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Research Article

The Supply Chain Management of the Vannamei Shrimp in Nakhon Pathom Province

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ABSTRACT
This study aims to find and analyze the supply chain management model of Vannamei shrimp in Nakhon Pathom province using SCOR Model. The questionnaire and interview form were used as research instruments. The sample was Vannamei shrimp farmers who live in Nakhon Pathom province. The 359 samples were questionnaire respondents and *32* samples, using purposive sampling, were interviewees. The data, gathered form questionnaires, were analyzed by using descriptive statistics. While, the data, obtained from the interviews, were analyzed, summarized, and discussed by capturing Traits as the main point. The results found that Vannamei shrimp farmers in Nakhon Pathom province had the supply chain management using their experience and familiarity in each activity. The processes of plan and source made the yield of each farmer different. In delivery, most customers received products themselves. The farmers needed the assistance from the public and private agencies in providing knowledge about product information, pushing the product price, and promoting agro-tourism in Nakhon Pathom so as to add value to agricultural Vannamei shrimp products.

Keywords: Vannamei Shrimp, Supply Chain Management, Nakhon Pathom

INTRODUCTION
Shrimp is a popular economic aquatic animal consumed both domestically and internationally around the world. In Thailand, there is a total area of shrimp raising area about 300,000 rais per year, with a yield of about 290,000 tons per year and a value of about 47 billion baht per year, which is mostly about 280,000 tons of Vannamei shrimp per year with its value of about 44 billion baht per year. The overall export of Thailand shrimp products to other countries is approximately 80,000 – 130,000 tons per year. Major importing countries are the United States, the European Union, and Japan. For the export and development of Thailand Vannamei shrimp, the government has supported and encouraged

farmers to raise, harvest, and pack the products in line with international standards, including focusing on environmentally friendly production. Such endorsement covers all agricultural fields, comprising plants, livestock, and fishery, along with research and species development to suit the market needs and extend shelf life as well as using transportation systems and packaging to suit the export of Vannamei shrimp with the lowest cost. The public relations and recommendations of Thai marine shrimp to be more known both at home and abroad have been made continuously (Ministry of Agriculture and Cooperatives, 2015).

Thailand is an important exporter of Vannamei shrimp to many countries and has a continuously growing export value. At present, Thailand has major export markets for Vannamei shrimp in many countries, such as the United States, the European Union, and Japan, because the Vannamei shrimp is an economically important marine shrimp. Its species is developed to be easy to raise, grow faster, lower production costs, and be popular with both domestic and foreign consumers. Vannamei shrimp can be processed into other products to facilitate storage, export, and respond to the consumer needs. This is a highlight that helps to have high export capability.

Nakhon Pathom is the province suitable in areas, such as water sources, with 100% irrigation and public utility systems, and valuable food sources for aquaculture. In addition, it is appropriate in the transportation system, which is beneficial to the fishery product market system of Thailand. Nakhon Pathom is the area in the central Thailand that has many Vannamei shrimp farmers, with a white shrimp raising area of about 20,000 rais. Vannamei shrimp is considered an economic animal that generates a lot of farmers' incomes (Nakhon Pathom Provincial Office, 2017). Nakhon Pathom, moreover, is a province that has all aspects of tourism, such as ecotourism, agro-tourism, and cultural tourist attractions.

Farmers and entrepreneurs should study production guidelines that help reduce production costs from upstream to downstream, including the development of new species. If farmers adapt and develop their products, as mentioned, there is an advantageous opportunity for Thailand in being an important center for the production and export of Vannamei shrimp as well as a distribution center for exporting Vannamei shrimp to other countries around the world. In the production of business or commercial Vannamei shrimp, technology, production, innovation, packaging, marketing, and transportation need to be studied. Most farmers and entrepreneurs, however, ignore these things. This causes problems, including high production costs, loss of products during transportation, and low selling price. The important thing is that those involved must start to realize that Thai white shrimp exports are faced with the competition. As a result, the production technology must be developed in order to increase the quality of Vannamei shrimp, including the improvement and promotion of agro-tourism which can increase farmers' incomes and people in the area.

