอาหารไทยไปยังประเทศญี่ปุ่นต่างกัน จะประสบปัญหาที่แตกต่างกัน คือ ปัญหาการขาดแคลนวัตถุดิบ ปัญหาวัตถุดิบมีสารปนเปื้อน ปัญหาการขาดแคลนเงินทุนหมุนเวียน เพื่อปรับปรุงและจัดการการผลิตให้มีประสิทธิภาพ ปัญหามาตรการสุขอนามัยและสุขอนามัยพืช ซึ่งปัญหาที่เกษตรกรผู้เลี้ยงไก่และเกษตรกรผู้เลี้ยงสัตว์น้ำประสบจะส่งผลกระทบต่อผู้แปรรูป/ผู้ส่งออกสินค้าอาหารไทยไปยังประเทศญี่ปุ่นทำให้ต้องประสบปัญหาต่างๆ จากปัญหาที่เกิดขึ้นทำให้หน่วยงานของภาครัฐกำหนดแนวทางการพัฒนาภาคการเกษตร และทิศทางการพัฒนาอุตสาหกรรมอาหารไทย เพื่อแก้ไขปัญหาและเพิ่มขีดความสามารถในการแข่งขันของประเทศ นอกจากนี้การพัฒนาโซ่อุปทานอาหารไทยไปยังประเทศญี่ปุ่นอย่างยั่งยืนควรคำนึงถึงปัจจัยเหล่านี้ประกอบในการพิจารณา รวมทั้งหน่วยงานที่เกี่ยวข้องสามารถกำหนดแนวทางการพัฒนาโซ่อุปทานอาหารไทยได้อย่างเหมาะสม

226 หน้า

CONTENTS

CONTENTS (cont.)

CONTENTS (cont.)

CONTENTS (cont.)

CONTENTS (cont.)

LIST OF TABLES

LIST OF TABLES (cont.)

LIST OF TABLES (cont.)

LIST OF TABLES (cont.)

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CHAPTER I
INTRODUCTION

This chapter presents the background and problems statement, objective, scope of work, and expected results.

1.1 Background and problems statement

Thai Kitchen to the World is one of the key strategies to drive our economy to move forward. It significantly concentrates on a series of industries such as the production of food raw materials, processed-food industry, and related and supporting food industries. According to an aim of promoting Thai kitchen and Thai food into the world, to strengthen Thailand's economy must be held in line with to increase an ability of private sectors to compete globally. More importantly, this may help food products together with both food and non-food materials produced by inbound industries be exposed to global market; consequently, national income will be drawn back to the country. Furthermore, Thai Kitchen to the World is to enable Thai restaurants emerging all over the world to provoke Thai tradition in the sense of export goods such as fresh foods, instant foods, semi-processed foods, seasoning, OTOP products, and tourism campaigns to global customers. This is to raise economic values from export sector and employment. It also increases the value of final goods and services produced in the country or increase in Gross Domestic Product (GDP).

From Thai Kitchen to the World strategy found that during the period 2004-2010, export values of food products from Thailand to other countries in overall perspective has increased continuously. The export values were US$ 12,657.22 13,077.07 14,953.05 18,141.80 24,055.30 22,408.56 and 25,743.69 million, respectively as shown in Figure 1.1. In 2009, the major food export market of Thailand ranked first is Japan. The export value was US$ 3,209.70 million and the ratio of export value accounted for 14.32 percent. During the period 2004-2010 found

that the export values of food products from Thailand to Japan has increased continuously. The export values were US$ 2,194.26 2,325.46 2,333.69 2,429.01 3,314.78 3,209.70 and 3,611.37 million, respectively as shown in Figure 1.2.

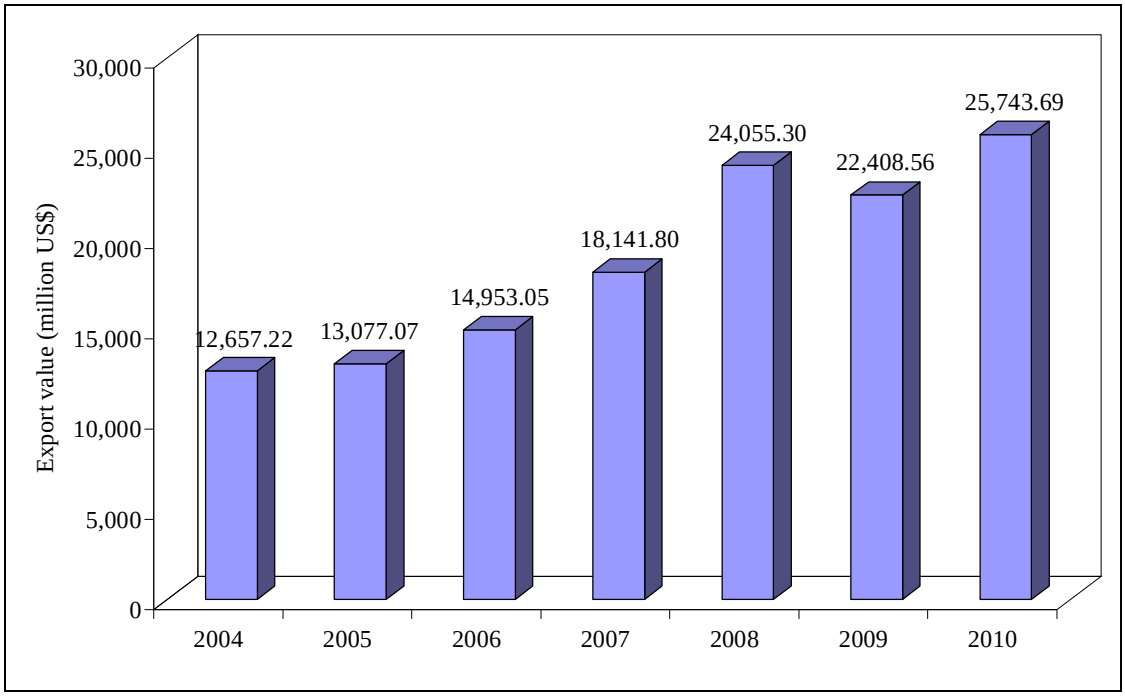

Figure 1.1 Export values of food products (million US$) from Thailand to other countries from 2004 to 2010

Source: Information and Communication Technology Center with cooperation of the Customs Department

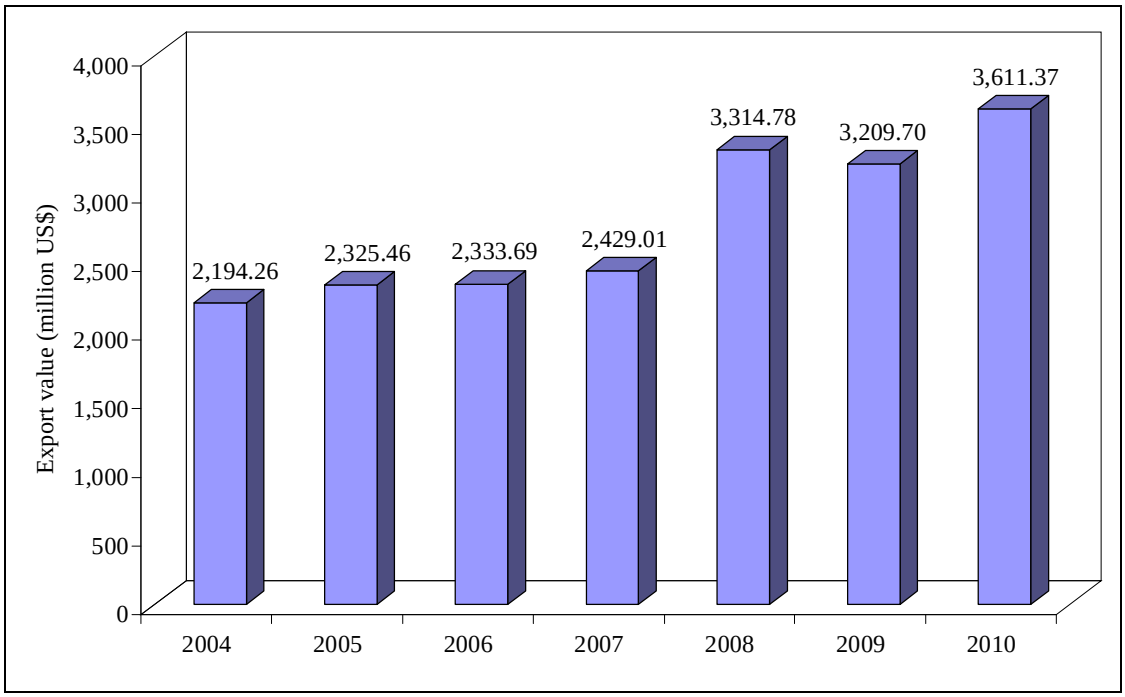

Figure 1.2 Export values of food products (million US$) from Thailand to Japan from 2004 to 2010

Source: Information and Communication Technology Center with cooperation of the Customs Department

In addition, Japan was ranked as the world forth importer of food products in 2007. Import value of agricultural and food products was US$ 52,289 million that catch up with USA, Germany and United Kingdom, respectively (National Food Institute, 2008). Such a large number of food import values into Japan may be attributed to an insufficient supply in agriculture and fishery sectors and a movement of manufacturing base to other countries in order to escape a lack of national resource and an expensive labor cost in the country, achieving a reduction in production costs by means of exporting those processed food back to Japan (Royal Thai Embassy Tokyo, Japan, 2007). This may be Thai food exporters an opportunity to penetrate into Japan market as Japanese' lifestyle already became changing to be a lot more healthy concern. Thus, food with a plenty of nutrition, convenient storage, time-saving cook as well as food for elders definitely are preferred for Japanese, while according to tasty

flavor, a variety of items and high nutrition with herbal ingredients Thai food can potentially be responded to the market.

Regarding Thai food supply chain export to Japan, it include young plant/broodstock, crop/livestock farming, integrators or central market of agricultural products, processors, Thai food exporters, importers, distributors in Japan and consumers as shown in Figure 1.3.

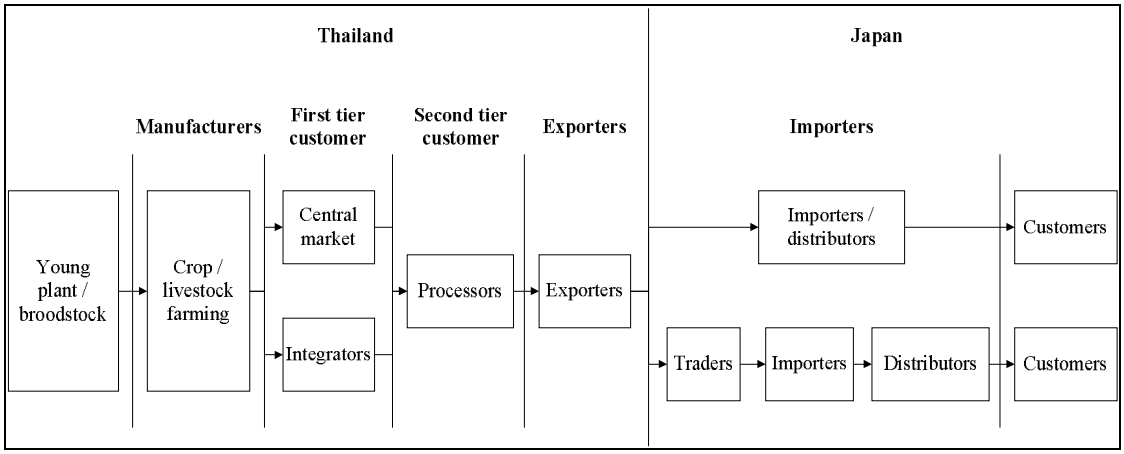

Figure 1.3 Thai food supply chain export to Japan
Source: Banomyong et al., 2010

From the import of Thai food products in Japan appeared to be essential obstacles have been defected by pesticide residues and substandard in fresh vegetables. In addition, some kinds of vegetables may be cropped in Okinawa prefecture, Japan which may cause the trend of Thailand raw material export to Japan to be more likely to fluctuate. More significantly, Thai food industry including processing and exporting approaches seemed a joint venture with a number of Japanese companies to act as suppliers, manufacturers and importers as due to quality and safety concerns, traceability, and in addition according to made-by-Japan policy issued by Japanese government. Japan needs to operate overall logistics management system from upstream to downstream that is to control the quality of food products from the source to the delivery of food to Japan. For Thai food import process relied upon trading firms's Japan located in Thailand to function as sourcing, quality control and deliver to Japan (Singkarin, 2010).

As a result, it is necessary for the research to study factors affecting for Thai food supply chain to Japan. This research studies the upstream of Thai food supply chain covering farmers, integrators or central market of agricultural products, processors, and Thai food exporters to Japan as well as studied problems and obstacles within Thai food supply chain in Thailand. The results of study will lead to recommendations and guidelines for the government in defining of policy direction for Thai Kitchen to the World and to increase the ability to competing with others in global market.

1.2 Objective

To identify the factors affecting farmers, processors, and exporters in the Thai food industry.

1.3 Scope of work

This research studied the elements of Thai food supply chain including farmers, processors, and Thai food exporters to Japan. Thai food products used to be studied for this research is “prepared or preserved seafood in airtight containers”, “processed chicken products” and “frozen shrimps”.

1.4 Expected results

To know the problems and obstacles of farmers, processors, and exporters in the Thai food industry.

CHAPTER II
BACKGROUND THEORY AND LITERATURE REVIEW

This chapter discusses the background theory and literature review that is divided into five sections as follows.

2.1 Background theory

In this section, the background theory used in this research is outlined as follows.

2.1.1 Sampling (Kanjanawasee, 2004)

Sampling is the process of selecting the sample population for the studying and testing of the data needed. The sample group, when appropriately selected with proper numbers, can be used as a subset for the whole population. This research calculated the sample size following equation 2.1.

$$n = \frac{N}{1+Ne^2} \quad (2.1)$$

Where

n	=	sample size
N	=	population size
e	=	estimation error

In addition, this research used probability sampling and stratified random sampling which implements by divide the stratum of population according to their familiar or different characteristics. The number of each sample group will also be determined according to the proportion of population.

2.1.2 The reliability testing of questionnaire (Panpinich, 2008)

To examine reliability by alpha coefficient or cronbach's alpha relies upon a set of research tools to collect sampling data in only one time. This method is similar to Kuder-Richardson method by which its rating scale for each point does not in a form of 0 or 1 but may be 5 4 3 2 1. Cronbach's alpha likely to examine reliability of questionnaire and interview forms which its formula presents in equation 2.2.

$$a = \frac{n}{n-1}\left[1-\frac{\sum S_i^2}{S_x^2}\right] \quad (2.2)$$

Where

a	=	coefficient of reliability of research tools
N	=	the number of questions
S_i^2	=	variance of measured points from each question
S_x^2	=	variance of measured points from all questions

Cronbach alpha coefficients are in a range of 0-1, and if they nearly reach 1, it means such questionnaires possess a high reliability, whereas if they nearly reach 0.5 or 0, it means such questionnaires possess a medium or low reliability respectively (Pisanlabut et al., 2006).

2.1.3 Statistical hypothesis testing (Sripairot, 1990)

In this research, inferential statistics consist of the Mann-Whitney U test and the Kruskal-Wallis test.

2.1.3.1 The Mann-Whitney U test

The Mann-Whitney U test is a type of nonparametric statistics, which has the similar process as the t-test statistic, and usually used to compare differences between two independent groups.

Hypotheses

H_0: Two independent random samples from the population have the same distribution.

H_1: Two independent random samples from the population have the different distribution.

Test Statistics

$$U_1 = n_1 n_2 + \frac{n_1(n_1+1)}{2} - \sum R_1 \quad (2.3)$$

$$U_2 = n_1 n_2 + \frac{n_2(n_2+1)}{2} - \sum R_2 \quad (2.4)$$

Where

n_1 = the sample size of the first sample

n_2 = the sample size of the second sample

$\sum R_1$ = the sum of ranks for the first sample

$\sum R_2$ = the sum of ranks for the second sample

The smaller value of U_1 and U_2 is the one used for compare to the table of critical values for the Mann-Whitney U-test.

For large sample size ($n_2 > 20$), the calculated z is compared to the standard normal significance levels.

$$Z = \frac{U - m_u}{s_u} \quad (2.5)$$

Where m_u is mean of U which is calculated as follows.

$$m_u = \frac{n_1 n_2}{2}$$

s_u is standard deviation of U which is calculated as follows.

$$s_u = \sqrt{\frac{n_1 n_2 (n_1 + n_2 + 1)}{12}}$$

Decision criteria

1) If the calculated U value is less than the critical value of U in the table, then the null hypothesis will be rejected.

2) In case of $n_2 > 20$ or converting U into Z

At the significant level of 0.05 (a = 0.05), critical value of Z from the z-table is ± 1.96. If the calculated Z value is more than +1.96 or less than -1.96, then the null hypothesis will be rejected.

2.1.3.2 The Kruskal-Wallis test

The Kruskal-Wallis test is nonparametric statistic which extended from Mann-Whitney U test, to make it apply for three or more groups of population (*k* groups), and to compare whether the independent group drawn from *k* groups of population has the same distribution, or whether the independent group is drawn from the population with the same mean.

Kruskal-Wallis test is similar to the one-way analysis of variance (ANOVA) in parametric statistics, except that there is no condition needed concerning the normal distribution and equality/homogeneity of variance, thus alternatively called the Kruskal-Wallis One-Way ANOVA test or Kruskal-Wallis H test, which have the basic condition as follows:

1) Two samples are independent of each other.

2) The cases of each group are independent.

3) The data can be sorted, or at least obtained as an ordinal scale.

Hypotheses

H_0: The *k* independent samples have the same distribution. (equal means)

H_1: The *k* independent samples have the different distribution. (at least one of the means is different from the others)

Test Statistics

$$H = \frac{12}{N(N+1)}\sum_{i=1}^{k}\frac{R_i^2}{n_i} - 3(N+1) \quad (2.6)$$

Where

N = the total number of samples

R_i = the sum of ranks of sample set i

n_i = the number of samples in sample set i

In case there are data of the same ranks (duplicated), they will be averaged and H must be adjusted as follows.

$$H_c = \frac{H}{1-\frac{\sum(t^3-t)}{N^3-N}} \quad (2.7)$$

Where

t = the number of tied values.

Significance test

1) In case three independent samples (k = 3) and the number of each samples is equal to or less than 5 ($n_i \leq 5$), refer to the table for critical value of H in Kruskal-Wallis One-Way Analysis of Variance test, then compare it to H obtained from the test.

2) Other cases where n_i is larger scale, H will be distributed by Chi-square test. Therefore the H value obtained must be compared to the critical value of c^2 with k-1 degrees of freedom.

Decision criteria

1) In case of k = 3 and $n_i \leq 5$

If the calculated H is greater than the critical value of H in the table, the null hypothesis will be rejected.

2) Other cases

If the calculated H is greater than the critical value of c^2, the null hypothesis will be rejected.

2.2 Logistics and supply chain management in food industry

This section describes definitions of logistics and supply chain management, logistics and food supply chain management, including demand management in food supply chain.

2.2.1 Definition of logistics and supply chain management

2.2.1.1 Definition of logistics management

The Council of Logistics Management (CLM), a professional USA organization in logistic and supply chain management, subsequently named as Council of Supply Chain Management Professionals (CSCMP) explained logistics management acts as a part of supply chain system, including planning, operation and controls, storage of goods, services, and information from the point of origin to the point of consumption with efficiency and effectiveness to meet customers' requirements (Wasusri et al., 2007).

2.2.1.2 Definition of supply chain management

Supply chain management was inclusively described as an attempt to achieve economy of scale, effective transportation, and satisfactory service to customers by emphasizing on cost-controlled material procurement. Supply chain initially began with feeding materials into process, and finished goods were then moved to store in warehouse in order to finally distribute to retailers or ultimate customers. To meet the most effective supply chain strategy in terms of cost reduction and improving service must rely on an interaction between all parties within the system, called as logistics network, consisting of suppliers, manufacturing centers, warehouses, distribution centers, wholesalers, retailers and customers (Mekhora et al., 2008).

Supply Chain Management: SCM was an effective integration of all parties: suppliers, manufacturer, warehouses and retailer for possessing a least-cost reduction when production and distribution were run upon the right way in a sense of quantity, place and time; at the same time customers' requirements were still be responded in time (Mekhora et al., 2008). Supply chain management is recognized as an important business process management in a network of organizations that constitute the supply chain (Croxton et al., 2001). An application of supply chain management based on insight understanding may enable businesses to spread market shares in both Thai and international market (Alistair and Collins, 2000; Ruteri and Xu, 2009).

Supply chain management was to execute where materials appropriately were traveled on the right time and place with a sophisticated coordination between communicating and operating, in which value-added products were taken place when they were moved along each process, based on properly cost-controlled management. To perform supply chain management, however, must rely upon melodiously coordinated operation of all parties in an organizational level. Philosophy of Win-Win operation, benefit-shared decision, may allow each party in supply chain management to interact productively (Suharitdamrong, 2003).

Business Relationship acted as a connector of all elements in supply chain management, from upstream to downstream. When each party in supply chain network was itself able to firmly handle business relationship, it could be inferred that all of them stepped into the beginning point of pursuing an organizational philosophy. More significantly, if business relationship was altered into business alliance, all operations within supply chain management would seem to work much more virtually (Suharitdamrong, 2003).

2.2.2 Logistics and food supply chain management

In operating food industry, an improvement of logistic flow, partly located in supply chain management must, to meet the aim of supply chain management and to gain a lot more convenient distribution, be performed. Aghazadeh (2004) offered a small number of suggestions as follows.

1) Improving overall management and performance-based issues by means of functionally determining approaches including leader procurement, training, controlling, expected outputs and workplace surroundings was more likely to result in lifting organizational efficiency and reaching customers' requirements.

2) Improving database, logistics management information system (LMIS), may allow executives to estimate customers' requirements in line with to assess the number of goods in process, contributing to a balance of supply chain system with a reduction of defected items or oversupply.

3) Improving prediction and procurement may be able to properly control the number of materials, not to be exceeded due to a distinction between estimation and usage. Executives might utilize information from logistics management information system (LMIS) to make a plan in narrowing such a different gap.

4) Improving distribution, storage and transportation may focus on the most potential good delivery to customers by providing an insurance of all facilities related to transportation process.

2.2.3 Demand management in food supply chain

Correspondent planning and demand management were known as concerning issues in improving performance from supply chain operation, in particular fresh, easy-rotten or fast-moving consumer goods. Overall operation must, to enhance demand management, be taken into account both technically and practically (Taylor, 2006; Taylor and Fearne, 2006, 2009).

Researches conducted by Taylor (2006), Taylor and Fearne (2006) and Taylor and Fearne (2009) studied demand management of 6 agro-supply chains. Value chain analysis (VCA) was used as a tool by being applied with British food industries, to multi-dimensionally assess how efficient value chains worked and to analyze the flow of goods and data together with supply chain management and controls. Data collection was held in a sense of two different purposes. The former was to acquire an understanding on operational structure and data management, and data were gathered from various interviewees who were in charge of procurement, prediction and production planning sectors. The latter was to achieve an understanding on data flow via diverse channels in supply chain management, and data were obtained from

concentrating on products to track previous prediction, a pattern of customers' requirements, downstream-back-purchasing orders by suppliers and activities taken place in each station of production and transportation sectors through supply chain management.

The result represented there were variations occurred in every chain of final customers' requirements. Some of them were caused by natural senses like seasonal consumption or short-term fluctuation like weather. Such unsteady needs, however, might be ascribe to sales-promotional activities. Customer's requirements, in general, appeared to be a least important factor. As revealed by this study, an in correspondence between needs and activities was taken place along the chain because of an extended demand or a limited operation in downstream section by batch-size policy or unpredictable procurement.

Taylor and Fearne (2006) and Taylor and Fearne (2009) suggested the framework of demand management in food supply chain might be qualified, composed of four preliminary procedures as follows:

The first step is to determine data relevant to demand management by recording all data systematically and accurately, reliable and relative data between trade partners within the chain and customers, purchasing pattern, level of inventory, key drivers of factors affecting directly on efficient and integrated demand management.

The second step is to distribute information on final customers' requirements to downstream sector, fundamental element to convey ultimate needs in supply chain management. To amplify capability of software application, web-based, may allow small-sized suppliers to take part in demand chain management. Not only may costs and laborious access to upstream data and management system be decreased, but also costs of management, failure, purchasing verification may be dwindled.

The third step is to analyze and involves in strategic changes and operations. A significant change appears to be a development and a use of only-one-pattern prediction through the chain, based on an agreement from representatives of all companies within network in order to finally standardize production and resource planning. In strategic term, it is vital for retailers, agriculturists and producers to

willingly cooperate for a plan of advanced-developing prediction, involving in a connection between farming production plan when materials are in process and needs prediction when crops are harvested. Apart from this, sales promotion activities and an impact of inconstant requirements must be strategically evaluated. A requirement of final customers mostly achieves a least uncertainty of all requirements and activities over supply chain system. However, an increase of variances owing to demand expansion and supply policy in downstream sector is able to be controlled by an effective management.

The forth step is to strategically plan and handle demand management. Such a specific concern might concentrate on micro-demand management by considering daily orders of weekly trade and how long orders are passed from retailers to producers. This may lead to cost reductions by avoiding oversupply, defected products and overtime-working or urgent delivery expenses.

2.3 Thai food

This section contains the definition of Thai food, foreign attitude to Thai food, Thai food exports and studied on Thai food products that are detailed as follows.

2.3.1 Definition of Thai food

Thai food is food which has been nationally consumed by Thai people for centuries so that they have appeared to be “Thai National Identity”. Thai food is made up of a combination of agricultural materials including vegetables, indigenous herbs, known as spices and seasonings which are essential ingredients contributing to tasty and nutritional foods. More significantly, Thai food is globally notable for their harmonious taste of sweet, sour, salty, spicy and bitter, relying on such a superior gastronomy, and also Western medical study ensures that Thai food, composed of not only vegetables and meats but also various herbal ingredients, benefit human body from their own nutrients such as mineral, vitamin, fiber, and provide a small number of medical cures for example flatulence, indigestion, constipation and etc. This may cause Thai food to become more attractive and admirable for global customers (Dokkularb, 2003; National Food Institute, 2004).

Consequently, a variety types of food and seasonings, a differentiation of Thai food against others might allow Thai food exporting sector to improve its capability and to enlarge its opportunity in order to become much more exposed to international market.

2.3.2 Foreign attitude to Thai food

From literature review related to foreign attitude to Thai food, it was found that survey research was conducted by using questionnaire as a research tools to collect data. Descriptive analysis and hypothesis testing were used to analyze data. The result revealed that Thai food was more likely to be the most popular due to favorable taste, variety, benefit for health, high quality, reasonable price, aromatic, attractiveness, public relations and ethnic food as shown in Table 2.1.

Table 2.1 Foreign attitude to Thai food

	Ruenrom and Unahanandh (2005)	Ongkrutraksa and Larpsrisawad (2009)	Jang et al. (2009)
Taste	ü	ü	
Variety	ü		
Benefit for health	ü		ü
High quality	ü		ü
Reasonable price	ü		
Aromatic			ü
Attractive			ü
Ethnic food		ü	
Method	- Questionnaire, In-depth interview - Descriptive analysis, Hypothesis testing	- Focus group interview, In-depth interview, Survey research	- Online questionnaires - ANOVA, IPA

2.3.3 Thai food exports

Japan was ranked as the top importer of Thai food products in 2009 as Thai food exporting values have continued to rise since 2004 till 2010 and are still climbing up. Total values of 47 food products stood at US$ 2,145.31, 2,267.25, 2,269.07, 2,363.97, 3,221.87, 3,150.39 and 3,535.20 million, respectively as shown in Figure 2.1.

The top of food products exported to Japan in 2010 appeared to be “prepared poultry”, earning US$ 741.70 million, and were followed by “prepared or preserved fish, crustaceans, molluscs in airtight containers”, “fresh, chilled or frozen shrimps, prawns and lobster”, “fresh, chilled or frozen fish fillets and other fish meat” and “sugar”. The export values were US$ 587.99, 328.57, 265.16 and 228.39 million, respectively as shown in Table B.1.

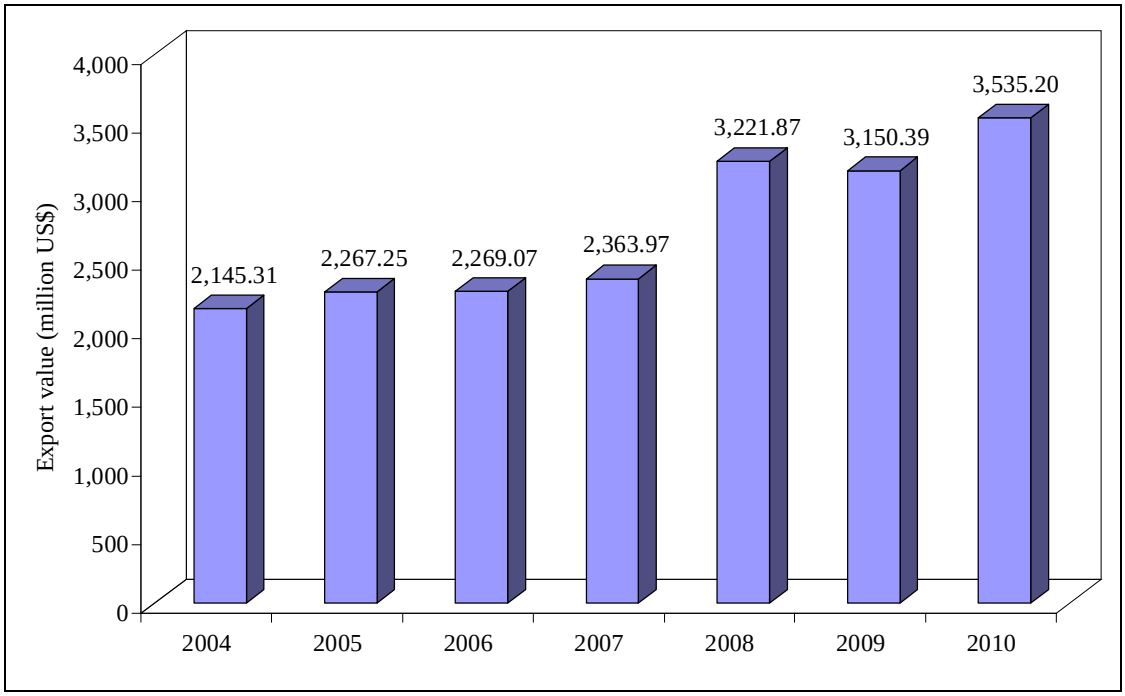

Figure 2.1 Export values of food products (million US$) in Thailand to Japan from 2004 to 2010

Source: Information and Communication Technology Center with cooperation of the Customs Department

2.3.4 Studied on Thai food products

Thai food products used to be studied for this research is based on Thai food exporting values to Japan from 2004 to 2010. It was found that the highest average of Thai food export value to Japan was “prepared or preserved fish, crustaceans, molluscs in airtight containers”, accounted for US$ 500.85 million, followed by “prepared poultry”, “fresh, chilled or frozen shrimps, prawns and lobster”, “fresh, chilled or frozen fish fillets and other fish meat” and “sugar”. The average of Thai food export values to Japan were US$ 477.70, 230.16, 210.96 and 180.87 million, respectively as shown in Figure 2.2.

As a result, food products picked up to study in this research comprise “prepared or preserved fish, crustaceans, molluscs in airtight containers”, “prepared poultry” and “fresh, chilled or frozen shrimps, prawns and lobster”. Since the average of Thai food export value to Japan is ranked 1st, 2nd and 3rd, respectively.

In consideration of the export values of food products for each year from 2004-2010 found that all of them has increased continuously. The export values of “prepared or preserved fish, crustaceans, molluscs in airtight containers” were US$ 453.50, 458.17, 448.33, 450.94, 560.01, 546.97 and 587.99 million. The export values of “prepared poultry” were US$ 254.57, 330.77, 332.84, 346.49, 672.56, 664.98 and 741.70 million. The export values of “fresh, chilled or frozen shrimps, prawns and lobster” were US$ 203.10, 183.84, 192.45, 215.39, 217.78, 270.01 and 328.57 million as show in Figure 2.3.

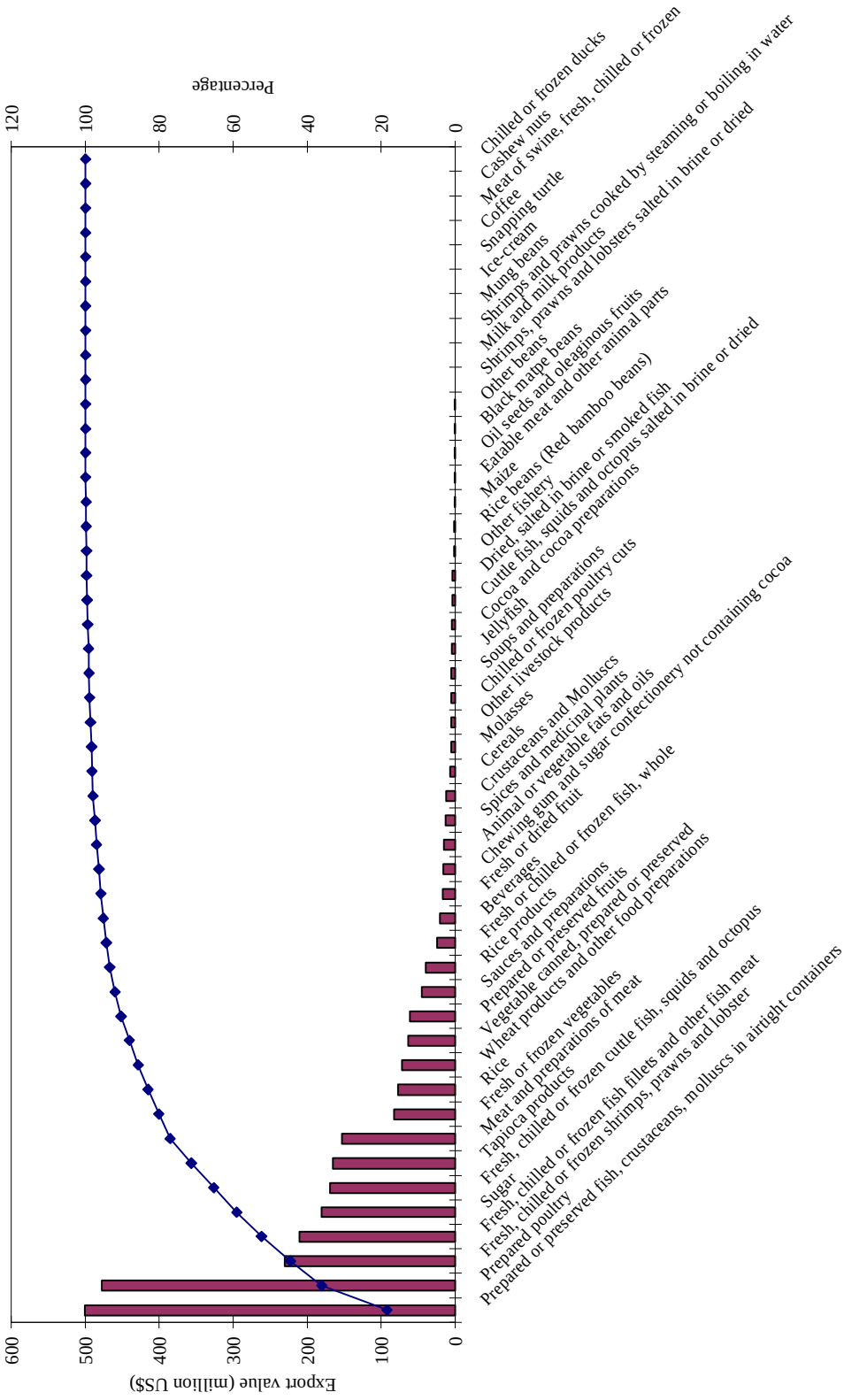

Figure 2.2 The average of Thai food export values to Japan from 2004 to 2010

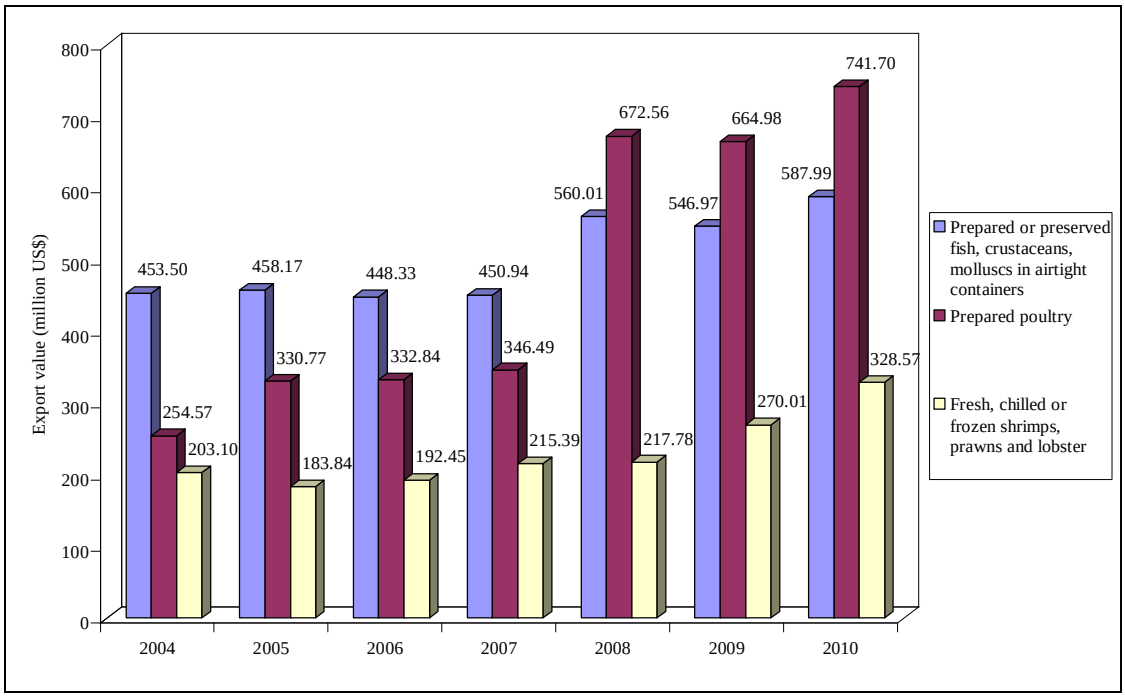

Figure 2.3 Export values of food products (million US$) in Thailand to Japan for each year from 2004 to 2010

Source: Information and Communication Technology Center with cooperation of the Customs Department

2.4 Preliminary information on food industry in Japan

This section contains Japan food imports, regulation of food imports in Japan, attitudes and purchasing and consuming behaviors of Japanese consumers, including Japan market penetration strategies that are detailed as follows.

2.4.1 Japan food imports (National Food Institute, 2008)

In 2007, Japan was the forth world importer of food products, following USA, Germany, and UK respectively, approximately reached US$ 52,289 million of its food and agricultural products. USA was the most top country of Japan food import, trading US$ 13,129 million, accounted for 25% of its total food import and products imported included cereals, meats and fishery products. China appeared to be the top second market where held 15% (US$ 8,034 million) of total market share in

Japan, followed by Australia and Canada and account for 7.86% and 6.19% severally. Ranked as the fifth imported products of Japan, agricultural goods dominated 4.85% share of its all imported products from Thailand and earned about US$ 2,540 million. Majority of imported products of Japan, primary market of Thai food export were, however, likely to be processed meat products and fishery products.

Due to a small number of supports from government like international roadshow subject to JETRO or The Japan External Trade Organization, to introduce global products to Japan market, the trend of imported products in Japan seems to edge up which totally allows Thailand to take an advantage by pushing Thai foods to kitchens all over the world.

2.4.2 Regulation of food imports in Japan

Regulations and Laws relevant to Japan food import are detailed as follow: (Office of the International Marketing Development, 2003)

2.4.2.1 Food Sanitation Law involves in damage or injury from packaging, authorized by Ministry of Public Health, Ministry of Labour Protection and Welfare (MHLW). This law covers foods, food additives, tableware, packaging, and toys by banning distributing, producing and importing foods or products which consist of any toxins and consequently are harmful for human body. All food imported products of Japan must be standardized and to inspect food compounds, randomed for finding if they meet this law condition.

2.4.2.2 Plant Quarantine Law concerns with safety protection of imported plants from pathology and insect disease, authorized by Ministry of Agricultures, Forests and Fishery (MAFF). All plant imported products to Japan must, to monitor residual toxins and unproved chemicals by Japanese government, be randomed for finding if they meet this law condition.

2.4.2.3 Domestic Animal Disease Control Law is related to a prevention of infection and epidemic from imported animals and products from animals, authorized by Ministry of Agricultures, Forests and Fishery (MAFF). Importers must officially request certificate before disposing all of them. Otherwise, allowed to import from only 43 countries such as USA, the European Union (EU), animals and products from animals like chickens, ducks, eggs, hams, sausages, bacons

and hoof must be verified in order to protect Food and Mouth Disease, Rinderpest, and African swine fever outbreak. Products from animals which are processed at 70 degree-Celsius heat up to 30 minutes, however, are allowed to import (Khunkhunthod, 2006; Rattanaporn, 2004).

2.4.2.4 The Law Concerning Standardization and Proper labeling of Agriculture and Forestry Product or Law for Japanese Agriculture Standard (JAS) is relevant to a certification of agricultural and forestry products' standardization, authorized by Ministry of Agricultures, Forests and Fishery (MAFF). Both domestic and international producers must willingly submit their requests, if approved, products will be sealed "JAS"; consequently, this may help Japanese consumers be confident in consuming those products. Products from Thailand in a number of items, nowadays, like cooled and frozen shrimps, cooled and frozen chickens were already proven (Khunkhunthod, 2006; Rattanaporn, 2004).

According to Table 2.2, primary laws concerning with Japan food imports are forced to be effective in terms of petition, inspection or regulations related to each type of foods. Additionally, they are declared in order to ensure food safety which may avoid negative effects on plants and animals and to protect domestic industry (The Japan External Trade Organization (JETRO Bangkok), 2004).

Table 2.2 Primary laws related to food imports of Japan

Categories	A law enforcement	Reasons for use
Total food products	Food Sanitation Law	Safety and health
Animal products	Domestic Animal Infectious Diseases Control Law	To prevent the spread of animal diseases
Agricultural products	Plant Protection Law	To prevent the spread of chronic insect pests
Fishery products and some seaweed	Foreign Exchange and Foreign Trade Law	To limit the type and quantity of imports
Liquor	Liquor Tax Law	To control the importation and distribution of liquor

Source: http://www.jetro.go.jp/thailand/thai/t_survey/pdf/foodimportQ6.pdf

2.4.3 Attitudes and purchasing and consuming behaviors of Japanese consumers

Japanese typically consumed three meals, fundamentally emphasizing on rice and fishes and especially preferred seasonal food by combining tourism with a meal and music. Any festivals always acquired a strong attention from Japanese and involved in seasonally consuming special foods. Japanese food consuming was characterized as “Eat with their eyes”, to consume food is an art that foods, must own gorgeous appearance and attractive look in terms of packaging, shelf display or table-served display. It was important for food producers to concern with selling art at higher level than other markets and regionally different consuming taste in Japan (National Food Institute, 2005). Besides, purchasing type and Japanese social value highlighted on service, freshness, quality rather than price (Childs and Batista, 1994; Martin et al., 1998). Total expectation of Japanese consumes, nevertheless, included freshness and quality plus reasonable price; as a result, those factors must be seriously taken into accounted in developing Japanese distribution structure (Childs and Batista, 1994). From conducting market research, Maguire (2001) found Japan was mostly occupied with middle-classed populations causing the market to become unique as Japanese women, normally, managed household expenses and would then act as major consumers. For other factors affecting on Japanese food consuming trend, they were listed as follows: (National Food Institute, 2005, 2008; Royal Thai Embassy Tokyo, Japan, 2007)

- Change of Japanese life style, for example housing area constraint, small family size, causing Japanese not to prefer large-packaging products as without hoard goods they spent more frequent times on shopping.

- Change of Japanese population structure, heading to an increase in the number of elder contrary to a decrease in the number of birth rate, caused easy-opening products to be popular among elder group.

- According to Japanese social value, a preference of seasonal and fresh food consumption, timely sales promotion activities may have a big impact on sales volume.

- Due to a change of Japanese life style to be western, dine-out preference, and a hasty lifestyle, ready-to-eat foods appeared to be favorite item and are easy to buy in the market.

- According to healthy concern, organic and nutritive foods became more interesting for Japanese consumer. However, organic foods must be approved by Japanese Agriculture Standard (JAS) before selling in the market.

- To ensure their healthy concern, Japanese consumers always selected labeled items firstly rather than non-labeled items. As a result, food products sold in supermarket with tag may gain a lot more sales volumes than those sold in other shops without tag. Additionally, packaging and container also affected on Japanese purchasing decision.

- It was important for food sellers to ensure product quality to Japanese customers due to such a high brand loyalty.

- In spite of cook-in drop in Japanese household that most of Japanese use their free-time for other relaxations, they were still willing to cook (Home made food) leading to ready to eat food preference.

- Fresh products which were likely to be easily-rotten may face a slump in consumption as they left a waste of an amount of food scraps, whereas a need of processed foods and dine-out meals conversely soared.

- As Japan considerably relied upon food import, consumers pay much more attention on safety and traceability of food original source. More importantly, Japanese government issued regulations in order to prevent substandard products to the country. Thus, Thai exporters must unavoidably confront such a tighten regulations.

As discussed above, all factors affecting on a demand of Japanese consumers must earnestly be taken into account.

2.4.4 Japan market penetration strategies

To penetrate into Japan market could be performed according to the following conditions: (Mongkhonsawat, 1997)

1) Packaging concern including size, color and attractiveness may be consider as Japanese consumers were sensitive to buy product with such an attractive packaging.

2) Thai producers must seriously focus on quality and standard of exporting goods to Japan as Japanese consumers consider important conditions.

3) Due to potentially purchasing power, Japanese consumer behavior was sensitive to the global trend. To success in the market may be based on deeply understanding on that.

4) Joint Venture could be used as a tool to attain distribution channels in the market rather than direct access.

5) Roadshow or an attendance in international trade fair may allow Thai exporters to have widely connection with Japanese importers as well as a requirement of product characteristic.

2.5 Factors influencing an image of Thai food industry

According to the review of literatures and the study of preliminary information, food industry in Thailand is affected by determined factors conclusively as follows.

2.5.1 Standards for agricultural products and food

Japan focuses on product quality and consumer safety. Japanese government regulated Non-Tariff Barrier (NTBs) such as Sanitary and Phytosanitary Standard (SPS), Environment Measures (ENV), etc. to monitor the imports, inspection, including prevention of diseases and inspect pests that may be attached to import products. These measures impact on exports of Thailand. Therefore, manufacturers and operators in Thailand should improve process in order to comply with the measures to be established (Wungsintaweekul, 2007). National Bureau of Agricultural Commodity and Food Standards, Ministry of Agriculture and Cooperatives (2005) regulate the production systems as follows:

- Agricultural production systems obtained from plant, livestock and aquaculture must comply with Good Agricultural Practices (GAPs).

- Production systems of agricultural products and processed foods must comply with General Principles of Food Hygiene and/or Hazard Analysis and Critical Control Point (HACCP).

- Agricultural products and food in hermetically sealed containers to be classified as low-acid and acidified low-acid canned food can be stored in the room temperature, including must comply with Good Agricultural Practices (GAPs) and General Principles of Food Hygiene and/or Hazard Analysis and Critical Control Point (HACCP). In addition, food processing must comply with the requirements specified in the Recommended International Code of Hygienic Practice for Low and Acidified Low Acid Canned Foods.

These requirements lead product quality and acceptable to the importing countries.

2.5.2 Qualifications of farmers

Mattarach (2002) collected the data from 127 samples of dairy farmer in Mahasarakham by questionnaire and statistical data analysis methods. The result showed that the career integrity, trainings, diligence, patience, yearning for knowledge and the improvement of farming technique were the critical factors in determining of the efficiency, including the productivity and quality of the farm.

2.5.3 Farming factors

The related literatures implemented the secondary data with time series, in-depth interview and questionnaire. Data analysis was divided into two parts: descriptive analysis and quantitative analysis. The study concluded that the deficiency of good breeds, high production costs (i.e., animal feeds, medicine and chemical products), disease outbreak, lack of knowledge and technology with breeding, inefficient farm management and lack of loans to support breeding or cultivation were the animal feeding strategy of the farmers as shown in Table 2.3.

Table 2.3 Farming factors

	Jitvarattana (1996)	Mongkhonsawat (1997)	Pongprayoo (1999)	Niemsang (2003)	Khunkhunthod (2006)	Prakobkij (2007)	National Food Institute (2008)
Deficiency of good breeds		ü	ü	ü	ü	ü	ü
High production costs such as animal feeds, medicine and chemical products both imported and locally	ü	ü	ü	ü	ü	ü	ü
Disease outbreak	ü		ü	ü	ü	ü	ü
Lack of knowledge and technology with breeding		ü	ü	ü		ü	
Inefficient farm management		ü	ü	ü		ü	
Lack of loans		ü	ü	ü		ü	
Unpredictably season	ü						
Method	- Secondary data with yearly time series - Descriptive and quantitative analysis	- Secondary data with yearly time series - Descriptive and quantitative analysis	- Secondary data with yearly time series - Interviews with major exporters of frozen shrimp and officials of Thai Frozen Foods Association - Descriptive and quantitative analysis	- Secondary data with yearly time series - Descriptive and quantitative analysis	- Secondary data with monthly time series - Descriptive and quantitative analysis	- Secondary data with yearly time series - Descriptive and quantitative analysis	- In-depth interviews with operators in shrimp and chicken industry in Thailand, Vietnam and China - Questionnaire

2.5.4 Government services factors

According to the research by Mattarach (2002), government officers played a critical role in monitoring and solving the problem of the farmers. They implemented the training course for the farmers to accumulate the knowledge and apply it to the production. The officers are experts in the field; therefore, the productivity of the farmers increased.

2.5.5 Raw material factors

Relevant literatures implemented questionnaires, interviewing of the entrepreneurs, including descriptive and quantitative analysis. The results found that the problems about raw materials in Thailand's food industry were lack of raw materials, contaminated raw material, unsustainable quality of material, including uncontrollable amount of material as a result of variation and unpredictability of the season as shown in Table 2.4.

2.5.6 Production factors

Review of relevant literatures implemented the secondary data with time series, interviewing of the exporters, employees, and government officers. Data analysis was divided into two parts: descriptive analysis and quantitative analysis. The results revealed that the problem of manufacturers were high labor costs (compare to the neighbor countries), lack of skilled workers, insufficient capital for improving and managing efficient production, and lack of technology and technique in analysis and development of the products as shown in Table 2.5.

2.5.7 Marketing factors

According to studies relevant literatures implemented the secondary data with time series, interviewing of the entrepreneurs, including descriptive and quantitative analysis. The results found that the problem of marketing were the price-cut tactics and domestic trade competition amongst entrepreneurs, low bargaining power thus low profit margin, unattractive packaging design, and lack of modern knowledge about the details of product as shown in Table 2.6.

Table 2.4 Raw material factors

	Mongkhonsawat (1997)	Pongprayoon (1999)	Sathong-aun (2000)	Niemsang (2003)	National Food Institute (2005)	Ruamyart (2006)	Lertsawat (2007)	National Food Institute (2008)
Lack of raw materials	ü	ü	ü	ü	ü		ü	ü
Contaminated raw material	ü	ü		ü		ü		
Unsustainable quality of material			ü				ü	
Uncontrollable amount of material as a result of variation and unpredictability of the season						ü		ü
Method	- Secondary data with yearly time series - Descriptive and quantitative analysis	- Secondary data with yearly time series - Interviews with major exporters of frozen shrimp and officials of Thai Frozen Foods Association - Descriptive and quantitative analysis	- Questionnaire - Descriptive analysis	- Secondary data with yearly time series - Descriptive and quantitative analysis	- In-depth interviews with operators in shrimp and surimi industry in Thailand, Vietnam and China - Questionnaire	- Questionnaire - Interviews with vegetable exporters - Descriptive and quantitative analysis	- Secondary data - Descriptive analysis	- In-depth interviews with operators in shrimp and chicken industry in Thailand, Vietnam and China - Questionnaire

Table 2.5 Production factors

	Nuamkhayan (1996)	Pongprayoon (1999)	Niemsang (2003)	National Food Institute (2005)	Ruamyart (2006)	Lertsawat (2007)	Prakobkij (2007)	National Food Institute (2008)
High labor costs (compare to the neighbor countries)	ü			ü		ü	ü	
High production costs		ü	ü	ü	ü	ü	ü	ü
Lack of skilled workers		ü	ü	ü		ü	ü	ü
Insufficient capital for improving and managing efficient production		ü	ü				ü	
Lack of technology and technique in analysis and development of the products				ü	ü	ü		ü
Method	- Interviews with frozen shrimp exporters and officials - Descriptive and quantitative analysis	- Secondary data with yearly time series - Interview - Descriptive and quantitative analysis	- Secondary data with yearly time series - Descriptive and quantitative analysis	- In-depth interviews with operators in shrimp and surimi industry in Thailand, Vietnam and China - Questionnaire	- Questionnaire - Interviews with vegetable exporters - Descriptive and quantitative analysis	- Secondary data - Descriptive analysis	- Secondary data with yearly time series - Descriptive and quantitative analysis	- In-depth interviews with operators in shrimp and chicken industry in Thailand, Vietnam and China - Questionnaire

Table 2.6 Marketing factors

	Mongkhonsawat (1997)	Pongprayoon (1999)	Niemsang (2003)	National Food Institute (2005)	Ruamyart (2006)
Price-cut tactics and domestic trade competition amongst entrepreneurs	**ü**	**ü**	**ü**	**ü**	**ü**
Low bargaining power thus low profit margin	**ü**	**ü**			**ü**
Unattractive packaging design and lack of modern knowledge about the details of product					**P**
Method	- Secondary data with yearly time series - Descriptive and quantitative analysis	- Secondary data with yearly time series - Interviews with major exporters of frozen shrimp and officials of Thai Frozen Foods Association - Descriptive and quantitative analysis	- Secondary data with yearly time series - Descriptive and quantitative analysis	- In-depth interviews with operators in shrimp and surimi industry in Thailand, Vietnam and China - Questionnaire	- Questionnaire - Interviews with vegetable exporters - Descriptive and quantitative analysis

2.5.8 Export factors

The related literatures implemented the secondary data with time series, questionnaires, descriptive analysis, and quantitative analysis. The results found that the problems about the export were the trade barriers, tax measures, the regulations of import in Japan, lack of sharing information or its obsoletes thus missing opportunity, lack of legal knowledge, delay process of relevant Thai officers concerning quality control and monitoring, lack of government support for exports, ineffective and high cost of transportation as shown in Table 2.7.

