

*26th International Conference  
on Innovations through  
Research Developments in  
Social Sciences, Humanities and  
Management Studies (IRDSSH)*



**SHANGHAI, CHINA**

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# **Full Paper Proceeding Book**

**26th International Conference on Innovations  
through Research Developments in Social Sciences,  
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Akademika Nusa Internasional (Association of Social Sciences and Humanities) is a platform that thrives to support the worldwide scholarly community to analyze the role played by the multidisciplinary innovations for the betterment of human societies. It also encourages academicians, practitioners, scientists, and scholars from various disciplines to come together and share their ideas about how they can make all the disciplines interact in an innovative way and to sort out the way to minimize the effect of challenges faced by the society. All the research work presented in this conference is truly exceptional, promising, and effective. These researches are designed to target the challenges that are faced by various sub-domains of the social sciences and applied sciences.

I would like to thank our honorable scientific and review committee for giving their precious time to the review process covering the papers presented in this conference. I am also highly obliged to the participants for being a part of our efforts to promote knowledge sharing and learning. We as scholars make an integral part of the leading educated class of the society that is responsible for benefitting the society with their knowledge. Let's get over all sorts of discrimination and take a look at the wider picture. Let's work together for the welfare of humanity for making the world a harmonious place to live and making it flourish in every aspect. Stay blessed.

Thank you.

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## Table of Contents

Conference Chair Message.....	6
Scientific Committee.....	7
Organizing Committee.....	9
Conference Tracks.....	10
The Implementing Medium (E-Market Place) Used to Manage The Logistics Industry.....	14
The Factors Affecting Administration and Management of the Cargo on the Plane.....	19
The Logistics Developed to Optimize Sales and After-Sales Services and Retail the Convenience Store.....	24
Marketing Strategy Development for Civil State Shops in Nakhon Pathom Province, Thailand...28	
Marketing Strategies Affecting Customers' Purchasing Decision on Product at Civil State Shop in Udon Thani Province, Thailand.....	34
Marketing Strategy Affecting Working-Age Customer Loyalty of Organic Products Store in Phutthamonthon District, Nakhon Pathom Province, Thailand.....	41
Increasing the Packaging Efficiency for Transport by Lean Concepts: A Case Study of the Packaging for Transport Fighting Fish.....	50
The Influence of Product Quality Management, and Services of Discount Store to Customer Satisfaction in Bangkok and Metropolitan Area.....	57
Product Development of Nata De Coco from Jaggery Palm Sugar.....	64
Product Development of Ready- to- Drink Jelly from Jaggery Palm Sugar.....	72
The Application of Saving Algorithm to Vehicle Routing Optimization.....	79
Application of The Information System Program to Enhance Service Excellence Competency of Securing at Air Transport: Case Study of ABC Company Limited.....	84
The Study of the Business Model Related to Local People's Ways of Living for Creating the Sustainable Community Enterprise Role Model: A Case Study of Pure Wild Honey Product at Huay Hin Lad Nai Village, Chiang Rai Province.....	91
Study of Import-Export (Shipping) Personnel's Capacities: A Case Study on International Trading Companies,Thailand.....	100
Factors Affecting Decision to Use KTC Credit Card of Consumers In Nakhonpathom.....	104

Factors Influencing the Level of Problem for Rail Transport Supply Chain: A Case of Transport Route From ICD Ladkrabang to Laem Chabang Port, Thailand.....	109
Factors Affecting Business Management of Fruits Selling Entrepreneurs in Nakhornpathom: A Case Study of Pathommongkol Market.....	117
Change Management, Human Capital Development, Business Partner, Competitive Advantage for Orchid Enterprises.....	123
Innovative Organization: Innovative Organization Development Model In Thailand 4.0 of SMEs Manufacturing Industries in Nakhon Pathom Province, Thailand (Phase 1).....	130
Causal Factors Development Suppliers That Influence Supply Chain and Affect the Performance of The Suppliers. Local Department Store in Thailand.....	139
Biomass Energy by Rubber Wood at Ranong. The Case Study of ABC Co.Ltd.....	147
Development Guidelines for Value Added of Rubber Supply Chain of Rubber Planters in Ranong Province: Case Study of Rubber Farmers in Ranong.....	153
The Factors Determining Students' Dormitory Consuming Behaviors and Economic Costs of Students' Dormitory in Phutthamonthon District Nakhon Pathom.....	159
The Factors Affecting the Inventory Management of Grocery Store in Bangkok.....	165
Factors Affecting the Consumer Buying Decision Toward Smartphone in Udonthani.....	170
An Application of Forecasting Technique for Process Management Case Study of ABC Company Limited.....	175
A Study of Factors Affecting to Influence on The Selection of Thai Ornamental Fish Export Service Providers.....	183
Study of Improving the Quality of Operations, Appropriate Parties: A Case of Terminal in Laem Chabang, Thailand.....	188
The Marketing Strategy Development of Cultural Tourism: A Case Study of Thung Bua Daeng Floating Market at Banglane, Banglen, Nakhon Pathom.....	193
Factors Affecting to Decision of Transportation Service at State Railway of Thailand.....	198
Satisfaction and Problems of Farmers Towards Rubber Business in Udon Thani.....	203
Supplier Selection in Thai Automotive Industry.....	208
Logistecs Service Provider Capability of Entrepreneurs Ramps Palm Oil in Suratthani Province, Thailand.....	212
Factors Affecting the Decision to Using Ranong Port Transport Service in Ranong.....	215
Mathematics Model for Container Ship Stowage Configuration Planning Problem.....	219

Value Chain Management of Ready Coconut Milk, Theppadungporn Coconut Company Limited.....	227
Service Quality Factors Affecting Trust and Expectation: A Case Study of Chiang Mai International Airport.....	233
A Study Of Specific Features That Required for Partners That Effected to Operational Efficiency of Custom Clearance: Case Study OOCL Logistic (Thailand) Co., Ltd.....	238
A Decision-Making Framework for the Choice of the Production Line Concept in the Automotive Seat Fabrication.....	244

## The Implementing Medium (E-Market Place) Used to Manage the Logistics Industry

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**Abstract.** This Qualitative research aimed to the implementing medium (E-market place) used to manage the logistics industry. Department of Primary Industries and Mines. The purpose is to study the factors that affect the implementation of the electronic marketplace. (E-Marketplace) used in the organization. And study ways to develop or improve system efficiency and effectiveness. This qualitative research by collecting data secondary and data Primary from in-depth interviews executive office logistics industry. Department of Primary Industries and Mines Members and medium systems the data is collected by the two groups. The study indicated that Factors affecting the introduction of electronic systems used in the enterprise market, there are many factors. Management logistics industry. Quality of Service how to use demand model system And most importantly, Factor in Success This requires other factors Involved Guidelines for the development of the system; Has developed a set of guidelines periodically. And problems encountered in doing business electronic commerce. Most of the problem of lack of trust in the buying or selling. The lack of legal support in business. Lack of information on the decision to buy or sell. And lack of expertise it also found that this form of electronic commerce undertaken by the private sector will have a relatively high chance of success than a form of electronic commerce undertaken by the government.

*Keywords*— : Implementing, E-Market Place, Logistics Industry

### INTRODUCTION

Since 2003, the government has initiated the preparation of strategic policy. National logistics. The committee enhancing the competitiveness of the country (Feb. b.) A draft strategic framework for the development of logistics National and later in 2005 the Office of Economic and Social Development (National Post. NESDB). The content is updated strategic framework. To comply with socioeconomic factors, both domestic and international changes. Development Master Plan prepared by the Los logistics of Thailand, 2007-2011, which is available today. And opportunities for all stakeholders. Agencies Both public and private push for the adoption of the strategy into action to achieve tangible results. To increase the competitiveness of international trade. Government policy to develop logistics as the cooperation between the public and private sectors to drive its financial services and information to customers. Therefore, the government must encourage and support entrepreneurial principles and methods. Used in business to make goods and services less expensive one. Products and services to consumers faster and more accurate.

If you compare the system logistics and supply chain with the new (E-Commerce) to carry out business activities and logistics legacy. The system is man-made. Not planning a joint production. A business to benefit their own affairs, only the new system (E-Commerce) or commerce between business to business (B2B) into new avenues of doing business via the Internet (Electronic Business or E-business) by the application. Internet to purchase goods General Electric, which has enabled the company to respond to their needs quickly. Reducing labor and material costs down (Source: Napadol.2011, p.79)

So for that reason, to show the importance and necessity of such matters. As a result, researchers are interested in studying. Implementing medium (E-market place) used to manage the logistics industry. Department of Primary Industries and Mines. And the results of this research will be used as a guide to management in strategic planning agency. In order to improve and enhance work efficiency to achieve the goals of the organization.

### RESEARCH OBJECTIVE

1. To study the factors that affect the implementation of medium used in the enterprise.
2. To study ways to develop or improve systems, electronic marketplace for efficiency and effectiveness.

### HYPOTHESIS OF RESEARCH

1. This research is a study of the Department of Primary Industries and Mines. The impact of using medium
2. Research the period from October 2560 - September 2561.

### LITERATURE REVIEW

Tha Nit Boonyaratgalin , Ekachai apisakkul (2015) conducted a study of the impact and implementation of the e-Auction bidding is used to determine the limit of ABC's corporate strategy. The results were as follows: Guidelines on the management and selection of the most appropriate is the development of new products, coupled with the development of people. Because the approach that benefits both organizations. And the staff of the organization are competent. This will result in better long-term profitability of the Company. For problems arising from the introduction of the e-Auction Bid form to contribute to the auction of a portion of the auction has been reduced. Because of the stiff

competition in the bidding. The company itself can not cope with price competition. But on the other hand, the company can continue to operate and has been employed by the agency, which is the old customers. By the way, hiring more special because it is an ongoing task.

Veera Chankong (2013) conducted a study on the status of potential. And objectives of the system in that there are barriers.

1. Data collection is delayed, incomplete, incorrect data to access the data. Coordination and not duplication
2. Analysis of the data is delayed modernization cooperation from processing aids is not good enough. Lack of analysis tools and lack of technical methods to analyze the data management
3. Run a rush too. The information is not covered by the requirements. Users also do not understand the benefits of data and system data are not good enough to run the inconvenience
4. Published. Insufficient budget Support from top management is not good enough. There are not enough staff to serve the poor quality has moved frequently in some departments. And assignments unclear.

The online market in the food industry is the company's website [www.foodmarketexchange.com](http://www.foodmarketexchange.com) Biz Dimension Co., which acts as a marketplace (B-to-B Marketplace), the industry's first food of Thailand and Southeast Asia. Founded in 2543 as a joint venture for 300 million baht group of business entrepreneurs in the food industry major. The need for a Market Food Market Exchange electronic trading. The food industry in the new Internet. The transaction between the Company and the Company.

Food Market Exchange.com Is an online marketplace that serves to bring sellers and buyers together or negotiate a trade in the same manner as middlemen or brokers without any proprietary product when the sale is successful, the company will receive a fee. From purchase through the website (Transaction Free) is the company's revenues are also found in the business model of the website is to help facilitate the dash. Leagues in trading is.

- Optimize the process trades faster, such as reducing the working paper (Paper Work) reduce the difference of working time (Time Zone)
- To reduce the cost of communication such as telephone, fax
- Fee. In commodities trading at a lower rate than the rate of commission (about 0.5-1.5% of turnover)
- Provides comprehensive services (One - stop Services) such as the information Center. Transportation services payments, insurance and so on.

## RESEARCH METHODOLOGY

This study A Qualitative Research were analyzed with qualitative data gathered from the problems really are. And presented the findings in a manner to include the importance of research, descriptive (Descriptive Research) by the researchers collected data from two sources, sources together.

1. Secondary (Secondary Data) secondary data. The study is available online in the form of e-commerce related. The study collected self. Academic research papers and books related to electronic commerce more.
2. Primary (Primary Data) primary data. To study the factors that affect electronic systems used in the enterprise market. The data obtained from in-depth interviews executive office logistics industry. Department of Primary Industries and Mines, 3 cases: (1) Dr. Touchaphan Sirivet Advisor to the logistics office logistics industry (2) Khun Nakhon Srimongkol Position of Chief Development System Shield. Logistics and (3) Khun Sarira Yanyongsawat Group head of Information logistics. Has developed technology to link logistics system integration throughout the supply chain. And transactions to create a distribution center and logistics industry.

And data derived from interviews with service users who are members of the system who have been trained how to use the system. Which is the operator of the private sector. The group aims to provide complete information and facts. Respectful and a target that has directly affected the number is 5.

1. Jarunee Kamwongdee Company Secretary's Asahi Tec Metal (Thailand) Co., Ltd.
2. Chaniporn wisethsang chief administrative units - purchasing Mining Company Limited
3. Teeran Anreeyaksakul President Nan Noble Truths Marie currency. Head of Procurement Asia Limited mining industry
4. Nattaporn sangchat Manager IT Support Company Limited
5. Kingkaow Suksawang Chief Procurement of Modern Ceramics Limited.

### *Data Collection Method*

1. Primary Data The data were collected by in-depth Interviews type Face -to-Face interview questions are open-ended manner. Interviewed by the Executive Office of the logistics industry. Department of Primary Industries and Mines, 3 cases and interviews with members of the electronic market system has come into the trainees, 5 takes in data from the target audience. After crawling to adopt the conclusion to two.
2. Secondary Data compilation of technical documents that are already collected. Including research Books and other related electronic commerce.

## RESEARCH RESULT

To study the implementation of the electronic marketplace. (E-Marketplace) used to manage the logistics industry. Department of Primary Industries and Mines with the objective to determine the factors. Affecting the implementation of

medium used in the organization. And guide the development of an even more effective. The study was conducted by collecting data from academic theses, books, internet and more. Associated and interviewed agency Executives logistics industry. Development or improvement the study found that the analysis and design of system requirements. Processes and workflows. To meet the needs of the industry and the most modern. Electronic Systems Market (E-marketplace) is a form of marketing online industry (industrial e-marketplace), which has made the system since 2006 and is open to members in early 2007, with a website for search and retrieval. Information (Web Directory) in 2008 to develop a system to be able to transact on the system. And is linked to the provider of electronic commerce and payment service providers. Logistics providers and insurance providers.

The system will be able to provide a more modern and spacious, with the auction (Auction) System comparison. Interactive systems (Live Chart) also has a content. To enhance the value and usefulness of the site with useful information and interesting. Management and information services (Content Management) within the site to date to build popularity for members and the general public due to a website hosted by the Government not to seek revenues or profits. There may be restrictions on some systems. Because the budget has been in years, but somewhat limited. We need to develop an effective system for the benefit of the government up. In fiscal year 2009 guidance for the development of a model system development life cycle (Software Development Life Cycle) A Water Fall Model, which was formed to develop an information system that has been popular in the world for a long time. The format used for budget implementation is not very high compared to other forms of system development life cycle.

Factor in the success of the preparation of the electronic systems market. (E-Marketplace) of the Department of Primary Industries and Mines. Its purpose is to gather information-centric material mining industry. Primary Industries and other industries associated by allowing private operators can search and find a way through the system. The link between the industrial supply chain business to business (Business to Business) can network both domestically and abroad. And provide operators with reduced cost of using this system. Factors for success the system is supplied by the government. Focus on supporting entrepreneurship and promoting the empowerment of competitiveness of the industrial sector. Which does not seek income and profits, so the need to develop a modern market system that is safe, meets the requirements of the operator. As a member of the set. The system can be linked to external service providers, both domestic and international. The transaction system is fully integrated. It is a factor in the success indicators (KPI) to meet the targets set.

## DISCUSSION

This study the purpose is to study the factors that affect electronic systems used in the enterprise market. And to study ways to develop or improve systems, electronic marketplace for efficiency and effectiveness. By collecting data from in-depth interviews executive office logistics industry. Department of Primary Industries and Mines and medium subscribers totaling 8 the results of the study are summarized in Chapter 4 and suggestions below.

The introduction of medium (E-Marketplace) application is a tool for managing the logistics industry. There were many factors that affect the system used in the organization. This requires a coherent ongoing. Whether the management logistics industry. The strategy must define strategic goals and methods of operation are clear. And having regard to the interests of the member or customer will receive from the government. Quality of Service The customer must be satisfied. Transparent Fairly quick and this has set a standard of service that can be measured (KPI) of how to use the medium. Plans and personnel training to member agencies.

Understanding the process of active and empowered to do business via e-commerce. And the format requirements of the new system. Will be updated styles to meet the needs of customers and continuous system. And the most important factor in success. The system can be linked to external service providers, both domestic and international. The transaction system is fully integrated. As a member of the set. And standards that can be measured (KPI) targets defined. The government has a clear policy on the development of the logistics industry. And the availability of information technology.

## CONCLUSION AND RECOMMENDATIONS

Guidelines for developing or improving medium for efficiency and effectiveness. The study found that the analysis and design of system requirements. Processes and workflows. And has set up a development plan in 2558, it has developed to be able to transact on the system. And is linked to the provider of electronic commerce, providing a comprehensive and in year 2559 will be a model system development life cycle (Software Development Life Cycle) A Water Fall Model, a model developed information systems that have been popular. Interpol and the cost is very high. Is consistent with a long Tha Nit Boonyaratgalin , Ekachai apisakkul (2015) conducted a study of the impact and implementation of the e-Auction bidding is used to determine the limit of ABC's corporate strategy. The results were as follows: Guidelines on the management and selection of the most appropriate is the development of new products, coupled with the development of people. Because the approach that benefits both organizations. And the staff of the organization are competent. This will result in better long-term profitability of the Company.

For problems arising from the introduction of the e-Auction Bid form to contribute to the auction of a portion of the auction has been reduced. Because of the stiff competition in the bidding. The company itself can not cope with price competition. But on the other hand, the company can continue to operate and has been employed by the agency, which is the old customers. By the way, hiring more special because it is an ongoing task. The various problems the face in doing business electronic commerce, including the lack of trust between buyers and sellers. The international trade When the problem more difficult to resolve because of long distances. The lack of legal support for transactions. To take advantage of opportunities or gaps of the law, the illegal trade deficit in the purchase or sale of goods. And that is the heart is Personnel must have knowledge and expertise in the business of e-commerce.



Also found Electronic commerce model where the private sector operates. Commerce to form a government action. The objectives are different in action, ie private profit-oriented businesses to do so. Partners and alliances can attract buyers for a major. And investment Join them has been featured in Business the chances of success are quite high. For any type of electronic commerce where the action is. Focuses on assistance to entrepreneurs. Which relies on many factors In order to make a success. Depending on the budget, personnel management. The system can provide a comprehensive service. The operator can use the system in dealing with international trades to gain competitive advantage in the global market. Allow for cost-oriented access (Economic of Speed) government can track the movements and mechanics of the industry quickly. This will cause the performance and service of the government even more.

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## The Factors Affecting Administration and Management of the Cargo on the Plane

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**Abstract:** This Qualitative research aimed to the factors affecting the management of the cargo on the plane is a qualitative research. Using data collected by collecting literature data. Monthly Report Annual Report and Data were collected by interviews and insights from executives of the two systems to handle cargo area. Cargo and Mail Commercial Department The practical work at the airport. To get the relevant information to support the purpose of research. The results showed that the factors affecting the management of cargo space on planes that are relevant factors into these key factors are the internal factors, which are factors that can be controlled and modified. And external factors this is a factor that can't be controlled. The environmental impact of freight space. The factors that impact can cause to the problem. Cause problems and improve the various circumstances that have changed over time. The Analysis was conducted on their part. Division cargo area Cargo and Mail Commercial Department The data and information gained from interviews with employees at the management level and some data from the document and report on data. Such as Cargo & Mail Commercial Department, Catering Department, Technical Services Department, Ground Support Equipment Services, Grand customer services.

*Keywords:* Affecting administration, Cargo, Plane.

### INTRODUCTION

Thailand has a good strategic landscape in the region of Southeast Asia. A country that can transport connections across multiple channels and has borders with many countries. It is useful to make Thailand a hub for air transport in the region is not difficult. As a result, air freight is the government of Thailand for four more important. Updated and expanded to a larger airport. To accommodate the number of passengers and Volume of more goods every year. The creation of the new airport and the opening of the Suvarnabhumi Airport on September 28, 2006 increased by enabling the Bangkok airports that can't support the expansion of passenger and goods.

Throughout the past activities of the Thai Cargo has expanded its transportation network more broadly, not only routes that spread all over the world. Also conducted in cooperation with airline alliances (Star Alliance) and the strategic management focused on market conduct. Especially in the area of management of cargo on the plane. Meet the needs of customers who want to deliver to the destination harshest soon as possible. Can provide the number and quantity desired. And the use of space on the plane's cargo tonnage for maximum benefit. It is therefore important that the information I learn that there are some factors that will affect the management of the cargo on the plane.

A comparison of the features that competitors offer inferior performance or performance of the company in what areas. The standard of service exactly as prescribed or not. So that customers receive the maximum benefit. Able to meet the needs of customers who choose to use air cargo to Thai Airways International Public Company Limited (), and can take advantage of areas that are causing revenue to the Company.

### RESEARCH OBJECTIVE

1. To study the factors that affect the management of the cargo on board the aircraft of Thai Airways International Public Company Limited.
2. To study the ability to optimize the management of the cargo on board the aircraft of Thai Airways International Public Company Limited
3. To determine the errors that cause damage to the administration area of cargo on the plane. Thai Airways International Public Company limited.

### HYPOTHESIS OF RESEARCH

1. The content of the research was to study the factors that affect the management of cargo space on flights of Thai Airways International Public Company Limited
2. Research the period from October 2017 - September 2018
3. Educated on their part. Stack control cargo on aircraft (Cargo Space Control and Load Planning), Head of Cargo and Mail Commercial (Thai Cargo), Thai Airways International Public Company Limited Airport
4. Interview information from employees at the manager level of operation. Active control Division in the area of cargo on a plane for 3-5 people.

### LITERATURE & THEORY

Kamnai Apibhayasakul (2007, pages 19-20) explained that the transport means to provide for the movement of persons, animals or objects with tools and equipment to transport from one place to another. On-demand and utility needs. Transportation will be comprised of the following characteristics:

1. This is an activity that requires movement of persons, animals or objects from one place to another place.
2. Move it must be done with tools or equipment to transport.
3. Must be based on need and those who transport utility purposes.

Transport has a significant effect on the sales and distribution as well. Because transportation is a factor that enhances the value of your product or service. Thus, consumers are in place to transport them to have. A consumer product or service based on their needs. Transport came to take the goods from the manufacturer through the middleman to consumers. Therefore, any business all relies on transport

Sompob Wattanapong (2012, pages 7-10) explained that air cargo. Rapid transport than other types of transport. And can transport goods long distances. Quickly It is the quickest way possible, but expensive. Used to transport restrictions at the time, such as spare parts orders, express shipping fruits, vegetables and flowers internationally. Express Mail shipping as Fedex, UPS, DHL shipping cost per unit of weight is relatively high. The air cargo use with a lightweight product. Air transportation will be scheduled based on commercial flights. The cargo plane (Air Cargo) as part of a commercial aircraft. It is indeed high time for transportation.

*The product is ideal for air freight can be divided into four categories:*

1. Products that have not been kept. Most of the agricultural products which are perishable (Perishable Goods) include fresh fruits, fresh flowers, plants, live animals and fashionable clothing items, etc.
2. Need urgent. To keep up to date or needs include relief. To give to those who have suffered from natural disasters or wars, etc.
3. Wish emergency (Emergency Goods) products include a requirement explicitly as the machine of industrial waste was not available and would like to Keelung by Parts Express.
4. Products include daily newspapers, periodicals, Documents and so on.

Siriwan Serirat (2012, page 11) has been described as organization theory refers to studies on how organizations. Action that is As well as being affected by the environment of the organization. And learn how to determine the function of the organization that affect personnel working in Lahore, however, during the organization theory can help administrators have the techniques or tools are used to improve management. Its efficient and more productive. The organization theory is useful for management as follows.

1. Allows administrators to better understand the behavior and characteristics of various phenomena. That occur unexpectedly in the organization
2. Allows administrators to predict the behavior of organizations that will occur in the future and prepare for what will happen in a bad way quickly. The Knowledge Channel Organization to put theory into practice in the future could, in theory, the organization can be implemented in practice. At present, many companies are faced with a rapidly changing environment to both customers and competitors. The organizations need to respond to the changing environment.

## RESEARCH METHODOLOGY

Research Factors affecting the management of the cargo on the plane. This is a qualitative research (Qualitative Research) is a research study analyzing qualitative data gathered from the environment is real. And presented the findings in a combination of descriptive study (Descriptive Research) data may be used to observe and interview unofficially. As is the fact that naturally occurring. Observe carefully all aspects. Then the results were analyzed to comment on logical inferences.

1. Primary Data to study the factors that affect the management of the cargo on board the aircraft of Thai Airways International Public Company Limited. The data derived from in-depth interviews with senior executives of medium. Division cargo space (Space Control and Load Planning) Cargo and Mail Commercial Department. Thai Airways International Public Company Limited with expertise in the flight path that can provide knowledge in the interview are as follows: 5 person.

1. Khun Kamnung Sangkam Managing Director. Total logistics solutions Co.,Ltd.
2. Khun Tritipan Apimolraksa Control Managers control the region and the local administration to control the flight path and analyze operational data. Affecting management areas in the region and within the country
3. Khun Pahuan Poalpong Control Manager, Europe and Australia. Management of controlled flight path and analyze operational data affecting the management area on the path to Europe and Australia
4. Khun Nuttapong Pokineyarat Control Manager the Americas and Asia over the administrative control of routes and flight. Data analysis operations, affecting management areas in the North America and Asia
5. Khun Danai Chinathumrongwat planning and management Manager, planning and management, network support, flight planning and flight support network. And quality control to perform tasks to prepare KPI reporting monthly and annual basis.

The interview was interviewed individuals (Personal Interview) with a 2-way conversation between the interviewer and answer questions as open-ended. The interview takes about 45 minutes to 1 so as to obtain a reference to approximate the environment and reality as possible.

2. Secondary Data to study the characteristics of the cargo on the plane. The study collected self. Publication Research magazine Air Cargo. The warehouses Logistic management The manual operation (Manual Operation) of Thai Airways International Public Company Limited , monthly and yearly basis..

## RESEARCH RESULT

Management of freight space on an aircraft are considered important in the process of THAI CARGO administration to all parts of the area under the plane (AIRCRAFT COMPARTMENT) for maximum benefit. And reduce the cost to a minimum. To improve and enhance work efficiency. To expand the market to meet the needs of customers who want to transport goods to the destination number and volume increases. Total revenue increased per unit area, although revenue. Division Management Area freight (Cargo

Space Control and Load Planning) is the agency that is at the heart of the commercial and Mail. The administration and management of the cargo on the plane. And revenues increase and decrease expenses or costs incurred in the operation. The cause of the problem is not enough cargo space.

1. No cargo aircraft only (Freighter Aircraft) can't increase their own cargo area is open enough to meet demand. 2. Use the space under the cargo plane (Belly Capacity) passengers on a flight with a passenger density. The need to allocate cargo space for luggage first. It is not enough to meet the demand of goods.
3. The type and size of the aircraft fit to fly passengers in smaller markets, but counter to the freight market where demand is higher. The product is Limited.
4. The budget for investment in the system, the main activity is passenger transport more cargo. Make a budget for development is limited.
5. Air Freight mainly caused by imports and exports of each country. Thailand is a country that needs transportation for export mainly. And there needs to import in small quantities. The Company so, faced problems shipping needs in one direction all the time.
6. Oil prices is a global problem that all airlines are facing. Due to price speculation in global markets. And the demand for oil in the world market soared.

#### *Troubleshooting Guidelines*

1. Find a space from contracts with other airlines. Making it possible to add a total of about 687 tons of cargo per week as negotiations Blocked Space Agreement (BSA) Djerba Crocodile Special Prorate Agreement (SPA) negotiations with partner airlines. To cooperate in cargo flights only (Freighter) negotiations with partner airlines. To buy cargo space.
2. Project management and cargo planes. This project is an important guideline to solve the cargo space is not sufficient to meet the needs of customers. Especially in the major markets, production and distribution.
3. Develop a system to detect and identify the presence (Track & Trace) of freight, international and domestic development on the Web and data protection, the terms and displays the results in a convenient form for users. And packaged Plan of warehouses. Control of cargo.
4. Forward Agent contract with the transport network with worldwide coverage and are trusted by the world's major producers of which the contract will cover the supply routes in the blank.
5. Encouraged to use Thailand as a transit hub through. The promotion, especially for the price. And building warehouses that support the transport of goods through its territory. To cause inbound freight to Thailand.
6. We are working with the government of Thailand. To fix the rate of charge Fuel Surcharge for arrivals from New Zealand. The rate at present. The company has to bear the full loss amount. And may be subject to the rates charged by the new Fuel Surcharge to be appropriate.

### DISCUSSION

The state of the economy in today's world, that is. Globalization all businesses in different countries Faced with global competition could be avoided. Although the business monopoly, it has to compete with itself. That one can't profit there is indeed a division rival. Maybe the rules are the rules somewhat. Because every business needs to seek revenue to survive. Thus, the adjustment process in the business to make operations more efficient and productive. In order to meet the needs and satisfaction of our customers is essential. And the Thai Airways International Public Company Limited will stand on the stage of the competition in the aviation business and the business of air cargo services that firmly. Would not be of advantage to the national airline. But the ability to meet the needs of customers. To satisfy customers in terms of service. Shipping to keep pace with demand. The effective administration in the area to benefit the most. And reduce costs, or costs to a minimum.