Due to such problems, the parties involved, both the public and private sectors, have supported and encouraged farmers to develop products to meet standards respond both domestic and international market needs, as well as publicizing the reputation of the white shrimp in Nakhon Pathom to become more well-known. The important issue is that farmers are facing problems in good supply chain management of Vannamei shrimp because there is no study analyzing such problems, including product movement, information flow, and the flow of fund and risk management, market structures and competition, technology and production innovation, and distribution channel. Therefore, encouraging Vannamei shrimp farmers in Nakhon Pathom to participate in the development of quality and efficiency supply chain management of Vannamai white shrimp and to find new production methods that will help reduce production costs from upstream to downstream will result in profits and able to operate their Vannamei shrimp businesses stably. Their businesses, moreover, can be developed as the important tourist attractions in Nakhon Pathom (Tunming, 2019).This research aims to find and analyze the supply chain management model of Vannamei shrimp in Nakhon Pathom so as to develop Vannamei shrimp farmers' capability in performing activities.

LITERATURE REVIEW

Supply chain management

Thananya Wasusri (2007) defines supply chain as a group of organizations or companies that conduct business with interrelationships regarding information about products, services, and activities, such as

procurement, production, delivery, storage, packaging, and handling of return products in the supply chain, with the objective of responding to the customer needs and maximizing the customer satisfaction by using the lowest costs. The supply chain consists of supplier networks, manufacturers, and customer networks.

Supply chain management needs to be considered in accordance with other management systems because the supply chain is a network covering all linked activities in a business operation that uses communication and coordination to generate the agility and appropriate costs in the flow of raw materials from suppliers to manufacturers and final consumers, respectively (Suharitdamrong, 2003). The current related studies in the context of supply chain management in Thailand are such as Supply Chain Management of the Cultivated Banana in Nakhon Pathom, as studied by Hiranphaet (2018), Factors of Advantage Creation for Competitive Electrical and Electronics Industries in Central Region of Thailand, as studied by Sooksai (2018), and The Mediating Role of Trust among Supply Chain Partners on Supply Chain Integration, Cultural Intelligence, Logistics Flexibility, and Supply Chan Performance, as studied by Aunyawong et al. (2018).

Key characteristics of agricultural products' modern supply chain

Modern supply chains of agricultural products are shorter than traditional supply chains because middlemen were eliminated. As a result, retailers or exporters buy and sell products directly with the manufacturer. Farmers and retailers still have a close relationship in the form of two-way communication, whether the information flow on production, technology, consumer satisfaction, or providing farmers with loans. Therefore, the modern supply chain has a circular shape. It is completely different from the traditional one which has a straight line from upstream, such as production factors and farms, flowing to midstream, such as processing and wholesales, and downstream, such as retails, exports, and consumers, respectively (Thailand Development Research Institute, 2010). The related research is such as Logistics System Development for Shrimp Business in Nakhon Pathom, as studied by Boonrod and Thongchai (2006), with the objective to support shrimp as the national key product.

Supply Chain Operation Reference Model (SCOR Model)

SCOR Model is a tool to help start the supply chain development because it has been developed to describe the business characteristics and display all business activities in the supply chain in relation to respond to customer satisfaction. The effective application of SCOR model comprises plan, source, make, delivery, return, and enable (Hiranphaet, 2019). The related research is such as The Supply Chain Management of Tilapia Transgenic Fish in the Sample Farm Project under the Royal Initiative of Nong Lat. Singburi Based SCOR model (Jaroonroj and Auttaphut, 2017).

Conceptual framework

The research on supply chain management of Vannamei shrimp in Nakhon Pathom has guidelines in the study using the theory and framework consistent with the research objectives. The concepts and theories related to supply chain management, agriculture and fishery business, and agricultural product supply chain management, and SCOR Model was studied, as shown in Figure 1.