2.5.9 External environment factors

From literature review related to factors affecting demand for exports and imports, including factors influencing demand for food products, they implemented the secondary data with time series, questionnaires. The data was analyzed by using descriptive and quantitative analysis. The study revealed that external environment factors of food industry were gross domestic product of the import countries, currency exchange, costs of import in those countries, and the variation of population as shown in Table 2.8-2.10.

Table 2.7 Export factors

	Nuamkhayan (1996)	Pongprayoon (1999)	Rungruengrit (2003)	Niemsang (2003)	National Food Institute (2005)	Yonniyom (2006)	Ruamyart (2006)	Prakobkij (2007)	Thambamrung (2007)	National Food Institute (2008)
Trade barriers		ü	ü	ü	ü	ü	ü	ü	ü	ü
Strict quality control standard in Japan		ü		ü	ü				ü	ü
Lack of sharing information or its obsoletes thus missing opportunity	ü		ü		ü		ü			
Lack of legal knowledge and regulations of import in Japan			ü		ü				ü	
Delay process of relevant Thai officers concerning quality control and monitoring	ü	ü								
Lack of government support for exports							ü	ü		
Ineffective and high cost of transportation		ü		ü	ü	ü	ü			
Method	- Interviews with frozen shrimp exporters and officials - Descriptive and quantitative analysis	- Secondary data with yearly time series - Interview - Descriptive and quantitative analysis	- Secondary data with yearly time series - Interview - Descriptive and quantitative analysis	- Secondary data with yearly time series - Descriptive and quantitative analysis	- In-depth interviews with operators in shrimp and surimi industry in Thailand, Vietnam and China - Questionnaire	- Secondary data with yearly time series - Descriptive and quantitative analysis	- Questionnaire - Interviews with vegetable exporters - Descriptive and quantitative analysis	- Secondary data with yearly time series - Descriptive and quantitative analysis	- Secondary data with yearly time series - Descriptive and quantitative analysis	- In-depth interviews with operators in shrimp and chicken industry in Thailand, Vietnam and China - Questionnaire

Table 2.8 Factors affecting export demand

	Jitvarattana (1996)	Korsriphithakkul (1996)	Armah and Epperson (1997)	Rattanaporn (2004)	Mali (2006)	Chayaprachakkul (2007)	Sonsun (2007)	Nanang (2010)
GDP of importing countries						ü	ü	
Exporting goods price	ü	ü	ü	ü	ü		ü	
Currency exchange rates	ü		ü	ü			ü	ü
Populations of importing countries						ü		
National incomes of importing countries		ü		ü	ü			ü
Method	- Secondary data with yearly time series - Descriptive and quantitative analysis	- Secondary data with yearly time series - Multiple regression analysis	- Secondary data with yearly time series - Econometrics method	- Secondary data with yearly time series - Descriptive and quantitative analysis	- Quarterly and yearly time series - Descriptive and quantitative analysis	- Secondary data - Multiple regression analysis	- Secondary data - Descriptive and quantitative analysis	- Secondary data with time series - Econometrics method

Table 2.9 Factors affecting import demand

	Fuller et al. (1992)	Lordkipanidze et al. (1998)	Tavanapong (2000)	Miljkovic et al. (2002)	Goktolga (2006)	Khunkhunthod (2006)	Thambamrung (2007)	Isin and Miran (2009)
GDP of importing countries			ü					
Importing goods price	ü		ü	ü	ü	ü	ü	ü
Currency exchange rates	ü	ü		ü	ü			
Price of substitute goods	ü	ü						
Trading policies and restrictions	ü			ü		ü		
Method	- Quarterly time series - Seemingly-unrelated-regression (SUR)	- Monthly time series - Generalized Least Squares (GLS)	- Quarterly time series - Ordinary least squares method	- Quarterly time series - Ordinary least squares method	- Secondary data with time series - Regression analysis	- Monthly time series - LA/AIDS with ordinary least squares method	- Secondary data with yearly time series - AIDS with SUR	- Secondary data - LA/AIDS

Table 2.10 Factors influencing demands for food products

	Han and Wahl (1998)	Yeong-Sheng et al. (2008)	Davis et al. (2009)	Zheng and Henneberry (2009)	Yu and Abler (2009)	Mergenthaler et al. (2009)
Price			ü			
Income per capita	ü	ü	ü	ü	ü	ü
Demographic change				ü		
Method	- Income-different sampling groups - Two-stage budgeting LES-LA/AIDS system	- Multi-stage budgeting system	- Censored translog demand system model	- Random sampling - Generalized Almost Ideal Demand System (GAIDS)	- 10-year-panel data - Econometrics method	- Observing - Almost Ideal Demand System (AIDS)

CHAPTER III
RESEARCH METHODOLOGY

This chapter describes the research methodology that is divided into eight sections as follows.

3.1 Data

The studied data in this research consists of primary data and secondary data.

3.1.1 Primary data

Primary data are gathered from questionnaires that are used as a research tools by interviewing farmers, processors and Thai food exporters. They know factors affecting Thai food exports to Japan and the problems and obstacles of Thai food supply chain in Thailand.

3.1.2 Secondary data

Secondary data on Thai food exports to Japan are gathered from both domestic and foreign sources such as Department of Export Promotion, Thai Customs Department, Ministry of Commerce, The Office of Industrial Economics, National Food Institute, related articles and researches, etc.

3.2 Population and sampling

The populations of this research are farmers, processors and exporters of food products from Thailand to Japan.

The sample size is calculated by equation (2.1) and sampling relies on stratified random sampling. The sample is used in this survey as shown in Table 3.1.

From equation 2.1, sample size of Thai food processors and exporters to Japan is calculated with a 95% level of confidence and 5 % margin of error. (N = 212, e = 0.05)

$$n = \frac{N}{1+Ne^2}$$

$$= \frac{212}{1+212(0.05)^2}$$

$$= 139 \text{ samples}$$

The sample size of processors and exporters for each type of foods such as prepared or preserved seafood in airtight containers, processed chicken products and frozen shrimp is calculated as follows.

The categories of Thai food exported to Japan

$$= \text{n of Thai food processors and exporters to Japan} \times \frac{\text{N of the processors and exporters divided by Thai food categories}}{\text{Total N of Thai food processors and exporters to Japan}}$$

Prepared or preserved seafood in airtight containers $= 139 \times \frac{164}{212}$

$= 87$ samples

Processed chicken products $= 139 \times \frac{39}{212}$

$= 15$ samples

Frozen shrimp $= 139 \times \frac{78}{212}$

$= 37$ samples

Table 3.1 Sample size at the 95 % confidence level and 5 % margin of error

	Population size (N)	**Sample size (n)**
Processors and exporters of prepared or preserved seafood in airtight containers	164	87
Processors and exporters of processed chicken products	39	15
Processors and exporters of frozen shrimp	78	37
Chicken farmers	229	146
Marine farmers	563	234

Notes: - List of Thai food exporters in 2010

-iList of registered chicken farms with the Department of Livestock Development in 2011

- List of registered marine farms with the Department of Fisheries in 2011

3.3 Conceptual research framework and hypotheses

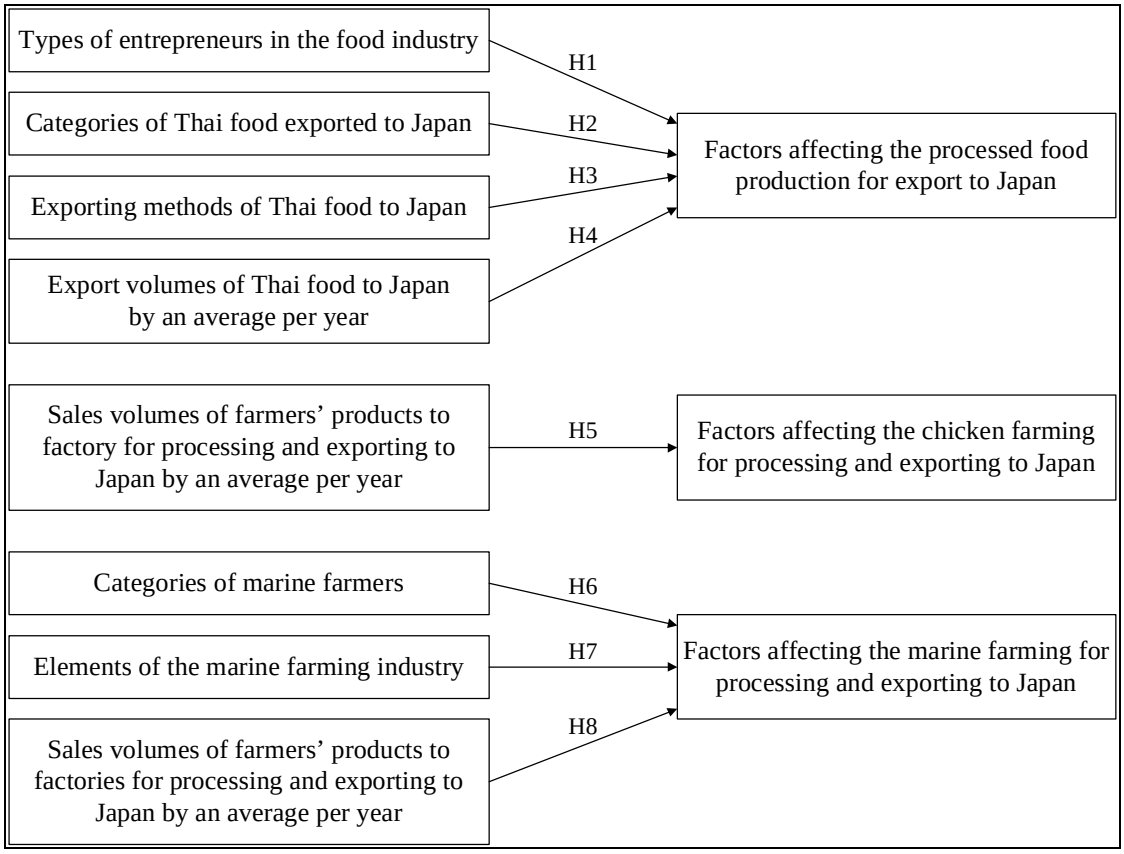

Figure 3.1 Conceptual research framework

From the conceptual research framework, hypotheses are proposed for testing as below.

Hypothesis 1 (H1). The different types of entrepreneurs in the food industry have effect the different factors affecting the processed food production for export to Japan.

Hypothesis 2 (H2). The different categories of Thai food exported to Japan have effect the different factors affecting the processed food production for export to Japan.

Hypothesis 3 (H3). The different exporting methods of Thai food to Japan have effect the different factors affecting the processed food production for export to Japan.

Hypothesis 4 (H4). The different export volumes of Thai food to Japan have effect the different factors affecting the processed food production for export to Japan.

Hypothesis 5 (H5). The different sales volumes of farmers' products to factory for processing and exporting to Japan have effect the different factors affecting the chicken farming for processing and exporting to Japan.

Hypothesis 6 (H6). The different categories of marine farmers have effect the different factors affecting the marine farming for processing and exporting to Japan.

Hypothesis 7 (H7). The different elements of marine farming industry have effect the different factors affecting the marine farming for processing and exporting to Japan.

Hypothesis 8 (H8). The different sales volumes of farmers' products to factories for processing and exporting to Japan have effect the different factors affecting the marine farming for processing and exporting to Japan.

3.4 Research tools

The tool used in this research is questionnaires. They are designed in accordance with the objectives of the research that consists of three sets as follows.

1) The questionnaire for opinion survey of food processors and exporters from Thailand to Japan is divided into two sections as follows.

Part 1: General data of processors and exporters of food products from Thailand to Japan

Part 2: Factors affecting the processed food production for export to Japan

2) The questionnaire for opinion survey of chicken farmers is divided into two sections as follows.

Part 1: General data of chicken farmers

Part 2: Factors affecting the chicken farming for processing and exporting to Japan

3) The questionnaire for opinion survey of marine farmers is divided into two sections as follows.

Part 1: General data of marine farmers

Part 2: Factors affecting the marine farming for processing and exporting to Japan

The questions regarding general data of farmers, processors and exporters of food products from Thailand to Japan are a checklist.

The questions regarding factors affecting Thai food supply chain to Japan are measured by using five-point Likert's rating scale anchored at 1 to 5 that are the highest-level problems, high-level problems, medium-level problems, low-level problems, and no problems.

3.5 The reliability testing of the tools

The questionnaire is analyzed validity and reliability before use as a research tools. The steps of evaluation questionnaire include four steps as follows.

1) The questionnaires will be sent to the experts or researchers who have experience regarding Thai food researches in a foreign country and supply chain to check content validity.

2) Questionnaires are revised along any suggestions from experts.

3) The preliminary-test (pre-test) of questionnaires will take place before they are actually used in the survey.

4) The reliability test is conducted to calculate the Cronbach's alpha coefficients. If the Cronbach's alpha coefficients are 0.7 or above, imply that the questionnaires are considered to be acceptable reliability and validity (Kock, 2007; Kock et al., 2009).

The results of reliability test of questionnaire for opinion survey's food processors and exporters from Thailand to Japan, chicken farmers and marine farmers are shown in Table 3.2-3.4.

Table 3.2 Results of reliability analysis for factors affecting the processed food production for export to Japan

Factors affecting the processed food production for export to Japan	**Number of items**	**Cronbach's alpha**
Food hygiene factors	62	0.949
Application of HACCP principles	15	0.945
Raw material factors	3	0.903
Production factors	5	0.796
Marketing factors	2	0.890
Export factors	10	0.904
External environment factors	4	0.741

Table 3.3 Results of reliability analysis for factors affecting the chicken farming for processing and exporting to Japan

Factors affecting the chicken farming for processing and exporting to Japan	**Number of items**	**Cronbach's alpha**
Good Agricultural Practices for livestock farming (GAP)	37	0.913
Qualifications of chicken farmer	2	0.773
Chicken farming factors	7	0.778
Government services factors	4	0.898

Table 3.4 Results of reliability analysis for factors affecting the marine farming for processing and exporting to Japan

Factors affecting the marine farming for processing and exporting to Japan	**Number of items**	**Cronbach's alpha**
Good Agricultural Practices for marine farming (GAP)	37	0.906
Qualifications of marine farmer	2	0.746
Marine farming factors	7	0.778
Government services factors	4	0.735

The results of reliability analysis indicated that all factors have Cronbach's alpha coefficients of greater than 0.7. Consequently, the questionnaires are considered to be acceptable reliability.

3.6 Data collection

The questionnaires will be sent to sample via email or mail according to sample size as shown in Table 3.1.

Data was collected from processors and exporters from August to October, 2011. In addition, data was collected from chicken farmers and marine farmers from September to November, 2011.

3.7 Data processing and analysis

Data processing and analysis are conducted as follows.

1) Part 1 of three questionnaires is analyzed by using descriptive analysis to describe as percentage of the representative samples who answered each question.

2) Part 2 of three questionnaires is analyzed factors affecting Thai food supply chain to Japan by using descriptive analysis to describe as percentage, mean and standard deviation. In this part, the questions are a five-point Likert's rating scale. The respondents can rate on a 1 to 5 response scale as following the criteria.

Points	The level of problem
5	The highest
4	High
3	Medium
2	Low
1	No problem

The mean score will be interpreted as follows (Sombatnimitsakul, 2003; Thongkham, 2003).

Point average 4.20 - 5.00 means the extremely important problem

Point average 3.40 - 4.19 means the highly important problem

Point average 2.60 - 3.39 means the moderately important problem

Point average 1.80 - 2.59 means the less important problem

Point average 1.00 - 1.79 means no problem

Furthermore, hypotheses testing are conducted to test the relationship between general data of food processors and exporters from Thailand to Japan and factors affecting the processed food production for export to Japan. For questionnaire of chicken farmers and marine farmers, hypothesis testing is conducted to test the relationship between general data of farmers and factors affecting the chicken / marine farming for processing and exporting to Japan.

In this study, inferential statistics is used to test hypotheses which consist of the Mann-Whitney U test and the Kruskal-Wallis test.

3.8 Conclusion

This step involves in conclusion and proposal guidance in the sense of business development of the Thai food industry and Thai food supply chain.

CHAPTER IV
RESULTS

The studied on factors affecting elements of supply chain in the Thai food industry are implemented by survey questionnaire, to collect samplings data from food processors, exporters, chicken farmers, and marine farmers.

This chapter is divided into three sections. Firstly, the results of studied on processors and exporters of food products from Thailand to Japan are discussed in the section 4.1. The results of studied on chicken farmers samples are presented in the section 4.2. Finally, the results of studied on marine farmers samples are described in the section 4.3 as shown in Figure 4.1.

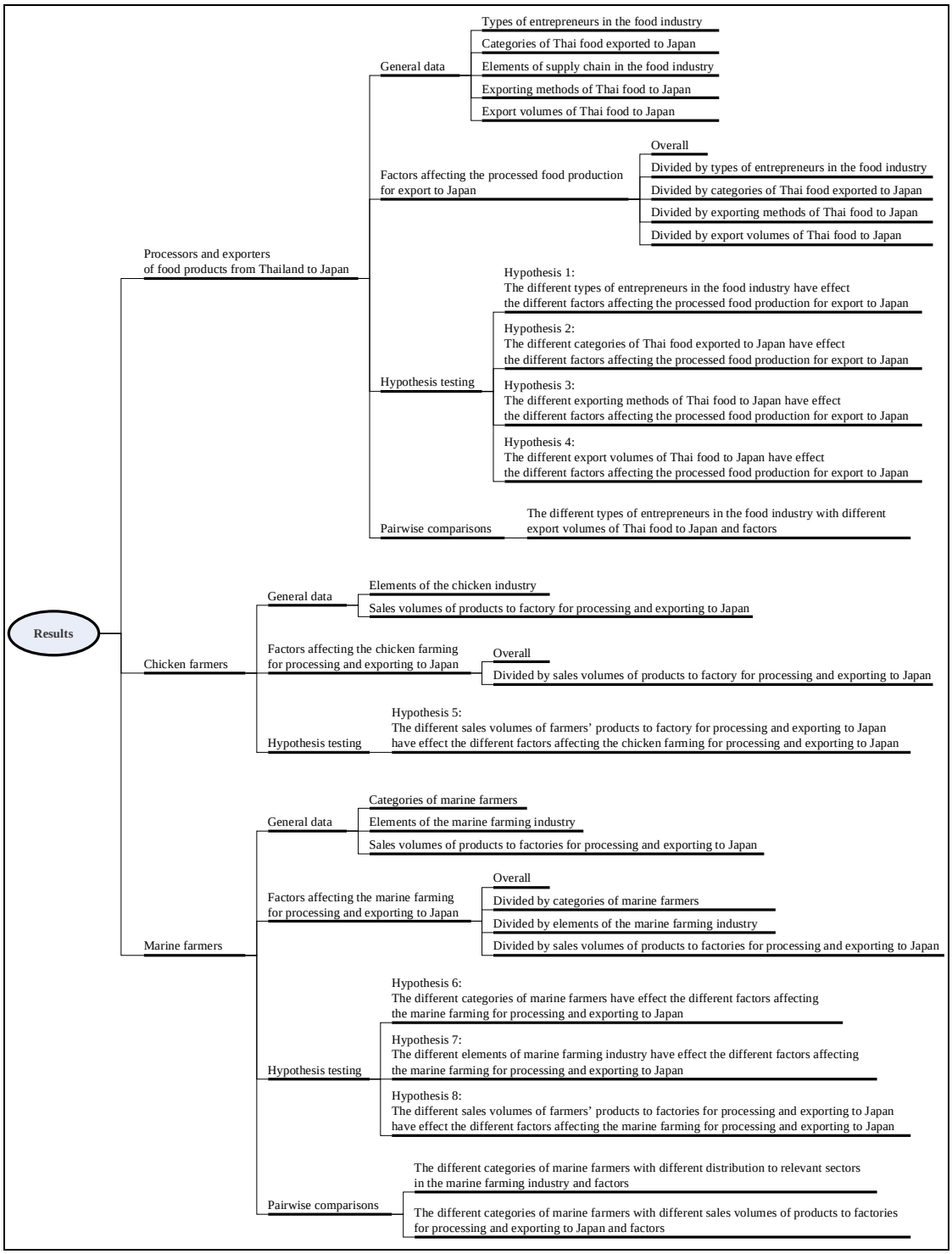

Figure 4.1 Details of the results

4.1 Results of studied on processors and exporters of food products from Thailand to Japan

The results of studies on food processors and exporters from Thailand to Japan have been separated into five parts as shown in Figure 4.2.

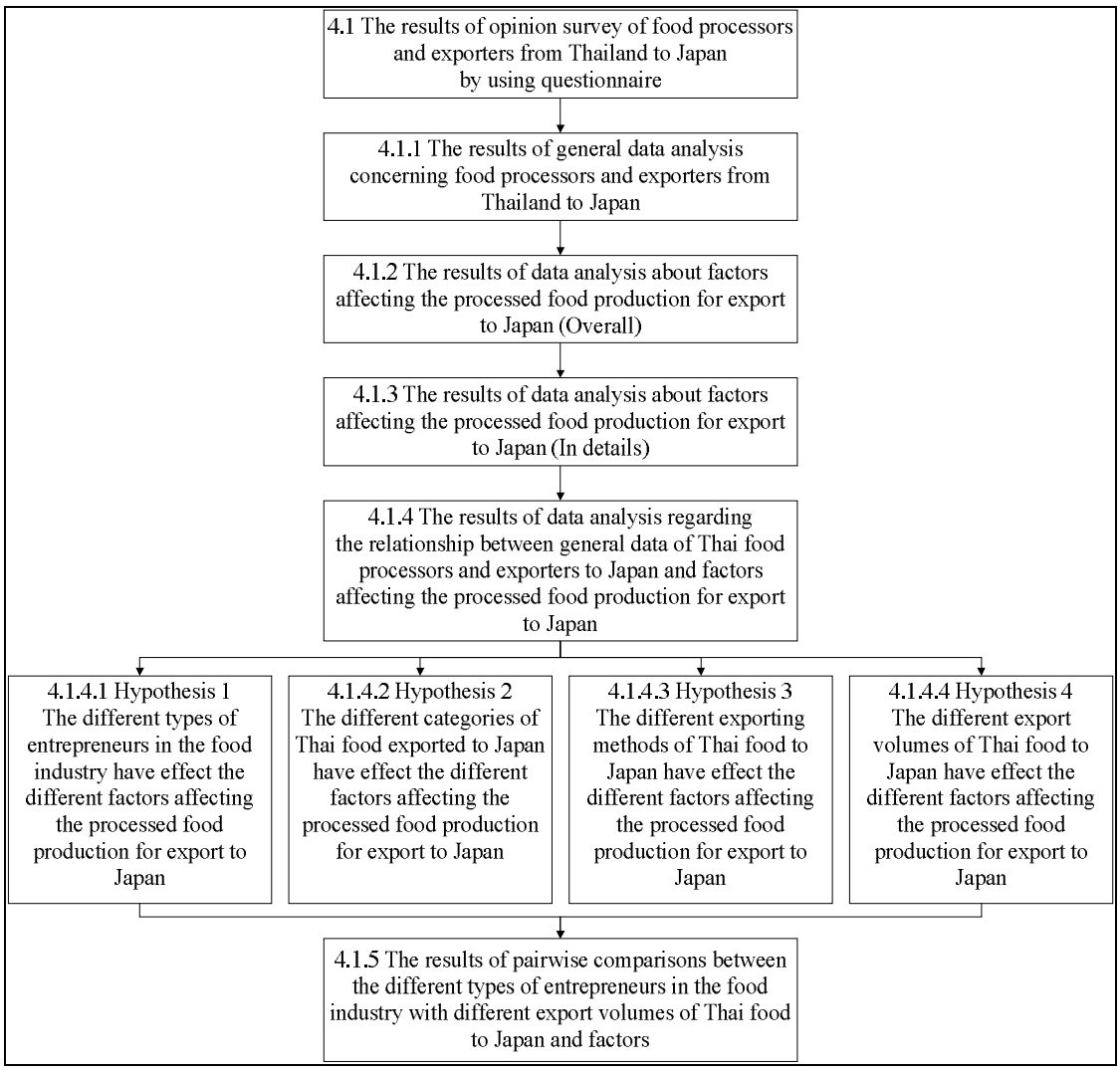

Figure 4.2 Details of the results of studied on food processors and exporters from Thailand to Japan

The questionnaires were sent to 139 samples. The 43 questionnaires were returned, accounted for 30.94 percent, which will be studied and analyzed concerning

general data, factors affecting the processed food production for export to Japan, and hypothesis testing.

4.1.1 Results of general data analysis concerning food processors and exporters from Thailand to Japan

The questions about general data of food processors and exporters from Thailand to Japan comprised types of entrepreneurs in the food industry, categories of Thai food exported to Japan, receiving of raw materials or food products from relevant suppliers in the food industry, exporting methods of Thai food to Japan, and export volumes of Thai food to Japan by an average per year.

Table 4.1 Number and percentage of respondents divided by types of entrepreneurs in the food industry

Types of entrepreneurs in the food industry	Number	Percentage
Exporter	3	7.0
Processor and exporter	40	93.0
Total	43	100.0

From Table 4.1, the most of respondents are in processor and exporter, the category of which has 40 people or 93 percent, and the rest are in exporter category, of which there are 3 people or 7 percent.

Table 4.2 Number and percentage of respondents divided by categories of Thai food exported to Japan

Categories of Thai food exported to Japan *	Number	Percentage
Prepared or preserved seafood in airtight containers	16	37.2
Processed chicken products	8	18.6
Frozen shrimp	14	32.6
Prepared or preserved seafood in airtight containers + Processed chicken products	2	4.7
Prepared or preserved seafood in airtight containers + Frozen shrimp	3	7.0
Total	43	100.0

Note: * The respondent can choose more than 1 choice

From Table 4.2, it found that most of the entrepreneurs export 37.2 percent of prepared or preserved seafood in airtight containers, followed by frozen shrimp with 32.6 percent, processed chicken products with 18.6 percent, prepared or preserved seafood in airtight containers and frozen shrimp with 7.0 percent, and prepared or preserved seafood in airtight containers and processed chicken products with 4.7 percent.

Table 4.3 Number and percentage of respondents divided by elements of supply chain in the food industry

Elements of supply chain in the food industry *	**Number**	**Percentage**
Farmers	2	4.7
Integrators	4	9.3
Central market	2	4.7
Processors	8	18.6
Other	9	20.9
Farmers + Integrators	7	16.3
Farmers + Central market	2	4.7
Farmers + Other	2	4.7
Farmers + Integrators + Central market	2	4.7
Integrators + Central market	1	2.3
Integrators + Processors	1	2.3
Integrators + Other	1	2.3
Integrators + Central market + Processors	1	2.3
Central market + Other	1	2.3
Total	43	100.0

Note: * The respondent can choose more than 1 choice

Table 4.3 shows 20.9 percent of entrepreneurs receive raw materials or fresh food from other sources (abroad, affiliates, and their own manufacturing), whereas 18.6 percent of them receive from processors, and 16.3 percent of them receive from farmers and integrators.

Table 4.4 Number and percentage of respondents divided by exporting methods of Thai food to Japan

Exporting methods of Thai food to Japan *	Number	Percentage
Export via export companies in Thailand	3	7.0
Export via Japanese importer companies located in Thailand	2	4.7
Export via Japanese importer companies located in Japan	20	46.5
Export directly to their own subsidiaries	6	14.0
Export directly to final consumers such as retail store in Japan (consumer goods), food processors in Japan (industrial goods)	2	4.7
Export via export companies in Thailand + Japanese importer companies located in Thailand	1	2.3
Export via export companies in Thailand + Japanese importer companies located in Japan	1	2.3
Export via Japanese importer companies located in Thailand + Japanese importer companies located in Japan	5	11.6
Export via Japanese importer companies located in Japan + Export directly to final consumers	2	4.7
Export via Japanese importer companies located in Thailand + Export directly to their own subsidiaries + Export directly to final consumers	1	2.3
Total	43	100.0

Note: * The respondent can choose more than 1 choice

From Table 4.4, it found that 46.5 percent of entrepreneurs export Thai food to Japan via Japanese importer companies located in Japan, whereas 14.0 percent of them export directly to their own subsidiaries, and 11.6 percent of them export via Japanese importer companies located in Thailand and Japanese importer companies located in Japan.

Table 4.5 Number and percentage of respondents divided by export volumes of Thai food to Japan

Export volumes of Thai food to Japan by an average per year	**Number**	**Percentage**
Less than 20 percent	14	32.6
21-40 percent	13	30.2
41-60 percent	4	9.3
61-80 percent	3	7.0
More than 81 percent	9	20.9
Total	43	100.0

From Table 4.5, a majority of entrepreneurs has the export volume of Thai food to Japan with an average volume of less than 20 percent per year accounted for 32.6 percent. The export volume of Thai food to Japan with an average volume of 21-40 percent per year is 30.2 percent. The export volume of Thai food to Japan with an average volume of more than 81 percent per year is 20.9 percent. The export volume of Thai food to Japan with an average volume of 41-60 percent per year is 9.3 percent. Lastly, the export volume of Thai food to Japan with an average volume of 61-80 percent per year is 7.0 percent.

The results of general data analysis concerning food processors and exporters from Thailand to Japan can be described as shown in Figure 4.3.

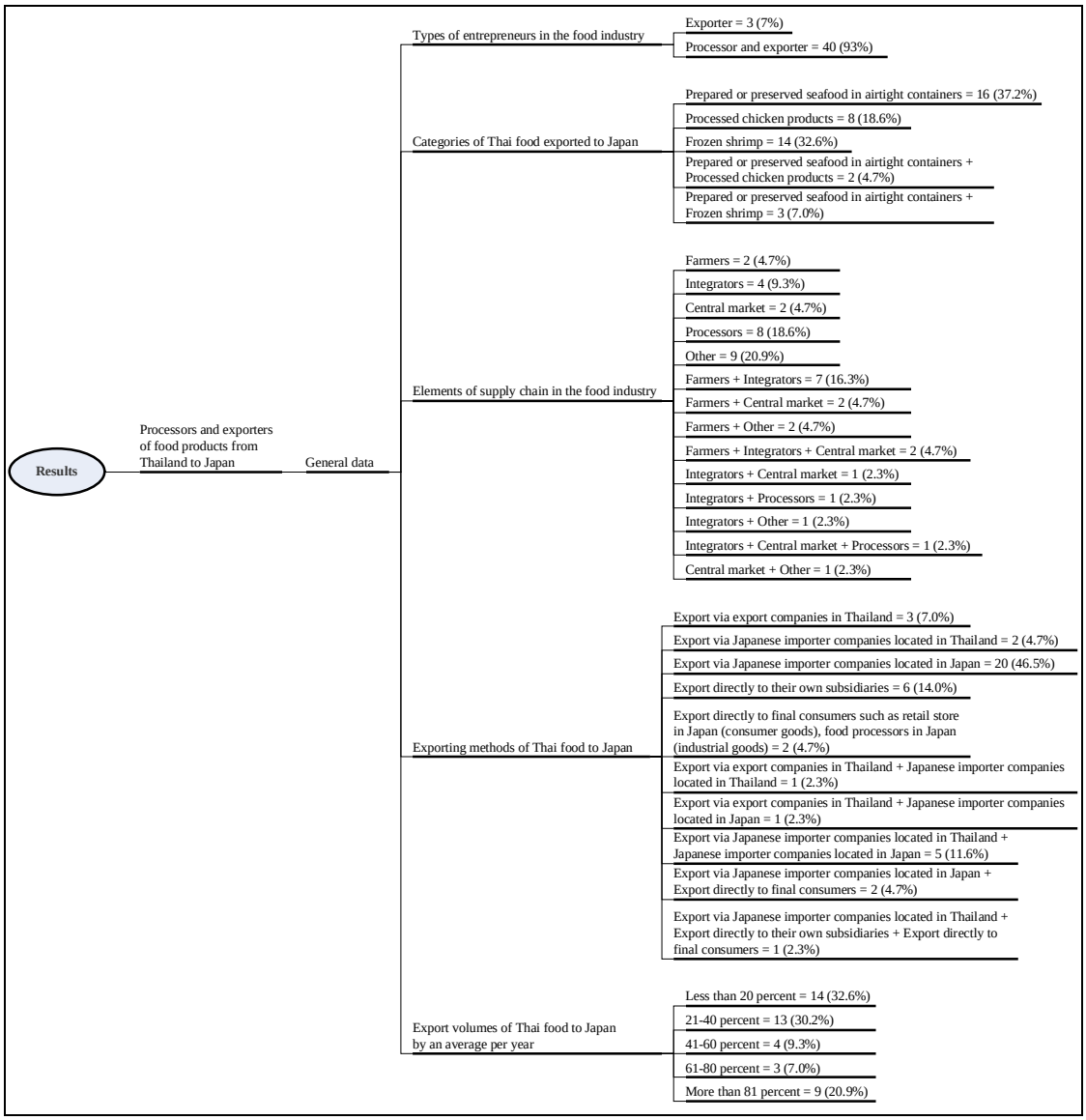

Figure 4.3 General data of processors and exporters of food products from Thailand to Japan

4.1.2 Results of data analysis about factors affecting the processed food production for export to Japan (Overall)

Factors affecting the processed food production for export to Japan were analyzed such as food hygiene factors, application of HACCP principles, raw material factors, production factors, marketing factors, export factors, and external environment factors, all of which are shown in Table 4.6.

Table 4.6 Problem/obstacle factors that influence the processed food production for export to Japan

General data	Factors	Food hygiene factors		Application of HACCP principles		Raw material factors		Production factors		Marketing factors		Export factors		External environment factors	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Types of entrepreneurs in the food industry	Exporter	1.20	0.122	1.07	0.115	4.56	0.192	3.93	0.115	2.67	1.528	3.13	0.945	3.50	0.250
	Processor and exporter	1.24	0.239	1.20	0.339	3.08	1.124	3.35	0.640	3.06	0.955	2.55	0.561	3.01	0.598
Categories of Thai food exported to Japan	Prepared or preserved seafood in airtight containers	1.25	0.238	1.16	0.303	3.21	1.121	3.25	0.470	2.75	1.095	2.50	0.591	3.05	0.493
	Processed chicken products	1.12	0.120	1.12	0.232	2.83	1.458	3.42	0.845	3.50	1.165	2.58	0.403	3.06	0.741
	Frozen shrimp	1.30	0.285	1.29	0.440	3.10	1.089	3.39	0.663	3.07	0.616	2.60	0.472	3.00	0.596
	Prepared or preserved seafood in airtight containers + Processed chicken products	1.26	0.205	1.07	0.094	4.00	0.943	3.60	0.566	2.50	0.707	2.85	1.909	2.88	1.237
	Prepared or preserved seafood in airtight containers + Frozen shrimp	1.20	0.168	1.07	0.067	3.89	0.839	4.00	0.721	3.50	1.323	2.97	0.833	3.25	0.661
Exporting methods of Thai food to Japan	Export via export companies in Thailand	1.19	0.093	1.33	0.467	2.56	1.503	3.13	0.416	2.83	0.289	2.57	0.289	3.17	0.382
	Export via Japanese importer companies located in Thailand	1.32	0.205	1.07	0.094	2.33	1.414	3.00	0.566	2.25	0.354	2.25	0.212	3.00	0.000
	Export via Japanese importer companies located in Japan	1.22	0.281	1.15	0.340	3.28	0.913	3.44	0.505	3.22	0.786	2.50	0.547	2.88	0.490
	Export directly to their own subsidiaries	1.17	0.130	1.01	0.027	3.44	1.559	3.50	0.724	2.42	1.201	2.60	0.957	3.04	0.828
	Export directly to final consumers	1.26	0.114	1.10	0.141	3.83	0.707	3.40	0.849	3.50	0.707	2.75	0.071	3.25	0.000

Table 4.6 Problem/obstacle factors that influence the processed food production for export to Japan (cont.)

General data	Factors	Food hygiene factors		Application of HACCP principles		Raw material factors		Production factors		Marketing factors		Export factors		External environment factors	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Exporting methods of Thai food to Japan (cont.)	Export via export companies in Thailand + Japanese importer companies located in Thailand	1.34	-	1.67	-	2.00	-	3.00	-	2.00	-	2.20	-	2.50	-
	Export via export companies in Thailand + Japanese importer companies located in Japan	1.26	-	1.20	-	4.00	-	4.60	-	5.00	-	3.00	-	4.25	-
	Export via Japanese importer companies located in Thailand + Japanese importer companies located in Japan	1.30	0.327	1.29	0.482	3.00	1.434	3.04	0.876	3.10	0.894	2.60	0.600	3.05	0.818
	Export via Japanese importer companies located in Japan + Export directly to final consumers	1.34	0.274	1.23	0.236	3.00	2.357	3.90	1.273	4.00	1.414	3.60	0.424	3.75	0.354
	Export via Japanese importer companies located in Thailand + Export directly to their own subsidiaries, + Export directly to final consumers	1.23	-	1.73	-	3.67	-	3.40	-	1.00	-	2.90	-	3.50	-

Table 4.6 Problem/obstacle factors that influence the processed food production for export to Japan (cont.)

General data	Factors	Food hygiene factors		Application of HACCP principles		Raw material factors		Production factors		Marketing factors		Export factors		External environment factors	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Export volumes of Thai food to Japan by an average per year	Less than 20 percent	1.31	0.276	1.18	0.324	2.74	0.917	3.01	0.493	2.39	0.561	2.30	0.359	2.73	0.475
	21-40 percent	1.18	0.244	1.20	0.383	2.85	1.191	3.25	0.561	3.15	0.625	2.36	0.307	2.81	0.410
	41-60 percent	1.27	0.245	1.50	0.482	3.83	0.694	3.65	0.300	3.00	1.472	2.98	0.050	3.25	0.289
	61-80 percent	1.06	0.074	1.00	0.000	3.33	1.528	3.47	0.702	3.67	1.155	2.23	0.833	3.08	0.878
	More than 81 percent	1.25	0.146	1.10	0.142	4.04	1.047	4.07	0.510	3.67	1.225	3.34	0.596	3.75	0.395
Overall		1.24	0.232	1.19	0.329	3.19	1.149	3.40	0.635	3.03	0.984	2.60	0.598	3.04	0.592

From Table 4.6, it shown that overall, production factors ($\overline{X}$ = 3.40) is the most important factor, and thus crucial problem to the manufacturing of processed foods for export to Japan. The raw material factors ($\overline{X}$ = 3.19), external environment factors, ($\overline{X}$ = 3.04), marketing factors ($\overline{X}$ = 3.03), export factors ($\overline{X}$ = 2.60), food hygiene factors ($\overline{X}$ = 1.24), and application of HACCP principles ($\overline{X}$ = 1.19) are ranked as 2nd, 3rd, 4th, 5th, 6th and 7th important factors, respectively.

In consideration, the factors affecting the processed food production for export to Japan categorized by types of business. The results found that exporters have raw material factors ($\overline{X}$ = 4.56) that are the most important factor, followed by production factors ($\overline{X}$ = 3.93), external environment factors ($\overline{X}$ = 3.50), export factors ($\overline{X}$ = 3.13), marketing factors ($\overline{X}$ = 2.67), food hygiene factors ($\overline{X}$ = 1.20), and application of HACCP principles ($\overline{X}$ = 1.07), respectively. In the category of processors and exporters, the most important factor is production factors ($\overline{X}$ = 3.35) which is moderately important problem/obstacle affecting the manufacturing of processed foods for export to Japan, followed by raw material factors ($\overline{X}$ = 3.08), marketing factors ($\overline{X}$ = 3.06), external environment factors ($\overline{X}$ = 3.01), export factors ($\overline{X}$ = 2.55), food hygiene factors ($\overline{X}$ = 1.24), and application of HACCP principles ($\overline{X}$ = 1.20), respectively.

In consideration, the factors affecting the processed food production for export to Japan divided by categories of Thai food products. It shown that prepared or preserved seafood in airtight containers have production factors ($\overline{X}$ = 3.25) as the most important factor, and such is moderately important problem/obstacle, regarding to it effect on the export of prepared or preserved seafood in airtight containers to Japan. The processed chicken products have marketing factors ($\overline{X}$ = 3.50) as the most important factor, which is classified as highly important problem/obstacle. The frozen shrimp has production factors ($\overline{X}$ = 3.39) as the most important factor, which is classified as moderately important problem/obstacle. The prepared or preserved seafood in airtight containers and processed chicken products have raw material factors ($\overline{X}$ = 4.00) as the most important factor, which is classified as highly important problem/obstacle. Lastly, the prepared or preserved seafood in airtight containers and frozen shrimp have production factors ($\overline{X}$ = 4.00) as the most important factor, which is classified as highly important problem/obstacle.

In consideration, the factors affecting the processed food production for export to Japan divided by exporting methods. The results found that the exporting via export companies in Thailand and the exporting via Japanese importer companies located in Thailand have external environment factors ($\overline{X}$ = 3.17 and 3.00) as the most important factor, which is classified as moderately important problem/obstacle. The exporting via Japanese importer companies located in Japan and the exporting directly to their own subsidiaries have production factors ($\overline{X}$ = 3.44 and 3.50) as the most important factor, which is classified as highly important problem/obstacle. The exporting directly to the final consumers has raw material factors ($\overline{X}$ = 3.83) as the most important factor, which is classified as highly important problem/obstacle. The exporting via export companies in Thailand and Japanese importer companies located in Thailand have production factors ($\overline{X}$ = 3.00) as the most important factor, which is classified as moderately important problem/obstacle. The exporting via export companies in Thailand and Japanese importer companies located in Japan have marketing factors ($\overline{X}$ = 5.00) as the most important factor, which is classified as extremely important problem/obstacle. The exporting via Japanese importer companies located in Thailand and Japanese importer companies located in Japan have

marketing factors ($\overline{X}$ = 3.10) as the most important factor, which is classified as moderately important problem/obstacle. The exporting via Japanese importer companies located in Japan and export directly to final consumers have marketing factors ($\overline{X}$ = 4.00) as the most important factor, which is classified as highly important problem/obstacle. Lastly, the exporting via Japanese importer companies located in Thailand, export directly to their own subsidiaries, and export directly to final consumers have raw material factors ($\overline{X}$ = 3.67) as the most important factor, which is classified as highly important problem/obstacle.

Analysis of the factors affecting the processed food production for export to Japan categorized by export volumes found that the food entrepreneurs who export to Japan with an average volume of less than 20 percent, 21-40 percent and more than 81 percent per year have production factors ($\overline{X}$ = 3.01, 3.25 and 4.07, respectively) as the most important factor. This is classified as moderately important problem/obstacle for those entrepreneurs who export to Japan with an average volume of less than 20 percent and 21-40 percent per year, whereas as highly important problem/obstacle for the average volume of more than 81 percent per year. The entrepreneurs who export to Japan with an average volume of 41-60 percent per year have raw material factors ($\overline{X}$ = 3.83) as the most important factor, which is classified as highly important problem/obstacle. Finally, the food entrepreneurs who export to Japan with an average volume of 61-80 percent per year have marketing factors ($\overline{X}$ = 3.67) as the most important factor, which is classified as highly important problem/obstacle affecting the processed food production for export to Japan.

In addition, the analysis of factors in overall, including divided by types of entrepreneurs, categories of food products, exporting methods, and export volumes shown that food hygiene factors and application of HACCP principles are not the problems and obstacles in processed food production for export to Japan.

4.1.3 Results of data analysis about factors affecting the processed food production for export to Japan (In details)

The results of data analysis concerning factors affecting the processed food production for export to Japan (In details) found that food hygiene factors and

application of HACCP principles are not the important problems/obstacles affecting the manufacturing of processed foods for export to Japan. Therefore, the scope of analysis is limited to details of raw material factors, production factors, marketing factors, export factors, and external environment factors.

Table 4.7 Details of problem/obstacle factors that influence the processed food production for export to Japan in overall and divided by types of entrepreneurs

Factors	Types of entrepreneurs in the food industry				Overall	
	Exporter		Processor and exporter			
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Food hygiene factors	1.20	0.122	1.24	0.239	1.24	0.232
Application of HACCP principles	1.07	0.115	1.20	0.339	1.19	0.329
Raw material factors	4.56	0.192	3.08	1.124	3.19	1.149
1. Lack of raw materials	5.00	0.000	3.40	1.277	3.51	1.298
2. Contaminated raw materials	4.67	0.577	2.95	1.280	3.07	1.316
3. Uncontrollable quality of raw materials, thus quality of products is inconsistent and unresponsive to customer needs	4.00	0.000	2.90	1.150	2.98	1.144
Production factors	3.93	0.115	3.35	0.640	3.40	0.635
1. High labor costs compared to neighboring countries	3.67	0.577	3.57	0.844	3.58	0.823
2. High production costs	4.00	0.000	3.72	0.784	3.74	0.759
3. Lack of skilled workers	4.67	0.577	4.32	0.730	4.35	0.720
4. Insufficient capital for improving and managing efficient production	4.00	0.000	2.60	1.057	2.70	1.081
5. Lack of know-how and technology for research and development of quality products	3.33	0.577	2.55	0.846	2.60	0.849
Marketing factors	2.67	1.528	3.06	0.955	3.03	0.984
1. Price war amongst domestic manufacturers	2.67	1.528	2.98	1.050	2.95	1.068
2. Low bargaining power of exporter, thus low profit margin	2.67	1.528	3.15	0.975	3.12	1.005
Export factors	3.13	0.945	2.55	0.561	2.60	0.598
1. Tariff Barriers (TBs)	3.33	0.577	2.72	0.784	2.77	0.782
2. Non-Tariff Barriers (NTBs)	3.17	1.181	2.46	0.711	2.51	0.754
2.1 Sanitary and Phytosanitary Standard (SPS)	4.33	0.577	2.85	0.921	2.95	0.975
2.2 Technical Barriers to Trade (TBT)	3.67	1.155	2.45	0.815	2.53	0.882
2.3 Environment Measures (ENV)	2.33	1.528	2.40	0.778	2.40	0.821
2.4 Nationalism Measures	2.33	1.528	2.15	0.736	2.16	0.785
3. Lack of international information and obsolete information, thus missing opportunity of exportation	2.33	1.528	2.15	0.802	2.16	0.843
4. Lack of legal knowledge or the regulations of importation process in Japan	2.67	1.155	2.22	0.698	2.26	0.727
5. Delay of work process of Thai officers in quality control and monitoring sector	3.00	1.000	2.58	0.747	2.60	0.760
6. Lack of support from government which neglect the export sector	3.33	0.577	2.70	0.853	2.74	0.848
7. Problem of transportation (High cost)	4.00	0.000	3.32	0.694	3.37	0.691
External environment factors	3.50	0.250	3.01	0.598	3.04	0.592
1. Decreasing of Japan's GDP	3.00	0.000	2.75	0.809	2.77	0.782
2. Fluctuations in currency exchange rates	4.00	0.000	3.55	0.815	3.58	0.794
3. Demographic change in Japan	3.00	0.000	2.60	0.810	2.63	0.787
4. High cost of export, concerning the whole process	4.00	1.000	3.13	0.757	3.19	0.794

From Table 4.7, analysis of factors affecting the processed food production for export to Japan in overall found that raw material factors are moderately important problem ($\overline{X}$ = 3.19), as the lack of raw materials is highly important problem/obstacle in the manufacturing of processed foods for export to Japan with mean value of 3.51.

The contaminated raw materials and the uncontrollable quality of raw materials, thus quality of products is inconsistent and unresponsive to customer needs are moderately important problem/obstacle with mean value of 3.07 and 2.98, respectively.

Production factors are highly important problem/obstacle ($\overline{X}$ = 3.40), as the lack of skilled workers is extremely important problem/obstacle in production of processed foods for export to Japan with mean value of 4.35. For high production costs and high labor costs in Thailand compared to neighboring countries are highly important problem/obstacle with mean value of 3.74 and 3.58, respectively. Furthermore, the insufficient capital for improving and managing efficient production and the lack of know-how and technology for research and development of quality products are moderately important problem/obstacle with mean value of 2.70 and 2.60, respectively.

Marketing factors are moderately important problem/obstacle ($\overline{X}$ = 3.03), as the low bargaining power of exporter and the price war amongst domestic manufacturers are moderately important problem/obstacle in production of processed foods for export to Japan with mean value of 3.12 and 2.95, respectively.

Export factors are moderately important problem/obstacle ($\overline{X}$ = 2.60), as the high cost of transportation, sanitary and phytosanitary standard (SPS), tariff barriers (TBs), lack of government support for exports, and delay of Thai officer in quality control and monitoring sector are moderately important problem/obstacle in production of processed foods for export to Japan with mean value of 3.37, 2.95, 2.77, 2.74 and 2.60, respectively. For technical barriers to trade (TBT), environment measures (ENV), lack of legal knowledge and regulation of Japan importation, nationalism measures, and lack of international information which led to missed opportunity in export are all classified as less important problem/obstacle with mean value of 2.53, 2.40, 2.26, 2.16 and 2.16, respectively.

Finally, external environment factors are moderately important problem/ obstacle ($\overline{X}$ = 3.04), as the currency exchange rate fluctuations is highly important problem/obstacle in processed food production for export to Japan with mean value of 3.58. The high cost of export-related process, the decrease in Japan's GDP, and the

demographic change in Japan are all classified as moderately important problem with mean value of 3.19, 2.77, and 2.63, respectively.

Analysis of problem factors affecting the processed food production for export to Japan divided by types of business found that exporters have raw material factors which are extremely important problem/obstacle ($\overline{X}$ = 4.56), as the lack of raw materials and contaminated raw materials are extremely important problem/obstacle in the manufacturing of processed foods for export to Japan with mean value of 5.00 and 4.67, respectively. For the uncontrollable quality of raw materials which led to the inconsistency of product quality is highly important problem/obstacle with mean value of 4.00.

Production factors are highly important problem/obstacle ($\overline{X}$ = 3.93), as the lack of skilled workers is extremely important problem/obstacle in processed food production for export to Japan with mean value of 4.67. For high production costs, insufficient capital, and high labor costs in Thailand compared to neighboring countries are highly important problem/obstacle with mean value of 4.00, 4.00 and 3.67, respectively. In addition, the lack of technology for research and development of quality products is moderately important problem/obstacle with mean value of 3.33.

Marketing factors are moderately important problem/obstacle ($\overline{X}$ = 2.67), as the price war amongst manufacturers and the low bargaining power are moderately important problem/obstacle with the same mean of 2.67.

Export factors are moderately important problem/obstacle ($\overline{X}$ = 3.13), as sanitary and phytosanitary standard (SPS) is extremely important problem in processed food production for export to Japan with mean value of 4.33. For the transportation problem and technical barriers to trade (TBT) are highly important problem/obstacle with mean value of 4.00 and 3.67, respectively. On the other hand, tariff barriers (TBs), lack of support from government, delay of Thai officer in export sector, and lack of legal knowledge or the regulations of importation process in Japan are moderately important problem/obstacle with mean value of 3.33, 3.33, 3.00 and 2.67, respectively. In addition, environment measures (ENV), nationalism measures,

and lack of international information which led to missed opportunity in export are less important problem/obstacle with the same mean of 2.33.

Lastly, external environment factors are highly important problem/obstacle ($\overline{X}$ = 3.50), as the currency exchange rate fluctuations and the high cost of the export process are highly important problem/obstacle in processed food manufacturing for export to Japan with the same mean of 4.00. The decreasing in Japan's GDP and the demographic change in Japan are moderately important problem/obstacle with the same mean of 3.00.

For processors and exporters found that raw material factors are moderately important problem/obstacle ($\overline{X}$ = 3.08), as the lack of raw materials is highly important problem/obstacle in production of processed foods for export to Japan with mean value of 3.40. Furthermore, the contaminated raw materials and the uncontrollable quality of raw materials which cause the inconsistency of product quality are moderately important problem/obstacle with mean value of 2.95 and 2.90, respectively.

Production factors are moderately important problem/obstacle ($\overline{X}$ = 3.35), as the lack of skilled workers is extremely important problem in processed food production for export to Japan with mean value of 4.32. For high production costs and high labor costs in Thailand are highly important problem/obstacle with mean value of 3.72 and 3.57, respectively. In addition, insufficient capital for improving and managing efficient production is moderately important problem/obstacle with mean value of 2.60. Lastly, the lack of technology for research and development of quality products is less important problem/obstacle with mean value of 2.55.

Marketing factors are moderately important problem/obstacle ($\overline{X}$ = 3.06), as the low bargaining power which led to lower profit and the price war amongst domestic manufacturers is moderately important problem/obstacle with mean value of 3.15 and 2.98, respectively.

Export factors are less important problem/obstacle ($\overline{X}$ = 2.55), as the high cost of transportation, sanitary and phytosanitary standard (SPS), tariff barriers (TBs), and lack of support from government which neglect the export sector are all

moderately important problem/obstacle in the manufacturing of processed foods for export to Japan with mean value of 3.32, 2.85, 2.72 and 2.70, respectively. For the delay of Thai officer in the process of quality control and monitoring, technical barriers to trade (TBT), environment measures (ENV), lack of legal and regulation knowledge of Japan importation, nationalism measures, and lack of international updated information which led to missed opportunity are all less important problem/obstacle with mean value of 2.58, 2.45, 2.40, 2.22, 2.15 and 2.15, respectively.

Finally, external environment factors are moderately important problem/ obstacle ($\overline{X}$ = 3.01), as the currency exchange rate fluctuations is highly important problem/obstacle with mean value of 3.55. For the high cost of exportation process, the decrease in Japan's GDP, and the demographic change in Japan are all moderately important problem/obstacle with mean value of 3.11, 2.75 and 2.60, respectively.