Research has indicated that the factors that affect the management of cargo space on planes that can be divided into two factors:

1. Internal factors affecting the management of cargo space. Most are caused by factors within the company itself. The relevant agencies Factors that can be modified and improved to benefit the company, such as deciding the routes and policies of the company. Finance company focused on the main activities are passenger transport. HR Information Systems and Technology The execution and implementation of the inefficiency.
2. External factors that affect the management of cargo space. A factor that can't control or fix the economy, finance and investment. Weather Laws and regulations Market competition in the airline business.

The findings contribute to understanding the ability to optimize the management of cargo space, performance and benefits of that. There are limits to optimize the investment in the technology is used. Increasing the number of staff to meet the workload. System and method to work properly. Clarity in the policy management space. The increase in employee productivity.

### CONCLUSION AND RECOMMENDATIONS

The research indicates that the error occurred that caused the damage and problems. It is an error is an error caused the rating agencies, such as communication within and among agencies. The performance of the employees. Errors that occur within the organization, such as the policy of the organization. The error due to the government policies of the government. Government support the results of the research can be seen as consistent with Siriwan Serirat (2012, p. 11) explained that studies on how organizations. Action that is As well as being affected by the environment of the organization. And learn how to determine the function of the organization that affect personnel working in Lahore, however, during the operation.

Theory can help executives with a tool or technique to improve the management of their efficient and more productive. Therefore it is important that administrators must have a deep understanding of the theories are applied to the managed appropriately. And is associated with Oilthip Kongsombhat (2015, p. 13-20) have described the importance of a good relationship between the customer and the service provider has on sales. The development of relations which is associated with planning, sales

and service in the long term. Creating a good relationship between customers and service providers will require cooperation from all parties. Employees must be trained. And clarification of policies and guidelines to perform a good relationship.

Factors cargo area is a vital part in making experiencing ongoing problem. The shortage of cargo space in the trunk, the passenger and freight transport market is experiencing high demand and the cargo space in the trunk of a tourist attraction, but not the freight market. A plane change problem the total number of passengers on the plane or collapse less. Freight space uncertainty. As a result, cargo can't go on as it has been booked. Moreover, the product has priority in the truck at the end. So if a weight limit on trucks is Offload first.

Thai airways international public company limited operates an airline that provides passenger service. Income from passenger transportation. The event is supported primarily established to support the transportation of passengers. Whether the activity Catering. Providing ground for servicing airplanes while the commercial business unit and Mail. Which is responsible for the operation of air cargo and warehouse services. The business unit is a single unit that is separate from the passenger transport activities. Its main activity is the air cargo space under the plane, which left from carrying baggage in the cargo. And providing support services to warehouse freight Services Company. And warehouses to customer airlines to increase revenue to the Company.

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## The Logistics Developed to Optimize Sales and After-Sales Services and Retail the Convenience Store.

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**Abstract:** This Qualitative research aimed to logistics Development to study the efficiency of the business, sales and after-sales services and retail trade by studying the "Company sells and provides after-sales services and retail outlets to the 7-11." The research is to study the development logistics Research to use such a strategy. To drive the business to business sales and after-sales services and retail. The convenience store efficiently. The researchers chose to model the Company Limited, a company selling equipment and services to retail convenience store 7-11. The study was based on interviews with the main tool to collect data. By asking open-ended (Open-Ended Question) interviews with the management. and staff associated The interviewed executives And officials associated with the company's business model and limited to the study of documents related to the development process Logistics whether the process from procurement, warehousing, transportation to education about the technology, the company simulated limit used. Corporate development made aware of the following process steps in the operation. Such as Warehouse logistics department, purchasing department, IT department or abroad

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*Keywords:* Logistics Developed, Optimize Sales, Retail, Convenience Store.

### INTRODUCTION

In the convenience store is regarded as important to consumers as well. For the convenience of customers in the matter. "Time to Serve" Most convenience stores are open 24 hours as well as a "prime location" near customers. It also provides a convenient way to shop. Despite its diversity not as a convenience store, but there are ways Supermarket. "Sort (Display)" provides a simple, fast payment. As a result, the current expansion of the convenience stores increased a lot. From the customer's needs are greater. Thus resulting in highly competitive in selling goods and services. Therefore, each enterprise must be managed effectively. In order to satisfy our customers with the most developed Logistics is part of the process to adopt a strategic plan of action. And control the performance and efficiency of the organization. Therefore, enterprises should be developed by the formation of the Logistics up.

The system, called Efficient Consumer Response, or ECR (EC's) came into use in the management. And increase profits sustained the business services provider to the convenience store has also introduced Logistics developed effectively by bringing Efficient Consumer Response, or ECR (EC's) came into use in the management of it. The ECR system the concept of modern management in the retail business. He emphasized the importance of cooperation between members of the supply chain retailing. In order to reduce the cost of operations. And can meet the needs of customers better, faster, with lower costs ECR concepts will require cooperation activities in trade and logistics. Among those who took part in the delivery of products and retailers. Logistics such development will contribute to the cost of moving freight warehouse. Keeping inventories and can fight with rivals and survive in a market where competition is fierce. In other words, "Logistics management development that would be one way of excellence of the business itself."

The research is to study the development Logistics Research to use such a strategy. To drive the business to business sales and after-sales services and retail. The convenience store efficiently. The researchers chose to model the Company Limited, a company selling equipment and services to retail convenience store 7-11

### RESEARCH OBJECTIVE

1. Logistics Development to study the efficiency of the business, sales and after-sales services and retail trade by studying the "Company sells and provides after-sales services and retail outlets to the 7-11."

### HYPOTHESIS OF RESEARCH

Development of Logistics can help improve sales and after-sales services to businesses. The existence of the competitiveness of enterprises. Provide a seamless continuity and reduce losses caused by interruption of activities. This will cause a strong business partner.

### LITERATURE & THEORY

Thanawat Boonnaiwah, 2007. King of Valve Co., Ltd. to import goods and equipment Pneumatic Solenoid valve from abroad. The imported goods of many kinds, each with its demand and time requirements of different products. Making it difficult to calculate the proper order. In the present study this research, there is no way to calculate the proper order. Take the guesswork and experience Bringing the total cost of ordering, storing, and also free of charge in case of a shortage of goods higher as well. This research aimed to quantify the appropriate order to reduce the cost of purchase and cost of storage as well as alleviate its shortage simultaneously. The study uses the theory of ABC Classification System to determine the priority of each product. It will then be used to predict product demand next year. The method used to predict the result of close to real as possible. Regression Analysis, which showed that the result was better than the other methods. Then use the Basic Model and Economic Order Quantity Theory (Q, R) Model to calculate the volume of orders. The results showed that each calculation method, the result was different. The results of the calculation method is not the only cost to a minimum. To consider each product and choose how to spend the



minimum on each product. Which will cost less than the old order of about 1,440,000 baht or about 24% of the total cost of using traditional methods.

Sanga Thanasasungwong, 2008. Education. "Problems and obstacles in the optimization of the transportation company" aims to study the problems that hinder development. The operational efficiency of the transportation company (b.) To study and why it is needed and appropriate approach to the problem. This study is a study of qualitative research (qualitative research) by means of descriptive (descriptive research) is described by the operator to focus on the analysis of documents (document analysis) and data from interviews with relevant academics. Executives who took part in the policy. And entrepreneurs from the public and private sectors. The study found that: -

1. The problem that hinders the development of effective implementation of b. Due to problems within the organization, including the management structure. Personnel issues the status of a state b. The delays. And a lack of streamlined operations. The problems include issues outside interference from interest groups. And political groups and unclear and inconsistent policies of the government.

2. A reasonable approach to the problem of Bks., Is to privatize b. (Privatization) Separate bus to serve the people of the management operations that are responsible for overseeing the operation to be processed. Public company following the deal, while the second bus will modify the status of an independent legal support responsibilities, supervision bus type 2, which transfers the work from the Department of Transport

3. Problems. There was an obstacle to privatization and b. Are the discrete issue of government policy. Employees and operators of car sharing does not understand the reason and necessity of privatization the privatization process Bks., Will be achieved. To build Common understanding between all state employees b. And bus operators, the private sector as well as public service users.

Kosachan Chariyawiro, 2008. Production and Inventory Control. A system that is vital to the industry. Working with systems that are effective and appropriate for the environment of the industries that will benefit in many aspects such as lower production costs, increase productivity and reduce production time, etc. This research has been prepared case studies. The development, production control and inventory. Effective and appropriate A case study in industrial production ballast. The objective of this industrial system is workable and more efficient. In this research, since the forecast demand for products using these models to fit the model to the needs of each of our products, which may not be the same. Then put them to use in production planning. Then a detailed plan to the production. To control the production and purchase of raw materials and manufactured components used in production. As part of the plan to produce a detailed development program is designed to provide convenient operation and accuracy even more. The developed program can also be used to control daily operations, such as the disbursement of raw materials and parts, purchase orders and so on.

## RESEARCH METHODOLOGY

This research was to study the development of Logistics to optimize sales and after-sales services to retail and convenience stores (Convenience Store): A case study of a Chamlong Co.,Ltd. The tools used to study traditional interview questions were used as the main tool for data collection. By asking open-ended (Open-Ended Question) interviews with the management. And staff associated

How to collect the data 1. Primary data (Primary Data) is an in-depth interview (In dept. Interview) using an open question. The researchers selected a sample interview 1. The sales executive. 2. Management of Engineering 3. Management Organization 4. Executive Procurement 5. Executive Officer to determine the procedures and processes of operational detail. 2. Secondary (Secondary Data) from the collection of technical documents related to various newspapers and literary journals, articles and information Web sites. The researchers conducted a literature review.

Data analysis for this study. Data analysis was done by qualitative data that is collected through interviews, observation and monitoring. Collection of technical documents related job writing magazine articles, newspapers and the Web sites.

## RESEARCH RESULT

The interviewed executives And officials associated with the company's business model and limited to the study of documents related to the development process Logistics whether the process from procurement, warehousing, transportation to education about the technology, the company simulated limit used. Corporate development made aware of the following process steps in the operation.

Warehouse currently experiencing product simulator Dead Stock Co. to find a way to dump it. The current method of cooling products used in the preparation of promotion. The value of the Dead Stock Company worth over 10 million baht, but the promotion ventilation products such as Dead Stock products that customers do not pay attention. Due to high prices and some outdated it can be difficult to market As a result, the promotion ventilation products. Do not get the attention of customers as they should. When the problem outdated products Sometimes companies need to solve the problem by removing the parts from suppliers. And there is no space to store goods.

Transport department, transport department manager of the interview. Contact the Department of Transportation that. Normally, customers of the Company's Simulation 7-11; if it is the opening of the new branch opening 7-11 to the Plan for the year came to the company in advance. The company the equipment will be installed to the 7-11 time as freezers drink. Coffee machine Air computers, etc., but when the scheduled opening of the 7-11 Truth will move on to the next one on the same day to open another branch. The companies had to prepare. As well as various tools such causes can result in problems because of the need to prepare successively. And sometimes the cargo to be delivered at then. But it appears that the 7-11 also is under development. Making the transport department must take the goods back to the company. Such problems result in lost time and increased

transportation costs due to not install. The goods leave the warehouse once customers the product packaging is intact in the box due to the lack of administration for delivery to the poor. Because some products have no packaging products. When the product reaches the customer, it can cause damage to older products. The current problem is another. Uncontrolled Supplier provided transportation. Supplier companies and employment in shipping. And the access is no monopoly Supplier bringing the price compared to the cost of the Supplier employ a higher price than the market.

Purchasing international issues of authority Buy foreign importation is unable to meet its deficit Stock Lead Time makes the product as a product group revenue for the company. Such problems make Sales to postpone delivery dates to customers. This causes a lack of customer confidence in its products. Causing business losses. And the purchasing agency has said. To provide sales and marketing. Forecast figures for the year to collect the foreign purchasing agency to negotiate with them to the Supplier Demand for the company's needs and the Supplier produced and delivered to meet the needs of the company.

## DISCUSSION

This study aimed to investigate the development of effective Logistics to business sales and after-sales service and retail companies from the sales and after-sales services and retail outlets to the 7-11.

Administrators have opinions that need to be taken into Logistics Development in the organization seriously. By establishing Logistics Agency to manage the relevant authorities, whether they are purchasing, sales, warehouse and transportation management, etc. Due to the overall review.

1. Stock day, the number fell
2. Make Cash Flow improved
3. To reduce the problem of Re Order
4. To help in the service. Supplier
5. To keep costs low
6. Reduce process redundancies down.

## CONCLUSION AND RECOMMENDATIONS

So you can see that the research findings are consistent with the Kosachan Chariyawit, 2008. The development, production and inventory control, efficient system of production control and inventory. A system that is vital to the industry. Working with systems that are effective and appropriate for the environment of the industries that will benefit in many aspects such as lower production costs, increase productivity and reduce production time, etc. This research has been prepared case studies. Development, production and inventory control systems are effective and appropriate. A case study in industrial production ballast. The objective of this industrial system is workable and more efficient. In this research, since the forecast demand for products using these models to fit the model to the needs of each of our products, which may not be the same. Then put them to use in production planning. Then a detailed plan to the production. To control the production and purchase of raw materials and manufactured components used in production. As part of the plan to produce a detailed development program is designed to provide convenient operation and accuracy even more. The developed program can also be used to control daily operations, such as the disbursement of raw materials and parts, purchase orders and so on.

Corporate executives to focus on bringing the logistics to improve the company. The Logistics processes in your organization can help optimize sales and after-sales service more effectively. And to determine ways to improve their business operations, sales and after-sales services to retail and convenience stores. And believes that the introduction of logistics development will also come. Reduce transport costs to respond to customers faster. To reduce losses from transport. And reduction in storage space. To develop ways to improve the supply chain and logistics for retail business. The results of the research on action to develop logistics retailing.

To develop ways to improve logistics for retail business. Divide operations into 3 phases.

*Short-term*, -knowledge and understanding about the model of supply chain and logistics - Administration / Management refill constantly. In order to manage customer demand and inventories are balanced - included in the shipment. To fill the cars faster. The retailers do not have to bear the burden of keeping inventories high. In order to compensate for low frequency - exchange trade information fast and accurate. The data inventory and shipments / sales from the warehouse. - Executive Order to stabilize. The orders are shipped out of the warehouse and fixed it. It allows manufacturers to deliver continuously. And not have to keep inventory for a lot - production in line with demand. This reduces production costs. Allows a reliable production process. Improve planning and forecasting in sales.

*Medium-term*, the establishment of a team of consultants to entrepreneurs, particularly retailers. To make recommendations in the retail business. As well as provide information needed by the operator to be able to adapt quickly to changes in the retail business has changed over the years.

*Long-term*, development of the supply side This will lead to cost reductions, including the addition of continuous production to meet demand. Migration in stock And integration between producers and traders of raw materials.

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## Marketing Strategy Development for Civil State Shops in Nakhon Pathom Province, Thailand

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**Abstract:** The research project on "Marketing Strategy Development for Civil State Shops in Nakhon Pathom Province, Thailand" with the purpose of analyzing the situations of market competition and marketing service strategy of civil state shops public, Nakhon Pathom province and analyzing market services strategy that affect the decision-making to purchase the products at civil state shops, Nakhon Pathom province. The population for this study was the executive or those associated with the business operations of civil state shops and also store employees, civil government leaders in the community and people in the community around 30 people for the purpose of collecting information by group interviews. This study was using data analysis technique to determine a group of important topics and the important concept of research issues. The study results from the marketing strategy analysis of civil state shops, Nakhon Pathom province found that the important factors that civil state shops have to consider are the cleaning of the product, control the production and an expiration date clearly. Together with the product have many types to choose according to their needs. Because it was affect their decision to buy the product. However, the expansion of new style modern shops was the barrier to the business. Therefore, civil state shops should increase the efficiency of business management in order to develop the modern shops. The design of the store and the product placement organized into categories for the sake of convenience to buy for customer. Furthermore, there should consider having the product price clearly, together with the pricing of goods should be based on the quality and services to meet the needs of expectations of the target customers of all levels. In addition, if the civil state shops could publicize by promoting sales activities, providing a discount on the price of goods will help stimulate sales, more than ever before.

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*Keywords:* Marketing Service Strategy, Marketing Competition, Civil State Shops, Nakhon Pathom Province

### INTRODUCTION

The government has set a policy to strengthen the foundations of the economy according to the state guidelines. Using the cooperation of government agencies, private sector, private development organization, network of development partners and civil society driving economic development foundation by doing this, the co-operation of building of the goods will be done by using space as the foundation for a sustainable economic foundation. SME collaboration and cooperation for sustainable community development and promotion of agricultural products. The long-term development of the country under the 12th National Economic and Social Development Plan (2017-2021) has resulted in the development of an improved mechanism for the operation of the public sector. It can effectively promote the production process and services of the private sector. And in line with the country's long-term development direction by using governmental mechanisms to support the link between research that can meet the needs of consumers.

Funding or budgeting for entrepreneurs including rules that do not impede or facilitate business. It also supports the mechanisms of cooperation between the state, the private, the public and the civil society. In the state as a link to the development of the country completely and push for public participation mechanisms to drive the 12th National Development Plan. Therefore, the transformation of a national development plan into practice requires a synergy between the various sectors. In the form of development networks, the government, the private sector, educational institutions, professional associations, and independent organizations such as the Federation of Thai Farmers Council The Federation of Thai Industries, the Federation of Reformers, through the process of networking at the regional level. To create an alliance to define and implement a joint strategy. (Office of the National Economic and Social Development Board, 2016, pp. 130-209).

Ministry of Commerce has participated in supporting the project to raise Civil State Shop for communities of village and community funds. To develop the country according to the policy of the state to accelerate the foundation of the economy. In the context of economic and social change. It has challenged many markets and community outlets such as 1) Competition from the market and modern convenience stores with the power of bargaining and the advantage of size which makes consumers opt to shop for less 2) Transition to the digital age, competition by the use of advanced technology at the market and community stores are still inaccessible and used 3) The market and community stores lacked the means to bring a wide range of products and quality to customers 4) Marketers and merchants lack of knowledge and understanding of effective management. It is necessary to have the support of the government to survive and grow. It is an option for people to access products at fair prices. Maintaining a balance of market forces against the monopoly of large capital businesses and build a strong community development mechanism (Siam Business, 2017).

The social environment and consumer behaviour change. Civil State Shops need to be aware of the problems or needs of consumers. This makes the consumer more product to meet the needs. Nowadays, entrepreneurs in the public knowledge shop. In marketing planning, the competition is intense and continuous. As a result, Civil State Shop in Nakhon Pathom Province strategic marketing services need to be adjusted. For the advantage and for the sake of future business survival. Because service marketing strategies are important factors influencing decision making (Lovelock and Wirtz, 2011, pp.44-48), consumers are more likely to shop and add a new customer base.

For the reasons mentioned above. The researcher is interested to study the development strategy of marketing management of Civil State Shops in Nakhon Pathom too be useful to other public sector merchants. To increase competitiveness in the current business. It will bring revenue. The economic development and quality of life of the executives of Civil State Shops can ultimately be self-reliant.

### LITERATURE REVIEW

This study investigated the concepts, theories and research related to the variables in the research framework. Factors influencing the purchasing decision of Civil State Shops in Nakhon Pathom Province. The concepts used in the study include the concept of service marketing strategy of Lovelock and Wirtz (2011, pp. 44-48) discuss marketing tools to reach consumer demand and create competitive advantage. The service market, also known as 7 P's, is product, price, location and time. Marketing and customer education, personnel, processes and physical environment of Dess and Miller's SWOT Analysis (1993, pp.1-14) includes the analysis of strengths, weaknesses, opportunities and barriers as a tool for analysing external and internal environmental situations. This helps managers determine weaknesses (from internal environment), opportunities and obstacles (from external environment). It will help to understand the factors that influence the work. The strength of an organization is the ability to be used to achieve goals. While weaknesses are a must to fix.

Opportunity is a potential situation that helps the organization achieve its goals. Barriers are obstacles that prevent the business from achieving its goals. SWOT analysis must assess both the internal and external environment. Research results from the research of Maikami (2007), Sangkasuk, Nakalunga, Akepol and Suratsawat (2017), Chetthanan and Sangayothin (2017), Kulwiset and Manmart (2015), Levy & Weitz (2007) and Chaitorn (2017) found that the decision to buy in a Civil State Shops in Nakhon pathom Province as a result of effective service marketing strategies integrated services marketing management or integration. The seven service marketing strategies are key to reaching consumer demand and generating business profits and competitive advantage in the service market. This is a marketing factor that can be controlled. The entrepreneur or the company can apply together to meet the satisfaction of target consumers

### RESEARCH OBJECTIVE

1. To analyse the competitive market and marketing strategies of Civil State Shops in Nakhon Pathom Province
2. To analyse the service marketing strategies that affect the purchasing decision of Civil State Shops in Nakhon Pathom Province

### SCOPE OF THE RESEARCH

The content area covers the content were guidelines for the development of marketing strategies for Civil State Shops in Nakorn Pathom Province, Thailand. By studying the marketing competition and the marketing strategy of Civil State Shops in that affect the purchasing decision of Civil State Shops in Nakhon Pathom.

The population consisted of both males and females aged over 20 years. The samples were divided into 4 groups, consisting of 5 executives or persons related to the operation of Civil State Shops, the 5 staffs of Civil State Shops, 10 people in the community (village, sub-district and district level) and 10 people in the community, totaling 30 target groups. The study was conducted between January and December 2018. The data were collected between March and April 2018.

### CONCEPTUAL FRAMEWORK

Conceptual framework of this research is shown in figure 1.

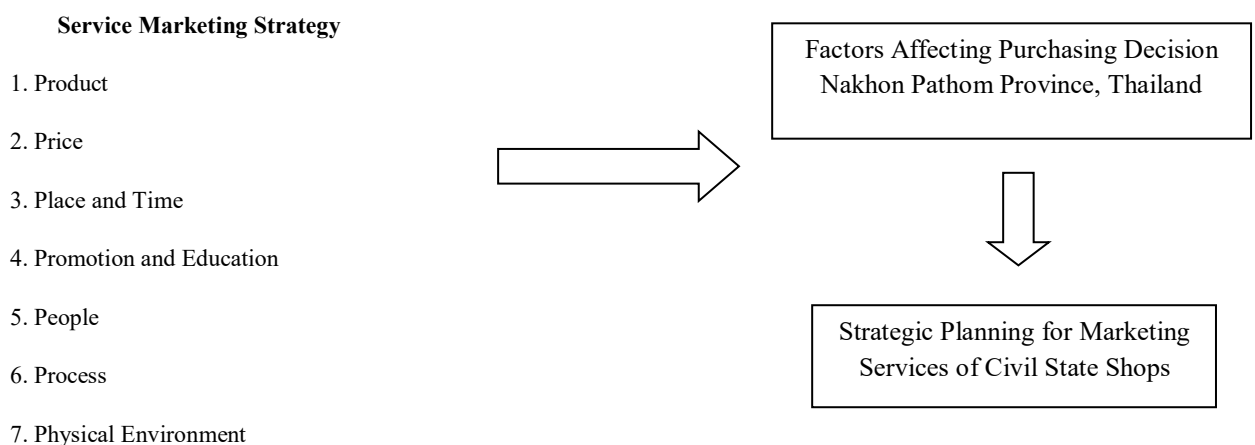


Figure 1: Conceptual Framework

### RESEARCH METHODOLOGY

This research was conducted using qualitative research. The researcher used questionnaire as a tool to collect data. A focus group interview was conducted with the key questions in the interview. The tools used in interviewing people involved in the operation of the Civil State Shop were 4 structured interviews, consisting of 1) Civil State Shop information, 2) Communication, Marketing, Personnel, Service Processes and the Physical Environment. 3) Factors affecting the purchase decision of Civil State Shop. 4)

Recommendations for data collection. The researcher conducted the study by explaining the purpose of this research. Focus group interviews and observation, emotional interviews as well as feelings of tone and expression. To analyze the data in depth. In addition, the researcher would like to ask the sample group to record the interview tape to collect as much information in the interview as possible. Record raw data and verify the completeness of the data.

Qualitative data analysis use the content analysis techniques to define topic / category ,patterns / themes and analysis of the environment both inside and outside the organization (SWOT analysis).

### RESEARCH RESULTS

*Part 1: Analyzing the potential of a Civil State Shop in Nakhon Pathom Province with SWOT analysis Tool.*

Analysis of the potential of Civil State Shop in Nakhon Pathom Province. An analysis of Civil State Shop in Nakhon Pathom using SWOT analysis technique by analyzing the internal and external environment. To lead the way to plan the marketing of Civil State Shops in Nakhon Pathom in table 1.

*Table 1 Analysis of Civil State Shop situation in Nakhon Pathom Province*

<b>Strengths</b>	<b>Weakness</b>
1. Civil State Shop has a variety of products. Can meet the needs of customers adequately. 2. Civil State Shop is different orderly. With customer service 3. Civil State Shop located in the right community. Easy to use. 4. The nature of the work of Civil State Shop is working every day without a break. Continuous service within the community. 5. Civil State Shop is a tourist attraction Can see the local community and culture. 6. Civil State Shop has surveyed the needs of customers. 7. Civil State Shop has public relations about the product to the community. 8. Civil State Shop has special events. To stimulate marketing at various festivals. The price will start selling lower than normal. For people to buy souvenirs or gifts.	1. Civil State Shop can not have as many products as malls. Because of limited space. 2. Civil State Shop can not advise customers about some products as well. 3. Civil State Shop lacks of the personnel to provide services quickly and conveniently. 4. Civil State Shops are still lacking in strategy. Marketing Planning To meet the needs of customers properly. 5. Civil State Shop still lacks of inspection, control and safety in the shop. 6. Civil State Shop lacks of public relations that can impress the customer regularly. 7. Civil State Shop lacks of a variety of marketing promotions, such as the accumulation of coupons to redeem prizes. And special sweepstakes. 8. Focus on the product in the community, lack of vision in marketing. 9. Some items lack of clear price tags.
<b>Opportunities</b>	<b>Threats</b>
1. Civil State Shop market is likely to continue to grow. Because some groups of farmers have high income. From higher agricultural output. I turned to the product. 2. Investing in Civil State Shop do not need to invest a lot. Because of the community's support for the operation. 3. Civil State Shop can reach customers easily. It is close to the community. 4. Consumer goods is a necessity for everyday life. The growth of this type of market has increased as the population increases. 5. The government provides training and marketing to shop managers and networks. 6. People in the community can group together to effectively manage resources and productivity. To create a bargaining power to not be exploited by middlemen. And can be self-reliant.	1. The economy is in a slowdown. Oil prices continue to rise. The impact on the cost of goods. Resulting in higher product prices. Allow customers to control expenses that may be more. The focus is to buy a lot. Do not go out to buy often. Choose a multinational retailer that can meet your needs or go to a place that has everything you need, such as Big C or Lotus Department Store. 2. Current consumer behaviour that emphasizes safety. Make quality control And quality improvement Is essential So technology And this news is what Civil State Shop face inevitably. 3. In a slow economy Multinational Retailers There are ways to scare customers with strategies. Whether it is a promotion, buy 1 get 1, or buy 2 pieces cheaper or to reduce redemption. Unlike Civil State Shop.

Source: Survey

Part 2: Service Marketing Strategies that affect purchasing decisions of Civil State Shops in Nakhon Pathom Province

Service Marketing Strategies. There are 7 main components of Service Marketing: (1) Product (2) Price (3) Place (4) Marketing Communication (Promotion) 5) People; (6) Process and (7) Physical environment. In analysis of service marketing strategies of Civil State Shops in Nakhon Pathom Province. All seven elements were analysed from the interviews.

2.1 Product, the quality of products sold is a key factor for our customers of Civil State Shops in Nakhon Pathom. The product must be clean. Daytime production control and the expiration date is clear. There are several types of products to choose from by Civil State Shops in Nakhon Pathom will not target buyers. It will focus on selling products that use resources and produce from the community. It is necessary to use in everyday life, including various kinds of consumer goods. The customer is satisfied and re-use the service. Will focus to choose a good quality products. The packaging is clean and beautiful. The shop will have to design the product to align the product back into the convenient. The public shop. Still a way of life as a local community shop. The good relationship between the seller and the buyer is the same. As a result, the product trend is a must for our customers. Also, Civil State Shops can sell products within the community and neighbouring communities for sale. It creates a community network that helps to increase economic value.

2.2. Price, Civil State Shops in Nakhon Pathom have a price, the cost, shipping, tax and profit are calculated together with the factors inside and outside the shop to consider together. To set prices to suit the quantity and quality of goods. It will be sold at standard prices or slightly lower. And regardless of the competition. To sell products at the general market price and focus on services that attract buyers. By selling quality goods at a cheap price to the community. However, the closing price tag is unclear and thorough. Still need to ask some prices from the service provider.

2.3 Distribution Channels, Civil State Shops in Nakhon Pathom set in the right location to travel. The interior is very eye-catching and attractive. The product is tidy. And light well ventilated and open at the right time.

2.4 Marketing Communication, Civil State Shops in Nakhon Pathom have public relations to solve community or service users. Get news or events at participating stores. Can provide information to customers to make a decision. Through the channels of government agencies.

2.5 People, Civil State Shops in Nakhon Pathom mostly in the community, the training methodology and work in the service. The reception staff is friendly. Employees are rehearsing for service. Can provide fast service. And to meet the needs of customers who use the service.

2.6. Service Process, Civil State Shops in Nakhon Pathom give people the opportunity to participate in the community. The service will be available in both pre and post order. Price is accurate and fast.

2.7 Physical Environment, Civil State Shops in Nakhon Pathom, the shop management has staffing and cleaning equipment. As a result, the shop is clean, tidy and good atmosphere.

## DISCUSSION

The interviews and analysis of the marketing strategy of the public It was found that the product price distribution channels. Communication, marketing, personnel, service processes, and physical environment. This is an important element that the shop managers need to plan from the start. In order to make the Civil State Shops competitive and successful. The results of the study can be summarized as follows.