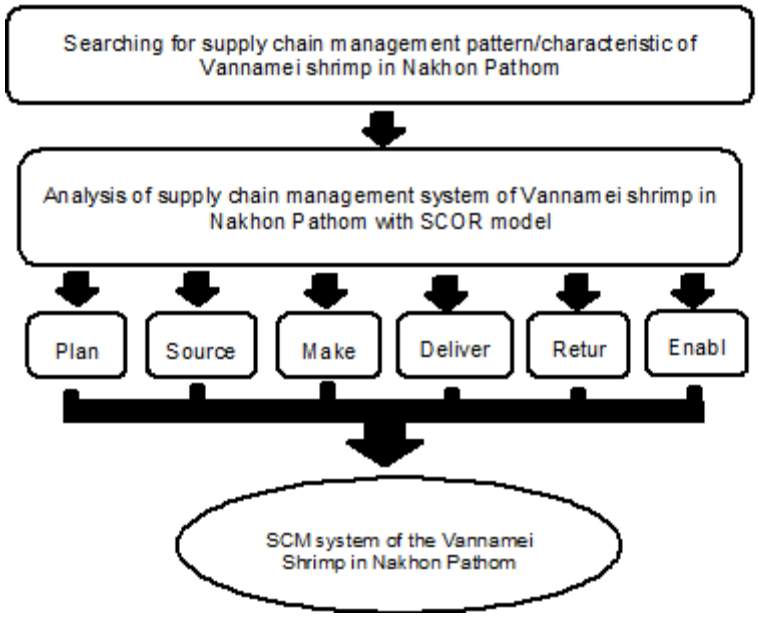

Figure 1**.** Research conceptual framework

RESEARCH METHODOLOGY

This research aimed to find and analyze the supply chain management model of Vannamei shrimp in Nakhon Pathom. The study was conducted with quantitative and qualitative research methods as the following details.

- Population and sample. It was divided into 2 parts. First, the quantitative sample was the 359 Vannamei shrimp farmers living in Nakhon Pathom by measuring the sample size from the formula of Taro Yamane (cited in Theeraphan Chitkawin, 2010). Second, the qualitative sample was 32 marine shrimp farmers in Nakhon Pathom, still operating their farms in 2017, who have registered and received aquaculture farm standard certification form the Department of Fisheries and (Korn Fishing Department, 2560). Purposive sampling was used as the sampling method for both quantitative and qualitative samples.
- Research Instrument. A questionnaire and an interview form were created with the following steps: First, relevant data and related research from books, journals, and publications on supply chain management of Vannamei shrimp was studied, such as Knowledge Management for Vannamei shrimp Production: A Case Study of Phetchaburi Province, as studied by Jutamat Thaklawpan et al. (2015), and Management of white shrimp farm in Thailand and analyze factors affecting the yield of white shrimp farmers, as studied by Saenrak et al. (2010). Second, the scopes and details of the content were defined in order to determine the structure of the desired tools. Third, questionnaire and interview form were created and adjusted as the research project consultants' recommendations.
- Data collection. The study collected data from surveying the area and questioning the sample of Vannamei shrimp farmers living in Nakhon Pathom with the questionnaire and the interview form. Research objectives and data collection methods were explained to the data collectors to make them understanding clearly before collecting data from the sample. The integrity of every questionnaire was examined by researchers until the questionnaires were completed.
- Data analysis. The analysis of data gathered from questionnaires, using descriptive statistics regarding supply chain management of Vannamei shrimp in each area, was presented in the form of frequency and percentage. While, the analysis of the data obtained from the interviews was summarized and discussed by capturing the main points of Traits and classifying the main events by separating the issues.

RESULTS

In this study, the researchers collected data about the supply chain management characteristics of Vannamei shrimp from Vannamei shrimp aquaculture farmers in Nakhon Pathom. The results were depicted in Table 1.