Table 4.8 Details of problem/obstacle factors that influence the processed food production for export to Japan divided by food categories

Factors	Categories of Thai food exported to Japan									
	Prepared or preserved seafood in airtight containers		Processed chicken products		Frozen shrimp		Prepared or preserved seafood in airtight containers + Processed chicken products		Prepared or preserved seafood in airtight containers + Frozen shrimp	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Food hygiene factors	1.25	0.238	1.12	0.120	1.30	0.285	1.26	0.205	1.20	0.168
Application of HACCP principles	1.16	0.303	1.12	0.232	1.29	0.440	1.07	0.094	1.07	0.067
Raw material factors	3.21	1.121	2.83	1.458	3.10	1.089	4.00	0.943	3.89	0.839
1. Lack of raw materials	3.56	1.094	3.12	1.642	3.29	1.383	4.50	0.707	4.67	0.577
2. Contaminated raw materials	3.00	1.366	2.75	1.488	3.14	1.231	3.50	2.121	3.67	1.155
3. Uncontrollable quality of raw materials, thus quality of products is inconsistent and unresponsive to customer needs	3.06	1.289	2.62	1.408	2.86	0.864	4.00	0.000	3.33	1.155
Production factors	3.25	0.470	3.42	0.845	3.39	0.663	3.60	0.566	4.00	0.721
1. High labor costs compared to neighboring countries	3.44	0.727	4.00	1.069	3.50	0.650	3.00	1.414	4.00	1.000
2. High production costs	3.75	0.683	4.00	0.926	3.50	0.760	3.50	0.707	4.33	0.577
3. Lack of skilled workers	4.31	0.602	4.50	0.756	4.14	0.864	4.50	0.707	5.00	0.000
4. Insufficient capital for improving and managing efficient production	2.44	0.814	2.38	1.061	2.93	1.269	3.50	0.707	3.33	1.528
5. Lack of know-how and technology for research and development of quality products	2.31	0.602	2.25	1.165	2.86	0.770	3.50	0.707	3.33	0.577
Marketing factors	2.75	1.095	3.50	1.165	3.07	0.616	2.50	0.707	3.50	1.323
1. Price war amongst domestic manufacturers	2.69	1.078	3.50	1.195	2.93	0.829	2.00	1.414	3.67	1.155
2. Low bargaining power of exporter, thus low profit margin	2.81	1.167	3.50	1.195	3.21	0.579	3.00	0.000	3.33	1.528

Table 4.8 Details of problem/obstacle factors that influence the processed food production for export to Japan divided by food categories (cont.)

Factors	Categories of Thai food exported to Japan									
	Prepared or preserved seafood in airtight containers		Processed chicken products		Frozen shrimp		Prepared or preserved seafood in airtight containers + Processed chicken products		Prepared or preserved seafood in airtight containers + Frozen shrimp	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Export factors	2.50	0.591	2.58	0.403	2.60	0.472	2.85	1.909	2.97	0.833
1. Tariff Barriers (TBs)	2.56	0.727	2.87	0.641	2.93	0.730	2.50	2.121	3.00	1.000
2. Non-Tariff Barriers (NTBs)	2.36	0.683	2.50	0.896	2.57	0.443	2.75	2.475	2.92	0.878
2.1 Sanitary and Phytosanitary Standard (SPS)	2.69	1.014	3.12	1.126	3.07	0.616	3.00	2.828	3.33	0.577
2.2 Technical Barriers to Trade (TBT)	2.37	0.806	2.38	0.744	2.64	0.745	3.00	2.828	3.00	1.000
2.3 Environment Measures (ENV)	2.25	0.683	2.25	0.886	2.50	0.760	2.50	2.121	3.00	1.000
2.4 Nationalism Measures	2.12	0.719	2.25	0.886	2.07	0.616	2.50	2.121	2.33	1.155
3. Lack of international information and obsolete information, thus missing opportunity of exportation	2.00	0.816	2.12	0.641	2.14	0.770	2.50	2.121	3.00	1.000
4. Lack of legal knowledge or the regulations of importation process in Japan	2.25	0.683	2.00	0.535	2.21	0.699	3.00	1.414	2.67	1.155
5. Delay of work process of Thai officers in quality control and monitoring sector	2.69	0.873	2.38	0.518	2.50	0.650	3.00	1.414	3.00	1.000
6. Lack of support from government which neglect the export sector	2.75	0.931	2.88	0.835	2.64	0.745	3.00	1.414	2.67	1.155
7. Problem of transportation (High cost)	3.31	0.793	3.50	0.535	3.29	0.726	3.50	0.707	3.67	0.577
External environment factors	3.05	0.493	3.06	0.741	3.00	0.596	2.88	1.237	3.25	0.661
1. Decreasing of Japan's GDP	2.56	0.892	3.00	0.756	2.86	0.663	2.50	0.707	3.00	1.000
2. Fluctuations in currency exchange rates	3.56	0.814	3.38	0.916	3.71	0.726	3.00	1.414	4.00	0.000
3. Demographic change in Japan	2.69	0.602	2.75	1.035	2.43	0.852	2.50	0.707	3.00	1.000
4. High cost of export, concerning the whole process	3.38	0.619	3.13	0.835	3.00	0.784	3.50	2.121	3.00	1.000

From Table 4.8, analysis of problem factors affecting the processed food production for export to Japan divided by categories of Thai food exported to Japan found that the prepared or preserved seafood in airtight containers have raw material factors which are moderately important problem/obstacle ($\overline{X}$ = 3.21), as the lack of raw materials is highly important problem/obstacle in production of the prepared or preserved seafood in airtight containers for export to Japan with mean value of 3.56. The uncontrollable quality of raw materials which cause the inconsistency of product quality and contaminated raw materials are moderately important problem/obstacle with mean value of 3.06 and 3.00, respectively.

Production factors are moderately important problem/obstacle ($\overline{X}$ = 3.25), as the lack of skilled workers is extremely important problem in production of the prepared or preserved seafood in airtight containers for export to Japan with mean value of 4.31. For high production costs and high labor costs in Thailand are highly

important problem/obstacle with mean value of 3.75 and 3.44, respectively. In addition, insufficient capital for improving and managing efficient production and lack of technology for research and development of quality products are less important problem/obstacle with mean value of 2.44 and 2.31, respectively.

Marketing factors are moderately important problem/obstacle ($\overline{X}$ = 2.75), as the low bargaining power which led to lower profit and the price war amongst domestic manufacturers are moderately important problem/obstacle with mean value of 2.81 and 2.69, respectively.

Export factors are less important problem/obstacle ($\overline{X}$ = 2.50), as the high cost of transportation, lack of support from government sector, delay of Thai officers in the quality control and monitoring process, and sanitary and phytosanitary standard (SPS) are all moderately important problem/obstacle in the manufacturing of prepared or preserved seafood in airtight containers for export to Japan with mean value of 3.31, 2.75, 2.69 and 2.69, respectively. In addition, tariff barriers (TBs), technical barriers to trade (TBT), environment measures (ENV), lack of legal and regulation knowledge of Japan importation, nationalism measures, and lack of international updated information which led to missed opportunity are all less important problem/obstacle with mean value of 2.56, 2.37, 2.25, 2.25, 2.12 and 2.00, respectively.

Lastly, external environment factors are moderately important problem/ obstacle ($\overline{X}$ = 3.05), as the currency exchange rate fluctuations is highly important problem/obstacle in the manufacturing of prepared or preserved seafood in airtight containers for export to Japan with mean value of 3.56. The high cost of exportation process and the demographic change in Japan are moderately important problem/obstacle with mean value of 3.38 and 2.69, respectively. For the decrease in Japan's GDP is less important problem/obstacle with mean value of 2.56.

For the processed chicken products found that raw material factors are moderately important problem/obstacle ($\overline{X}$ = 2.83), as the lack of raw materials, contaminated raw materials, and uncontrollable quality of raw materials are moderately important problem/obstacle with mean value of 3.12, 2.75 and 2.62, respectively.

Production factors are highly important problem/obstacle ($\overline{X}$ = 3.42), as the lack of skilled workers is extremely important problem in production of the processed chicken products for export to Japan with mean value of 4.50. For high production costs and high labor costs in Thailand are highly important problem/obstacle with the same mean of 4.00. In addition, insufficient capital for improving and managing efficient production and lack of technology for research and development of quality products are less important problem/obstacle with mean value of 2.38 and 2.25, respectively.

Marketing factors are highly important problem/obstacle ($\overline{X}$ = 3.50), as the price war amongst domestic manufacturers and the low bargaining power which led to lower profit are highly important problem/obstacle with the same mean of 3.50.

Export factors are less important problem/obstacle ($\overline{X}$ = 2.58), as the high cost of transportation is highly important problem/obstacle in the manufacturing of processed chicken products for export to Japan with mean value of 3.50. For sanitary and phytosanitary standard (SPS), lack of support from government sector, and tariff barriers (TBs) are moderately important problem/obstacle with mean value of 3.12, 2.88 and 2.87, respectively. In addition, the delay of Thai officers in the quality control and monitoring process, technical barriers to trade (TBT), environment measures (ENV), nationalism measures, lack of international updated information which led to missed opportunity, and lack of legal and regulation knowledge of Japan importation are all less important problem/obstacle with mean value of 2.38, 2.38, 2.25, 2.25, 2.12 and 2.00, respectively.

Finally, external environment factors are moderately important problem/ obstacle ($\overline{X}$ = 3.06), as the currency exchange rate fluctuations, the high cost of exportation process, the decrease in Japan's GDP, and the demographic change in Japan are all moderately important problem/obstacle with mean value of 3.38, 3.13, 3.00 and 2.75, respectively.

For the frozen shrimp found that raw material factors are moderately important problem/obstacle ($\overline{X}$ = 3.10), as the lack of raw materials, contaminated raw

materials, and uncontrollable quality of raw materials are all moderately important problem/obstacle with mean value of 3.29, 3.14 and 2.86, respectively.

Production factors are highly important problem/obstacle ($\overline{X}$ = 3.42), as the lack of skilled workers, high production costs, and high labor costs in Thailand are highly important problem in production of the frozen shrimp for export to Japan with mean value of 4.14, 3.50 and 3.50, respectively. For insufficient capital for improving and managing efficient production and lack of technology for research and development of quality products are moderately important problem/obstacle with mean value of 2.93 and 2.86, respectively.

Marketing factors are moderately important problem/obstacle ($\overline{X}$ = 3.07), as the low bargaining power which led to lower profit and the price war amongst domestic manufacturers are moderately important problem/obstacle with mean value of 3.21 and 2.93, respectively.

Export factors are moderately important problem/obstacle ($\overline{X}$ = 2.60), as the high cost of transportation, sanitary and phytosanitary standard (SPS), tariff barriers (TBs), technical barriers to trade (TBT), and lack of support from government sector are moderately important problem/obstacle with mean value of 3.29, 3.07, 2.93, 2.64 and 2.64, respectively. For the delay of Thai officers in the quality control and monitoring process, environment measures (ENV), lack of legal and regulation knowledge of Japan importation, lack of international updated information which led to missed opportunity, and nationalism measures are less important problem/obstacle with mean value of 2.50, 2.50, 2.21, 2.14 and 2.07, respectively.

Lastly, external environment factors are moderately important problem/ obstacle ($\overline{X}$ = 3.00), as the currency exchange rate fluctuations is highly problem/obstacle with mean value of 3.71. For the high cost of exportation process and the decrease in Japan's GDP are moderately important problem/obstacle with mean value of 3.00 and 2.86, respectively. In addition, the demographic change in Japan is less important problem/obstacle with mean value of 2.43.

For the prepared or preserved seafood in airtight containers and processed chicken products found that raw material factors are highly important

problem/obstacle ($\overline{X}$ = 4.00), as the lack of raw materials is extremely important problem/obstacle with mean value of 4.50. The uncontrollable quality of raw materials and contaminated raw materials are highly important problem/obstacle with mean value of 4.00 and 3.50, respectively.

Production factors are highly important problem/obstacle ($\overline{X}$ = 3.60), as the lack of skilled workers is extremely important problem/obstacle with mean value of 4.50. For high production costs, insufficient capital for improving and managing efficient production, and lack of technology for research and development of quality products are highly important problem/obstacle with the same mean of 3.50. In addition, high labor costs in Thailand is moderately important problem/obstacle with mean value of 3.00.

Marketing factors are less important problem/obstacle ($\overline{X}$ = 2.50), as the low bargaining power which led to lower profit is moderately important problem/obstacle with mean value of 3.00. For the price war amongst domestic manufacturers is less important problem/obstacle with mean value of 2.00.

Export factors are moderately important problem/obstacle ($\overline{X}$ = 2.85), as the high cost of transportation is highly important problem/obstacle with mean value of 3.50. For the lack of legal and regulation knowledge of Japan importation, delay of Thai officers in the quality control and monitoring process, lack of support from government sector, sanitary and phytosanitary standard (SPS), and technical barriers to trade (TBT) are moderately important problem/obstacle with the same mean of 3.00. In addition, tariff barriers (TBs), environment measures (ENV), nationalism measures, and lack of international updated information which led to missed opportunity are less important problem/obstacle with the same mean of 2.50.

Lastly, external environment factors are moderately important problem/ obstacle ($\overline{X}$ = 2.88), as the high cost of exportation process is highly important problem/obstacle with mean value of 3.50. The currency exchange rate fluctuations is moderately problem/obstacle with mean value of 3.00. For the decrease in Japan’s GDP and the demographic change in Japan are less important problem/obstacle with the same mean of 2.50.

For the prepared or preserved seafood in airtight containers and frozen shrimp found that raw material factors are highly important problem/obstacle ($\overline{X}$ = 3.89), as the lack of raw materials is extremely important problem/obstacle with mean value of 4.67. For contaminated raw materials is highly important problem/obstacle with mean value of 3.67. The uncontrollable quality of raw materials is moderately important problem/obstacle with mean value of 3.33.

Production factors are highly important problem/obstacle ($\overline{X}$ = 4.00), as the lack of skilled workers and high production costs are extremely important problem/obstacle with mean value of 5.00 and 4.33, respectively. High labor costs in Thailand is highly important problem/obstacle with mean value of 4.00. For the lack of technology for research and development of quality products and the insufficient capital for improving and managing efficient production are moderately important problem/obstacle with the same mean of 3.33.

Marketing factors are highly important problem/obstacle ($\overline{X}$ = 3.50), as the price war amongst domestic manufacturers is highly important problem/obstacle with mean value of 3.67. For the low bargaining power which led to lower profit is moderately important problem/obstacle with mean value of 3.33.

Export factors are moderately important problem/obstacle ($\overline{X}$ = 2.97), as the high cost of transportation is highly important problem/obstacle with mean value of 3.67. For sanitary and phytosanitary standard (SPS), tariff barriers (TBs), technical barriers to trade (TBT), environment measures (ENV), lack of international updated information which led to missed opportunity, delay of Thai officers in the quality control and monitoring process, lack of legal and regulation knowledge of Japan importation, and lack of support from government sector are moderately important problem/obstacle with mean of 3.33, 3.00, 3.00, 3.00, 3.00, 3.00, 2.67 and 2.67. In addition, nationalism measure is less important problem/obstacle with mean value of 2.33.

Finally, external environment factors are moderately important problem/ obstacle ($\overline{X}$ = 3.25), as the currency exchange rate fluctuations is highly problem/obstacle with mean value of 4.00. For the decrease in Japan's GDP, the

demographic change in Japan, and the high cost of exportation process are moderately important problem/obstacle with the same mean of 3.00.

Table 4.9 Details of problem/obstacle factors that influence the processed food production for export to Japan divided by methods of export

Factors	Exporting method of Thai food to Japan									
	Export via export companies in Thailand		Export via Japanese importer companies located in Thailand		Export via Japanese importer companies located in Japan		Export directly to their own subsidiaries		Export directly to final consumers	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Food hygiene factors	1.19	0.093	1.32	0.205	1.22	0.281	1.17	0.130	1.26	0.114
Application of HACCP principles	1.33	0.467	1.07	0.094	1.15	0.340	1.01	0.027	1.10	0.141
Raw material factors	2.56	1.503	2.33	1.414	3.28	0.913	3.44	1.559	3.83	0.707
1. Lack of raw materials	2.67	1.528	3.00	1.414	3.65	1.040	4.00	1.673	4.00	1.414
2. Contaminated raw materials	2.33	1.528	2.00	1.414	3.15	1.040	3.17	1.835	3.50	0.707
3. Uncontrollable quality of raw materials, thus quality of products is inconsistent and unresponsive to customer needs	2.67	1.528	2.00	1.414	3.05	1.146	3.17	1.329	4.00	0.000
Production factors	3.13	0.416	3.00	0.566	3.44	0.505	3.50	0.724	3.40	0.849
1. High labor costs compared to neighboring countries	2.67	0.577	3.50	0.707	3.80	0.768	3.33	0.816	3.50	0.707
2. High production costs	3.33	0.577	3.50	0.707	3.85	0.745	3.67	0.516	3.50	0.707
3. Lack of skilled workers	4.00	1.000	3.50	0.707	4.45	0.759	4.67	0.516	4.00	0.000
4. Insufficient capital for improving and managing efficient production	3.00	0.000	2.00	0.000	2.50	1.000	3.00	1.265	3.00	1.414
5. Lack of know-how and technology for research and development of quality products	2.67	0.577	2.50	0.707	2.60	0.821	2.83	0.983	3.00	1.414
Marketing factors	2.83	0.289	2.25	0.354	3.22	0.786	2.42	1.201	3.50	0.707
1. Price war amongst domestic manufacturers	3.00	0.000	2.00	0.000	3.05	0.999	2.50	1.225	3.50	0.707
2. Low bargaining power of exporter, thus low profit margin	2.67	0.577	2.50	0.707	3.40	0.754	2.33	1.211	3.50	0.707
Export factors	2.57	0.289	2.25	0.212	2.50	0.547	2.60	0.957	2.75	0.071
1. Tariff Barriers (TBs)	2.67	0.577	2.00	1.414	2.75	0.851	2.67	0.816	3.00	0.000
2. Non-Tariff Barriers (NTBs)	2.58	0.382	2.00	0.000	2.40	0.676	2.46	1.188	2.88	0.177
2.1 Sanitary and Phytosanitary Standard (SPS)	3.33	0.577	2.00	0.000	2.80	0.951	3.00	1.414	3.50	0.707
2.2 Technical Barriers to Trade (TBT)	2.67	0.577	2.00	0.000	2.30	0.801	2.67	1.366	3.00	0.000
2.3 Environment Measures (ENV)	2.33	0.577	2.00	0.000	2.40	0.754	2.17	1.169	2.50	0.707
2.4 Nationalism Measures	2.00	0.000	2.00	0.000	2.10	0.788	2.00	1.265	2.50	0.707
3. Lack of international information and obsolete information, thus missing opportunity of exportation	2.33	0.577	2.00	0.000	2.05	0.826	2.17	1.169	2.00	0.000
4. Lack of legal knowledge or the regulations of importation process in Japan	2.00	0.000	2.50	0.707	2.15	0.745	2.33	1.033	2.00	0.000
5. Delay of work process of Thai officers in quality control and monitoring sector	2.33	0.577	2.00	0.000	2.55	0.826	2.83	0.753	2.50	0.707
6. Lack of support from government which neglect the export sector	2.67	0.577	2.50	0.707	2.65	0.875	2.83	1.169	3.00	0.000
7. Problem of transportation (High cost)	3.33	0.577	3.50	0.707	3.25	0.716	3.33	0.816	3.50	0.707
External environment factors	3.17	0.382	3.00	0.000	2.88	0.490	3.04	0.828	3.25	0.000
1. Decreasing of Japan's GDP	3.00	1.000	2.50	0.707	2.65	0.671	2.33	1.211	3.00	0.000
2. Fluctuations in currency exchange rates	3.33	0.577	3.50	0.707	3.50	0.607	3.67	1.366	4.00	0.000
3. Demographic change in Japan	3.00	0.000	3.00	0.000	2.30	0.801	2.67	0.816	3.00	0.000
4. High cost of export, concerning the whole process	3.33	0.577	3.00	0.000	3.05	0.686	3.50	1.049	3.00	0.000

Table 4.9 Details of problem/obstacle factors that influence the processed food production for export to Japan divided by methods of export (cont.)

Factors	Exporting method of Thai food to Japan (cont.)									
	Export via export companies in Thailand + Japanese importer companies located in Thailand		Export via export companies in Thailand + Japanese importer companies located in Japan		Export via Japanese importer companies located in Thailand + Japanese importer companies located in Japan		Export via Japanese importer companies located in Japan + Export directly to final consumers		Export via Japanese importer companies located in Thailand + Export directly to their own subsidiaries + Export directly to final consumers	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Food hygiene factors	1.34	-	1.26	-	1.30	0.327	1.34	0.274	1.23	-
Application of HACCP principles	1.67	-	1.20	-	1.29	0.482	1.23	0.236	1.73	-
Raw material factors	2.00	-	4.00	-	3.00	1.434	3.00	2.357	3.67	-
1. Lack of raw materials	2.00	-	5.00	-	3.00	1.414	3.00	2.828	4.00	-
2. Contaminated raw materials	2.00	-	4.00	-	3.40	1.817	3.00	2.828	3.00	-
3. Uncontrollable quality of raw materials, thus quality of products is inconsistent and unresponsive to customer needs	2.00	-	3.00	-	2.60	1.140	3.00	1.414	4.00	-
Production factors	3.00	-	4.60	-	3.04	0.876	3.90	1.273	3.40	-
1. High labor costs compared to neighboring countries	3.00	-	5.00	-	3.20	0.837	4.00	1.414	4.00	-
2. High production costs	4.00	-	5.00	-	3.20	0.837	4.00	1.414	5.00	-
3. Lack of skilled workers	4.00	-	5.00	-	4.00	0.707	5.00	0.000	4.00	-
4. Insufficient capital for improving and managing efficient production	2.00	-	4.00	-	2.80	1.483	3.50	2.121	2.00	-
5. Lack of know-how and technology for research and development of quality products	2.00	-	4.00	-	2.00	0.707	3.00	1.414	2.00	-
Marketing factors	2.00	-	5.00	-	3.10	0.894	4.00	1.414	1.00	-
1. Price war amongst domestic manufacturers	2.00	-	5.00	-	3.00	1.000	4.00	1.414	1.00	-
2. Low bargaining power of exporter, thus low profit margin	2.00	-	5.00	-	3.20	0.837	4.00	1.414	1.00	-
Export factors	2.20	-	3.00	-	2.60	0.600	3.60	0.424	2.90	-
1. Tariff Barriers (TBs)	2.00	-	3.00	-	3.00	0.707	3.50	0.707	3.00	-
2. Non-Tariff Barriers (NTBs)	2.25	-	3.25	-	2.45	0.975	3.38	0.530	3.25	-
2.1 Sanitary and Phytosanitary Standard (SPS)	3.00	-	4.00	-	2.80	1.095	3.50	0.707	4.00	-
2.2 Technical Barriers to Trade (TBT)	2.00	-	3.00	-	2.80	1.095	3.50	0.707	3.00	-
2.3 Environment Measures (ENV)	2.00	-	3.00	-	2.20	1.095	3.50	0.707	3.00	-
2.4 Nationalism Measures	2.00	-	3.00	-	2.00	0.707	3.00	0.000	3.00	-
3. Lack of international information and obsolete information, thus missing opportunity of exportation	2.00	-	3.00	-	2.00	1.000	3.50	0.707	2.00	-
4. Lack of legal knowledge or the regulations of importation process in Japan	2.00	-	2.00	-	2.40	0.548	3.50	0.707	2.00	-
5. Delay of work process of Thai officers in quality control and monitoring sector	2.00	-	3.00	-	2.60	0.548	4.00	0.000	2.00	-
6. Lack of support from government which neglect the export sector	2.00	-	2.00	-	2.80	0.837	4.00	0.000	3.00	-
7. Problem of transportation (High cost)	3.00	-	4.00	-	3.40	0.894	4.00	0.000	4.00	-
External environment factors	2.50	-	4.25	-	3.05	0.818	3.75	0.354	3.50	-
1. Decreasing of Japan's GDP	3.00	-	4.00	-	3.00	0.707	3.50	0.707	3.00	-
2. Fluctuations in currency exchange rates	3.00	-	5.00	-	3.60	1.140	4.00	0.000	3.00	-
3. Demographic change in Japan	2.00	-	4.00	-	2.80	0.837	3.50	0.707	3.00	-
4. High cost of export, concerning the whole process	2.00	-	4.00	-	2.80	0.837	4.00	0.000	5.00	-

From Table 4.9, it found that the method of exportation via export companies in Thailand has raw material factors as less important problem/obstacle ($\overline{X}$ = 2.56), as the lack of raw materials and uncontrollable quality of raw materials which cause the inconsistency of product quality are moderately important problem/obstacle in production of processed foods for export to Japan with the same mean of 2.67. For contaminated raw materials is less important problem/obstacle with mean value of 2.33.

Production factors are moderately important problem/obstacle ($\overline{X}$ = 3.13), as the lack of skilled workers is highly important problem/obstacle in processed food production for export to Japan with mean value of 4.00. For high production costs, insufficient capital for improving and managing efficient production, high labor costs compared to neighboring countries, and lack of technology for research and development of quality products are all moderately important problem/obstacle with mean value of 3.33, 3.00, 2.67 and 2.67, respectively.

Marketing factors are moderately important problem/obstacle ($\overline{X}$ = 2.83), as the price war amongst domestic manufacturers and the low bargaining power which led to lower profit are moderately important problem/obstacle with mean value of 3.00 and 2.67, respectively.

Export factors are less important problem/obstacle ($\overline{X}$ = 2.57), as sanitary and phytosanitary standard (SPS), high cost of transportation, tariff barriers (TBs), technical barriers to trade (TBT), and lack of support from government sector are moderately important problem/obstacle with mean value of 3.33, 3.33, 2.67, 2.67 and 2.67. For environment measures (ENV), lack of international updated information which led to missed opportunity, delay of Thai officers in the quality control and monitoring process, nationalism measures, and lack of legal and regulation knowledge of Japan importation are all less important problem/obstacle with mean value of 2.33, 2.33, 2.33, 2.00 and 2.00, respectively.

Lastly, external environment factors are moderately important problem/ obstacle ($\overline{X}$ = 3.17), as the currency exchange rate fluctuations, the high cost of exportation process, the demographic change in Japan, and the decrease in Japan's

GDP are all moderately important problem/obstacle with mean value of 3.33, 3.33, 3.00 and 3.00, respectively.

The method of exportation via Japanese importer companies located in Thailand has raw material factors as less important problem/obstacle ($\overline{X}$ = 2.33), as the lack of raw materials is moderately important problem/obstacle affecting the manufacturing of processed foods for export to Japan with mean value of 3.00. For contaminated raw materials and uncontrollable quality of raw materials which cause the inconsistency of product quality is less important problem/obstacle with the same mean of 2.00.

Production factors are moderately important problem/obstacle ($\overline{X}$ = 3.00), as high labor costs compared to other countries, high production costs, and lack of skilled workers are highly important problem/obstacle in processed food production for export to Japan with the same mean of 3.50. In addition, the lack of technology for research and development of quality products and insufficient capital for improving and managing efficient production are less important problem/obstacle with mean value of 2.50 and 2.00, respectively.

Marketing factors are less important problem/obstacle ($\overline{X}$ = 2.25), as the low bargaining power which led to lower profit and the price war amongst domestic manufacturers are less important problem/obstacle with mean value of 2.50 and 2.00, respectively.

Export factors are less important problem/obstacle ($\overline{X}$ = 2.25), as the high cost of transportation is highly important problem/obstacle with mean value of 3.50. For the lack of legal and regulation knowledge of Japan importation, lack of support from government sector, sanitary and phytosanitary standard (SPS), technical barriers to trade (TBT), environment measures (ENV), nationalism measures, lack of international updated information which led to missed opportunity of export, delay of Thai officers in the quality control and monitoring process, and tariff barriers (TBs) are all less important problem/obstacle in processed food production for export to Japan with mean value of 2.50, 2.50, 2.00, 2.00, 2.00, 2.00, 2.00, 2.00, and 2.00, respectively.

Lastly, external environment factors are moderately important problem/ obstacle ($\overline{X}$ = 3.00), as the currency exchange rate fluctuations is highly important problem/obstacle with mean value of 3.50. The demographic change in Japan and the decrease in Japan's GDP are moderately important problem/obstacle with the same mean of 3.00. For the high cost of export-related process is less important problem/obstacle with mean value of 2.50.

The method of exportation via Japanese importer companies located in Japan has raw material factors as moderately important problem/obstacle ($\overline{X}$ = 3.28), as the lack of raw materials is highly important problem/obstacle in processed food production for export to Japan with mean value of 3.65. For contaminated raw materials and uncontrollable quality of raw materials which cause the inconsistency of product quality are moderately important problem/obstacle with mean value of 3.15 and 3.05, respectively.

Production factors are highly important problem/obstacle ($\overline{X}$ = 3.44), as the lack of skilled workers is extremely important problem/obstacle in processed food production for export to Japan with mean value of 4.45. For high production costs and high labor costs are highly important problem/obstacle with mean value of 3.85 and 3.80, respectively. The lack of technology for research and development of quality products is moderately important problem/obstacle with mean value of 2.60. In addition, insufficient capital for improving and managing efficient production is less important problem/obstacle with mean value of 2.50.

Marketing factors are moderately important problem/obstacle ($\overline{X}$ = 3.22), as the low bargaining power which led to lower profit is highly important problem/obstacle with mean value of 3.40. The price war amongst domestic manufacturers is moderately important problem/obstacle with mean value of 3.05.

Export factors are less important problem/obstacle ($\overline{X}$ = 2.50), as the high cost of transportation, sanitary and phytosanitary standard (SPS), tariff barriers (TBs), and lack of government support for exports are moderately important problem/obstacle in processed food production for export to Japan with mean value of 3.25, 2.80, 2.75 and 2.65, respectively. Furthermore, the delay of Thai officers in the quality control

and monitoring process, environment measures (ENV), technical barriers to trade (TBT), lack of legal and regulation knowledge of Japan importation, nationalism measures, and lack of international updated information which led to missed opportunity of export are less important problem/obstacle with mean value of 2.55, 2.40, 2.30, 2.15, 2.10 and 2.05, respectively.

Finally, external environment factors are moderately important problem/ obstacle ($\overline{X}$ = 2.88), as the currency exchange rate fluctuations is highly important problem/obstacle in processed food production for export to Japan with mean value of 3.50. The high cost of exportation process and the decrease in Japan's GDP are moderately important problem/obstacle with mean value of 3.05 and 2.65, respectively. In addition, the demographic change in Japan is less important problem/obstacle with mean value of 2.30.

The method of exportation directly to their own subsidiaries has raw material factors as highly important problem/obstacle ($\overline{X}$ = 3.44), as the lack of raw materials is highly important problem/obstacle affecting the processed food production for export to Japan with mean value of 4.00. For uncontrollable quality of raw materials which cause the inconsistency of product quality and contaminated raw materials are moderately important problem/obstacle with the same mean of 3.17.

Production factors are highly important problem/obstacle ($\overline{X}$ = 3.50), as the lack of skilled workers is extremely important problem/obstacle in processed food production for export to Japan with mean value of 4.67. For high labor costs compared to neighboring countries is highly important problem/obstacle with mean value of 3.67. In addition, high production costs, insufficient capital for improving and managing efficient production, and lack of technology for research and development of quality products are all moderately important problem/obstacle with mean value of 3.33, 3.00 and 2.83, respectively.

Marketing factors are less important problem/obstacle ($\overline{X}$ = 2.42), as the price war amongst domestic manufacturers and the low bargaining power which led to lower profit are less important problem/obstacle with mean value of 2.50 and 2.33, respectively.

Export factors are moderately important problem/obstacle ($\overline{X}$ = 2.60), as the high cost of transportation, sanitary and phytosanitary standard (SPS), delay of Thai officers in the quality control and monitoring process, lack of support from government sector, tariff barriers (TBs), and technical barriers to trade (TBT) are moderately important problem/obstacle with mean value of 3.33, 3.00, 2.83, 2.83, 2.67 and 2.67, respectively. For the lack of legal and regulation knowledge of Japan importation, environment measures (ENV), lack of international updated information which led to missed opportunity, and nationalism measures are less important problem/obstacle with mean value of 2.33, 2.17, 2.17 and 2.00, respectively.

Lastly, external environment factors are moderately important problem/ obstacle ($\overline{X}$ = 3.04), as the currency exchange rate fluctuations and the high cost of exportation process are highly important problem/obstacle in processed food production for export to Japan with mean value of 3.67 and 3.50, respectively. The demographic change in Japan is moderately important problem/obstacle with mean value of 2.67. In addition, the decrease in Japan's GDP is less important problem/obstacle with mean value of 2.33.

The method of exportation directly to the final consumers has raw material factors as highly important problem/obstacle ($\overline{X}$ = 3.83), as uncontrollable quality of raw materials which cause the inconsistency of product quality, lack of raw materials, and contaminated raw materials are all highly important problem/obstacle affecting the manufacturing of processed food for export to Japan with mean value of 4.00, 4.00 and 3.50, respectively.

Production factors are highly important problem/obstacle ($\overline{X}$ = 3.40), as the lack of skilled workers, high labor costs compared to other countries, and high production costs are highly important problem/obstacle in processed food production for export to Japan with mean value of 4.40, 3.50 and 3.50, respectively. In addition, insufficient capital for improving and managing efficient production and lack of technology for research and development of quality products are moderately important problem/obstacle with mean value of 3.00 equally.

Marketing factors are highly important problem/obstacle ($\overline{X}$ = 3.50), as the price war amongst domestic manufacturers and the low bargaining power which led to lower profit are highly important problem/obstacle in processed food production for export to Japan with the same mean of 3.50.

Export factors are moderately important problem/obstacle ($\overline{X}$ = 2.75), as sanitary and phytosanitary standard (SPS) and high cost of transportation are highly important problem/obstacle in processed food production for export to Japan with mean value of 3.50 equally. For tariff barriers (TBs), technical barriers to trade (TBT), and lack of government support for exports are moderately important problem/obstacle with the same mean value of 3.00. In addition, environment measures (ENV), nationalism measures, delay of Thai officers in the quality control and monitoring process, lack of international updated information which led to missed opportunity of export, and lack of legal and regulation knowledge of Japan importation are less important problem/obstacle with mean value of 2.50, 2.50, 2.50, 2.00 and 2.00, respectively.

Lastly, external environment factors are moderately important problem/ obstacle ($\overline{X}$ = 3.25), as the currency exchange rate fluctuations is highly important problem/obstacle in processed food production for export to Japan with mean value of 4.00. The decrease in Japan's GDP, the demographic change in Japan, and the high cost of exportation process are moderately important problem/obstacle with the same mean of 3.00.

Table 4.10 Details of problem/obstacle factors that influence the processed food production for export to Japan divided by export volumes of Thai food to Japan

Factors	Export volumes of Thai food to Japan by an average per year									
	Less than 20 percent		21-40 percent		41-60 percent		61-80 percent		More than 81 percent	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Food hygiene factors	1.31	0.276	1.18	0.244	1.27	0.245	1.06	0.074	1.25	0.146
Application of HACCP principles	1.18	0.324	1.20	0.383	1.50	0.482	1.00	0.000	1.10	0.142
Raw material factors	2.74	0.917	2.85	1.191	3.83	0.694	3.33	1.528	4.04	1.047
1. Lack of raw materials	3.00	1.038	3.31	1.494	3.75	0.500	3.67	1.155	4.44	1.333
2. Contaminated raw materials	2.50	0.941	2.77	1.301	3.75	0.957	3.00	2.000	4.11	1.269
3. Uncontrollable quality of raw materials, thus quality of products is inconsistent and unresponsive to customer needs	2.71	1.069	2.46	1.198	4.00	0.816	3.33	1.528	3.56	0.726
Production factors	3.01	0.493	3.25	0.561	3.65	0.300	3.47	0.702	4.07	0.510
1. High labor costs compared to neighboring countries	3.14	0.535	3.54	0.877	4.50	0.577	3.33	1.155	4.00	0.707
2. High production costs	3.36	0.745	3.62	0.650	4.75	0.500	3.67	0.577	4.11	0.601
3. Lack of skilled workers	4.07	0.829	4.08	0.641	4.75	0.500	4.67	0.577	4.89	0.333
4. Insufficient capital for improving and managing efficient production	2.07	0.730	2.69	0.947	2.00	0.000	2.67	1.155	4.00	0.866
5. Lack of know-how and technology for research and development of quality products	2.43	0.756	2.31	0.855	2.25	0.500	3.00	1.000	3.33	0.707
Marketing factors	2.39	0.561	3.15	0.625	3.00	1.472	3.67	1.155	3.67	1.225
1. Price war amongst domestic manufacturers	2.21	0.802	3.08	0.641	3.00	1.414	3.67	1.155	3.67	1.225
2. Low bargaining power of exporter, thus low profit margin	2.57	0.646	3.23	0.725	3.00	1.633	3.67	1.155	3.67	1.225
Export factors	2.30	0.359	2.36	0.307	2.98	0.050	2.23	0.833	3.34	0.596
1. Tariff Barriers (TBs)	2.21	0.699	2.85	0.801	3.00	0.000	2.67	0.577	3.44	0.527
2. Non-Tariff Barriers (NTBs)	2.27	0.523	2.15	0.608	3.00	0.354	2.17	1.127	3.31	0.659
2.1 Sanitary and Phytosanitary Standard (SPS)	2.71	0.825	2.54	0.877	3.25	0.957	2.67	1.528	3.89	0.601
2.2 Technical Barriers to Trade (TBT)	2.14	0.663	2.31	0.751	2.75	0.500	2.00	1.000	3.56	0.726
2.3 Environment Measures (ENV)	2.29	0.726	2.00	0.577	3.00	0.000	2.00	1.000	3.00	1.000
2.4 Nationalism Measures	1.93	0.616	1.77	0.599	3.00	0.000	2.00	1.000	2.78	0.833
3. Lack of international information and obsolete information, thus missing opportunity of exportation	2.00	0.679	1.85	0.689	2.25	0.500	1.67	0.577	3.00	1.000
4. Lack of legal knowledge or the regulations of importation process in Japan	2.00	0.392	2.00	0.577	2.75	0.500	1.67	0.577	3.00	0.866
5. Delay of work process of Thai officers in quality control and monitoring sector	2.21	0.426	2.54	0.660	2.50	0.577	2.33	0.577	3.44	0.882
6. Lack of support from government which neglect the export sector	2.43	0.646	2.46	0.776	3.50	0.577	2.33	1.155	3.44	0.726
7. Problem of transportation (High cost)	3.07	0.616	3.31	0.630	3.75	0.957	3.00	1.000	3.89	0.333
External environment factors	2.73	0.475	2.81	0.410	3.25	0.289	3.08	0.878	3.75	0.395
1. Decreasing of Japan's GDP	2.57	0.756	2.46	0.660	3.00	0.000	2.67	1.528	3.44	0.527
2. Fluctuations in currency exchange rates	3.21	0.893	3.46	0.660	3.50	0.577	3.67	0.577	4.33	0.500
3. Demographic change in Japan	2.43	0.646	2.31	0.751	2.75	0.500	2.67	1.528	3.33	0.500
4. High cost of export, concerning the whole process	2.71	0.611	3.00	0.707	3.75	0.957	3.33	0.577	3.89	0.601

From Table 4.10, analysis of problem/obstacle factors that affect the processed food production for export to Japan divided by export volumes of Thai food to Japan found that the export volume to Japan with an average volume of less than 20 percent per year has raw material factors as moderately important problem/obstacle ($\overline{X}$ = 2.74), as the lack of raw materials and uncontrollable quality of raw materials which cause the inconsistency of product quality are moderately important problem/obstacle affecting the processed food production for export to Japan with

mean value of 3.00 and 2.71, respectively. For contaminated raw materials is less important problem/obstacle with mean value of 2.50.

Production factors are moderately important problem/obstacle ($\overline{X}$ = 3.01), as the lack of skilled workers is highly important problem/obstacle in production of processed food for export to Japan with mean value of 4.07. For high production costs and high labor costs (compared to other countries) are moderately important problem/obstacle with mean value of 3.36 and 3.14, respectively. In addition, the lack of technology for research and development of quality products and insufficient capital for improving and managing efficient production are less important problem/obstacle with mean value of 2.43 and 2.07, respectively.

Marketing factors are less important problem/obstacle ($\overline{X}$ = 2.39), as the low bargaining power which led to lower profit and the price war amongst domestic manufacturers are all less important problem/obstacle with mean value of 2.57 and 2.21, respectively.

Export factors are less important problem/obstacle ($\overline{X}$ = 2.30), as the high cost of transportation and sanitary and phytosanitary standard (SPS) are moderately important problem/obstacle in production of processed food for export to Japan with mean value of 3.07 and 2.71, respectively. In addition, the lack of support from government sector, environment measures (ENV), delay of Thai officers in the quality control and monitoring process, tariff barriers (TBs), technical barriers to trade (TBT), lack of legal and regulation knowledge of Japan importation, lack of international updated information which led to missed opportunity, and nationalism measures are all less important problem/obstacle with mean value of 2.43, 2.29, 2.21, 2.21, 2.14, 2.00, 2.00 and 1.93, respectively.

Lastly, external environment factors are moderately important problem/ obstacle ($\overline{X}$ = 2.73), as the currency exchange rate fluctuations and the high cost of exportation process are moderately important problem/obstacle in processed food production for export to Japan with mean value of 3.21 and 2.71, respectively. The decrease in Japan's GDP and the demographic change in Japan are less important problem/obstacle with mean value of 2.57 and 2.43, respectively.

The export volume of Thai food to Japan with an average volume of 21-40 percent per year has raw material factors as moderately important problem/obstacle ($\overline{X}$ = 2.85), as the lack of raw materials and contaminated raw materials are moderately important problem/obstacle affecting the processed food production for export to Japan with mean value of 3.31 and 2.77, respectively. The uncontrollable quality of raw materials which cause the inconsistency of product quality is less important problem/obstacle with mean value of 2.46.

Production factors are moderately important problem/obstacle ($\overline{X}$ = 3.25), as the lack of skilled workers, high production costs, and high labor costs (compared to other countries) are highly important problem/obstacle in production of processed food for export to Japan with mean value of 4.08, 3.62 and 3.54, respectively. The insufficient capital for improving and managing efficient production is moderately important problem/obstacle with mean value of 2.69. In addition, the lack of technology for research and development of quality products is less important problem/obstacle with mean value of 2.31.

Marketing factors are moderately important problem/obstacle ($\overline{X}$ = 3.15), as the low bargaining power which led to lower profit and the price war amongst domestic manufacturers are moderately important problem/obstacle with mean value of 3.23 and 3.08, respectively.

Export factors are less important problem/obstacle ($\overline{X}$ = 2.36), as the high cost of transportation and tariff barriers (TBs) are moderately important problem/obstacle in production of processed food for export to Japan with mean value of 3.31 and 2.85, respectively. For the delay of Thai officers in the quality control and monitoring process, sanitary and phytosanitary standard (SPS), lack of support from government sector, technical barriers to trade (TBT), environment measures (ENV), lack of legal and regulation knowledge of Japan importation, and lack of international updated information which led to missed opportunity are all less important problem/obstacle with mean value of 2.54, 2.54, 2.46, 2.31, 2.00, 2.00 and 1.85, respectively. In addition, nationalism measures has a mean value of 1.77, thus is not problem/obstacle.

Lastly, external environment factors are moderately important problem/ obstacle ($\overline{X}$ = 2.81), as the currency exchange rate fluctuations is highly important problem/obstacle in processed food production for export to Japan with mean value of 3.46. The high cost of exportation process is moderately important problem/obstacle with mean value of 3.00. In addition, the decrease in Japan's GDP and the demographic change in Japan are less important problem/obstacle with mean value of 2.46 and 2.31, respectively.

The export volume of Thai food to Japan with an average volume of 41-60 percent per year has raw material factors as highly important problem/obstacle ($\overline{X}$ = 3.83), as uncontrollable quality of raw materials which cause the inconsistency of product quality, contaminated raw materials, and lack of raw materials are highly important problem/obstacle affecting the processed food production for export to Japan with mean value of 4.00, 3.75 and 3.75, respectively.

Production factors are highly important problem/obstacle ($\overline{X}$ = 3.65), as the lack of skilled workers, high production costs, and high labor costs are extremely important problem/obstacle in production of processed food for export to Japan with mean value of 4.75, 4.75 and 4.50, respectively. The lack of technology for research and development of quality products and insufficient capital for improving and managing efficient production are all less important problem/obstacle with mean value of 2.25 and 2.00, respectively.

Marketing factors are moderately important problem/obstacle ($\overline{X}$ = 3.00), as the price war amongst domestic manufacturers and the low bargaining power which led to lower profit are moderately important problem/obstacle with the same mean of 3.00.

Export factors are moderately important problem/obstacle ($\overline{X}$ = 2.98), as the high cost of transportation and lack of support from government sector are highly important problem/obstacle in production of processed food for export to Japan with mean value of 3.75 and 3.50, respectively. Sanitary and phytosanitary standard (SPS), tariff barriers (TBs), environment measures (ENV), nationalism measures, technical barriers to trade (TBT), and lack of legal and regulation knowledge of Japan

importation are moderately important problem/obstacle with mean value of 3.25, 3.00, 3.00, 3.00, 2.75 and 2.75, respectively. In addition, the delay of Thai officers in the quality control and monitoring process and lack of international updated information which led to missed opportunity are less important problem/obstacle with mean value of 2.50 and 2.25, respectively.

Finally, external environment factors are moderately important problem/ obstacle ($\overline{X}$ = 3.25), as the high cost of exportation process and the currency exchange rate fluctuations are highly important problem/obstacle in production of processed food for export to Japan with mean value of 3.75 and 3.50, respectively. The decrease in Japan's GDP and the demographic change in Japan are moderately important problem/obstacle with mean value of 3.00 and 2.75, respectively.

The export volume of Thai food to Japan with an average volume of 61-80 percent per year has raw material factors as a moderately important problem/obstacle ($\overline{X}$ = 3.33), as the lack of raw materials is highly important problem/obstacle affecting the processed food production for export to Japan with mean value of 3.67. For uncontrollable quality of raw materials which cause the inconsistency of product quality and contaminated raw materials are moderately important problem/obstacle with mean value of 3.33 and 3.00, respectively.

Production factors are highly important problem/obstacle ($\overline{X}$ = 3.47), as the lack of skilled workers is extremely important problem/obstacle in processed food production for export to Japan with mean value of 4.67. For high production costs is highly important problem/obstacle with mean value of 3.67. In addition, high labor costs (compared to other countries), lack of technology for the research and quality development of products, and insufficient capital for improving and managing efficient production are moderately important problem/obstacle with mean value of 3.33, 3.00 and 2.67, respectively.

Marketing factors are highly important problem/obstacle ($\overline{X}$ = 3.67), as the price war amongst domestic manufacturers and the low bargaining power which led to lower profit are highly important problem/obstacle with the same mean of 3.67.

Export factors are less important problem/obstacle ($\overline{X}$ = 2.23), as the high cost of transportation, tariff barriers (TBs), and sanitary and phytosanitary standard (SPS) are moderately important problem/obstacle in processed food production for export to Japan with mean value of 3.00, 2.67 and 2.67, respectively. For the delay of Thai officer in the quality control and monitoring process, lack of support from government sector, technical barriers to trade (TBT), environment measures (ENV), and nationalism measures are all less important problem/obstacle with mean value of 2.33, 2.33, 2.00, 2.00 and 2.00, respectively. In addition, the lack of international updated information which led to missed opportunity and lack of legal and regulation knowledge of Japan importation have the same mean of 1.67; therefore, they are not problem/obstacle.

Lastly, external environment factors are moderately important problem/ obstacle ($\overline{X}$ = 3.08), as the currency exchange rate fluctuations is highly important problem/obstacle in processed food production for export to Japan with mean value of 3.67. The high cost of export, the decrease in Japan's GDP, and the demographic change in Japan are moderately important problem/obstacle with mean value of 3.33, 2.67 and 2.67, respectively.

The export volume of Thai food to Japan with an average volume of more than 81 percent per year has raw material factors as highly important problem/obstacle ($\overline{X}$ = 4.04), as the lack of raw materials is extremely important problem/obstacle affecting the processed food production for export to Japan with mean value of 4.44. For contaminated raw material and uncontrollable quality of raw materials which cause the inconsistency of product quality are highly important problem/obstacle with mean value of 4.11 and 3.56, respectively.

Production factors are highly important problem/obstacle ($\overline{X}$ = 4.07), as the lack of skilled workers is extremely important problem/obstacle in production of processed food for export to Japan with mean value of 4.89. For high production costs, high labor costs, and insufficient capital for improving and managing efficient production are all highly important problem/obstacle with mean value of 4.11, 4.00 and 4.00, respectively. In addition, the lack of know-how and technology for research

and development of quality products is moderately important problem/obstacle with mean value of 3.33.

Marketing factors are highly important problem/obstacle ($\overline{X}$ = 3.67), as the price war amongst domestic manufacturers and the low bargaining power which led to lower profit are all highly important problem/obstacle with mean of 3.67 equally.

Export factors are moderately important problem/obstacle ($\overline{X}$ = 3.34), as the high cost of transportation, sanitary and phytosanitary standard (SPS), technical barriers to trade (TBT), tariff barriers (TBs), lack of support from government sector, and delay of Thai officers in the process of quality control and monitoring are all highly important problem/obstacle in production of processed food for export to Japan with mean value 3.89, 3.89, 3.56, 3.44, 3.44 and 3.44, respectively. The lack of legal and regulation knowledge of Japan importation, environment measures (ENV), lack of international updated information which led to missed opportunity, and nationalism measures are all moderately important problem/obstacle with mean value of 3.00, 3.00, 3.00 and 2.78, respectively.

Ultimately, external environment factors are highly important problem/ obstacle ($\overline{X}$ = 3.75), as the currency exchange rate fluctuations is extremely important problem/obstacle in processed food production for export to Japan with mean value 4.33. The high cost of export and the decrease in Japan's GDP are highly important problem/obstacle with mean value of 3.89 and 3.44, respectively. In addition, the demographic change in Japan is moderately important problem/obstacle with mean value of 3.33.

4.1.4 Results of data analysis regarding the relationship between general data of Thai food processors and exporters to Japan and factors affecting the processed food production for export to Japan

Hypothesis testing is the statistical analysis to find the relationship between general data of Thai food processors and exporters to Japan (consists of the types of entrepreneurs in the food industry, categories of Thai food exported to Japan, exporting methods of Thai food to Japan, and export volumes of Thai food to Japan) and factors affecting the processed food production for export to Japan (consists of

food hygiene factors, application of HACCP principles, raw material factors, production factors, marketing factors, export factors, and external environment factors) at a significance level of 0.05.

4.1.4.1 Hypothesis 1: The different types of entrepreneurs in the food industry have effect the different factors affecting the processed food production for export to Japan.

The null and alternative hypotheses are

H_0: The different types of entrepreneurs in the food industry have not effect the different factors affecting the processed food production for export to Japan.

H_1: The different types of entrepreneurs in the food industry have effect the different factors affecting the processed food production for export to Japan.

Table 4.11 Results of hypothesis testing of the different types of entrepreneurs in the food industry have effect the different factors affecting the processed food production for export to Japan

Factors	**Types of entrepreneurs in the food industry**		**Results**
	z	**Sig.**	
1. Food hygiene factors	-0.167	0.867	Accept H_0
2. Application of HACCP principles	-0.530	0.596	Accept H_0
3. Raw material factors	-2.468	0.014	Reject H_0
3.1 Lack of raw materials	-2.363	0.018	Reject H_0
3.2 Contaminated raw materials	-2.222	0.026	Reject H_0
3.3 Uncontrollable quality of raw materials, thus quality of products is inconsistent and unresponsive to customer needs	-1.782	0.075	Accept H_0
4. Production factors	-1.753	0.080	Accept H_0
4.1 High labor costs compared to neighboring countries	-0.205	0.838	Accept H_0
4.2 High production costs	-0.704	0.482	Accept H_0
4.3 Lack of skilled workers	-0.793	0.428	Accept H_0
4.4 Insufficient capital for improving and managing efficient production	-2.255	0.024	Reject H_0
4.5 Lack of know-how and technology for research and development of quality products	-1.626	0.104	Accept H_0

Table 4.11 Results of hypothesis testing of the different types of entrepreneurs in the food industry have effect the different factors affecting the processed food production for export to Japan (cont.)

Factors	Types of entrepreneurs in the food industry		Results
	z	Sig.	
5. Marketing factors	-0.268	0.788	Accept H_0
6. Export factors	-1.151	0.250	Accept H_0
6.1 Tariff Barriers (TBs)	-1.343	0.179	Accept H_0
6.2 Non-Tariff Barriers (NTBs)	-1.012	0.312	Accept H_0
6.2.1 Sanitary and Phytosanitary Standard (SPS)	-2.515	0.012	Reject H_0
6.2.2 Technical Barriers to Trade (TBT)	-1.891	0.059	Accept H_0
6.2.3 Environment Measures (ENV)	-0.308	0.758	Accept H_0
6.2.4 Nationalism Measures	-0.051	0.959	Accept H_0
6.3 Lack of international information and obsolete information, thus missing opportunity of exportation	-0.051	0.959	Accept H_0
6.4 Lack of legal knowledge or the regulations of importation process in Japan	-0.664	0.507	Accept H_0
6.5 Delay of work process of Thai officers in quality control and monitoring sector	-0.930	0.352	Accept H_0
6.6 Lack of support from government which neglect the export sector	-1.315	0.188	Accept H_0
6.7 Problem of transportation (High cost)	-1.810	0.070	Accept H_0
7. External environment factors	-1.684	0.092	Accept H_0

Table 4.11 shows the results of nonparametric statistical analysis with the Mann-Whitney U Test. It found that food hygiene factor, application of HACCP principles, production factors, marketing factors, export factors, and external environment factors have the p-value of 0.867, 0.596, 0.080, 0.788, 0.250 and 0.092, respectively which are greater than 0.05. That is, the null hypothesis (H_0) is accepted and the alternative hypothesis (H_1) is rejected. Therefore, it means that the different types of entrepreneurs in the food industry have not effect the difference in food hygiene factor, application of HACCP principles, production factors, marketing factors, export factors, and external environment factors.

The raw material factors have the p-value of 0.014 which are less than 0.05. That is, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. Therefore, it means that the different types of entrepreneurs in the food industry have effect the difference in raw material factors at a significance level of 0.05.

The detailed analysis of each factors found that the lack of raw materials, contaminated raw materials, insufficient capital for improving and managing efficient production, and sanitary and phytosanitary standard (SPS) has the p-value of 0.018, 0.026, 0.024 and 0.012, respectively which are less than 0.05. Therefore, it means that the different types of entrepreneurs in the food industry have effect the difference in the lack of raw materials, contaminated raw materials, insufficient capital for improving and managing efficient production, and sanitary and phytosanitary standard (SPS) at a significance level of 0.05.

4.1.4.2 Hypothesis 2: The different categories of Thai food exported to Japan have effect the different factors affecting the processed food production for export to Japan.

The null and alternative hypotheses are

H_0: The different categories of Thai food exported to Japan have not effect the different factors affecting the processed food production for export to Japan.

H_1: The different categories of Thai food exported to Japan have effect the different factors affecting the processed food production for export to Japan.

Table 4.12 Results of hypothesis testing of the different categories of Thai food exported to Japan have effect the different factors affecting the processed food production for export to Japan

Factors	Categories of Thai food exported to Japan		Results
	Chi-Square	Sig.	
1. Food hygiene factors	3.024	0.554	Accept H_0
2. Application of HACCP principles	0.878	0.928	Accept H_0
3. Raw material factors	2.919	0.571	Accept H_0
4. Production factors	3.551	0.470	Accept H_0
5. Marketing factors	3.220	0.522	Accept H_0
6. Export factors	0.732	0.947	Accept H_0
7. External environment factors	0.718	0.949	Accept H_0

Table 4.12 shows the results of nonparametric statistical analysis with the Kruskal-Wallis H. It found that food hygiene factors, application of HACCP principles, raw material factors, production factors, marketing factors, export factors, and external environment factors have the p-value of 0.554, 0.928, 0.571, 0.470, 0.522, 0.947 and 0.949, respectively which are greater than 0.05. That is, the null hypothesis (H_0) is accepted and the alternative hypothesis (H_1) is rejected. Therefore, it means that the different categories of Thai food exported to Japan have not effect the different factors affecting the processed food production for export to Japan.

