African Journal of Hospitality, Tourism and Leisure, Volume 8 (5) - (2019) ISSN: 2223-814X

The supply chain management of agricultural products, aromatic coconut and agro-tourism in Thailand

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Abstract

This research aimed to find the supply chain management characteristics of agricultural products, and aromatic coconut. This analysis would lead to a supply chain management model. The sample group used in the research comprised of the farmers who grow aromatic coconut and who resided in Phutthamonthon district, Nakhon Pathom Province, Thailand. This amounted to 600 respondents and 9 key informants who were used in the mixed methods study. The quantitative research used questionnaires and the qualitative research applied an interview method in a phenomenological approach. The statistics used in data analysis included percentages, means, standard deviations and composition analysis using the main component analysis method and rotating the axis by the Varimax process. It was found that the supply chain management model of aromatic coconut agricultural products was as appropriate one to consider for the amount of farmers'. This would serve to promote the supply chain management model with the participation of the community which will hopefully lead to joint decision making, problem solving and resource mobilization. The findings are important as they will support businesses in the community to become successful, self-reliant, and sustainable. The model is a useful guideline for farmers to develop according to the situation of the external environment and strong business competition. By adopting an agricultural supply chain management model that uses information technology in the process, will also result in the further development of the supply chain management model for agricultural products in general.

Keywords: Supply chain management, agricultural, products, aromatic coconut, Thailand.

Introduction

Thailand has a growing area of all varieties of coconuts which constitutes an important economic crop of because Thai people use coconut meat for consumption as a savoury and sweet food in daily life. The National Statistical Office conducted a survey and ascertained that each Thai person will consume approximately 8,273.2 grams of coconut meat per year. Currently, Thailand has about 55 million citizens who are using approximately 990 million coconut fruits, or about 65% of the total output. The remaining approximately, 35% of the total output or 489 million results are used in the form of industrial or export material (Economic Office, 2016). It is an exhaustive task leading to the end-product:

> Normally, coconut exporters shape the aromatic coconut before exporting. The standard shape of aromatic coconut is trimmed-coconut and polished coconut (Thai Agriculture Standard, 2007). Firstly, trimmed-coconut is an aromatic coconut that is normally removed the exocarp into diamond shape. Also, its shelf life is two months. Secondly, polished coconut is an aromatic coconut which is removed all the mesocarp until reaching the shell. Also, the polished coconut has two shapes which are with cone cover shape and standing base shape. However, its shelf life is only one. Consequently, transportation duration for polished coconut is one of the major concerns when exporters penetrate the international market (Pipatkanaporn, 2016).

Thailand has been exporting all types of coconuts for many years. In 2015, the value of 11,243 million baht increased from 7,000 million baht, of which 60 percent was coconut milk exports which were exported to the United States, England and Australia. This is now followed by coconut oil which is exported to Japan and Korea, fresh coconuts which are exported to China and Hong Kong

and coconut water packed in boxes which have been exported to the United States and Australia. Aromatic coconut of Thailand can thus be another of the economically valuable plants and more importantly, Thailand can be the global centre of ASEAN coconut water in the future but it has to adjust the structure of the coconut production. Marketing and management is in a systematic manner accelerating the expansion of plantations and planting good varieties to replace old coconut types. The establishment of the National Coconut Institute, the use of neighbouring countries as a raw coconut processing base are significant. The development of coconut products is more diverse and innovate and developing innovations that can bring aromatic coconut packed in a box without the taste changing is good news. The Office of Trade Policy and Strategy Ministry of Commerce can create a coconut business prototype in the global market because coconut is the economic crop of Thailand, according to the report of "FAO Statistics" between 2004 and 2014.

The world's coconut growing area increased from 69 million rai to 75 million hectares. The productivity increased from 55 million tons to 61 million, of which Thailand has risen to the highest rank of sixth. The coconut growing area of Thailand is divided into curry coconuts, 1.1 million hectares, producing some 900 000 tons, with 200 000 households. Aromatic coconuts, on 1.2 hundred thousand hectares, produced 318,361 tons, with 45,575 households. The farmers of Thailand, grow rubber, rice and palm because of higher returns (Department of International Trade Promotion, 2018), which is the principle that drives agricultural development in the sector of small-scale agricultural product operators. In Thailand, there is supply chain management in agriculture and this has made the country into an agricultural destination (Pimonratanakan Sudarat & Ayasanond Chitpong, 2018)

From the 2nd National Tourism Development Plan (2017-2021), the National Tourism Development Plan for tourism has to be managed and continuously developed by establishing tourism development zones in rural areas. The development of outstanding products and services that are unique to each locality, and promoting niche markets for tourists with special interest such as a sustainable agricultural tourist environment and ecotourism tourists (National Tourism Development Plan, 2017) is essential. Tourism is recognized as an important strategy to bring income into Thailand, especially with two strengths that can help drive revenue and stimulate the country's economy to be sustainable. It is an agricultural country and a tourist attraction that can attract people from all over the world (Bullkul, 2013). Thailand has tourism for agro-tourism which is a form of tourism that uses agricultural activities as a tourism activity, allowing tourists to gain agricultural knowledge and to appreciate the outstanding scenery of the countryside (Hall & Jenkins, 1998). Rural tourism is therefore one of the activities in the rural development process, which is a link between agriculture and tourism that affects the rehabilitation of resources. The natural resources and the allocation of economic and social benefits (Hron & Srnec, 2004), are an agricultural way of life based on wisdom. The majority, 95% of coconut trees are harvested by smallholders. The region produces 90% of the world's coconut products but global demand is growing at more than 12% a year, and yet the present rate of production growth is just below 2% per year (Coconut Knowledge Center, 2014).