Table 1**.** Supply chain management characteristics of Vannamei shrimp

Characteristic	Description	Frequency	Percentage
1) Shrimp fry stocking rate	Less than 30,000 fry/rai	143	39.83
	30,001 – 50,000 fry /rai	109	30.36
	50,001 – 100,000 fry /rai	57	15.88
	More than 100,001 shrimps /rai	50	13.93
2) The highest yield per rai per culture	Less than 500 kilograms	95	26.46
	501 – 1,000 kilograms	191	53.20
	More than 1,001 kilograms	73	20.33
3) Types of Vannamei shrimp culture in the culture area	Monoculture (raising only Vannamei shrimp)	117	32.59
	Mixed culture (raising Vannamei shrimp with other aquatic animals)	242	67.41
4) Feeding frequency	1 time a day	27	7.52
	2 times a day	301	83.84
	3 times a day	20	5.57
	4 times a day	10	2.79
	Others	1	0.28
5) Culture periods to yield as market needs	Less than 2 months	24	6.69
	2 – 3 months	283	78.83
	3 – 4 months	34	9.47
	More than 4 months	18	5.01
6) Tools for harvesting white shrimp	Trawl	152	42.34
	Net	74	20.61
	Trap	32	8.91
	Water pump	101	28.13
7) The most productive season	Summer	97	27.02
	Rainy season	224	62.40
	Winter	38	10.58
8) Distribution	Self-selling	129	35.93
	Customers come to buy	230	64.07
9) Types of vehicles in transporting Vannamei shrimp	Motorcycle	29	8.08
	Pick-up truck	330	91.92
10) Vannamei shrimp destination	Markets in The community	88	24.51
	Country	233	64.90
	Aboard	17	4.74
	Markets	20	5.57
	Others	1	0.28
11) Vannamei shrimp culture	No culture planning	180	50.14
	Culture planning in line with specific	115	32.03

Characteristic	Description	Frequency	Percentage
planning	time period		
	Culture planning in line with customer needs	64	17.83
12) Sources in supplying Vannamei shrimp species for aquaculture use	Self- culture	46	12.81
	Other farmers	83	23.12
	Wholesalers / Distributors	229	63.79
	Others	1	0.28
13) Food supply for raising Vannamei shrimp	Food wholesalers	125	34.82
	Food retailers	195	54.32
	Other farmers	39	10.86

The results of the study on supply chain management system of Vannamei shrimp of 359 respondents were shown in Table 2.

Table 2**.** Results on supply chain management system of Vannamei shrimp

Description	Frequency	Percentage
1) Planning demand and supply		
There is a plan to culture in advance.	258	71.87
There is a plan to order feeds.	243	67.69
There is a plan to order farming equipment.	176	49.03
There is a plan to distribute the Vannamei shrimp.	134	37.33
There is a plan to deliver products to customers.	54	15.04
There is a plan to return products.	8	2.23
No supply and demand planning.	5	1.39
2) Sourcing raw materials		
There is the selection of species or sizes of Vannamei shrimp.	274	76.32
There is a clear sourcing process for Vannamei shrimp feeds.	235	65.46
There is a clear purchasing process for Vannamei shrimp fry.	152	42.34
There is an area selection for raising Vannamei shrimp.	117	32.59
There is a clear purchasing process for equipment used in raising Vannamei shrimp.	33	9.19
No clear sourcing process.	3	0.84
3) Manufacturing / processing products		
Vannamei shrimp are weighed after harvesting.	303	84.40
Sizes of Vannamei shrimp are separated after harvesting.	211	58.77
There is a clear separation process for the quality of Vannmei white shrimp.	77	21.45
There is a clear storing process for Vannamei shrimp.	25	6.96
Vannamei shrimp products are processed.	6	1.67
No clear manufacturing and processing procedure.	2	0.56
4) Delivering products to customers		
There is a distribution channel.	277	77.16
There is a clear process for delivery.	160	44.57
There is a clear order management process.	132	36.77
The products are collected in advance to deliver as the quantity required by customers.	18	5.01

Description	Frequency	Percentage
No clear delivery process.	2	0.56
5) Product warranty		
No return.	303	84.40
The products are returned in the case that the products did not meet the quality as customer requirements.	25	6.96
The products are returned in the case that the middleman did not sell out the products.	31	8.64

The analysis results of supply chain management system of Vannamei shrimp in Nakhon Pathom from the interview form based on SCOR Model were shown in Table 3.