4.1.4.3 Hypothesis 3: The different exporting methods of Thai food to Japan have effect the different factors affecting the processed food production for export to Japan.

The null and alternative hypotheses are

H_0: The different exporting methods of Thai food to Japan have not effect the different factors affecting the processed food production for export to Japan.

H_1: The different exporting methods of Thai food to Japan have effect the different factors affecting the processed food production for export to Japan.

Table 4.13 Results of hypothesis testing of the different exporting methods of Thai food to Japan have effect the different factors affecting the processed food production for export to Japan

Factors	Exporting methods of Thai food to Japan		Results
	Chi-Square	Sig.	
1. Food hygiene factors	5.117	0.824	Accept H_0
2. Application of HACCP principles	10.853	0.286	Accept H_0
3. Raw material factors	5.075	0.828	Accept H_0
4. Production factors	6.907	0.647	Accept H_0
5. Marketing factors	13.680	0.134	Accept H_0
6. Export factors	9.201	0.419	Accept H_0
7. External environment factors	10.324	0.325	Accept H_0

Table 4.13 shows the results of nonparametric statistical analysis with the Kruskal-Wallis H. It found that food hygiene factors, application of HACCP principles, raw material factors, production factors, marketing factors, export factors, and external environment factors have the p-value of 0.824, 0.286, 0.828, 0.647, 0.134, 0.419 and 0.325, respectively which are greater than 0.05. That is, the null hypothesis (H_0) is accepted and the alternative hypothesis (H_1) is rejected. Therefore, it means that the different exporting methods of Thai food to Japan have not effect the different factors affecting the processed food production for export to Japan.

4.1.4.4 Hypothesis 4: The different export volumes of Thai food to Japan have effect the different factors affecting the processed food production for export to Japan.

The null and alternative hypotheses are

H_0: The different export volumes of Thai food to Japan have not effect the different factors affecting the processed food production for export to Japan.

H_1: The different export volumes of Thai food to Japan have effect the different factors affecting the processed food production for export to Japan.

Table 4.14 Results of hypothesis testing of the different export volumes of Thai food to Japan have effect the different factors affecting the processed food production for export to Japan

Factors	Export volumes of Thai food to Japan by an average per year		Results
	Chi-Square	Sig.	
1. Food hygiene factors	6.783	0.148	Accept H_0
2. Application of HACCP principles	6.952	0.138	Accept H_0
3. Raw material factors	12.455	0.014	Reject H_0
3.1 Lack of raw materials	10.289	0.036	Reject H_0
3.2 Contaminated raw materials	10.909	0.028	Reject H_0
3.3 Uncontrollable quality of raw materials, thus quality of products is inconsistent and unresponsive to customer needs	8.988	0.061	Accept H_0
4. Production factors	16.718	0.002	Reject H_0
4.1 High labor costs compared to neighboring countries	12.339	0.015	Reject H_0
4.2 High production costs	13.467	0.009	Reject H_0
4.3 Lack of skilled workers	12.677	0.013	Reject H_0
4.4 Insufficient capital for improving and managing efficient production	17.993	0.001	Reject H_0
4.5 Lack of know-how and technology for research and development of quality products	9.989	0.041	Reject H_0
5. Marketing factors	14.073	0.007	Reject H_0
5.1 Price war amongst domestic manufacturers	13.373	0.010	Reject H_0
5.2 Low bargaining power of exporter, thus low profit margin	9.725	0.045	Reject H_0
6. Export factors	22.662	0.000	Reject H_0
6.1 Tariff Barriers (TBs)	14.257	0.007	Reject H_0
6.2 Non-Tariff Barriers (NTBs)	16.944	0.002	Reject H_0
6.2.1 Sanitary and Phytosanitary Standard (SPS)	13.163	0.011	Reject H_0
6.2.2 Technical Barriers to Trade (TBT)	16.519	0.002	Reject H_0
6.2.3 Environment Measures (ENV)	11.977	0.018	Reject H_0
6.2.4 Nationalism Measures	15.665	0.004	Reject H_0

Table 4.14 Results of hypothesis testing of the different export volumes of Thai food to Japan have effect the different factors affecting the processed food production for export to Japan (cont.)

Factors	Export volumes of Thai food to Japan by an average per year		Results
	Chi-Square	Sig.	
6. Export factors (cont.)			
6.3 Lack of international information and obsolete information, thus missing opportunity of exportation	10.646	0.031	Reject H_0
6.4 Lack of legal knowledge or the regulations of importation process in Japan	16.122	0.003	Reject H_0
6.5 Delay of work process of Thai officers in quality control and monitoring sector	13.440	0.009	Reject H_0
6.6 Lack of support from government which neglect the export sector	13.388	0.010	Reject H_0
6.7 Problem of transportation (High cost)	10.266	0.036	Reject H_0
7. External environment factors	18.905	0.001	Reject H_0
7.1 Decreasing of Japan's GDP	11.164	0.025	Reject H_0
7.2 Fluctuations in currency exchange rates	12.210	0.016	Reject H_0
7.3 Demographic change in Japan	11.166	0.025	Reject H_0
7.4 High cost of export, concerning the whole process	14.808	0.005	Reject H_0

Table 4.14 shows the results of nonparametric statistical analysis with the Kruskal-Wallis H. It found that food hygiene factors and application of HACCP principles have the p-value of 0.148 and 0.138, respectively which are greater than 0.05. That is, the null hypothesis (H_0) is accepted and the alternative hypothesis (H_1) is rejected. Therefore, it means that the different export volumes of Thai food to Japan have not effect the different factors affecting the processed food production for export to Japan.

For raw material factors, production factors, marketing factors, export factors, and external environment factors have the p-value of 0.014, 0.002, 0.007, 0.000 and 0.001, respectively which are less than 0.05. That is, the null hypothesis

(H_0) is rejected and the alternative hypothesis (H_1) is accepted. Therefore, it means that the different export volumes of Thai food to Japan have effect the difference in raw material factors, production factors, marketing factors, export factors, and external environment factors at a significance level of 0.05.

The detailed analysis of raw material factors found that the lack of raw materials and contaminated raw materials has the p-value of 0.036 and 0.028, respectively which are less than 0.05. Therefore, it means that the different export volumes of Thai food to Japan have effect the difference in raw material factors (i.e., the lack of raw materials and contaminated raw materials) at a significance level of 0.05.

The detailed analysis of production factors found that high labor costs (compared to other countries), high production costs, lack of skilled workers, insufficient capital for improving and managing efficient production, and lack of technology for research and development of quality products have the p-value of 0.015, 0.009, 0.013, 0.001 and 0.041, respectively which are less than 0.05. Therefore, it means that the different export volumes of Thai food to Japan have effect the difference in production factors (i.e., high labor costs, high production costs, lack of skilled workers, insufficient capital for improving and managing efficient production, and lack of technology for research and development of quality products) at a significance level of 0.05.

The detailed analysis of marketing factors found that the price war amongst domestic manufacturers and the low bargaining power which led to lower profit have the p-value of 0.010 and 0.045, respectively which are less than 0.05. Therefore, it means that the different export volumes of Thai food to Japan have effect the difference in marketing factors (i.e., the price war amongst domestic manufacturers and the low bargaining power which led to lower profit) at a significance level of 0.05.

The detailed analysis of export factors found that tariff barriers (TBs), sanitary and phytosanitary standard (SPS), technical barriers to trade (TBT), environment measures (ENV), nationalism measures, lack of international updated information which led to missed opportunity, lack of legal and regulation knowledge of Japan importation, delay of Thai officers in the quality control and monitoring process, lack of support from government sector, and high cost of transportation have

the p-value of 0.007, 0.011, 0.002, 0.018, 0.004, 0.031, 0.003, 0.009, 0.010 and 0.036, respectively which are less than 0.05. Therefore, it means that the different export volumes of Thai food to Japan have effect the difference in export factors (i.e., tariff barriers (TBs), sanitary and phytosanitary standard (SPS), technical barriers to trade (TBT), environment measures (ENV), nationalism measures, lack of international updated information which led to missed opportunity, lack of legal and regulation knowledge of Japan importation, delay of Thai officers in the quality control and monitoring process, lack of support from government sector, and high cost of transportation) at a significance level of 0.05.

The detailed analysis of external environment factors found that the decrease in Japan's GDP, the fluctuations in currency exchange rates, the demographic change in Japan, and the high cost of export-related process has the p-value of 0.025, 0.016, 0.025 and 0.005, respectively which are less than 0.05. Therefore, it means that the different export volumes of Thai food to Japan have effect the difference in external environment factors (i.e., the decrease in Japan's GDP, the fluctuations in currency exchange rates, the demographic change in Japan, and the high cost of export-related process) at a significance level of 0.05.

The results of data analysis regarding the relationship between the general data of Thai food processors and exporters to Japan and the factors affecting the processed food production for export to Japan can be described as shown in Figure 4.4.

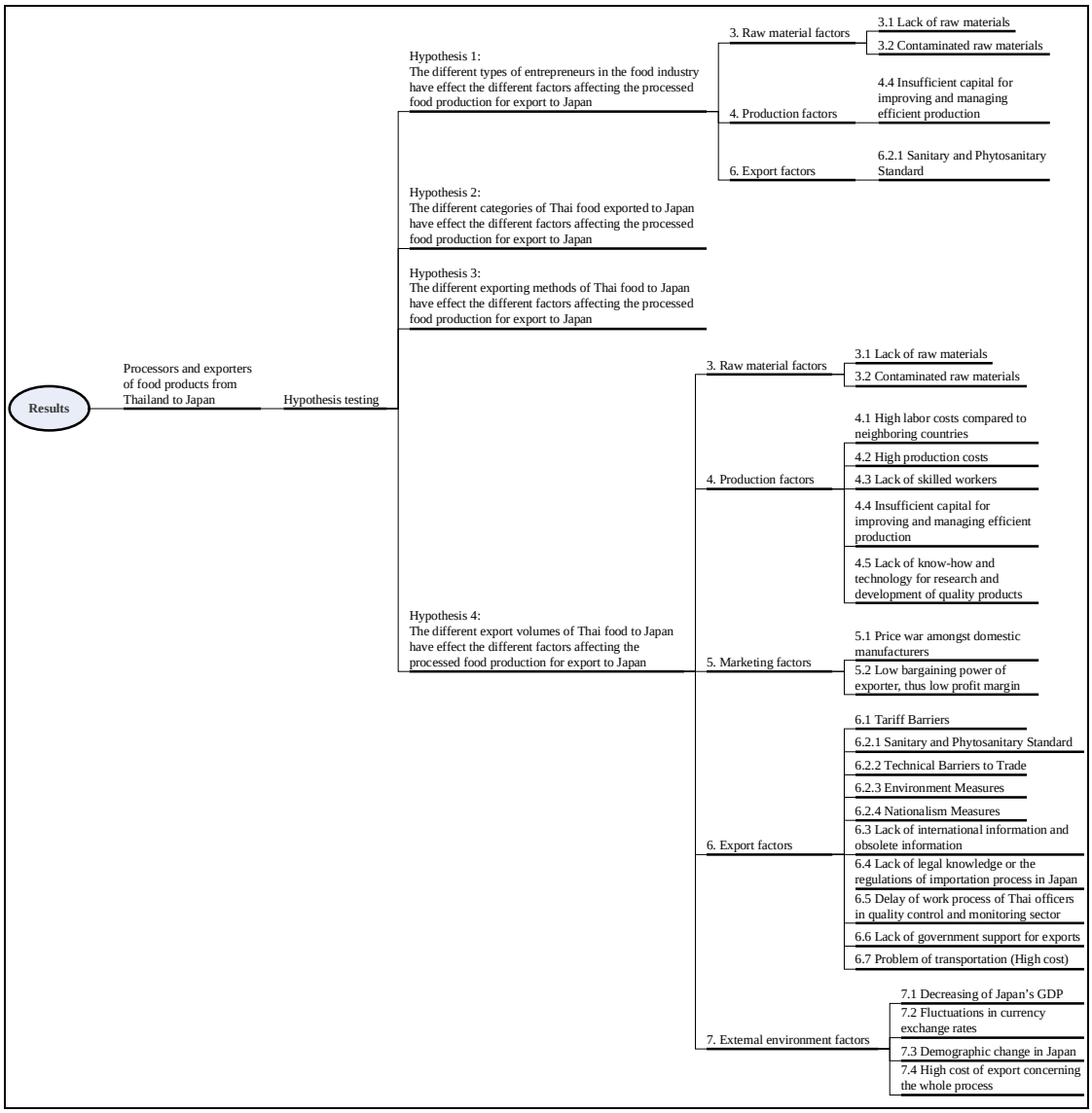

Figure 4.4 Results of hypothesis testing of Thai food processors and exporters to Japan

4.1.5 Results of pairwise comparisons between the different types of entrepreneurs in the food industry with different export volumes of Thai food to Japan and factors

From the results of relation analysis between general data of Thai food processors and exporters to Japan and factors affecting the processed food production for export to Japan found that the different types of entrepreneurs in the food industry and the different export volumes of Thai food to Japan have effect the lack of raw materials, contaminated raw materials, insufficient capital for improving and

managing efficient production, and sanitary and phytosanitary standard (SPS) at a significance level of 0.05.

Therefore, we will be pairwise comparisons between the different types of entrepreneurs in the food industry with different export volumes of Thai food to Japan and factors such as the lack of raw materials, contaminated raw materials, insufficient capital for improving and managing efficient production, and sanitary and phytosanitary standard (SPS) at a significance level of 0.05. Hypothesis is denoted.

H_0: $m_1 = m_2 = m_3 = m_4 = m_5 = m_6$

H_1: $m_i \neq m_j$ for at least one pair (i, j)

Where

m_1 = exporters with export volume of Thai food to Japan by an average more than 81 percent per year

m_2 = processors and exporters with export volume of Thai food to Japan by an average less than 20 percent per year

m_3 = processors and exporters with export volume of Thai food to Japan by an average of 21-40 percent per year

m_4 = processors and exporters with export volume of Thai food to Japan by an average of 41-60 percent per year

m_5 = processors and exporters with export volume of Thai food to Japan by an average of 61-80 percent per year

m_6 = processors and exporters with export volume of Thai food to Japan by an average more than 81 percent per year

Table 4.15 Results of pairwise comparisons between the different types of entrepreneurs in the food industry with different export volumes of Thai food to Japan and the lack of raw materials

Raw material factors	Types of entrepreneurs and export volumes of Thai food to Japan	Exporters / more than 81 percent $\overline{X}$ = 5.00	Processors and exporters / less than 20 percent $\overline{X}$ = 3.00	Processors and exporters / 21-40 percent $\overline{X}$ = 3.31	Processors and exporters / 41-60 percent $\overline{X}$ = 3.75	Processors and exporters / 61-80 percent $\overline{X}$ = 3.67	Processors and exporters / more than 81 percent $\overline{X}$ = 4.17
Lack of raw materials	Exporters / more than 81 percent $\overline{X}$ = 5.00	-					
	Processors and exporters / less than 20 percent $\overline{X}$ = 3.00	-2.736* (0.006)	-				
	Processors and exporters / 21-40 percent $\overline{X}$ = 3.31	-2.102* (0.036)	-0.804 (0.421)	-			
	Processors and exporters / 41-60 percent $\overline{X}$ = 3.75	-2.291* (0.022)	-1.320 (0.187)	-0.297 (0.767)	-		
	Processors and exporters / 61-80 percent $\overline{X}$ = 3.67	-1.581 (0.114)	-0.788 (0.431)	-0.139 (0.889)	-0.382 (0.703)	-	
	Processors and exporters / more than 81 percent $\overline{X}$ = 4.17	-1.061 (0.289)	-2.170* (0.030)	-1.508 (0.132)	-1.478 (0.139)	-0.853 (0.394)	-

Notes: * is different at the 0.05 level of significance

(Number) is p-value

Table 4.15 shows the results of pairwise comparisons by the Mann-Whitney U Test. It found that the different types of entrepreneurs in the food industry with different export volumes of Thai food to Japan have a difference in the lack of raw materials at the 0.05 level of significance in four pairs as follows.

The exporters with export volume of Thai food to Japan on an average more than 81 percent per year differ the processors and exporters with export volumes of Thai food to Japan on an average less than 20 percent, 21-40 percent and 41-60 percent per year due to the p-value are 0.006, 0.036 and 0.022, respectively, which are less than 0.05.

The processors and exporters with export volume of Thai food to Japan on an average less than 20 percent per year differ the processors and exporters with

export volume of Thai food to Japan on an average more than 81 percent per year due to the p-value is 0.030, which is less than 0.05.

Table 4.16 Results of pairwise comparisons between the different types of entrepreneurs in the food industry with different export volumes of Thai food to Japan and the contaminated raw materials

Raw material factors	Types of entrepreneurs and export volumes of Thai food to Japan	Exporters / more than 81 percent $\overline{X}$ = 4.67	Processors and exporters / less than 20 percent $\overline{X}$ = 2.50	Processors and exporters / 21-40 percent $\overline{X}$ = 2.77	Processors and exporters / 41-60 percent $\overline{X}$ = 3.75	Processors and exporters / 61-80 percent $\overline{X}$ = 3.00	Processors and exporters / more than 81 percent $\overline{X}$ = 3.83
Contaminated raw materials	Exporters / more than 81 percent $\overline{X}$ = 4.67	-					
	Processors and exporters / less than 20 percent $\overline{X}$ = 2.50	-2.594* (0.009)	-				
	Processors and exporters / 21-40 percent $\overline{X}$ = 2.77	-2.200* (0.028)	-0.603 (0.547)	-			
	Processors and exporters / 41-60 percent $\overline{X}$ = 3.75	-1.310 (0.190)	-1.997* (0.046)	-1.286 (0.198)	-		
	Processors and exporters / 61-80 percent $\overline{X}$ = 3.00	-1.159 (0.246)	-0.458 (0.647)	-0.207 (0.836)	-0.556 (0.578)	-	
	Processors and exporters / more than 81 percent $\overline{X}$ = 3.83	-0.990 (0.322)	-2.199* (0.028)	-1.712 (0.087)	-0.559 (0.576)	-0.671 (0.502)	-

Notes: * is different at the 0.05 level of significance

(Number) is p-value

Table 4.16 shows the results of pairwise comparisons by the Mann-Whitney U Test. It found that the different types of entrepreneurs in the food industry with different export volumes of Thai food to Japan have a difference in the contaminated raw materials at the 0.05 level of significance in four pairs as follows.

The exporters with export volume of Thai food to Japan on an average more than 81 percent per year differ the processors and exporters with export volumes of Thai food to Japan on an average less than 20 percent and 21-40 percent per year due to the p-value are 0.009 and 0.028, respectively, which are less than 0.05.

The processors and exporters with export volume of Thai food to Japan on an average less than 20 percent per year differ the processors and exporters with export volumes of Thai food to Japan by an average of 41-60 percent and more than 81 percent per year due to the p-value are 0.046 and 0.028, respectively, which are less than 0.05.

Table 4.17 Results of pairwise comparisons between the different types of entrepreneurs in the food industry with different export volumes of Thai food to Japan and the insufficient capital for improving and managing efficient production

Production factors	Types of entrepreneurs and export volumes of Thai food to Japan	Exporters / more than 81 percent $\overline{X}$ = 4.00	Processors and exporters / less than 20 percent $\overline{X}$ = 2.07	Processors and exporters / 21-40 percent $\overline{X}$ = 2.69	Processors and exporters / 41-60 percent $\overline{X}$ = 2.00	Processors and exporters / 61-80 percent $\overline{X}$ = 2.67	Processors and exporters / more than 81 percent $\overline{X}$ = 4.00
Insufficient capital for improving and managing efficient production	Exporters / more than 81 percent $\overline{X}$ = 4.00	-					
	Processors and exporters / less than 20 percent $\overline{X}$ = 2.07	-2.775* (0.006)	-				
	Processors and exporters / 21-40 percent $\overline{X}$ = 2.69	-2.344* (0.019)	-1.803 (0.071)	-			
	Processors and exporters / 41-60 percent $\overline{X}$ = 2.00	-2.449* (0.014)	-0.244 (0.807)	-1.742 (0.082)	-		
	Processors and exporters / 61-80 percent $\overline{X}$ = 2.67	-1.581 (0.114)	-0.827 (0.408)	-0.217 (0.828)	-1.155 (0.248)	-	
	Processors and exporters / more than 81 percent $\overline{X}$ = 4.00	-0.463 (0.643)	-2.963* (0.003)	-2.278* (0.023)	-2.315* (0.021)	-1.518 (0.129)	-

Notes: * is different at the 0.05 level of significance

(Number) is p-value

Table 4.17 shows the results of pairwise comparisons by the Mann-Whitney U Test. It found that the different types of entrepreneurs in the food industry with different export volumes of Thai food to Japan have a difference in the insufficient capital for improving and managing efficient production at the 0.05 level of significance in six pairs as follows.

The exporters with export volume of Thai food to Japan on an average more than 81 percent per year and the processors differ the exporters with export volumes of Thai food to Japan on an average less than 20 percent, 21-40 percent and 41-60 percent per year due to the p-value are 0.006, 0.019 and 0.028, respectively, which are less than 0.05.

The processors and exporters with export volumes of Thai food to Japan on an average less than 20 percent, 21-40 percent and 41-60 percent per year differ the processors and exporters with export volume of Thai food to Japan on an average more than 81 percent per year due to the p-value are 0.003, 0.023 and 0.021, respectively, which are less than 0.05.

Table 4.18 Results of pairwise comparisons between the different types of entrepreneurs in the food industry with different export volumes of Thai food to Japan and sanitary and phytosanitary standard (SPS)

Export factors	Types of entrepreneurs and export volumes of Thai food to Japan	Exporters / more than 81 percent $\overline{X}$ = 4.33	Processors and exporters / less than 20 percent $\overline{X}$ = 2.71	Processors and exporters / 21-40 percent $\overline{X}$ = 2.54	Processors and exporters / 41-60 percent $\overline{X}$ = 3.25	Processors and exporters / 61-80 percent $\overline{X}$ = 2.67	Processors and exporters / more than 81 percent $\overline{X}$ = 3.67
Sanitary and Phytosanitary Standard (SPS)	Exporters / more than 81 percent $\overline{X}$ = 4.33	-					
	Processors and exporters / less than 20 percent $\overline{X}$ = 2.71	-2.514* (0.012)	-				
	Processors and exporters / 21-40 percent $\overline{X}$ = 2.54	-2.617* (0.009)	-0.450 (0.653)	-			
	Processors and exporters / 41-60 percent $\overline{X}$ = 3.25	-1.560 (0.119)	-1.074 (0.283)	-1.329 (0.184)	-		
	Processors and exporters / 61-80 percent $\overline{X}$ = 2.67	-1.623 (0.105)	-0.134 (0.893)	-0.362 (0.717)	-0.556 (0.578)	-	
	Processors and exporters / more than 81 percent $\overline{X}$ = 3.67	-1.543 (0.123)	-2.379* (0.017)	-2.629* (0.009)	-0.732 (0.464)	-1.155 (0.248)	-

Notes: * is different at the 0.05 level of significance

(Number) is p-value

Table 4.18 shows the results of pairwise comparisons by the Mann-Whitney U Test. It found that the different types of entrepreneurs in the food industry with different export volumes of Thai food to Japan have a difference in sanitary and phytosanitary standard (SPS) at the 0.05 level of significance in four pairs as follows.

The exporters with export volume of Thai food to Japan on an average more than 81 percent per year differ the processors and exporters with export volumes of Thai food to Japan on an average less than 20 percent and 21-40 percent per year due to the p-value are 0.012 and 0.009, respectively, which are less than 0.05.

The processors and exporters with export volumes of Thai food to Japan on an average less than 20 percent and 21-40 percent per year differ the processors and exporters with export volume of Thai food to Japan on an average more than 81 percent per year due to the p-value are 0.017 and 0.009, respectively, which are less than 0.05.

The results of pairwise comparisons between the different types of entrepreneurs in the food industry with different export volumes of Thai food to Japan and factors can be described as shown in Figure 4.5.

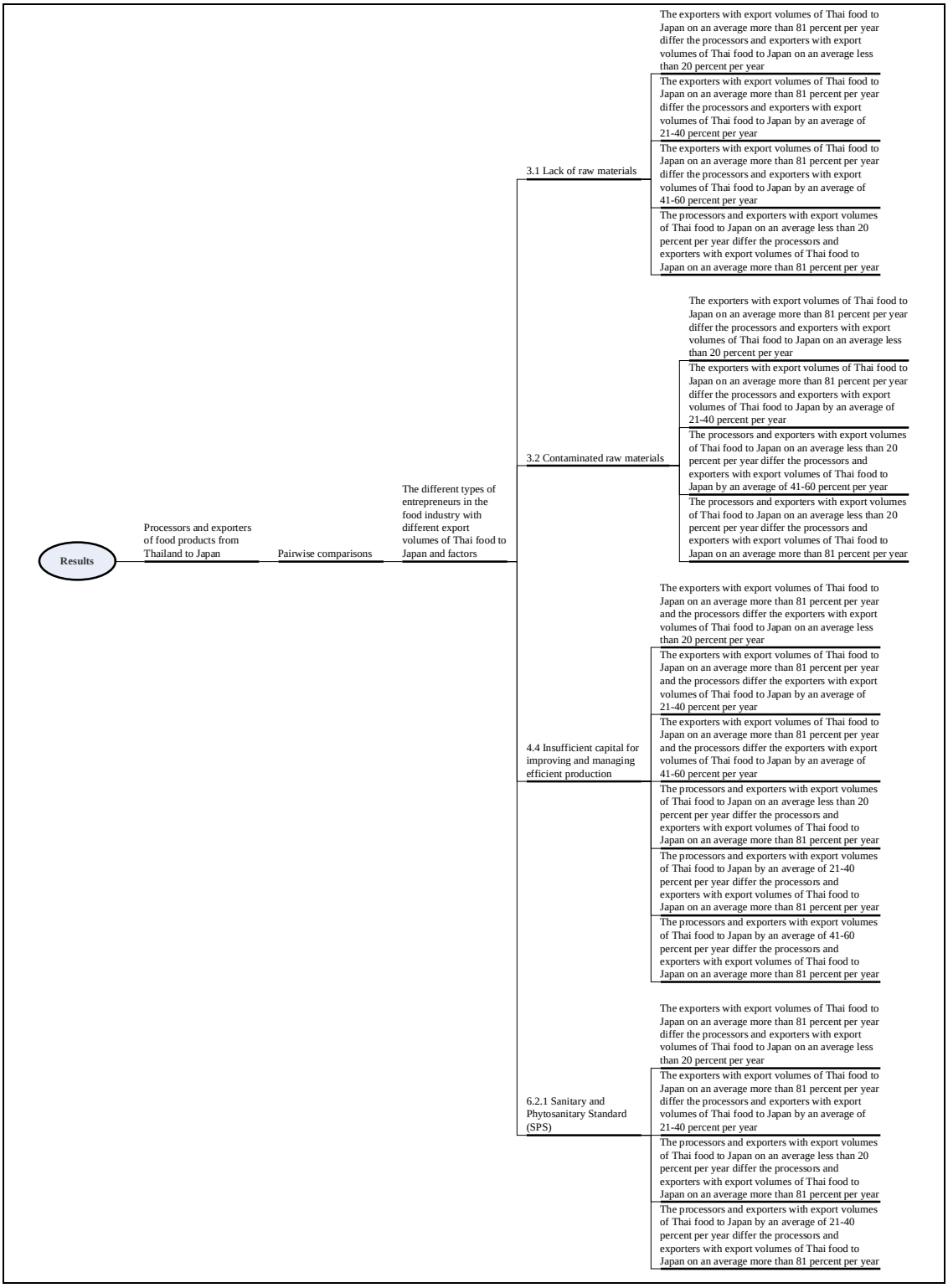

Figure 4.5 Results of pairwise comparisons between the different types of entrepreneurs in the food industry with different export volumes of Thai food to Japan and factors

4.2 Results of studied on chicken farmers samples

The results of studied on chicken farmers samples have been separated into four parts as shown in Figure 4.6.

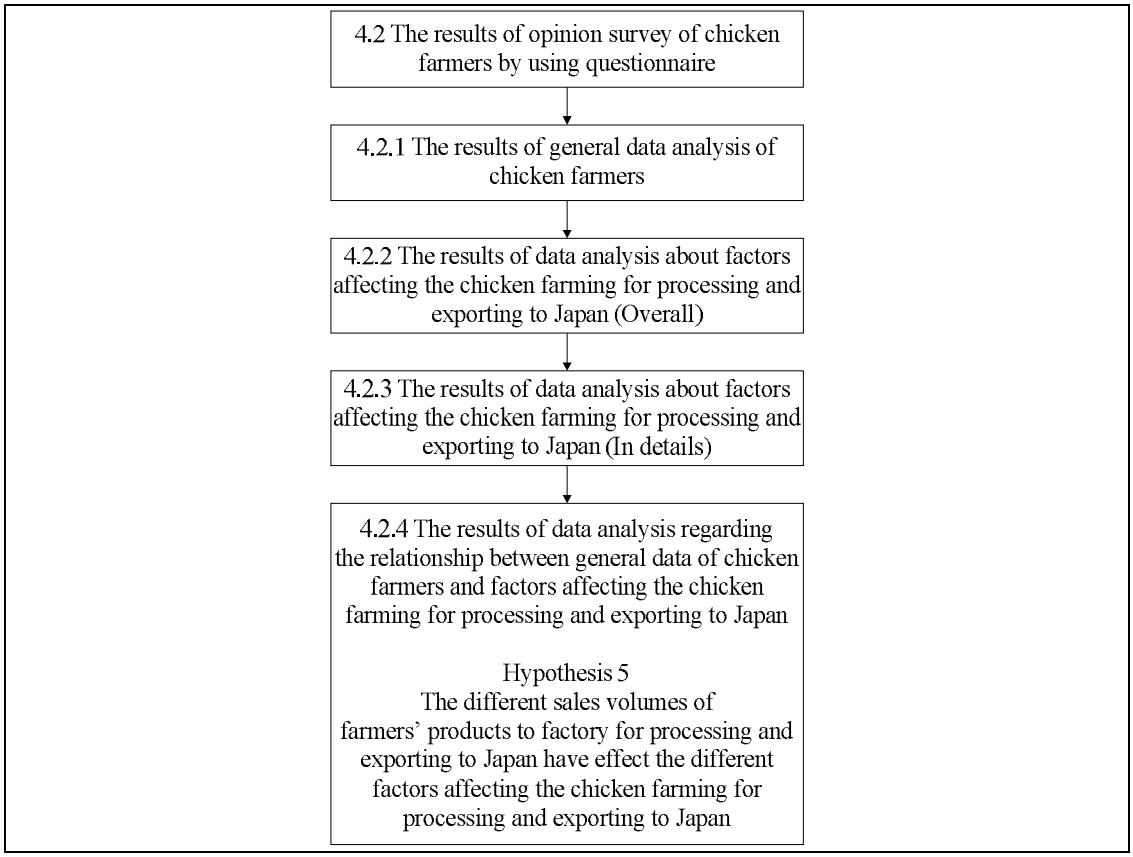

Figure 4.6 Details of the results of studied on chicken farmers samples

The questionnaires were sent to 146 chicken farmers samples. The 39 questionnaires were returned, accounted for 26.71 percent, which will be analyzed in the aspect of general data, factors affecting the chicken farming for processing and exporting to Japan and statistical hypothesis testing.

4.2.1 Results of general data analysis of chicken farmers

The general questions on chicken farmers consists of the distribution of products to relevant sectors in chicken industry and sales volumes of farmers' products to factory for processing and exporting to Japan by an average per year.

Table 4.19 Number and percentage of respondents divided by elements of the chicken industry

Elements of the chicken industry	Number	Percentage
Processing factory	39	100.0
Total	39	100.0

From Table 4.19, it found that chicken farmers distribute their produce to the processing factory accounted for 100.0 percent.

Table 4.20 Number and percentage of respondents divided by sales volumes of products to factory for processing and exporting to Japan

Sales volumes of farmers' products to factory for processing and exporting to Japan by an average per year	Number	Percentage
61-80 percent	6	15.4
More than 81 percent	33	84.6
Total	39	100.0

From Table 4.20, a majority of chicken farmers have sales volume of products to factory for processing and exporting to Japan on an average more than 81 percent per year, accounted for 84.6 percent. In addition, the sales volume of products to factory for processing and exporting to Japan by an average of 61-80 percent per year is 15.4 percent.

The results of general data analysis of chicken farmers can be described as shown in Figure 4.7.

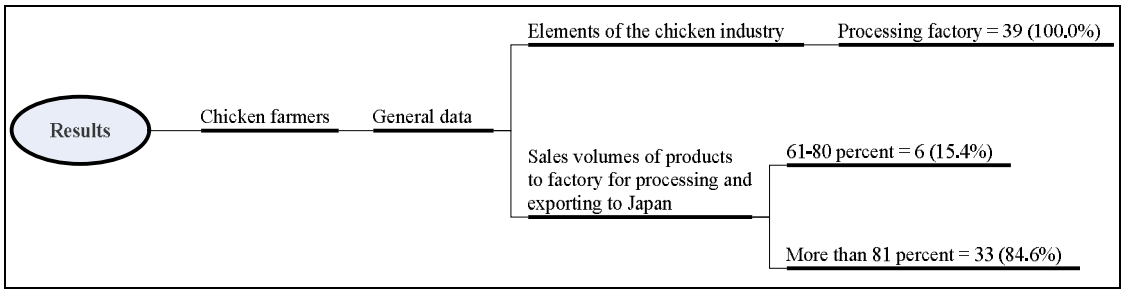

Figure 4.7 General data of chicken farmers

4.2.2 Results of data analysis about factors affecting the chicken farming for processing and exporting to Japan (Overall)

Factors affecting the chicken farming for processing and exporting to Japan were analyzed such as Good Agricultural Practices for livestock farming (GAP), qualifications of chicken farmer, chicken farming factors, and government services factors, all of which are shown in Table 4.21.

Table 4.21 Problem/obstacle factors that influence the chicken farming for processing and exporting to Japan

Factors	Sales volumes of farmers' products to factory for processing and exporting to Japan by an average per year				Overall	
	61-80 percent		More than 81 percent			
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Good Agricultural Practices for livestock farming (GAP)	1.35	0.307	1.57	0.346	1.53	0.346
Qualifications of chicken farmer	1.08	0.204	1.21	0.376	1.19	0.356
Chicken farming factors	2.52	0.562	3.05	0.728	2.97	0.725
Government services factors	1.92	0.785	2.61	1.077	2.51	1.060

From Table 4.21, it shown that overall, chicken farming factors ($\overline{X}$ = 2.97) are the most important factor and moderately important problem/obstacle affecting the chicken farming for processing and exporting to Japan, whereas government services factors ($\overline{X}$ = 2.51), Good Agricultural Practices for livestock farming ($\overline{X}$ = 1.53), and

qualifications of chicken farmer ($\overline{X}$ = 1.19) are ranked as 2nd, 3rd and 4th important factors, respectively.

In consideration, the factors affecting the chicken farming for processing and exporting to Japan divided by sales volumes of farmers' products to factory for processing and exporting to Japan found that sales volumes of products to factory for processing and exporting to Japan by an average of 61-80 percent per year and more than 81 percent per year have chicken farming factors ($\overline{X}$ = 2.52 and 3.05, respectively) as the most important factor. The sales volume of products to factory for processing and exporting to Japan by an average of 61-80 percent per year has chicken farming factors as less important problem/obstacle and the sales volume of products to factory for processing and exporting to Japan on an average more than 81 percent per year has chicken farming factors as moderately important problem/obstacle.

In addition, the analysis of factors in overall and divided by sales volumes of farmers' products to factory for processing and exporting to Japan found that Good Agricultural Practices for livestock farming (GAP) and qualifications of chicken farmer are not the problems and obstacles affecting the chicken farming for processing and exporting to Japan.

4.2.3 Results of data analysis about factors affecting the chicken farming for processing and exporting to Japan (In details)

The results of data analysis regarding factors affecting the chicken farming for processing and exporting to Japan (In details) found that Good Agricultural Practices for livestock farming (GAP) and qualifications of chicken farmer are not the problems and obstacles affecting the chicken farming for processing and exporting to Japan. Therefore, the scope of analysis is limited to details of chicken farming factors and government services factors.

Table 4.22 Details of problem/obstacle factors that influence the chicken farming for processing and exporting to Japan

Factors	Sales volumes of farmers' products to factory for processing and exporting to Japan by an average per year				Overall	
	61-80 percent		More than 81 percent			
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Good Agricultural Practices for livestock farming (GAP)	1.35	0.307	1.57	0.346	1.53	0.346
Qualifications of chicken farmer	1.08	0.204	1.21	0.376	1.19	0.356
Chicken farming factors	2.52	0.562	3.05	0.728	2.97	0.725
1. Lack of broodstock	1.17	0.408	1.97	0.585	1.85	0.630
2. Disease outbreak	1.50	0.548	2.97	1.380	2.74	1.390
3. High production costs such as animal feeds, medicine and chemical products	4.50	1.225	4.21	1.053	4.26	1.069
4. Lack of farming knowledge and technology	3.17	1.472	2.85	0.972	2.90	1.046
5. Inefficient farm management	1.67	0.816	2.88	0.927	2.69	1.004
6. Chemical residues due to the use of drugs and chemicals in high doses	1.33	0.516	2.48	1.176	2.31	1.173
7. Lack of loans to support farming	4.33	1.633	4.00	1.225	4.05	1.276
Government services factors	1.92	0.785	2.61	1.077	2.51	1.060
1. Lack of support and technical knowledge dissemination about poultry farming	1.83	0.753	2.82	1.158	2.67	1.155
2. Lack of attention and service from government sector	1.83	0.753	2.61	1.298	2.49	1.254
3. Insufficient government officers	2.17	0.983	2.70	1.357	2.62	1.310
4. Inexperienced government officers	1.83	0.753	2.33	1.164	2.26	1.117

From Table 4.22, analysis of factors affecting the chicken farming for processing and exporting to Japan in overall found that chicken farmers have chicken farming factors as moderately important problem/obstacle ($\overline{X}$ = 2.97). When considering details of factors found that high production costs (i.e., animal feeds, medicine and chemical products) is highly important problem/obstacle with mean value of 4.26. The lack of loans to support farming is highly important problem/obstacle with mean value of 4.05. The lack of farming knowledge and technology, disease outbreak, and inefficient farm management are all moderately important problem/obstacle with mean value of 2.90, 2.74 and 2.69, respectively. In

addition, chemical residues due to the use of drugs and chemicals in high doses and the lack of broodstock are all less important problem/obstacle with mean value of 2.31 and 1.85, respectively.

Government services factors are less important problem/obstacle ($\overline{X}$ = 2.51), as the lack of support and technical knowledge dissemination about poultry farming and the insufficient government officers are moderately important problem/obstacle affecting the chicken farming for processing and exporting to Japan with mean value of 2.67 and 2.62, respectively. The lack of attention and service from government sector and the inexperienced government officers are less important problem/obstacle with mean value of 2.49 and 2.26, respectively.

Analysis of problem factors affecting the chicken farming for processing and exporting to Japan divided by sales volumes of products to factory for processing and exporting to Japan found that chicken farmers with sales volume of products to factory for processing and exporting to Japan by an average of 61-80 percent per year have chicken farming factors as less important problem/obstacle ($\overline{X}$ = 2.52), as high production costs (i.e., animal feeds, medicine and chemical products) and the lack of loans to support farming are highly important problem/obstacle with mean value of 4.50 and 4.33, respectively. The lack of farming knowledge and technology is moderately important problem/obstacle with mean value of 3.17. In addition, the inefficient farm management, disease outbreak, chemical residues due to the use of drugs and chemicals in high doses, and the lack of broodstock are not problem/obstacle with mean value of 1.67, 1.50, 1.33 and 1.17, respectively.

Government services factors are less important problem/obstacle ($\overline{X}$ = 1.92), as the insufficient government officers, the lack of support and technical knowledge dissemination about poultry farming, the lack of attention and service from government sector, and the inexperienced government officers are less important problem/obstacle affecting the chicken farming for processing and exporting to Japan with mean value of 2.17, 1.83, 1.83 and 1.83, respectively.

The chicken farmers with sales volume of products to factory for processing and exporting to Japan on an average more than 81 percent per year have

chicken farming factors as moderately important problem/obstacle ($\overline{X}$ = 3.05), as high production costs (i.e., animal feeds, medicine and chemical products) is extremely important problem/obstacle with mean value of 4.21. The lack of loans to support farming is highly important problem/obstacle with mean value of 4.00. The disease outbreak, the inefficient farm management, and the lack of farming knowledge and technology are moderately important problem/obstacle with mean value of 2.97, 2.88 and 2.85, respectively. In addition, the chemical residues due to the use of drugs and chemicals in high doses and the lack of broodstock are less important problem/ obstacle with mean value of 2.48 and 1.97, respectively.

Government services factors are moderately important problem/obstacle ($\overline{X}$ = 2.61), as the lack of support and technical knowledge dissemination about poultry farming, the insufficient government officers, and the lack of attention and service from government sector are moderately important problem/obstacle affecting the chicken farming for processing and exporting to Japan with mean value of 2.82, 2.70 and 2.61, respectively. The inexperienced government officer is less important problem/obstacle with mean value of 2.33.

4.2.4 Results of data analysis regarding the relationship between general data of chicken farmers and factors affecting the chicken farming for processing and exporting to Japan

The hypothesis testing is statistical analysis to find the relationship between sales volumes of farmers' products to factory for processing and exporting to Japan and factors affecting the chicken farming for processing and exporting to Japan (consists of Good Agricultural Practices for livestock farming (GAP), qualifications of chicken farmer, chicken farming factors, and government services factors) at a significance level of 0.05.

Hypothesis 5: The different sales volumes of farmers' products to factory for processing and exporting to Japan have effect the different factors affecting the chicken farming for processing and exporting to Japan.

The null and alternative hypotheses are

H_0: The different sales volumes of farmers' products to factory for processing and exporting to Japan have not effect the different factors affecting the chicken farming for processing and exporting to Japan.

H_1: The different sales volumes of farmers' products to factory for processing and exporting to Japan have effect the different factors affecting the chicken farming for processing and exporting to Japan.

Table 4.23 Results of hypothesis testing of the different sales volumes of farmers' products to factory for processing and exporting to Japan have effect the different factors affecting the chicken farming for processing and exporting to Japan

Factors	**Sales volumes of farmers' products to factory for processing and exporting to Japan by an average per year**		**Results**
	z	**Sig.**	
1. Good Agricultural Practices for livestock farming (GAP)	-1.540	0.124	Accept H_0
2. Qualifications of chicken farmer	-0.662	0.508	Accept H_0
3. Chicken farming factors	-1.958	0.050	Reject H_0
3.1 Lack of broodstock	-2.970	0.003	Reject H_0
3.2 Disease outbreak	-2.859	0.004	Reject H_0
3.3 High production costs such as animal feeds, medicine and chemical products	-1.011	0.312	Accept H_0
3.4 Lack of farming knowledge and technology	-0.203	0.839	Accept H_0
3.5 Inefficient farm management	-2.624	0.009	Reject H_0
3.6 Chemical residues due to the use of drugs and chemicals in high doses	- 2.579	0.010	Reject H_0
3.7 Lack of loans to support farming	-1.151	0.250	Accept H_0
4. Government services factors	-1.310	0.190	Accept H_0
4.1 Lack of support and technical knowledge dissemination about poultry farming	- 1.966	0.049	Reject H_0
4.2 Lack of attention and service from government sector	-1.310	0.190	Accept H_0
4.3 Insufficient government officers	-0.866	0.387	Accept H_0
4.4 Inexperienced government officers	-0.871	0.383	Accept H_0

Table 4.23 shows the results of nonparametric statistical analysis with the Mann-Whitney U Test. It found that Good Agricultural Practices for livestock farming (GAP), qualifications of chicken farmer, and government services factors have the p-value of 0.124, 0.508 and 0.190, respectively which are greater than 0.05. That is, the null hypothesis (H_0) is accepted and the alternative hypothesis (H_1) is rejected. Therefore, it means that the different sales volumes of farmers' products to factory for processing and exporting to Japan have not effect the difference in Good Agricultural Practices for livestock farming (GAP), qualifications of chicken farmer, and government services factors.

The chicken farming has the p-value of 0.050. That is, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. Therefore, it means that the different sales volumes of farmers' products to factory for processing and exporting to Japan have effect the difference in chicken farming factors at a significance level of 0.05.

The detailed analysis of factors found that the lack of broodstock, disease outbreak, inefficient farm management, chemical residues due to the use of drugs and chemicals in high doses, and lack of support and technical knowledge dissemination about poultry farming have the p-value of 0.003, 0.004, 0.009, 0.010 and 0.049, respectively which are less than 0.05. That is, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. Therefore, it means that the different sales volumes of farmers' products to factory for processing and exporting to Japan have effect the difference in the lack of broodstock, disease outbreak, inefficient farm management, chemical residues due to the use of drugs and chemicals in high doses, and lack of support and technical knowledge dissemination about poultry farming at a significance level of 0.05.

The results of data analysis regarding the relationship between general data of chicken farmers and factors affecting the chicken farming for processing and exporting to Japan can be described as shown in Figure 4.8.

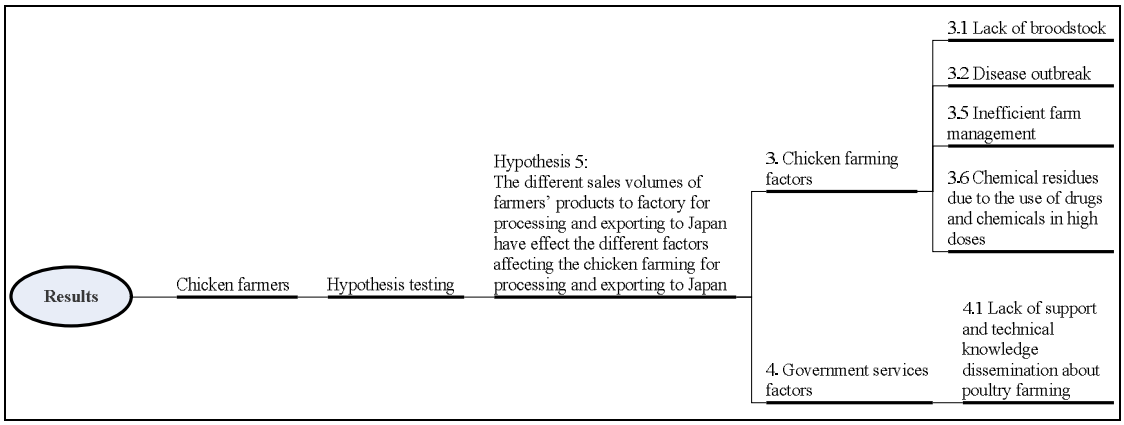

Figure 4.8 Results of hypothesis testing of chicken farmers

4.3 Results of studied on marine farmers samples

The results of studied on marine farmers samples have been separated into five parts as shown in Figure 4.9.

The questionnaires were sent to 234 marine farmers samples. The 64 questionnaires were returned, accounted for 27.35 percent, which will be analyzed general data of marine farmers. For factors affecting the marine farming for processing and exporting to Japan and statistical hypothesis testing will be analyzed from 48 returned questionnaires, accounted for 20.51 percent.

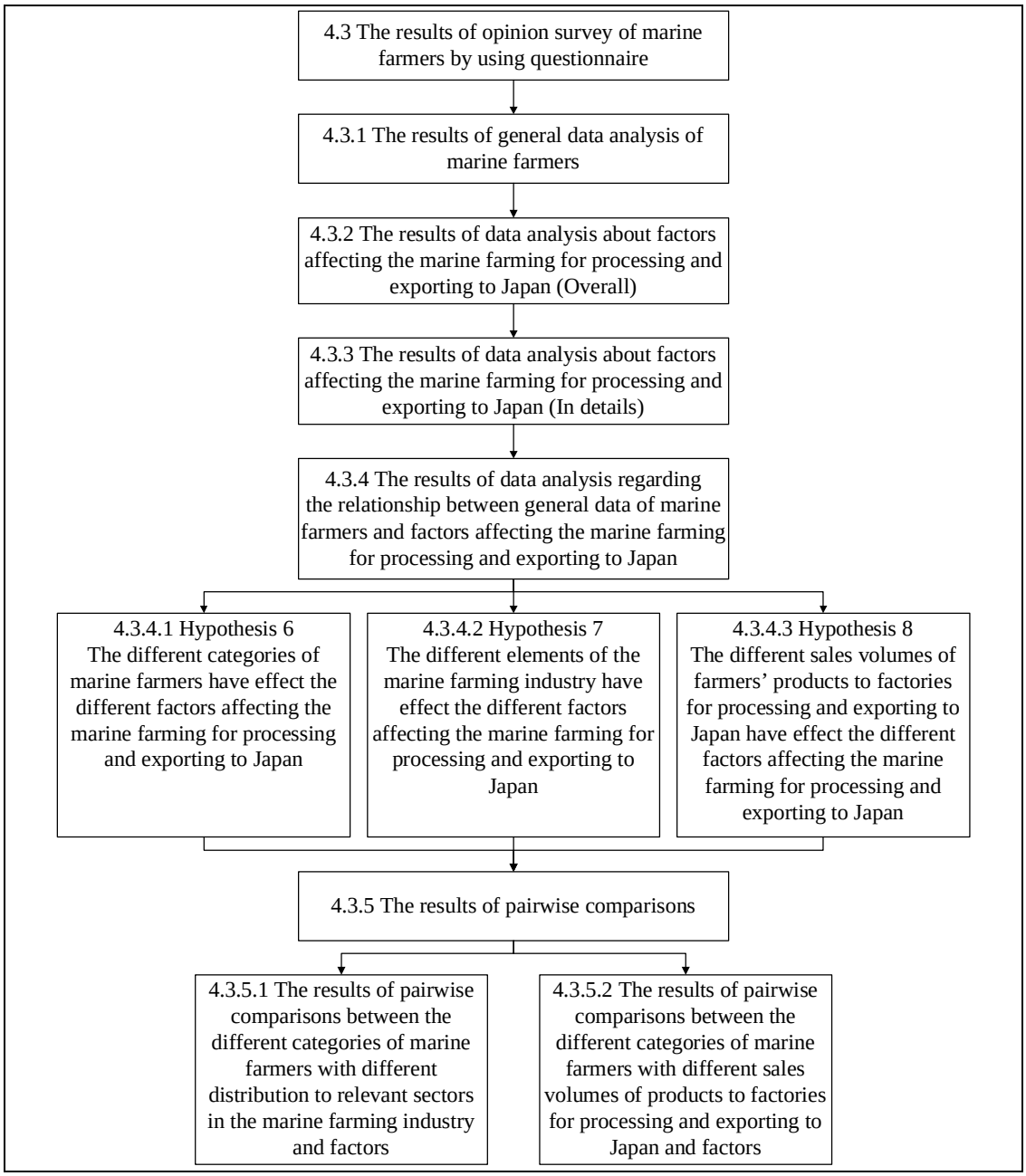

Figure 4.9 Details of the results of studied on marine farmers samples

4.3.1 Results of general data analysis of marine farmers

The general questions on marine farmers consists of categories of marine farmers, the distribution of products to relevant sectors in the marine farming industry, and sales volumes of farmers' products to factories for processing and exporting to Japan by an average per year.

Table 4.24 Number and percentage of respondents divided by categories of marine farmers

Categories of marine farmers *	Number	Percentage
Shrimp farmers	36	56.2
Fish farmers	8	12.5
Shrimp + Fish farmers	12	18.8
Shrimp + Crab + Fish farmers	8	12.5
Total	64	100.0

Note: * The respondent can choose more than 1 choice

From Table 4.24, it found that a majority of respondents are shrimp farmers, accounted for 56.2 percent, followed by shrimp and fish farmers with 18.8 percent, fish farmers with 12.5 percent, and shrimp, crab and fish farmers with 12.5 percent.

Table 4.25 Number and percentage of respondents divided by elements of the marine farming industry

Elements of the marine farming industry *	Number	Percentage
Integrators	10	15.6
Central market	2	3.1
Processing factories	1	1.6
Integrators + Central market	4	6.2
Integrators + Processing factories	32	50.0
Central market + Processing factories	5	7.8
Integrators + Central market + Processing factories	10	15.6
Total	64	100.0

Note: * The respondent can choose more than 1 choice

From Table 4.25, a majority of marine farmers distribute their produce to integrators and processing factories, accounted for 50.0 percent, followed by integrators with 15.6 percent, and integrators, central market and processing factories with 15.6 percent.

Table 4.26 Number and percentage of respondents divided by sales volumes of products to factories for processing and exporting to Japan

Sales volumes of farmers' products to factories for processing and exporting to Japan by an average per year	**Number**	**Percentage**
Less than 20 percent	22	45.8
21-40 percent	20	41.7
41-60 percent	4	8.3
More than 81 percent	2	4.2
Total	48	100.0

From Table 4.26, it found that the most of marine farmers have sales volume of products to factories for processing and exporting to Japan on an average less than 20 percent per year, accounted for 45.8 percent. The sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year is 41.7 percent. The sales volume of products to factories for processing and exporting to Japan by an average of 41-60 percent per year is 8.3 percent. In addition, the sales volume of products to factories for processing and exporting to Japan on an average more than 81 percent per year is 4.2 percent.

The results of general data analysis of marine farmers can be described as shown in Figure 4.10.