The many interesting cultural traditions of Thai agricultural communities caused the Tourism Authority of Thailand and the Department of Agricultural Extension to organize agricultural tourism activities and it now has a policy to manage agricultural tourism in all provinces (Tourism Authority of Thailand, 2019). The entrepreneur, and aromatic coconut farmer in Phutthamonthon District, Nakhon Pathom is in an area with guidelines for sustainable agricultural tourism development with agricultural tourist attractions, and mixed farming fields. With tourists observing the farmers way of life and farming, and opening gardens as a tourist attraction for agriculture (Tourism Information Division Tourism Authority of Thailand, 2015) the principles that drive tourism development and forge links between agriculture and tourism are in the sector of small-scale agricultural product entrepreneurs in Thailand. The small-scale farmers and the exporters must all understand the needs' of key stakeholders who include growers and importers. In fact all stakeholders must be fully attuned to the happenings in the coconut industry and relationship with non-market stakeholders in for example the agrotourism sector and how it can be enhanced to the benefit of all (Nicolaides, 2015).

Problems in exporting aromatic coconut in Thailand abound as farmers have to face greater competition, from the Philippines Indonesia and India and including new competitors like Vietnam. These countries, as competitors, are accelerating the development of production technology in order to increase the quality of aromatic coconut. Thus the exporters of aromatic coconut are facing new challenges, with those involved having to accelerate change to adjust and maintain the existing market and accelerate new market creation. Farmers making aromatic coconut are experiencing problems in the supply chain of aromatic coconut. Due to the lack of good management there has been no study to analyze the problems in managing the coconut supply chain. In the processes starting from upstream, midstream and downstream, including production, moving goods information flow and the flow of capital and risk burden division, little is known. In the case of moving goods, market structure and competition it is similar. Production process and technology for increasing quantity and quality, distribution channels, product characteristics, processing within the community, farmers groups or as raw materials into industrial plants for processing and promoting marketing in exporting products are all needed information. Once in hand this will encourage farmers to make aromatic coconut plants and participate in the development of aromatic coconut for effective supply chain management. Efficient production and processes and quality, and being able to produce aromatic coconut and find new production methods that reduce production costs from upstream to downstream are vital. Developing and enhancing production capacity in order to prevent the market from becoming stagnant and promoting marketing in product export is equally important. This will increase the value of exports so that farmers are sustainable and able to compete with other countries quality production outputs.

Research's objectives

1. To ascertain the supply chain management characteristics of aromatic coconut in Phutthamonthon District, Nakhon Pathom.
2. To create a supply chain management model of aromatic coconut in Phutthamonthon District, Nakhon Pathom.
3. To apply the supply chain management model and transfer it to the practice of supply chain management of aromatic coconut in Phutthamonthon District, Nakhon Pathom.

Literature Review

Supply Chain Management

Lee and Billington (1995) define the supply chain as a network of facilities that enables production from raw materials to processing it into final products and delivering products to customers which is the range of procurement, production and distribution of products that are completed and then passing those products on to the consumer. The supply chain also incorporates all costs, time, transportation, packing and storage. There are various steps in the production process in order to be able to deliver products to customers appropriately. and at present, the supply chain includes products that are returned after being used which includes renewable materials. Re-useable packaging, including the use of waste as well. Jones and Riley (1985) define the supply chain as the planning and control of the flow of all raw materials from suppliers to suppliers and distributors to consumers. Stevens (1989), defines the supply chain as a series of activities interconnected with planning, collaboration and control of raw materials and products from suppliers to consumers. Scott and Westrook (1991) define the supply chain as a chain of connections of the components of the production process and the flow of supply from a raw material stage to a finished product for consumers.

Chen and Paulraj (2004) said that supply chain management's objective is to develop the scope of research that will improve the understanding of Supply Chain Management (SCM) and which can help researchers study the important structures of supply chain management and the impact on capacity. Supply chain from both theory and observations can be divided into 3 parts: part 1 is

presentation that is consistent and prioritizes the knowledge that is the main structure of supply chain management which consists of important components in supply management or the performance of the supply chain. Part 2 is the development of a research framework of supply chain management. Part 3 is a response to the need to create a theory in management that shows that businesses that do not cooperate with others, will not compete in the long term but will be able to compete if competing in the supply chain which can add value to customers through collaboration between supply chain members in planning raw material, control service and data linking.