Table 3**.** Data regarding supply chain management of Vannamei shrimp in Nakhon Pathom based on SCOR Model

Topic	Description
Plan	Farmers planned by using their experience and familiarity in every process, excluding plan to add value to the products.
Source	Farmers sourced the raw materials, such as equipment, shrimp breeds, and shrimp feeds, from regular sellers.
Make	Farmers had different productions due to their specific plans and sources in which farmers divided shrimp sites and weights before selling.
Delivery	Farmers distributed to customers according to the purchase orders or their productivity. Most of the customers received the products themselves.
Return	Farmers refused returned items since they did not plan on returning goods.
Enable	Farmers did not have sufficient processing tools. The cash payment was used more than the online payment.

CONCLUSIONS AND DISCUSSION

From the model study and data analysis of supply chain management of Vannamei shrimp in Nakhon Pathom from questionnaires and interview forms according to SCOR model, the results can be summarized and discussed as follows.

The results of the study of supply chain management model of Vannamei shrimp in Nakhon Pathom from inquiring sample white shrimp farmers found that some farmers have plans for raising, while some do not have a plan for raising. Most farmers will raise Vannamei shrimp with other aquatic animals. The Vannamei shrimp species are purchased from wholesalers or distributors. The less than 30,000 shrimp fry/rai will be released into the pond. The shrimp feeds will be sourced from retailers and the farmers feed 2 times a day. Vannamei shrimp culture has a period of 2-3 months. After that, trawl or water pump is in the harvest which will yield approximately 501 - 1,000 kilograms/rai. The rainy season is the most productive season. Most buyers or customers are merchants coming to buy and then sell in the provinces. Most of them will use pickup trucks for transportation.

The analysis results of supply chain management of Vannamei shrimp in Nakhon Pathom from inquiring and interviewing the sample white shrimp farmers with SCOR Model are as follows.

In Plan, farmers have a plan for raising in advance using experience and familiarity in planning, whether seasonal planning or market price planning. In ordering feeds, farmers do not have a certain time period for ordering but they will not keep the inventory for too long because it will spoil the feeds. The amount of feeds purchased is related to the number of shrimp and the size of shrimp in the pond. Regarding sales plans, farmers will sell products to regular customers or new customers by vending the whole pond or according to the weight in kilograms. When sold, most farmers do not have plans to return products.

In Source, farmers select the species and sizes of shrimp fry. However, some farmers do not have a sourcing process, so they are therefore unable to select the quality of the shrimp fry as needed. Farmers will purchase feeds from the regular cooperative shops or wholesalers/ retailers. The selection of areas for shrimp farming will depend on the areas that farmers have or areas with good water, no impurities near water sources, and far from industrial plants. Then, framers purchase equipment for shrimp farming in keeping with the costs since the beginning of shrimp farming.

In Make, planning for shrimp farming and sourcing raw materials for Vannamei shrimp culture cause the product quality of each farmer to be different. Farmers weigh and select sizes after collecting Vannamei shrimp from the pond by sorting out into 4 sizes or 3 sizes. Each size affects the prices and the buyers will separate the quality of the shrimp that they receive themselves. Most farmers have not yet processed products in order to renew the products or increase the value of the products.

In Delivery, farmers have a clear distribution channel and order process. The products will be distributed in line with the purchase orders or existing products. Vannamei shrimp will not be stored in advance. If there are many rounds of Vannamei shrimp buying, the farmers will manage the orders of one-time customers by limiting the amount of sales each time or making queue in advance so that the main customers are not affected.

In Return, most farmers do not have a return process at all and never receive a complaint for a product. Only a few farmers, however, receive the products returned from buyers in the case of poor quality.

In Enable, farmers use mobile phones as one way to contact and coordinate with buyers and sellers. Cash payment and transferring money via bank are used in Vannamei shrimp transactions. There is no hiring migrant labor for raising Vannamei shrimp.

Most farmers in the central Thailand will culture Vannamei shrimp in a sufficiently integrated manner. Thus, this causes insufficient farming information on species sources, shrimp species selection, and products and makes trading difficult and underpriced. Therefore, the government is required to provide this assistance, including opening a learning center for Vannamei shrimp farming or a restaurant so as to help promote natural based tourism in Nakhon Pathom.