1. Executives of Civil State Shops who have good or successful performance in the market will be executives who have a clear view on strategic marketing. Daytime production control And the expiration date of the product. Focus on selling products that are needed in daily life. And the output of the community. It is a community network that helps to increase economic value, which is in line with the research results of Chetthanan and Sangayothin (2017). Manufacturers should focus on the application in everyday life. And create a product identity with emphasis on beauty and sophistication. Maikami (2007) has found that the product strategy was an important factor in the study of demand for cooperative shop services. There are a variety of products to choose from. And the needs of users.

2. Civil State Shops sells products at reasonable prices. There are a variety of prices. The price tag clearly. Procurement of low cost products. To lower the price. It will not focus on price reduction, but will focus on fair prices. Be honest and do not deceive customers about price. This is consistent with the findings of Chetthanan and Sangayothin (2017) who found that the quality determinant was appropriate to the set price. By the quality of the product is already high, the price is higher.

3. Civil State Shops in Nakhon Pathom set in the right location. To travel Available at the right time by providing convenient and fast service. To create customer satisfaction. This is consistent with the results of the study conducted by Maikami (2007) found that the distribution. Should arrange the goods to order. It also provides a well-rounded entrance hall, as well as full day service.

4. Successful Civil State Shops need to promote marketing during key festivals. Or the sales decline. To motivate the purchase. According to research by Kulwiset and Manmart (2015), distribution channels are a feature that has a significant influence on the customer's affection. In addition, if the sales of the store is likely to decline, such as public relations on the radio. In line with the research conducted by Sangkasuk et al (2017) found that the strategy of access to online distribution channels. As a result, consumers are more interested in purchasing community enterprise products through e-commerce, so changes in marketing strategies for publicly-owned consumer goods located in highly competitive markets from other stores. Offering the same mix of products to customers and in less competitive markets will not have a positive impact on the sales of the store and the number of customers entering the store. It may be necessary to conduct additional research to find out. Does the store management have a positive impact on sales from promotional campaigns?

5. Civil State Shops requires a receptionist. Services must be accurate to meet the needs of customers who use the service. In line with Lovelock and Wirtz's (2011) theory, services must be directly relevant to both providers and recipients. The People's Procurement Business must be prepared for the personnel process. From recruiting, training, motivating staff. To make the service provider deliver value to customers. Personnel are an important part of the success of a business because the staff can be satisfied. Pull the customer back. Or to expel customers from the interaction. With a single customer.

6. Strategic marketing services that bring about successful marketing operations. It is important that the management of Civil State Shops pay attention to the speed of service. And to provide services to customers such as picking goods to customers, customers do not need to walk. Or home delivery service. In line with Lovelock and Wirtz (2011), it is stated that in order to create and deliver product elements to the customer, the process must be designed and managed effectively. Can be explained. It is the method and sequence of steps that the service system needs to perform. The poorly designed production process often creates customer dissatisfaction. Because there may be a delay. There are many steps and effective in low service. At the same time, the production process is not good. It affects the employees who serve customers in the work. These will result in quality of service output and service failure.

7. Civil State Shops must determine the location of goods within the store, the management of exhibits within the store and the front or outside of the store in a manner that is effective and contributes to stimulating motivation to buy. This is in line with Levy and Weitz (2007) found that storefront displays increase shop interest and lead to unplanned shop visits. Including customer service in the parking area, etc. to impress. Affecting Satisfaction and re-use.

## CONCLUSION AND RECOMMENDATIONS

Development of marketing strategies for Civil State Shops. In this phase, the marketing strategy of the shop is determined by analyzing the service marketing strategy. There are 6 main components: (1) product (2) price (3) Place (4) Marketing Communications (Promotion) (5) Personnel (6) Process (7) Physical Environment (Physical) Group to Design Strategies Market Development Nakhon Pathom Province:

1. Civil State Shops in Nakhon Pathom should improve the service. To build loyalty for customers to return to service in the future. There should be a variety of products to meet the needs of target customers. And should have set the target customers of the store that the customer group is what kind of product. It can be purchased to meet the needs of the consumer. It should also consider the variety of products because the product must have a variety of forms. Each style is unique. Therefore, the pricing depends on the quality of the goods and services. And expectations from customers if the store has problems with money. Government should support credit. And supply cheap source.

2. Civil State Shops in Nakhon Pathom should develop the shop to be up-to-date with the arrangement of goods into organized into categories. Convenience and ease of purchase. The price tag clearly. The shop should study the modern retail stores such as Seven Eleven. The space is limited, but it can also be used to store the space within the store. Therefore, the design factor of the store and its layout. As well as customer service. This is a major factor affecting the purchase decision of Civil State Shops customers in Nakhon Pathom Province

3. Civil State Shops in Nakhon Pathom, Modern technology should be used to help manage more, such as automatic cash registers. Or a barcode scanner, etc. to facilitate the payment of customers.

4. Civil State Shops in Nakhon Pathom focus on selling resources and products only within the community. Product is not widespread. Marketing promotion is therefore an important factor. Should be developed in the advertising. If it is found that the sale of the store is likely to decline, such as public relations on the radio. Or through the Internet and so on. Public relations through public TV. To help spread the ability to market in the province. Focus on service with knowledgeable staff. And have a fast service.

5. Civil State Shops in Nakhon Pathom should sell products that match the lifestyle of the customer and the packaging needs to be different. To pull the highlight of the product out by promoting packaging.

## ACKNOWLEDGEMENTS

This paper would not have been possible without the contribution, the supporting, the kindness help and the encouragement of Associate Professor Dr.LuedechGirdwichai, The Chancellor of Suan Sunandha Rajabhat University, Bangkok, Thailand.



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## Marketing Strategies Affecting Customers' Purchasing Decision on Product at Civil State Shop in Udon Thani Province, Thailand

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**Abstract:** The research project on "Marketing Strategies Affecting Customers' Purchasing Decision on Product at Civil State Shop in Udon Thani Province, Thailand" with the purpose of analyzing the situations of market competition and marketing service strategy of civil state shops public, Udon Thani province and analyzing market services strategy that affect the decision-making to purchase the products at civil state shops, Udon Thani province. The population for this study was the executive or those associated with the business operations of civil state shops and also store employees, civil government leaders in the community and people in the community around 30 people for the purpose of collecting information by group interviews. This study was using data analysis technique to determine a group of important topics and the important concept of research issues. The study results from the marketing strategy analysis of civil state shops, Udon Thani province found that the important factors that civil state shops have to consider are the cleaning of the product because the product is available in a variety of formats and sizes. Products are standard quality. Product modernization and the local identity. The factors that influence the decision to buy the product. However, due to the expansion of the modern business obstructing the business. Therefore, fair pricing aligns with customer perceptions of price and quality. Have a clear price tag. Should celebrate the price reduction. Points for points to buy. Souvenirs at festivals. Additional payment options by credit card. Adding channels to familiar customers such as online channels. To be easily accessible. Nowadays, there are more online shopping habits. The emphasis is on training the sales staff to interact with customers better. To provide a standardized service process. Accurately and quickly the emphasis is on cleanliness and safety. Therefore, it is important to influence the decision to buy goods in the public.

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*Keywords:* Marketing Service Strategy, Marketing Competition, Civil State Shops, Udon Thani Province, Thailand.

### INTRODUCTION

The government has set a policy to strengthen the foundations of the economy according to the state guidelines. Using the cooperation of government agencies, private sector, private development organization, network of development partners and civil society driving economic development foundation by doing this, the co-operation of building of the goods will be done by using space as the foundation for a sustainable economic foundation. SME collaboration and cooperation for sustainable community development and promotion of agricultural products. The long-term development of the country under the 12th National Economic and Social Development Plan (2017-2021) has resulted in the development of an improved mechanism for the operation of the public sector. It can effectively promote the production process and services of the private sector. And in line with the country's long-term development direction by using governmental mechanisms to support the link between research that can meet the needs of consumers.

Funding or budgeting for entrepreneurs including rules that do not impede or facilitate business. It also supports the mechanisms of cooperation between the state, the private, the public and the civil society. In the state as a link to the development of the country completely and push for public participation mechanisms to drive the 12th National Development Plan. Therefore, the transformation of a national development plan into practice requires a synergy between the various sectors. In the form of development networks, the government, the private sector, educational institutions, professional associations, and independent organizations such as the Federation of Thai Farmers Council The Federation of Thai Industries, the Federation of Reformers, through the process of networking at the regional level. To create an alliance to define and implement a joint strategy (Office of the National Economic and Social Development Board, 2016, pp. 130-209).

Ministry of Commerce has participated in supporting the project to raise Civil State Shop for communities of village and community funds. To develop the country according to the policy of the state to accelerate the foundation of the economy. In the context of economic and social change. It has challenged many markets and community outlets such as 1) Competition from the market and modern convenience stores with the power of bargaining and the advantage of size which makes consumers opt to shop for less 2) Transition to the digital age, competition by the use of advanced technology at the market and community stores are still inaccessible and used 3) The market and community stores lacked the means to bring a wide range of products and quality to customers 4) Marketers and merchants lack of knowledge and understanding of effective management. It is necessary to have the support of the government to survive and grow. It is an option for people to access products at fair prices. Maintaining a balance of market forces against the monopoly of large capital businesses and build a strong community development mechanism (Siam Business, 2017).

The social environment and consumer behaviour change. Civil State Shops need to be aware of the problems or needs of consumers. This makes the consumer more product to meet the needs. Nowadays, entrepreneurs in the public knowledge shop. In marketing planning, the competition is intense and continuous. As a result, Civil State Shop in Udon Thani Province strategic marketing services need to be adjusted. For the advantage and for the sake of future business survival. Because service marketing strategies are important factors influencing decision making (Lovell and Wirtz, 2011, pp.44-48), consumers are more likely to shop and add a new customer base.

For the reasons mentioned above, researchers are interested to study the service marketing strategies that affect the purchase decision of Civil State Shop in Udon Thani, Thailand for businessmen to increase the ability to compete with the current business. It will bring revenue, the economic development and quality of life of the executives of Civil State Shops can be sustainable.

## LITERATURE REVIEW

This study investigated the concepts, theories and research related to the variables in the research framework.

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2. Research results from the research of Chantiviboon (2018), Maikami (2007), Srijampa and Athawongsa (2017), Sangayothin (2017), Kulwiset and Manmart (2015), Levy and Weitz (2007) and Chaitorn (2017) found that the decision to buy in a Civil State Shops in Udon Thani Province as a result of effective service marketing strategies integrated services marketing management or integration. The seven service marketing strategies are key to reaching consumer demand and generating business profits and competitive advantage in the service market. This is a marketing factor that can be controlled. The entrepreneur or the company can apply together to meet the satisfaction of target consumers.

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1. To analyse the competitive market and marketing strategies of Civil State Shops in Udon Thani Province
2. To analyse the service marketing strategies that affect the purchasing decision of Civil State Shops in Udon Thani Province.

## SCOPE OF THE RESEARCH

The content area covers the content about strategic marketing services affecting Civil State Shops decision making in Udon Thani, Thailand. The marketing strategy of public service stores that affect the purchasing decision of Civil State Shops in Udon Thani Province.

The Demographic scope, the population consisted of both males and females aged over 20 years. The samples were divided into 4 groups, consisting of 5 executives or persons related to the operation of five Civil State Shops, the 5 staffs of Civil State Shops, 10 people in the community (village, sub-district and district level) and 10 people in the community, totalling 30 target groups. Time boundary, the study was conducted between January and December 2018. The data were collected between March and April 2018.

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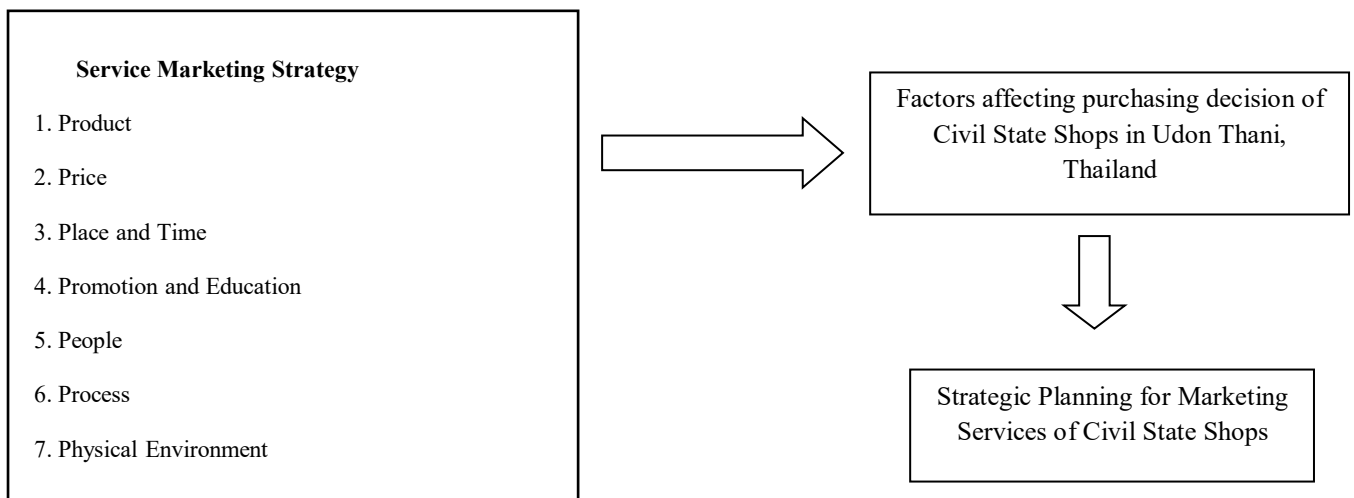


Figure 1: Conceptual Framework

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Table 1 Analysis of Civil State Shop situation in Udon Thani Province

Strengths	Weakness
<ol style="list-style-type: none"> <li>1. Customers come to buy goods in Civil State Shop conveniently because it is in the community.</li> <li>2. Most Civil State Shops are cheaper than leading department stores.</li> <li>3. Civil State Shops have enough products to meet the needs of customers.</li> <li>4. Civil State Shops are financially ready. Can be used in administration. Manage quickly and easily.</li> <li>5. Civil State Shops have the characteristics of work. It is closed daily, non-stop continuous service within the community.</li> <li>6. Civil State Shops are located in the community area. Clients can see the local community and culture.</li> <li>7. Civil State Shops have made the local communities have jobs and income.</li> <li>8. Civil State Shops are operated by the people in the community.</li> <li>9. The location is mostly narrow. Category placement may not be as effective compared to leading stores.</li> <li>10. Civil State Shops in OTOP Products, Community Enterprise Products And the agricultural products that stand out are the distinctive and guaranteed products. The tourists pay attention.</li> </ol>	<ol style="list-style-type: none"> <li>1. Civil State Shops lack of a clear image of the shop. The lack of interest is different from convenience stores such as 7-11 or malls because of limited space.</li> <li>2. Civil State Shops still lack knowledge of the design. Strategic Planning and Marketing To meet the needs of customers properly.</li> <li>3. Civil State Shops still lacks a variety of marketing promotions, such as the accumulation of coupons to redeem prizes. And special sweepstakes.</li> <li>4. The management emphasizes that some of Civil State Shops are still traditional retailers, resulting in a lack of vision for new markets.</li> <li>5. Civil State Shops lack of personnel to provide services with ease and speed immediately.</li> <li>6. Civil State Shops have not many distribution channels. Meet the needs of a single customer.</li> </ol>
Opportunities	Threats
<ol style="list-style-type: none"> <li>1. The products that Civil State Shops sells are consumer goods that are essential to the community. Expansion throughout the product will be higher.</li> <li>2. State policy to support the establishment of Civil State Shops. In addition, the public relations of the public is interested in the people in the community.</li> </ol>	<ol style="list-style-type: none"> <li>1. Competition conditions between public and convenience stores and leading general stores in the future.</li> <li>2. Customers in the community who like convenience and modern can affect the use of Civil State Shops in the future.</li> <li>3. Convenience Stores and most of the leading stores that</li> </ol>

<p>3. The government has considered the appropriateness and feasibility of supporting the establishment of Civil State Shops. It provides opportunities for entrepreneurs and farmers who have the potential and readiness to sell their products.</p> <p>4. Investing in Civil State Shops business does not need to invest a lot. Because of the community's support for the operation.</p> <p>5. Civil State Shops can reach customers easily. It is close to the community.</p> <p>6. The government provides training and marketing to shop managers and networks</p> <p>7. Consumer behavior in the community now makes more shopping in Civil State Shops.</p>	<p>sell products in large quantities can buy at a lower price can affect the use of Civil State Shop services.</p> <p>4. In a slow economy multinational retailers , there are ways to scare customers with strategies whether it is a promotion, buy 1 get 1, or buy 2 pieces cheaper or to reduce redemption. Unlike Civil State Shop.</p> <p>5. The economic crisis can cost the households in the community economically.</p> <p>6. Obstacles to the operation of Civil State Shops are shortages of investment. And to promote knowledge of effective store management. This may result in success and self-sufficiency in the future.</p>
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Source: Survey

*Part 2: Service Marketing Strategies that affect purchasing decisions of Civil State Shops in Udon Thani Province*

Service Marketing Strategies. There are 7 main components of Service Marketing: (1) Product (2) Price (3) Place (4) Marketing Communication (Promotion) 5) People; (6) Process and (7) Physical environment. In analysis of service marketing strategies of Civil State Shops in Udon Thani Province. All seven elements were analyzed from the interviews.

2.1 Products demand for various products and is a category. The easy way to shop is the key to Civil State Shops in Udon Thani Province The issue of choice is the most important issues for the community, such as fresh and dried food. Cosmetic Group Medicine Household appliances Cash replenishment, etc., as well as sale of festive products such as selling clay, water guns, etc. In addition, the planning of product allocation is the choice of goods to be sold must be consistent with the financial condition. Especially cost and profit. We need to consider the size and requirements of customers. At the same time, shops need to improve the product's modernity and popularity. Should watch the movement of any product when sold out, order another product or find new products. Circulation to sell. Thus, the public sector entrepreneurs are free to make adjustments. And can plan the business itself.

2.2. Price of Civil State Shops in Udon Thani Province. The pricing of Civil State Shops are cheaper than the top department stores or modern convenience stores. The quality of the goods compared to the products sold by the general store. Pricing must focus on quality products and inexpensive. To affect the decision to buy or pay the price to buy. The price must be reasonable. Easy to distinguish the quality of different products. Have a clear price tag. Fair pricing aligns with customer perceptions of price and quality. Can make a profit Therefore, it is important to influence the decision to buy goods in Civil State Shops in Udon Thani Province.

2.3 Distribution channels of Civil State Shops in Udon Thani Province set in the right location and so safe. The location of Civil State Shops are not inferior to the convenience store that is currently seen. Customers can easily access the service. Easy to travel and walk the goods. If located in a gas station, there will be parking and safe.

2.4 Marketing Communication of Civil State Shops in Udon Thani Province. The shop is clearly labeled. Colorful text that attracts customers. It makes it easy to remember. It is one of the communications that customers have to publicly distribute products. And advertising through the media. Because of the activities. Related to product promotion. Affect customers to shop. Information or activities at participating stores. It is a way for customers to make a decision.

2.5 People, Civil State Shops in Udon Thani Province mostly in the area. Can know the needs of customers. Asking the customer what kind of product. To get customers to meet the needs. In addition, employees in the public sector must focus on quality and accuracy. Can provide information about the product to help customers make a purchase decision. And love to service. As well as the employees have to dress up with the atmosphere of Civil State Shops , such as the province. Or highlight the cultural dress of the province to attract customers. In addition to building a good relationship with customers. It will maintain the old customer base and add new customers.

2.6. Service Process, Civil State Shops in Udon Thani Province must have a standardized service process. Accurately and quickly to provide quality service. Development of service or work processes. This is done by evaluating the performance. Customer Satisfaction and Customer Satisfaction with Products and Services. To have different service processes from competitors. The service is fast and quality. Affecting customer satisfaction leads to customer loyalty.

2.7 Physical Environment, Civil State Shops in Udon Thani Province characteristics that influence product selection or purchasing decisions. There must be enough light in the store. Make it clear cleanliness and safety are another important factor in the store front and inside.

## DISCUSSION

The interviews and analysis of the marketing strategy of Civil State Shops in Udon Thani Province found that the product price distribution channels. Communication, marketing, personnel, service processes, and physical environment. This is an important element that the shop managers need to plan from the start. In order to make the public shops competitive and successful. The results of the study can be summarized as follows.

1. The public store management with products to meet the needs of customers regularly. Products are standard quality. Create confidence for customers to buy. And the product factor has a huge impact on making a purchase decision. Should provide a variety of products. And variety of sizes and with rare items. Seasonal Products and a unique local. In order to promote the operation of Civil State Shops for sustainable income. This is consistent with the findings of Chetthanan and Sangayothin (2017) found that product placement benefits were obtained. Manufacturers should focus on the application in everyday life. And create a product identity with emphasis on beauty and sophistication. And consistent with the research of Chantiviboon (2018) found that the product strategy, especially the quality and safety of goods, is an important factor in raising public standards. Ordering is orderly. Have a merchant account such factors can generate income opportunities and good quality of life for local people.

2. Civil State Shops sell products at standard prices equivalent to the general store. And the price compared to quality or size is reasonable. The price tag is clear. Bargain as appropriate. And it's a non-profit store too. According to the ideology of Civil State Shops operations system. It is in line with the findings of Chantiviboon (2018) that elevation of public goods requires a clear price tag. It is consistent with the research of Chetthanan and Sangayothin (2017) who found that the quality was determined to suit the price. By the quality of the product is already high, the price is higher.

3. Civil State Shops in Udon Thani Province, the distribution channels are located in appropriate locations, such as Civil State Shops at the gas station or the PTT gas station, etc. Transport can come in many directions, clean shops and safe. Customers can visit and shop conveniently. And do not worry about parking problems. According to the study of Chantiviboon (2018), the public market must be structured to be strong, clean, and accessible. In addition, it is consistent with the research conducted by Maikami (2007) that the distribution should arrange the goods to order. It also provides a well-rounded entrance hall, as well as full day service.

4. Successful Civil State Shops need marketing promotion because of public relations, television, radio or symposium media. And a variety of promotional activities. Especially promoting the market during the festive season. Or the sales decline. To motivate the purchase. According to research by Kulwiset and Manmart (2015), distribution channels are a feature that has a significant influence on the customer's affection. In addition, if the sales of the store is likely to decline. It should be promoted through television, print, or via the Internet. In line with research by Srijampa and Athawongsa (2017) found that channel access strategy. Consequently, the change in marketing strategy for publicly-owned consumer goods stores located in highly competitive markets of the shop. Others offering the same mix of products to customers and in less competitive markets will not have a positive impact on the sales of the store and the number of customers entering the store. It may be necessary to conduct additional research to find out. Does the store management have a positive impact on sales from promotional campaigns?

5. Civil State Shops requires a receptionist. Lovelock and Wirtz (2011) states that the service must be directly relevant to both the provider and the customer. The People's Procurement Business must be prepared for the personnel process. From recruiting, training, motivating staff. To make the service provider deliver value to customers. Personnel are an important part of the success of a business because the staff can be satisfied. Pull the customer back. Or to expel customers from the interaction. With a single customer. And consistent with the research of Chantiviboon (2018), the involvement of traders and buyers is a key factor. Therefore, traders need to dress cleanly. And verbally The training is provided by the buyer and the buyer understands the requirements of the buyer.

6. Services Marketing Strategy that bring about successful marketing operations. It is important that the management of Civil State Shops pay attention to the speed of service. And to provide services to customers such as picking goods to customers, customers do not need to walk. In line with Lovelock and Wirtz (2011), it is stated that in order to create and deliver product elements to the customer, the process must be designed and managed effectively. Can be explained. It is the method and sequence of steps that the service system needs to perform. The poorly designed production process often creates customer dissatisfaction. Because there may be a delay. There are many steps and effective in low service. At the same time, the production process is not good. It affects the employees who serve customers in the work. These will result in quality of service output and service failure.

## CONCLUSION AND RECOMMENDATIONS

Development of marketing strategies for public service shops. This is a development stage Civil State Shops in Udon Thani. Marketing Strategies by Service Marketing Analysis has 6 main components: (1) Product (2) Price (3) Place (4) Marketing (Promotion) (5) Personnel (6) Processes and (7) Physical Environment by collecting Focus Group data to design marketing strategy of Civil State Shops in Udon Thani Province.

1. Civil State Shops in Udon Thani Province should focus on the selection of outstanding products. Quality is inexpensive. Containers are easily visible. And size of product to choose. Whether it is small, medium or large, suitable for family size. And there are many flavors to choose from. Target groups like teenagers who want to eat healthy food but do not like pungent

odor. Or diabetic groups with less sugar, etc., to suit the needs of consumers. In addition, stores should have a number of products to suit the number of customers in that area.

2. Civil State Shops in Udon Thani Province should celebrate the price reduction. Points for points to buy. Or souvenirs at festivals. To create more satisfaction and attract more customers to buy more.

3. Civil State Shops in Udon Thani Province, there should be channels for distribution of familiar products such as online channels. To be easily accessible. Nowadays, the choice of online products is increasing.

4. Civil State Shops in Udon Thani Province should focus on the salesman. Because salespeople have good manners. Beaming Can promote and recommend products to help attract people who are shopping to make the decision easier. Should focus on training sales staff to interact with customers better.

5. Civil State Shops in Udon Thani Province focus on selling resources and products only within the community. Product is not widespread. Marketing promotion is therefore an important factor. Should be developed in the advertising. If it is found that the sales of the store is likely to decline, such as public relations through public television. To help spread the ability to market in the province.

Therefore, the public shop operators should improve their marketing strategies, services that affect the decision to purchase goods of all seven customers, including products, prices, distribution channels. Communication, Marketing, Personnel, Service Processes and physical environment To develop the quality of products and services to meet the needs of consumers. In addition, the agency has direct responsibilities, such as the Provincial Commercial Office. Should study the problem and help the management of the public. Especially in terms of investment. Due to the lack of knowledge about the financing. In addition, the public should look to the competitors. Especially convenience stores such as Seven Eleven stores, etc., using strategies in the form of selling products at cheaper prices than the market. There are various products. Clear price tag, discount or credit card payment of merchants. Develop sales staff to impress customers. Or make a membership card. And the privileges of the members. To the executive of the state. Products can be sold to meet the needs of consumers in their area.

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## Marketing Strategy Affecting Working-Age Customer Loyalty of Organic Products Store in Phutthamonthon District, Nakhon Pathom Province, Thailand

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**Abstract:** The purpose of this research were (1) to explore the personal characteristics of the organic products customers, purchasing behavior, service marketing strategy and loyalty of working-age customers of organic products store in Phutthamonthon District Nakhon Pathom Province, Thailand. (2) to analyze factors influencing the loyalty of working-age customers of organic products store in Phutthamonthon District Nakhon Pathom Province, Thailand. The sample was studied for working-age customers aged 25-59 years who used organic products in Phutthamonthon. Nakhon Pathom. There were 246 cases that they purchased more than 2 times in the past 6 months and the data collected by group discussion. The statistics used in the research were frequency, percentage, mean and standard deviation. The results of the study revealed that the personal factors of working-age consumers of organic products shops in Phutthamonthon Nakhon Pathom. The majority of working-age customers were female and age between 26-35 years old. The average monthly income is 15,001 - 30,000 Baht, and most working-age people work as private employees or employees. Behavior of organic products purchase of working-age consumers of organic products in Phutthamonthon. In Nakhon Pathom province, most of the working-age consumers bought organic rice and buy at the supermarket. The cost of buying between 101 - 300 Baht Frequency of purchase often, most of the purchase period is not certain. The family is influenced by the purchase and to buy organic agricultural products is a good health. The customers of the organic products retailers in the working-age group focused on the overall marketing strategy at a high level. The second is the place and time, the personnel, the price, the physical environment, the process and the marketing promotion, and the customer education respectively, for the loyalty of the customers. It was found that the overall level was very high. And essays from least to most are positive attitudes. Return to repurchase and advice Suggestions for the research were the operators of organic agricultural products and directly responsible agencies such as the Organic Agriculture Association Ministry of Agriculture and Cooperatives and the Bangkok Metropolitan Administration. The findings can be applied to the planning of integrated marketing strategies that are appropriate to the customer service and to create customer satisfaction. The customer has confidence in the products and services received. As a result, the image of the organic store improved. And will affect the loyalty of the customer. As well as adding a new customer base.

**Keywords:** Marketing Strategy, Customer Loyalty, Organic Product Store, Thailand

### INTRODUCTION

According to the concept of national development in the long run under the National Economic and Social Development Plan No. 12 (2017 - 2021), which still maintains. The philosophy of Sufficiency Economy is to lead enough to eat enough. Food security, food security, poverty reduction in the household and community sectors. As a result, farmers have adopted the philosophy of sufficiency economy in many areas, from commercial farming to organic farming. In the government sector, the government has set guidelines for farmers to produce organic products under the organic farming standards. The 12th Development Plan for Sustainable agriculture and environmentally friendly. Thailand is also the hub for organic products in the ASEAN region. (Office of the National Economic and Social Development Board, 2016, pp. 87-96).

The Ministry of Agriculture and Cooperatives is the main agency in promoting the production of organic products. And the responsibility for the appointment of the National Organic Agriculture Development Board is to draft the National Organic Strategy for Organic Farming No. 2 (2013 - 2016) to improve the quality of life and strengthen good health for farmers. Produce and consume foods that are safe from chemicals. And increase the competitiveness of organic products in Thailand. Office of Agricultural Economics. Following up on the results of the implementation of the Strategic Plan for Organic Products No. 1 (2008 - 2011), organic agriculture in Thailand has increased its area of growth in 2010. And there is the potential for organic farming. The certification of organic farming continues. (Office of Agricultural Economics, 2016) for organic agriculture in the year 2013 has continued to grow again, in the year 2015 has grown by 21%. The organic rice and mixed plants (Greenet, 2016).