There are four key components in supply chain management: Strategic Purchasing, Supply Management, Logistics Integration and Collaboration Network Management. Supply Network Coordination including the concept of supply chain performance is done by identifying financial performance, and also operational performance. Langley (2002) asserts that the elements of supply chain management are the guidelines or future of the supply chain notion that requires elements or characteristics that need to be concerned, namely customers and demand management supply chain performance measurement information technology. Providing external services, cooperative relationship, core strength and effective supply chain strategy is challenging. On the other hand, the researcher has provided a meaning of supply chain management, which means the use of the organization's systems, technologies, resources, information, news and activities to be applied together to move goods or services from suppliers to customers in an efficient manner.

Concept of Supply chain management and logistics

Thailand Development Research Institute (2010) has said that supply chain management will have a broader meaning than the meaning of logistics. In fact, logistics is one of the five key elements of supply chain management which consists of links between those involved by using information. Production and transportation management need to be together with the integration of business processes towards maximum efficiency. Supply chain management is an activity throughout the supply chain. The whole activity that flows up and down along the chain is compiled (orchestrated) and coordinated by activities (as if there is a central agency responsible) in order to ensure that supply per product is consistent with every demand in the chain step. Sharing information and technology between stakeholders at all stages to create innovation is needed to reduce the duration of the product development cycle time. There are flows, moving goods and production factors instead. "Inventory" to meet the needs of customers, reducing costs and increasing customer satisfaction effectively is key.

Concept of supply chain management of agricultural products

Thailand's Development Research Institute (2010) has also stated that supply chain management of agricultural products will focus on product circulation, information flow and capital and risk. Factors affecting product flow are divided into market structures and competition. Distribution channel, Manufacturing Processes, Product characteristics and logistics Information flow will also cover the production process and technology. For the flow of funds, this will include risk management and a risk burden division.

Concept of Agro-tourism

Agricultural tourism means tourism that has agricultural activities as the main tourism resource, attracting tourists, providing a standardized service system and generating income for farmers (Esichaikul, 2003). Agricultural tourism is a part of tourism in which the community determines the process, direction and style of their own tourism, all villagers own the tourism resources and have a stake in tourism. The tourism by the community has many selling points, both nature, history, culture, traditions, ways of life, and conservation, including development of forms to create sustainability for generations, and to benefit local communities truly involved in the tourist sector and the public sector (Rojrungsaj, 2010).

Coconut is a very environmentally friendly smallholder palm in the tropical environment. It covers 12.28 million hectares in 90 countries with an annual production of 64.3 billion nuts. Coconut also provides USD$ 7.73 Billion per annum to global coconut smallholders. Global Coconut production yields up to 6 million tons in coconut oil equivalent annually and 70% is

produced in the Philippines, Indonesia and India (Coconut Knowledge Center, 2014). The Sub-suppliers accomplish an important task as well, not only do they buying, assemble, grade and carry out they primary processing, but they similarly provide technical know-how to smallholder farmers, seeds, fertilizers, chemicals, and of course they offer market information to all the farmers.

Agricultural tourism requires a good management of the owner of the land on which crops are planted. Tour operators and tourists from different groups must know how to systematically manage for sustainable agricultural tourism (King Mongkut's Institute of Technology Ladkrabang, 2013). By organizing tours as a travel arrangement, and via traveling to tourist attractions, there are important components, which are tour operators, the actual tourist attraction, transportation, accommodation, food and souvenir products (Chittungwattana & Sukleang, 2006).

An important aspect of community tourism is community participation, including tourism activities operated by villagers (Sarobol et al., 2013). Agricultural tourism is tourism to agricultural areas such as orchards, agroforestry, herb gardens, and ranches (Wongvipak et al., 2004). It must comprise of at least three factors, namely travel, overnight stay and eating out (Chatkul, 2007).

From the review of related literature, the researcher created a conceptual framework for supply chain management of agricultural products - aromatic coconut (See Figure 1).