RECOMMENDATIONS

This study presents the guidelines for improving the supply chain management process of Vannamei shrimp in Nakhon Pathom based on SCOR Model as follows.

Plan. The uses of shrimp farmers' experience and familiarity in planning result in different production, costs, and incomes in shrimp farming. Therefore, farmers should assemble and have a trial farm for everyone to participate in so as to ensure that theoretical planning or planning from training can be done. Planning, moreover, should be promoted in terms of product improvement in accordance with the agro-tourism development to enable farmers to have sustainable incomes (Benghadbane, 2019).

Source. Shrimp farmers are still unable to select the quality of the shrimp fry or choose the suitable area for raising Vannamei shrimp. As a result, the growth and the sizes of the shrimp are different. The Implementation of sourcing process from training will help to be a guideline for selecting quality raw materials and creating farmers' confidence. Both government and private agencies should support in providing the knowledge on shrimp farming, shrimp species selection, and product information (Molefe, P.L. and Group, 2018).

Make. Shrimp farmers should cooperate to create quality products or to process products so as to create value added product in order to increase farmers' incomes. Farmers should cooperate with educational institutions, both vocational colleges and universities, in the area to coordinate to be a source of knowledge or to build the shrimp farms as a tourist attraction so that jobs (Sooksai, 2019), careers, incomes are generated sustainably for the general public (Office of the National Economic and Social Development Board, 2017).

Delivery. Shrimp farmers should make processes of order management and delivery more clear to be used as guidelines for transportation route arrangements in order to be able to help reduce the delivery

costs, including increasing sales channels by surveying the customer needs and various contact channels, such as website, Line, and Facebook, that will be able to rise sales opportunities.

Return. At present, most farmers do not give priority to product guarantees. Shrimp farmers should prepare information on complaints from customers or the general public and discuss ways to improve product warranty. Farmers, besides, should manage customer relationships to make customers satisfied and confident to achieve sustainable trading.

Enable. Farmers do not have enough support in various work processes. They should be sustained by relevant public and private agencies. Such organizations should participate in the development of facilities to be modern and suitable for use in modern times, such as online systems or technologies in raising Vannamei shrimp, including training on how to use various tools for farmers.

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REFERENCES

1. Aunyawong, W., Wararatchai, P., and Hotrawaisaya, C. (2018). The Mediating Roles of Trust among Supply Chain Partners on Supply Chain Integration, Cultural Intelligence, Logistics Flexibility, and Supply Chan Performance. *Science International Journal, 30(4), 629-633.*
2. Benghadbane, F. (2019).Sustainable Tourism Development a basic factor for preserving urban heritage in Algeria: An Applied study on the Casbah of Algiers. *African Journal of Hospitality, Tourism and Leisure, 8(1)*
3. Boonrod, K. and Thongchai, S. (2006). DEVELOPMENT OF A LOGISTICS SYSTEM FOR THE GIANT FRESHWATER PRAWN BUSINESS INNAKHONPATHOM PROVINCE, THAILAND. Proceeding the Conference on Fisheries 2006.
4. Boonlar, T. (2007). THAILAND LOGISTICS. Bangkok: Technology Promotion Association (Thailand-Japan) : TPA.
5. Department of Fisheries. Aquaculture farm certification information. Retrieved September 20, 2017. From http://thacert.fisheries.go.th.
6. Department of Fisheries. (2014). FISHERIES STATISTICS OF THAILAND. Ministry of Agriculture and Cooperatives. Thailand.
7. Department of Fisheries. (2015). STATISTICS OF MARINE SHRIMP CULTURE 2015. Ministry of Agriculture and Cooperatives. Thailand.
8. Hiranphaet, A. (2019).Supply chain management factors affecting tourists' satisfaction towards Thung Bua Daeng Floating Market, Thailand. *African Journal of Hospitality, Tourism and Leisure, 8(4)*
9. Hiranphaet, A. (2018). The supply chain management of the cultivated banana in Nakhon Pathom. 2018 16th International Conference on ICT and Knowledge Engineering (ICT&KE). Bangkok, Thailand.
10. Jaroonroj, P. and Auttaphut, P. (2017). The Management of the Supply Chain of Tilapia transgenic fish in the sample farm project under the Royal Initiative of Nong Lat. Singburi based SCOR model. *Journal of Logistics and Supply Chain College Vol.3 No.2 July-December 2017 page 101-109.*
11. Garhun, T., lerttanapiput, S., Suwannachot, S., and Sirikongsuk, A. (2016). Analysis of TransportCosts of White Shrimp Farming in Nakhon Pathom. VRU Research and Development Journal Humanities and Social Science Vol 11 No 2 (2016).
12. Meegum, S. (2014). The farm management of shrimp farmers in Nakhon Pathom Province. *Journal of Management Science Nakhon Pathom Rajabhat University, 1(1), 29-41.*
13. Molefe, P.L. and Group (2018). The effects of tourism supply chain management practices on tourism operations in Pretoria, South Africa. *African Journal of Hospitality, Tourism and Leisure, 7(2)*
14. Nakhon Pathom Provincial Administration Organization. Number of Population. Retrieved September 21, 2017. From http://www.nkppao.go.th/content-2-6.html.Office of Agricultural Economics. (2015). Situation of important agricultural products and trends 2015.
15. Nakhon Pathom Provincial Agricultural Office. (2017). Nakhon Pathom Province Agricultural Development Plan 2017.
16. Nakhon Pathom Provincial Office. (2017). Nakhon Pathom Province Development Plan (2018–2021)
17. National research policy and strategy (2017-2021). National Research Council of Thailand
18. Saenrak, P., Ongkunaruk, P., Chaveesuk, R., and Liangrokapart, J. (2010). Study of Pacific White Shrimp (Litopenaeus vannamei) Farm Management in Thailand and Identifying the Key Factors on Yield Enhancement.Department of Agro – Industrial Technology Management, Faculty of Agro – Industry, Kasetsart University, Bangkok.