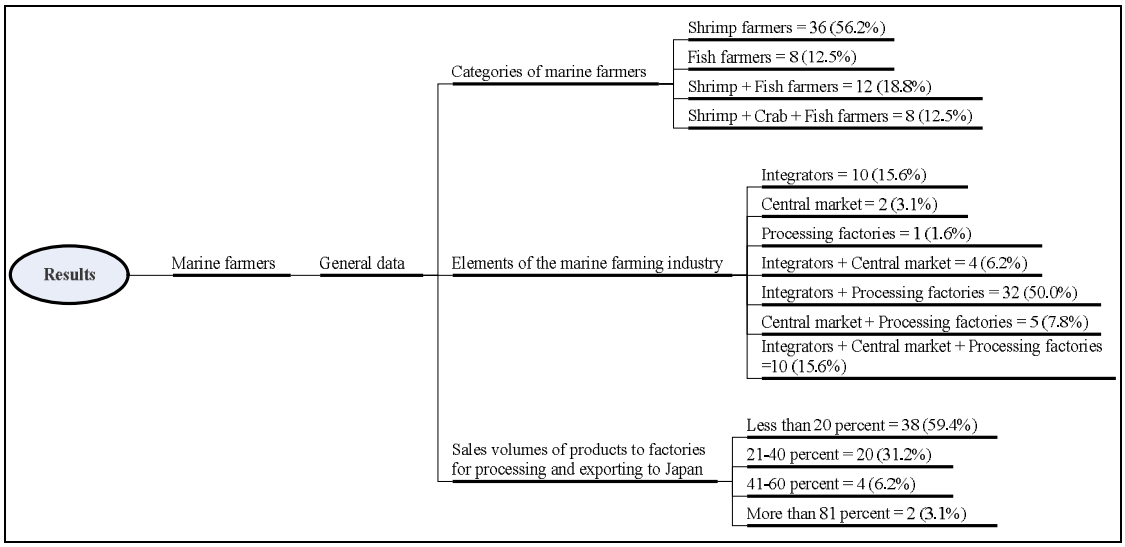

Figure 4.10 General data of marine farmers

4.3.2 Results of data analysis about factors affecting the marine farming for processing and exporting to Japan (Overall)

Factors affecting the marine farming for processing and exporting to Japan were analyzed such as Good Agricultural Practices for marine farming (GAP), qualifications of marine farmer, marine farming factors, and government services factors, all of which are shown in Table 4.27.

Table 4.27 Problem/obstacle factors that influence the marine farming for processing and exporting to Japan

Factors		Good Agricultural Practices for marine farming (GAP)		Qualifications of marine farmer		Marine farming factors		Government services factors	
General data		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Categories of marine farmers	Shrimp farmers	1.70	0.378	1.33	0.392	2.53	0.356	2.55	0.662
	Fish farmers	1.71	0.390	1.60	0.652	2.46	0.409	2.70	0.837
	Shrimp + Fish farmers	1.81	0.338	1.60	0.615	3.23	0.564	3.03	0.617
	Shrimp + Crab + Fish farmers	1.82	0.326	2.00	0.548	3.05	0.233	2.58	0.465
Elements of the marine farming industry	Processing factories	1.84	-	1.00	-	2.00	-	2.00	-
	Integrators + Processing factories	1.72	0.372	1.38	0.539	2.74	0.525	2.59	0.578
	Central market + Processing factories	1.92	0.588	1.90	0.418	2.54	0.275	3.20	1.022
	Integrators + Central market + Processing factories	1.71	0.133	1.75	0.354	2.87	0.459	2.70	0.654

Table 4.27 Problem/obstacle factors that influence the marine farming for processing and exporting to Japan (cont.)

General data	Factors	Good Agricultural Practices for marine farming (GAP)		Qualifications of marine farmer		Marine farming factors		Government services factors	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Sales volumes of farmers' products to factories for processing and exporting to Japan by an average per year	Less than 20 percent	1.74	0.389	1.52	0.499	2.52	0.388	2.62	0.747
	21-40 percent	1.65	0.267	1.30	0.299	2.85	0.471	2.64	0.571
	41-60 percent	2.08	0.521	2.12	1.031	3.14	0.833	2.88	0.829
	More than 81 percent	1.88	0.177	2.00	0.000	3.07	0.101	3.00	0.000
Overall		1.74	0.358	1.50	0.526	2.73	0.498	2.67	0.659

From Table 4.27, it shown that overall, marine farming factors ($\overline{X}$ = 2.73) are the most important factor and moderately important problem/obstacle affecting the marine farming for processing and exporting to Japan, whereas government services factors ($\overline{X}$ = 2.67), Good Agricultural Practices for marine farming ($\overline{X}$ = 1.74), and qualifications of marine farmer ($\overline{X}$ = 1.50) are ranked as 2nd, 3rd and 4th important factors, respectively.

In consideration, the factors affecting the marine farming for processing and exporting to Japan divided by categories of marine farmers found that the shrimp farmers and the fish farmers have government services factors ($\overline{X}$ = 2.55 and 2.70, respectively) as the most important factor and less important problem/obstacle for shrimp farmers, while it is moderately problem/obstacle for fish farmers. The shrimp and fish farmers and the shrimp, crab and fish farmers have marine farming factors ($\overline{X}$ = 3.23 and 3.05, respectively) as the most important factor and moderately important problem/obstacle.

In consideration, the factors affecting the marine farming for processing and exporting to Japan divided by elements of marine farming industry found that the marine farmers distribute their produce to the integrators and processing factories and the integrators, central market and processing factories have marine farming factors ($\overline{X}$ = 2.74 and 2.87, respectively) as the most important factor and moderately important problem/obstacle, whereas the marine farmers distribute their produce to the central market and processing factories have government services factors ($\overline{X}$ = 3.20) as the most important factor and moderately important problem/obstacle.

In consideration, the factors affecting the marine farming for processing and exporting to Japan divided by sales volumes of products to factories for processing and exporting to Japan found that the sales volume of products to factories for processing and exporting to Japan on average less than 20 percent per year has government services factors ($\overline{X}$ = 2.62) as the most important factor and moderately important problem/obstacle. The sales volumes of products to factories for processing and exporting to Japan by an average of 21-40 percent, 41-60 percent and more than 81 percent per year have marine farming factors ($\overline{X}$ = 2.85, 3.14 and 3.07, respectively) as the most important factor and moderately important problem/obstacle.

In addition, the analysis of factors in overall, including divided by categories of marine farmers, elements of marine farming industry, and sales volumes of products to factories for processing and exporting to Japan found that GAP for marine farming and qualifications of marine farmer are not the problems and obstacles affecting the marine farming for processing and exporting to Japan.

4.3.3 Results of data analysis about factors affecting the marine farming for processing and exporting to Japan (In details)

The results of data analysis regarding factors affecting the marine farming for processing and exporting to Japan (In details) found that GAP for marine farming and qualifications of marine farmer are not the problems and obstacles affecting the marine farming for processing and exporting to Japan. Therefore, the scope of analysis is limited to detail of marine farming factors and government services factors.

Table 4.28 Details of problem/obstacle factors that influence the marine farming for processing and exporting to Japan in overall and divided by categories of marine farmers

Factors	Categories of marine farmers								Overall	
	Shrimp farmers		Fish farmers		Shrimp + Fish farmers		Shrimp + Crab + Fish farmers			
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Good Agricultural Practices for marine farming (GAP)	1.70	0.378	1.71	0.390	1.81	0.338	1.82	0.326	1.74	0.358
Qualifications of marine farmer	1.33	0.392	1.60	0.652	1.60	0.615	2.00	0.548	1.50	0.526
Marine farming factors	2.53	0.356	2.46	0.409	3.23	0.564	3.05	0.233	2.73	0.498
1. Lack of broodstock	2.11	0.847	2.00	0.000	3.00	1.247	3.33	1.366	2.44	1.070
2. Disease outbreak	2.70	0.823	2.40	0.548	3.60	1.506	2.83	0.753	2.88	1.024
3. High production costs such as animal feeds, medicine and chemical products	4.19	0.786	3.40	0.894	4.90	0.316	2.67	1.366	4.06	1.040
4. Lack of farming knowledge and technology	2.00	0.734	2.40	0.548	3.10	1.197	3.67	1.033	2.48	1.052
5. Inefficient farm management	2.22	0.801	2.20	0.447	2.40	0.516	3.00	0.894	2.35	0.758
6. Chemical residues due to the use of drugs and chemicals in high doses	1.56	0.506	2.20	0.837	1.90	0.738	2.50	0.837	1.81	0.704
7. Lack of loans to support farming	2.93	1.299	2.60	0.548	3.70	1.252	3.33	0.516	3.10	1.189
Government services factors	2.55	0.662	2.70	0.837	3.03	0.617	2.58	0.465	2.67	0.659
1. Lack of support and technical knowledge dissemination about marine farming	2.67	0.784	3.00	1.000	3.60	1.265	3.33	0.516	2.98	0.956
2. Lack of attention and service from government sector	2.41	0.797	2.60	0.894	3.20	1.135	3.00	0.894	2.67	0.930
3. Insufficient government officers	2.85	0.907	2.60	0.894	2.90	0.876	2.00	0.894	2.73	0.917
4. Inexperienced government officers	2.26	0.984	2.60	0.894	2.40	0.516	2.00	0.894	2.29	0.874

From Table 4.28, analysis of factors affecting the marine farming for processing and exporting to Japan in overall found that marine farmers have marine farming factors as moderately important problem/obstacle ($\overline{X}$ = 2.73). When considering details of factors found that high production costs (i.e., animal feeds, medicine and chemical products) is highly important problem/obstacle with mean value of 4.06. The lack of loans to support farming and disease outbreak are moderately important problem/obstacle with mean value of 3.10 and 2.88, respectively. In addition, the lack of farming knowledge and technology, the lack of broodstock, the inefficient farm management, and chemical residues due to the use of drugs and chemicals in high doses are less important problem/obstacle with mean value of 2.48, 2.44, 2.35 and 1.81, respectively.

Government services factors are moderately important problem/obstacle ($\overline{X}$ = 2.67), as the lack of support and technical knowledge dissemination about marine farming, the insufficient government officers, and the lack of attention and service from government sector are moderately important problem/obstacle with mean

value of 2.98, 2.73 and 2.67, respectively. The inexperienced government officer is less important problem/obstacle with mean value of 2.29.

Analysis of problem factors affecting the processed food production for export to Japan divided by categories of marine farmers found that the shrimp farmers have marine farming factors as less important problem/obstacle ($\overline{X}$ = 2.53), as high production costs is highly important problem/obstacle with mean value of 4.19. The lack of loans to support farming and disease outbreak are moderately important problem/obstacle with mean value of 2.93 and 2.70, respectively. The inefficient farm management, the lack of broodstock, and the lack of farming knowledge and technology are less important problem/obstacle with mean value of 2.22, 2.11 and 2.00, respectively. In addition, chemical residue due to the use of drugs and chemicals in high doses is not problem/obstacle with mean value of 1.56.

Government services factors are less important problem/obstacle ($\overline{X}$ = 2.55), as the insufficient government officers and the lack of support and technical knowledge dissemination about marine farming are moderately important problem/obstacle with mean value of 2.85 and 2.67, respectively. In addition, the lack of attention and service from government sector and the inexperienced government officer are less important problem/obstacle with mean value of 2.41 and 2.26, respectively.

For the fish farmers have marine farming factors as less important problem/obstacle ($\overline{X}$ = 2.46), as high production costs is highly important problem/obstacle with mean value of 3.40. The lack of loans to support farming is moderately important problem/obstacle with mean value of 2.60. The disease outbreak, the lack of knowledge and technology for farming, the inefficient farm management, chemical residues due to the use of drugs and chemicals in high doses, and the lack of broodstock are less important problem/obstacle with mean value of 2.40, 2.40, 2.20, 2.20 and 2.00, respectively.

Government services factors are moderately important problem/obstacle ($\overline{X}$ = 2.70), as the lack of support and technical knowledge dissemination about

marine farming, the lack of attention and service from government sector, the insufficient government officers, and the inexperienced government officers are all moderately important problem/obstacle with mean value of 3.00, 2.60, 2.60 and 2.60, respectively.

For the shrimp and fish farmers have marine farming factors as moderately important problem/obstacle ($\overline{X}$ = 3.23), as high production costs is extremely important problem/obstacle with mean value of 4.90. The lack of loans to support farming and disease outbreak are highly important problem/obstacle with mean value of 3.70 and 3.60, respectively. The lack of farming knowledge and technology and the lack of broodstock are moderately important problem/obstacle with mean value of 3.10 and 3.00, respectively. In addtion, the inefficient farm management and chemical residues due to the use of drugs and chemicals in high doses are less important problem/obstacle with mean value of 2.40 and 1.90, respectively.

Government services factors are moderately important problem/obstacle ($\overline{X}$ = 3.03), as the lack of support and technical knowledge dissemination about marine farming is highly important problem/obstacle with mean value of 3.60. The lack of attention and service from government sector and the insufficient government officers are moderately important problem/obstacle with mean value of 3.20 and 2.90, respectively. In addition, the inexperienced government officer is less important problem/obstacle with mean value of 2.40.

For the shrimp, crab and fish farmers have marine farming factors as a moderately important problem/obstacle ($\overline{X}$ = 3.05), as the lack of farming knowledge and technology is highly important problem/obstacle with mean value of 3.67. The lack of loans to support farming, the lack of broodstock, the inefficient farm management, disease outbreak, and high production costs are moderately important problem/obstacle with mean value of 3.33, 3.33, 3.00, 2.83 and 2.67, respectively. In addtion, chemical residue due to the use of drugs and chemicals in high doses is less important problem/obstacle with mean value of 2.50.

Government services factors are less important problem/obstacle ($\overline{X}$ = 2.58), as the lack of support and technical knowledge dissemination about marine farming and the lack of attention and service from government sector are moderately important problem/obstacle with mean value of 3.33 and 3.00, respectively. For the insufficient government officers and the inexperienced government officer are less important problem/obstacle with the same mean of 2.00.

Table 4.29 Details of problem/obstacle factors that influence the marine farming for processing and exporting to Japan in overall, including detail of factors divided by elements of marine farming industry

Factors	Elements of the marine farming industry							
	Processing factories		Integrators + Processing factories		Central market + Processing factories		Integrators + Central market + Processing factories	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Good Agricultural Practices for marine farming (GAP)	1.84	-	1.72	0.372	1.92	0.588	1.71	0.133
Qualifications of marine farmer	1.00	-	1.38	0.539	1.90	0.418	1.75	0.354
Marine farming factors	2.00	-	2.74	0.525	2.54	0.275	2.87	0.459
1. Lack of broodstock	2.00	-	2.41	1.043	2.20	1.095	2.70	1.252
2. Disease outbreak	3.00	-	2.88	1.070	2.40	0.548	3.10	1.101
3. High production costs such as animal feeds, medicine and chemical products	4.00	-	4.03	1.177	4.00	1.000	4.20	0.632
4. Lack of farming knowledge and technology	1.00	-	2.56	1.190	2.00	0.707	2.60	0.516
5. Inefficient farm management	2.00	-	2.47	0.879	2.20	0.447	2.10	0.316
6. Chemical residues due to the use of drugs and chemicals in high doses	1.00	-	1.81	0.693	1.80	0.837	1.90	0.738
7. Lack of loans to support farming	1.00	-	3.03	1.177	3.20	1.643	3.50	0.850
Government services factors	2.00	-	2.59	0.578	3.20	1.022	2.70	0.654
1. Lack of support and technical knowledge dissemination about marine farming	2.00	-	2.87	1.040	3.40	0.894	3.20	0.632
2. Lack of attention and service from government sector	2.00	-	2.56	0.982	3.20	1.095	2.80	0.632
3. Insufficient government officers	2.00	-	2.66	0.902	3.20	1.095	2.80	0.919
4. Inexperienced government officers	2.00	-	2.28	0.813	3.00	1.225	2.00	0.816

From Table 4.29, it found that marine farmers distribute their produce to integrators and processing factories have marine farming factors as moderately important problem/obstacle ($\overline{X}$ = 2.74), as high production costs (i.e., animal feeds, medicine and chemical products) is highly important problem/obstacle with mean value of 4.03. The lack of loans to support farming and disease outbreak are moderately important problem/obstacle with mean value of 3.03 and 2.88, respectively. In addition, the lack of farming knowledge and technology, the inefficient farm management, the lack of broodstock, and chemical residues due to the

use of drugs and chemicals in high doses are less important problem/obstacle with mean value of 2.56, 2.47, 2.41 and 1.81, respectively.

Government services factors are less important problem/obstacle ($\overline{X}$ = 2.59), as the lack of support and technical knowledge dissemination about marine farming and the insufficient government officers are moderately important problem/obstacle with mean value of 2.87 and 2.66, respectively. For the lack of attention and service from government sector and the inexperienced government officer are less important problem/obstacle with mean value of 2.56 and 2.28, respectively.

The marine farmers distribute their produce to central agricultural market and processing factories have marine farming factors as less important problem/obstacle ($\overline{X}$ = 2.54), as high production costs is highly important problem/obstacle with mean value of 4.00. The lack of loan to support farming is moderately important problem/obstacle with mean value of 3.20. In addition, the disease outbreak, the inefficient farm management, the lack of broodstock, the lack of farming knowledge and technology, and chemical residues due to the use of drugs and chemicals in high doses are less important problem/obstacle with mean value of 2.40, 2.20, 2.20, 2.00 and 1.80, respectively.

Government services factors are moderately important problem/obstacle ($\overline{X}$ = 3.20), as the lack of support and technical knowledge dissemination about marine farming is highly important problem/obstacle with mean value of 3.40. For the lack of attention and service from government sector, the insufficient government officers, and the inexperienced government officer are moderately important problem/obstacle with mean value of 3.20, 3.20 and 3.00, respectively.

The marine farmers distribute their produce to integrators, central agricultural market and processing factories have marine farming factors as moderately important problem/obstacle ($\overline{X}$ = 2.87), as high production costs is extremely important problem/obstacle with mean value of 4.20. The lack of loans to support farming is highly important problem/obstacle with mean value of 3.50. The

disease outbreaks, the lack of broodstock, and the lack of farming knowledge and technology are moderately important problem/obstacle with mean value of 3.10, 2.70 and 2.60, respectively. In addition, the inefficient farm management and chemical residues due to the use of drugs and chemicals in high doses are less important problem/obstacle with mean value of 2.10 and 1.90, respectively.

Government services factors are moderately important problem/obstacle ($\overline{X}$ = 2.70), as the lack of support and technical knowledge dissemination about marine farming, the lack of attention and service from government sector, and the insufficient government officers are moderately important problem/obstacle with mean value of 3.20, 2.80 and 2.80, respectively. For the inexperienced government officer is less important problem/obstacle with mean value of 2.00.

Table 4.30 Details of problem/obstacle factors that influence the marine farming for processing and exporting to Japan divided by sales volumes of products to factories for processing and exporting to Japan

Factors	Sales volumes of farmers' products to factories for processing and exporting to Japan by an average per year							
	Less than 20 percent		21-40 percent		41-60 percent		More than 81 percent	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Good Agricultural Practices for marine farming (GAP)	1.74	0.389	1.65	0.267	2.08	0.521	1.88	0.177
Qualifications of marine farmer	1.52	0.499	1.30	0.299	2.12	1.031	2.00	0.000
Marine farming factors	2.52	0.388	2.85	0.471	3.14	0.833	3.07	0.101
1. Lack of broodstock	2.05	0.899	2.50	0.946	4.00	1.414	3.00	0.000
2. Disease outbreak	2.45	0.858	3.25	1.020	3.00	1.414	3.50	0.707
3. High production costs such as animal feeds, medicine and chemical products	4.18	0.907	4.30	0.733	2.75	2.062	3.00	0.000
4. Lack of farming knowledge and technology	2.05	0.722	2.65	0.988	3.75	1.893	3.00	0.000
5. Inefficient farm management	2.09	0.684	2.40	0.681	3.25	0.957	3.00	0.000
6. Chemical residues due to the use of drugs and chemicals in high doses	1.59	0.666	1.85	0.587	2.25	0.957	3.00	0.000
7. Lack of loans to support farming	3.23	1.343	3.00	1.026	3.00	1.633	3.00	0.000
Government services factors	2.62	0.747	2.64	0.571	2.88	0.829	3.00	0.000
1. Lack of support and technical knowledge dissemination about marine farming	2.59	0.908	3.25	0.851	3.75	1.258	3.00	0.000
2. Lack of attention and service from government sector	2.45	0.912	2.70	0.923	3.50	1.000	3.00	0.000
3. Insufficient government officers	2.95	0.950	2.60	0.754	2.00	1.414	3.00	0.000
4. Inexperienced government officers	2.50	0.913	2.00	0.858	2.25	0.500	3.00	0.000

From Table 4.30, it found that marine farmers with sales volume of products to factories for processing and exporting to Japan on average less than 20 percent per year have marine farming factors as less important problem/obstacle ($\overline{X}$ = 2.52), as high production costs (i.e., animal feeds, medicine and chemical products) is

highly important problem/obstacle with mean value of 4.18. The lack of loans to support farming is moderately important problem/obstacle with mean value of 3.23. For disease outbreaks, inefficient farm management, the lack of farming knowledge and technology, and the lack of broodstock are less important problem/obstacle with mean value of 2.45, 2.09, 2.05 and 2.05, respectively. In addition, chemical residue due to the use of drugs and chemicals in high doses is not problem/obstacle with mean value of 1.59.

Government services factors are moderately important problem/obstacle ($\overline{X}$ = 2.62), as the insufficient government officers is moderately important problem/obstacle with mean value of 2.95. The lack of support and technical knowledge dissemination about marine farming, the inexperienced government officers, and the lack of attention and service from government sector are less important problem/obstacle with mean value of 2.59, 2.50 and 2.45, respectively.

The marine farmers with sales volume of products to factories for processing and exporting to Japan by an average 21-40 percent per year have marine farming factors as moderately important problem/obstacle ($\overline{X}$ = 2.85), as high production costs is extremely important problem/obstacle with mean value of 4.30. For disease outbreaks, the lack of loans to support farming, and the lack of knowledge and technology for farming are moderately important problem/obstacle with mean value of 3.25, 3.00 and 2.65, respectively. In addition, the lack of broodstock, inefficient farm management, and chemical residues due to the use of drugs and chemicals in high doses are less important problem/obstacle with mean value of 2.50, 2.40 and 1.85, respectively.

Government services factors are moderately important problem/obstacle ($\overline{X}$ = 2.64), as the lack of support and technical knowledge dissemination about marine farming, the lack of attention and service from government sector, and the insufficient government officers are moderately important problem/obstacle with mean value of 3.25, 2.70 and 2.60, respectively. The inexperienced government officer is less important problem/obstacle with mean value of 2.00.

The marine farmers with sales volume of products to factories for processing and exporting to Japan by an average 41-60 percent per year have marine farming factors as moderately important problem/obstacle ($\overline{X}$ = 3.14), as the lack of broodstock and the lack of farming knowledge and technology are highly important problem/obstacle with mean value of 4.00 and 3.75, respectively. For inefficient farm management, disease outbreaks, lack of loans to support farming, and high production costs are moderately important problem/obstacle with mean value of 3.25, 3.00, 3.00 and 2.75, respectively. In addition, chemical residue due to the use of drugs and chemicals in high doses is less important problem/obstacle with mean value of 2.25.

Government services factors are moderately important problem/obstacle ($\overline{X}$ = 2.88), as the lack of support and technical knowledge dissemination about marine farming and the lack of attention and service from government sector are highly important problem/obstacle with mean value of 3.75 and 3.50, respectively. The inexperienced government officers and the insufficient government officers are less important problem/obstacle with mean value of 2.25 and 2.00, respectively.

In addition, the marine farmers with sales volume of products to factories for processing and exporting to Japan on an average more than 81 percent per year have marine farming factors as moderately important problem/obstacle ($\overline{X}$ = 3.07), as disease outbreak is highly important problem/obstacle with mean value of 3.50. For the lack of broodstock, high production costs, the lack of farming knowledge and technology, inefficient farm management, chemical residues due to the use of drugs and chemicals in high doses, and the lack of loan to support farming are moderately important problem/obstacle with the same mean of 3.00.

Government services factors are moderately important problem/obstacle ($\overline{X}$ = 3.00), as the lack of support and technical knowledge dissemination about marine farming, the lack of attention and service from government sector, the insufficient government officers, and the inexperienced government officers are moderately important problem/obstacle with the same mean value of 3.00.

4.3.4 Results of data analysis regarding the relationship between general data of marine farmers and factors affecting the marine farming for processing and exporting to Japan

The hypothesis testing is statistical analysis to find the relationship between general data of marine farmers (consists of categories of marine farmers, elements of marine farming industry, and sales volumes of products to factories for processing and exporting to Japan) and factors affecting the marine farming for processing and exporting to Japan (consists of Good Agricultural Practices for marine farming (GAP), qualifications of marine farmer, marine farming factors, and government services factors) at a significance level of 0.05.

4.3.4.1 Hypothesis 6: The different categories of marine farmers have effect the different factors affecting the marine farming for processing and exporting to Japan.

The null and alternative hypotheses are

H_0: The different categories of marine farmers have not effect the different factors affecting the marine farming for processing and exporting to Japan.

H_1: The different categories of marine farmers have effect the different factors affecting the marine farming for processing and exporting to Japan.

Table 4.31 Results of hypothesis testing of the different categories of marine farmers have effect the different factors affecting the marine farming for processing and exporting to Japan

Factors	Categories of marine farmers		Results
	Chi-Square	Sig.	
1. Good Agricultural Practices for marine farming (GAP)	0.700	0.873	Accept H_0
2. Qualifications of marine farmer	8.578	0.035	Reject H_0
2.1 Lack of training in marine farming principles	10.512	0.015	Reject H_0
2.2 Unregistered farmer	1.180	0.758	Accept H_0

Table 4.31 Results of hypothesis testing of the different categories of marine farmers have effect the different factors affecting the marine farming for processing and exporting to Japan (cont.)

Factors	Categories of marine farmers		Results
	Chi-Square	Sig.	
3. Marine farming factors	16.577	0.001	Reject H_0
3.1 Lack of broodstock	10.203	0.017	Reject H_0
3.2 Disease outbreak	3.091	0.378	Accept H_0
3.3 High production costs such as animal feeds, medicine and chemical products	18.798	0.000	Reject H_0
3.4 Lack of farming knowledge and technology	15.403	0.002	Reject H_0
3.5 Inefficient farm management	4.775	0.189	Accept H_0
3.6 Chemical residues due to the use of drugs and chemicals in high doses	9.483	0.024	Reject H_0
3.7 Lack of loans to support farming	4.227	0.238	Accept H_0
4. Government services factors	4.672	0.197	Accept H_0

Table 4.31 shows the results of nonparametric statistical analysis with the Kruskal-Wallis H. It found that Good Agricultural Practices for marine farming (GAP) and government services factors have the p-value of 0.873 and 0.197, respectively which are greater than 0.05. That is, the null hypothesis (H_0) is accepted and the alternative hypothesis (H_1) is rejected. Therefore, it means that the different categories of marine farmers have not effect the difference in Good Agricultural Practices for marine farming (GAP) and government services factors.

The qualifications of marine farmer and marine farming factors have the p-value of 0.035 and 0.001, respectively which are less than 0.05. That is, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. Therefore, it means that the different categories of marine farmers have effect the difference in qualifications of marine farmers and marine farming factors at a significance level of 0.05.

The detailed analysis of factors found that the lack of training in marine farming principles, the lack of broodstock, high production costs (i.e., animal feeds,

medicine and chemical products), the lack of farming knowledge and technology, and chemical residues due to the use of drugs and chemicals in high doses have the p-value of 0.015, 0.017, 0.000, 0.002 and 0.024, respectively which are less than 0.05. That is, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. Therefore, it means that the different categories of marine farmers have effect the difference in the lack of training in marine farming principles, the lack of broodstock, high production costs (i.e., animal feeds, medicine and chemical products), the lack of farming knowledge and technology, and chemical residues due to the use of drugs and chemicals in high doses at a significance level of 0.05.

4.3.4.2 Hypothesis 7: The different elements of marine farming industry have effect the different factors affecting the marine farming for processing and exporting to Japan.

The null and alternative hypotheses are

H_0: The different elements of marine farming industry have not effect the different factors affecting the marine farming for processing and exporting to Japan.

H_1: The different elements of marine farming industry have effect the different factors affecting the marine farming for processing and exporting to Japan.

Table 4.32 Results of hypothesis testing of the different elements of marine farming industry have effect the different factors affecting the marine farming for processing and exporting to Japan

Factors	**Elements of the marine farming industry**		**Results**
	Chi-Square	**Sig.**	
1. Good Agricultural Practices for marine farming (GAP)	0.930	0.818	Accept H_0
2. Qualifications of marine farmer	12.692	0.005	Reject H_0
2.1 Lack of training in marine farming principles	10.555	0.014	Reject H_0
2.2 Unregistered farmer	2.142	0.543	Accept H_0
3. Marine farming factors	3.715	0.294	Accept H_0
4. Government services factors	3.534	0.316	Accept H_0

Table 4.32 shows the results of nonparametric statistical analysis with the Kruskal-Wallis H. It found that GAP for marine farming, marine farming factors, and government services factors have the p-value of 0.818, 0.294 and 0.316, respectively which are greater than 0.05. That is, the null hypothesis (H_0) is accepted and the alternative hypothesis (H_1) is rejected. Therefore, it means that the different elements of marine farming industry have not effect the difference in GAP for marine farming, marine farming factors, and government services factors.

The qualifications of marine farmer have the p-value of 0.005. That is, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. Therefore, it means that the different elements of marine farming industry have effect the difference in qualifications of marine farmer at a significance level of 0.05.

The detailed analysis of factors found that the lack of training in marine farming principles have the p-value of 0.014 which are less than 0.05. That is, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. Therefore, it means that the different categories of marine farmers have effect the difference in the lack of training in marine farming principles at a significance level of 0.05.

4.3.4.3 Hypothesis 8: The different sales volumes of farmers' products to factories for processing and exporting to Japan have effect the different factors affecting the marine farming for processing and exporting to Japan.

The null and alternative hypotheses are

H_0: The different sales volumes of farmers' products to factories for processing and exporting to Japan have not effect the different factors affecting the marine farming for processing and exporting to Japan.

H_1: The different sales volumes of farmers' products to factories for processing and exporting to Japan have effect the different factors affecting the marine farming for processing and exporting to Japan.

Table 4.33 Results of hypothesis testing of the different sales volumes of farmers' products to factories for processing and exporting to Japan have effect the different factors affecting the marine farming for processing and exporting to Japan

Factors	**Sales volumes of farmers' products to factories for processing and exporting to Japan by an average per year**		**Results**
	Chi-Square	**Sig.**	
1. Good Agricultural Practices for marine farming (GAP)	3.607	0.307	Accept H_0
2. Qualifications of marine farmer	6.999	0.072	Accept H_0
3. Marine farming factors	8.400	0.038	Reject H_0
3.1 Lack of broodstock	12.078	0.007	Reject H_0
3.2 Disease outbreak	8.244	0.041	Reject H_0
3.3 High production costs such as animal feeds, medicine and chemical products	5.739	0.125	Accept H_0
3.4 Lack of farming knowledge and technology	8.093	0.044	Reject H_0
3.5 Inefficient farm management	8.567	0.036	Reject H_0
3.6 Chemical residues due to the use of drugs and chemicals in high doses	8.493	0.037	Reject H_0
3.7 Lack of loans to support farming	0.560	0.905	Accept H_0
4. Government services factors	2.342	0.505	Accept H_0
4.1 Lack of support and technical knowledge dissemination about marine farming	7.925	0.048	Reject H_0
4.2 Lack of attention and service from government sector	5.180	0.159	Accept H_0
4.3 Insufficient government officers	4.237	0.237	Accept H_0
4.4 Inexperienced government officers	8.354	0.039	Accept H_0

Table 4.33 shows the results of nonparametric statistical analysis with the Kruskal-Wallis H. It found that GAP for marine farming, qualifications of marine farmer, and government services factors have the p-value of 0.307, 0.072 and 0.505, respectively which are greater than 0.05. That is, the null hypothesis (H_0) is accepted and the alternative hypothesis (H_1) is rejected. Therefore, it means that the different sales volumes of farmers' products to factories for processing and exporting to Japan

have not effect the difference in GAP for marine farming, qualifications of marine farmer, and government services factors.

The marine farming factors have the p-value of 0.038. That is, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. Therefore, it means that the different elements of marine farming industry have effect the difference in marine farming factors at a significance level of 0.05.

The detailed analysis of factors found that the lack of broodstock, disease outbreak, the lack of knowledge and technology for farming, inefficient farm management, chemical residues due to the use of drugs and chemicals in high doses, and the lack of support and technical knowledge dissemination about marine farming have the p-value of 0.007, 0.041, 0.044, 0.036, 0.037 and 0.048, respectively which are less than 0.05. That is, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. Therefore, it means that the different categories of marine farmers have effect the difference in the lack of broodstock, disease outbreak, the lack of knowledge and technology for farming, inefficient farm management, chemical residues due to the use of drugs and chemicals in high doses, and the lack of support and technical knowledge dissemination about marine farming at a significance level of 0.05.

The results of data analysis regarding the relationship between general data of marine farmers and factors affecting the marine farming for processing and exporting to Japan can be described as shown in Figure 4.11.

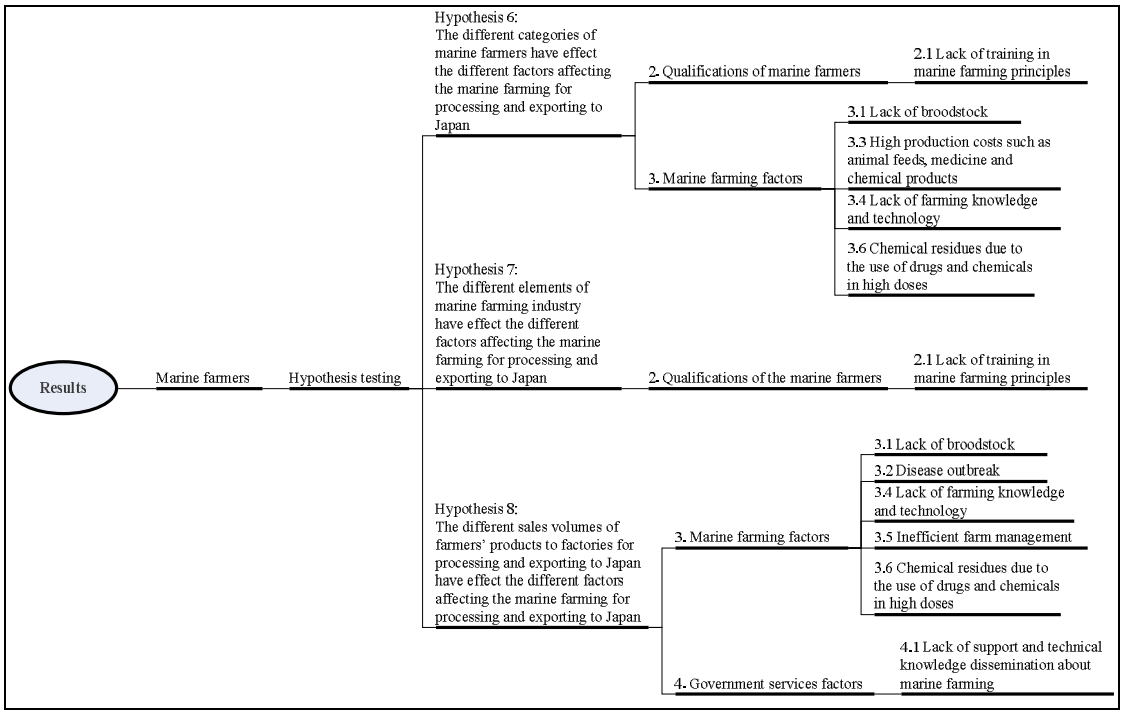

Figure 4.11 Results of hypothesis testing of marine farmers

4.3.5 Results of pairwise comparisons

From the results of hypothesis testing to find the relationship between general data of marine farmers and factors affecting the marine farming for processing and exporting to Japan found that the different categories of marine farmers and the different elements of marine farming industry have effect the difference in the lack of training in marine farming principles at a significance level of 0.05. In addition, the different categories of marine farmers and the different sales volumes of farmers' products to factories for processing and exporting to Japan have effect the difference in the lack of broodstock, the lack of farming knowledge and technology, including chemical residues due to the use of drugs and chemicals in high doses at a significance level of 0.05.

Therefore, in section 4.3.5.1 will be implemented pairwise comparisons between the different categories of marine farmers with different distribution to relevant sectors in the marine farming industry and the lack of training in marine farming principles. In addition, in section 4.3.5.2 will be implemented pairwise comparisons between the different categories of marine farmers with different sales

volumes of products to factories for processing and exporting to Japan and factors (i.e., the lack of broodstock, the lack of farming knowledge and technology, including chemical residues due to the use of drugs and chemicals in high doses), to find the pair which has the difference at a significance level of 0.05.

4.3.5.1 Results of pairwise comparisons between the different categories of marine farmers with different distribution to relevant sectors in the marine farming industry and the lack of training in marine farming principles

Hypothesis is denoted.

H_0: $m_1 = m_2 = m_3 = m_4 = m_5 = m_6 = m_7 = m_8 = m_9 = m_{10} = m_{11}$

H_1: $m_i \neq m_j$ for at least one pair (i, j)

Where

m_1 = shrimp farmers distribute their produce to processing factories

m_2 = shrimp farmers distribute their produce to integrators and processing factories

m_3 = shrimp farmers distribute their produce to central market and processing factories

m_4 = shrimp farmers distribute their produce to integrators, central market and processing factories

m_5 = fish farmers distribute their produce to integrators and processing factories

m_6 = fish farmers distribute their produce to central market and processing factories

m_7 = fish farmers distribute their produce to integrators, central market and processing factories

m_8 = shrimp and fish farmers distribute their produce to integrators and processing factories

m_9 = shrimp and fish farmers distribute their produce to integrators, central market and processing factories

m_{10} = shrimp, crab and fish farmers distribute their produce to integrators and processing factories

m_{11} = shrimp, crab and fish farmers distribute their produce to integrators, central market and processing factories

Table 4.34 Results of pairwise comparisons between the different categories of marine farmers with different distribution to relevant sectors in the marine farming industry and the lack of training in marine farming principles

Qualifications of marine farmer	Categories of marine farmers and elements of the marine farming industry	Shrimp farmers / processing factories	Shrimp farmers / integrators and processing factories	Shrimp farmers / central market and processing factories	Shrimp farmers / integrators, central market and processing factories	Fish farmers / integrators and processing factories	Fish farmers / central market and processing factories	Fish farmers / integrators, central market and processing factories	Shrimp and fish farmers / integrators and processing factories	Shrimp and fish farmers / integrators, central market and processing factories	Shrimp, crab and fish farmers / integrators and processing factories	Shrimp, crab and fish farmers / integrators, central market and processing factories
		$\overline{X}$ = 1.00	$\overline{X}$ = 1.32	$\overline{X}$ = 2.50	$\overline{X}$ = 2.00	$\overline{X}$ = 1.33	$\overline{X}$ = 3.00	$\overline{X}$ = 3.00	$\overline{X}$ = 2.00	$\overline{X}$ = 2.25	$\overline{X}$ = 3.25	$\overline{X}$ = 2.50
Lack of training in marine farming principles	Shrimp farmers / processing factories $\overline{X}$ = 1.00	-										
	Shrimp farmers / integrators and processing factories $\overline{X}$ = 1.32	-0.574 (0.566)	-									
	Shrimp farmers / central market and processing factories $\overline{X}$ = 2.50	-1.088 (0.277)	-2.161* (0.031)	-								
	Shrimp farmers / integrators, central market and processing factories $\overline{X}$ = 2.00	-1.732 (0.083)	-2.212* (0.027)	-0.585 (0.558)	-							
	Fish farmers / integrators and processing factories $\overline{X}$ = 1.33	-0.577 (0.564)	-0.185 (0.854)	-1.297 (0.195)	-1.581 (0.114)	-						

Notes: * is different at the 0.05 level of significance

(Number) is p-value

Table 4.34 Results of pairwise comparisons between the different categories of marine farmers with different distribution to relevant sectors in the marine farming industry and the lack of training in marine farming principles (cont.)

Qualifications of marine farmer	Categories of marine farmers and elements of the marine farming industry	Shrimp farmers / processing factories	Shrimp farmers / integrators and processing factories	Shrimp farmers / central market and processing factories	Shrimp farmers / integrators, central market and processing factories	Fish farmers / integrators and processing factories	Fish farmers / central market and processing factories	Fish farmers / integrators, central market and processing factories	Shrimp and fish farmers / integrators and processing factories	Shrimp and fish farmers / integrators, central market and processing factories	Shrimp, crab and fish farmers / integrators and processing factories	Shrimp, crab and fish farmers / integrators, central market and processing factories
		$\overline{X}$ = 1.00	$\overline{X}$ = 1.32	$\overline{X}$ = 2.50	$\overline{X}$ = 2.00	$\overline{X}$ = 1.33	$\overline{X}$ = 3.00	$\overline{X}$ = 3.00	$\overline{X}$ = 2.00	$\overline{X}$ = 2.25	$\overline{X}$ = 3.25	$\overline{X}$ = 2.50
Lack of training in marine farming principles	Fish farmers / central market and processing factories $\overline{X}$ = 3.00	-1.000 (0.317)	-1.936 (0.053)	-0.363 (0.717)	-1.732 (0.083)	-1.414 (0.157)	-					
	Fish farmers / integrators, central market and processing factories $\overline{X}$ = 3.00	-1.000 (0.317)	-1.936 (0.053)	-0.363 (0.717)	-1.732 (0.083)	-1.414 (0.157)	-0.000 (1.000)					
	Shrimp and fish farmers / integrators and processing factories $\overline{X}$ = 2.00	-0.837 (0.403)	-1.164 (0.245)	-0.780 (0.435)	-0.866 (0.386)	-0.577 (0.564)	-1.048 (0.295)	-1.048 (0.295)	-			
	Shrimp and fish farmers / integrators, central market and processing factories $\overline{X}$ = 2.25	-1.581 (0.114)	-2.675* (0.007)	-0.310 (0.757)	-0.866 (0.386)	-1.775 (0.076)	-1.225 (0.221)	-1.225 (0.221)	-1.153 (0.249)	-		
	Shrimp, crab and fish farmers / integrators and processing factories $\overline{X}$ = 3.25	-1.451 (0.147)	-3.156* (0.002)	-0.744 (0.457)	-1.775 (0.076)	-1.999* (0.046)	0.000 (1.000)	0.000 (1.000)	-1.650 (0.099)	-1.423 (0.155)	-	
	Shrimp, crab and fish farmers / integrators, central market and processing factories $\overline{X}$ = 2.50	-1.225 (0.221)	-2.234* (0.025)	0.000 (1.000)	-1.225 (0.221)	-1.521 (0.128)	-0.707 (0.480)	-0.707 (0.480)	-1.051 (0.293)	-0.559 (0.576)	-0.750 (0.453)	-

Notes: * is different at the 0.05 level of significance

(Number) is p-value

Table 4.34 shows the results of pairwise comparisons by the Mann-Whitney U Test. It found that the different categories of marine farmers and the different distribution to relevant sectors in the marine farming industry have a difference in the lack of training in marine farming principles at the 0.05 level of significance in six pairs as follows.

The shrimp farmers distribute their produce to integrators and processing factories differ from the shrimp farmers distribute their produce to central market and processing factories, the shrimp farmers distribute their produce to integrators, central market and processing factories, the shrimp and fish farmers distribute their produce to integrators, central market and processing factories, the shrimp, crab and fish farmers distribute their produce to integrators and processing factories, including the shrimp, crab and fish farmers distribute their produce to integrators, central market and processing factories due to the p-value are 0.031, 0.027, 0.007, 0.002 and 0.025, respectively, which are less than 0.05.

The fish farmers distribute their produce to integrators and processing factories differ from the shrimp, crab and fish farmers distribute their produce to integrators and processing factories due to the p-value are 0.046 which are less than 0.05.

The results of pairwise comparisons between the different categories of marine farmers with different distribution to relevant sectors in the marine farming industry and factors can be described as shown in Figure 4.12.

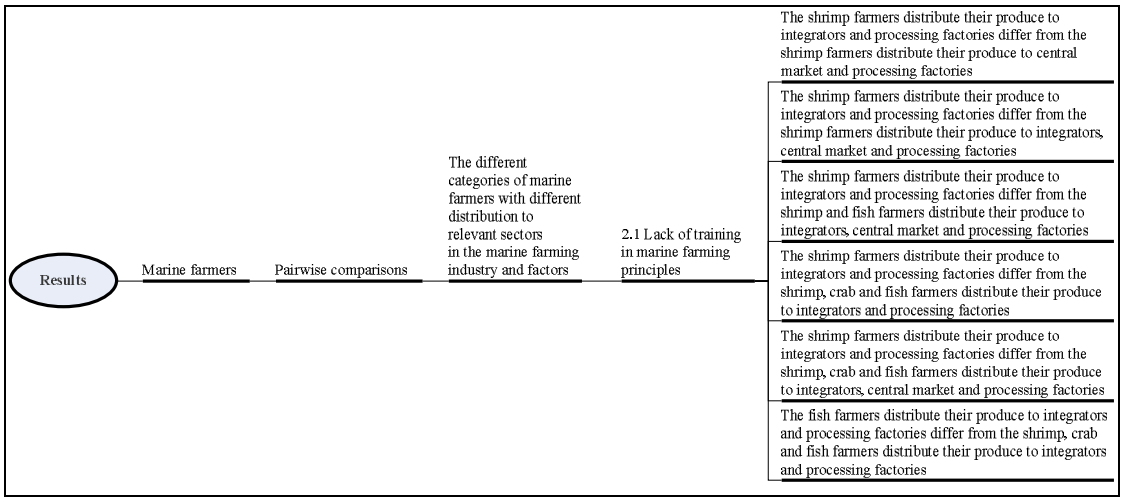

Figure 4.12 Results of pairwise comparisons between the different categories of marine farmers with different distribution to relevant sectors in the marine farming industry and factors

4.3.5.2 Results of pairwise comparisons between the different categories of marine farmers with different sales volumes of products to factories for processing and exporting to Japan and factors

The analyzed factors were the lack of broodstock, the lack of farming knowledge and technology, and chemical residues due to the use of drugs and chemicals in high doses.

Hypothesis is denoted.

H_0: $m_1 = m_2 = m_3 = m_4 = m_5 = m_6 = m_7 = m_8 = m_9 = m_{10} = m_{11}$

H_1: $m_i \neq m_j$ for at least one pair (i, j)

Where

m_1 = shrimp farmers with sales volume of products to factories for processing and exporting to Japan on an average less than 20 percent per year

m_2 = shrimp farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year

m_3 = shrimp farmers with sales volume of products to factories for processing and exporting to Japan by an average of 41-60 percent per year

m_4 = fish farmers with sales volume of products to factories for processing and exporting to Japan on an average less than 20 percent per year

m_5 = fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year

m_6 = shrimp and fish farmers with sales volume of products to factories for processing and exporting to Japan on an average less than 20 percent per year

m_7 = shrimp and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year

m_8 = shrimp and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 41-60 percent per year

m_9 = shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year

m_{10} = shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 41-60 percent per year

m_{11} = shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan on an average more than 81 percent per year

Table 4.35 Results of pairwise comparisons between the different categories of marine farmers with different sales volumes of products to factories for processing and exporting to Japan and the lack of broodstock

Marine farming factors	Categories of marine farmers and sales volumes of products to factories for processing and exporting to Japan	Shrimp / less than 20 percent $\overline{X}$ = 2.07	Shrimp / 21-40 percent $\overline{X}$ = 2.18	Shrimp / 41-60 percent $\overline{X}$ = 2.00	Fish / less than 20 percent $\overline{X}$ = 2.00	Fish / 21-40 percent $\overline{X}$ = 2.00	Shrimp and fish / less than 20 percent $\overline{X}$ = 2.00	Shrimp and fish / 21-40 percent $\overline{X}$ = 3.60	Shrimp and fish / 41-60 percent $\overline{X}$ = 4.00	Shrimp, crab and fish / 21-40 percent $\overline{X}$ = 2.00	Shrimp, crab and fish / 41-60 percent $\overline{X}$ = 5.00	Shrimp, crab and fish / more than 81 percent $\overline{X}$ = 3.00
Lack of broodstock	Shrimp / less than 20 percent $\overline{X}$ = 2.07	-										
	Shrimp / 21-40 percent $\overline{X}$ = 2.18	-1.072 (0.284)	-									
	Shrimp / 41-60 percent $\overline{X}$ = 2.00	-0.237 (0.813)	-0.447 (0.655)	-								
	Fish / less than 20 percent $\overline{X}$ = 2.00	-0.396 (0.692)	-0.769 (0.442)	0.000 (1.000)	-							
	Fish / 21-40 percent $\overline{X}$ = 2.00	-0.329 (0.743)	-0.630 (0.529)	0.000 (1.000)	0.000 (1.000)	-						
	Shrimp and fish / less than 20 percent $\overline{X}$ = 2.00	-0.451 (0.652)	-0.885 (0.376)	0.000 (1.000)	0.000 (1.000)	0.000 (1.000)	-					
	Shrimp and fish / 21-40 percent $\overline{X}$ = 3.60	-2.278* (0.023)	-2.500* (0.012)	-1.225 (0.221)	-1.932 (0.053)	-1.640 (0.101)	-2.168* (0.030)	-				
	Shrimp and fish / 41-60 percent $\overline{X}$ = 4.00	-1.393 (0.164)	-2.098* (0.036)	-1.000 (0.317)	-1.732 (0.083)	-1.414 (0.157)	-2.000* (0.046)	-0.302 (0.763)	-			
	Shrimp, crab and fish / 21-40 percent $\overline{X}$ = 2.00	-0.329 (0.743)	-0.630 (0.529)	0.000 (1.000)	0.000 (1.000)	0.000 (1.000)	0.000 (1.000)	-1.640 (0.101)	-1.414 (0.157)	-		
	Shrimp, crab and fish / 41-60 percent $\overline{X}$ = 5.00	-2.356* (0.018)	-2.663* (0.008)	-1.414 (0.157)	-2.000* (0.046)	-1.732 (0.083)	-2.236* (0.025)	-1.296 (0.195)	-1.414 (0.157)	-1.732 (0.083)	-	
	Shrimp, crab and fish / more than 81 percent $\overline{X}$ = 3.00	-1.414 (0.157)	-2.126* (0.027)	-1.414 (0.157)	-2.000* (0.046)	-1.732 (0.083)	-2.236* (0.025)	-0.432 (0.666)	-1.414 (0.157)	-1.732 (0.083)	-1.732 (0.083)	-

Notes: * is different at the 0.05 level of significance

(Number) is p-value

Table 4.35 shows the results of pairwise comparisons by the Mann-Whitney U Test. It found that the different categories of marine farmers and the different sales volumes of products to factories for processing and exporting to Japan have a difference in the lack of broodstock at the 0.05 level of significance in twelve pairs as follows.

The shrimp farmers with sales volume of products to factories for processing and exporting to Japan on an average less than 20 percent per year differ the shrimp and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year and the shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 41-60 percent per year due to the p-value are 0.023 and 0.018, respectively, which are less than 0.05.

The shrimp farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year differ the shrimp and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year, the shrimp and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 41-60 percent per year, the shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 41-60 percent per year, including the shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan on an average more than 81 percent per year due to the p-value are 0.012, 0.036, 0.008 and 0.027, respectively, which are less than 0.05.

The fish farmers with sales volume of products to factories for processing and exporting to Japan on an average less than 20 percent per year differ the shrimp, crab and fish farmers with sales volumes of products to factories for processing and exporting to Japan by an average of 41-60 percent per year and more than 81 percent per year due to the p-value are 0.046, which are less than 0.05.

The shrimp and fish farmers with sales volume of products to factories for processing and exporting to Japan on an average less than 20 percent per year differ the shrimp and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year, the shrimp and fish

farmers with sales volume of products to factories for processing and exporting to Japan by an average of 41-60 percent per year, the shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 41-60 percent per year, and the shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan on an average more than 81 percent per year due to the p-value are 0.030, 0.046, 0.025 and 0.025, respectively, which are less than 0.05.

Table 4.36 Results of pairwise comparisons between the different categories of marine farmers with different sales volumes of products to factories for processing and exporting to Japan and the lack of farming knowledge and technology

Marine farming factors	Categories of marine farmers and sales volumes of products to factories for processing and exporting to Japan	Shrimp / less than 20 percent $\bar{X}$ = 1.80	Shrimp / 21-40 percent $\bar{X}$ = 2.36	Shrimp / 41-60 percent $\bar{X}$ = 1.00	Fish / less than 20 percent $\bar{X}$ = 2.67	Fish / 21-40 percent $\bar{X}$ = 2.00	Shrimp and fish / less than 20 percent $\bar{X}$ = 2.50	Shrimp and fish / 21-40 percent $\bar{X}$ = 3.40	Shrimp and fish / 41-60 percent $\bar{X}$ = 4.00	Shrimp, crab and fish / 21-40 percent $\bar{X}$ = 3.00	Shrimp, crab and fish / 41-60 percent $\bar{X}$ = 5.00	Shrimp, crab and fish / more than 81 percent $\bar{X}$ = 3.00
Lack of farming knowledge and technology	Shrimp / less than 20 percent $\bar{X}$ = 1.80	-										
	Shrimp / 21-40 percent $\bar{X}$ = 2.36	-1.977* (0.048)	-									
	Shrimp / 41-60 percent $\bar{X}$ = 1.00	-1.195 (0.232)	-1.565 (0.118)	-								
	Fish / less than 20 percent $\bar{X}$ = 2.67	-1.869 (0.062)	-0.696 (0.486)	-1.414 (0.157)	-							
	Fish / 21-40 percent $\bar{X}$ = 2.00	-0.509 (0.611)	-0.888 (0.375)	-1.414 (0.157)	-1.333 (0.182)	-						
	Shrimp and fish / less than 20 percent $\bar{X}$ = 2.50	-1.757 (0.079)	-0.292 (0.770)	-1.491 (0.136)	-0.408 (0.683)	-1.118 (0.264)	-					
	Shrimp and fish / 21-40 percent $\bar{X}$ = 3.40	-2.310* (0.021)	-1.218 (0.223)	-1.508 (0.132)	-0.473 (0.636)	-1.296 (0.195)	-0.786 (0.432)	-				

Notes: * is different at the 0.05 level of significance

(Number) is p-value

Table 4.36 Results of pairwise comparisons between the different categories of marine farmers with different sales volumes of products to factories for processing and exporting to Japan and the lack of farming knowledge and technology (cont.)