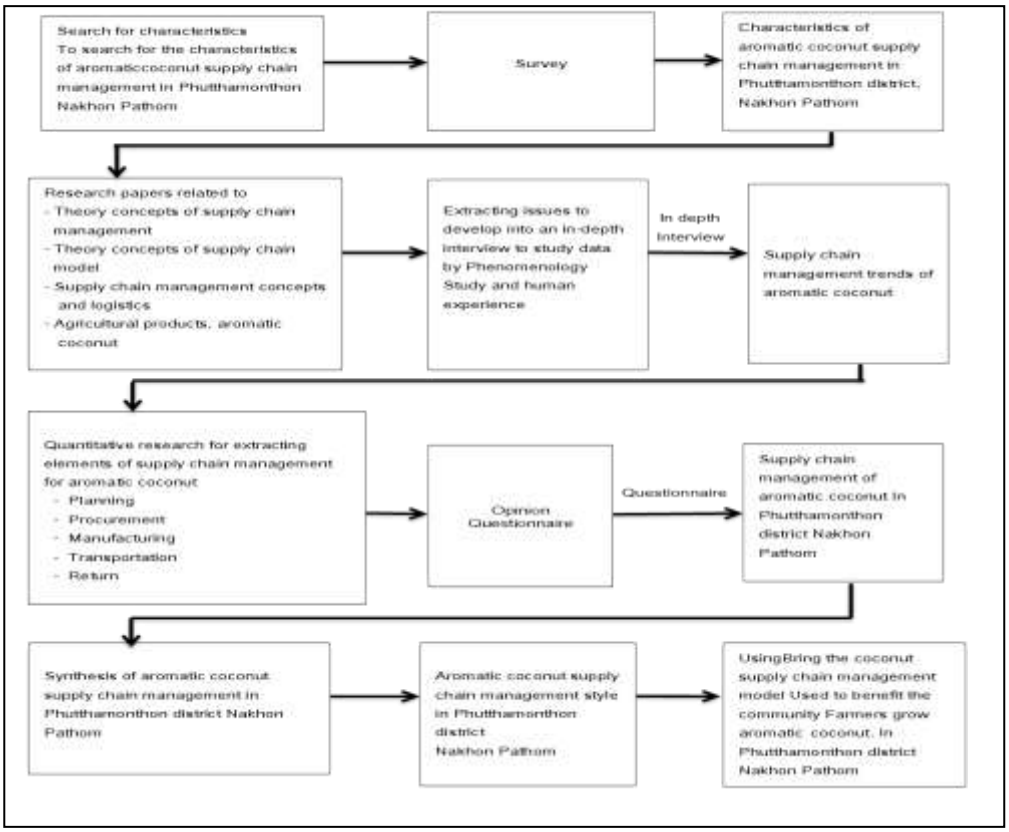

Figure 1. Map of the conceptual framework

The researcher has established a conceptual framework for a quantitative research, supply chain management model of agricultural products - aromatic coconut. As illustrated in Figure 1

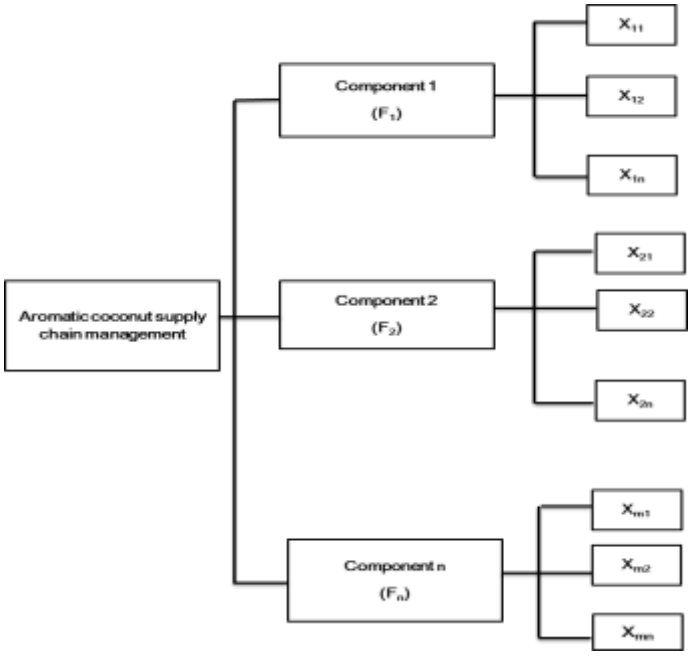

Figure 2. Conceptual framework of quantitative research, supply chain management model of agricultural products - aromatic coconut.

Methodology

Population and sample

The population used in this quantitative research were farmers growing aromatic coconut and were people that live in Phutthamonthon District, Nakhon Pathom Province. For the sample group, the researcher considered the research data that required advanced analytical statistics, i.e. exploratory factor analysis, therefore determining the size of the sample group to be consistent with the use of preliminary statistics. The criteria for determining the sample size are the sample size of 10-20 people per 1 sample parameter (Hair, et al., 2010). The sample used were thus some farmers growing aromatic coconut in Phutthamonthon district Nakhon Pathom. The observed variables numbered 40. The criteria for determining the sample size were 15 persons per 1 observation variable. Therefore, the research used 600 samples.

Tools used for data collection

This research used a questionnaire as the tool for collecting data. The characteristics of the questionnaire were divided into 4 parts, namely: part 1, a questionnaire about general information of respondents; part 2, a questionnaire about searching for supply chain management characteristics; part 3, a questionnaire about analyzing, creating chain management patterns, and part 4, a Supply and Episode 4 questionnaire with open-ended questions to determine the level of opinion based on the a 5 point Likert Rating Scale. Each item was divided into 5 levels, which were from the highest, high, medium, less to the least.

The researcher had to check the quality of the tool in the following ways:

1) Content Validity: by bringing the questionnaire to experts to consider consistency. Coverage of questions and objectives of the research, definition, vocabulary and appropriateness of the questionnaire were validated by setting the criteria for the index of consistency of each question with the Index of Item-Objective Congruence (IOC) from 0.50 steps (Prasop Chaipasontorn, 2012: 224). According to the recommendations of the experts the researcher then developed the form of tools to be suitable for further use by testing the IOC value from 0.85 and upwards.

2) Reliability: the questionnaire was pilot-tested before collecting data with the sample of 50 people and the data obtained was used to test the confidence by finding the alpha coefficient (Cronbach's Alpha) according to Cronbach's method (Boonchom Srisaew, 2011: 99) From the calculation, it appeared that the alpha coefficient was confident. The value of 0.90, which was considered by the questionnaire, has the confidence that the criteria must be greater than 0.7, indicating that the test group gives the corresponding score with a value of 1 indicating that the test has high confidence level.