The above can be seen. Both public and private sectors. Promoting and supporting the network of organic products. Campaign for Thailand to increase organic vegetable and fruit growing areas as well as retail and organic farming businesses. To expand the market. (Ministry of Commerce, 2014) and in line with the future direction of human resource growth in Thailand. In 2022, the increase in Thai population will continue to increase in the future. At present, the population, particularly the working-age group, is focusing on health care. Therefore, the products related to health is a product that is growing in the future. Even with high prices. Consumers will pay more for quality than other products (Olanakitanan, 2013, PP.42-85).

Organic agriculture shop in Thailand is a specialty store. Focus on organic products. In 2011 there were 315 stores (Office of the Permanent Secretary, 2011, pp. 1-38). The entrepreneurs have many forms of business such as health food stores. And environment or organic supermarket. The organic market, a niche market, has expanded to all regions of Thailand. For example, organic shops in Thailand, such as Navilit, Lemon Farm, Thai Sabai and Doi Kham, etc., to enhance the competitiveness of the target groups, especially the working and income earners. Buy high Therefore, to increase the competitiveness of competitors. Sustainable development requires sustainable development. To meet the needs of the organic market both domestically and internationally. Operators or retailers need to focus on marketing strategies to build loyalty among customers in the long run. However, the organic store business has a wide range of organic products to meet the needs of its customers. And prices of organic products are higher than average prices. The market is limited to high-income groups. The impact of the economic downturn may also affect the purchasing power of some consumers of organic products to reduce consumption. (Organic Farming Innovation Network, 2014).

For the reasons mentioned above. Researchers are interested in developing marketing strategies that affect the loyalty of working-age consumers of organic products shops in Phutthamonthon District. Nakhon Pathom because of the health consciousness of consumers. The promotion of organic marketing of both public and private sectors. Consequently, consumers pay more attention

to organic products. The study of concepts and theories related to consumer behavior models that influence customer loyalty include personal attributes. Buying behavior and organic marketing strategies. Research on the marketing strategy of the organic market is still under-studied. Including in-depth study on customer loyalty, working-age group, organic products store in Phutthamonthon. Nakhon Pathom The result of this research is to develop marketing strategies for organic products. And to provide information to entrepreneurs to promote the production of organic products. To provide marketing information to those interested in selling organic products in Phutthamonthon., Nakhon Pathom in the future.

RESEARCH OBJECTIVE

1. To explore the personal attributes of the organic farmer. Organic Purchasing Behavior Customer feedback on marketing strategy. Loyalty and customer loyalty of organic farmer in Phutthamonthon. Nakorn Pathom Province, Thailand
2. To analyze the factors affecting the loyalty of the working-age group of organic store in Phutthamonthon. Nakorn Pathom Province, Thailand

HYPOTHESIS

Hypothesis 1: Working-age clients place emphasis on the marketing strategy of the organic store in Phutthamonthon. Nakhon Pathom. Overall, it was at a high level.

Hypothesis 2: Working-class clients value the loyalty of the organic store in Phutthamonthon. Nakhon Pathom. Overall, it was at a high level.

SCOPE OF THE RESEARCH

The scope of the content will cover the content of marketing strategies that affect the loyalty of the working-age consumers of organic products in Phutthamonthon. Nakhon Ratchasima Province by using personal characteristics of the customers. Organic Purchasing Behavior Customer feedback on service marketing strategies. And the loyalty of the customers of organic products in Thailand.

The study population consisted of those who had purchased more than 2 times last 6 months at the organic store in Phutthamonthon. Nakhon Pathom Province was studied by 246 people. The company is a group of 315 Thai Organic Mapping Service (Office of the Permanent Secretary, 2011, pp. 1-38) and interviews with organic products and services. The Focus group consists of 5 working-age people and 5 organic farmers, totally 10 people.

The research was conducted between January and December 2018. Data were collected during March to April 2018.

Conceptual Framework

Conceptual framework of this research is shown in figure 1.

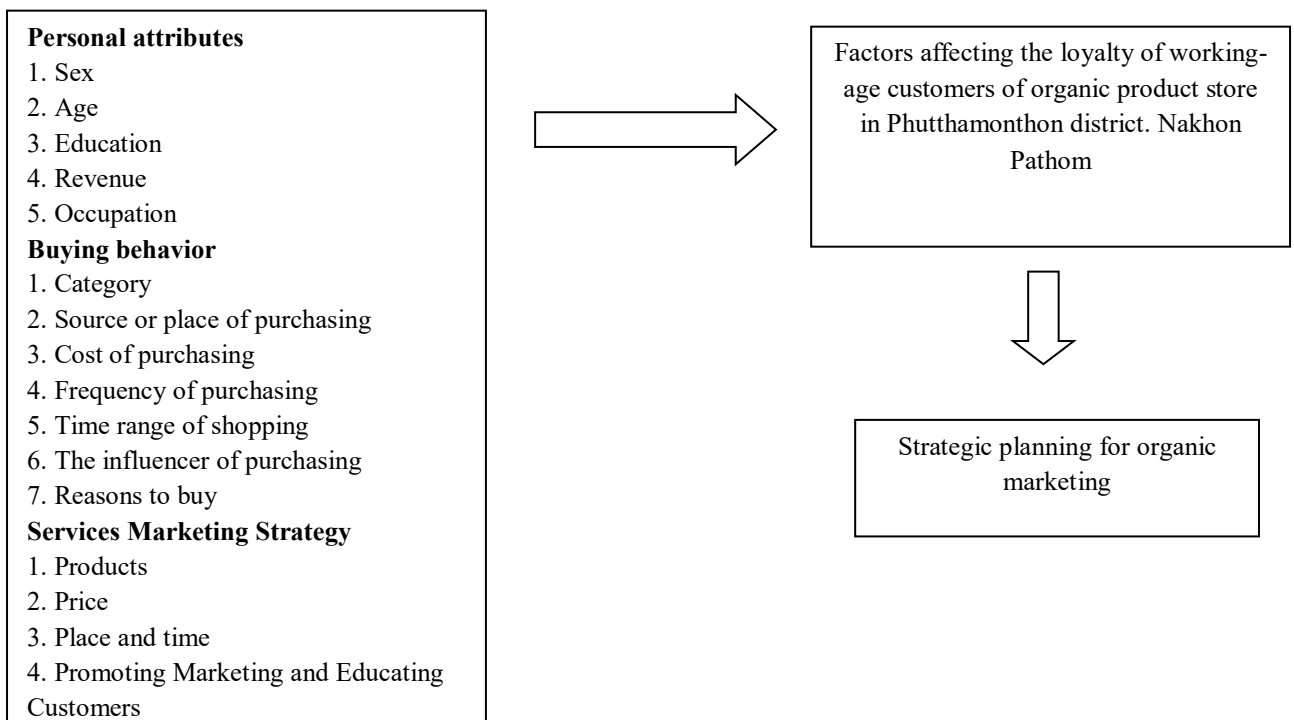


Figure 1: Conceptual Framework

LITERATURE REVIEW

This study investigated the concepts, theories and research related to the variables in the research framework.

1. Factors influencing customer loyalty, the concepts used in the study are (1) Kotler and Keller's Consumer Behavior (2012, p.183). Consumer behavior refers to behavior that consumers expect to meet their own needs. And by experience it can be said that the study of decision behavior and the actions of people related to the purchase. And sales this is a process that identifies the needs and loyalty of customers in the service. Purchase behavior is the type of product, source or place of purchase. Cost of purchase Frequency Period of purchase Influences on purchases (2) Lovelock and Wirtz (2011, pp. 44-48) discusses the marketing strategies of consumer service marketing and provides an advantage. The competition in the service market, also known as 7 P's, is product, price, location and time. Marketing and customer education, personnel, processes and physical environment; and (3) Oliver's customer loyalty concept (1999). Return to repurchase and advice.

2. Relevant research work from Li and Green Research (2011, p. 1), Mula (2012, p. 1), Suthar, Lathangi and Pradhan (2014, p. 619), and Wararatchai (2017) found that building customer loyalty using relationship marketing strategies that to create value for consumers. By Service Market Strategy Rahman, Haque and Jalil (2014, pp. 304-316) investigated the relationships between variables. Price strategy influences customer loyalty. Salgado-Beltrán, Espejel-Blanco and Beltrán-Morales (2012, pp.618-623), conducted a research on the marketing strategies that affect the purchase of organic products by the Mexican consumers found that marketing strategy consists of products, price, distribution channels Akepanitthaworn and Kongsawat (2011, p.72) have found that the factor of organic marketing on organic purchase of organic vegetables in Bangkok area was investigated. Consumers of organic vegetables are more concerned about their loyalty to the product and continue to buy more. Yenpiam and Arunrimorakot (2011) have found the factors of high level on the decision to buy organic jasmine rice. The factor of marketing promotion in culture and social aspect was moderate at the decision to buy organic jasmine rice. Jinsorn (2011) studied the factors used in purchasing organic vegetables in Bangkok. Found that the product factor. And the channel. Consumers focus on the most at the highest level, while price and promotion aspects. Consumers focus on the overall level. As for the behavior of buying organic vegetables, consumers want to consume vegetables that are not contaminated by chemicals.

RESEARCH METHOD

This research uses the mixed methodology of quantitative research. Quantitative Research and Qualitative Research by quantitative research. The study population consisted of consumers who had purchased more than 2 times over 6 months at the organic products store in Phutthamonthon. Based on a sample of Chocharan (1977) and 10 entrepreneurs and stakeholders in organic agriculture in Thailand, the objective was to evaluate marketing strategies that affect the loyalty of working-age customers of organic products store in Phutthamonthon Nakhon Pathom

The instruments used in the research were questionnaires. And group discussion The quality of the questionnaire was determined by the validity of the questionnaire. The questionnaire had the IOC value of more than 0.60. Tested for reliability. Try-out with similar groups of 30 samples to determine Conbach's Alpha Coefficient- $\alpha$  which is the coefficient of confidence. The reliability of the questionnaire (Cronbach, 1990)

The data and statistics used in the research are descriptive statistics, such as frequency distribution, percentage, measure of data mean. And standard deviation and qualitative data analysis. Use content analysis techniques to define topic / category and conceptual concepts that are the subject of research pattern / themes.

RESEARCH RESULTS

*Part 1 Organic purchasing behavior of working-age customers of organic product store in Phutthamonthon District, Nakhon Pathom*

Table 1 Number and percentage of organic purchasing behavior of working-age customers of organic product store in Phutthamonthon District, Nakhon Pathom n=246.

Organic Purchasing Behavior		n	Percent
Category	Rice	90	36.6
	Vegetables	79	32.1
	Fruits	46	18.7
	Drink	30	12.2
	Others (snack)	1	0.4
Source or place to buy	Market	97	39.4
	Supermarket	103	41.9
	Organic Shop	22	8.9
	Organic Farm	16	6.5
	General Plaza	8	3.3
Costs in Purchasing	Less than 100 baht	52	21.1
	101-300 baht	94	38.2
	301-500 baht	51	20.7
	501-1,000 baht	34	13.8
	More than 1,000 Baht	15	6.2
	Everyday	31	12.6

Frequency of Purchasing	Once a week	84	34.1
	Once a month	40	16.3
	Rarely	91	37.0
Time Range of Purchasing	Morning	39	15.9
	Afternoon	44	17.9
	Evening	34	13.8
	Not sure	129	52.4
Influencer of Purchasing	Family	131	53.3
	Friend	64	26.0
	Lover	26	10.6
	Sales person	21	8.5
	Others (self)	4	1.6
Reasons of Purchasing	It is good for health.	103	41.9
	Quality / non-toxic / cleanness	67	27.2
	Freshness / good taste	31	12.6
	Popularity	32	13.0
	Eco-friendly products	13	5.3

Table 1: Organic purchasing behavior of working-age customers of organic products in Phutthamonthon District in Nakhon Pathom province, most of the working-age consumers bought organic rice. 36.6% bought at Supermarket. 41.9% had the cost of purchasing between 101 - 300 baht or 38.2%. Frequency of purchase was 37.0%. Most of the time, the purchase period is uncertain. At 52.4 percent, the family was influenced by the purchase. 53.3 per cent. And purchase of organic products is a good cause for health. Accounted for 41.9%

*Part 2: Marketing strategies of working-age customers of organic product store in Phutthamonthon District, Nakhon Pathom*

A Survey of customer behaviors on marketing strategies of organic product store in Phutthamonthon District, Nakhon Pathom. The data were descriptive statistics, ie mean and standard deviation. The details are shown in Table 4 and Table 5.

Table 2 Descriptive statistics on marketing strategies of working-age consumers of organic products shops in Phutthamonthon District Nakhon Pathom.

Marketing Strategy	$\bar{X}$	SD	Translation
<b>Product</b>			
1. The products in the store have a variety of healthier options.	4.30	0.76	Most
2. The product is fresh or has a clear expiration date.	4.38	0.72	Most
3. Products with organic standards	4.28	0.75	Most
<b>Average</b>	<b>4.32</b>	<b>0.62</b>	<b>Most</b>
<b>Price</b>			
4. The product is suitable for quality and quantity.	4.02	0.80	Much
5. The product has many levels to choose.	4.21	0.72	Most
6. The product has a clear price tag.	4.33	0.70	Most
<b>Average</b>	<b>4.19</b>	<b>0.55</b>	<b>Much</b>
<b>Place and Time</b>			
7. Shop with branches nationwide. Can use the service thoroughly.	4.16	0.77	Much
8. The location is in a convenient location. Easy to access.	4.27	0.71	Most
9. The place is clean, not crowded and free from pollution.	4.25	0.76	Most
<b>Average</b>	<b>4.23</b>	<b>0.59</b>	<b>Most</b>

Marketing Strategy	$\bar{X}$	SD	Translation
<b>Marketing Promotion and Customer Education</b>			
10. Shop with knowledge activities. And there are staff to advise, such as introductory activities or product demonstrations.	4.09	0.76	Much
11. Billboards and publicity through media such as newspapers, television, leaflets, Internet, etc., as an incentive to buy organic products.	4.13	0.76	Much
12. Reducing the price, giving the edge, and winning prizes on various occasions, such as the New Year Festival, the launch of new products before another product.	4.17	0.85	Much
<b>Average</b>	<b>4.13</b>	<b>0.65</b>	<b>Much</b>

Marketing Strategy	$\bar{X}$	SD	Translation
<b>People</b>			
13. Employees can describe the benefits of the product.	4.15	0.83	Much
14. Employees speak well and have courtesy to the customer.	4.24	0.73	Most
15. Employees are enthusiastic and sincere in service.	4.24	0.74	Most
<b>Average</b>	<b>4.21</b>	<b>0.65</b>	<b>Most</b>
<b>Process</b>			
16. Customers can try the product or try the product yourself.	4.16	0.83	Much
17. Advice on how to consume or use the product.	4.12	0.80	Much
18. Fast service, Do not waste time to wait.	4.17	0.76	Much
<b>Average</b>	<b>4.15</b>	<b>0.69</b>	<b>Much</b>
<b>Physical Environment</b>			
19. There are shopping facilities such as shopping cart, basket etc.	4.13	0.81	Much
20. Clean place, have enough light	4.21	0.71	Most
21. The product have arranged, easy to pick or choose.	4.20	0.74	Much
<b>Average</b>	<b>4.18</b>	<b>0.61</b>	<b>Much</b>
<b>Total Average</b>	<b>4.20</b>	<b>0.47</b>	<b>Much</b>

From table 2, the results of the survey on marketing strategies of working-age group of organic store in Phutthamonthon Nakhon Pathom (1) Products (2) Rate (3) and (4) promoting, marketing and customer education (5) people (6) processes, and (7) Environmental services. The data is presented as arithmetic mean. And standard deviation. Descriptive characteristics of marketing strategies of the working-age group of organic product store in Phutthamonthon. Nakhon Pathom Overall, at a high level (= 4.20)

Considering the opinions on each marketing strategy, it was found that the working-age customer had the highest score (= 4.32), followed by the place and time (4.23). (4.21). Overall, the overall picture was high (= 4.19). The overall picture was high (= 4.18). Promote and the overall customer education level (= 4.13), respectively.

When considering product marketing strategies, it was found that working-age customers had product feedback. Sort by descending order the details are as follows: The product is fresh or has a clear expiration date. At the highest level (= 4.38). At the highest level (= 4.30) and products with organic standards At the highest level (= 4.28), respectively.

When considering pricing strategies, it was found that working-age customers had a price-sensitive attitude. Sort by descending order the details are as follows. The opinions on the highest level (= 4.33), followed by the price level at the highest level (= 4.21), the products were priced at the highest quality and quantity. The opinions were high (= 4.02), respectively.

Considering the location and time marketing strategy, it was found that working-age customer had a better idea of location and time. Sort by descending order the location is conveniently located. Easy to access. At the highest level (= 4.27), the place was clean, not crowded and free of pollution. The opinions on the highest level (= 4.25) and the distribution shops with branches nationwide. Can use the service thoroughly. The opinions were high (= 4.16), respectively.

When considering marketing strategies for marketing promotion and education, customers find that working-age customers have a positive attitude toward marketing promotion and customer education. Sort by descending order the details are as follows. Before another product. (4.17), followed by billboards and public relations through media such as newspapers, television, leaflets, Internet, etc., as an incentive to buy organic products. There was a high level of feedback (= 4.13). There were staff members giving advice such as introductory activities or product demonstrations, etc. There was a high level of feedback (= 4.09), respectively.

When considering the marketing strategy of personnel, it was found that the working-age customers had the opinion of the personnel. Sort by descending order the details are as follows. And have courtesy to the customer. At the highest level (= 4.24), the employees were enthusiastic and sincere in service. At the highest level (= 4.24), the employees could describe the benefits of the product. The opinions were high (= 4.15), respectively.

When considering a process marketing strategy, it was found that working-age customers had a positive feedback on the process. Sort by descending order the details are as follows: Service is fast. Do not waste time waiting. The opinions were high (= 4.17). Or try the product yourself. There was a high level of feedback (= 4.16) and advice on consumption or use. The opinions were high (= 4.15), respectively.

When considering marketing strategies for physical environment, it was found that working-age customers had a positive opinion about the physical environment. Sort by descending order the details are as follows. Have enough light at the highest level (= 4.20), the order was ranked second. Easy to pick or choose. There was a high level of feedback (= 4.20), and there were shopping facilities such as carts, baskets, etc. (= 4.13).

*Part 3. Loyalty of working-age customers in the organic product store in Phutthamonthon. Nakhon Pathom*

*Table 3 Descriptive statistics on consumer loyalty among working-age customers of organic products stores in Phutthamonthon district Nakhon Pathom.*

Loyalty	$\bar{X}$	SD	แปลผล
<b>Positive Attitude</b>			
1. Continue to buy organic products, although others have suggested switching to cheaper products.	4.15	0.75	Much
2. Other Organic Consumption Options	4.15	0.77	Much
3. The continued use of organic products. The price is higher.	4.09	0.78	Much
<b>Average</b>	<b>4.13</b>	<b>0.66</b>	<b>Much</b>
<b>Repurchasing</b>			
4. Return to organic products store when there is a need to buy organic products in the future.	4.12	0.76	Much
5. To consume organic products. Customers will come back to buy organic products.	4.14	0.73	Much
6. Return to buy organic products more often.	4.05	0.77	Much
<b>Average</b>	<b>4.10</b>	<b>0.64</b>	<b>Much</b>
<b>Recommendations</b>			
7. Recommending others to buy organic products	4.09	0.81	Much
8. Recommending more people to buy organic products.	4.00	0.73	Much
9. Telling the impression in the organic product store to other people.	4.02	0.80	Much
<b>Average</b>	<b>4.04</b>	<b>0.64</b>	<b>Much</b>
<b>Total Average</b>	<b>4.09</b>	<b>0.56</b>	<b>Much</b>

Table 3: Survey of loyalty among working-age customer of organic products store in Phutthamonthon Nakhon Pathom Province consists of (1) positive attitude (2) repeat buying and (3) The data is presented as arithmetic mean. And standard deviation. To describe the opinions of loyal customers in the organic product store in Phutthamonthon. Nakhon Pathom Overall, at a high level (= 4.09)

When considering each loyalty, it was found that the working-age customer had positive attitude toward the overall level (= 4.13), followed by the repurchase at the high level (= 4.10) and a high level of referral (= 4.09), respectively.

When considering positive attitude loyalty, it was found that working-age customers had positive attitude. Sort by descending order the details are as follows: Continue to buy organic products, although others have suggested switching to cheaper products. (= 4.15), followed by other organic products (4.15) and continued use of organic products (= 4.15). The price is higher. There was a high level of feedback (= 4.09).

When considering reliance on return buys, it was found that working-age customers had a positive feedback about buying back. Sort by descending order if you want to consume organic products. Customers will come back to buy organic products. There was a high level of feedback (= 4.14), followed by return of organic products when needed to purchase organic products. There was a high level of feedback (= 4.12) and a return to organic products. (4.05), respectively.

When considering loyalty, the recommendations suggested that working-age customers had a positive feedback on their recommendations. Sort by descending order the following is recommended to purchase organic products. There was a high level of feedback (= 4.09), followed by a positive feedback on organic products. There was a high level of feedback (= 4.02) and the introduction of more people to buy organic products. The opinions were high (= 4.00), respectively.

## DISCUSSION

Based on the findings of the organic purchase behavior of working-age customers, the purchase cost of working-age group is focused on the purchase of consumed rice. Mostly bought in the supermarket. Influential buyers are family members. There are reasons to buy for good health. Researchers think that in the future, healthy food market will be very popular. It is because consumers are likely to get information. And the opportunity to choose more. From a group discussion of organic buyers, working-class buyers the organic farmer's purchase of organic products has increased. As people age, they become more aware of their health and their families. Choose foods that are safe to keep you and your family healthy. And those who have higher income from work. Therefore, it is possible to buy organic products that are higher than the price of ordinary products. Along with the tendency to use the shopping center to buy products and socialize with friends, this is an important factor for purchasing organic products.

Marketing strategies that affect the loyalty of the working-age customers of organic products shops in Phutthamonthon. The products include price, location and time. Marketing and customer education, personnel, processes and physical environment. This finding coincides with the concept of Lovelock and Wirtz (2007), which states that effective response to consumer demand and loyalty Marketing Strategies Needed Feature of product or service Marketers will design a product or service with good features. Perfect over the competition. And it is the consumer's desire. The study found that most of the working-age consumers bought organic products. Organic products are good for health. Product design requires organic label. And information on health products. The results of the research were in agreement with Jinsorn (2011). The factors that were used in purchasing organic vegetables in Bangkok. Products Consumers put the most importance at the highest level.

The customers of organic products in the working-age group place a high level of loyalty. Organic farming shoppers are sensitive to positive attitudes and are aware of the continued need to purchase organic products, although others have suggested switching to cheaper products. However, organic farmers in Phutthamonthon Nakhon Pathom Priority is given to products with reasonable prices for quality and quantity received. It may be due to the price of organic products and the price of organic products compared with the benefits. If the price is different than the benefits are not very different. To make customers turn to the general consumer. So the price factor is the price the consumer pays. If the value of the product is higher than the price. Consumers will make the decision to buy, so the pricing is wide to choose what the customer wants.

From the study of behavior of working-age consumers, the majority of working-age customers spent about 101-300 baht on organic products and emphasized on the benefits. Organic and Non-Toxic Organic Consumption to create value for customers to feel the quality of goods. We are pleased to pay the price level at the store. Such factors are important factors in the loyalty of the organic store in Phutthamonthon. Nakhon Pathom As a result, customers continue to purchase organic products, although others have suggested switching to cheaper products. And other organic products. Salmonella, Salgado-Beltrán, Espejel-Blanco and Beltrán-Morales (2012, pp. 993-1006) found that price strategies negatively affected the purchase of organic food.

## CONCLUSION AND RECOMMENDATIONS

Working-age group who use organic products store in Phutthamonthon Therefore, the price level should be appropriate to the quality and quantity received. There are a variety of prices to choose from. Customers are welcome to pay at the price level specified by the store. The price of organic products is an important factor in the loyalty of the organic store in Phutthamonthon. Nakhon Pathom As a result, customers continue to purchase organic products, although others have suggested switching to cheaper products. And other organic food choices.

Promoting effective marketing and customer education creates a positive image. Trust Lead to guide Tell Or use the service regularly. So organic products store in Phutthamonthon. Nakhon Pathom Should organize activities to educate. The staff will provide advice such as introductory activities or product demonstrations. In order to have a better understanding of the product. And can recommend the product to the customer correctly. As well as operators, the store must evaluate employees in terms of service and personality. To follow the spirit of the store. And motivation to work. By giving awards or compliments. To create a good feeling for the sales staff.

Organic Farm Shop in Phutthamonthon District Nakhon Pathom should advise the process of consuming or using the product. Because customers want to take special care and advice. Especially if customers do not know the benefits of the product clearly. So the systematic plan of action. It helps to operate efficiently. Organic store has many steps. Especially the service process, in which the information age can spread rapidly. The customer's voice influences the survival of the business. If the store offers instructions on how to use the product and provide information about the product as well. It creates a great impression on our customers.

Most working-age customers buy organic products in supermarkets. Organic product shop in Phutthamonthon District Nakhon Pathom. There should be shopping facilities such as carts, baskets, etc., because of the convenience and speed of

purchasing products and services. Customers pay more. By the convenience of the service. Affect the feeling of being worth the service. And bring to the need to buy more and more.

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## Increasing the Packaging Efficiency for Transport by Lean Concepts: A Case Study of the Packaging for Transport Fighting Fish

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**Abstract:** This paper proposes the method to increase the packaging efficiency for transportation using lean concepts: It focuses on the case study of the packaging of transport Fighting fish. Problems of packaging for transportation are not strong and do not meet the value of transport. This research aims: 1. to study the process and effect of packaging for transporting of fighting fish and 2. to study the modification of packaging to transport fighting fish effectively. The research consists of studying the effects of paper box packaging to transport, collecting data, analyzing of the cause of the problem by adopting Lean concepts to apply with the eight types of waste technique to solve the problem by changing the packaging. The study indicated that changing the packaging from paper box to the foam packaging is helpful for transport. The foam packaging minimizes the damage of fighting fish 100 percent as this can protect the whole product kept in the transportation without affecting to packaging for transport. It also helps to increase the area of the enclosure to put more products and to decrease the time for organizing the products; as a result, it increases the transport efficiency.

*Keywords:* Packaging, Lean concept, Foam packaging, Fighting fish

### INTRODUCTION

The Fighting fish is a native fish of Thailand. Nowadays, fighting fish is widely popular among foreigners in Europe, Australia and Asia because of their beautiful color, easy feeding and tactful fighting behavior. This resulted in the widespread export of these fish. Many Thai entrepreneurs are interested in exporting this kind of fish.

The key factor of transportation is the durability of the package for transporting fish because this kind of fish is fierce. If fish are put and placed close together, each fish tries to fight with other fish in the same box. The bag containing the fish is absent which causes the crate to break. This will have an adverse effect on transportation and the survival rate of fish delivers to customers.

Many companies use paper box packaging. It will collapse when hit by water and moisture. It effected on fish survival rate when it arrived at destination. This will lead to the study of the impact of packaging on paper transport and apply the 7 wastes technique to solve problems by changing the packaging for transportation.

### RESEARCH OBJECTIVE

1. To study the process and effect of packaging for transporting of fighting fish.
2. To study the modification of packaging to transport fighting fish effectively.

### RESEARCH FRAMEWORK

Research framework of this research is shown in figure 1.

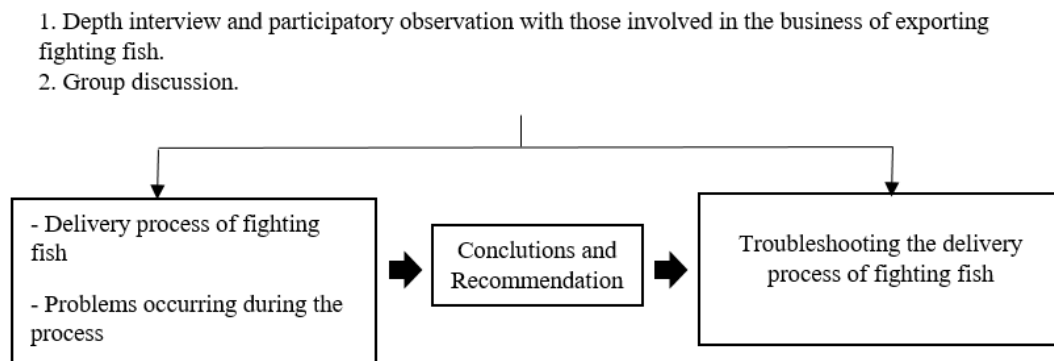


Figure 1: Research framework

### LITERATURE REVIEW

Nipon Boukeaw, 2004; "Lean Manufacturing Systems" is a production system that focuses on the flow of work. By eliminating the waste of the work and add value to the product continuously to the customer satisfaction.

Viroj Lakkana-Adisorn, 2009; Lean is a concept that can be produced consistently with reliable standards and no wastes happen. This is consistent with the 3M concept of the Toyota Production System consists of: 1. Muda is one of the wastes, 2. Mura is a variation, 3. Muri is a state of overpower.

Viroj Lakkana-Adisorn, 2009; describes that the Toyota Production System (TPS) is a prototype of a lean manufacturing system. There are 7 wastes consist of: 1. Over production, 2. Waiting time or idle time, 3. Unnecessary movement and transportation, 4. Unnecessary stock, 5. Defective production, 6. Inefficient process and 7. Unnecessary motion.