19. Sorat, T. (2007). HOW TO APPLY LOGISTICS AND SUPPLY CHAIN MANAGEMENT. 1st Edition. V-SERVE LOGISTICS CO.,LTD.
20. Sooksai, T. (2018). Factors of Advantage Creation for Competitive Electrical and Electronics Industries in Central Region of Thailand. 2018 16th International Conference on ICT and Knowledge Engineering (ICT&KE). Bangkok, Thailand.
21. Sooksai, T. (2019). Push-pull factors and behaviors of tourists to Tongchom Marekt, Mae La Noi District, Mae Hong Son Province, Thailand. *African Journal of Hospitality, Tourism and Leisure, 8(4)*
22. Suharit Damrong, V. (2006). Looking around, Think of logistics.. Bangkok : E.I.Square Publishing.
23. Suharit Damrong, V. (2003). Supply Chain Management : strategy,planning,and operation. Bangkok : PEARSON EDUCATION INDOCHINA LTD.
24. Thailand Development Research Institute. (2010). Project of Study of supply chain management and logistics of agricultural products. Office of the National Economics and Social Development Council. Thailand.
25. Thaklaewphan, C., KlinNgam, S., Thapahoodee, W., and Kamkum, S. (2015). The Knowledge Management of White Shrimp (Litopenaeus vannamei) Production, Case study in Phetchaburi. RAJABHAT AGRIC. 14 (1) : 22-30 (2015). Thailand.
26. The Twelfth National Economic and Social Development Plan (2017-2021). Office of the National Economics and Social Development Council. Thailand.
27. Tunming, P., Chaigasem, T., Phitak Siriwong, P. (2019).The increasing of potential in tourism logistics supply chain to Khon Kaen ME city, Thailand. *African Journal of Hospitality, Tourism and Leisure, 8(1)*
28. Visankitti, C. (2012). Supply chain management of vegetable safety in Nakhonpathom Province.Master of Business Administration Program in Entrepreneurship. Silpakorn University.
29. Wasusri, T. and Singkarin, D.K.. (2007). Supply Chain Management : from theories to practices. Bangkok :Logistics book.
30. Yamane, Taro. (1967). Statistics, An Introductory Analysis, 2nd Ed., New York: Harper and Row.