3) Data analysis: Statistical data analysis in this research was conducted by using descriptive statistics, consisting of statistics, frequency, percentages, mean, standard deviation (SD), which the researcher used with the following criteria: 4.21-5.00 Most, score 3.41-4.20 indicates that it is at a high level, score 2.61-3.40, indicating that it is at a moderate level, score 1.81-2.60, indicating that it is at a low level and the score is 1.00-1.80, indicating that it is at the lowest level (Boonchom Si Saam, 2011: 99- 102). Factor analysis was also used to test the relationship between variables with prerequisite tests.

Qualitative research

This research was qualitative using a phenomenological approach which is a study of human phenomena and experiences. By looking at the supply chain management of perfume coconut of farmers planting aromatic coconut that live in Phutthamonthon District, Nakhon Pathom Province the study was conducted according to the following steps.

Main contributor

The main contributors were farmers growing aromatic coconut that live in Putthamonthon District, Nakhon Pathom Province. A specific number of 9 people was used, which is a different target group to the quantitative aspect. They were selected due to their participation in the supply chain management of aromatic coconut and their knowledge in this area.

Tools used for data collection

The tool used to collect this data was an interview form. The researcher selected to use this important tools to help the data collection to be complete in accordance with the objectives consisting of questions, interviews, notes, pens, mobile phones, researcher and interviewer.

Data collection

The study gathered data from peer-reviewed academic articles, documents, books and other related research on the concept of supply chain management. This was in order to know the meaning and principles of this concept. In-depth interviews were used. The researcher interviewed the main contributors with the questions about the supply chain management of aromatic coconut. In this regard, the researcher prepared the interview question to be given to the informants beforehand in order to give them an opportunity to share their work experiences and work independently. The researcher was then able to expand or check with confidence the data collected by other means, including non-participant observation and note-taking and also by recording and reflecting on thoughts.

Data reliability checking

To check the reliability of the data the researcher used data triangulation. Where the information obtained was not enough, the researcher could collect additional information by examining different information and at different times. Different places and different persons were selected in which each person could offer their responses and thus provide information or not. When not matching, the researcher opted to interview at different times and locations in order to confirm and find additionally needed information for clarity's sake.

Data analysis

The researcher used data analysis to create a conclusion from the data obtained from the interviews. He then created a concept using the theoretical principles comparing with the supply chain management theory, and once complete, analyzed and synthesized the data to find the next step.

Results

Quantitative research

The researcher summarized the results as follows:

1. The sample group was mostly farmers, males, aged 41-50 years, having experience in growing aromatic coconut for at least 11-20 years, with an area of cultivation 11-20 rai, with an average annual income of. 200,001-250,000 baht.

2. The study of supply chain management characteristics of aromatic coconut agricultural products found that in the production process, the varieties of aromatic coconut that are mostly grown in the bottom of the crimp.

The most common result accounted for 53% of propagation methods. All of these plants were in the nursery- 100.0%. Growing aromatic coconut is a planting to lift the groove into plots – the highest number here was 66% .Harvesting, it is a difficult walk according to 77%. For aromatic coconut disease, the Highest number of responses was 35%. Of the insects that are the enemy of aromatic coconut the most prolific was found to be the rhinoceros beetle 39.0 percent. How to prevent and eliminate pests with the use of chemicals (40%) - highest number accounted for was 66.0%.

The method used to deliver water to cultivated aromatic coconuts was by the use of a boat to spray water 58.16%. The employment characteristics: is the second largest number of employment accounted for 40.0% used in the product storage needs. The period in which cutting begins cut after planting is 3 -5 years 45% of the time and the cutting takes place in October-November (52.0)% , the cutting frequency was determined to be 20 days / time (80.0%). Concerning the average production volume (Results / beginning / per year) most of the 200 results, the highest number (57.0%).

The percent for transportation, sales channels leading to a direct consumer sale (34.5%). The place items were sold at was a local market (54.0%). The quality of the results sold is the highest grade grading, representing (52.5%). Characteristics of perfume coconut sales sold was 40%. Price and criteria for pricing followed and according to the study the market price highest number accounted for 80.50%. After sales payment is the largest amount of cash as stated by 47.50%. The transport method used was to hire others to transport highest number - 48.50 %. Marketing knowledge sources to become a professional farmer showed a 35.33% response. The percent in production control methods and increasing production volume by add fertilizer yielded a 29% total. 29.00. Production cost reduction as an extension of the breed by itself- 56.33% was the highest number found.

3. Composition and analysis of results

Prerequisite testing for component analysis

1) The sample group needed to be able to answer more than 150 questionnaires (Pallant, 2001). However from the requirements it was found that this research had a sample of 400 people.

2) Preliminary correlation between variables needed to be higher than 0.3 (Wiersma, 1991). From the test data, it was found that the initial correlation between data variables was higher than 0.3 and had 350 pairs.