Georage (2002, p.36) describes that the results of lean manufacturing operations consist of: 1. Inventory decreased, 2. Production or efficiency increased 5-50%, 3. Lead time decreased 80 - 90% and 4. Purchase price decreased 20-60%

Thai Insufoam Industry Co.,ltd. (2018) Foam properties; 1. Light weight but able to bear weight, 2. Low thermal conductivity, It is a good insulation, 3. The passage of the sound, 4. Prevent water, 5. Can be cut or formed easily, 6. Long life and 7. Flexible and Good shock resistance.

Prithipong Phothiwarapan (2005) conducted a study on the application of lean manufacturing in a mixed industry (Continuous-Range). Case study of the steel industry. The study began with the use of educational machines, starting with lean production tools help to distinguish the value of the production process. The results of the study found that, by eliminating the loss. In the production process already. The production cycle time from 16.24 days to 8.56 days was 47.30% and the process inventory was reduced from 96.35 tons per day to 10.62 tons per day, equivalent to 88.98%

Adisorn Sangchai (2012) conducted a study on the improvement of the quality of the weighing machine production process. Case Study Steel Millers Co., Ltd. The study began with the use of checklists. To prioritize each problem with the Pareto chart and use the fishbone map tool to analyze the cause of the problem. According to the study, three main wastes are lost from production, waste, transport and transportation. The results of the study found that. The defect from the welding process was reduced by 100%. The defect from the assembly was reduced by 33.33%. The defect from the folding process was reduced by 50%. The defect from the process of production was reduced by 75%. 100% workpiece movement and 4.82% reduction in total cycle time.

Paitoon Pakarapung (2012) conducted a study on the optimization of the production process with lean techniques. Case study of brick production process or block concrete. The study found that. In the production process, the extrusion process is the bottleneck in production. Lack of production skills cannot increase productivity. The result of this study is to use the first ingredient ratio. By smoothing and educating employees. Have skill with lean techniques. It was found that the efficiency in the process increased. The volume of products increased from 96.5% to 99.49%, increased by 2.99%, and brick production increased from 19,536 to 22,885 pieces or 17.14%

Banyen Maneeoyod and Chairit tongrod (2015) study to reduce waiting period of service for OPD department of Yanhee Hospital, study ways to reduce the duration of the service to be provided by the theory of Lean used as a guide and satisfaction to user of (OPD) Yanhee Hospital to increase opportunities for competition. The tools used in this study is a questionnaire by the research group is user of (OPD) Yanhee Hospital who satisfied after inquiry by the theories lean in to shorten the waiting time for 400 by the formula of Taro Yamane. The results of applying the guidelines to reduce the waiting period by a speculative lean can shorten the waiting time of up to 9 minutes per one case the service. After the satisfaction of the service, there are quite satisfied overall, and thus can provide a service to a greater number in the same period. Most are female, the highest education is bachelor's degree, most are aged 20-40 years have the highest number of relationships with patients / clients are patient, for the average revenue per month. 25001- 35000 baht has the largest number. Most does not come to Yanhee hospital for the first time. The service has been very satisfied, including patient registration, medical facilities. The pharmaceutical and financial satisfaction is most

## RESEARCH METHODOLOGY

The research consists of 3 parts: 1. Data collection, 2. Preparation of data collection tools and 3. Data analysis.

1. Data collection is 3 types of data collection:

1.1 Depth interviews. Use open-ended questions alongside the discussion. Interviewees have a friendly feeling with the interviewer. The information used in the interview is about how to proceed, packing fish into paper box, transportation problems, obstacles and suggestions.

1.2. Participatory observation is the observation in the real environment.

1.3 Group discussion is similar to interview but it is a group discussion with the members of the group by use open-ended questions. Members of group have commented on the issue of the question. The questions will focus on the problems or obstacles in working with paper packaging.

2. Preparation of tools used to record data. The tools used in research such as pens, notes, cell phones, camera and portable computer.

3. Analysis of data can be divided into two parts.

3.1 Study on the process and impact of packaging for transportation the fighting fish by paper packaging. Data were collected from interviews and group discussions with those who were it involves packing fish into paper packaging and transport staff. After getting the data, it will be used to improve the packaging. The paper packaging used is a size of paper crate used to carry the fighting fish in the transportation is 31 cm long, 36 cm width, and 26 cm height as shown in Figure 2.



Figure 2: The paper packaging

Study on packaging process for fish transport from the preparation of fish into the bag until packing the fish in the paper packaging. Details are as follows.

1. Use a 4x6 inch bag to pack one third of the bag.
2. Put 1 fish into 1 bag and carry oxygen up to 60% -70% of bag. Not hard or tense tightly wrap the bag and wipe the bag to dry.
3. Put the bag of fish in the paper packaging as shown in Figure 3.



Figure 3: Putting fish in a paper packaging.

3.2 Study how to change the packaging to transport fighting fish to be effective. Take the data above to analyze by the concept of lean. It will use 7 wastes techniques to analyze. The wastes arising from the use of this crate transport packaging. See Table 1.

Table 1: 7 wastes from the use of paper packaging

Type of waste	Description	Sample
Defect	Efforts caused by rework, scrap, and incorrect information.	Paper packages are not designed to contain water. This can cause damage when the fish bag leak.
Overproduction	Production that is more than needed or before it is needed.	Putting fish in a bag is too fast and too much can cause bags to leak and oxygen in the bag is too little.
Transportation	Unnecessary movements of products and materials.	Each box contains a lot of fighting fish. This may cause damage during transit.
Waiting	Wasted time waiting for the next step in a process.	Packing a lot of fish into paper crates. It takes a lot of time.
Inventory	Excess products and materials not being processed.	There are lots of inventory such as crates, paper bags, etc.
Motion	Unnecessary movements by people (e.g., walking).	Employees have to spend time sorting the bag, put the fish into the boxes as much as possible.
Over Processing	More work or higher quality than is required by the customer.	Putting a lot of fighting fish in a crate and not making a standard makes the carton and fighting fish damaged.

### RESEARCH RESULT

Lean concept is used to analyze the problem using 7 wastes technique to analyze the waste arising from the use of packaging to transport paper crates. The results can be divided into two parts.

*Part 1: To study the process and effect of packaging for transporting of fighting fish.*

The analyzing of waste using the Lean concept, let's know that the packaging is the paper boxes used is square. The cardboard is lightweight, but when the fish is put in the box, it turns out that the paper box is not resistant to water that may leak from the bag. There are many fish in the box. Each box contains about 40 - 50 packs of fish. Then gag bag and box with clear plastic wrap box. When the truck arrives, staffs will put the paper crate on the package and put it on the car. This process can cause paper crates to become damaged



Figure 4: Arrange fighting fish boxes in the truck

While carrying paper boxes, some boxes have been damaged caused by paper packaging due to shipping, such as paper boxes, has been displaced due to the need to rearrange latches, resulting in partial paper when exposed to water that may leak. The paper will be damp and loose. This results in a crate of paper.

Part 2: To study the modification of packaging to transport fighting fish effectively.

When it comes to the waste that comes from using paper box, Researchers are trying to solve the problem by using a foam boxes to pack fish for transportation. The following solutions have been adopted.



Figure 5: Foam boxes size

Figure 5 is a sample of a foam box used for fighting fish. Researchers use a foam box size 375x255x217 mm. because the foam box has the property of stretching; keeping the temperature, resistant to water and moisture leakage and the size can also be arranged with the transport vehicle perfectly. And also provides equipments to optimize the foam box, such as future board size 65x49 cm, label and the bag size 4x12 inches

The researcher developed the packaging by cut the future board into sections. There are 16 channels or more. See figure 6. The size of the fish bag and the future board can be changed as appropriate.

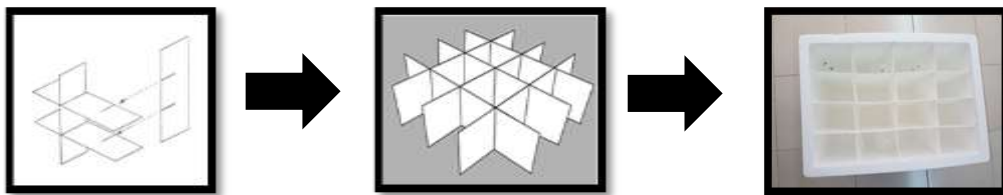


Figure 6: Package assembly process

The fish will be packed in the bag as follows.

- Use 4x12 inch of bag and fill water about one third of the bag.
- Take 1 fish per bag and fill 60% -70% of oxygen. Not hard or tense tightly wrap the bag and wipe the bag to dry.



Figure 7: The process of packing fighting fish to foam boxes

- Take the bag to cover the other two layers, tie the bag and then use tape sealing the plastic bag.
- Each bag should be clearly labeled, numbered and affixed to each bag.
- Put a bag of fish in the foam boxes 16 bags per 1 boxes.
- Close the boxes cover and stick the shipping mark.



Figure 8: The arrangement foam boxes on the truck.

The transport process is when the drivers arrived. Drivers load foam boxes by placing them in a lined truck until the amount of preparation. The driver will drive out and bring fish to the destination.

Table 2: Summary table of advantages and disadvantages of paper and foam boxes.

	Advantages	Disadvantages
<b>Paper Boxes</b>	<ol style="list-style-type: none"> <li>1. Cheapest compared to foam boxes.</li> <li>2. There are empty back space cabins.</li> </ol>	<ol style="list-style-type: none"> <li>1. Free space to ship</li> <li>2. There is a waste of paper boxes caused by delivery.</li> <li>3. Stacking and storage is difficult.</li> <li>4. The damage in the pull out in the crate because the paper has moisture.</li> <li>5. Damage while shipping cause by water, moisture and overlap.</li> <li>6. Broken fish bag or leak from the shock.</li> </ol>
<b>Foam Boxes</b>	<ol style="list-style-type: none"> <li>1. Resistant to water and transport conditions.</li> <li>2. Full use of space</li> <li>3. Less time to sort in the boxes.</li> <li>4. Can be reused several times.</li> <li>5. Reduce the damage of the fish bag.</li> </ol>	<ol style="list-style-type: none"> <li>1. Price is higher than paper box.</li> <li>2. Production process is more difficult than paper box.</li> </ol>

The foam box is used for transportation, which can reduce the damage of the fish bag 100% because the foam box has to be flexible, Keep the temperature. Optimization of foam box by making a honeycomb box helps keep the bag from hitting and protecting fighting fish from their predatory habits. Importantly, the packaging can be reused several times, resulting in more efficient transportation of fish and cost reduction.

## DISCUSSION

The results of the study can be divided into 2 parts as follows.

1. Study on the movement and impact of packaging for transporting crate for fighting fish. The problem of packaging for transportation, paper box used to transport the fighting fish was aware of the problems caused by water moisture, overlap of packaging and stuffing the fish into the crate. The concept of packaging development has been applied in the solution to optimize the packaging.

2. Study of modifications packaging for fighting effectively. The concept of Lean by using 7 wastes technique to analyze and solve the problem of packaging to reduce the damage to the packaging and the cracking of the bag. The result has led to the development of transport packaging. The foam box is used as a new transport packaging for use in fish packaging. The result after the development of the packaging is to avoid wastage and damage from shipping. It can also be used several times. It is more efficient to transport..

## CONCLUSION AND RECOMMENDATIONS

This research focuses on the optimization of transport packaging. This concept is based on the problem of packaging for transport. Paper box are damaged by shocks and overlapping causes the bag to break and leak. This is a major cause of fighting fish death after transportation. This research is divided into two parts.

1. Summary of the study on the movement and impact of packaging for fighting fish transport in paper boxes for fighting fish. Let us know that in the process of packaging paper boxes used in transportation. The disadvantage is that the crate packaging is

not resistant to water overlap, humidity and packing of fish into the paper box. As a result, Paper box damaged both the paper box and the fish bag, resulting in cracking and leakage.

2. A study on the modification of packaging for the transportation of fish to be effective. The Lean concepts used 7 wastes techniques to analyze to find the waste that comes from the process of packaging the paper box. As a result, we can conclude that the packaging needs to be transformed into paper transport into other types of containers. In this research, a foam box is placed inside the box for inserting the fish instead of paper packaging. This new packaging is flexible, resistant to humidity, water and pressure to protect the entire bag. Reduce damage to the fighting fish is 100%, and also beneficial. This will increase the area of the cabinet to put more goods. Include time to organize goods. As a result, the efficiency of transportation is increasing. Customer satisfaction is another.

#### ACKNOWLEDGEMENTS

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## The Influence of Product Quality Management, and Services of Discount Store to Customer Satisfaction in Bangkok and Metropolitan Area

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**Abstract:** In this thesis, the researcher investigates the influence of products quality management and services of discount store consists of products quality management, services of discount store to the customer satisfaction in Bangkok and metropolitan area. Data were collected from 400 customers in Bangkok and metropolitan area overall 6 provinces. The data collected were analyzed using a computer software through statistical applications for multiple regression analysis. The finding showed that the influence of products quality management of discount store affected positively to the customers satisfaction in Bangkok and metropolitan area but the influence of service quality management didn't affected positively to the customers satisfaction at the statistically significant level of 0.05.

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*Keywords:* Discount Store / Customers / Products Quality Management And Services

### INTRODUCTION

In the past, Sukhothai was the capital of Sukhothai, which was inscribed on the stone inscription of the King Ramkhamhaeng, as the proverb says, "Who loves elephant trade, who trade horses?" The use of exchange (Barter System) to use the currency. Monetary system from the hawker or stall exchange of goods has changed into a commercial building called "Shabu Shabu", which means grocery store, is the word of Chaozhou and has developed into Chinese. Department store Supermarket Convenience Store and general retailers. The sight is common in Bangkok. And in the provinces. The change of lifestyle of Thai people, focusing on convenience, speed and modernization. The size and style of the family has changed, and the consumption has shifted to the convenience and comfort of the home, with the goods needed, the lifestyle, the hustle and bustle, the time to travel and to do it. Daily consumption urban life and traffic congestion may make Thai people increasingly use convenience stores or retailers.

At present, the general retail business environment in Thailand is expanding with increasing population. Shop management system is the result of orders from large retailers that facilitate the convenience of customers in terms of products and services. Especially from competition, compression and compression to adapt to differentiating from competitors, large retailers still have to compete to scramble customers with goods and services to meet their needs. The change in consumer behaviour is in line with the policy of Thailand 4.0. Innovation, science, technology and research and development. Local people know how to change. Have protection Ability to manage Self and good quality of life and perception of value creation in goods and services. Selection of products that meet the needs of consumers. Sorting Products Bringing modern technology into use in large retail outlets. The quality control of these products is both strengths, weaknesses, opportunities, and obstacles, and ways to improve quality management, quality management, and quality management. Stability gives operators the ability to manage large retailers. The quality of life, family and society with good economy. The Department of Business Development has also improved the preparation of Thai and foreign retailers, wholesalers and retailers.

Logistics in the understanding of the investment context in Thailand and abroad. The Department of Business Development continues to develop by providing training, knowledge, marketing and business negotiation in various regions. To understand the channels to expand into foreign markets, there is continuous coordination of foreign businessmen. And businessmen to buy business. Or joint investment, such as joint investment business. And to build cooperation to promote. Facilitate and build confidence. The business of the Department of Business Development of Thailand is registered business convenience, speed, transparency, affecting the business expansion of Thai entrepreneurs. Foreign Investors Amendments to the Civil and Commercial Code on Partnerships Reduce the burden of meeting calls through newspapers, reducing the concerns of Thai private sector and foreign investors. About the attendance. The Board of Directors Amendment of the Public Limited Companies Act, the Ministerial Regulations prescribing rules and procedures for the repurchase of shares. The sale of the repurchased shares and the elimination of the repurchased shares of the public limited company to clarify and streamline the public company's share repurchase. The computer system is used to store and verify corporate documents to cover all areas in every province nationwide. The researcher is interested in researching the influence of quality management of goods and services of large retailers on customer satisfaction in Bangkok and its vicinity..

### RESEARCH OBJECTIVE

1. To study the product quality management of large retailers. Product management influence of Customer Satisfaction in Bangkok Metropolitan Area
2. To study the service quality management of large retailers. Service management influence of Customer Satisfaction in Bangkok Metropolitan Area.

### SCOPE OF RESEARCH

Research on the influence of quality management on goods and services of large retailers. The satisfaction of customer satisfaction in Bangkok and its vicinity. Research scope:

*Content scope*

Research influences the quality management of products and services of large retailers. The satisfaction of customer satisfaction in Bangkok and its vicinity.

1. Independent variables are the management of the quality of goods and services of large retailers.
2. The dependent variable is customer satisfaction.

*Area Scope*

The area in this research is the large retail customers in the area. Bangkok and vicinity Big retail customers in Bangkok and its vicinities in 6 provinces. The sample was chosen to represent the population. By sampling without probability. Nonprobability sampling was used to select random samples of 400 samples. The data analysis technique used in this research was statistical program for multiple regression analysis. Data and analysis of research results in July 2018 - September 2019

**HYPOTHESES**

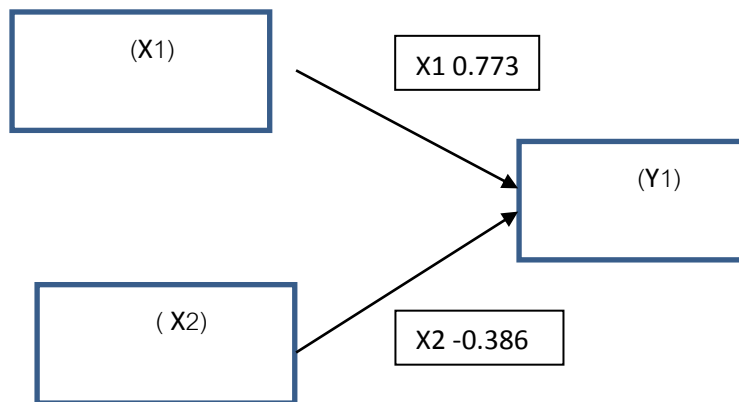
1. To study the product quality management of large retailers positively influence on customer satisfaction.
2. To study the service quality management of large retailers positively influence on customer satisfaction.

**METHODOLOGY**

Type of research Quantitative research on survey research and Correlation Research. Random sampling by random sampling. 400 samples. The statistics used in the analysis were descriptive statistics. The statistics used were frequency, mean, standard deviation, and percentage. Inferential Statistics In Pearson's Correlation, this research uses a statistical program for multiple regression analysis. Cronbach's Alpha assay is performed by sampling without probability. Nonprobability sampling was used to select random samples of 400 samples using questionnaires. (Questionnaire) is a tool to collect data into 4 parts. Reliability of the tool reliability. Cronbach's Alpha Coefficient. Storage location It is a large retail store in Bangkok and its vicinity.

*Date and place of data collection were a large retail store in Bangkok and its vicinity.*

Research Framework, Research, Influence, Quality Management, Products and Services of Large Retailers. Customer Satisfaction in Bangkok Metropolitan Area The independent variables are product quality management (X1) and service quality management (X2) of large retailers. The dependent variable is customer satisfaction (Y1).



**Statistics used in data analysis.**

Descriptive Statistics used to describe the characteristics of the data collected. Statistics used are frequency, mean, standard deviation, and percentage. Inferential Statistics in Pearson's Correlation, this research uses statistical packages to analyze multiple regression analysis.

## RESULTS

*Part 1 Basic data analysis respondents are gender, age, education level, housing income, purchasing frequency and cost of purchase as shown in Table 1*

<b>Topic</b>	<b>Amount</b>	<b>Percentage</b>
<b>Gender</b>		
Male	230	57.50
Female	170	42.50
<b>Age</b>		
Under 20 years	60	15.00
20-30 years	100	25.00
31-40 years	120	30.00
41-50 years	20	5.00
51-60 years	50	12.50
Over 60 years	50	12.50
<b>Education</b>		
Undergraduate	80	20.50
Graduate	210	52.50
Master Degree	110	27.50
Over Master Degree	-	-
<b>Monthly Income</b>		
10,000 baht or below	90	22.50
10,001-20,000 baht	80	20.00
20,001- 30,000 baht	60	15.00
30,001- 40,000 baht	90	22.50
Over 40,000 baht	80	20.00
<b>Location</b>		
Bangkok	80	20.00
Nakhon Pathom	70	17.50
Nonthaburi	60	15.00
Pathum Thani	70	17.50
Samut Prakarn	40	10.00
Samut Sakorn	80	20.00
<b>Purchasing Frequency</b>		
1 week – 1 month	110	27.50
1 month- 2 months	200	50.00
2 months – 3 months	80	20.00
Over than 3 months	10	2.50
<b>Cost of Purchasing per once</b>		
1-1,000 baht	80	20.00
1,001-2,000 baht	180	45.00
2,001-4,000 baht	120	30.00
Over than 4,001 baht	20	5.50

*Part 2 Analysis of Influence of Product Quality and Service Management of Large Retailers on Customer Satisfaction in Bangkok Metropolitan Area Average and standard deviation.*

**Table 2**

<b>Product quality management</b>	<b>M</b>	<b>SD</b>	<b>Rank</b>
1. Performance Product quality can be sorted by style.	4.50	.50	4
2. Key Features The quality of the product is different.	4.55	.54	1
3. The trust is based on the characteristics that do not rot - easy.	4.17	.58	8
4. Consistency Products are standardized according to specifications.	4.27	.63	7
5. Durability It is used throughout the period of use.	4.42	.50	5
6. Ability to have after sales service. Warranty	4.55	.49	2
7. Aesthetics, Product quality Good design, sense and smell.	4.35	.57	6
8. Value perceived Product quality Famous products	4.55	.49	3

**Table 3**

<b>Service quality management</b>	<b>M</b>	<b>SD</b>	<b>Rank</b>
Tangibility	4.40	.53	10
1. Modern Equipment			
2. Have the facilities.	4.40	.58	11
3. Beautiful dressing staff.	4.50	.50	7
4. There are objects in the sales process that are beautiful.	4.55	.54	3
Reliability	4.20	.51	21
5. Provide service according to the contract.			
6. Provided advice when the customer has problems.	4.27	.63	17
7. The service was first correct.	4.45	.59	9
8. Service at the right time.	4.55	.49	4
9. Adhere to no mistakes.	4.32	.50	16
Responsiveness	4.25	.62	18
10. Inform the customer			
11. Provides timely service to customers.	4.17	.62	22
12. Welcome to customer support.	4.55	.49	5
13 Respond to customer requests.	4.40	.53	12
Assurance	4.40	.53	13
14. Make customers believe			
15. Feel safe in using the service.	4.50	.54	6
16. Honest to Customer	4.55	.54	2
17. Knowledge enough.	4.22	.61	20
Empathy			
18 Pay attention to individual customers.	4.25	.66	19
19. Open customer service hours.	4.57	.49	1
20. Employees pay close attention to their customers.	4.40	.53	14
21. Caring customer with heart	4.40	.58	15
22. Understand the special needs of customers.	4.47	.54	8

**Table 4**

<b>Customer Satisfaction</b>	<b>M</b>	<b>SD</b>	<b>Rank</b>
Satisfaction	4.40	.66	1
1. Quality of service Reliability, responsiveness, warranty and attention.			
2. Price aspect determines the quality of service.	4.27	.67	3
3. Environment, economic conditions, competition in the market	4.27	.63	4
4. The attitude, emotions and understanding of the service.	4.27	.63	5
5. Product quality included. Customers need good quality products, coupled with good service.	4.55	.52	2

Part 3 Analysis of the relationship between quality management of goods and services of large retailers. The satisfaction of customer satisfaction in Bangkok metropolitan area and hypothesis testing.

The results of the correlation coefficient between influence on satisfaction (N = 400)

		correlations		
		ZSAT	ZX1	ZX2
Pearson Correlation	ZSAT			
	ZX1	.492	1.000	
Correlation	ZX2		.731	1.000

The analysis of the correlation coefficient between variables of influence on customer satisfaction was found. The influence of the quality management of large retailers on customer satisfaction in Bangkok and its vicinity was positively correlated with satisfaction. The coefficient of correlation (r) was .492, having a high level of significance at the 0.05 level.

The influence of the service quality management of large retailers on customer satisfaction in Bangkok metropolitan areas was positively correlated with satisfaction. The correlation coefficient (r) of .731 was significantly correlated at 0.05 level.

Influence coefficient of variables. (N = 400)

Influence of variables	B	Std	Beta	t	sig.
1. Product Quality Management of Large Retailer (X1)	.972	.077	.773	12.73	.000
2. Service Quality Management of Large Retailer (X2)	-.547	.087	-.386	-6.317	.000

R=0.558, Adjusted R<sup>2</sup>=0.308, SEE=0.23728, F=89.598, Sig=0.000

\* Statistically significant at the 0.05 level

From the table, it was found that the influence of large retailers' quality management and the influence of quality management on large retailers. The coefficient of correlation (R) is 0.558 and can explain the variation of the influence that affects customer satisfaction in Bangkok and its vicinity significantly at 0.05 ( $t \leq 1.96$ ) at 30.8 percent ( $R^2=0.308$ ), which can be written as follows:

Predictability in raw score form

$$SAT = a + 0.972 (X1) + -0.574 (X2)$$

(12.673)            (-6.317)

Forecasting in Standard Format

$$SAT = 0.773 (X1) + -0.386 (X2)$$

(12.673)            (-6.317)

The predictive equation of the influence of the quality management of large retailers and the influence of the service quality management of large retailers affect customer satisfaction in Bangkok and its vicinity.

The predictors of influential variables in the quality management of large retailers and the influence of high quality retailers' service quality affect customer satisfaction in Bangkok and its vicinity. It was found that the influence of the quality management of large retailers resulted in the satisfaction of customers in Bangkok metropolitan area rather than the influence of the service quality management of large retailers, which resulted in customer satisfaction in Bangkok metropolitan area.

### DISCUSSION

The purpose is to study the product quality management of large retailers' influence of customer satisfaction in Bangkok metropolitan area. It was found that the study of product quality management of large retailers. Product management. Influence of positive effect on customer satisfaction in Bangkok metropolitan area.

Deeprasert Jirawan, et al. (2008) found that the samples were the most satisfied in terms of product distribution. And the quality of the product is standard and consistent with Sripattanakul Arisa (2016) studied the factors affecting the satisfaction of purchasing the products of Taoom Lotus consumers in Bangkok and its vicinity. Products are of high quality and fresh, clean, modern, reliable and reliable. Affecting Consumer Satisfaction in Bangkok Metropolitan Area Consistent with Donkwa Kwankamol and Ternnadee Sunitiya (2005). Studying the potential and trend of retail management in the northeastern region, the factors influencing consumers' choice in retail areas. There are no modern retailers. The quality of the goods, the price tag, the location, the classification of the goods. The two groups are not different. Except for good service factors and different standards. It has no effect and does not give importance to the purchase decision of areas with modern retail stores. In accordance with research by Deekrajang Napat and Sairasert Wannai (2015) the study of consumer attitudes in Muang Samut Sakhon on traditional retail stores and modern retail stores revealed that a comparison of traditional retailers and modern retailers from consumers found that modern retailer factors were higher than quality products. Reasonable price Distribution Product or service presentation Consistent with Tonthaisong Tanatip (2014) Study on loyalty factors affecting Tesco Lotus Mall. It was found that the quality of products affected the loyalty to Tesco Lotus Department Store, but the trust factor did not affect the Tesco Lotus Mall. Of users in Bangkok and its vicinity Consistent with Limchaikul Thitikan (2014) Factors Affecting Decision to Use Retailer Services Hypermarket The study found that the product price and value. There are a variety of products. Marketing, service, and personal aspects were not the factors influencing the choice of Hypermarket.

The purpose is to study the service quality management of large retailers in Bangkok metropolitan area and found that quality management service of large retailers The management style of service has no influence on customer satisfaction in Bangkok and its vicinities.

Consistent with Donkwa Kwankamol and Ternnadee Sunitiya (2005) Studying the potential and trend of retail management in the northeastern region, the factors influencing consumers' choice in retail areas. There are no modern retailers. The quality of the goods, the price tag, the location, the classification of the goods. The two groups are not different. Except for good

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Consistent with Limchaikul Thitikan (2014) Factors Affecting Decision to Use Retailer Services Hypermarket The study found that the product price and value. There are a variety of products. Marketing, service, and personal aspects were not the factors influencing the choice of Hypermarket.

Consistent with Suppara Charoenpoom (2011) Factors Influencing Future Shopping Intention of Traditional Grocery Stores in Dusit District, Bangkok it is found that the consumers have moderate level of perception on location, service quality, risk, shopping enjoyment, value for money, shopping satisfaction and future shopping intention. The factor including value for money, shopping enjoyment and the risk strongly influence on shopping satisfaction and the shopping satisfaction influences on the future shopping intention. This research also indicates that the factor on shopping enjoyment mostly stems from the consumers organize activities together at traditional grocery stores.

Arthur Meidan and Anne Tomes (1991) studied "Cash and Carry Customers' Shopping Habits and Supplier Choice Criteria." The study found that the selection factor of Cash & Carry was reasonable and cost effective. Including the importance of clean shops. There are a variety of products to choose from. The problem with Cash & Carry stores is the long queue of goods that are lacking in stock, but the factors that affect the choice of Cash & Carry stores, but it is normal to have restaurants, desserts, and oil pumps. Phone Special care and the size of the store.