Marine farming factors	Categories of marine farmers and sales volumes of products to factories for processing and exporting to Japan	Shrimp / less than 20 percent $\overline{X}$ = 1.80	Shrimp / 21-40 percent $\overline{X}$ = 2.36	Shrimp / 41-60 percent $\overline{X}$ = 1.00	Fish / less than 20 percent $\overline{X}$ = 2.67	Fish / 21-40 percent $\overline{X}$ = 2.00	Shrimp and fish / less than 20 percent $\overline{X}$ = 2.50	Shrimp and fish / 21-40 percent $\overline{X}$ = 3.40	Shrimp and fish / 41-60 percent $\overline{X}$ = 4.00	Shrimp, crab and fish / 21-40 percent $\overline{X}$ = 3.00	Shrimp, crab and fish / 41-60 percent $\overline{X}$ = 5.00	Shrimp, crab and fish / more than 81 percent $\overline{X}$ = 3.00
Lack of farming knowledge and technology	Shrimp and fish / 41-60 percent $\overline{X}$ = 4.00	-1.769 (0.077)	-1.718 (0.086)	-1.000 (0.317)	-1.414 (0.157)	-1.414 (0.157)	-1.491 (0.136)	-0.302 (0.763)	-			
	Shrimp, crab and fish / 21-40 percent $\overline{X}$ = 3.00	-2.089* (0.037)	-1.331 (0.183)	-1.414 (0.157)	-0.816 (0.414)	-1.732 (0.083)	-1.118 (0.264)	0.000 (1.000)	-1.414 (0.157)	-		
	Shrimp, crab and fish / 41-60 percent $\overline{X}$ = 5.00	-2.397* (0.017)	-2.305* (0.021)	-1.414 (0.157)	-1.826 (0.068)	-1.732 (0.083)	-1.936 (0.053)	-1.296 (0.195)	-1.414 (0.157)	-1.732 (0.083)	-	
	Shrimp, crab and fish / more than 81 percent $\overline{X}$ = 3.00	-2.089* (0.037)	-1.331 (0.183)	-1.414 (0.157)	-0.816 (0.414)	-1.732 (0.083)	-1.118 (0.264)	0.000 (1.000)	-1.414 (0.157)	0.000 (1.000)	-1.732 (0.083)	-

Notes: * is different at the 0.05 level of significance

(Number) is p-value

Table 4.36 shows the results of pairwise comparisons by the Mann-Whitney U Test. It found that the different categories of marine farmers and the different sales volumes of products to factories for processing and exporting to Japan have a difference in the lack of farming knowledge and technology at the 0.05 level of significance in six pairs as follows.

The shrimp farmers with sales volume of products to factories for processing and exporting to Japan on an average less than 20 percent per year differ the shrimp farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year and the shrimp and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year due to the p-value are 0.048 and 0.021, respectively, which are less than 0.05.

The shrimp farmers with sales volume of products to factories for processing and exporting to Japan on an average less than 20 percent per year differ the shrimp, crab and fish farmers with sales volumes of products to factories for processing and exporting to Japan by an average of 21-40 percent, 41-60 percent, and more than 81 percent per year due to the p-value are 0.037, 0.017 and 0.037, respectively, which are less than 0.05.

The shrimp farmers with sales volumes of products to factories for processing and exporting to Japan by an average of 21-40 percent per year differ the shrimp, crab and fish farmers with sales volumes of products to factories for processing and exporting to Japan by an average of 41-60 percent per year due to the p-value are 0.021 which are less than 0.05.

Table 4.37 Results of pairwise comparisons between the different categories of marine farmers with different sales volumes of products to factories for processing and exporting to Japan and the chemical residues due to the use of drugs and chemicals in high doses

Marine farming factors	Categories of marine farmers and sales volumes of products to factories for processing and exporting to Japan	Shrimp / less than 20 percent $\overline{X}$ = 1.53	Shrimp / 21-40 percent $\overline{X}$ = 1.64	Shrimp / 41-60 percent $\overline{X}$ = 1.00	Fish / less than 20 percent $\overline{X}$ = 2.33	Fish / 21-40 percent $\overline{X}$ = 2.00	Shrimp and fish / less than 20 percent $\overline{X}$ = 1.25	Shrimp and fish / 21-40 percent $\overline{X}$ = 2.40	Shrimp and fish / 41-60 percent $\overline{X}$ = 2.00	Shrimp, crab and fish / 21-40 percent $\overline{X}$ = 1.50	Shrimp, crab and fish / 41-60 percent $\overline{X}$ = 3.00	Shrimp, crab and fish / more than 81 percent $\overline{X}$ = 3.00
Chemical residues due to the use of drugs and chemicals in high doses	Shrimp / less than 20 percent $\overline{X}$ = 1.53	-										
	Shrimp / 21-40 percent $\overline{X}$ = 1.64	-0.515 (0.606)	-									
	Shrimp / 41-60 percent $\overline{X}$ = 1.00	-1.000 (0.317)	-1.183 (0.237)	-								
	Fish / less than 20 percent $\overline{X}$ = 2.33	-1.434 (0.152)	-1.281 (0.200)	-1.000 (0.317)	-							
	Fish / 21-40 percent $\overline{X}$ = 2.00	-1.222 (0.222)	-0.985 (0.325)	-1.414 (0.157)	-0.609 (0.543)	-						

Notes: * is different at the 0.05 level of significance

(Number) is p-value

Table 4.37 Results of pairwise comparisons between the different categories of marine farmers with different sales volumes of products to factories for processing and exporting to Japan and the chemical residues due to the use of drugs and chemicals in high doses (cont.)

Marine farming factors	Categories of marine farmers and sales volumes of products to factories for processing and exporting to Japan	Shrimp / less than 20 percent $\overline{X}$ = 1.53	Shrimp / 21-40 percent $\overline{X}$ = 1.64	Shrimp / 41-60 percent $\overline{X}$ = 1.00	Fish / less than 20 percent $\overline{X}$ = 2.33	Fish / 21-40 percent $\overline{X}$ = 2.00	Shrimp and fish / less than 20 percent $\overline{X}$ = 1.25	Shrimp and fish / 21-40 percent $\overline{X}$ = 2.40	Shrimp and fish / 41-60 percent $\overline{X}$ = 2.00	Shrimp, crab and fish / 21-40 percent $\overline{X}$ = 1.50	Shrimp, crab and fish / 41-60 percent $\overline{X}$ = 3.00	Shrimp, crab and fish / more than 81 percent $\overline{X}$ = 3.00
Chemical residues due to the use of drugs and chemicals in high doses	Shrimp and fish / less than 20 percent $\overline{X}$ = 1.25	-0.981 (0.326)	-1.281 (0.200)	-0.500 (0.617)	-1.380 (0.167)	-1.581 (0.114)	-					
	Shrimp and fish / 21-40 percent $\overline{X}$ = 2.40	-2.502* (0.012)	-2.237* (0.025)	-1.581 (0.114)	-0.163 (0.870)	-0.980 (0.327)	-2.226* (0.026)	-				
	Shrimp and fish / 41-60 percent $\overline{X}$ = 2.00	-0.882 (0.378)	-0.707 (0.480)	-1.000 (0.317)	-0.471 (0.637)	0.000 (1.000)	-1.225 (0.221)	-0.707 (0.480)	-			
	Shrimp, crab and fish / 21-40 percent $\overline{X}$ = 1.50	-0.086 (0.931)	-0.350 (0.726)	-0.707 (0.480)	-0.913 (0.361)	-1.000 (0.317)	-0.559 (0.576)	-1.512 (0.130)	-0.707 (0.480)	-		
	Shrimp, crab and fish / 41-60 percent $\overline{X}$ = 3.00	-2.459* (0.014)	-2.404* (0.016)	-1.414 (0.157)	-0.816 (0.414)	-1.732 (0.083)	-2.000* (0.046)	-1.342 (0.180)	-1.414 (0.157)	-1.633 (0.102)	-	
	Shrimp, crab and fish / more than 81 percent $\overline{X}$ = 3.00	-2.459* (0.014)	-2.404* (0.016)	-1.414 (0.157)	-0.816 (0.414)	-1.732 (0.083)	-2.000* (0.046)	-1.342 (0.180)	-1.414 (0.157)	-1.633 (0.102)	0.000 (1.000)	-

Notes: * is different at the 0.05 level of significance

(Number) is p-value

Table 4.37 shows the results of pairwise comparisons by the Mann-Whitney U Test. It found that the different categories of marine farmers and the different sales volumes of products to factories for processing and exporting to Japan have a difference in chemical residues due to the use of drugs and chemicals in high doses at the 0.05 level of significance in nine pairs as follows.

The shrimp farmers with sales volume of products to factories for processing and exporting to Japan on an average less than 20 percent per year differ

the shrimp and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year, the shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 41-60 percent per year, and the shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan on an average more than 81 percent per year due to the p-value are 0.012, 0.014 and 0.014, respectively, which are less than 0.05.

The shrimp farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year differ the shrimp and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year, the shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 41-60 percent per year, and the shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan on an average more than 81 percent per year due to the p-value are 0.025, 0.016 and 0.016, respectively, which are less than 0.05.

The shrimp and fish farmers with sales volumes of products to factories for processing and exporting to Japan on an average less than 20 percent per year differ the shrimp and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year, the shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 41-60 percent per year, and the shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan on an average more than 81 percent per year due to the p-value are 0.026, 0.046 and 0.046, respectively, which are less than 0.05.

The results of pairwise comparisons between the different categories of marine farmers with different sales volumes of products to factories for processing and exporting to Japan and factors can be described as shown in Figure 4.13.

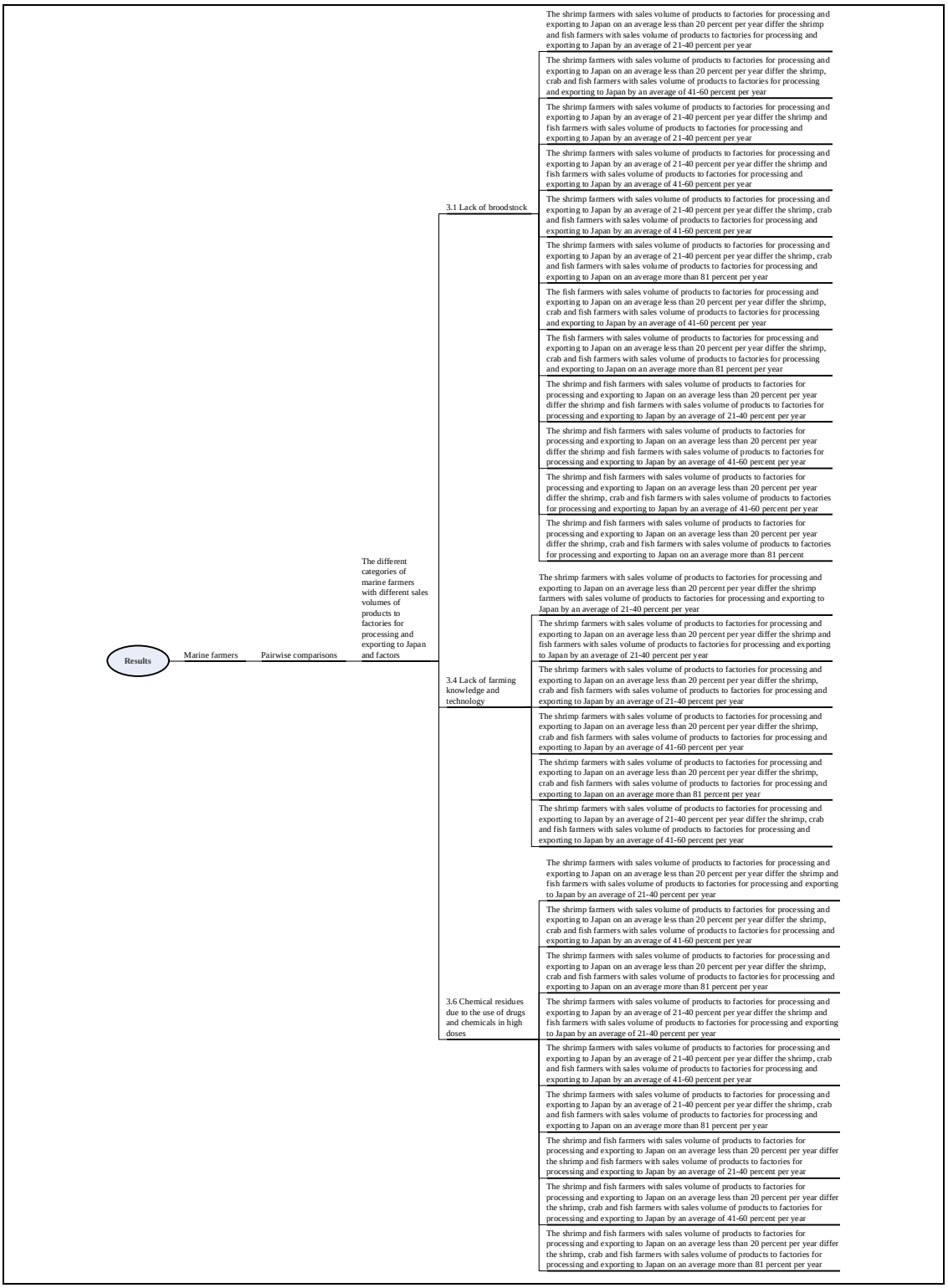

Figure 4.13 Results of pairwise comparisons between the different categories of marine farmers with different sales volumes of products to factories for processing and exporting to Japan and factors

CHAPTER V
CONCLUSION DISCUSSION AND RECOMMENDATION

This chapter is divided into three sections. Firstly, the summary results of survey data from Thai food processors and exporters, chicken farmers, and marine farmers are discussed in the section 5.1. The discussion and recommendation are presented in the section 5.2. Finally, the suggestions for future research are described in the section 5.3.

5.1 Conclusion

In this section, the summary results are divided into three parts as follows.

5.1.1 The summary results of opinion survey of food processors and exporters from Thailand to Japan

5.1.1.1 General data of food processors and exporters from Thailand to Japan

The general data of processors and exporters of food products from Thailand to Japan found that the most of processors and exporters receive raw materials or fresh food from other sources (abroad, affiliates, and their own manufacturing), accounted for 20.9 percent. They process and export the most prepared or preserved seafood in airtight containers, accounted for 34.9 percent, which export via Japanese importer companies located in Japan, accounted for 46.5 percent and have export volume of Thai food to Japan on an average less than 20 percent per year, accounted for 32.6 percent. For the exporters receive food from only processors. They export the most prepared or preserved seafood in airtight containers and processed chicken products which export directly to their own subsidiaries and final customer. In addition, the exporters have only export volume of Thai food to Japan on an average more than 81 percent per year as shown in Figure 5.1.

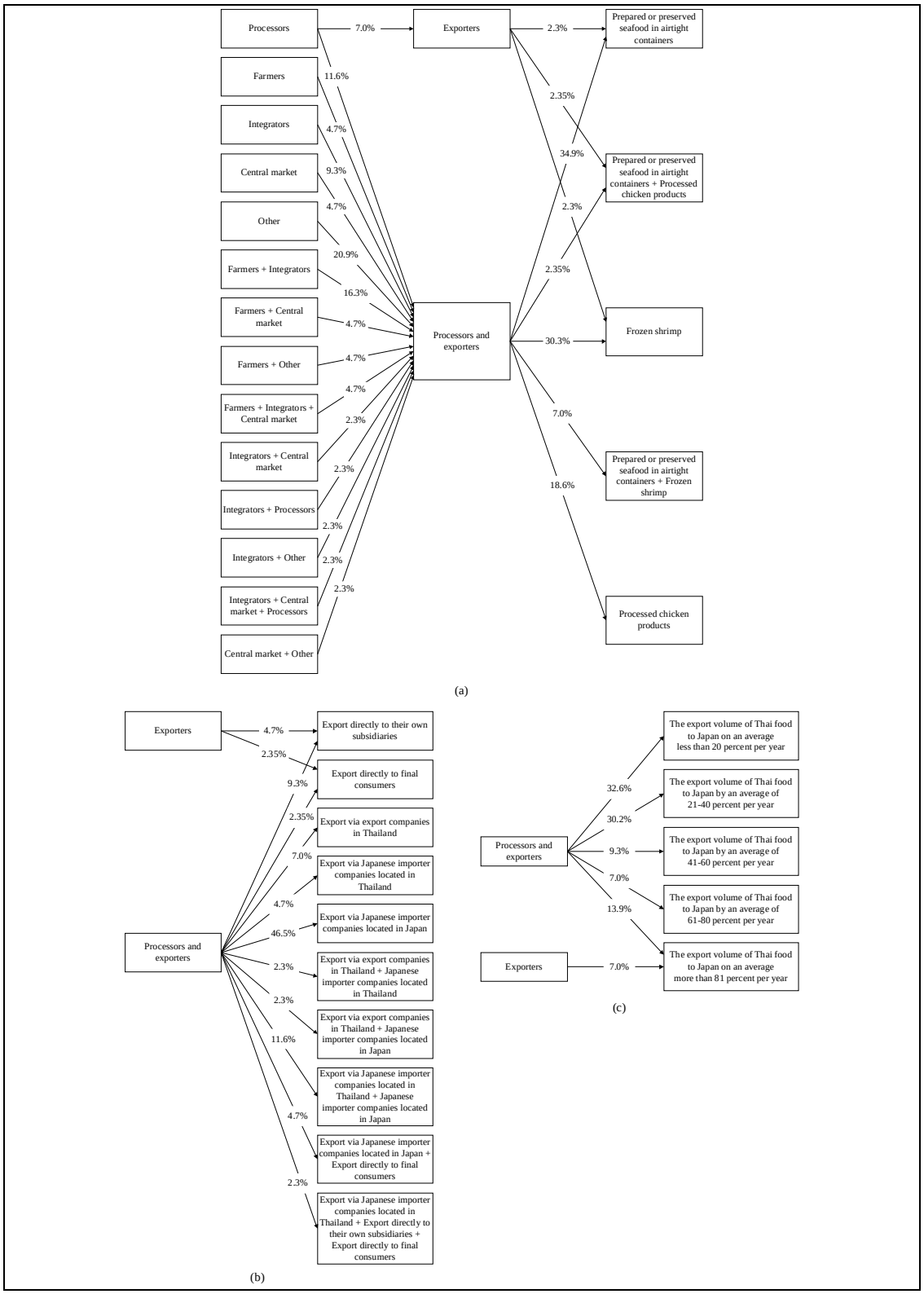

Figure 5.1 Summary results of general data on processors and exporters of food products from Thailand to Japan

5.1.1.2 Factors affecting the processed food production for export to Japan

The studies on problem/obstacle factors that influence the processed food production for export to Japan in overall, including divided by types of entrepreneurs in the food industry, categories of Thai food exported to Japan, elements of supply chain in food industry, exporting methods of Thai food to Japan, and export volumes of Thai food to Japan are summarized as follows.

The analysis of problem/obstacle factors that influence the processed food production for export to Japan in overall found that production factors is highly important problem/obstacle. The detailed analysis of factors found that the lack of skilled workers is extremely important problem/obstacle.

The analysis of problem/obstacle factors that influence the processed food production for export to Japan divided by types of entrepreneurs in the food industry found that the exporters have raw material factors as extremely important problem/obstacle. The detailed analysis of factors indicated that the lack of raw materials and contaminated raw materials are extremely important problem/ obstacle in production of processed foods for export to Japan, whereas the processors and exporters have raw material factors as moderately important problem/obstacle. In addition, the exporters and the processors and exporters have the lack of skilled workers as extremely important problem/obstacle as displayed in Figure 5.2.

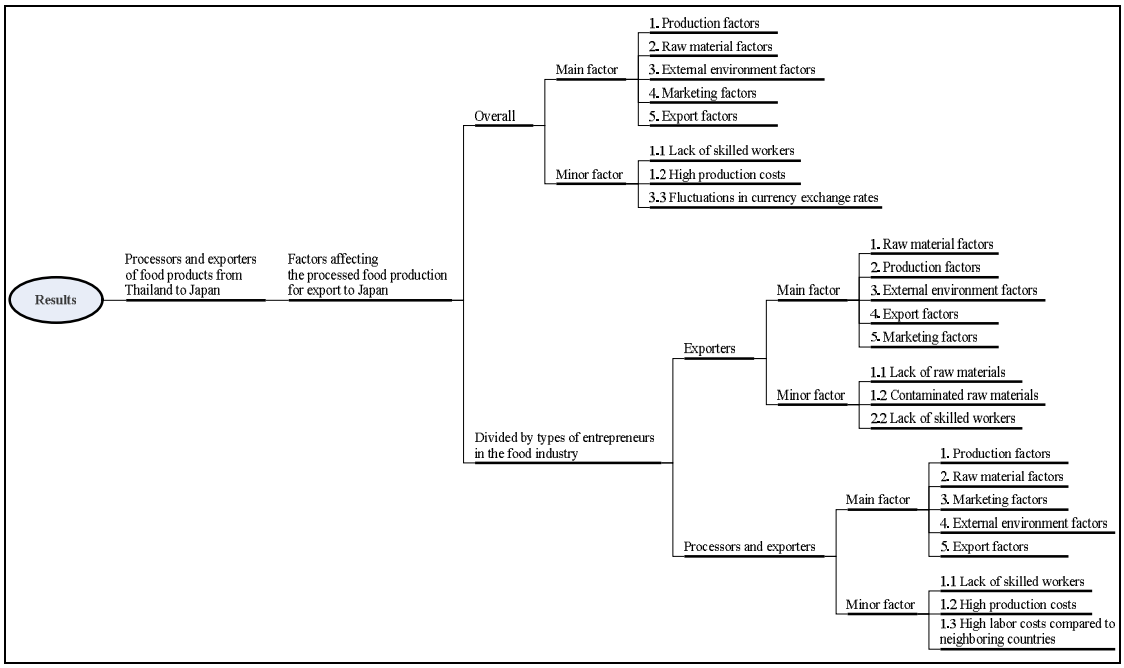

Figure 5.2 Summary results of problem/obstacle factors that influence the processed food production for export to Japan in overall and divided by types of entrepreneurs in the food industry

The analysis of problem/obstacle factors that influence the processed food production for export to Japan divided by categories of Thai food exported to Japan found that all four types of food products (i.e., prepared or preserved seafood in airtight containers, processed chicken products, prepared or preserved seafood in airtight containers and processed chicken products, and prepared or preserved seafood in airtight containers and frozen shrimp) have the lack of skilled workers as extremely important problem/obstacle in processed foods production for export to Japan. For frozen shrimp has the lack of skilled workers as highly important problem/obstacle as shown in Figure 5.3.

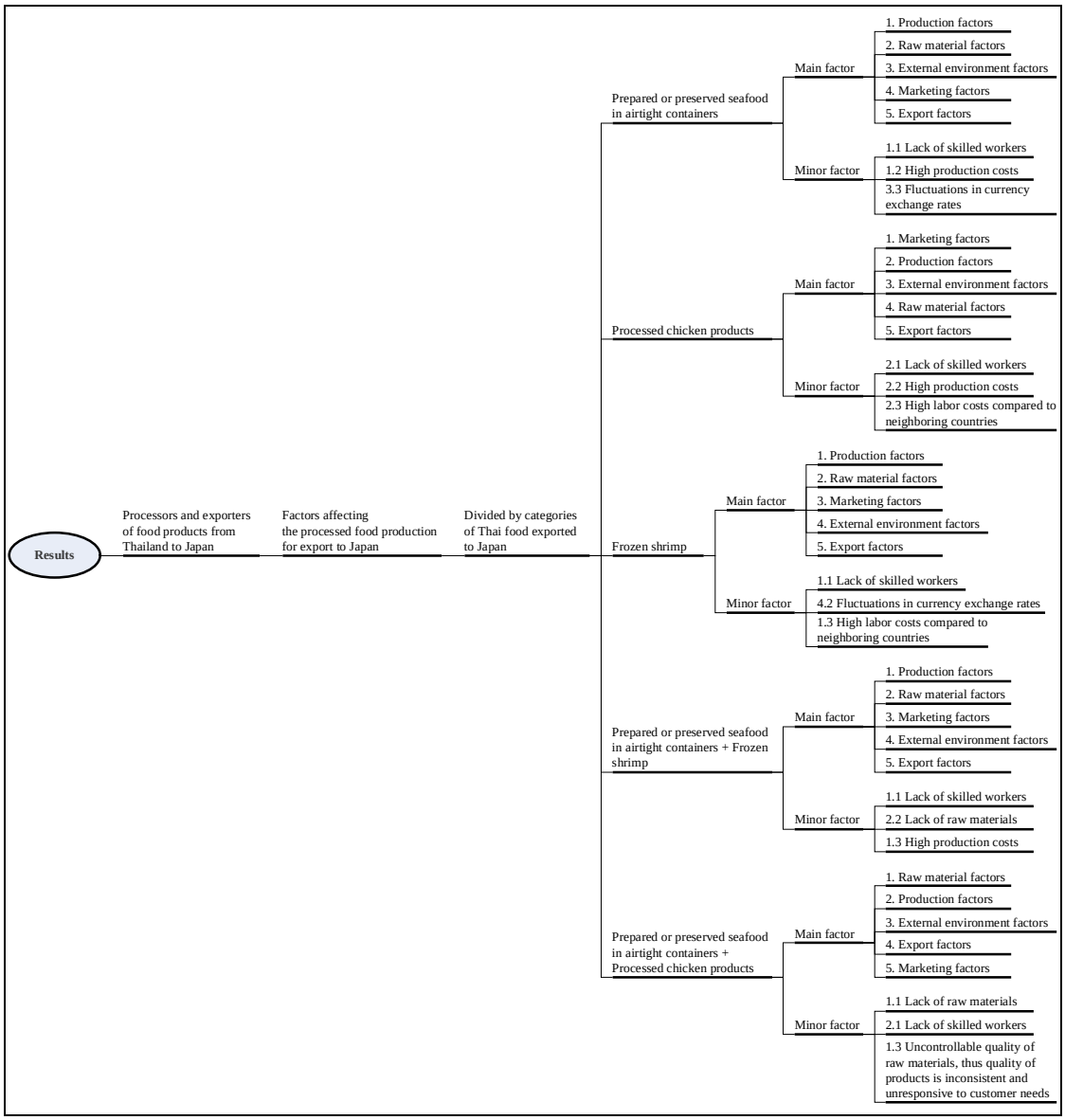

Figure 5.3 Summary results of problem/obstacle factors that influence the processed food production for export to Japan divided by categories of Thai food exported to Japan

The analysis of problem/obstacle factors that influence the processed food production for export to Japan divided by exporting methods of Thai food to Japan found that three methods, i.e., exporting via Japanese importer companies located in Japan, exporting directly to their own subsidiaries, and both exporting via Japanese importer companies located in Japan and exporting directly to the final consumers have the lack of skilled workers as extremely important

problem/obstacle in processed food production for export to Japan, whereas four methods, i.e., exporting via export companies in Thailand, exporting via Japanese importer companies located in Thailand, exporting directly to the final consumers, and both exporting via Japanese importer companies located in Thailand and Japanese importer companies located in Japan have the lack of skilled workers as highly important problem/obstacle as shown in Figure 5.4.

The analysis of problem/obstacle factors that influence the processed food production for export to Japan divided by export volumes of Thai food to Japan found that an average export volume of 41-60 percent per year, 61-80 percent per year, and more than 81 percent per year have the lack of skilled workers as extremely important problem/obstacle in the manufacturing of processed foods, whereas an average export volumes of less than 20 percent per year and 21-40 percent per year have the lack of skilled workers as highly important problem/obstacle as shown in Figure 5.5.

In addition, the analysis of factors in overall, including divided by types of entrepreneurs, categories of food products, exporting methods, and export volumes indicated that food hygiene factors and application of HACCP principles are not the problems and obstacles in production of processed foods for export to Japan.

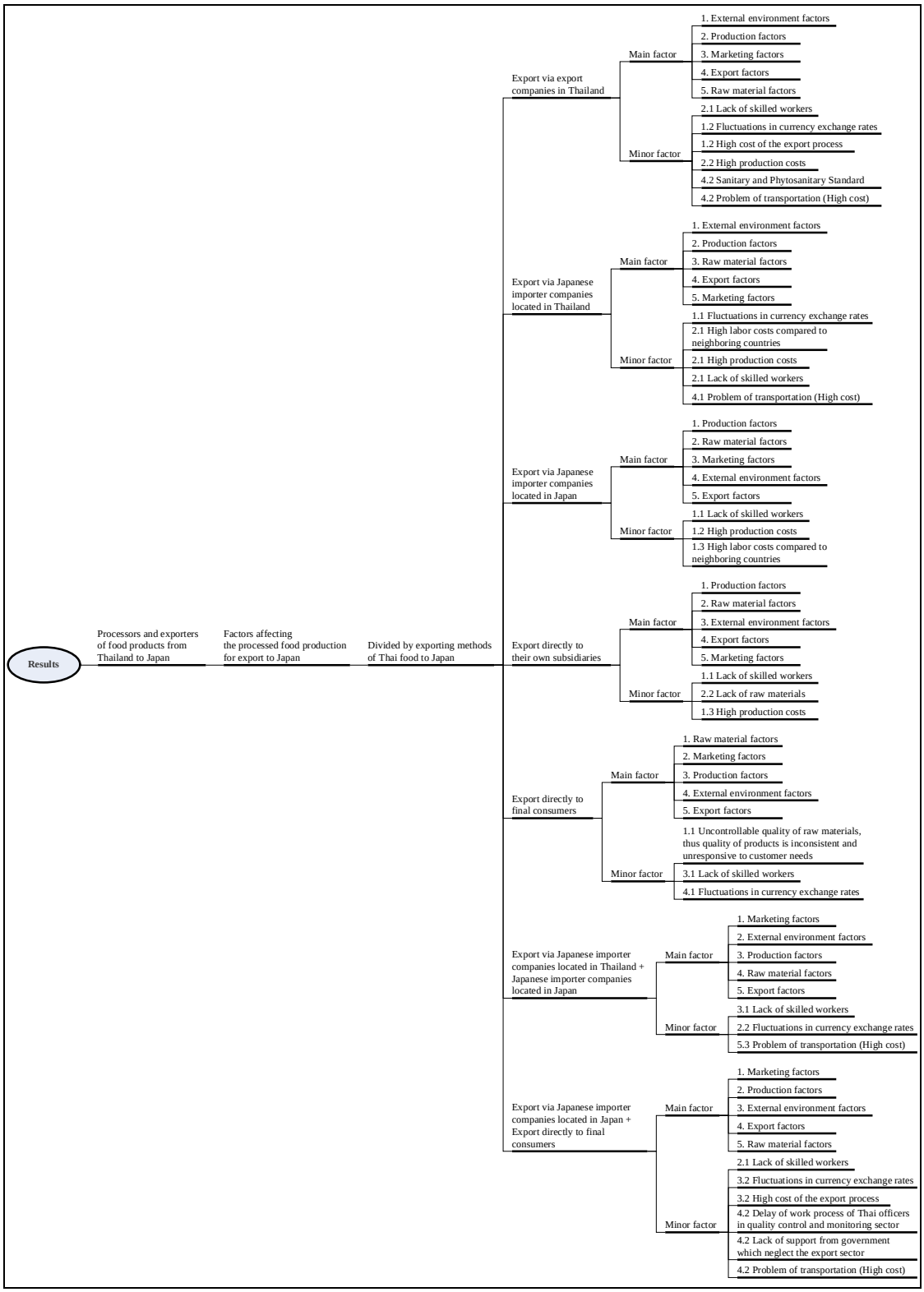

Figure 5.4 Summary results of problem/obstacle factors that influence the processed food production for export to Japan divided by exporting methods of Thai food to Japan

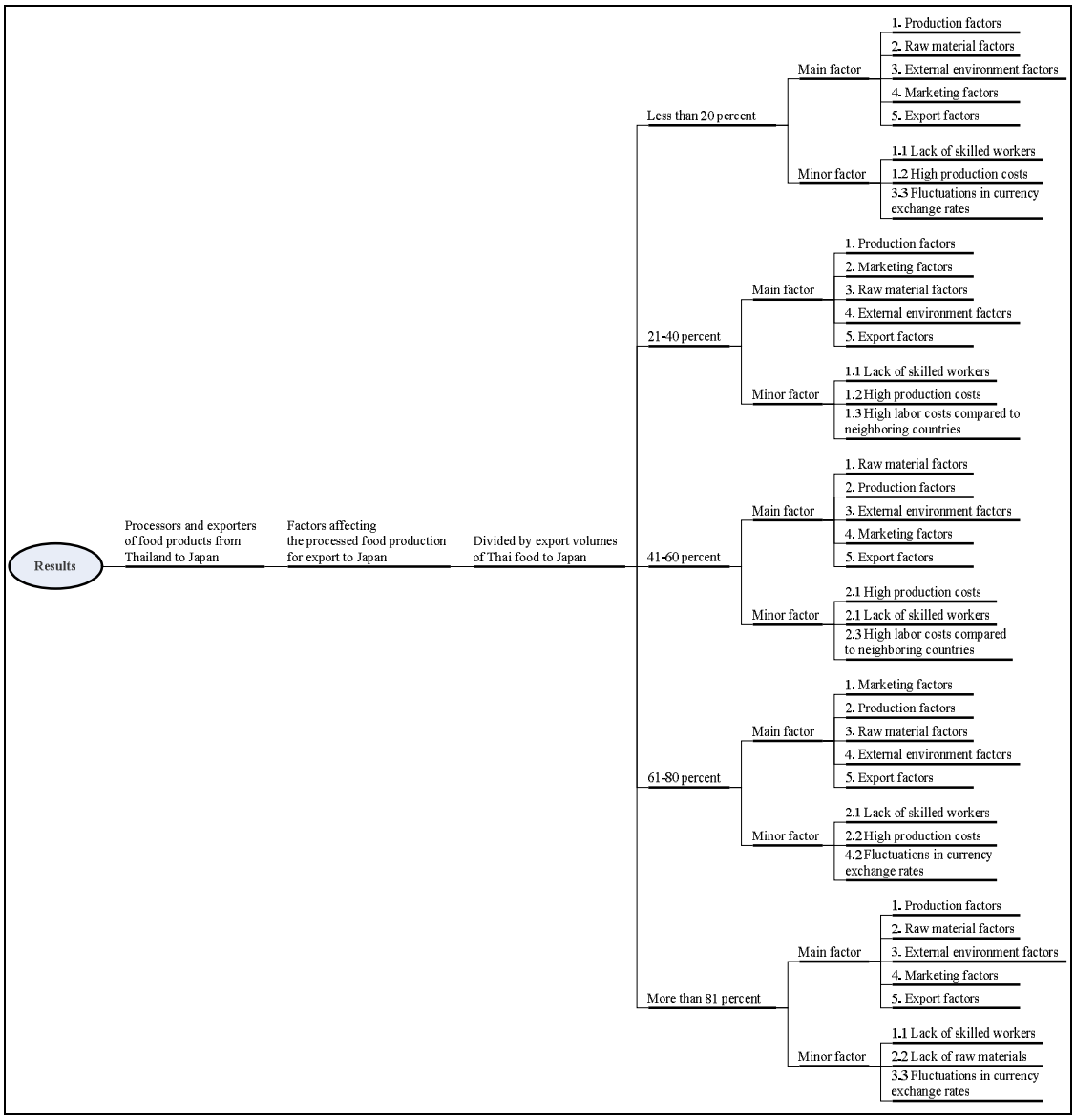

Figure 5.5 Summary results of problem/obstacle factors that influence the processed food production for export to Japan divided by export volumes of Thai food to Japan

5.1.1.3 Results of hypothesis testing to find the relationship between general data of the processors and exporters of foods products from Thailand to Japan and factors affecting the processed food production for export to Japan

The general data of Thai food processors and exporters to Japan were analyzed comprising types of entrepreneurs, categories of food products, exporting methods of Thai food to Japan, and export volumes of Thai food to Japan. For factors affecting the processed food production for export to Japan comprise food

hygiene factors, application of HACCP principles, raw materials factors, production factors, marketing factors, export factors, and external environment factors. The results of hypothesis testing are concluded as can be seen in Table 5.1.

The different types of entrepreneurs have effect the difference in raw material factors, that is, the lack of raw materials and contaminated raw materials at a significance level of 0.05. In addition, the different types of entrepreneurs have effect the insufficient capital for improving and managing efficient production and sanitary and phytosanitary standard (SPS) at a significance level of 0.05.

For the different export volumes of Thai food to Japan have effect the difference in raw material factors, production factors, marketing factors, export factors, and external environment factors at a significance level of 0.05.

Therefore, pairwise comparisons is implemented between the different types of entrepreneurs in the food industry with different export volumes of Thai food to Japan and factors (i.e., the lack of raw materials, contaminated raw materials, insufficient capital for improving and managing efficient production, and sanitary and phytosanitary standard (SPS)) to find the pair which has the difference at a significance level of 0.05. The summary results of pairwise comparisons are:

The exporters with export volume of Thai food to Japan on an average more than 81 percent per year (m_1) have problem and obstacle in the lack of raw material differ from the processors and exporters with export volumes to Japan on an average less than 20 percent per year (m_2), 21-40 percent per year (m_3), and 41-60 percent per year (m_4). Furthermore, the processors and exporters with export volume to Japan on an average less than 20 percent per year (m_2) have problem and obstacle in the lack of raw material differ from the processors and exporters with export volume of Thai food to Japan on an average more than 81 percent per year (m_6).

The exporters with export volume of Thai food to Japan on an average more than 81 percent per year (m_1) have problem and obstacle in contaminated raw materials differ from the processors and exporters with export volumes to Japan on an average less than 20 percent per year (m_2) and 21-40 percent per year (m_3). In addition, the processors and exporters with export volume to Japan

on an average less than 20 percent per year (m_2) have problem and obstacle in contaminated raw materials differ from the processors and exporters with export volumes to Japan by an average of 41-60 percent per year (m_4) and more than 81 percent per year (m_6).

The exporters with export volume of Thai food to Japan on an average more than 81 percent per year (m_1) have problem and obstacle in the insufficient capital for improving and managing efficient production differ from the processors and exporters with export volumes to Japan on an average less than 20 percent per year (m_2), 21-40 percent per year (m_3), and 41-60 percent per year (m_4). In addition, the processors and exporters with export volumes to Japan on an average less than 20 percent per year (m_2), 21-40 percent per year (m_3), and 41-60 percent per year (m_4) have problem and obstacle in the insufficient capital for improving and managing efficient production differ from the processors and exporters with export volume of Thai food to Japan on an average more than 81 percent per year (m_6).

The exporters with export volume of Thai food to Japan on an average more than 81 percent per year (m_1) have problem and obstacle in sanitary and phytosanitary standard (SPS) differ from the processors and exporters with export volumes to Japan on an average less than 20 percent per year (m_2) and 21-40 percent per year (m_3). Furthermore, the processors and exporters with export volumes to Japan on an average less than 20 percent per year (m_2) and 21-40 percent per year (m_3) have problem and obstacle in sanitary and phytosanitary standard (SPS) differ from the processors and exporters with export volume of Thai food to Japan on an average more than 81 percent per year (m_6) as shown in Figure 5.6.

Table 5.1 Summary results of hypothesis testing to find the relationship between general data of the processors and exporters of foods products from Thailand to Japan and factors affecting the processed food production for export to Japan

General data / Factors	Types of entrepreneurs in the food industry	Categories of Thai food exported to Japan	Exporting methods of Thai food to Japan	Export volumes of Thai food to Japan by an average per year
1. Food hygiene factors	™	™	™	™
2. Application of HACCP principles	™	™	™	™
3. Raw material factors	~	™	™	~
3.1 Lack of raw materials	~	™	™	~
3.2 Contaminated raw materials	~	™	™	~
3.3 Uncontrollable quality of raw materials, thus quality of products is inconsistent and unresponsive to customer needs	™	™	™	™
4. Production factors	™	™	™	~
4.1 High labor costs compared to neighboring countries	™	™	™	~
4.2 High production costs	™	™	™	~
4.3 Lack of skilled workers	™	™	™	~
4.4 Insufficient capital for improving and managing efficient production	~	™	™	~
4.5 Lack of know-how and technology for research and development of quality products	™	™	™	~
5. Marketing factors	™	™	™	~
5.1 Price war amongst domestic manufacturers	™	™	™	~
5.2 Low bargaining power of exporter, thus low profit margin	™	™	™	~
6. Export factors	™	™	™	~
6.1 Tariff Barriers (TBs)	™	™	™	~
6.2 Non-Tariff Barriers (NTBs)				
6.2.1 Sanitary and Phytosanitary Standard (SPS)	~	™	™	~
6.2.2 Technical Barriers to Trade (TBT)	™	™	™	~
6.2.3 Environment Measures (ENV)	™	™	™	~
6.2.4 Nationalism Measures	™	™	™	~
6.3 Lack of international information and obsolete information, thus missing opportunity of exportation	™	™	™	~
6.4 Lack of legal knowledge or the regulations of importation process in Japan	™	™	™	~
6.5 Delay of work process of Thai officers in quality control and monitoring sector	™	™	™	~
6.6 Lack of support from government which neglect the export sector	™	™	™	~
6.7 Problem of transportation (High cost)	™	™	™	~
7. External environment factors	™	™	™	~
7.1 Decreasing of Japan's GDP	™	™	™	~
7.2 Fluctuations in currency exchange rates	™	™	™	~
7.3 Demographic change in Japan	™	™	™	~
7.4 High cost of export, concerning the whole process	™	™	™	~

Notes: ™ No statistically significant at the 0.05 level

~ There is statistically significant at the 0.05 level

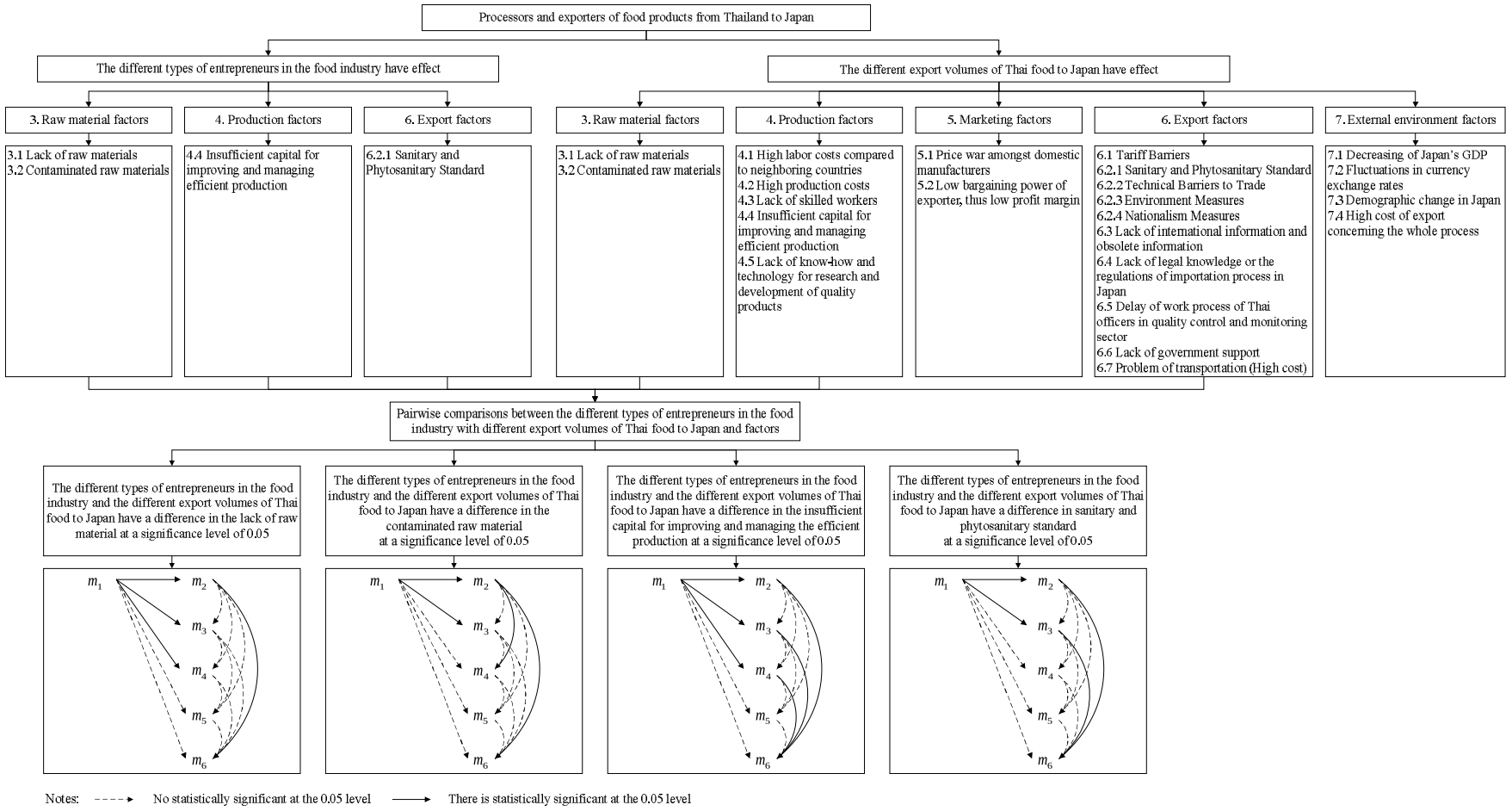

Figure 5.6 Summary results of hypothesis testing of general data on food processors and exporters from Thailand to Japan and factors affecting the processed food production for export to Japan

5.1.2 The summary results of opinion survey of chicken farmers

5.1.2.1 General data of chicken farmers

The general data of chicken farmers found that the most of chicken farmers distribute their produce to processing factory, accounted for 100.0 percent. In addition, most of farmers have sales volume of products to factory for processing and exporting to Japan on an average more than 81 percent per year, accounted for 84.6 percent.

5.1.2.2 Factors affecting the chicken farming for processing and exporting to Japan

The studies on problem/obstacle factors that influence the chicken farming for processing and exporting to Japan in overall and divided by sales volumes of products to factory for processing and exporting to Japan are summarized as follows.

The analysis of problem/obstacle factors that influence the chicken farming for processing and exporting to Japan in overall found that chicken farming factors is moderately important problem/obstacle. The detailed analysis of factors found that high production costs, i.e., animal feeds, medicine and chemical products is extremely important problem/obstacle.

The analysis of problem/obstacle factors that influence the chicken farming for processing and exporting to Japan divided by sales volumes of products to factory for processing and exporting to Japan found that the chicken farmers with sales volume of products to factory for processing and exporting to Japan on an average more than 81 percent per year have chicken farming factors and government services factors as moderately important problem/obstacle. On the other hand, the chicken farmers with sales volume of products to factory for processing and exporting to Japan by an average of 61-80 percent per year have chicken farming factors and government services factors as less important problem/obstacle.

In addition, chicken farmers with sales volumes of products to factory for processing and exporting to Japan by an average of 61-80 percent per year and more than 81 percent per year have high production costs such as animal feeds, medicine and chemical products as extremely important problem/obstacle, including the same opinion concerning Good Agricultural Practices for livestock farming (GAP)

and qualifications of chicken farmer are not problem/obstacle affecting the chicken farming for processing and exporting to Japan as displayed in Figure 5.7.

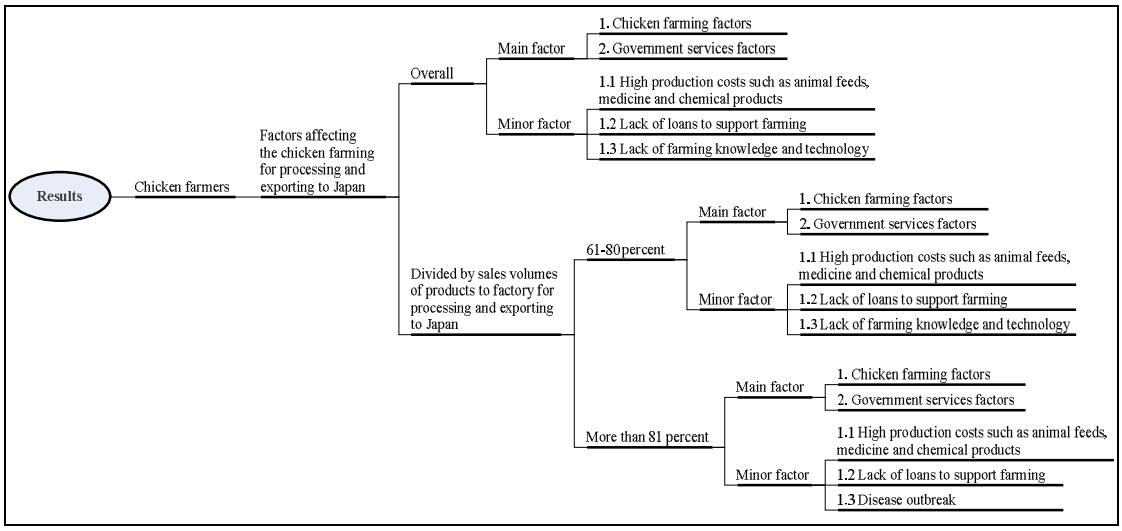

Figure 5.7 Summary results of problem/obstacle factors that influence the chicken farming for processing and exporting to Japan

5.1.2.3 Results of hypothesis testing to find the relationship between sales volumes of farmers' products to factory for processing and exporting to Japan and factors affecting the chicken farming for processing and exporting to Japan

The factors affecting the chicken farming for processing and exporting to Japan were analyzed comprising Good Agricultural Practices for livestock farming (GAP), qualifications of chicken farmer, chicken farming factors, and government services factors. The results of hypothesis testing are concluded as displayed in Table 5.2.

The different sales volumes of farmers' products to factory for processing and exporting to Japan have a difference in chicken farming factors such as the lack of broodstock, disease outbreak, inefficient farm management, and chemical residues due to the use of drugs and chemicals in high doses at a significance level of 0.05. Furthermore, the different sales volumes of farmers' products to factory for processing and exporting to Japan have a difference in the lack of support and

technical knowledge dissemination about poultry farming at a significance level of 0.05.

Table 5.2 Summary results of hypothesis testing to find the relationship between sales volumes of farmers' products to factory for processing and exporting to Japan and factors affecting the chicken farming for processing and exporting to Japan

Factors	Sales volumes of farmers' products to factory for processing and exporting to Japan by an average per year
1. Good Agricultural Practices for livestock farming (GAP)	™
2. Qualifications of chicken farmer	™
2.1 Lack of training in livestock farming principles	™
2.2 Unregistered farmer	™
3. Chicken farming factors	~
3.1 Lack of broodstock	~
3.2 Disease outbreak	~
3.3 High production costs such as animal feeds, medicine and chemical products	™
3.4 Lack of farming knowledge and technology	™
3.5 Inefficient farm management	~
3.6 Chemical residues due to the use of drugs and chemicals in high doses	~
3.7 Lack of loans to support farming	™
4. Government services factors	™
4.1 Lack of support and technical knowledge dissemination about poultry farming	~
4.2 Lack of attention and service from the government sector	™
4.3 Insufficient government officers	™
4.4 Inexperienced government officers	™

Notes: ™ No statistically significant at the 0.05 level

~ There is statistically significant at the 0.05 level

5.1.3 The summary results of opinion survey of marine farmers

5.1.3.1 General data of marine farmers

The general data of marine farmers found that a majority of respondents are shrimp farmers, accounted for 56.2 percent. Most of farmers have sales volume of products to factories for processing and exporting to Japan on an average less than 20 percent per year, accounted for 37.5 percent as displayed in Figure 5.8.

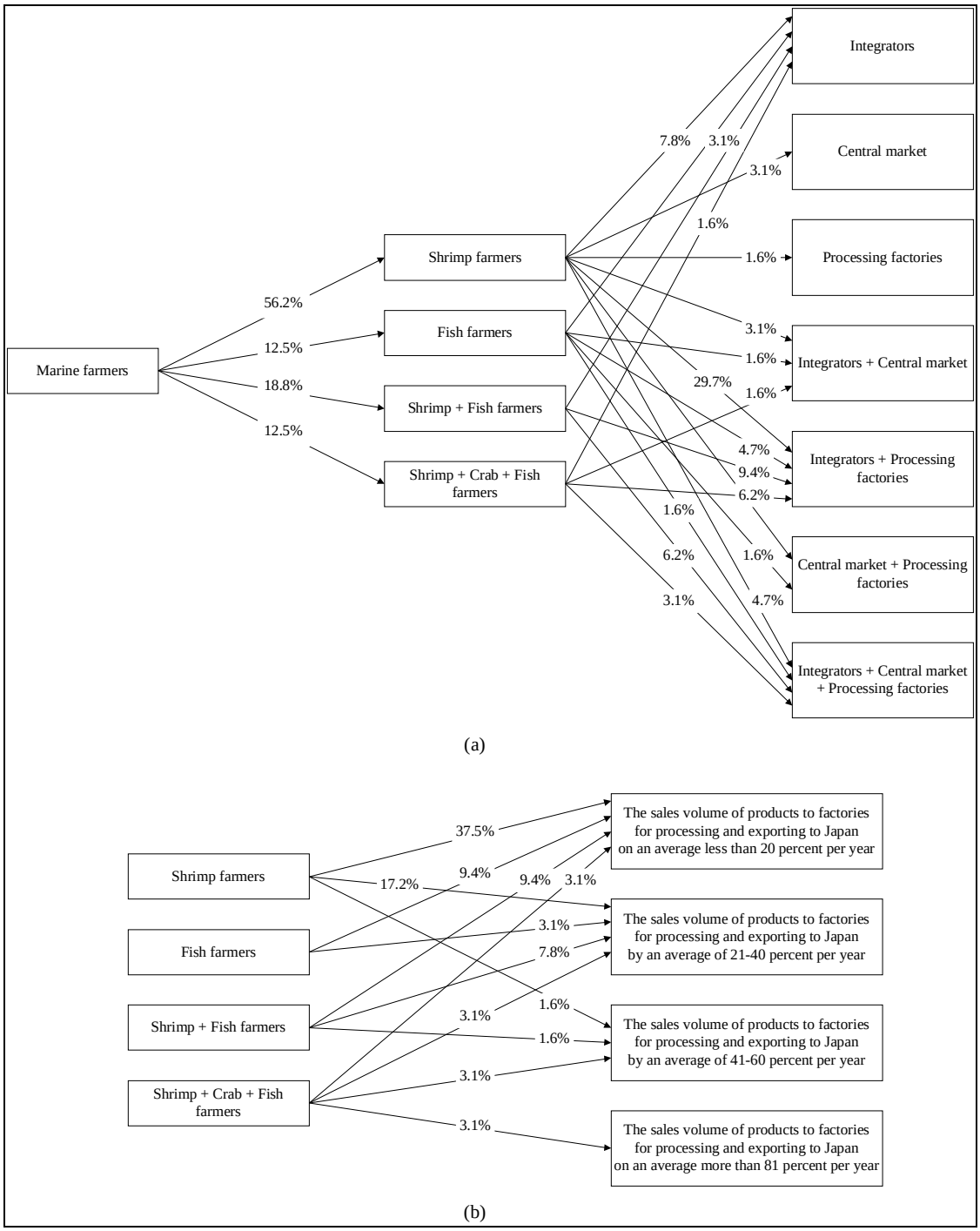

Figure 5.8 Summary results of general data on marine farmers

5.1.3.2 Factors affecting the marine farming for processing and exporting to Japan

The studies on problem/obstacle factors that influence the marine farming for processing and exporting to Japan in overall and divided by

categories of marine farmers, elements of the marine farming industry, and sales volumes of products to factories for processing and exporting to Japan are summarized as follows.

The analysis of problem/obstacle factors that influence the marine farming for processing and exporting to Japan in overall found that marine farming factors and government services factors are moderately important problem/obstacle. The detailed analysis of factors found that high production costs, i.e., animal feeds, medicine and chemical products is highly important problem/ obstacle.