3) Considering the KMO value that is higher than 0.6 or not, and the Bartlett value 's test Sphericity is either statistically significant or not (Burns, 1990) as shown in Table 1

Table 1. KMO and Bartlett 's test Sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.728
Bartlett 's test Sphericity	Approx. Chi-Square	7907.137
	Df	489
	Sig.	0.00

From Table 1, it was found that the value of the KMO obtained was 0.728, indicating that the existing data was appropriate to use factor analysis and Bartlett's Test of Sphericity was then used to test the hypothesis with Chi-Square = 7907.137. The value of p = 0.00 therefore rejects the hypothesis (H0), that is, all 45 variables. Therefore, from the test results, all 3 preliminary agreements are appropriate to use the component analysis technique.

The next step was factor analysis to determine the supply chain management of aromatic coconut in Phutthamonthon district. How many elements can be classified, and how many are not related? The orthogonal axis with a Varimax method, where the number of cycles in the extraction of 25 elements shows the Eigen values that are higher than 1 and do not show a factor coefficient that is less than 0.3 it was found that the Eigen values obtained by more than 1 have 5 elements and the last element can explain the variables as high as 70.125 percent. From the analysis, the variables that have the factor loading value is less than 0.3.The remaining variables were classified into only 40 elements, and when analysed from the Scree plot, this led to finding the corresponding conclusion.

Based on the analysis of all variables in the supply chain management of aromatic coconut in Phutthamonthon district Nakhon Pathom, the classification in each of the elements that create the element must have a weight value of not less than .40 (Pimpa, 2003). In addition, from the analysis of Communality values, it wass found that Final Communality Estimated value was at a 4.935 level. Therefore, the researcher could identify the chain management. Supply of coconut fragrances can be used for 5 components as follows:

Composition 1: The name of the planning for the production of aromatic coconut consists of aspects, 1) before planting, there is a plan to arrange the area of cultivation that is flat and without flooding problems. 2) Examine the temperature, humidity and light conditions to suit the type and species grown. 3) Care and plan not to have weeds growing 4) Have a convenient path, that is easy and fast to operate 5) There is a plan to find information on the direction of the development of perfume in the future. This group of variables has the level of ICI equal to 7.591.

Composition 2: Production of aromatic coconut consisting of 6 sides, consisting of 1) Water used to grow aromatic coconut is a good quality water with a not too high mineral content 2) Regularly fertilizing 3) Spraying insecticides and disease prevention drugs regularly. 4) Fertilizer schedules are prepared. Spraying insecticides and preventive medicine appropriate diseases 5) Technology is used in production. 6) Information on additional knowledge in planting decisions. With this group of variables having the level of icing value equal to 7.205

Composition 3: Purchasing of aromatic coconut consists of 5 aspects which consist of 1) There are a few suppliers. The group of suppliers is divided into hierarchies according to the criteria for easy consideration. Find the supplier of the right raw materials and have a long-term agreement 3) It is a two-way communication to participate in solving problems and developing technology together. 4) Raw material suppliers are to be verified for product quality 5) Contracts for futures trading with this group of variables must have the level of icing value equal to 7.130.

Composition 4: The transportation of aromatic coconut consists of 5 sides, which consists of 1) the quality of the aromatic coconut remains the same condition during transportation 2) transportation is convenient and fast 3) the transportation cost is at the appropriate level 4) Knowledgeable personnel with relevant transportation expertise 5) Technology is used in transportation. 6) Planning for transportation costs. This group of variables has the level of icing value equal to 6.503.

Composition 5: Creating a network for purchasing sourcing aromatic coconut consisting of 4 aspects, which consists of 1) there are a few suppliers. The group of suppliers is divided into hierarchies according to the specified criteria. For easy consideration of finding the right supplier of raw materials putting together a win - win 4) have agreed to improve quality by continuing to coordinate cooperation with suppliers of raw materials to improve the process. This group of variables has the level of ICON value of 6.380.

Qualitative research

From interviews with key informants and from the research, the following findings were made:

1. From the study and research, it was found that the supply chain management model of agricultural products, aromatic coconut is According to the suitability of the farmer size which is to needed to promote the supply chain management model of agricultural products. With the participation of the community this will create ideas for problem solving and resource mobilization which is an important way to conduct business in the community. This will make farmers more successful, self-reliant, and sustainable.

2. From the study of the context of farmers planting aromatic coconut the form of supply chain management of aromatic coconut systems that will affect the success of the management needs to be managed on its own. This is divided into various areas, including planning, storage, production, transportation, production control methods processing and selling of aromatic coconut. The distribution of aromatic coconut has a domestic market. In each area, there will be a systemic relationship based on the importance of each workload.

From each study, it was also found that:

2.1 Production storage has a period of time starting to cut after planting at 2 and a half years, then giving results and harvesting for up to 40 years before being re-planted. The time for cutting the soft fruit is in the period when the soft fruit has full texture and the water has a sweet aroma which must take about 6 months, and 2 weeks from blooming. The typical perfume of coconut will fall to 15-16 Chan per year. The fruit that has fallen will result in more than 20 fruits. Mutation is therefore very small. In the harvest there are 3 ways to divide the softness and maturity of the coconut by looking at the thickness of the coconut meat. One layer of coconut meat, half a layer of coconut meat and 2 layers of coconut meat.