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## Product Development of Nata DE Coco FROM Jaggery PALM SUGAR

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**Abstract:** The purposes of this research are 1) to study the standard formula of Nata de Coco from jaggery palm sugar. 2) to study the appropriate ratio of jaggery palm sugar and water in order to develop the standard recipe. 3) to study the quality of product, Nata de Coco made from jaggery palm sugar. 4) to study the consumers' acceptance on Nata de Coco made from jaggery palm sugar. According to the study, it showed that the ratio of jaggery palm sugar and water that gained the most acceptance from the consumers is at 1:1. The physical analysis of Nata de Coco made from jaggery palm sugar showed that it has 1.50 centimeters of thickness, 830 grams of weight, 4.80 pH level and 11 °Brix of sweetness. The chemical analysis of the product showed that 100 grams of the example of Nata de Coco made from jaggery palm sugar gives 133 kilocalories, 32.80 percent of carbohydrate, less than <1.25 percent of protein, 0.21 percent of fat, 67.00 percent of moisture content and 0.69 percent of fiber. After the study of the shelf life in glass bottles, the product can be stored up to 22 days at a temperature of  $8 \pm 2$  °C. Nata de Coco made from jaggery palm sugar also had *Clostridium perfringens* <10 CFU / g total plate count <10 CFU / g Yeast and Mold < 10 CFU / g. *Salmonella* spp., *Staphylococcus aureus* are not found in Nata de Coco. The consumers in this study accepted Nata de Coco made from developed jaggery palm sugar at 100 percent.

*Keywords:* Nata De Coco, Jaggery Palm Sugar.

### INTRODUCTION

As the science and technology today have greatly advanced, there were quite a number of innovation happened in the last decade, including in production. Also in food processing industry, useful microorganisms has been used in various consumer products such as vinegar, alcohol beverages and UHT yoghurt, including Nata de Coco, developed coconut jelly in this study. *Acetobacter xylinum* bacteria which was used in this food processing by fermentation establishes white fiber look floating on the surface of a sticky pulp. It couldn't be melted at 100 degrees Celsius of boiling water. This kind of insoluble gelatin-like sheets, Nata de Coco, have been processed into many types of sweet and savory dishes. It was also found that this Nata de Coco benefits to digestive system and helps prevent constipation. This would reduce gastrointestinal problems and excretory system, as well as the prevention of colon cancer and nutrition (Kamolwan, 2007).

Jaggery palm sugar, a great source of *Acetobacter xylinum* bacteria, was substituted for sugar in this reserch. The benefits of this Jaggery palm sugar are to relief a thirsty throat, give energy , help to relax body, awaken the rejuvenating and can be developed to be healthy products for consumers (Prachya, 2002).

From the data above, the researcher saw the capability in developing the Nata de Coco products in order to create new products that has more nutrition and become an alternative for local farmers to add higher economic value to the consumer products and then create jobs that has more income for the farmers in the local area. Moreover, this can be a great alternative of healthy and novelty products for consumers.

Hence, the objectives of this research are to:

- 1) To study the standard formula of Nata de Coco made from jaggery palm sugar.
- 2) To study the appropriate ratio of jaggery palm sugar and water in the product recipe.
- 3) To study the quality of Nata de Coco made from jaggery palm sugar.
- 4) To study the consumer acceptance on Nata de Coco made from jaggery palm sugar

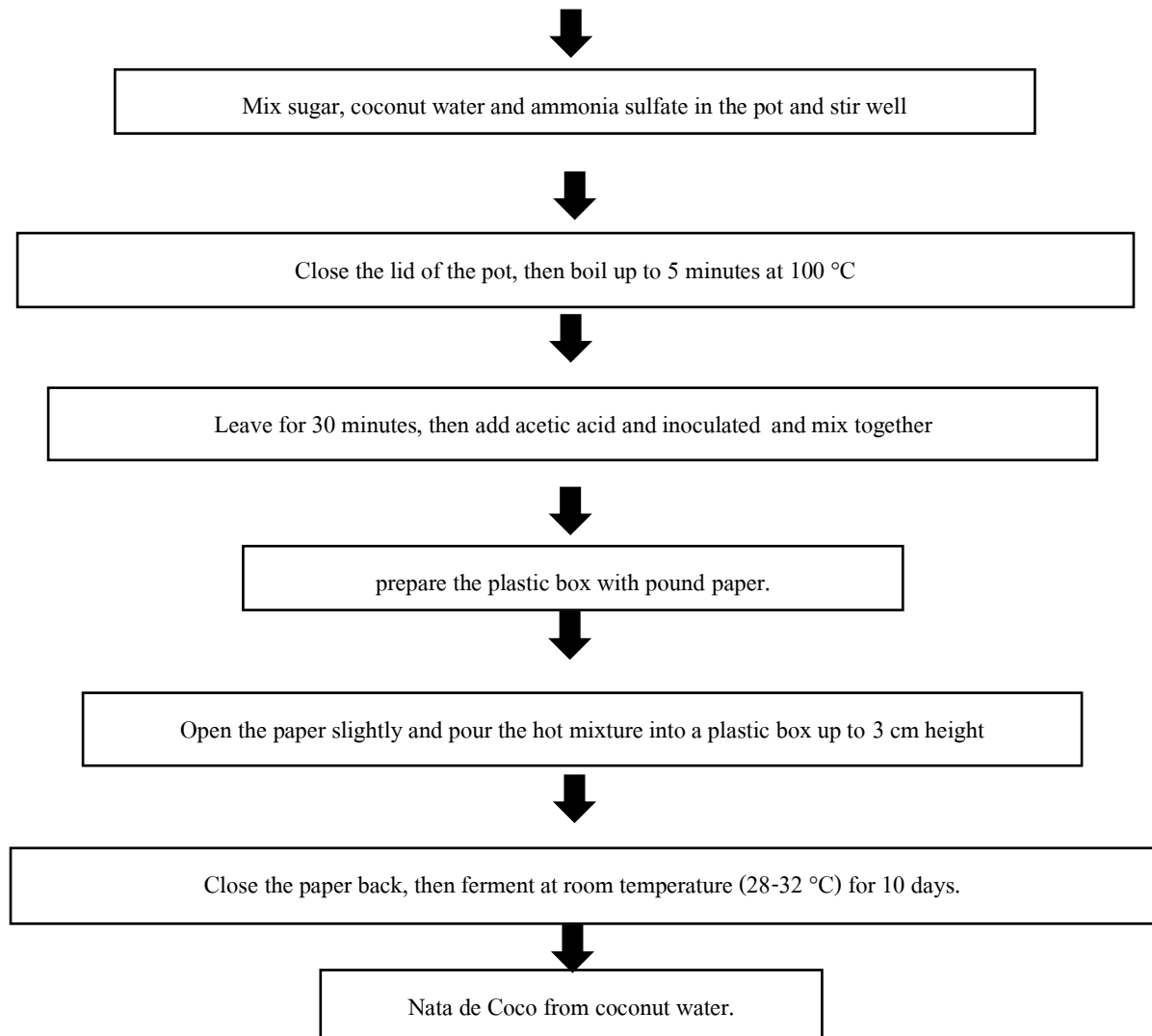
### METHODOLOGY

The study on Nata de Coco's standard recipes made from jaggery palm sugar.

The study on the basic recipe bacterial cellulose coconut water.

The Randomized Complete, Block Design, (RCBD) was adopted in this study (Saichon, 2546). Three basic formulas of Nata de Coco made from coconut water were evaluated on their organoleptic quality and the appearance, color, smell, taste, texture (elasticity) and overall liking by a group of 70 people using the 9-Point Hedonic Scale (Phenkhwun, 2549). Then compare the differences of the average using Duncan's New Multiple Range Test, (DMRT) and analyze results with statistical software.

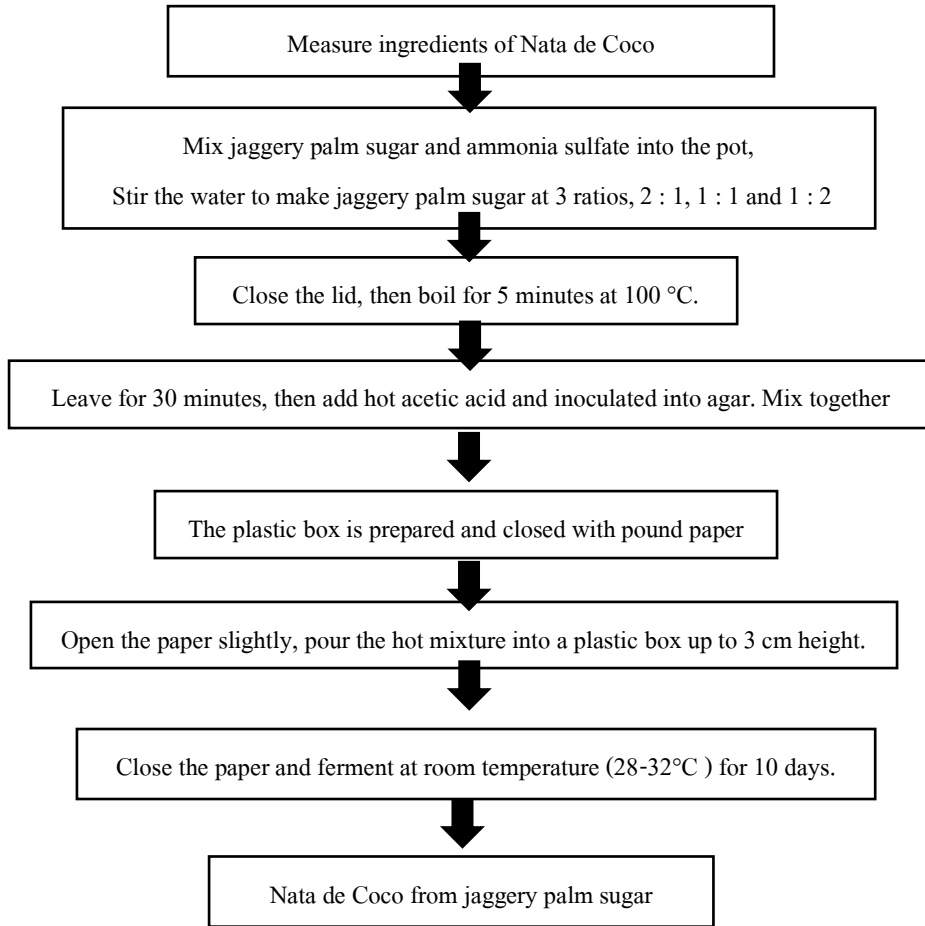




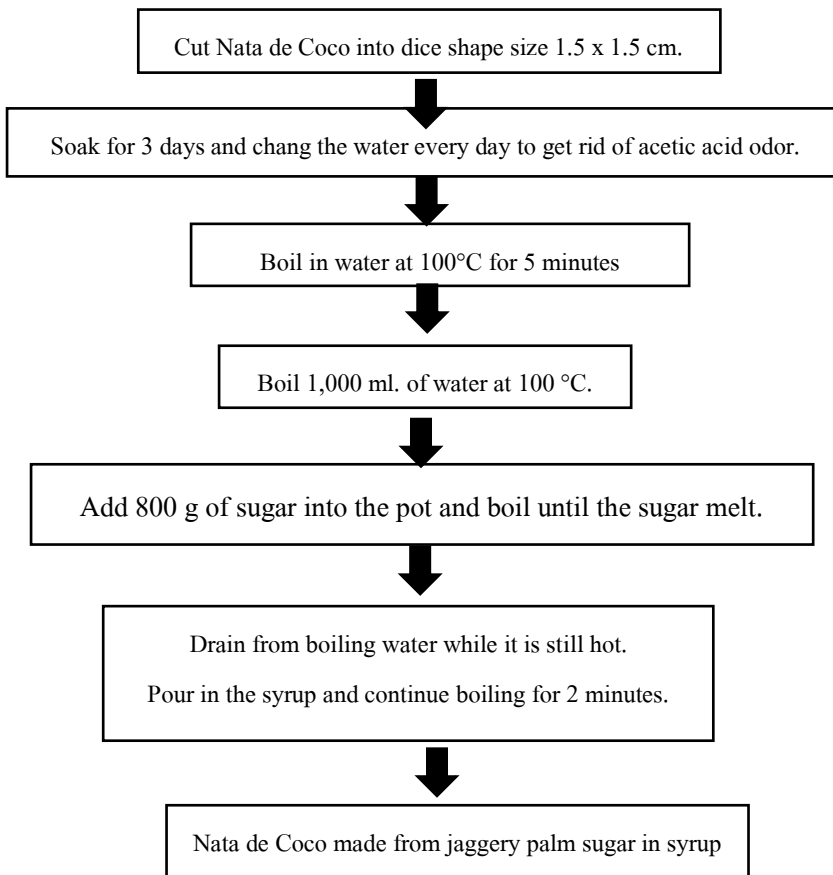
**Chart 1** The process of making the basic recipe Nata de Coco from coconut water.

*1.2 The study on the appropriate ratio of jaggery palm sugar and water for Nata de Coco production.*

The formula which was selected from 1.1 was studied on the amount of jaggery palm sugar and water. In this production of Nata de Coco from jaggery palm sugar, 3 different ratios, 2 : 1, 1 : 1 and 1 : 2 were applied. The experiment used Randomized Complete Block Design, (RCBD) (Saichol, 2003) and assessed the sensory quality, in terms of appearance, color, aroma, taste, texture (elasticity) and overall liking by a sample of 70 people and score using the 9-Point Hedonic Scale (Penkwan, 2006). To compare the difference in the means, Duncan's New Multiple Range Test, (DMRT) was adopted and then analyzed the result with statistical software.



**Chart 2** The ratio of jaggery palm sugar and water in the production of the Nata de coco.



**Chart 3** The production of Nata de Coco from jaggery palm sugar in syrup

**1.3 The Study on the quality of Nata de Coco made from jaggery palm sugar.**

The formula selected from 1.2 was measured its quality as following.

**1.3.1 Determine the physical characteristics of Nata de Coco from jaggery palm sugar.**

- Measured sweetness using refractometer.
- Determination of acid – base using pH meter, which was measured before the addition of concentrate Nata de

Coco

- Thickness measurement using a ruler to measure the thickness of a sheet of Nata de Coco (cm.) after the experiment.

- Weight measurements by using digital scales.

**1.3.2 Determine the chemical characteristics of Nata de Coco made from jaggery palm sugar.**

- The amount of energy (kcal, %): using the method according to the Method of Analysis for Nutrition Labeling (1993), p.106.

- Analysis of the overall carbohydrates (total carbohydrate, %): calculated from 100% minus the quantity of moisture, ash, fat and protein, as the methods of AOAC (2012).

- Analysis of proteins (protein, %): adopting Formal titration method according to AOAC (2012).

- Analysis of lipid (fat, %): using Roesse-Gottlieb method of AOAC (2012).

- Analysis Quantitative of fiber (fiber, %): according to the method of AOAC (2012).

- Analysis of moisture (moisture, %): according to the methods of AOAC (2012)

- Analysis of ash (ash, %): according to the methods of AOAC (2012)

**1.3.3 Determine the microbiological characteristics of Nata de Coco from jaggery palm sugar**

- Analysis of Clostridium perfringens (CFU/g): as a method of BAM (2001).

- Analysis of Salmonella spp. (in 25g): as a method of ISO 6579 (2001).

- Analysis of Staphylococcus aureus (in 0.1g): as a method of BAM (2001).

- Analysis of Total Plate Count (CFU/g): as a method of BAM (2001).

- Analysis of Yeast and Mold (CFU/g): as a method of BAM (2001).

**1.4 Study on consumers' the acceptance of Nata de Coco made from jaggery palm sugar.**

This product of Nata de Coco from jaggery palm sugar was tested and scored by a group of 150 samples by using the 5-point hedonic Scale (1 = the most disliked and 5 = the most liked). This is to study on the sensory evaluation on the appearance, color, aroma, taste, texture (elasticity) and overall liking of the accidental sampling of 150 people (Thanin, 2010)

*The sensory quality evaluation*

The experiment used randomized complete block design (RCBD) (Saichol, 2003) to study on 3 formulas of Nata de Coco from jaggery palm sugar. The sample of 70 people from the Faculty of Home Economics of Technology Rajamangala University of Technology Phra Nakhon tested and scored by using the 9- point hedonic scale (Penkhwan, 2003) in terms of appearance, color, taste, texture and overall liking.

*Statistical data analysis*

The experiment used Randomized Complete Block Design, (RCBD) and compare the difference of the average using Duncan's New Multiple Range Test, (DMRT). Then analyzed with statistical software with the confidence level at 0.05.

**RESULTS AND DISCUSSION**

*1. The study of standard recipes of Nata de Coco made from jaggery palm sugar.*

*Table 1 The average of three basic recipes of Nata de Coco.*

Sensory quality	Average and overall liking		
	Formulations 1	Formulations 2	Formulations 3
Appearance	6.77±1.32 <sup>b</sup>	<b>7.12±1.41<sup>a</sup></b>	6.66±1.42 <sup>b</sup>
Color	6.89±1.39 <sup>b</sup>	<b>7.13±1.42<sup>a</sup></b>	7.04±1.24 <sup>ab</sup>
Smell <sup>ns</sup>	6.07±1.63	5.99±1.81	6.01±1.62
flavor	5.80±1.73 <sup>b</sup>	<b>6.30±1.67<sup>a</sup></b>	5.91±1.99 <sup>ab</sup>
Texture (elasticity) <sup>ns</sup>	6.20±1.95	<b>6.50±1.92</b>	6.30±1.91
Overall <sup>ns</sup>	6.51±1.63	<b>6.68±1.59</b>	6.32±1.85

**Remark:** 1) a and b different alphabet horizontal means that value is the difference statistically significant at the level of 0.05

2) ns means not significantly different at the 0.05 level of statistical

From Table 1 , according to the study of the basic of Nata de Coco, it was found that the formula 2 gained the highest acceptance in its appearance, taste, texture (flexible) and overall liking at 7.12, 7.13, 6.30, 6.50, and 6.68 respectively. Nata de Coco formula 2 were low in physical characteristics as following: viscous texture, white colour, sour smell of acid water, mild vinegar taste. Its elasticity was moderate. After analyzed variance and the difference of all sensory, it was found that the smell, texture (factory) and overall liking have no significant difference in means at 0.05. So the second standard formula was chosen to be studied on an appropriate ratio of jaggery palm sugar and water.

2. Results of the study on the appropriate ratio between water and jaggery palm sugar in the Nata de Coco.

**Table 2** The average of sensory quality studying on three ratios of jaggery palm sugar and water in Nata de Coco from jaggery palm sugar.

Sensory quality	The ratio between the water and jaggery palm sugar Average and overall liking		
	2 : 1	1 : 1	1 : 2
Appearance	7.13±1.48 <sup>b</sup>	7.31±1.29 <sup>ab</sup>	<b>7.41±1.36<sup>a</sup></b>
Color <sup>ns</sup>	7.20±1.22	<b>7.36±1.22</b>	7.33±1.12
Smell <sup>ns</sup>	6.99±1.35	<b>7.07±1.37</b>	6.89±1.32
Flavor <sup>ns</sup>	7.33±1.16	<b>7.36±1.38</b>	7.24±1.43
Texture (flexible) <sup>ns</sup>	<b>7.37±1.25</b>	7.36±1.61	7.17±1.65
overall <sup>ns</sup>	7.39±1.24	<b>7.53±1.28</b>	7.49±1.24

**Remark:** 1) a and b different alphabet horizontal means that value is the difference statistically significant at the level of 0.05  
2) ns means not significantly different at the 0.05 level of statistical.

From Table 2, the results of the study showed that the most suitable ratio between the water and jaggery palm sugar in the Nata de Coco products is at 1:1. It gained the highest acceptance in color, odor, flavor and overall liking at 7.36, 7.07, 7.36 and 7.53 respectively. In terms of variances and statistical differences analysis, there was no significant different at 0.05 in color, odor, taste, texture (elasticity) and overall liking. So the formula 2 was selected as a standard recipe in further development of the quality of Nata de Coco made from jaggery palm sugar.

3. The results of the study on the quality of Nata de Coco made from jaggery palm sugar

*Table 3 Physical quality of Nata de Coco from jaggery palm sugar.*

Formula	Thickness	Weight	Sweetness	pH
	cm.	g.	°Brix	-
2 : 1	1.10	650	14	4.70
1 : 1	<b>1.50</b>	<b>830</b>	<b>11</b>	<b>4.80</b>
1 : 2	1.30	700	8	4.90

From Table 3, the results of the physical quality of products, Nata de Coco from jaggery palm sugar found that the first formula of Nata de Coco from jaggery palm sugar has 1.10 cm of thickness, 650 grams of weight, 14 °Brix of sweetness and 4.70 of pH. As the result, the physical appearance of the examined product was defoliant yellow, odorless, moderately sweet and less elasticity in terms of texture.

For the second formula, it has 1.50 cm of thickness, 830 grams of weigh, 11 °Brix of sweetness and 4.80 of pH, making a physical appearance as following: defoliant yellow, medium sweetness, odorless and moderate elasticity. For the third formula, the thickness was at 1.30 cm, weigh was at 700 grams, sweetness was at 8 °Brix and acidity pH was at 4.90. As a result, the physical appearance of the mucous membrane was pale yellow, odorless, moderately sweet and very flexible in terms of texture. This complied with the study on the optimal condition for Nata Production from Molasses by Anan Boonpan, Sirikhae Pongswat and Chiraphan Khampha (2553) that said bacteria will create molasses, which has thickness at 1.61 cm. and weight at 96.29 grams, at 12°Brix, 5.0 of pH within 12 days. Furthermore, Laochareonsuk and Kaewtaro. (2005) also studied on the optimal condition for nata production sugar palm syrup by *Acetobacter xylinum* TISTR 107 and found that jaggery palm sugar at 1 litre must have sweetness at 15 °Brix and pH at 4.25, and ferment at room temperature to get the Nata sugar palm syrup at 1.15 cm. of thickness within 9 days.

**Table 4** The illustrates on the nutrition value of Nata de Coco from jaggery palm sugar at 100 grams

Chemical Composition	Nata de Coco from jaggery palm sugar
Energy (kilocalories)	133.00
Carbohydrates (grams)	32.80
Protein (grams)	<1.25
Fats (grams)	0.21
Dietary fiber (grams)	0.69
Moisture (grams)	67.00
Ash (grams)	0.00

The study on the nutrition value of the Nata de Coco from jaggery palm sugar at 100 grams (table 4), it showed that it provides 133 kilocalories of energy, 32.8 grams of Carbohydrates, 1.25 grams of protein, < 0.21 grams of Fat, 0.69 grams of dietary fiber, 67.0 grams of moisture and 0 grams of ash. Because Nata de Coco already has sweetness from the welding process of jaggery palm sugar and syrup and its sweetness will be converted into energy. This, as the result, attributed to Nata de Coco made from jaggery palm sugar energy at 133 kilocalories. In terms of fiber, its fiber is Micro-Fibril Cellulose that are delicate and soft than the Dietary Fiber found in fruits and vegetables. Its benefit is to drain poison and minimize problems in the digestive system and excretory system (Somkid, 1988). ]

The ash is 0 grams due to the lack of inorganic substances in Nata de Coco made from jaggery palm sugar. The ash gained the residue from burning. So 12% of Ash means a big meal of 100 grams burnt to ash which weighs only 12 grams. A good food should have the least ash because it is useless. If the value of the ash is higher than normal, it could mean that food might contain other substances, such as sand (Audcharine, 2011).

4. The examination on the microbiological characteristics of Nata de Coco made from jaggery palm sugar

Table 5 Microbiological Characteristics of Nata de Coco made from jaggery palm sugar.

Microbiological	Storage time		Unit
	0 day	22 days	
<i>Clostridium perfringens</i>	<10	<10	(CFU/g)
<i>Salmonella spp.</i>	-	-	(in 25g)
<i>Staphylococcus aureus</i>	-	-	(in 0.1g)
Total Plate Count	<10	<10	(CFU/g)
Yeast and Mold	<10	<10	(CFU/g)

From Table 5 , The study on the shelf life of the Nata de Coco made from jaggery palm sugar at 12 days found that there were *Clostridium perfringens* <10 CFU / g Total Plate Count <10 CFU / g Yeast and Mold <10 CFU / g. But there was no *Salmonella spp.* and *Staphylococcus aureus* found in products.

5. The results on the consumer’s acceptance towards the Nata de Coco made from Jaggery palm sugar

Table 6 The Results of consumer’s acceptance towards the Nata de Coco from Jaggery palm sugar

Sensory quality	Average
Appearance	4.37+ 0.62
Color	4.25+ 0.70
Smell	4.27+ 0.86
Flavor	4.47+ 0.66
Texture	4.53+ 0.60
Overall	4.51+ 0.62

Acceptance of consumer products	Number of Participants	%
Yes	150	100.00
No	0	0.00
Total	150	100.00

From Table 6, the developed product of Nata de Coco made from Jaggery palm sugar gained the consumers’ acceptance on its color, smell, taste, texture and overall liking at 4.37, 4.25, 4.27, 4.47, 4.53 and 4.51 respectively. The physical characteristics of the product is as following: yellow, moderately sweet, sticky, no odor and meduim flexibility. This Nata de Coco from Jaggery palm sugar gained the highest acceptance at 100 percent from 150 people because of its deliciousness, good balance of sweetness and appetizing.

CONCLUSION AND SUGGESTIONS

Conclusion

According to the study on the Nata de Coco made from Jaggery palm sugar, the result revealed that among three developed formulas, the second formula received the highest acceptance in terms of its appearance, color, aroma, taste, texture and overall liking. The most appropriate ratio of the jaggery palm sugar and water is 1:1 which had physical characteristic as following: 1.50 cm of thickness, 830 grams of weight, 4.80 of pH and the sweetness at 11 °Brix. For the study on the nutrition of Nata de Coco from Jaggery palm sugar, the results showed that it gives 133 kilocalories of energy; 32.8 grams of Carbohydrates; 1.25 grams of protein; < 0.21 grams of Fat; 0.69 grams of dietary fiber, 67.0 grams of moisture and 0 grams of ash. Moreover, its shelf life is up to 22 days. The examination on *clostridium perfringens*, total Plate Count and Yeast and Mold showed that each of them has less than 10 CFU/g. Also, there is no *salmonella spp.*, *Staphylococcus aureus* found in the products.

Finally, the study on the consumers’ acceptance showed that the developed product of Nata de Coco from Jaggery palm sugar gained very high acceptance at 100 percent on its appearance, color, aroma, taste, texture (elasticity) and overall liking at 4.37, 4.25, 4.27, 4.47, 4.53 and 4.51 respectively.

Suggestions

1. On Nata de Coco from Jaggery palm sugar production, there should be a further study on the influence of other factors that might affect the creation of *Acetobacter xylinum* agar plates, such as the amount of ammonium sulphate, quantity of magnesium sulfate, a component in the liquid that increases mineral food for microorganism.
2. There should be more study on product’s shelf-life in order to develop a higher quality product with longer shelf-life.

#### ACKNOWLEDMENTS

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## Product Development of Ready-to-Drink Jelly from Jaggery Palm Sugar

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**Abstract:** The purposes of this research are 1) to study the standard formula of ready-to-drink jelly made from jaggery palm sugar 2) to study the production of ready-to-drink jelly made from jaggery palm sugar 3) to study the quality of ready-to-drink jelly from jaggery palm sugar and 4) to study consumers' acceptance on ready-to-drink jelly product from jaggery palm sugar. According to the study, it was found that the formula of this ready-to-drink jelly made from jaggery palm sugar that gained the highest acceptance from the consumers contains 60% of white sugar, 5% of Carrageenan and 15% of coconut jelly. The physical analysis of ready-to-drink jelly product from palm sugar has the following color values: Hue level is at 2.5 Y, value level is at 9 and Chroma level is at 2, the pH level is at 6.8 and sweetness level is at 18 °Brix. The chemical analysis of the product showed that 100 grams of the example of ready-to-drink jelly made from jaggery palm sugar give 50.8 kilocalories of the energy, 12.7 percent of carbohydrate, 0.20 percent of protein, 0.24 percent of fiber, 87.1 percent of moisture content and 0.24 percent of ash. And after the study of the shelf life in tightly sealed polyethylene containers, the product can be stored for 12 days at a temperature of  $8 \pm 2$  °C. The microbiological analysis of the product showed that the palm sugar jelly drink had a Clostridium perfringens <10 CFU / g Total Plate Count 30 CFU Yeast and Mold <10 CFU / g. Also, Salmonella spp., Staphylococcus aureus were not found in ready to drink jelly product from palm sugar. Ninety eight percent of the consumers accepted product development of ready-to-drink jelly made from jaggery palm sugar.

**Keywords:** Ready-To-Drink Jelly, Jaggery Palm Sugar, Carrageenan, Coconut Jelly.

### INTRODUCTION

Thailand is situated in a tropical area which has a rich diversity of edible plants. These plants can be processed and become various consumer products. However, it depends on culture and lifestyle of the particular societies. In this case, Thailand is an agricultural country. Most of its populations are farmers and mainly cultivate fruits, vegetables and herbs which generates main income for them. Consequently, for many decades, the government has been trying to support this agricultural sector with many policies and one of them is to help raise the price of fruit, vegetables and herb and also to increase the value of agricultural products included processed food.

Food processing is a process that changes the state of the vegetables and will expand a shelf life and add more value to products. Jaggery Palm sugar, in this study, is one of the food which are processed from Palmyra. Its roots can be boiled and drink to treat fever, Aphthous Ulcer and diuretic etc. (Somkiat, 2008). Hence, in this research, Jaggery Palm sugar was chosen to be developed into "jelly", a modern and easy to drink food.

Jelly is a very popular form of food in the consumer market, particularly among young adolescents, due to its shape, color and sweet flavor. As a result, it has gained more total sales each year (Chuthamas, 2012). Fluid jelly refers to products derived from fruits, vegetables, cereal or juice or herbal extracts mixed with sweeteners. In this research, gelatin and carrageenan were mixed with fruit acids and other ingredients such as fruits, vegetables, cereal herbs to achieve a thick and slick texture.

Therefore, the objectives of this research are as following.