The analysis of problem/obstacle factors that influence the marine farming for processing and exporting to Japan divided by categories of marine farmers found that the shrimp farmers and the fish farmers have high production costs (i.e., animal feeds, medicine and chemical products) as highly important problem/ obstacle, whereas the shrimp and fish farmers face this extremely problem. For the shrimp, crab and fish farmers have the lack of farming knowledge and technology as highly important problem/obstacle. In addition, the shrimp farmers and the fish farmers have the same opinion that Good Agricultural Practices for marine farming (GAP) and qualifications of marine farmer are not problem/obstacle affecting the marine farming for processing and exporting to Japan while the shrimp and fish farmers and the shrimp, crab and fish farmers face this less problem as shown in Figure 5.9.

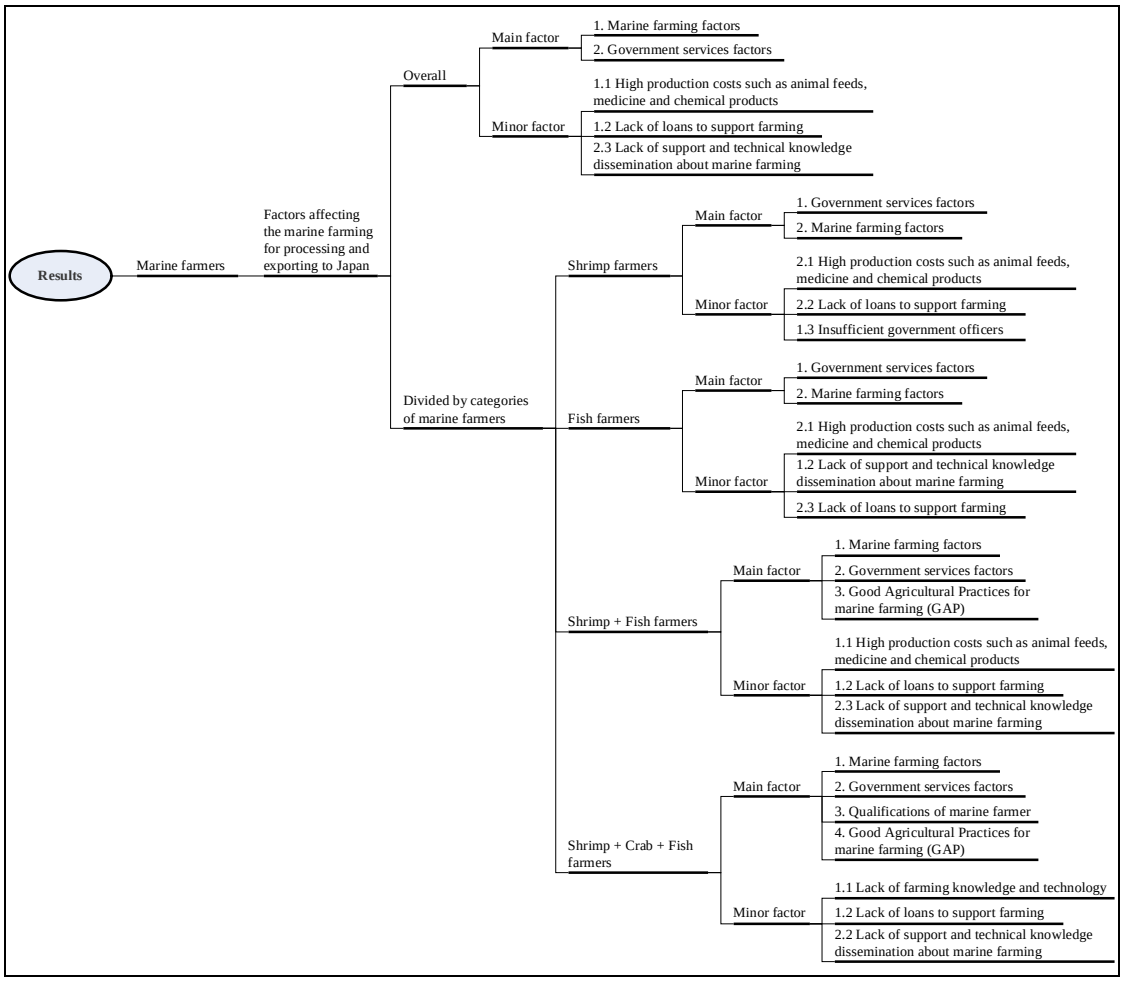

Figure 5.9 Summary results of problem/obstacle factors that influence the marine farming for processing and exporting to Japan in overall and divided by categories of marine farmers

The analysis of problem/obstacle factors that influence the marine farming for processing and exporting to Japan divided by elements of marine farming industry found that marine farmers distribute their produce to the integrators and processing factories and the central market and processing factories have high production costs such as animal feeds, medicine and chemical products as highly important problem/obstacle. While marine farmers distribute their produce to the integrators, central market and processing factories have high production costs such as animal feeds, medicine and chemical products as extremely important problem/ obstacle.

The analysis of problem/obstacle factors that influence the marine farming for processing and exporting to Japan divided by sales volumes of products to factories for processing and exporting to Japan found that marine farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year have high production costs such as animal feeds, medicine and chemical products as extremely important problem/obstacle. While marine farmers with sales volume of products to factories for processing and exporting to Japan on an average less than 20 percent per year faces highly problem, including marine farmers with sales volumes of products to factories for processing and exporting to Japan by an average of 41-60 percent per year and more than 81 percent per year face moderately problem.

In addition, factors on Good Agricultural Practices for marine farming (GAP) and qualifications of marine farmer with sales volumes of products to factories for processing and exporting to Japan on an average less than 20 percent per year and 21-40 percent per year are not problem/obstacle affecting the marine farming for processing and exporting to Japan while marine farmers with sales volumes of products to factories for processing and exporting to Japan by an average of 41-60 percent per year and more than 81 percent per year face less problem as shown in Figure 5.10.

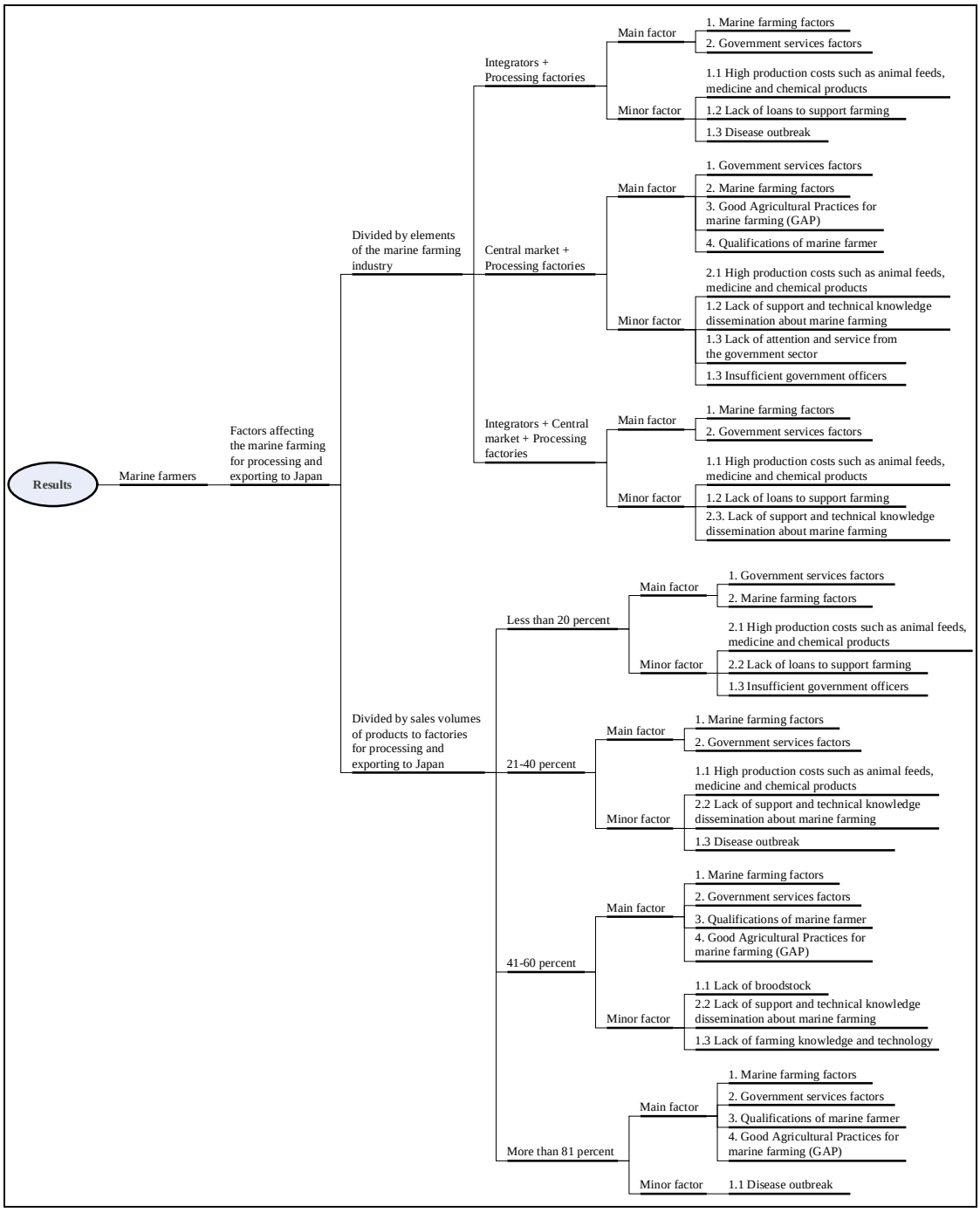

Figure 5.10 Summary results of problem/obstacle factors that influence the marine farming for processing and exporting to Japan divided by elements of marine farming industry and sales volumes of products to factories for processing and exporting to Japan

5.1.3.3 Results of hypothesis testing to find the relationship between general data of marine farmers and factors affecting the marine farming for processing and exporting to Japan

The general data of marine farmers were analyzed comprising categories of marine farmers, elements of marine farming industry, and sales volumes of products to factories for processing and exporting to Japan. For factors affecting the chicken farming for processing and exporting to Japan consists of Good Agricultural Practices for marine farming (GAP), qualifications of marine farmer, marine farming factors, and government services factors. The results of hypothesis testing are concluded as shown in Table 5.3.

The different categories of marine farmers have effect the difference in qualifications of marine farmers and marine farming factors at a significance level of 0.05. The different elements of marine farming industry have effect the difference in qualifications of marine farmers at a significance level of 0.05. In addition, the different sales volumes of farmers' products to factories for processing and exporting to Japan have effect the difference in marine farming factors at a significance level of 0.05 as displayed in Figure 5.11.

The pairwise comparisons between the different categories of marine farmers with different distribution to relevant sectors in marine farming industry and the lack of training in marine farming principles found that the shrimp farmers distribute their produce to integrators and processing factories (m_2) have problem and obstacle in the lack of training in marine farming principles differ from the shrimp farmers distribute their produce to central market and processing factories (m_3), the shrimp farmers distribute their produce to integrators, central market and processing factories (m_4), the shrimp and fish farmers distribute their produce to integrators, central market and processing factories (m_9), the shrimp, crab and fish farmers distribute their produce to integrators and processing factories (m_{10}), and the shrimp, crab and fish farmers distribute their produce to integrators, central market and processing factories (m_{11}). The fish farmers distribute their produce to integrators and processing factories (m_5) have problem and obstacle in the lack of training in marine

farming principles differ from the shrimp, crab and fish farmers distribute their produce to integrators and processing factories (m_{10})

For pairwise comparisons between the different categories of marine farmers with different sales volumes of products to factories for processing and exporting to Japan and factors can be concluded as shown in Figure 5.8 by m_1 is shrimp farmers with sales volume of products to factories for processing and exporting to Japan on an average less than 20 percent per year, m_2 is shrimp farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year, m_3 is shrimp farmers with sales volume of products to factories for processing and exporting to Japan by an average of 41-60 percent per year, m_4 is fish farmers with sales volume of products to factories for processing and exporting to Japan on an average less than 20 percent per year, m_5 is fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year, m_6 is shrimp and fish farmers with sales volume of products to factories for processing and exporting to Japan on an average less than 20 percent per year, m_7 is shrimp and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year, m_8 is shrimp and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 41-60 percent per year, m_9 is shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 21-40 percent per year, m_{10} is shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan by an average of 41-60 percent per year, and m_{11} is shrimp, crab and fish farmers with sales volume of products to factories for processing and exporting to Japan on an average more than 81 percent per year.

Table 5.3 Summary results of hypothesis testing to find the relationship between general data of marine farmers and factors affecting the marine farming for processing and exporting to Japan

General data / **Factors**	**Categories of marine farmers**	**Elements of marine farming industry**	**Sales volume of products to factories for processing and exporting to Japan by an average per year**
1. Good Agricultural Practices for marine farming (GAP)	™	™	™
2. Qualifications of marine farmer	~	~	™
2.1 Lack of training in marine farming principles	~	~	™
2.2 Unregistered farmer	™	™	™
3. Marine farming factors	~	™	~
3.1 Lack of broodstock	~	™	~
3.2 Disease outbreak	™	™	~
3.3 High production costs such as animal feeds, medicine and chemical products	~	™	™
3.4 Lack of farming knowledge and technology	~	™	~
3.5 Inefficient farm management	™	™	~
3.6 Chemical residues due to the use of drugs and chemicals in high doses	~	™	~
3.7 Lack of loans to support farming	™	™	™
4. Government services factors	™	™	™
4.1 Lack of support and technical knowledge dissemination about marine farming	™	™	~
4.2 Lack of attention and service from the government sector	™	™	™
4.3 Insufficient government officers	™	™	™
4.4 Inexperienced government officers	™	™	™

Notes: ™ No statistically significant at the 0.05 level

~ There is statistically significant at the 0.05 level

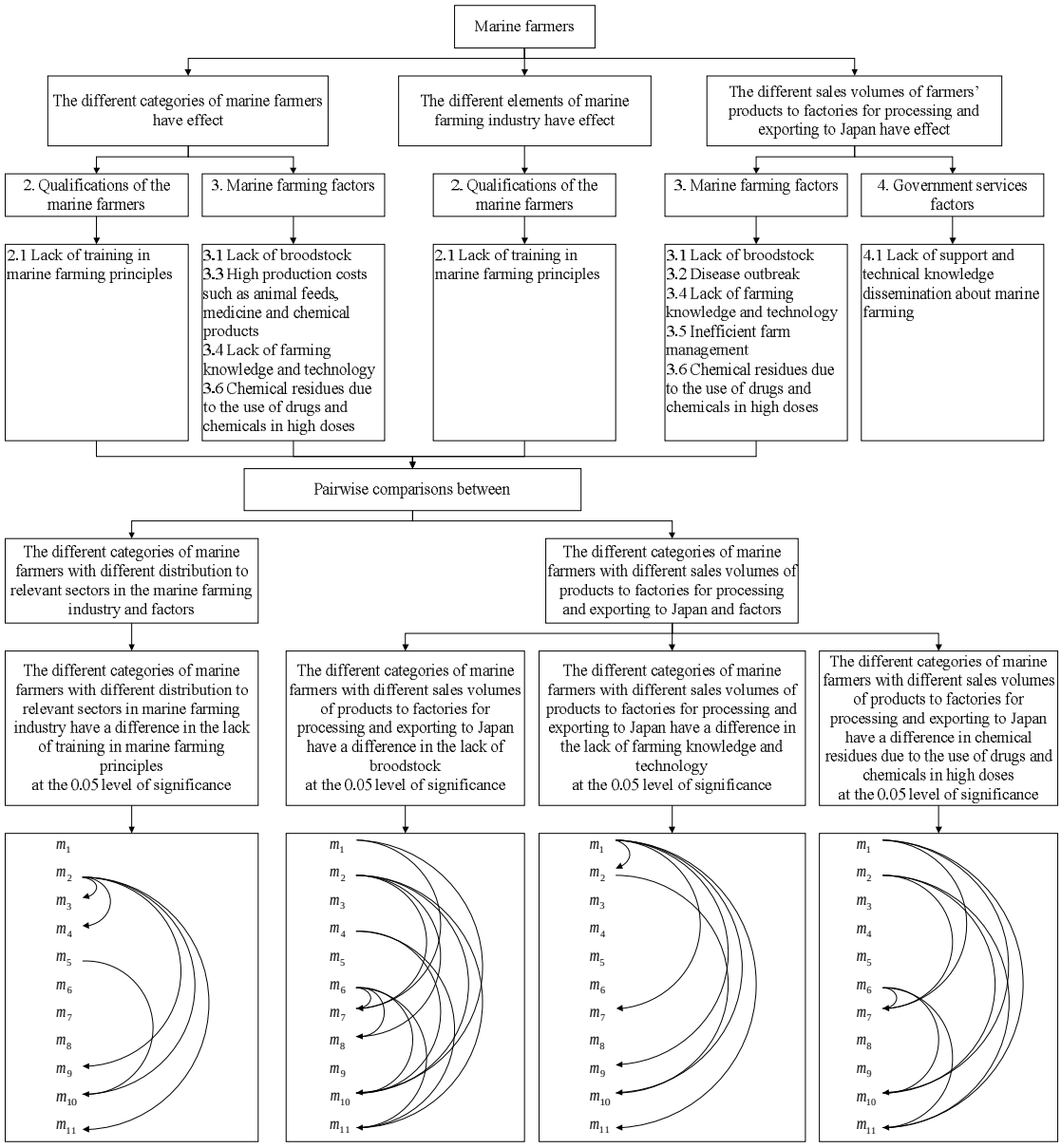

Figure 5.11 Summary results of hypothesis testing of general data on marine farmers and factors affecting the marine farming for processing and exporting to Japan

5.2 Discussion and recommendation

The results from this study indicated that factors affecting the supply chain of Thai food for exporting to Japan have factors on standard for agricultural products and processed food as highly important factor, since it can guarantee the quality and recognized by importing countries. Therefore, farmers and entrepreneurs in the food

industry focus Good Agricultural Practice (GAP) in agricultural production as well as General Principles of Food Hygiene and Hazard Analysis Critical Control Point (HACCP) in processed foods production.

For other factors indicated that the different types of entrepreneurs in the food industry with different export volumes of Thai food to Japan have different problems/obstacles including the lack of raw material, contaminated raw materials, insufficient capital for improving and managing efficient production, and sanitary and phytosanitary standard as shown in Table 5.4-5.8.

From Table 5.4, it shown that exporters face the lack of raw materials, contaminated raw materials, and sanitary and phytosanitary standard (SPS) as extremely important problem differ from processors and exporters face these problems with highly important problem. Due to the processors and exporters operate food processing, including export food products; therefore, they have experience and expertise in sourcing raw material sufficient to produce and selection of quality raw material rather than the exporters operate export business only. In consideration processors and exporters with different export volumes of Thai food to Japan found that processors and exporters have problem in different level. The processors and exporters with export volume of Thai food to Japan on an average less than 20 percent per year have the lack of raw materials, contaminated raw materials, and sanitary and phytosanitary standard (SPS) less than the processors and exporters with export volume of Thai food to Japan on an average more than 81 percent per year. Due to high export volumes might mean a large amount of raw materials used in production. In addition, standard and quality of raw materials meet the requirement of importing countries. Therefore, insufficient amount of raw materials may affect the volume of exports.

Table 5.4 Importance level of problems and obstacles that influence the processed food production for export to Japan divided by types of entrepreneurs in the food industry and export volumes of Thai food to Japan

Export volumes of Thai food to Japan by an average per year	Lack of raw materials		Contaminated raw materials		Insufficient capital for improving and managing efficient production		Sanitary and Phytosanitary Standard (SPS)	
	Exporter	Processor and exporter	Exporter	Processor and exporter	Exporter	Processor and exporter	Exporter	Processor and exporter
Less than 20 percent	-	**i**	-	r	-	r	-	**i**
21-40 percent	-	**i**	-	**i**	-	**i**	-	r
41-60 percent	-	**ž**	-	**ž**	-	r	-	**i**
61-80 percent	-	**ž**	-	**i**	-	**i**	-	**i**
More than 81 percent	**~**	**ž**	**~**	**ž**	**ž**	**ž**	**~**	**ž**

Notes: - = No data

p = No problem

r = The less important problem

i = The moderately important problem

ž = The highly important problem

~ = The extremely important problem

When considering importance level of problem divided by types of entrepreneurs in the food industry, categories of Thai food exported to Japan, and export volumes of Thai food to Japan found that the exporters with export volume of prepared or preserved seafood in airtight containers, frozen shrimp, and prepared or preserved seafood in airtight containers and processed chicken products to Japan on an average more than 81 percent per year have the lack of raw material as extremely important problem as well as the processors and exporters with export volume of prepared or preserved seafood in airtight containers, processed chicken products, and prepared or preserved seafood in airtight containers and processed chicken products to Japan on an average more than 81 percent per year as displayed in Table 5.5.

In addition, the processors and exporters with export volume of food product to Japan on an average less than 20 percent per year have the lack of raw material which can be classified into three groups as follows.

1) The processors and exporters of processed chicken products have the lack of raw material as less important problem because a majority of entrepreneurs operate a fully integrated business. They can know the amount of raw materials required to produce a certainly. Therefore, they face problem of the lack of raw material less than the other entrepreneurs.

2) The processors and exporters of prepared or preserved seafood in airtight containers and the processors and exporters of frozen shrimp have the lack of raw material as moderately important problem.

3) The processors and exporters of prepared or preserved seafood in airtight containers and processed chicken products and the processors and exporters of prepared or preserved seafood in airtight containers and frozen shrimp have the lack of raw material as highly important problem.

Group 2 and 3 have the lack of raw material as moderately and highly important problem, respectively due to raw materials used in production are marine animals. In addition, there are several factors that may cause the insufficient raw materials to produce for export such as seasonal, weather variability, the deterioration of the marine environment, and so on.

Table 5.5 Importance level of problem of the lack of raw materials divided by types of entrepreneurs in the food industry, categories of Thai food exported to Japan, and export volumes of Thai food to Japan

Export volumes of Thai food to Japan by an average per year	Lack of raw materials									
	Exporter					Processor and exporter				
	Prepared or preserved seafood in airtight containers	Processed chicken products	Frozen shrimp	Prepared or preserved seafood in airtight containers + Processed chicken products	Prepared or preserved seafood in airtight containers + Frozen shrimp	Prepared or preserved seafood in airtight containers	Processed chicken products	Frozen shrimp	Prepared or preserved seafood in airtight containers + Processed chicken products	Prepared or preserved seafood in airtight containers + Frozen shrimp
Less than 20 percent	-	-	-	-	-	¡	r	¡	ž	ž
21-40 percent	-	-	-	-	-	ž	r	¡	-	~
41-60 percent	-	-	-	-	-	ž	ž	-	-	-
61-80 percent	-	-	-	-	-	¡	ž	-	-	-
More than 81 percent	~	-	~	~	-	~	~	¡	-	~

Notes: - = No data

p = No problem

r = The less important problem

¡ = The moderately important problem

ž = The highly important problem

~ = The extremely important problem

For contaminated raw materials found that the exporters with export volume of various food product to Japan on an average more than 81 percent per year have problem of contaminated raw materials in different level as well as the processors and exporters with export volume of various food product to Japan on an average more than 81 percent per year. Due to problem of contaminated raw materials may be caused by the unhygienic facilities for pre-processing of fishery products, contamination during shipment of raw materials to processing factories, lack of knowledge about raw material storage, and so on as shown in Table 5.6.

For insufficient capital for improving and managing efficient production found that the exporters with export volume of prepared or preserved seafood in airtight containers, frozen shrimp, and prepared or preserved seafood in airtight containers and processed chicken products to Japan on an average more than 81 percent per year have insufficient capital as highly important problem as well as the processors and exporters with export volume of prepared or preserved seafood in airtight containers, processed chicken products, and frozen shrimp to Japan on an average more than 81 percent per year. When considering the processors and exporters of various food products found that the processors and exporters with export volume of food product to Japan on an average less than 20 percent per year have problem of the insufficient capital for improving and managing efficient production less than the processors and exporters with export volume of food product to Japan on an average more than 81 percent per year. Due to the export operation have cost about monitor the quality of food products and transportation. Therefore, high export volumes require more capital to operate exports to foreign countries as can be seen in Table 5.7.

Table 5.6 Importance level of problem of contaminated raw materials divided by types of entrepreneurs in the food industry, categories of Thai food exported to Japan, and export volumes of Thai food to Japan

Export volumes of Thai food to Japan by an average per year	Contaminated raw materials									
	Exporter					Processor and exporter				
	Prepared or preserved seafood in airtight containers	Processed chicken products	Frozen shrimp	Prepared or preserved seafood in airtight containers + Processed chicken products	Prepared or preserved seafood in airtight containers + Frozen shrimp	Prepared or preserved seafood in airtight containers	Processed chicken products	Frozen shrimp	Prepared or preserved seafood in airtight containers + Processed chicken products	Prepared or preserved seafood in airtight containers + Frozen shrimp
Less than 20 percent	-	-	-	-	-	r	r	¡	r	¡
21-40 percent	-	-	-	-	-	¡	p	¡	-	¡
41-60 percent	-	-	-	-	-	ž	ž	-	-	-
61-80 percent	-	-	-	-	-	p	ž	-	-	-
More than 81 percent	~	-	ž	~	-	ž	ž	¡	-	~

Notes: - = No data

p = No problem

r = The less important problem

¡ = The moderately important problem

ž = The highly important problem

~ = The extremely important problem

Table 5.7 Importance level of problem of insufficient capital for improving and managing efficient production divided by types of entrepreneurs in the food industry, categories of Thai food exported to Japan, and export volumes of Thai food to Japan

Export volumes of Thai food to Japan by an average per year	Insufficient capital for improving and managing efficient production									
	Exporter					Processor and exporter				
	Prepared or preserved seafood in airtight containers	Processed chicken products	Frozen shrimp	Prepared or preserved seafood in airtight containers + Processed chicken products	Prepared or preserved seafood in airtight containers + Frozen shrimp	Prepared or preserved seafood in airtight containers	Processed chicken products	Frozen shrimp	Prepared or preserved seafood in airtight containers + Processed chicken products	Prepared or preserved seafood in airtight containers + Frozen shrimp
Less than 20 percent	-	-	-	-	-	r	r	r	i	r
21-40 percent	-	-	-	-	-	r	p	ž	-	i
41-60 percent	-	-	-	-	-	r	r	-	-	-
61-80 percent	-	-	-	-	-	r	i	-	-	-
More than 81 percent	ž	-	ž	ž	-	ž	ž	ž	-	~

Notes: - = No data

p = No problem

r = The less important problem

i = The moderately important problem

ž = The highly important problem

~ = The extremely important problem

For sanitary and phytosanitary standard (SPS) found that the exporters with export volume of prepared or preserved seafood in airtight containers to Japan on an average more than 81 percent per year have problem of sanitary and phytosanitary standard (SPS) as well as the processors and exporters with export volume of prepared or preserved seafood in airtight containers to Japan on an average more than 81 percent per year. In addition, the processors and exporters of various food products with different export volumes of Thai food to Japan have problem of sanitary and phytosanitary standard (SPS) in different level. Due to Thai food exports to Japan will have to inspect the quality, food safety, including standards which sanitary and phytosanitary standard (SPS) is measures to control agricultural and food products in order to protect the non-quality products imported to Japan and increase confidence to the importing countries as displayed in Table 5.8.

In addition, the chicken farmers and the different categories of marine farmers with different sales volumes of products to factories for processing and exporting to Japan have different problems/obstacles including the lack of broodstock, the lack of knowledge and technology for the farming, and chemical residues due to the use of drugs and chemicals in high doses as shown in Table 5.9.

From Table 5.9, it shown that farmers have the lack of broodstock and chemical residues due to the use of drugs and chemicals in high doses as less important problem since in the present, there is research and development on aquaculture system for broodstock, including promoting and supporting sustainable development of marine environment such as the protection and preservation of mangroves which are an important source of food for marine animals. Therefore, problem of the lack of broodstock decreased. For problem of chemical residues due to the use of drugs and chemicals in high doses found that government sector, that is, National Bureau of Agricultural Commodity and Food Standards, Ministry of Agriculture and Cooperatives (2005) regulate the agricultural production systems obtained from plant, livestock and aquaculture must comply with Good Agricultural Practices (GAPs). The farmers have to follow the requirements and standards to ensure products quality, to meet customer needs, including problem of chemical residues decreased.

Table 5.8 Importance level of problem of sanitary and phytosanitary standard (SPS) divided by types of entrepreneurs in the food industry, categories of Thai food exported to Japan, and export volumes of Thai food to Japan

Export volumes of Thai food to Japan by an average per year	Sanitary and Phytosanitary Standard (SPS)									
	Exporter					Processor and exporter				
	Prepared or preserved seafood in airtight containers	Processed chicken products	Frozen shrimp	Prepared or preserved seafood in airtight containers + Processed chicken products	Prepared or preserved seafood in airtight containers + Frozen shrimp	Prepared or preserved seafood in airtight containers	Processed chicken products	Frozen shrimp	Prepared or preserved seafood in airtight containers + Processed chicken products	Prepared or preserved seafood in airtight containers + Frozen shrimp
Less than 20 percent	-	-	-	-	-	¡	¡	¡	p	¡
21-40 percent	-	-	-	-	-	r	r	¡	-	¡
41-60 percent	-	-	-	-	-	¡	ž	-	-	-
61-80 percent	-	-	-	-	-	p	ž	-	-	-
More than 81 percent	ž	-	ž	~	-	ž	ž	¡	-	ž

Notes: - = No data

p = No problem

r = The less important problem

¡ = The moderately important problem

ž = The highly important problem

~ = The extremely important problem

Table 5.9 Importance level of problems and obstacles that influence the farming for processing and exporting to Japan divided by categories of farmers and sales volumes of products to factories for processing and exporting to Japan

Sales volumes of farmers' products to factories for processing and exporting to Japan by an average per year	Lack of broodstock					Chemical residues due to the use of drugs and chemicals in high doses				
	Chicken farmers	Shrimp farmers	Fish farmers	Shrimp + Fish farmers	Shrimp +Crab + Fish farmers	Chicken farmers	Shrimp farmers	Fish farmers	Shrimp + Fish farmers	Shrimp +Crab + Fish farmers
Less than 20 percent	-	r	r	r	-	-	p	r	p	-
21-40 percent	-	r	r	ž	r	-	p	r	r	p
41-60 percent	-	r	-	ž	~	-	p	-	r	i
61-80 percent	p	-	-	-	-	p	-	-	-	-
More than 81 percent	r	-	-	-	i	r	-	-	-	i

Notes: - = No data

p = No problem

r = The less important problem

i = The moderately important problem

ž = The highly important problem

~ = The extremely important problem

These problems of the farmers cause the processors and exporters of food products to face many problems, that is, when farmers have problems/obstacles including the insufficient capital for improving and managing efficient production and disease outbreak. This problem affect on the food processors and exporters from Thailand to Japan must face problem about the lack of raw material. These results are consistent with the findings of Ruamyart (2006) who revealed that products have more or less volumes depend on many factors such as weather, outbreak of disease and insect pests, government policies, equipment damage, including the lack of loan which are crucial obstacle to the farming development process. The lack of knowledge and technology for farming is related to problems of the processors and exporters, i.e., the uncontrollable quality of raw materials, thus quality of products is inconsistent and unresponsive to customer needs. This result is consistent with the findings of Lertsawat (2007) who found that the uncertain quality of raw material cannot be used to produce the processed foods because of improper farming practices and inappropriate storage. Furthermore, high production costs of farmers such as animal feeds, medicine and chemical products impact high production costs of processors and exporters. This result is consistent with the findings of Pratchayabarirak (2005) who revealed that high cost of animal feed affect the processed chicken in term of high cost of production which may be difficult to compete with other countries.

From the interview of the shrimp farmers and the processors and exporters of the frozen shrimp found that problems of farmers affect the processors and exporters that is, the weather variability which the amount of raw materials required to production may by decreased, including the specification of farmers' products (such as size, weight, color, etc.) does not meet the requirements of the processors. The processors buy raw materials from the farmers who registered with the Department of Fisheries. When the purchase deal is done, the farmers must request the movement document (MD) from the Department of Fisheries. For the processors export their products, they must show the movement document to the Department of Fisheries for requesting the health certificate. Therefore, when problem occurred, it can traceability. In a similar way, the Department of Livestock Development will issue the poultry movement document and the health certificate, to the poultry farmers for the same purpose.

According to the mentioned problems, Office of the National Economic and Social Development Board, Office the Prime Minister (2011) has issued the guideline for agricultural development as follows.

1) The government should weight the importance on research and development, especially in aspects of plant seeds, animal breeds, and the aquatic animals that have the great endurance concerning global weather variability.

2) Control and monitor the import and use of chemicals in agricultural sector to meet the standards, including encouragement to create awareness for the farmers regarding the appropriate use of chemicals.

3) Support to enhance the quality of agricultural products and food standard to meet international standard, strictly monitor and scan the process of qualification guarantee, including develop the traceability system.

4) Adding value to the livestock products by improving the standard of production process, safety, including increase performance of the quarantine system, and apply the theoretically method of farming for the better quality and safety to the consumer.

5) Motivate the farmers and the manufacturers comply with the standard such as safety foods standard by sharing knowledge about the standard, reducing the cost of guarantee process to expand the manufacturing sector, and encouraging the confidence of consumer in both domestic and international.

The Office of Industrial Economics, Ministry of Industry Thailand (2011) has issued the guideline for the development of Thai food industry to increase the competency that is, control the standard on food products for both domestic and export to the same standard and equivalents to global standard, set the traceability system to track the source of raw materials, production process, packaging, and resources of the production, encourage the acceptable mark of food safety guarantee, including create value for buying food products with food safety guarantee mark and health benefits as shown in Figure 5.12.

According to the problem of the farmers and the processors and exporters, including the government guidelines found that most of problems have been proposed to guide the development of Thai food industry. However, there are some problems that the government should also consider such as the high production costs, the lack of

loan to support farming since they might affect the other elements in Thai food supply chain. For solving the high production costs, public sector should control and monitor production factors such as the reasonable price of animal feeds, etc. The problem on the lack of loan to support farming, public and private sector should provide source of investment funds or capital for the farmers, so that they will have enough capital to improve and develop their farms. In addition, the results of opinion survey from the farmers and the processors and exporters indicated that the farmers with different sales volumes of products to factories for processing and exporting to Japan and the processors and exporters with different export volumes of Thai food to Japan face the different problems and obstacles. Therefore, the development of Thai food supply chain to Japan should consider these factors in order to achieve sustainable development and determine the appropriate development guidelines of Thai food supply chain.

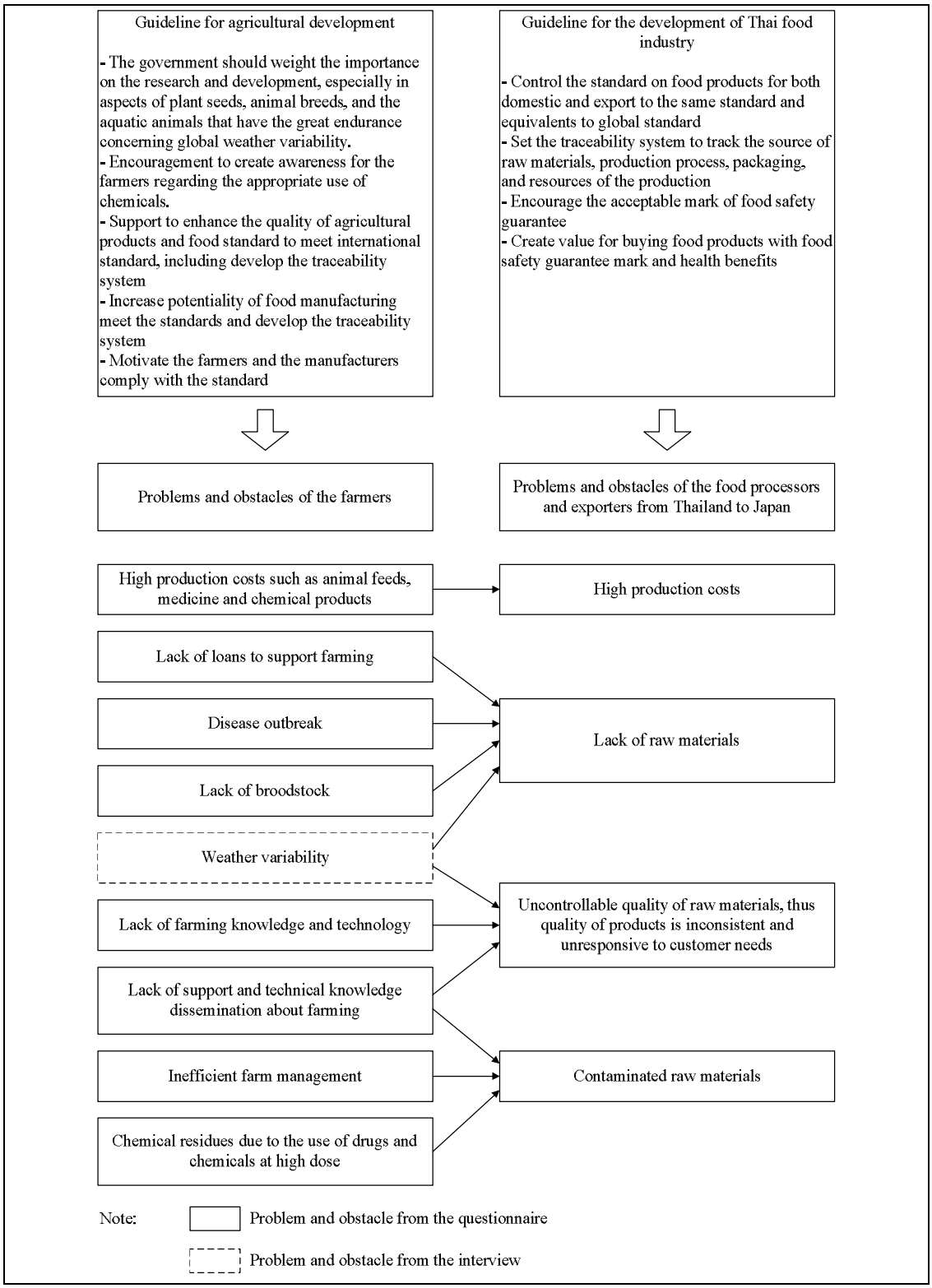

Figure 5.12 Problems and obstacles of the farmers and the food processors and exporters from Thailand to Japan and the guidelines for the development of agricultural sector and Thai food industry

5.3 Suggestions for future research

This research concerns factors affecting the supply chain of Thai food for exporting to Japan, in aspect of the farmers and the processors and exporters. The future research should study the other elements in the supply chain of Thai food such as integrators and Japanese importers in order to know the actual problems and obstacles of Thai food supply chain. Furthermore, the study on business environment of entrepreneurs in the food industry should be conducted to analyze the potential of operators, strength, weakness, and opportunity in order to determine guideline for improving the operation of entrepreneurs to compete against those in global markets.

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APPENDICES

APPENDIX A

THAILAND'S MAJOR FOOD EXPORT MARKETS

Table A.1 Thailand's major food export markets 2004-2010

No.	Country	Value : million US$						
		2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
1	U.S.A.	2,040.68	2,246.45	2,699.29	2,740.66	3,149.73	3,183.56	3,665.17
2	JAPAN	2,194.26	2,325.46	2,333.69	2,429.01	3,314.78	3,209.70	3,611.37
3	CHINA	743.07	841.57	1,162.65	1,174.80	992.30	1,546.21	2,003.91
4	INDONESIA	469.75	472.10	449.58	777.12	823.29	713.71	1,093.21
5	UNITED KINGDOM	341.45	431.22	547.74	703.37	923.66	853.86	960.93
6	PHILIPPINES	221.48	235.93	236.58	371.54	709.09	396.11	793.69
7	MALAYSIA	651.46	542.54	569.27	755.03	1,055.52	615.27	778.75
8	NIGERIA	203.57	176.87	112.81	114.07	637.65	586.77	650.08
9	VIETNAM	81.99	131.93	216.47	297.36	359.46	464.08	646.11
10	AUSTRALIA	286.38	341.23	374.99	429.07	565.44	538.14	642.38
Total 10 records		7,234.09	7,745.30	8,703.07	9,792.02	12,530.92	12,107.41	14,845.60
Other		5,423.13	5,331.77	6,249.98	8,349.78	11,524.38	10,301.15	10,898.09
Total		12,657.22	13,077.07	14,953.05	18,141.80	24,055.30	22,408.56	25,743.69

Source: Information and Communication Technology Center with cooperation of The Customs Department

APPENDIX B

THAI FOOD EXPORTS TO JAPAN

Table B.1 Thailand's food export values to Japan

No.	Description	Value : million US$						
		2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
1	Prepared poultry	254.57	330.77	332.84	346.49	672.56	664.98	741.70
2	Prepared or preserved fish, crustaceans, molluscs in airtight containers	453.50	458.17	448.33	450.94	560.01	546.97	587.99
3	Fresh, chilled or frozen shrimps, prawns and lobster	203.10	183.84	192.45	215.39	217.78	270.01	328.57
4	Fresh, chilled or frozen fish fillets and other fish meat	190.52	193.73	159.62	173.79	270.73	223.16	265.16
5	Sugar	119.17	128.20	158.48	146.18	244.56	241.13	228.39
6	Tapioca products	120.76	120.87	125.92	162.41	232.99	165.54	228.12
7	Meat and preparations of meat	89.60	143.56	163.28	149.20	174.80	170.44	182.89
8	Fresh, chilled or frozen cuttle fish, squids and octopus	208.69	179.69	169.08	182.23	155.45	136.29	154.01
9	Rice	24.86	57.22	35.24	46.96	91.10	133.91	153.22
10	Fresh or frozen vegetables	87.89	85.17	81.42	72.63	73.98	85.72	95.47
11	Wheat products and other food preparations	45.80	57.26	77.34	71.10	81.45	80.49	91.77
12	Prepared or preserved fruits	48.10	55.33	50.77	52.59	78.33	68.11	77.57
13	Vegetable canned, prepared or preserved	63.29	62.44	66.64	64.45	61.25	61.56	67.58
14	Sauces and preparations therefor	27.32	31.84	38.64	41.22	53.10	60.93	62.91
15	Rice products	38.26	31.10	30.96	30.85	47.07	47.01	51.72
16	Fresh or chilled or frozen fish, whole	18.16	17.33	19.13	17.35	28.33	32.49	37.75
17	Chewing gum and sugar confectionery not containing cocoa	3.62	3.72	5.01	6.50	32.25	32.75	31.42
18	Beverages	26.15	22.76	11.83	21.72	26.63	12.66	20.00
19	Fresh or dried fruit	15.32	15.28	17.26	19.47	20.10	17.17	18.29
20	Spices and medicinal plants	10.86	10.74	10.97	16.05	17.78	11.80	16.62

Table B.1 Thailand's food export values to Japan (cont.)

No.	Description	Value : million US$						
		2004	2005	2006	2007	2008	2009	2010
21	Animal or vegetable fats and oils	15.27	15.61	11.14	14.43	20.04	15.95	15.44
22	Crustaceans and Molluscs	13.46	12.10	10.69	9.27	10.99	16.50	13.71
23	Cuttle fish, squids and octopus salted in brine or dried	1.36	1.41	1.53	7.22	4.16	4.36	8.10
24	Other livestock products	3.84	4.93	4.31	4.80	5.73	7.95	7.80
25	Cocoa and cocoa preparations	6.11	4.10	3.90	3.22	2.41	4.34	7.70
26	Cereals	4.63	5.61	7.28	10.74	10.98	6.00	6.84
27	Molasses	3.44	7.87	5.72	6.30	5.37	7.58	6.14
28	Dried, salted in brine or smoked fish	5.62	3.81	1.76	2.03	2.21	4.36	5.82
29	Jellyfish	3.98	2.62	8.08	2.81	5.68	3.87	5.61
30	Soups and preparations therefor	7.95	8.35	4.24	4.33	2.75	3.09	4.52
31	Other fishery	1.71	1.16	1.04	1.20	2.64	4.18	4.34
32	Eatable meat and other animal parts	0.71	0.39	1.09	1.05	1.15	1.62	3.01
33	Rice beans (Red bamboo beans)	2.07	1.65	1.50	1.40	2.55	2.18	2.24
34	Maize	0.58	0.40	1.71	0.94	1.62	3.28	0.84
35	Black matpe beans	0.61	0.52	0.62	0.43	0.37	0.35	0.58
36	Other beans	0.19	0.23	0.17	0.71	0.57	0.53	0.47
37	Chilled or frozen poultry cuts	19.41	5.43	7.44	4.04	0.87	0.36	0.37
38	Mung beans	0.03	0.07	0.05	0.19	0.07	0.06	0.13
39	Shrimps, prawns and lobsters salted in brine or dried	0.50	0.20	0.27	0.09	0.09	0.11	0.11
40	Oil seeds and oleaginous fruits	3.63	1.48	1.05	0.78	0.56	0.28	0.08
41	Coffee	0.01	0.05	0.03	0.09	0.03	0.10	0.06
42	Shrimps and prawns cooked by steaming or boiling in water	0.09	0.05	0.06	0.16	0.26	0.13	0.05
43	Ice-cream	0.11	0.02	0.06	0.08	0.11	0.03	0.04
44	Milk and milk products	0.46	0.07	0.05	0.05	0.35	0.02	0.02

Table B.1 Thailand's food export values to Japan (cont.)

No.	Description	value : million US$						
		2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
45	Meat of swine, fresh, chilled or frozen	0.01	0.00	-	0.00	0.04	0.00	0.01
46	Snapping turtle	0.00	0.10	0.10	0.09	0.07	0.05	0.00
47	Cashew nuts	-	-	-	-	-	-	0.00
48	Chilled or frozen ducks	-	-	-	-	-	-	-
Total 48 records		2,145.31	2,267.25	2,269.07	2,363.97	3,221.87	3,150.39	3,535.20
Other		11,346.32	12,822.60	14,116.83	15,755.08	16,871.77	12,573.29	16,880.51
Total		13,491.63	15,089.85	16,385.90	18,119.05	20,093.64	15,723.68	20,415.71

Source: Information and Communication Technology Center with cooperation of the Customs Department

APPENDIX C
QUESTIONNAIRES

เลขที่แบบสอบถามผู้แปรรูป / ผู้ส่งออก
[ ][ ][ ]

แบบสอบถามเพื่อการวิจัย
เรื่อง การระบุปัจจัยที่ส่งผลต่อโซ่อุปทานอาหารไทยไปยังประเทศญี่ปุ่น
(สำรวจความคิดเห็นของผู้แปรรูป / ผู้ส่งออกสินค้าอาหารไทยไปยังประเทศญี่ปุ่น)

คำชี้แจง

แบบสอบถามฉบับนี้เป็นส่วนหนึ่งของการทำวิทยานิพนธ์ในระดับปริญญาโท สาขาวิชาวิศวกรรมอุตสาหการ คณะวิศวกรรมศาสตร์ มหาวิทยาลัยมหิดล โดยมีวัตถุประสงค์เพื่อศึกษาปัจจัยที่ส่งผลต่อโซ่อุปทานอาหารไทยไปยังประเทศญี่ปุ่น ซึ่งทำการสำรวจความคิดเห็นของผู้แปรรูป / ผู้ส่งออกสินค้าอาหารไทยไปยังประเทศญี่ปุ่น ผลการวิจัยครั้งนี้จะเป็นแนวทางในการพัฒนาและส่งเสริมการส่งออกสินค้าอาหารไทย

ข้อมูลที่ได้รับจากการตอบแบบสอบถามจะถูกเก็บรักษาไว้เป็น**ความลับอย่างดีที่สุด** โดยจะนำไปใช้เพื่อวิเคราะห์ข้อมูลและสรุปผลการวิจัย**ทางการศึกษาเท่านั้น**

ผู้วิจัยจึงใคร่ขอความอนุเคราะห์จากท่าน โปรดตอบแบบสอบถามทุกข้อบนพื้นฐานความเป็นจริงและตรงกับความคิดเห็นของท่านมากที่สุด ทั้งนี้ทางผู้วิจัยใคร่ขอขอบพระคุณเป็นอย่างยิ่งในความอนุเคราะห์ของท่านในครั้งนี้

แบบสอบถามฉบับนี้ ประกอบด้วย 2 ส่วน ดังนี้

ส่วนที่ 1 ข้อมูลทั่วไปของผู้แปรรูป / ผู้ส่งออกสินค้าอาหารไทยไปยังประเทศญี่ปุ่น

ส่วนที่ 2 ข้อมูลเกี่ยวกับปัจจัยด้านต่างๆ ที่ส่งผลต่อการผลิตอาหารแปรรูปเพื่อส่งออกไปยังประเทศญี่ปุ่น

หลังจากท่านได้ตอบแบบสอบถามฉบับนี้แล้ว กรุณานำแบบสอบถามใส่ซองที่ได้จัดเตรียมไว้ แล้วส่งไปรษณีย์กลับตามที่อยู่ที่ผู้วิจัยได้จ่าหน้าซองและติดแสตมป์ไว้เรียบร้อยแล้ว **ภายในวันที่** 31 **สิงหาคม** 2554

หากท่านมีข้อสงสัยประการใด กรุณาติดต่อ นางสาวอนงค์ ลีลาสวัสดิ์สุข หมายเลขโทรศัพท์: 084-750-1491 หรือ E-mail: lee.anong@gmail.com

ขอขอบพระคุณในความกรุณาของท่านที่ได้สละเวลาอันมีค่ามา ณ โอกาสนี้

นางสาวอนงค์ ลีลาสวัสดิ์สุข
นักศึกษาปริญญาโท สาขาวิชาวิศวกรรมอุตสาหการ
คณะวิศวกรรมศาสตร์ มหาวิทยาลัยมหิดล

ส่วนที่ 1 ข้อมูลทั่วไปของผู้แปรรูป / ผู้ส่งออกสินค้าอาหารไทยไปยังประเทศญี่ปุ่น

<u>คำชี้แจง</u> โปรดทำเครื่องหมาย ü ลงใน o หรือเติมข้อความลงในช่องว่างที่ตรงกับความเป็นจริงของท่าน

ชื่อบริษัท: .....

ชื่อ-สกุลผู้ตอบแบบสอบถาม: .....

ตำแหน่ง: .....

1.1 ลักษณะของกิจการ

- o 1) ผู้แปรรูป
- o 2) ผู้ส่งออก
- o 3) ผู้แปรรูปและผู้ส่งออก
- o 4) อื่นๆ (โปรดระบุ) .....

1.2 บริษัทของท่านแปรรูป / ส่งออกสินค้าอาหารไทยประเภทใดไปยังประเทศญี่ปุ่น

- o 1) อาหารทะเลกระป๋องและแปรรูป ได้แก่ .....
- o 2) ไก่แปรรูป
- o 3) กุ้งสดแช่เย็นแช่แข็ง

1.3 บริษัทของท่านรับวัตถุดิบ หรือ สินค้าอาหารไทยมาจากใคร

- o 1) เกษตรกร

  (โปรดระบุรายชื่อเกษตรกร)

  1. .....
  2. .....
  3. .....
- o 2) ผู้รวบรวมผลผลิต

  (โปรดระบุรายชื่อผู้รวบรวมผลผลิต)

  1. .....
  2. .....
  3. .....

- o 3) ตลาดกลางสินค้าเกษตร

  (โปรดระบุรายชื่อตลาดกลางสินค้าเกษตร)

  1. .....
  2. .....
  3. .....

- o 4) โรงงานแปรรูป

  (โปรดระบุรายชื่อโรงงานแปรรูป)

  1. .....
  2. .....
  3. .....

- o 5) อื่นๆ (โปรดระบุ) .....

1.4 บริษัทของท่านส่งออกสินค้าอาหารไทยไปยังประเทศญี่ปุ่นด้วยวิธีการใด *(ตอบได้มากกว่า 1 ข้อ)*

- o 1) ส่งออกโดยผ่านบริษัทผู้ส่งออกในประเทศไทย
- o 2) ส่งออกโดยผ่านบริษัทผู้นำเข้าของประเทศญี่ปุ่นที่ตั้งอยู่ ณ ประเทศไทย
- o 3) ส่งออกโดยผ่านบริษัทผู้นำเข้าของประเทศญี่ปุ่นที่ตั้งอยู่ ณ ประเทศญี่ปุ่น
- o 4) ส่งออกโดยตรงไปยังบริษัทสาขาของตนเอง
- o 5) ส่งออกโดยตรงไปยังผู้บริโภคขั้นสุดท้าย เช่น ร้านค้าปลีกในประเทศญี่ปุ่น (สินค้าอุปโภคบริโภค) หรือผู้ผลิตอาหารแปรรูปในประเทศญี่ปุ่น (สินค้าอุตสาหกรรม)
- o 6) อื่นๆ (โปรดระบุ) .....