2.2 In terms of transportation, there is a distribution channel for aromatic coconut to be sold to small and large exporters. Small exporters buy aromatic coconut from farmers and most farmers will sell the aromatic coconut to the buyers and major exporters. But at the same time, the major exporters have their own transportation vehicles and some buy aromatic coconut directly from the farmer's garden. The aromatic coconut is sold as an aromatic coconut as a result of its processing. The focus is on retail and wholesale-grade grading and not grading as well as payment after sales, which then has a method of payment where cash is paid in trust.

2.3 Production control methods are important. In the business of exporting aromatic coconut that can generate income for Thailand through exporters who are planning to buy aromatic coconut by procuring a quality coconut plantation with standardized output, it is vital to look at the coconut skin. The aroma must be beautiful without any traces of decay or blemishes, skin colour must be good with a smooth surface that is not rough. When receiving quality aromatic coconut, exporters will contact foreign importers to check the quality of the aromatic coconut plantation area and have contact with farmers. After this the exporters will contact the futures trading with the farmers which sets the amount of exports of each exporter. After this it is exported and aromatic coconut is sent to China, Taiwan, Singapore, Japan, the United States and some member countries of the European Union.

2.4 Processing aromatic coconut means bringing the coconut, with its soft aroma, to peel and then shell, leaving only the shell, which has a smooth texture and water inside it. To reduce shipping weight and for the ease of packaging, the processing is separated according to the needs of the market by 1) The Domestic market, the demand of the market is the coconut that has been

processed as coconut, boiled coconut and coconut bag. 2) The International market - The delivery of aromatic coconut sold in foreign markets will be delivered in the form of stranded coconut and also chia coconut.

2.5 The distribution of aromatic coconut has a domestic market. It is as a fresh product. Either breaking or separating it into constituent parts and then processed in the form of coconut, boiled coconut and coconut bags. Sources for sale and purchase are available in the local market. For the international market it is traded in a manner that is fresh, and it is processed in the form of stranded coconut and chia coconut. The factors that make aromatic coconut popular with consumers, include 1) the productivity of farmers trying to grade and screening coconut, with its beautiful aroma and quality. They then send it to send the coconut exporter, who perfumes and packages it for export which will result in higher selling prices 2) the participation of groups of farmers is important as they can collaborate to produce perfumed coconut. There is also an exchange of knowledge among farmers. In terms of the selling price, this depends on the quality of the aromatic coconut. In order to have a break-even point and profit, farmers need more choices thus making it possible to negotiate their prices.

From the in-depth interviews the summary results from data analysis and synthesis were reached on the issues of supply chain management of agricultural products and specifically aromatic coconut. The supply chain management model shows that it is appropriate to use as information in the way it is formulated, and used for the benefit of farmers, communities, and exporters of agricultural products. Aromatic coconut is a systematic model that will affect the success of the management that can be managed by itself, and it is divided into 3 parts: part 1, upstream, part 2, middle part of water and part 3, the downstream part.

Part 1 Upstream section which is the upstream part of the farmer who relies on information for planning control knowledge and experience in production by having to establish a club or group to take care of the farmers group by using management methods that have a clear structure contain with production planning information management procurement system, production system, control system management system. And promote the production, distribution,

Part 2 of the water section which is part of the retailer, wholesaler, agent, exporter that requires information in the purchasing plan. There is a structure to facilitate communication and information flow. Product flow contain with Purchasing system Transportation system to transport products to the source of purchase and part 3 downstream part Which is the part of the exporter that requires good planning and effective control Must have a structure to facilitate communication and information flow and good productivity. And most importantly, there must be a clear and systematic process of export activities. And must meet export standards contain with consumer communication system for both domestic and international markets In each area, there will be a systemic relationship based on the importance of each workload. When getting a coconut supply chain management model. This pattern can be developed according to the circumstances of the business competition environment. By using the supply chain management model of perfume coconut that uses information technology in the process

From the study and research, the findings are as follows:

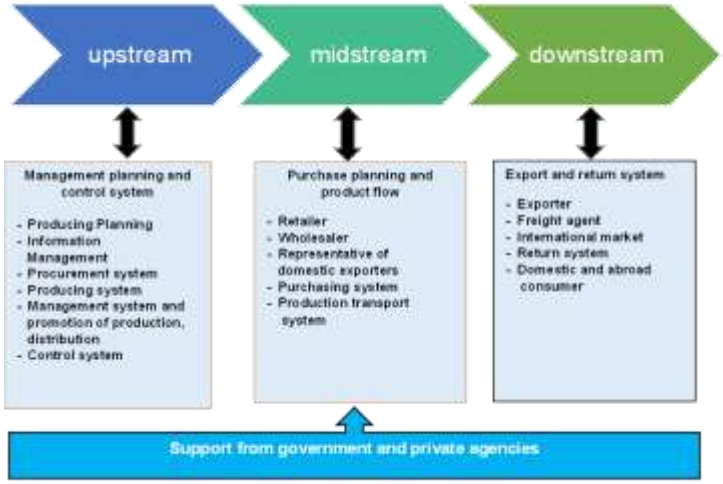

Figure 3. Supply chain management model of aromatic coconut agricultural products in Putthamonthon Nakhon Pathom

Discussion

From the results of the research, the results can be discussed as follows.