1. To study the standard formula of ready-to-drink jelly product from jaggery palm sugar.
2. To study the process of ready-to-drink jelly product from jaggery palm sugar.
3. To study the quality of ready-to-drink jelly product from jaggery palm sugar.
4. To study the consumer acceptance to ready-to-drink jelly product from jaggery palm sugar

### METHODOLOGY

#### 1. The study of the standard formulas of ready-to-drink jelly product from jaggery palm sugar

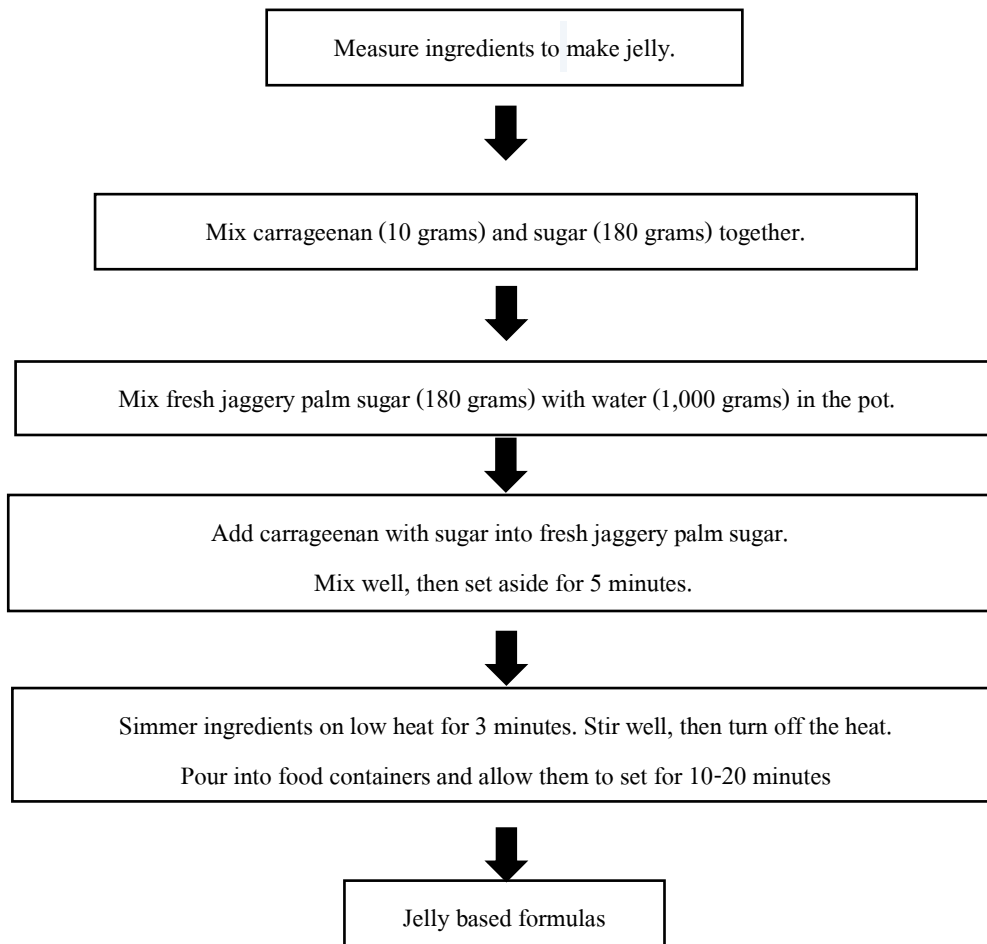
##### 1.1 The study of basic recipes

Three basic recipes of ready-to-drink jelly made from jaggery palm sugar are shown in Table 1. This experiment used a randomized complete block Randomized Complete Block Design, (RCBD) (Saichol, 2003) to evaluate the sensory aspects including appearance, color, aroma, taste, texture (elasticity) and overall. The 9-point hedonic scale was used to measure the acceptability of a group of samples of 70 people on this ready-to-drink jelly made from jaggery palm sugar (Penkhwan, 2006). The collected data were then compared by using Duncan's new multiple range test (DMRT) to differentiate the significance of means before being analyzed with statistical software.

Table 1 Ingredients in each formulations of ready-to-drink jelly made from jaggery palm sugar

Ingredients	Quantity (%)		
	Formula 1	Formula 2	Formula 3
Fresh Jaggery	10.65	24.83	25.15
Sugar	29.58	16.55	11.32
Water	59.17	57.94	62.89
Carrageenan	0.59	0.49	0.62
Citric acid	0.00	0.16	0.00
<b>Source:</b>	Special Foods, (2016)	Tisha, (2006)	Anonymous, (2011)





**Chart 1** The process of making jelly based formulas

*1.2 The Development of standard recipes of ready-to-drink jelly made from jaggery palm sugar.*

1.2.1 Study on the appropriate quantity of fresh jaggery palm sugar which should be used to substituted for sugar in this ready-to-drink jelly. The best formula chosen from 1.1, the study of basic recipes, was added with jaggery palm sugar at 3 different levels: 50, 60 and 70 percent of the total weight of the mixture. Then three samples were tested for sensory evaluation.

1.2.2 Study on the quantity of carrageenan which affects the texture of the ready-to- drink jelly made from jaggery palm sugar. The ratio of jaggery palm sugar in ready-to-drink jelly from 1.2.1 that gain the highest acceptance was then studied on the quantity of carrageenan at 3 different level: 3, 5 and 7 percent of the total weight of all ingredients used. Then 3 samples were tested for sensory evaluation.

1.2.3 Study on the appropriate quantity of coconut jelly to create the best texture for ready-to-drink jelly from jaggery palm sugar. The formula from 1.2.2 which gained the most acceptance on sensory evaluation was then added with coconut jelly at 3 different levels: 10, 15 and 20 percent of the total weight of the mixture. Then 3 samples were tested for sensory evaluation.

*1.3 Study on quality of ready-to-drink jelly made from jaggery palm sugar .*

One of the formulas of ready-to-drink jelly from jaggery palm sugar from 1.2.3 which gained the most acceptance was selected to determine the physical characteristics of the products.

1.3.1 Check the physical characteristics of the ready-to-drink jelly made from jaggery palm sugar.

- Color measurement: by using The Munsell Book Of Color to find the color value of ready-to-drink jelly made from jaggery palm sugar.

- Measurement of texture: by testing ready-to-drink jelly made from jaggery palm sugar products with Texture analyzer model TA.XT. Plus the probe P / 0.5R, diameter of 0.5 inches high, middle test speed (speed test) 1 mm. / sec.

- Measurement of parameters of sweetness: by using Refractometer to measure the sweetness of the ready-to-drink jelly from jaggery palm sugar. Firstly, drip the solution on this study onto the prism, then close with a flap and look through the light. A colored bar will appear. Then read the numbers on the scale of the machine.

- Measuring pH-value (pH): using the pH meter according to the AOAC (2012)

1.3.2 Check the chemical characteristics of the ready-to-drink jelly made from jaggery palm sugar.

- The amount of energy (kcal, %): using the method according to the Method of Analysis for Nutrition Labeling (1993), p.106.

- Analysis of the overall carbohydrates (total carbohydrate, %): calculated from 100% minus the quantity of moisture, ash, fat and protein, as the methods of AOAC (2012).

- Analysis of proteins (protein, %): adopting Formal titration method according to AOAC (2012).

- Analysis of lipid (fat, %): using Roesse-Gottlieb method of AOAC (2012).

- Analysis Quantitative of fiber (fiber, %): according to the method of AOAC (2012).

- Analysis of moisture (moisture, %): according to the methods of AOAC (2012)

- Analysis of ash (ash, %): according to the methods of AOAC (2012)

- 1.3.3 Check the microbiological characteristics of the ready-to-drink jelly made from jaggery palm sugar.
  - Analysis of Clostridium perfringens (CFU/g): as a method of BAM (2001).
  - Analysis of Salmonella spp. (in 25g): as a method of ISO 6579 (2001).
  - Analysis of Staphylococcus aureus (in 0.1g): as a method of BAM (2001).
  - Analysis of Total Plate Count (CFU/g): as a method of BAM (2001).
  - Analysis of Yeast and Mold (CFU/g): as a method of BAM (2001).

1.4 Study on the acceptance of the consumers on the ready-to-drink jelly made from jaggery palm sugar products.

This ready-to-drink jelly made from jaggery palm sugar was tested and scored by a group of 70 samples by using the 5-point hedonic Scale (Penkhwan, 2006) (1 = the most disliked and 5 = the most liked). This is to study on the sensory evaluation on the appearance, color, aroma, taste, texture (elasticity) and overall liking of the accidental sampling (Boonchom, 1989) of 70 people.

The sensory quality evaluation

A randomized complete block design (RCBD) (Saichol, 2003) was used in this experiment. In order to study 3 formulas of the ready-to-drink jelly made from jaggery palm sugar, the 9- point hedonic scale was adopted (Penkhwan, 2003) and the products were tested by seventy samples of the teachers and students of Faculty Home Economics of Technology Rajamangala University of Technology Phra Nakhon and evaluated on the sensory qualities in terms of appearance, color, taste, texture and overall liking. .

Statistical data analysis

This experiment used a Randomized Complete Block Design, (RCBD). Also, Duncan's New Multiple Range Test, (DMRT) was adopted to compare the difference of the average and analyzed with statistical software at the confidence level of 0.05.

RESULTS AND DISCUSSION

1. The study on the standard recipes of ready-to-drink jelly made from jaggery palm sugar

Table 2 The average of three standard recipes of ready-to-drink jelly made from jaggery palm sugar.

Sensory quality	Average and overall liking		
	Formula 1	Formula 2	Formula 3
Appearance <sup>ns</sup>	7.00±1.39	6.48±1.47	<b>7.21±1.33</b>
Color	7.04±1.43 <sup>ab</sup>	6.77±1.47 <sup>b</sup>	<b>7.16±1.35<sup>a</sup></b>
Smell			
Flavor	6.69±1.72 <sup>a</sup>	6.00±1.69 <sup>b</sup>	<b>6.97±1.43<sup>a</sup></b>
Texture (elasticity)	6.79±1.77 <sup>a</sup>	5.37±1.99 <sup>b</sup>	<b>7.21±1.49<sup>a</sup></b>
Overall	6.80±1.72 <sup>a</sup>	6.16±1.86 <sup>b</sup>	<b>7.11±1.67<sup>a</sup></b>
	7.04±1.45 <sup>a</sup>	5.90±1.82 <sup>b</sup>	<b>7.19±1.48<sup>a</sup></b>

**Remark:** 1) a and b different alphabet horizontal means that value is the difference statistically significant at the level of 0.05  
 2) ns means not significantly different at the 0.05 level of statistical.

From Table 2, the result of the study on the standard recipes of the ready-to-drink jelly showed that the third formula gained the highest acceptance in every sensory: the appearance, color, flavor, texture (elasticity) overall liking at 7.21, 7.16, 6.97, 7.21, 7.11 and 7.19 respectively. The analysis on the variance analysis and statistical difference found that the appearance, texture (elasticity) and overall liking have a statistically significant differences at 0.05 level. So the third formula was chosen to use in the development of the standard formula for ready-to-drink jelly made from jaggery palm sugar.

**Table 3** The average of sensory quality of jaggery palm sugar being substituted for sugar, which affects the texture of all three formulas of the ready-to-drink jelly made from jaggery palm sugar.

Sensory quality	Average and overall liking		
	50 %	60 %	70 %
Appearance <sup>ns</sup>	6.93±1.38	<b>7.37±1.38</b>	6.97±1.31
Color	7.03±1.41 <sup>b</sup>	<b>7.43±1.15<sup>a</sup></b>	6.98±1.22 <sup>b</sup>
Smellns	6.66±1.69	<b>7.03±1.54</b>	6.77±1.22
Flavor ns	6.68±1.76	<b>6.93±1.84</b>	6.84±1.29
Texture (elasticity) <sup>ns</sup>	6.80±1.72	<b>7.21±1.68</b>	6.81±1.50
Overall	6.93±1.40 <sup>b</sup>	<b>7.96±1.54<sup>a</sup></b>	6.84±1.26 <sup>b</sup>

**Remark:** 1) a and b different alphabet horizontal means that value is the difference statistically significant at the level of 0.05  
 2) ns means not significantly different at the 0.05 level of statistical.

From Table 3, the study of the ready-to-drink jelly made from jaggery palm sugar substituted for sugar revealed that the consumer accepted at 60 percent on the appearance, color, aroma, taste, texture (elasticity) and overall liking at scores 7.37, 7.43, 7.03, 6.93, 7.21 and 7.96 respectively. The ready-to-drink jelly has transparent pale yellow colour and it has its moderate odor, sweet flavor and flexible texture, which reached the standard of a good quality jelly Thai Industrial Standards Institute (2004).

Every human has different liking on the level of sweetness, for example, sugar (sucrose) at 10 mM. depending on age, temperature, stickyness, metabolism and personal taste (Suntaree and Chutima, 2006). In this study, the sugar used for the ready-to-drink jelly made from jaggery palm sugar is natural fructose which gives mild sweetness. However, this sweetness can be adjusted by the amount of the sugar added in the product.

**Table 4** The average of the sensory quality of carrageenan that affects the texture of the ready-to-drink jelly from jaggery palm sugar in three formulas.

Sensory quality	Average and overall liking		
	3 %	5 %	7 %
Appearance	7.13±1.34 <sup>a</sup>	<b>7.38±1.14<sup>a</sup></b>	7.06±1.26 <sup>b</sup>
Color	<b>6.86±1.10<sup>a</sup></b>	7.40±1.13 <sup>a</sup>	7.10±1.28 <sup>b</sup>
Smell <sup>ns</sup>	7.07±6.00	<b>7.27±1.31</b>	6.47±1.44
Flavor	6.48±1.48 <sup>b</sup>	6.78±1.32 <sup>ab</sup>	<b>6.93±1.41<sup>a</sup></b>
Texture	6.73±1.52 <sup>b</sup>	<b>7.28±1.30<sup>a</sup></b>	7.26±1.42 <sup>a</sup>
Overall	6.80±1.45 <sup>b</sup>	<b>7.40±1.22<sup>a</sup></b>	6.87±1.43 <sup>b</sup>

**Remark:** 1) a and b different alphabet horizontal means that value is the difference statistically significant at the level of 0.05  
 2) ns means not significantly different at the 0.05 level of statistical.

From Table 4, the study of the ready-to-drink jelly made from carrageenan substituted for sugar revealed that the consumer accepted the product which contained carrageenan at 5 percent, because of its appearance, smell, texture and overall liking at average scores of 7.38, 7.28 and 7.40. The derived product with carrageenan at 5 percent has high flexibility and modate water absorbtion which made it easy to be drunk through a straw (Thai Industrial Standards Institute, 2004). This conclusion based on the examination on both carrageenan at 3 percent and 7 percent and the result showed that the texture of the outcome products were too runny and too tough respectively.

In the study of the odor of the products, there was no significant difference at 0.05 (table 4). Carrageenan is a polysaccharide which is extracted from Red Algae. Its stucture is random coil which will changed its form into double helices in cold water. It is also able to turn into 3D structure if is cooled down at the room temperature, because the polymer chain will gather and create junction point that help set the gel texture (Nithiya, 2002: Xu, at el,1992).

**Table 5** The average amount of sensory quality of Nata de Coco affecting texture of the ready-to-drink jelly made from jaggery palm sugar in 3 formulas

Sensory quality	Average and overall liking		
	10 percent	15 percent	20 percent
Appearance	7.40±1.12 <sup>ab</sup>	<b>7.49±1.10<sup>a</sup></b>	7.23±1.20 <sup>b</sup>
Color <sup>ns</sup>	7.21±0.93	<b>7.40±1.07</b>	7.29±1.23
Smell <sup>ns</sup>	6.91±1.05	<b>6.99±1.51</b>	6.86±1.64
Flavor <sup>ns</sup>	7.27±1.38	<b>7.30±1.32</b>	7.20±1.47
Texture <sup>ns</sup>	<b>7.23±1.29</b>	7.11±1.14	7.16±1.43
Overall <sup>ns</sup>	7.17±1.41	<b>7.34±1.23</b>	7.33±1.25

**Remark:** 1) a and b different alphabet horizontal means that value is the difference statistically significant at the level of 0.05  
 2) ns means not significantly different at the 0.05 level of statistical.

From Table 5, the study on the ready-to-drink jelly made from Nata de Coco revealed that the consumers accepted the amount at 15 percent. In terms of appearance, color, smell, flavor ,and overall liking, the average scores are at 7.49, 7.40, 6.99, 7.30 and 7.34 respectively. However, there is no significant difference among all 3 receipes, at 0.05. To explain, because Nata de Coco is cellulose gel which is high in fiber and energy. Adding too too much in the product could cause less flexibility in its texture. According to Sukanya, Sudarath and Kannika (2016) on Production of Mao (Antidesma bunius) Juice Mixed with Nata de Coco in Clear-Glass Bottle, it showed that the amount of Nata de Coco should not be more than 10 percent of all ingredients.

**2. The result on the quality of ready-to-drink jelly from palm sugar jelly.**

**Table 6** The physical quality (color, pH meter, sweetness) of ready-to-drink jelly from palm sugar jelly.

Physical quality	Color			pH meter	Sweetness (°Brix)
	Hue	Value	Chroma		
ready-to-drink jelly from palm sugar jelly	2.5Y	9	2	6.8	18

**Remark:** Hue is the colors; Value is the brightness of colors; Chroma is the bright / concentration.

From Table 6, the result of the physical quality showed that the ready-to-drink jelly from palm sugar had Hue value at 2.5Y, color value at 9 and Chroma value at 2. This created a transparent pale yellow color to the jelly. This ready-to-drink jelly from palm sugar has the sweetness value at 18 °Brix. The examination also revealed that the ready-to-drink jelly from palm sugar has PH at 6.8, which complied with Nithiya’s (2002) study that a good structure of carrageenan has PH at 7.0.

**Table 7** The physical Quality (Texture) of ready-to-drink jelly from palm sugar.

Physical Composition	Breaking Force (N)	Distance to Rupture (Cm)	Gel Strength (N.cm)
Ready-to-drink jelly from palm sugar jelly	6.22	2.35	14.61

**Remark:** 1) Breaking Force = force that jelly broken. Obtained from the maximum force used in drilling through examples. The maximum wage less than a softer.

- 2) Distance to Rupture = flexibility of the sample. Obtained from the distances that maximum force by distances over that samples are very flexible
- 3) Gel Strength = Gel strength obtained from the Breaking Force x Distance to Rupture.

From Table 7, the ready-to-drink jelly from palm sugar has Breaking force value at 6.22 N, Distance to Rupture value at 2.35 cm and Gel strength value at 14.61 N.cm. Carrageenan is a polysaccharide, so it attributes to the Breaking force value (Nithiya, 2002). As a matter of fact that the ready-to-drink jelly need to be drinkable through a straw, its Breaking force, Distance to Rupture and Gel strength has to be low.

**Table 8** The illustrates on the nutrition value of the ready-to-drink jelly made from 100 grams of jaggery palm sugar.

Chemical Composition	Ready-to-drink jelly from jaggery palm sugar
Energy (kilocalories)	50.80
Carbohydrates (grams)	12.70
Protein (grams)	0.20
Fats (grams)	0.00
Fiber (grams)	0.24
Moisture (grams)	87.10
Ash (grams)	0.24

From Table 8, The study on the chemical property of the ready-to-drink jelly made from 100 grams of jaggery palm sugar showed that it gives energy at 50.8 kilocalories, carbohydrates at 12.7 g, protein at 0.20 g, fats at 0 g, moisture at 87.1 g, fiber at 0.24 g and ash at 0.24 g.

*Table 9 The characteristics of microbiological of ready-to-drink jelly from jaggery palm sugar.*

Microbiological	Storage time		Unit
	0 Day	12 Days	
<i>Clostridium perfringens</i>	<10	<10	(CFU/g)
<i>Salmonella spp.</i>	-	-	(in 25g)
<i>Staphylococcus aureus</i>	-	-	(in 0.1g)
Total Plate Count	480	30	(CFU/g)
Yeast and Mold	<10	<10	(CFU/g)

From Table 9, The study on The characteristics of microbiological of ready-to-drink jelly from jaggery palm sugar showed that the product had shelf life up to 12 days and it has *Clostridium perfringens* <10 CFU/g Total Plate Count 30 CFU/g Yeast and Mold <10 CFU/g. Also, there is no *Salmonella spp.* And *Staphylococcus aureus* found in the product.

In most typical jaggery palm sugar, bacteria such as *Micrococcus*, *Streptococcus* will be found, as well as yeast such as *Kloeckera apiculata* *Saccharomyces chevaliri* *Candida spp.*, *S. cerevisiar* (Pramote, 1978). These bacteria and yeast creates sour flavour. However, the ready-to-drink jelly from jaggery palm sugar in this study was pasteurized. Hence, it has low in bacteria and yeast that creates sour flavour, complying with the standard of the consumer products (Tipawan, Puntarika and Nattakran, 2008)

**3. The results of consumer’s acceptance towards Product Development of Ready-to-Drink Jelly made from Jaggery palm sugar**

**Table 10** The results of consumer’s acceptance towards Product Development of Ready-to-Drink Jelly from Jaggery palm sugar.

Sensory quality	Average	
Appearance	4.47±0.57	
Color	4.37±0.67	
Smell	4.06±0.84	
Flavor	4.23±0.73	
Texture	4.41±0.64	
Overall	4.46±0.65	
Acceptance of consumer products	Number of Participants	%
Yes	147	98.00
No	3	2.00
<b>Total</b>	<b>150</b>	<b>100.00</b>

From Table 10, Product Development of Ready-to-Drink Jelly made from Jaggery palm sugar was tested and the average scores of the consumers' acceptance on its color, smell, taste, texture and overall preference are at 4.46, 4.47, 4.37, 4.06, 4.23 and 4.41 respectively. Overall liking and acceptance are as high as 98.00 percent.

## CONCLUSION AND SUGGESTIONS

### *Conclusion*

According to the study of the ready-to-eat jelly made from jaggery palm sugar, the third formula gained the highest acceptance from the consumers. As well as the amount of palm sugar added in the jelly, most of the consumers accepted at 60 percent. The study on the amount of Carrageenan which has an effect on the texture of the jelly revealed that at 5 percent gained the most acceptance in terms of appearance, texture (elasticity) and overall liking. Lastly on the examination of the amount of coconut which affected the texture of the ready-to-drink jelly made from jaggery palm sugar, it showed that most of the consumers accepted at 15 percent on the appearance, color, aroma, flavor and overall liking.

After testing on microbiological characteristics of the products, it showed that the product has shelf life up to 12 days and it gives energy at 50.8 kilocalories, carbohydrates at 12.7 g, protein at 0.20 g, fats at 0 g, moisture at 87.1 g, fiber at 0.24 g and ash at 0.24 g. Finally, the study found that the developed products, ready-to-drink jelly from jaggery palm sugar succeeded in gaining the consumers' acceptance at 98.00 percent.

### *Suggestions*

1. Different types of Carrageenan created gel's texture at the different level. Hence, further study on the composition of each type of Carrageenan are essential.
2. The amount of the acid variation, related to the type of ingredients, also created the difference in the gel's texture of the ready-to-drink jelly made from jaggery palm sugar.
- 3 . Using the different level of heat has an effect on the physical, chemical and microbiological characteristics of the products. This could continuously help raise and further promote the standard of Thai consumer products at industry level.

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## The Application of Saving Algorithm to Vehicle Routing Optimization

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**Abstract:** This research aimed to reduce the transportation distance. The company was used this case study was small and medium enterprise. The company is a plastic manufacturer. This plastic is a synthetic polymer. Plastic products of the company are plastic film. Plastic packaging is plastic film sandwiched between two layers of laminate or more for fresh food, dry food, chemical fertilizers, plastic rolls against drinking cup lid. Data collection started from January 1, 2018 to June 30, 2018. It was found that there were 9 regular customers, so the samples of this research were 9 customers. The scope of this research does not consider the possibility of loading cargo as a variable in the transportation routing. Research process, it started to study detailed customers, shipping conditions, creating a saving distance table, transportation routing by using Saving Algorithm, Nearest Algorithm, Excel Solver, SN Algorithm (Saving Algorithm mixed with Nearest Algorithm) and comparison of transportation routing results. The research showed that transportation routing by using Excel Solver and SN Algorithm had the shortest distance and was 379.4 km. This company used Nearest Algorithm to transportation routing. Result of transportation routing by using Nearest Algorithm was 403.8 km. Therefore, transportation routing by using SN Algorithm can reduce the distances 24.4 km or 6.04%.

*Keywords:* Saving Algorithm, Nearest Algorithm, Transportation Routing, Routing.

### INTRODUCTION

Suan Sunandha Rajabhat University, Nakhon Pathom Learning Center, is one of four educational centers that have implemented teaching, learning according to the university's educational expansion policy and have started teaching since August 1, 2015. College of Logistics and Supply Chain is one of many faculties have taught at Nakhon Pathom Learning Center. Around Suvarnabhumi Rajabhat University Nakhon Pathom Education Center, there are many small and medium sized companies (SMEs). One of them is a plastic company. Many companies cannot compete because they are small companies and do not have good management systems (Sutthachaidee Wanee, 2015). There are also many problems in the management of transport, such as delayed delivery, damaged during delivery (Jandasang Duangjai, 2015). Researchers are interested in applying the Saving Algorithm to transport routes. The purpose of this research is to reduce transportation distances. The results are compared with the current situation to find the answer.

### LITERATURE REVIEW

Nakorn Chaiwongsakda (2017), this study proposes effective vehicle routing for drinking water transportation using both a saving algorithm and the traveling salesman problem (TSP). In this study, the service area for drinking water transportation is zoned and then routed by using a saving algorithm. Each modified route is subsequently rearranged by using linear programming for the TSP. This process helps to reduce the size of the problem and also can be conveniently completed by using the Solver in Microsoft Excel. The TSP, in addition, provides the best answer for the minimal distance in each route. The simulation results for the six sample routes in area zone 1 showed that using the TSP provides a superior outcome and also offers a distance reduction of 4.16%, better than the saving algorithm.

Patsakorn Rustchanapat (2011), the propose of his project is to apply Saving Algorithms for the right path and increase efficiency in the delivery of each shipment. It was found that the traditional route has been transported by the not full weight of vehicles and experienced personnel is a major decision. It is not certain that the same path as the most appropriate method and the risk of shipping costs incurred for each shipment. Therefore, the study use Saving Algorithm to get the shortest path. The procedure is 1.the default answer 2. calculate savings 3.the distance in rank from most to least value so calculation of saving. The calculation of the saving each pair of customers and The highest value is the criteria for deciding on partners who will send before or after. The traveling distances from Saving Algorithm decrease about 18.98%, the vehicle utilization increases from 74.16% to 90.09%, and the average number of vehicles decrease from 12 vehicles per day to 10 vehicles per day.

### RESEARCH METHODOLOGY

#### 3.1 Population and Sample

The population were the total number of customers that the company had shipped. There were 83 customers.

The sample was the total number of customers that the company had shipped during the 6 months from January 1, 2011 to June 30, 2017. There were 9 customers.

#### 3.2 Operating procedures

1. Study the details of the company.
2. Study customer details.
3. Study shipping conditions to each customer and the scope of the study.
4. Creating a customer distance table
5. Creating a saving distance table
6. Calculate routing by using Saving Algorithm.
7. Calculate routing by using Nearest Algorithm.
8. Calculate routing by using Excel Solver.
9. Calculate routing by using SN algorithm.
10. Comparison of routing

RESULTS

4.1 Results of the study of the company

Based on the secondary data of the company and from interviews with factory managers, the company found that the company is a plastic producer. This is a synthetic polymer. Our plastic products are plastic film. It is often used to make bags or to wrap goods.

4.2 Results of the study customer details

The secondary data of the company showed that during the 6 months from January 1, 2018 to June 30, 2018, there were 9 regular customers, as shown in Figure 1.

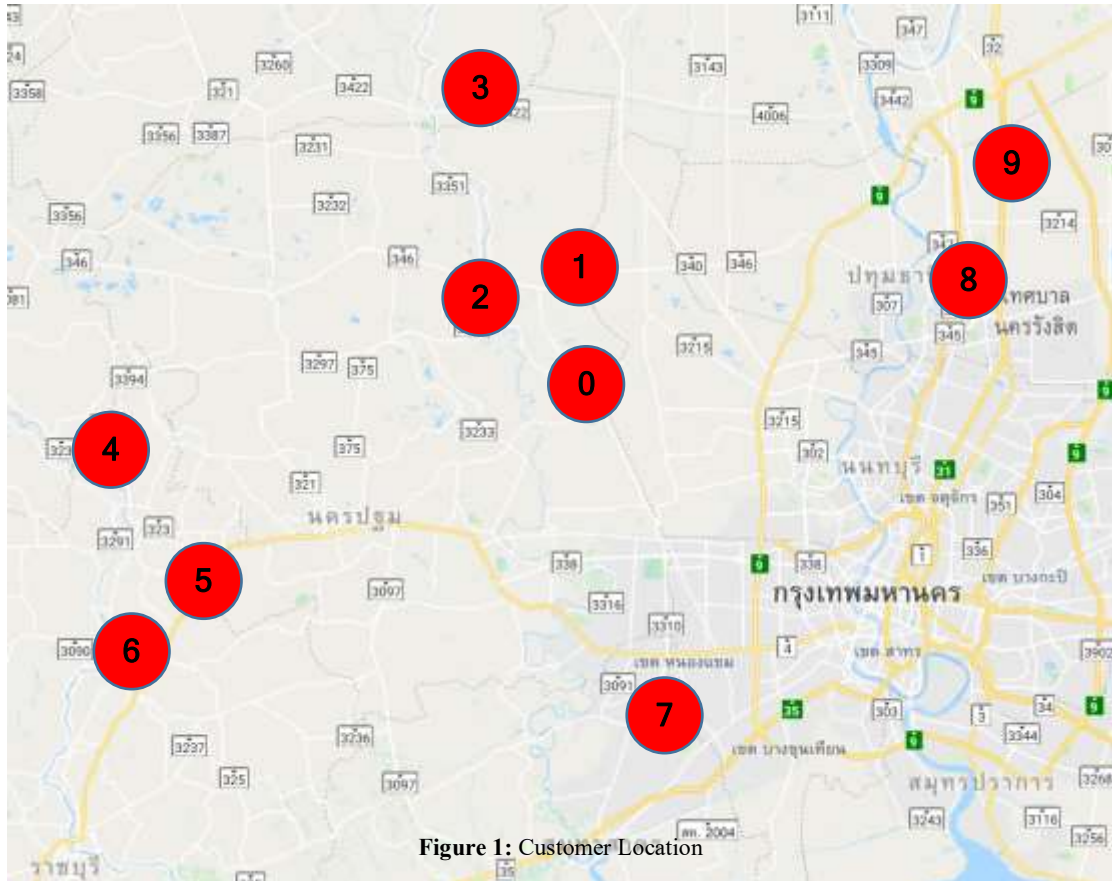


Figure 1: Customer Location

4.3 Results of the study shipping conditions to each customer and the scope of the study

Based on the secondary data of the company and interviews with factory managers, it was found that these 9 customers had no special conditions and can send the time of 8 am to 5 pm.