1.5 ปริมาณการส่งออกสินค้าอาหารไทยไปยังประเทศญี่ปุ่นโดยเฉลี่ยต่อปีคิดเป็นร้อยละเท่าใดของปริมาณการส่งออกสินค้าอาหารไทยทั้งหมด

- o 1) น้อยกว่าร้อยละ 20
- o 2) ร้อยละ 21-40
- o 3) ร้อยละ 41-60
- o 4) ร้อยละ 61-80
- o 5) มากกว่าร้อยละ 81

ส่วนที่ 2 ข้อมูลเกี่ยวกับปัจจัยด้านต่างๆ ที่ส่งผลต่อการผลิตอาหารแปรรูปเพื่อส่งออกไปยังประเทศญี่ปุ่น

<u>คำชี้แจง</u> โปรดทำเครื่องหมาย ü ลงในช่องว่างที่ตรงกับความเป็นจริงของท่าน

"มากที่สุด" หมายถึง ปัจจัยด้านนั้นเป็นปัญหาและอุปสรรคที่มีความสำคัญมากที่สุดที่ส่งผลต่อการผลิตอาหารแปรรูปเพื่อส่งออกไปยังประเทศญี่ปุ่น

"มาก" หมายถึง ปัจจัยด้านนั้นเป็นปัญหาและอุปสรรคที่มีความสำคัญมากที่ส่งผลต่อการผลิตอาหารแปรรูปเพื่อส่งออกไปยังประเทศญี่ปุ่น

"ปานกลาง" หมายถึง ปัจจัยด้านนั้นเป็นปัญหาและอุปสรรคที่มีความสำคัญปานกลางที่ส่งผลต่อการผลิตอาหารแปรรูปเพื่อส่งออกไปยังประเทศญี่ปุ่น

"น้อย" หมายถึง ปัจจัยด้านนั้นเป็นปัญหาและอุปสรรคที่มีความสำคัญน้อยที่ส่งผลต่อการผลิตอาหารแปรรูปเพื่อส่งออกไปยังประเทศญี่ปุ่น

"ไม่ใช่ปัญหา" หมายถึง ปัจจัยด้านนั้นไม่ใช่ปัญหาและอุปสรรคที่ส่งผลต่อการผลิตอาหารแปรรูปเพื่อส่งออกไปยังประเทศญี่ปุ่น

2.1 ท่านคิดว่ารายละเอียดของปัจจัยด้านต่างๆ เป็นปัญหาและอุปสรรคที่ส่งผลต่อการผลิตอาหารแปรรูปเพื่อส่งออกไปยังประเทศญี่ปุ่นระดับใด

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
1. ปัจจัยด้านสุขลักษณะอาหาร					
1.1 อาคารและสถานที่ผลิต					
1.1.1 สภาพแวดล้อมของสถานที่ผลิต					
1) ตั้งอยู่ในแหล่งอุตสาหกรรมที่ก่อให้เกิดมลพิษ					
2) ตั้งอยู่ในแหล่งที่มีน้ำท่วมขัง					
3) ตั้งอยู่ในแหล่งที่มีฝุ่นมากผิดปกติ					
4) ตั้งอยู่ในแหล่งที่มีกองขยะ					
1.1.2 การออกแบบอาคารและสถานที่ผลิต					
1) การวางผังอาคารผลิตและสายการผลิตไม่เอื้ออำนวยต่อการปฏิบัติงานอย่างถูกสุขลักษณะ และไม่สะดวกในการดูแลรักษาความสะอาด					

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
1.1.2 การออกแบบอาคารและสถานที่ผลิต (ต่อ)					
2) พื้น เพดาน ผนังของสถานที่ผลิตทำด้วยวัสดุที่ไม่เหมาะสมต่อการดำเนินการ					
3) ทางระบายน้ำมีจำนวน ขนาด และความลาดเอียงไม่เหมาะสม					
4) ภายในบริเวณผลิตมีการระบายอากาศที่ไม่ดี					
5) แสงสว่างไม่เพียงพอในบริเวณปฏิบัติงาน					
6) สถานที่เปลี่ยนชุดปฏิบัติงาน และเก็บของใช้ส่วนตัวของพนักงานไม่แยกเป็นสัดส่วนออกจากบริเวณผลิต					
1.1.3 วัสดุ เครื่องมือ และอุปกรณ์ทุกชนิดที่ใช้ในบริเวณผลิต					
1) วัสดุ เครื่องมือ และอุปกรณ์ทำด้วยวัสดุที่ไม่เหมาะสมต่อการใช้งาน					
2) สถานที่เก็บวัสดุ เครื่องมือ และอุปกรณ์ไม่เหมาะสม ซึ่งก่อให้เกิดการปนเปื้อน					
1.2 การควบคุมการผลิต					
1.2.1 วัตถุดิบที่รับเข้ามาและใช้ในการผลิต					
1) วัตถุดิบที่ใช้ในการผลิตไม่มีการแยกรุ่นอย่างชัดเจน และไม่สามารถบ่งชี้รายละเอียดถึงแหล่งที่มาของวัตถุดิบ					
2) วัตถุดิบที่รับมาไม่ได้ตรวจสอบคุณภาพทางกายภาพทุกรุ่น เช่น ลักษณะผิดปกติ การเริ่มเน่าเสีย					
1.2.2 สารเติมแต่งอาหารหรือวัตถุเจือปนอาหาร					
1) สารเติมแต่งอาหารหรือวัตถุเจือปนอาหารที่ใช้ในการผลิตไม่สอดคล้องกับข้อกำหนดของประเทศผู้นำเข้า					
2) ไม่มีการระบุชื่อสารเติมแต่งอาหารหรือวัตถุเจือปนอาหารบนภาชนะบรรจุอย่างชัดเจน					
3) สถานที่เก็บสารเติมแต่งอาหารหรือวัตถุเจือปนอาหารไม่เหมาะสม เช่น การจัดเก็บแยกเป็นหมวดหมู่ ความสะอาด การระบายอากาศที่ดี					

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
1.2.3 น้ำที่ใช้ในกระบวนการผลิต					
1) น้ำที่ใช้ในกระบวนการผลิตไม่มีคุณสมบัติตามที่ระบุใน WHO Guidelines for Drinking Water Quality *					
2) ปริมาณน้ำไม่เพียงพอกับการใช้ทั้งในการผลิตและการทำความสะอาดเครื่องมือ อุปกรณ์ และห้องผลิต					
3) ไม่มีวิธีป้องกันการปนเปื้อนของเชื้อจุลินทรีย์ในระบบน้ำใช้					
4) ไม่มีการตรวจวิเคราะห์คุณภาพน้ำทางจุลินทรีย์อย่างสม่ำเสมอ					
1.2.4 น้ำแข็งที่ใช้ในกระบวนการผลิต					
1) น้ำแข็งที่ใช้ในกระบวนการผลิตไม่มีคุณสมบัติตามที่ระบุใน WHO Guidelines for Drinking Water Quality					
2) สถานที่เก็บและภาชนะและอุปกรณ์ที่ใช้กับน้ำแข็งไม่ถูกสุขลักษณะ					
3) ไม่มีการตรวจวิเคราะห์คุณภาพน้ำแข็งทางจุลินทรีย์อย่างสม่ำเสมอ					
1.2.5 การควบคุมกระบวนการผลิตเบื้องต้น					
1) อุณหภูมิและระยะเวลาในการให้ความร้อนวัตถุดิบไม่เป็นไปตามข้อ กำหนดของกฎหมายที่เกี่ยวข้อง					
2) ไม่มีการบันทึกอุณหภูมิและระยะเวลาในการให้ความร้อนตามความถี่ที่กำหนด					

* WHO Guidelines for Drinking Water Quality หมายถึง มาตรฐานน้ำบริโภคขององค์การอนามัยโลก โดยองค์การอนามัยโลกได้กำหนดเกณฑ์คุณภาพของน้ำบริโภคทางด้านกายภาพ (สี กลิ่น รส ความขุ่น) ทางด้านเคมี (อลูมิเนียม แอมโมเนียม คลอไรด์ ความกระด้าง ไฮโดรเจนซัลไฟด์ เหล็ก แมงกานีส โซเดียม ซัลเฟต สารละลายทั้งหมดที่เหลือจากการระเหย สังกะสี ฟลูออไรด์ ตะกั่ว ปรอท ซิลิเนียม ทองแดง โครเมี่ยม แคดเมี่ยม สารหนู) และทางด้านแบคทีเรีย (แบคทีเรียประเภทโคลิฟอร์ม แบคทีเรียประเภทฟีคัลโคลิฟอร์ม)

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
1.2.6 บรรจุภัณฑ์					
1) รูปแบบบรรจุภัณฑ์และวัสดุที่ใช้ไม่สามารถป้องกันผลิตภัณฑ์ได้อย่างเพียงพอ					
2) รูปแบบบรรจุภัณฑ์ไม่เอื้อต่อการปิดฉลาก					
1.3 การบำรุงรักษาและการสุขาภิบาล					
1.3.1 การบำรุงรักษา					
1) ไม่มีการบำรุงรักษาสถานที่ผลิต เครื่องมือและอุปกรณ์ให้อยู่ในสภาพดีและพร้อมใช้งานตามวัตถุประสงค์					
1.3.2 การทำความสะอาดและการฆ่าเชื้อสถานประกอบการอาหาร					
1) ไม่มีแผนการทำความสะอาดและฆ่าเชื้ออุปกรณ์ เครื่องมือ และสถานที่ผลิตก่อนและหลังการผลิตอย่างเหมาะสม					
2) สถานที่เก็บอุปกรณ์ทำความสะอาด เช่น แปรงขัดถู อุปกรณ์ปาดน้ำ ไม่เป็นสัดส่วนและไม่ถูกสุขลักษณะ					
3) น้ำยาล้างทำความสะอาดและน้ำยาฆ่าเชื้อมีคุณสมบัติไม่เหมาะสำหรับใช้ในสถานประกอบการอาหาร					
4) การจัดเก็บน้ำยาทำความสะอาด น้ำยาฆ่าเชื้อ และสารเคมีที่เป็นพิษไม่ได้แยกออกจากส่วนผสมที่ใช้กับอาหาร					
5) ไม่มีการตรวจติดตามประสิทธิภาพการทำความสะอาดอย่างสม่ำเสมอ					
1.3.3 การควบคุมแมลงและสัตว์พาหะนำเชื้อของสถานประกอบการอาหาร					
1) อาคารผลิตมีช่องเปิด ซึ่งอาจเป็นทางเข้าออกของแมลงและสัตว์พาหะนำโรคต่างๆ					
2) ไม่มีการวางแผนงานสำหรับการป้องกันการกำจัดสัตว์พาหะนำเชื้ออย่างสม่ำเสมอ					
3) ไม่มีการตรวจติดตามการปรากฏหรือร่องรอยของสัตว์พาหะนำเชื้อในบริเวณผลิตอย่างสม่ำเสมอ					

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
1.3.4 การจัดการเศษเหลือและน้ำทิ้งจากกระบวนการผลิต					
1) เศษเหลือจากกระบวนการผลิตไม่มีการขนถ่ายออกจากบริเวณผลิตอย่างสม่ำเสมอ					
2) ภาชนะใส่เศษเหลือทำจากวัสดุที่ไม่เอื้ออำนวยต่อการทำความสะอาด					
3) สถานที่เก็บเศษเหลือและของเสียไม่ได้แยกเป็นสัดส่วน					
4) ไม่มีการกำจัดน้ำทิ้งอย่างเหมาะสม					
1.3.5 ห้องสุขา					
1) ห้องสุขามีจำนวนไม่เพียงพอ					
2) ห้องสุขาไม่ได้แยกเป็นสัดส่วนออกจากบริเวณผลิต					
3) ไม่มีการระบายสิ่งปฏิกูลอย่างถูกสุขลักษณะ เช่น แยกจากการบำบัดน้ำเสียอย่างชัดเจน					
1.3.6 อ่างล้างมือ / บ่อล้างเท้าของสถานประกอบการอาหาร					
1) อ่างล้างมือมีจำนวนไม่เพียงพอต่อการใช้งาน					
2) อ่างน้ำยาฆ่าเชื้อสำหรับจุ่มมือ / ถุงมือ และบ่อล้างเท้ามีปริมาณน้ำยาฆ่าเชื้อไม่เหมาะสม					
3) ไม่มีการตรวจติดตามปริมาณความเข้มข้นของน้ำยาฆ่าเชื้ออย่างเหมาะสม					
1.4 สุขลักษณะส่วนบุคคล					
1.4.1 บุคลากร					
1) พนักงานที่ปฏิบัติหน้าที่ในบริเวณผลิตไม่ได้รับการตรวจสุขภาพประจำปี					
2) พนักงานที่ทำงานในห้องผลิตที่มีบาดแผลไม่มีวิธีการป้องกันที่เหมาะสม เช่น ปิดแผลด้วยวัสดุปิดแผลกันน้ำได้					
1.4.2 การปฏิบัติของบุคลากร					
1) บุคลากรปฏิบัติงานไม่ถูกสุขลักษณะ เช่น การรักษาความสะอาดของร่างกายไม่เพียงพอ การรับประทานอาหารขณะปฏิบัติงานอยู่ในบริเวณผลิต					
2) เสื้อผ้าและเครื่องแต่งกายที่สวมใส่ปฏิบัติงานไม่สะอาด ไม่มีสิ่งปกปิดคลุมผมให้มิดชิด					

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
1.5 **การเก็บรักษาผลิตภัณฑ์**					
1.5.1 ลักษณะการเก็บรักษาผลิตภัณฑ์					
1) ไม่มีการควบคุมอุณหภูมิของผลิตภัณฑ์ในขณะเก็บรักษา					
2) บริเวณที่เก็บผลิตภัณฑ์ไม่ถูกสุขลักษณะ เช่น อากาศถ่ายเทได้ไม่สะดวก บริเวณที่เก็บไม่สะอาด ไม่แยกเป็นสัดส่วนแยกจากบริเวณทำการผลิต					
1.5.2 การบ่งชี้แหล่งที่มาของผลิตภัณฑ์					
1) ผลิตภัณฑ์ที่อยู่ระหว่างการเก็บรักษาไม่สามารถบ่งชี้แหล่งที่มา เพื่อการตามสอบกลับได้					
1.6 **เอกสารและการบันทึกข้อมูลเกี่ยวกับสุขลักษณะของสถานประกอบการอาหาร**					
1) ไม่มีเอกสารแสดงการควบคุมสุขลักษณะ เช่น การบำรุงรักษาและการรักษาความสะอาด การป้องกันหนู แมลง และสัตว์พาหะนำเชื้ออื่นๆ การควบคุมคุณภาพวัตถุดิบและการผลิต การควบคุมอื่นๆ รวมถึงการควบคุมสารเคมีและการกำจัดเศษเหลือ					
2) ไม่มีการบันทึกผลการตรวจติดตามสุขลักษณะตามที่กำหนด รวมทั้งการเก็บข้อมูลไว้เพื่อการตรวจสอบ					
1.7 **การขนส่ง**					
1) พาหนะหรือตู้ขนส่งสินค้าไม่สามารถป้องกันสิ่งปนเปื้อน เช่น ฝุ่น ควัน ที่อาจเกิดขึ้นระหว่างการขนส่ง					
2) พาหนะหรือตู้ขนส่งสินค้าไม่สามารถรักษาระดับอุณหภูมิ ความชื้น และบรรยากาศ ทำให้จุลินทรีย์ที่เป็นอันตรายเจริญเติบโตและอาหารเกิดการเน่าเสีย					
1.8 **ข้อมูลเกี่ยวกับผลิตภัณฑ์**					
1) ฉลากผลิตภัณฑ์อาหารแสดงรายละเอียดของผลิตภัณฑ์อาหารไม่ครบถ้วนและชัดเจน เช่น ชื่อผลิตภัณฑ์ ส่วนผสมและวัตถุเจือปนอาหาร น้ำหนักหรือปริมาตรของผลิตภัณฑ์ วัน เดือน ปี ที่หมดอายุ วิธีการเก็บรักษา ชื่อและที่อยู่ของสถานที่ผลิต					
2) ภาษาที่ใช้ในฉลากผลิตภัณฑ์อาหารไม่เป็นไปตามข้อกำหนดของประเทศผู้นำเข้า					

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
1.9 **การฝึกอบรมพนักงานที่ปฏิบัติงาน**					
1) ไม่มีการฝึกอบรมพนักงานที่ปฏิบัติงาน เพื่อให้เข้าใจถึงมาตรฐานความปลอดภัยของอาหาร การปฏิบัติที่ดีด้านสุขลักษณะของการแปรรูปอาหารและการควบคุมคุณภาพ					
2) ไม่มีการทบทวนรายการฝึกอบรมและปรับปรุงให้ทันสมัย					
2. ปัจจัยด้านการประยุกต์ใช้หลักการ HACCP [†]					
2.1 ผู้ประกอบการด้านอาหารไม่มีความรู้และความชำนาญเกี่ยวกับผลิตภัณฑ์อาหาร					
2.2 ไม่มีคำอธิบายรายละเอียดผลิตภัณฑ์และข้อมูลด้านความปลอดภัยที่เกี่ยวข้อง เช่น ส่วนประกอบ ลักษณะทางกายภาพ/เคมี ความคงทนต่อการเสื่อมเสีย สภาวะการเก็บรักษา					
2.3 ไม่ระบุวัตถุประสงค์การใช้ผลิตภัณฑ์					
2.4 ไม่มีการจัดทำแผนภูมิกระบวนการผลิต					
2.5 ไม่มีการตรวจสอบยืนยันความถูกต้องของแผนภูมิกระบวนการผลิต ณ สถานที่ผลิต					
2.6 ไม่มีการระบุอันตรายทุกชนิดที่อาจเกิดขึ้นในแต่ละขั้นตอนของกระบวนการผลิต					
2.7 ไม่มีการวิเคราะห์อันตราย และพิจารณาหามาตรการในการควบคุมอันตรายที่ตรวจพบ					
2.8 ไม่มีการกำหนดจุดวิกฤตที่ต้องควบคุม					
2.9 ไม่มีการกำหนดค่าวิกฤตและตรวจสอบความถูกต้องของแต่ละจุดวิกฤตที่ต้องควบคุม					
2.10 ไม่มีการกำหนดระบบการตรวจเฝ้าระวังสำหรับแต่ละจุดวิกฤตที่ต้องควบคุม					

[†] การวิเคราะห์อันตรายและจุดวิกฤตที่ต้องควบคุม (Hazard Analysis and Critical Control Point: HACCP) หมายถึง ระบบที่ชี้บ่ง ประเมินอันตราย และกำหนดระบบการควบคุมอันตราย ซึ่งมีความสำคัญต่อความปลอดภัยของอาหาร

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
2. ปัจจัยด้านการประยุกต์ใช้หลักการ HACCP (ต่อ)					
2.11 ไม่มีการกำหนดวิธีการแก้ไขเฉพาะในแต่ละจุดวิกฤตที่ต้องควบคุม					
2.12 ไม่มีการบันทึกวิธีการจัดการสินค้าที่ไม่เป็นไปตามข้อกำหนดในระบบการเก็บเอกสารของระบบ HACCP					
2.13 ไม่มีการทวนสอบและการตรวจประเมินขั้นตอนการดำเนินงานและการทดสอบ เพื่อยืนยันว่าระบบ HACCP ดำเนินไปอย่างมีประสิทธิผล					
2.14 ไม่มีการจัดทำเอกสารและการจัดเก็บบันทึกข้อมูล					
2.15 ไม่มีการฝึกอบรมบุคลากรเรื่องหลักการ HACCP และการประยุกต์ใช้					
3. ปัจจัยด้านวัตถุดิบ					
3.1 การขาดแคลนวัตถุดิบ					
3.2 วัตถุดิบมีสารปนเปื้อน					
3.3 วัตถุดิบมีคุณสมบัติไม่แน่นอน ส่งผลให้ผลิตภัณฑ์ที่ผลิตได้มีคุณภาพที่ไม่สม่ำเสมอและไม่ตรงกับความต้องการของลูกค้า					
4. ปัจจัยด้านการผลิต					
4.1 ต้นทุนแรงงานของประเทศไทยสูง เมื่อเทียบกับประเทศคู่แข่ง					
4.2 ต้นทุนการผลิตสูง					
4.3 การขาดแคลนแรงงาน					
4.4 การขาดแคลนเงินทุนหมุนเวียน เพื่อปรับปรุงและจัดการการผลิตให้มีประสิทธิภาพ					
4.5 การขาดแคลนเทคโนโลยีด้านการวิจัยและพัฒนาผลิตภัณฑ์ / สินค้า					
5. ปัจจัยด้านการตลาด					
5.1 การตัดราคาส่งออกกันเอง เนื่องจากการแข่งขันสูงระหว่างผู้ผลิตภายในประเทศ					
5.2 ผู้ส่งออกมีอำนาจในการต่อรองราคาน้อย จึงทำให้ได้กำไรน้อย					

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
6. ปัจจัยด้านการส่งออก					
6.1 มีมาตรการกีดกันทางการค้าที่อยู่ในรูปภาษี (Tariff Barriers: TBs)					
6.2 มีมาตรการกีดกันทางการค้าที่ไม่ใช่ภาษี (Non-Tariff Barriers: NTBs)					
1) มาตรการสุขอนามัยและสุขอนามัยพืช (Sanitary and Phytosanitary Standard: SPS)					
2) มาตรการอุปสรรคทางการค้าด้านเทคนิค (Technical Barriers to Trade: TBT) ‡					
3) มาตรการด้านสิ่งแวดล้อม (Environment Measures: ENV)					
4) มาตรการชาตินิยม (Nationalism Measures)					
6.3 การขาดข้อมูลข่าวสารระหว่างประเทศ หรือข่าวสารที่ได้รับไม่ทันต่อเหตุการณ์ ทำให้ผู้ส่งออกของไทยเสียโอกาสในการส่งออก					
6.4 การขาดความรู้ความเข้าใจเกี่ยวกับกฎหมาย หรือข้อกำหนดต่างๆ ในการนำเข้าสินค้าอาหารของประเทศญี่ปุ่น					
6.5 ความล่าช้าในการปฏิบัติงานของหน่วยราชการไทยที่เกี่ยวกับระบบการควบคุมคุณภาพและการตรวจสอบสินค้าส่งออก					
6.6 การขาดการส่งเสริมจากภาครัฐ ซึ่งไม่ค่อยได้รับการสนับสนุนในด้านการส่งเสริมการส่งออก					
6.7 ปัญหาด้านการขนส่ง และต้นทุนการขนส่งสูง					
7. ปัจจัยด้านสภาพแวดล้อมภายนอก					
7.1 ผลิตภัณฑ์มวลรวมของประเทศญี่ปุ่นลดลง					
7.2 ความผันผวนของอัตราแลกเปลี่ยนเงินตราต่างประเทศ					

‡ มาตรการอุปสรรคทางการค้าด้านเทคนิค (Technical Barriers to Trade: TBT) หมายถึง ข้อกำหนดคุณลักษณะของผลิตภัณฑ์หรือกระบวนการและกรรมวิธีการผลิตที่เกี่ยวข้องกับผลิตภัณฑ์ รวมถึงข้อกำหนดทางการบริหารซึ่งเป็นสิ่งที่ต้องปฏิบัติตาม โดยกฎระเบียบทางเทคนิค ได้แก่ ข้อกำหนดเกี่ยวกับการเรียกชื่อ การใช้สัญลักษณ์ การบรรจุหีบห่อ การทำเครื่องหมาย และการติดฉลากผลิตภัณฑ์ เป็นต้น

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
7. ปัจจัยด้านสภาพแวดล้อมภายนอก (ต่อ)					
7.3 การเปลี่ยนแปลงลักษณะทางประชากรศาสตร์ของประเทศญี่ปุ่น เช่น ลักษณะครอบครัว อัตราการเพิ่มขึ้นของผู้สูงอายุ การเพิ่มขึ้นของประชากร					
7.4 ค่าใช้จ่ายทั้งหมดสูงที่ใช้จ่ายในการส่งออกสินค้าอาหารจากประเทศไทยไปยังประเทศญี่ปุ่น					

2.2 ข้อคิดเห็นและข้อเสนอแนะเพิ่มเติมเกี่ยวกับปัจจัยที่ส่งผลต่อการผลิตอาหารแปรรูปเพื่อส่งออกไปยังประเทศญี่ปุ่น

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ขอขอบพระคุณทุกท่านเป็นอย่างสูง ที่กรุณาสละเวลาอันมีค่าในการตอบแบบสอบถามครั้งนี้

เลขที่แบบสอบถามเกษตรกรผู้เลี้ยงไก่
[ ][ ][ ]

แบบสอบถามเพื่อการวิจัย
เรื่อง การระบุปัจจัยที่ส่งผลต่อโซ่อุปทานอาหารไทยไปยังประเทศญี่ปุ่น
(สำรวจความคิดเห็นของเกษตรกรผู้เลี้ยงไก่)

<u>คำชี้แจง</u>

แบบสอบถามฉบับนี้เป็นส่วนหนึ่งของการทำวิทยานิพนธ์ในระดับปริญญาโท สาขาวิชาวิศวกรรมอุตสาหการ คณะวิศวกรรมศาสตร์ มหาวิทยาลัยมหิดล โดยมีวัตถุประสงค์เพื่อศึกษาปัจจัยที่ส่งผลต่อโซ่อุปทานอาหารไทยไปยังประเทศญี่ปุ่น ซึ่งทำการสำรวจความคิดเห็นของเกษตรกรผู้เลี้ยงไก่ ผลการวิจัยครั้งนี้จะเป็นแนวทางในการพัฒนาและส่งเสริมการส่งออกสินค้าอาหารไทย

ข้อมูลที่ได้รับจากการตอบแบบสอบถามจะถูกเก็บรักษาไว้เป็น**<u>ความลับอย่างดีที่สุด</u>** โดยจะนำไปใช้เพื่อวิเคราะห์ข้อมูลและสรุปผลการวิจัย**<u>ทางการศึกษาเท่านั้น</u>**

ผู้วิจัยจึงใคร่ขอความอนุเคราะห์จากท่าน โปรดตอบแบบสอบถามทุกข้อบนพื้นฐานความเป็นจริงและตรงกับความคิดเห็นของท่านมากที่สุด ทั้งนี้ทางผู้วิจัยใคร่ขอขอบพระคุณเป็นอย่างยิ่งในความอนุเคราะห์ของท่านในครั้งนี้

แบบสอบถามฉบับนี้ ประกอบด้วย 2 ส่วน ดังนี้

ส่วนที่ 1 ข้อมูลทั่วไปของเกษตรกรผู้เลี้ยงไก่

ส่วนที่ 2 ข้อมูลเกี่ยวกับปัจจัยด้านต่างๆ ที่ส่งผลต่อการเลี้ยงไก่เพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่น

หลังจากท่านได้ตอบแบบสอบถามฉบับนี้แล้ว กรุณานำแบบสอบถามใส่ซองที่ได้จัดเตรียมไว้ แล้วส่งไปรษณีย์กลับตามที่อยู่ที่ผู้วิจัยได้จ่าหน้าซองและติดแสตมป์ไว้เรียบร้อยแล้ว **<u>ภายในวันที่</u>** <u>30 กันยายน 2554</u>

หากท่านมีข้อสงสัยประการใด กรุณาติดต่อ นางสาวอนงค์ ลีลาสวัสดิ์สุข หมายเลขโทรศัพท์: 084-750-1491 หรือ E-mail: <u>lee.anong@gmail.com</u>

ขอขอบพระคุณในความกรุณาของท่านที่ได้สละเวลาอันมีค่ามา ณ โอกาสนี้

นางสาวอนงค์ ลีลาสวัสดิ์สุข
นักศึกษาปริญญาโท สาขาวิชาวิศวกรรมอุตสาหการ
คณะวิศวกรรมศาสตร์ มหาวิทยาลัยมหิดล

ส่วนที่ 1 **ข้อมูลทั่วไปของเกษตรกรผู้เลี้ยงไก่**

<u>คำชี้แจง</u> โปรดทำเครื่องหมาย ü ลงใน o หรือเติมข้อความลงในช่องว่างที่ตรงกับความเป็นจริงของท่าน

ชื่อเกษตรกรผู้ตอบแบบสอบถาม: .....
ที่อยู่: .....
โทรศัพท์: .....

1.1 ท่านจัดส่งผลผลิตให้กับใคร และปริมาณการจำหน่ายผลผลิตโดยเฉลี่ยต่อปีคิดเป็นร้อยละเท่าใดของปริมาณผลผลิตที่ผลิตได้ทั้งหมด *(รวมคำตอบทั้งหมดคิดเป็น 100%)*

- o 1) ผู้รวบรวมผลผลิต
  (โปรดระบุรายชื่อผู้รวบรวมผลผลิต)
  1. ..... คิดเป็นร้อยละ .....
  2. ..... คิดเป็นร้อยละ .....
  3. ..... คิดเป็นร้อยละ .....
- o 2) ตลาดกลางสินค้าเกษตร
  (โปรดระบุรายชื่อตลาดกลางสินค้าเกษตร)
  1. ..... คิดเป็นร้อยละ .....
  2. ..... คิดเป็นร้อยละ .....
  3. ..... คิดเป็นร้อยละ .....
- o 3) โรงงานแปรรูป
  (โปรดระบุรายชื่อโรงงานแปรรูป)
  1. ..... คิดเป็นร้อยละ .....
  2. ..... คิดเป็นร้อยละ .....
  3. ..... คิดเป็นร้อยละ .....
- o 4) ผู้ส่งออก
  (โปรดระบุรายชื่อผู้ส่งออก)
  1. ..... คิดเป็นร้อยละ .....
  2. ..... คิดเป็นร้อยละ .....
  3. ..... คิดเป็นร้อยละ .....
- o 5) อื่นๆ (โปรดระบุ) .....

ส่วนที่ 2 ข้อมูลเกี่ยวกับปัจจัยด้านต่างๆ ที่ส่งผลต่อการเลี้ยงไก่เพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่น

<u>คำชี้แจง</u> โปรดทำเครื่องหมาย ü ลงในช่องว่างที่ตรงกับความเป็นจริงของท่าน

"มากที่สุด" หมายถึง ปัจจัยด้านนั้นเป็นปัญหาและอุปสรรคที่มีความสำคัญมากที่สุดที่ส่งผลต่อการเลี้ยงไก่เพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่น

"มาก" หมายถึง ปัจจัยด้านนั้นเป็นปัญหาและอุปสรรคที่มีความสำคัญมากที่ส่งผลต่อการเลี้ยงไก่เพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่น

"ปานกลาง" หมายถึง ปัจจัยด้านนั้นเป็นปัญหาและอุปสรรคที่มีความสำคัญปานกลางที่ส่งผลต่อการเลี้ยงไก่เพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่น

"น้อย" หมายถึง ปัจจัยด้านนั้นเป็นปัญหาและอุปสรรคที่มีความสำคัญน้อยที่ส่งผลต่อการเลี้ยงไก่เพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่น

"ไม่ใช่ปัญหา" หมายถึง ปัจจัยด้านนั้นไม่ใช่ปัญหาและอุปสรรคที่ส่งผลต่อการเลี้ยงไก่เพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่น

2.1 ท่านคิดว่ารายละเอียดของปัจจัยด้านต่างๆ เป็นปัญหาและอุปสรรคที่ส่งผลต่อการเลี้ยงไก่เพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่นระดับใด

ปัจจัย	**ระดับความสำคัญของปัญหา**				
	มากที่สุด (5)	**มาก** (4)	**ปานกลาง** (3)	**น้อย** (2)	**ไม่ใช่ปัญหา** (1)
1. ปัจจัยด้านการปฏิบัติทางการเกษตรที่ดีสำหรับปศุสัตว์					
1.1 องค์ประกอบฟาร์ม					
1.1.1 สถานที่ตั้ง					
1) ตั้งอยู่ในแหล่งที่มีน้ำท่วมขัง					
2) ตั้งอยู่ในแหล่งที่มีกองขยะ					
3) ตั้งอยู่ในแหล่งรวมสัตว์ปีก เช่น ตลาดค้าสัตว์ปีก โรงฆ่าสัตว์ปีก					
4) การคมนาคมไม่สะดวก					
5) ระบบสาธารณูปโภคพื้นฐานไม่เพียงพอ เช่น ระบบไฟฟ้า ประปา					

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
1.1.2 ผังและลักษณะฟาร์ม					
1) พื้นที่ของฟาร์มมีขนาดไม่เหมาะสมกับการเลี้ยงสัตว์					
2) ไม่มีการวางผังฟาร์มที่ดี ไม่มีผังแสดงการจัดวางที่แน่นอน					
3) บริเวณพื้นที่เลี้ยงสัตว์ไม่มีรั้วรอบ มีทางเข้า-ออกหลายทาง					
1.1.3 โรงเรือน					
1) การทำความสะอาดและบำรุงรักษาโรงเรือนสามารถดำเนินการได้ยาก					
2) โรงเรือนมีลักษณะและขนาดที่ไม่เหมาะสมกับจำนวนไก่ที่เลี้ยง					
3) อุปกรณ์ให้แสงสว่างภายในโรงเรือนไม่เพียงพอ เพื่อให้ไก่ได้รับแสงสว่างตามเกณฑ์ที่กำหนด					
1.2 อาหารสำหรับไก่					
1) อาหารไก่ไม่มีคุณภาพและมาตรฐานตามกฎหมายว่าด้วยการควบคุมคุณภาพอาหารสัตว์					
2) สถานที่เก็บรักษาอาหารสัตว์ไม่สามารถป้องกันการปนเปื้อนและรักษาคุณภาพของอาหารไม่ให้เสื่อมสภาพได้					
3) อาหารที่ใช้เลี้ยงไม่เหมาะสมกับความต้องการทางโภชนาการในแต่ละช่วงอายุและพันธุ์ไก่					
4) ภาชนะบรรจุอาหารสัตว์ไม่เพียงพอเพื่อให้ไก่ได้รับอาหารอย่างทั่วถึง					
5) การตรวจรับอาหารไก่ไม่มีการตรวจสอบลักษณะทางกายภาพเบื้องต้น					
1.3 น้ำที่ใช้ภายในฟาร์ม					
1) แหล่งน้ำที่ใช้ในฟาร์มไม่สามารถป้องกันการปนเปื้อนมูลสัตว์หรือน้ำเสียจากโรงเรือน					
2) น้ำที่ใช้เลี้ยงไก่และใช้ภายในฟาร์มมีปริมาณไม่เพียงพอ					
3) น้ำที่ใช้เลี้ยงไก่และใช้ภายในฟาร์มไม่มีคุณภาพตามมอก. 257 มาตรฐานน้ำบริโภคของมาตรฐานผลิตภัณฑ์อุตสาหกรรม					

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
1.3 **น้ำที่ใช้ภายในฟาร์ม** (ต่อ)					
4) จำนวนและขนาดของอุปกรณ์ให้น้ำ เช่น รางน้ำ นิปเปิล (nipple) กระติกน้ำ ไม่เพียงพอ เพื่อให้ไก่ได้รับน้ำอย่างทั่วถึง					
1.4 **การจัดการฟาร์ม**					
1) คู่มือการจัดการฟาร์มไม่แสดงรายละเอียดการปฏิบัติงานที่สำคัญภายในฟาร์ม เช่น ระบบการเลี้ยง อาหารและน้ำสำหรับสัตว์ ระบบการเก็บบันทึกข้อมูล การป้องกันและควบคุมโรค การจัดการด้านสวัสดิภาพสัตว์ปีก สุขอนามัยในฟาร์ม					
2) จำนวนบุคลากรไม่เพียงพอเหมาะสมกับจำนวนไก่ที่เลี้ยง					
3) บุคลากรที่ดูแลเลี้ยงไก่ไม่มีความรู้และความชำนาญในการดูแลไก่					
4) อุปกรณ์ที่เกี่ยวข้องกับการเลี้ยงไก่ เช่น ภาชนะบรรจุอาหารและน้ำ ไม่สามารถทำความสะอาดได้อย่างทั่วถึง					
5) ไม่มีการตรวจสอบการทำงานของเครื่องมือและอุปกรณ์ต่างๆ ที่สำคัญ เช่น อุปกรณ์การเลี้ยงแบบอัตโนมัติที่จำเป็นต่อสวัสดิภาพสัตว์					
6) ไม่มีระบบการทำความสะอาดและฆ่าเชื้อโรงเรือน อุปกรณ์ และบริเวณโดยรอบอย่างมีประสิทธิภาพ					
1.5 **สุขภาพสัตว์**					
1) ไก่เนื้อที่นำมาเลี้ยงไม่สามารถระบุแหล่งที่มาได้					
2) ไม่มีมาตรการป้องกันและควบคุมโรคก่อนเข้าฟาร์ม					
3) ไม่มีการแยกผู้ปฏิบัติงานและอุปกรณ์ในการดำเนินกิจกรรมแต่ละโรงเรือนอย่างชัดเจน					
4) ไม่มีแผนเฝ้าระวังการระบาดของโรคในฟาร์มที่สอดคล้องกับแผนของกรมปศุสัตว์					
5) ไม่มีแผนการให้วัคซีนไก่ในฟาร์ม เพื่อสร้างภูมิคุ้มกันและป้องกันโรค					

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
1.6 สวัสดิภาพสัตว์					
1) จำนวนไก่ต่อโรงเรือนหนาแน่นเกินไป					
2) ไม่มีการตรวจสอบสุขภาพไก่อย่างสม่ำเสมอ เช่น 2 สัปดาห์ต่อครั้ง 4 สัปดาห์ต่อครั้ง					
1.7 สิ่งแวดล้อม					
1) ไม่มีการกำจัดขยะ ซากไก่ และของเสียอื่นๆ เช่น มูลไก่ ซึ่งก่อให้เกิดการสะสมเป็นแหล่งของกลิ่นและเชื้อโรคแพร่ออกสู่ภายนอก					
2) น้ำที่ใช้ในการล้างโรงเรือนและอุปกรณ์ในช่วงเตรียมโรงเรือน ไม่มีการบำบัดก่อนปล่อยลงในแหล่งน้ำสาธารณะ					
1.8 การบันทึกข้อมูล					
1) ไม่มีการบันทึกข้อมูลผลการปฏิบัติงานในขั้นตอนที่สำคัญในการจัดการฟาร์ม เช่น ข้อมูลเกี่ยวกับการบริหารฟาร์ม ข้อมูลเกี่ยวกับการจัดการด้านการผลิต ข้อมูลการควบคุม ป้องกันและบำบัดโรค					
2) ไม่มีการเก็บบันทึกข้อมูลเพื่อตรวจสอบ					
2. ปัจจัยด้านคุณสมบัติของเกษตรกรผู้เลี้ยงไก่					
2.1 ไม่ได้เข้าฝึกอบรมหลักการเลี้ยงไก่					
2.2 ไม่ได้ขึ้นทะเบียนเกษตรกรผู้เลี้ยงสัตว์					
3. ปัจจัยด้านการเลี้ยงไก่					
3.1 การขาดแคลนพ่อแม่พันธุ์สัตว์					
3.2 การระบาดของโรค					
3.3 ต้นทุนการผลิตสูง เช่น ค่าอาหาร ค่ายา-เคมีภัณฑ์					
3.4 การขาดความรู้และเทคโนโลยีการเลี้ยงสัตว์					
3.5 การขาดการจัดการระบบฟาร์มที่ดี					
3.6 การใช้ยาและเคมีภัณฑ์ในปริมาณสูง จึงทำให้เกิดปัญหาสารเคมีตกค้าง					
3.7 การขาดแคลนสินเชื่อ เพื่อสนับสนุนการเลี้ยงสัตว์					

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
4. ปัจจัยด้านการบริการของภาครัฐ					
4.1 การขาดการส่งเสริมและเผยแพร่ความรู้ทางวิชาการเกี่ยวกับการเลี้ยงสัตว์ปีก					
4.2 เจ้าหน้าที่ของภาครัฐไม่เอาใจใส่การให้บริการกับเกษตรกร					
4.3 จำนวนเจ้าหน้าที่ของภาครัฐไม่เพียงพอต่อการให้บริการแก่เกษตรกร					
4.4 เจ้าหน้าที่ของภาครัฐขาดความรู้ความชำนาญในการปฏิบัติงาน					

2.2 ข้อคิดเห็นและข้อเสนอแนะเพิ่มเติมเกี่ยวกับปัจจัยที่ส่งผลต่อการเลี้ยงไก่เพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่น

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ขอขอบพระคุณเป็นอย่างสูง ที่กรุณาสละเวลาในการตอบแบบสอบถามครั้งนี้

เลขที่แบบสอบถามเกษตรกรผู้เลี้ยงสัตว์น้ำ
[ ][ ][ ]

แบบสอบถามเพื่อการวิจัย
เรื่อง การระบุปัจจัยที่ส่งผลต่อโซ่อุปทานอาหารไทยไปยังประเทศญี่ปุ่น
(สำรวจความคิดเห็นของเกษตรกรผู้เลี้ยงสัตว์น้ำ)

คำชี้แจง

แบบสอบถามฉบับนี้เป็นส่วนหนึ่งของการทำวิทยานิพนธ์ในระดับปริญญาโท สาขาวิชาวิศวกรรมอุตสาหการ คณะวิศวกรรมศาสตร์ มหาวิทยาลัยมหิดล โดยมีวัตถุประสงค์เพื่อศึกษาปัจจัยที่ส่งผลต่อโซ่อุปทานอาหารไทยไปยังประเทศญี่ปุ่น ซึ่งทำการสำรวจความคิดเห็นของเกษตรกรผู้เลี้ยงสัตว์น้ำ ผลการวิจัยครั้งนี้จะเป็นแนวทางในการพัฒนาและส่งเสริมการส่งออกสินค้าอาหารไทย

ข้อมูลที่ได้รับจากการตอบแบบสอบถามจะถูกเก็บรักษาไว้เป็น**ความลับอย่างดีที่สุด** โดยจะนำไปใช้เพื่อวิเคราะห์ข้อมูลและสรุปผลการวิจัย**ทางการศึกษาเท่านั้น**

ผู้วิจัยจึงใคร่ขอความอนุเคราะห์จากท่าน โปรดตอบแบบสอบถามทุกข้อบนพื้นฐานความเป็นจริงและตรงกับความคิดเห็นของท่านมากที่สุด ทั้งนี้ทางผู้วิจัยใคร่ขอขอบพระคุณเป็นอย่างยิ่งในความอนุเคราะห์ของท่านในครั้งนี้

แบบสอบถามฉบับนี้ ประกอบด้วย 2 ส่วน ดังนี้

ส่วนที่ 1 ข้อมูลทั่วไปของเกษตรกรผู้เลี้ยงสัตว์น้ำ

ส่วนที่ 2 ข้อมูลเกี่ยวกับปัจจัยด้านต่างๆ ที่ส่งผลต่อการการเลี้ยงสัตว์น้ำเพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่น

หลังจากท่านได้ตอบแบบสอบถามฉบับนี้แล้ว กรุณานำแบบสอบถามใส่ซองที่ได้จัดเตรียมไว้ แล้วส่งไปรษณีย์กลับตามที่อยู่ที่ผู้วิจัยได้จ่าหน้าซองและติดแสตมป์ไว้เรียบร้อยแล้ว **ภายในวันที่** 30 **กันยายน** 2554

หากท่านมีข้อสงสัยประการใด กรุณาติดต่อ นางสาวอนงค์ ลีลาสวัสดิ์สุข หมายเลขโทรศัพท์: 084-750-1491 หรือ E-mail: lee.anong@gmail.com

ขอขอบพระคุณในความกรุณาของท่านที่ได้สละเวลาอันมีค่ามา ณ โอกาสนี้

นางสาวอนงค์ ลีลาสวัสดิ์สุข
นักศึกษาปริญญาโท สาขาวิชาวิศวกรรมอุตสาหการ
คณะวิศวกรรมศาสตร์ มหาวิทยาลัยมหิดล

ส่วนที่ 1 **ข้อมูลทั่วไปของเกษตรกรผู้เลี้ยงสัตว์น้ำ**

<u>คำชี้แจง</u> โปรดทำเครื่องหมาย ü ลงใน o หรือเติมข้อความลงในช่องว่างที่ตรงกับความเป็นจริงของท่าน

ชื่อเกษตรกรผู้ตอบแบบสอบถาม: .....
ที่อยู่: .....
โทรศัพท์: .....

1.1 ท่านเลี้ยงสัตว์น้ำประเภทใด *(ตอบได้มากกว่า 1 ข้อ)*

- o 1) กุ้ง
- o 2) ปู
- o 3) ปลา
- o 4) อื่นๆ (โปรดระบุ) .....

1.2 ท่านจัดส่งผลผลิตให้กับใคร และปริมาณการจำหน่ายผลผลิตโดยเฉลี่ยต่อปีคิดเป็นร้อยละเท่าใดของปริมาณผลผลิตที่ผลิตได้ทั้งหมด *(รวมคำตอบทั้งหมดคิดเป็น 100%)*

- o 1) ผู้รวบรวมผลผลิต
  (โปรดระบุรายชื่อผู้รวบรวมผลผลิต)
  1. ..... คิดเป็นร้อยละ .....
  2. ..... คิดเป็นร้อยละ .....
  3. ..... คิดเป็นร้อยละ .....
- o 2) ตลาดกลางสินค้าเกษตร
  (โปรดระบุรายชื่อตลาดกลางสินค้าเกษตร)
  1. ..... คิดเป็นร้อยละ .....
  2. ..... คิดเป็นร้อยละ .....
  3. ..... คิดเป็นร้อยละ .....
- o 3) โรงงานแปรรูป
  (โปรดระบุรายชื่อโรงงานแปรรูป)
  1. ..... คิดเป็นร้อยละ .....
  2. ..... คิดเป็นร้อยละ .....
  3. ..... คิดเป็นร้อยละ .....

- 4) ผู้ส่งออก

  (โปรดระบุรายชื่อผู้ส่งออก)

  1. ..... คิดเป็นร้อยละ .....
  2. ..... คิดเป็นร้อยละ .....
  3. ..... คิดเป็นร้อยละ .....

- 5) อื่นๆ (โปรดระบุ) .....

ส่วนที่ 2 ข้อมูลเกี่ยวกับปัจจัยด้านต่างๆ ที่ส่งผลต่อการเลี้ยงสัตว์น้ำเพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่น

<u>คำชี้แจง</u> โปรดทำเครื่องหมาย ü ลงในช่องว่างที่ตรงกับความเป็นจริงของท่าน

"มากที่สุด" หมายถึง ปัจจัยด้านนั้นเป็นปัญหาและอุปสรรคที่มีความสำคัญมากที่สุดที่ส่งผลต่อการเลี้ยงสัตว์น้ำเพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่น

"มาก" หมายถึง ปัจจัยด้านนั้นเป็นปัญหาและอุปสรรคที่มีความสำคัญมากที่ส่งผลต่อการเลี้ยงสัตว์น้ำเพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่น

"ปานกลาง" หมายถึง ปัจจัยด้านนั้นเป็นปัญหาและอุปสรรคที่มีความสำคัญปานกลางที่ส่งผลต่อการเลี้ยงสัตว์น้ำเพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่น

"น้อย" หมายถึง ปัจจัยด้านนั้นเป็นปัญหาและอุปสรรคที่มีความสำคัญน้อยที่ส่งผลต่อการเลี้ยงสัตว์น้ำเพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่น

"ไม่ใช่ปัญหา" หมายถึง ปัจจัยด้านนั้นไม่ใช่ปัญหาและอุปสรรคที่ส่งผลต่อการเลี้ยงสัตว์น้ำเพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่น

2.1 ท่านคิดว่ารายละเอียดของปัจจัยด้านต่างๆ เป็นปัญหาและอุปสรรคที่ส่งผลต่อการเลี้ยงสัตว์น้ำเพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่นระดับใด

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
1. ปัจจัยด้านการปฏิบัติทางการประมงที่ดีสำหรับฟาร์มเลี้ยงสัตว์น้ำ					
1.1 สถานที่ตั้งสำหรับฟาร์มเลี้ยงสัตว์น้ำ					
1.1.1 ตั้งอยู่ในแหล่งที่มีน้ำไม่มีคุณภาพ					
1.1.2 ตั้งอยู่ในแหล่งกำเนิดมลพิษ					

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
1.1 **สถานที่ตั้งสำหรับฟาร์มเลี้ยงสัตว์น้ำ** (ต่อ)					
1.1.3 ตั้งอยู่ในพื้นที่ที่ไม่ถูกกฎหมาย					
1.1.4 การคมนาคมไม่สะดวก					
1.1.5 ระบบสาธารณูปโภคพื้นฐานไม่เพียงพอ เช่น ระบบไฟฟ้า ประปา					
1.2 **การจัดการฟาร์มทั่วไป**					
1.2.1 เลือกใช้พ่อแม่พันธุ์ที่มีคุณสมบัติไม่เหมาะสม					
1.2.2 อัตราความหนาแน่นของสัตว์น้ำไม่เหมาะสมกับขนาดของพื้นที่ที่ใช้เลี้ยง					
1.2.3 อาหารสำหรับสัตว์น้ำมีการเตรียมและเก็บรักษาไม่ถูกสุขลักษณะ					
1.2.4 ไม่มีการจัดทำคู่มือขั้นตอนการปฏิบัติงานการเลี้ยงสัตว์น้ำที่สอดคล้องกับมาตรฐานที่กำหนดไว้					
1.2.5 ไม่มีการตรวจคุณภาพน้ำในแหล่งน้ำที่ใช้เลี้ยงสัตว์น้ำตามระยะเวลาที่ระบุไว้ในคู่มือ					
1.2.6 ไม่มีมาตรการป้องกันการระบาดของโรคจากบ่อหนึ่งไปยังอีกบ่อหนึ่ง					
1.3 **ยาสัตว์ สารเคมี วัตถุอันตราย และผลิตภัณฑ์จุลินทรีย์ที่ใช้ในการเลี้ยงสัตว์น้ำ**					
1.3.1 ยาสัตว์ สารเคมี วัตถุอันตราย และผลิตภัณฑ์จุลินทรีย์ที่ใช้ในการเลี้ยงสัตว์น้ำไม่ได้ขึ้นทะเบียนกับหน่วยงานภาครัฐอย่างถูกต้อง					
1.3.2 ใช้ยาสัตว์ สารเคมี วัตถุอันตราย และผลิตภัณฑ์จุลินทรีย์ที่ประเทศคู่ค้าและทางราชการประกาศห้ามใช้ในการเพาะเลี้ยงสัตว์น้ำ					
1.3.3 การเก็บรักษายาสัตว์ สารเคมี วัตถุอันตราย และผลิตภัณฑ์จุลินทรีย์ไม่ปฏิบัติตามฉลากยาและเอกสารกำกับยา					
1.4 **การจัดการน้ำทิ้ง**					
1.4.1 ไม่มีการบำบัดหรือควบคุมคุณภาพน้ำก่อนปล่อยทิ้งออกจากฟาร์ม					
1.4.2 ไม่มีวัสดุและอุปกรณ์ เช่น ตาข่าย ตะแกรง เป็นต้น สำหรับกรองน้ำเข้า-ออกจากฟาร์มเลี้ยง					

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
1.5 **พลังงานและน้ำมันเชื้อเพลิง**					
1.5.1 การใช้เครื่องสูบน้ำหรือเครื่องเพิ่มอากาศในบ่อเลี้ยงสัตว์น้ำไม่มีมาตรการอนุรักษ์น้ำและใช้พลังงานอย่างประหยัด					
1.5.2 ระบบไฟฟ้าภายในฟาร์มไม่มีความปลอดภัยต่อผู้ปฏิบัติงาน					
1.6 **การจัดการขยะและสุขอนามัยภายในฟาร์ม**					
1.6.1 สถานที่เก็บขยะ สิ่งปฏิกูล และภาชนะบรรจุยาสัตว์ไม่เป็นสัดส่วน					
1.6.2 ลักษณะการเก็บรักษาปัจจัยการผลิต วัสดุและอุปกรณ์ต่างๆ ไม่ถูกสุขลักษณะ					
1.7 **การเก็บเกี่ยว รวบรวม และการปฏิบัติหลังการเก็บเกี่ยวก่อนการขนส่ง/จำหน่าย**					
1.7.1 ไม่มีการวางแผนการเก็บเกี่ยว การรวบรวม และการขนส่ง					
1.7.2 ใช้สารเคมีระหว่างหรือหลังการเก็บเกี่ยวในปริมาณที่ไม่เหมาะสม					
1.7.3 ใช้สารต้องห้ามในระหว่างการเก็บเกี่ยว					
1.8 **แรงงานและสวัสดิการ**					
1.8.1 จ้างแรงงานไม่ถูกต้องตามกฎหมายว่าด้วยแรงงาน / จ้างแรงงานต่างด้าว					
1.8.2 ไม่มีระบบสวัสดิการต่อแรงงานอย่างพอเพียง เช่น บ้านพัก น้ำดื่ม น้ำใช้ ตู้ยา และอื่นๆ					
1.8.3 ไม่มีการฝึกอบรมการปฐมพยาบาลเบื้องต้นในรอบ 1 ปี เช่น การถูกไฟฟ้าช็อต การเสียเลือดมาก					
1.9 **ความรับผิดชอบต่อสังคมและสิ่งแวดล้อม**					
1.9.1 ไม่มีส่วนร่วมในกิจกรรมช่วยเหลือสังคม หรือกิจกรรมที่ส่งเสริมความ สัมพันธ์ระหว่างฟาร์มกับชุมชน					
1.9.2 ไม่ใช้ทรัพยากรในท้องถิ่นอย่างประหยัด					
1.9.3 ไม่มีการประชุมหรือฝึกอบรมด้านวิชาการทั้งด้านการจัดการและการใช้ปัจจัยการผลิตที่เกี่ยวข้องกับการผลิตสัตว์น้ำ					

ปัจจัย	ระดับความสำคัญของปัญหา				
	มากที่สุด (5)	มาก (4)	ปานกลาง (3)	น้อย (2)	ไม่ใช่ปัญหา (1)
1.9 **ความรับผิดชอบต่อสังคมและสิ่งแวดล้อม** (ต่อ)					
1.9.4 ไม่มีการฝึกอบรมด้านกฎระเบียบและกฎหมายที่เกี่ยวกับอุตสาหกรรมเพาะเลี้ยงสัตว์น้ำ					
1.9.5 ไม่ได้เข้าร่วมเป็นสมาชิกและเข้าร่วมกิจกรรมองค์กรเกษตรกร เช่น ชมรม สหกรณ์ที่เกี่ยวข้องกับการเลี้ยงสัตว์น้ำ					
1.10 **การบันทึกข้อมูลเกี่ยวกับการดำเนินการของฟาร์มเลี้ยงสัตว์น้ำ**					
1.10.1 ไม่มีการบันทึกและเก็บรักษาผลการบันทึกข้อมูลที่ดี					
2. ปัจจัยด้านคุณสมบัติของเกษตรกรผู้เลี้ยงสัตว์น้ำ					
2.1 ไม่ได้เข้าฝึกอบรมหลักการเลี้ยงสัตว์น้ำ					
2.2 ไม่ได้ขึ้นทะเบียนเกษตรกรผู้เลี้ยงสัตว์น้ำ					
3. ปัจจัยด้านการเลี้ยงสัตว์น้ำ					
3.1 การขาดแคลนพ่อแม่พันธุ์สัตว์น้ำ					
3.2 การระบาดของโรค					
3.3 ต้นทุนการผลิตสูง เช่น ค่าอาหาร ค่ายา-เคมีภัณฑ์					
3.4 การขาดความรู้และเทคโนโลยีการเพาะเลี้ยงสัตว์น้ำ					
3.5 การขาดการจัดการระบบฟาร์มที่ดี					
3.6 การใช้ยาและเคมีภัณฑ์ในปริมาณสูง จึงทำให้เกิดปัญหาสารเคมีตกค้าง					
3.7 การขาดแคลนสินเชื่อ เพื่อสนับสนุนการเพาะเลี้ยงสัตว์น้ำ					
4. ปัจจัยด้านการบริการของภาครัฐ					
4.1 การขาดการส่งเสริมและเผยแพร่ความรู้ทางวิชาการเกี่ยวกับการเลี้ยงสัตว์น้ำ					
4.2 เจ้าหน้าที่ของภาครัฐไม่เอาใจใส่การให้บริการกับเกษตรกร					
4.3 จำนวนเจ้าหน้าที่ของภาครัฐไม่เพียงพอต่อการให้บริการแก่เกษตรกร					
4.4 เจ้าหน้าที่ของภาครัฐขาดความรู้ความชำนาญในการปฏิบัติงาน					

2.2 ข้อคิดเห็นและข้อเสนอแนะเพิ่มเติมเกี่ยวกับปัจจัยที่ส่งผลต่อการเลี้ยงสัตว์น้ำเพื่อแปรรูปและส่งออกไปยังประเทศญี่ปุ่น

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ขอขอบพระคุณเป็นอย่างสูง ที่กรุณาสละเวลาในการตอบแบบสอบถามครั้งนี้

BIOGRAPHY

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