The results of the study on the management model of aromatic coconut supply chain in Phutthamonthon district, Nakhon Pathom province has been analyzed and a supply chain management model for aromatic coconut was created at a high level. It was found that the supply chain management model of agricultural products such as aromatic coconut is based on the suitability of farmers in making aromatic coconut and in their ability to promote the supply chain management model with the participation of other community farmers. This will lead to joint decision making which is an important plus for farmers in Phutthamonthon district. This will help them to become successful, self-reliant, and sustainable. From the study of the context of the farmers making aromatic coconut, supply chain management as a systematic model will affect the success of the whole supply chain management system so that it can be managed manually, successfully, and can also be more self-reliant and sustainable.

The researcher derived a supply chain management model that is in line with the needs of farmers and which can satisfy farmers and also influence the development of agricultural supply chain management model in line with Wisner et al., (2005) supply chain management and implementation. The SCOR Model was developed to describe the characteristics and shows all business activities related to customer satisfaction response and helps solve the problem of lacking the same standard of work in supply chain development. The work process is defined as the same standard and has a structure showing the relationship between the range of processes.

In creating a supply chain management model it can be seen that most farmers have the idea that creating a supply chain management model for aromatic coconut for the development of aromatic coconut for further export is a good idea. This is in line with the research of Sasithorn Hakkong and Piyachat Jarutharatsan (2015), who studied the supply chain management of aromatic coconut, via case studies, and by using fragments of ‘Uncle’ Daeng’s garden of aromatic Chachoengsao .The research found that coconut supply chain management covers garden management as well. From product design the production process design is followed by the selection of the location of the sale location. The design of the operation plan in order to meet the needs of customers who want to order coconut for eating or for further sale, needs to maintain the distinctive characteristics of the coconut for the identity of the aromatic coconut. From the design of the operation plan, starting from the process of receiving order information to the shipping process are all vital steps in the supply chain.

Contributions

1. Human resource development is served as the study on the development of skilled labor to enter the aromatic coconut production system is enhanced. Supply chain is served by using educational tools for foreign labor management in the matter of production and labor migration to the industrial sector.
2. Farmers attending training courses or academic seminars for SME entrepreneurs in the administration by applying information technology to operate effectively will develop knowledge in increasing product value. This will protect mainly the smallholder farmers who depend on coconut and to an extent it will also ensure sustainable coconut plantations and a solid processing industry.
3. Purchasing aromatic coconut. There is a greater export focus on the quality of the aromatic coconut in the decision to buy products based on quality and price in parallel. The study will develop the knowledge of agricultural products and aromatic coconut. Cost of purchase and delivery speed will be known as will the relationship between organizations and gardeners. Experience and teamwork may be bolstered.
4. Research is increased as there is an emphasis on aromatic coconut research because it is an economic plant suitable for the climate in Thailand. And more importantly, there should be a research plan that supports a continuous research budget as posited in this study.

Future Research Direction

This study confirmed the composition of the coconut supply chain management. Supply chain management of aromatic coconut in Phutthamonthon district Nakhon Pathom in the next research, both quantitative and qualitative data will be collected to make a data analysis result that is clear and effective for the research objectives. The data collected was in the form of a cross-sectional study. Therefore, when the period changes, the various environments in the process of entrepreneurship, will see changes as well. Therefore, in the next study one should consider using longitudinal studies to study the changes or developments in the operation by the operator.

In future using research methodology with mixed method i.e. using questionnaires as a tool to collect data from agricultural product operators will be useful. Statistics used in data analysis was the frequency distribution. Using the average value, percentage and structural equation modeling using the LISREL program to achieve good results will enhance the competitiveness of agricultural products entrepreneurs to the operating results of the organization. Such a study will acquire guidelines and methods that enhance knowledge and skills brought to the policy of agencies representing the government and the private sector. This will help in the implementation of policy as well as including establishing a new policy to promote and help farmers and entrepreneurs involved in enhancing the competitiveness in the agricultural industry in each area.

Conclusion

Investment is desirable to build coconut stakeholders' capacity and resources across the entire value-chain. This is especially important for the needed genetic resource preservation. It is clear that coconut production and the associated income from it hugely depends on growers having access to the necessary broad genetic varieties of the crop. The majority of the plantations' and smallholders' palms are old, comparatively unproductive and in dire need of replanting. "The trees may be older than the farmers with small holder farmers not knowing what variety they have, nor how to replace their old palms with elite planting material with the traits to resist climate change, droughts, pests and disease" (Coconut Knowledge Center, 2014).

It is evident that unproductive coconut palms must be replaced by high yielding legitimate planting materials. This means that there must sound farming practices and ideal land use (Harries, 2016). There needs to be an Integration of the upstream with the downstream using the idea of zero waste as the state and stakeholders all help to transform coconut farming from a mere traditional crop into a flourishing sustainable industry.

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