This research did not consider the capacity to carry. In order to see the difference of how to use the route. No factors involved.

4.4 Results of the creating a customer distance table

From Figure 1 Customer Location, after that, we had to find the distance from one point to another by using the google map and defining the distance go to the customer and a return trip was the same, as shown in Table 1.

Table 1: a customer distance.

	0	1	2	3	4	5	6	7	8	9
0		20.2	22.6	41.6	61.1	59.2	61.5	37.7	51.1	70.3
1			11.7	30.7	61.9	60.0	68.6	51.3	44.3	57.5
2				36.6	46.6	48.3	56.9	55.5	67.0	80.2
3					64.2	75.7	84.3	69.9	61.2	74.4
4						20.5	28.8	73.4	103.0	116.0
5							12.0	65.8	100.0	110.0
6								72.7	109.0	119.0
7									69.1	81.4
8										16.1
9										



4.5 Results of the creating a saving distance table

From Table 1 a customer distance, the next step was to find the saving distance, as shown in Table 2.

**Table 2:** saving distance.

	0	1	2	3	4	5	6	7	8	9
0										
1			31.1	31.1	19.4	19.4	13.1	6.6	27.0	33.0
2				27.6	37.1	33.5	27.2	4.8	6.7	12.7
3					38.5	25.1	18.8	9.4	31.5	37.5
4						99.8	93.8	25.4	9.2	15.4
5							108.7	31.1	10.3	19.5
6								26.5	3.6	12.8
7									19.7	26.6
8										105.3
9										

4.6 Results of the calculate shipping route using Saving Algorithm

From Table 2, the next step was to sort the values in descending order, as shown in Table 3. Then select the route with the most saving distance first. The results are shown in Table 4.

**Table 3:** Sample of saving distance from descending order.

Route	Saving distance
5-6	108.7
8-9	105.3
4-5	99.8
4-6	93.8
3-4	38.5
3-9	37.5
2-4	37.1
2-5	33.5
1-9	33
3-8	31.5

**Table 4:** Routing results by using Saving Algorithm.

Algorithm	Route	Total distance (km)
Saving Algorithm	0-6-5-4-3-9-8-1-2-7-0	397.9

4.7 Results of the calculate routing by using Nearest Algorithm.

The company's routing algorithm uses the Nearest Algorithm method, which is easy to route, because the company is a small company does not have a lot of customers and do not have the funds to buy a routing program. The algorithm of Nearest Algorithm is to select the nearest customer location in Table 1. The results are shown in Table 5.

**Table 5:** Routing results by using Saving Algorithm.

Algorithm	Route	Total distance (km)
Nearest Algorithm	0-1-2-3-8-9-7-5-4-6-0	403.8

4.8 Results of the calculate routing by using Excel Solver.

From table 1 a customer distance table, the routing was solved by using Excel Solver because it could find the best solution, as shown in Figure 2 and Table 6.

**Table 6:** Routing results by using Excel Solver.

Algorithm	Route	Total distance (km)
Excel Solver	0-6-5-4-2-1-3-8-9-7-0	379.4

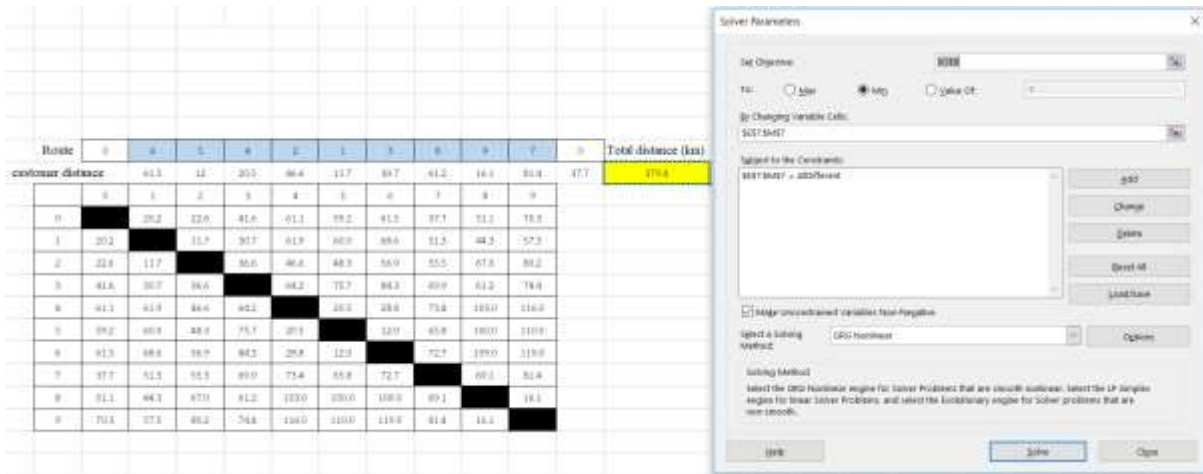


Figure 2: Excel Solver.

4.9 Results of the calculate routing by using SN Algorithm.

SN Algorithm is a combination of Saving Algorithm and Nearest Algorithm. Only the first saving distance will be used. After that, route is selected by selecting the nearest point. The results are shown in Table 7.

Table 7: Routing results by using SN Algorithm.

Algorithm	Route	Total distance (km)
SN Algorithm	0-6-5-4-2-1-3-8-9-7-0	379.4

4.10 Comparison of routing

From Table 4, Table 5, Table 6 and Table 7, it could be seen that routing by using Excel Solver and SN Algorithm had the shortest distance of 379.4 kilometers. The results are shown in Table 8.

Table 8: Comparison of routing.

Algorithm	Route	Total distance (km)
Excel Solver	0-6-5-4-2-1-3-8-9-7-0	379.4
SN Algorithm	0-6-5-4-2-1-3-8-9-7-0	379.4
Saving Algorithm	0-6-5-4-3-9-8-1-2-7-0	397.9
Nearest Algorithm	0-1-2-3-8-9-7-5-4-6-0	403.8

CONCLUSION

Routing by using Excel Solver and SN Algorithm gave the shortest distance of 379.4 kilometers. In comparison with routing by using the Nearest Algorithm, the routing of the company, was 403.8 kilometers. Total distances were reduced 6.04%. SN Algorithm is better than Excel Solver, SN Algorithm can calculate by manual labor.

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## Application of the Information System Program to Enhance Service Excellence Competency of Securing at Air Transport: Case Study of ABC Company Limited

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**Abstract:** This research aims to investigate the application of information system program to enhance service excellence competency of securing at air transport; case study of ABC Company Limited. The distribution of paper based on 216 questionnaires was a convenience sample among customer involvement, partnership management and firm's supply performance in the air transport. The research instruments were both open and close ended questions. For data analysis, descriptive statistics includes frequency, percentage, mean and standard deviation were applied. The evaluation results of the applications performance, it was found that the overall performance was at the high level with the mean of 3.54 and standard deviation of 0.66. The overall satisfaction of service level was at the high level with the mean of 3.99 and standard deviation of 0.62. For the application of the information system program to enhance service excellence competency of securing at air transport consisted of 5 factors (1) the use of modern information technology with the mean of 3.71 and standard deviation of 0.62, (2) the system that links data to help reduce time with the mean of 3.56 and standard deviation of 0.65, (3) electronic data interchange (EDI) data is transmitted to provide the same standard with the mean of 3.53 and standard deviation of 0.64, (4) use tracking system to check product status with the mean of 3.45 and standard deviation of 0.68, (5) barcode technology improves accuracy, reduces service errors with the mean of 3.43 and standard deviation of 0.69. Based on the results, it can be deemed that the developed system could meet the needs of the users and was in line with the development of the current information system of the securing at air transport.

**Keywords:** Application, Information System, Service Excellence, Air Transport

### INTRODUCTION

Air transport is an important aspect of economic development. It represents one of the yardsticks for gauging development (Abraham et al., 2015). First, air transport contributes to the provision of employment. Second, air transport industry is a viable means for generating revenue via personal income and profit taxes. Third, it has contributed over 4 percent to gross domestic product (Oxford Economics, 2012). Other significant contributions are in the area of tourism development, globalization, trade development and foreign direct investment (FDI) opportunity. The growth in the aviation sector cannot be matched by any transport units (road, rail and water) due to its unique technical skills and new innovations. This has improved economic and tourist development of the nation. The aviation industry plays an important role in the aspect of work and leisure to people around the globe. The sector helps to promote and improve quality of life, living standards of people within the nation. All this helps to generate economic growth and poverty alleviation by way of providing employment opportunities, increasing revenues from taxes. The employment opportunities would be generated through supply chain transformation from the airports. This makes the industry the gateway to any economy aspiring to develop, enabling globalization, trade facilitation and tourism development. It is very crucial in the promotion of FDI (Ladele, 2012). One can therefore say that the industry is crucial to the growth of the economy and national development. Ladele (2012) in her study of FDI, noted that as the emerging economies grow, their demand for air transportation will grow as their citizens becomes more financially empowered with increased disposable income. More specifically, air transport enables FDI, business cluster development, specialization, and other spillover effects. The analysis produced by Oxford Economics is one of the first attempts to estimate these benefits of connectivity (Perovic, 2013). Also, passengers, shippers, exporters gain from the aviation industry.

For Thailand's exports in 2018 are expected to grow. International trade will support exports in 2018 and affect international shipping. (Kasikornthai Research Centre, 2017). After the flight of the Thailand International Civil Aviation Organization (ICAO) has raised a red flag with a flag. Confidence returned to the country of the airline business in a dynamic and constantly growing. The growth potential of the business plan and Thailand government's policy support the industry (Ploenhad J., 2018). Liquidation of special development zone: Eastern Economic Corridor (EEC) will occur through the aviation city project or U-Tapao Aerropolis. The Government expected the main mechanism for strategic projects in the development of the EEC which was the target area of the economy in order to attract investment and technology industries in high levels of innovation and enhance the capability of the country after facing an economic slowdown in service sector through distant joint venture. Warehouse will help attract business investment in technology and innovation industries most of which rely on air transport. Even though the domestic transport in Thailand continue to rely on road transport, international trade requires air freight because of air cargo is considered a form of the fastest transportation which has rapidly expanded almost twice during the past 10 years. Since competition in the air cargo to propel the economy between countries because of business e-commerce, air freight must create changes and updates the operating system to comply with today business world relying on supply chain and freight services between destinations worldwide by airfreight (Arden, W., 2018). Air cargo companies are expected to provide air freight services of managing conveyor. Research the importance of the part of the development of transport competency the most effective services respond the needs of the user and enables the highest service satisfaction whether it's time to speed, economy, safety and convenient of course certainty and punctuality encourage organizations to improve operations respond the needs of the user as the competitors.

### RESEARCH OBJECTIVE

1. To study the application of information system program; case study of ABC Company Limited.
2. To investigate the application of information system program to enhance service excellence competency of securing at air transport; case study of ABC Company Limited.

### LITERATURE REVIEW

Literature review includes three parts. In the first part, we mention the air transport concept and the applications of information system program operation known as information technology (IT). Then we discuss the concept of enhancing service excellence.

### *The air transport*

Transportation refers to the movement of goods from a point of origin to a point of consumption. It can involve raw materials being brought into the production process and/or finished goods being shipped out to the customer. Air transport is necessary for the cargo that needs time and minimal damage. Air freight is the fastest transportation and can ship to all over the world in various types and transport containers. A key feature of air transport are as follows: 1) Air freight can be the fastest 2) Air transport has the exact table and always punctual. Air freight can significantly reduce the cost related to a warehouse because it will be shipped at any time. It also saves material and reduces the transportation costs because the packaging of the goods is often easily. Material transport is an activity that involves moving raw materials, prepare the workplace. There are positions for each type of material device for moving material to process or to add value. Considering the use of materials handling equipment in an investment. Items that use suitable materials transport create a lot of benefits. Streamline and automate continuity in production help reduce the damage that may occur during the material unloading process. Impact of product quality leads to cost reduction in production and profit (Madmai, B., 2017). Elements of material transport systems (Hirunwat, A. 2017) lead to an efficient material transport 1) movement of materials 2) times 3) quantity of material associated with the demand quantity 4) space for the mechanism of effective materials handling systems.

For the distribution (Rushton, A., Croucher, P., & Baker, P. (2010), the actions inside the organization and moving goods through distribution channels. A response to the need creates a satisfying customer activity, transportation, storage, inventory management, packaging, delivery. The continuous success of goods orders depends on moving goods of manufacturers to meet the demand for strategic check. The result of a determined strategy is on logistics and supply chain management which vary and complex in each industry or product composition. An important starting point in defining logistics is an analysis of the characteristics in the product requirements. In considering the cycle of the product, the average standard of time (Lead Time) (Suhridamrong W., 2015).

Transportation has assumed a greater role in many logistics systems. Storage and materials handling addresses the physical requirements of holding inventory. It uses a wide range of manual semi-automated, automated equipment including consideration of the storage protection and control of materials throughout their manufacturing. Packaging refers to the process of designing, evaluating and producing packages. Packaging is important to attract consumer attention. From logistics perspective, packaging provides protection during storage materials handling and transport. Information processing refers to the manipulation of digitized information by computers and other digital electronic equipment, collectively known as information technology (IT).

### *The applications of information system program*

Information technology advances play an important role in social progress and economic growth (Brown and Ulijn, 2004). They also lead to many innovations and new enterprises. Computers and computer networks have drastically increased the amount and speed of processing information. Development of the Internet has changed the nature of communication in business. It has also established a platform for electronic commerce altering merchandising, advertising, and product distribution practices.

Advances in information technology have changed the way of doing business in many industries including lodging. Hospitality technology applications employed in hotels are credited with providing a basis for competitive advantage, productivity improvement, enhanced financial performance, and guest service expansion (Collins and Cobanoglu, 2008; Ip et al., 2011; Kasavana and Cahill, 2007; Kim et al., 2008; Siguaw et al., 2000). Technology adoption has significantly increased hotels' offerings to their guests (e.g. in-room technology amenities, on-line reservations and payments). It has also made an impact on hotels' back-office operations such as reservations, check-in/out, guest accounting, housekeeping, payroll, recruiting, and others.

Information technology connects all areas of logistics system and creates management information systems which lead to faster order placement and faster delivery. Demand forecasting optimizes supply of demand by co-operating supply chain and business management. Demand forecasting may be used in production planning, inventory management and assessing future capacity requirements. Demand forecasting involves techniques including both informal methods such as educated guesses and quantitative methods such as the use of historical data and statistical techniques.

The benefit of information technology Electronic Data Interchange System (EDI) (Wattanarungson, 2015) can 1) reduces the error from logging into the system and when the people involved to use it to get information that is accurate and very fast 2) reduces the budget document in term of redundant operating 3) improves operational efficiency to make those involved to interact with trading partners quickly 4) can use EDI help executives make decisions quickly and correctly in order to make your competitive advantage. Barcode system Barcodes help minimize errors and increase productivity (improve operational efficiency). Increasing the speed is correct and it also leads to reduce costs and increase the organization image. There are international standard barcode systems. The application which is actually in almost every business, in particular, the transport of goods and services. Radio frequency identification (RFID). Deployment logistics processes with application to bring the technology RFID chip attach the wooden pallet for traceability product. When the wooden pallet passes a reader, the system will record detailed information, product of lot, number of periods when I go to send it will have another reader to verify whether the information is correct or not. When a forklift truck driving through the reader, it will be able to read and save data quickly. RFID systems are not at very high cost. Customer satisfaction and confidence in employees work in the process.

### *The enhancing service excellence*

Service quality is used to measure service excellence. Oliver (1981) believed that it is different from satisfaction level. And it is continuous evaluation of an event by customers. On the other hand, satisfaction level is a temporary response to an event by customers. A conceptual model of service quality suggested by Parasuraman et al. (1985) encompassed 10 elements which was considered the most completed and accepted. However, it is also too complicated to be measured. Thus, it was modified to include only 5 factors, i.e. tangibles, reliability, responsiveness, assurance, and empathy (Parasuraman et al. 1988). Wakefield (2001) also mentioned that service quality is the difference between customers' service expectation and perceived service. We defined service quality of transportation as the subjective perception during the service process including ticket selling, riding, and arriving destination. Customer satisfaction is the subjective perception after transportation service process.

According to Parasuraman et al. (1988), service quality can be defined as an overall judgment similar to attitude towards the service and generally accepted as an antecedent of overall customer satisfaction (Zeithaml and Bitner, (1996). Parasuraman et al. (1988) have defined service quality as the ability of the organization to meet or exceed customer expectations. It is the difference between customer expectations of service and perceived service (Zeithaml et al., 1990). Perceived service quality results from comparisons by customers of expectations with their perceptions of service delivered by the suppliers (Zeithaml et al., 1990). If expectations are greater than performance, then perceived quality is less than satisfactory and hence customer dissatisfaction occurs (Parasuraman et al., 1985; Lewis and Mitchell, 1990).

Service quality can be defined in a number of ways but one of the most popular is “a comparison between the expected service and the perceived service (Gronroos, 1984).

Carolina Camén (2010) study the “Service quality on three management levels; A study of service quality in public tendering contracts.” The aim of this paper is to deepen the understanding of how service quality factors are stipulated in advance within contracts, in order to ensure the providing of a high-quality service to the user, when the service is contracted out to an external partner. It aims to identify, describe, and analyse the service quality descriptions included in contracts. The study highlights that service quality factors in formal procurement contracts can be related to three interdependent management levels: the rhetorical level, the strategic level, and the operational level, in each of which the factors are described differently.

Shirshendu Ganguli and Sanjit Kumar Roy (2010) study the “Service quality dimensions of hybrid services.” This paper aims to identify the dimensions of service quality in the case of hybrid services. The paper identifies nine service quality dimensions in the hybrid services - customer service, staff competence, reputation, price, tangibles, ease of subscription, technology security and information quality, technology convenience, and technology usage easiness and reliability.

Lovelock (1994) explained the service delivery and perceived service, according to the responses of focus group participants, the judgments of high and low service quality depended on how consumers perceived the actual service performance in the context of what they expected, and showed the expected service-perceived service gap. After the gaps modeling, the determinants of service quality that consumers used when interpreting the quality were described. The ten service quality determinants and their descriptions have been identified for excellence as shown in Table 1 (Parasuraman et al., 1985; Ayasanond C. 2018)

Table 1: The ten service quality determinants for excellence

1.Reliability	Consistency of performance and dependability, accuracy in billing, keeping records correctly, performing the service right at the designated time.
2.Responsiveness	Willingness or readiness of employees to provide service, timeliness of service such as mailing a transaction slip immediately, calling the customer back quickly, giving prompt service.
3.Competence	Possession of the required skills and knowledge to perform the service, knowledge and skill of the contact and support personnel, research capability of the organization.
4.Access	Approachability and ease of contact, the service is easily accessible by telephone, waiting time to receive service is not extensive, convenient hours of operation, convenient location of service facility.
5.Courtesy	Politeness, respect, consideration, friendliness of contact personnel, consideration for the consumer's property, clean and neat appearance of public contact personnel.
6.Communication	Keeping customers informed in language they can understand and listening to them, explaining the service itself and its cost, assuring the consumer that a problem will be handled.
7.Credibility	Trustworthiness, believability, honesty, company reputation, having the customer's best interests at heart, personal characteristics of the contact personnel.
8.Security	Freedom from danger, risk, or doubt, physical safety, financial security, confidentiality.
9.Understanding/knowing the customer	Understanding customer needs, learning the customer's specific requirements, providing individualized attention, recognizing the regular customer.
10.Tangibles	Physical evidence and representations of the service, other customers in service facility.

## RESEARCH METHODOLOGY

This research was a quantitative research and data collection by questionnaires. The distribution of paper based on 216 questionnaires was a convenience sample among customer involvement, partnership management and firm's supply performance in the air transport. Using Taro Yamane's prepared table according to the recipe with the likelihood of error tolerance 0.05. Researcher had defined the characteristics of the tools used to collect data and construct the tools used in this research. Questionnaires had been developed based on objectives to study the application of information system program and investigate the application of information system program to enhance service excellence competency of securing at air transport; case study of ABC Company Limit. The research instruments were both open and close ended questions. The questionnaire was divided into 3 parts, 1) The customer data 2) The opinion in using the application of information system program and 3) Problems and Suggestions.

Researcher had created tools to collect data. The steps were as follows

- Study concepts and theories from academic papers, textbooks, websites, and related research of similar nature to bring information from various sources as a guideline to create a questionnaire.
- Analyze the objectives, content and structure of the research to determine the guidelines and scope of the questionnaire.
- Create a draft questionnaire, by defining the scope and scope of the question in accordance with the objectives of the research.

- Bring the draft questionnaire to the advisor for review, consideration and correction, and provide the experts with knowledge and experience in the application of information system program and air transportation service. By statistics research and consider the questionnaire for 3 persons to review and make further recommendations. As well as content validity. Understanding and using the language to evaluate the results of the decision to find the Index of Item Objective Congruence (IOC).

- Complete a complete questionnaire for use in the research sample.

The researcher selected the questions with the IOC value of over 0.6 as a question. As well as improving the questionnaire was clear and comprehensive for the purpose of this research. The researcher used a questionnaire that was subjected to expert review and tried out the sample with the similarity to the sample with the similar characteristics.

The data analysis was a statistical computer analysis program. Descriptive statistics includes frequency, percentage, mean and standard deviation were applied.

### RESEARCH RESULT

Summary of education level reviews conclude that logistics management is required. Number of the condition meet the defined levels user reviews of the service level that are frequently to be seen, but the appropriate charge. There's a level with only moderate reviews. Fast service, timely and full customer support service quality levels, with many reviews. The section is a service that facilitates comprehensive coverage. There are the level reviews with less management, information technology and the availability of information system program operation. Data transmission system with EDI data are the same. There is the level with the most comments. Barcode technology increase speed, accuracy and reduce errors to the information service system. Call center service and data link system also reduce time and reduce the duplication of work steps. These are level with moderate reviews. The system of tracking trace and track standards use modern information technology system reviews, ranks, with less. The operation side, the conveyor equipment in operation to the appropriate item. Availability in the storage location management Levels, with many reviews. Punctual actions in the transport until the recipient warehouse standards in the transport of goods moderate levels, with reviews in the debate result, as shown in Table 2 and 3.

Table 2: The overall satisfaction of service level

Service quality management	Mean	S.D	Level
Understanding/knowing the customer	4.14	0.48	High
Credibility	4.10	0.65	High
Tangibles	4.09	0.59	High
Security	4.07	0.69	High
Reliability	4.06	0.50	High
Courtesy	4.03	0.65	High
Communication	3.92	0.74	High
Responsiveness	3.91	0.55	High
Accessibility	3.81	0.69	High
Competence	3.80	0.71	High
Average	3.99	0.62	High

Table 3: The application of the information system program to enhance service excellence competency of securing at air transport consisted of 5 factors

Application program	Mean	S.D	Level
The use of modern information technology	3.71	0.62	High
The system that links data to help reduce time	3.56	0.65	High
Electronic data interchange (EDI) data is transmitted to provide the same standard	3.53	0.64	High
Use tracking system to check product status	3.45	0.68	High
Barcode technology improves accuracy, reduces service errors	3.43	0.69	High
Average	3.54	0.66	High

### DISCUSSION

For the management of information system program, the study found that of technology systems and information technology have the least review level. Information system program can be an enabler for both front-end and back-end processing in a supply chain. Access to information system program in a supply chain can make logistics services more accurate, swift and less costly. Therefore, the major findings from this survey could be useful in assessing various the application of the information system program related factors to enhance service excellence competency of securing at air transport. The study indicates that the use of information system program is becoming prominent in warehousing and transportation sector. This could have been facilitated by excellent information system program infrastructure and the demand by the clients for easy access to information on products such as lead time, payments status, stocks and inventory in pipe-line.

The visibility of correct information can help the management to innovate operations for further improvements in service efficiency of a air transport company. Therefore, research should use of digital transport solutions in order to coordinate the different stages of the air transport process to help solve the problem in term of verifying the notification source and destination of the transportation which is received via status messages. Transporter in real-time, consistent with the study of method of distribution logistics operations to network monitor. The study found that transport operations must be developed by using frames and floor structures base on network access to independent information system program exchange standards. The business regarding logistics or transport cover all disciplines. Using the framework development and the access point enable the digital distribution solutions for coordination in the different stages of the transport process. To solve the problem of verifying the

notification on the source and destination of the air transport status messages received via the real-time transport, data transmitted can be entered manually or come from the auto-code solutions using a variety of barcode and RFID technology.

### CONCLUSION AND RECOMMENDATIONS

Based on the results, it can be deemed that the developed information system program could meet the needs of the users and was in line with the development of the current application information system program to enhance service excellence competency of securing at air transport.

For the operation recommendations; the company should focus on strategies to make the difference in air transport by adopted 7R in logistics transportation service management that include: Right Product, Right Quantity, Right Place, Right Time, Right Cost, Right Condition and Right Customer (S.Sudalaimuthu and S. Anthony Raj, 2009, p.11., H. Gleissner and J.C. Femerling, 2013) in the view of enhancing service excellence. The company should develop personnel, enhance personality skills, these will help to enhance the personnel service efficiency. The company should provide equipment to carry the goods properly and sufficient to accommodate the service, operational readiness, and should increase technology RFID to track movement of goods within the warehouse to speed up the perceived value of the product and for the ability to recognize more detailed information delivery process.

For the further research; 1) Study in EDI section which links the company's information with the customer, how to reduce working time, accurate the information, that can work quickly and complete to meet the customer needs 2) Study the Multi Model Transportation in terms of air transport, how to associated with various modes of transport and the continuation of transport until the goods reach the destination with efficiency 3) Comparative study on other cargo handling services to assess the strategies management methods to reduce problems in transport and conveying goods to create a competitive advantage of the company.

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## **The Study of the Business Model Related to Local People's Ways of Living for Creating the Sustainable Community Enterprise Role Model : A Case Study of Pure Wild Honey Product at Huay Hin Lad Nai Village, Chiang Rai Province**

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**Abstract:** This research focuses on studying a business model of pure wild honey product from a community enterprise of Huay Hin Lad Nai Village, Chiang Rai Province. The data collection is accomplished by observation and depth interview. The major income of people in this community is mainly gained from the pure wild honey produced by two species of wild bees: Giant Honey Bees and Asiatic Honey Bees. Some of revenue from pure wild honey product is deducted into the two honey funds; The deduction of the sale on the product from Giant Honey Bees is 20 Baht per bottle that cumulatively goes to the fund around 4,000 Baht per year, while the deduction of the sale on the product from Asiatic Honey Bees is counted 30% of the whole revenue that cumulatively goes to the fund around 52,500 Baht per year. The supply chain management of this business emphasizes on creating value to pure wild honey by value added activities in the value chain. In addition, the funds are spent on forest ranging that causes the positive effects toward the bees' ways of living, reproducing, including honey producing. This finally leads to the high quality of honey. Consequently, it can be claimed that both the value added activities and the forest ranging are concerned as the important keys to the value added products. As the pure wild honey product business is an outstanding interconnection among business, community and environment being under the sustainable development concept, this business can be a good model for other communities to set up their community enterprises.

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*Keywords:* Pure Wild Honey, Community Enterprise, Giant Honey Bees, Asiatic Honey Bees, Sustainable Development- Concept.

### INTRODUCTION

Most businesses drive their supply chain by using tremendous resources along the chain beginning from inbound logistics to outbound logistics. Due to the competitive business environment, most companies contend to increase customers' satisfaction by quick response. Therefore, their operations such as production, packaging and transportation need more resources. This case is affected by many environmental problems, such as waste emissions from manufacturers and transportation, waste water and air pollution from production and waste of non-recyclable products and packaging (OKI group's, 2009). Moreover, overproduction affects people's living. These situations are making the businesses more conscious of the environmental and societal impacts. Consequently, reducing the environmental and social impacts of business are important issues that they are trying to address. Corporate Social Responsibility (CSR) is the concept that various companies adapt to enhance the society and environment that are affected by business (Jamali and Mirshak, 2007). Generally, the four main categories of CSR are economic, legal, ethical and philanthropic issues (Carroll, 1991). As the result, CSR can help the companies increase the positive impacts of its operations on society and the environment. In addition, this model reflects a good image of the companies (Jamali and Mirshak, 2007).

Nowadays, not only CSR which refers to the role of business in society and environmental responsibility, but also the sustainable development concept is required for the current trend of businesses' overproduction and high customers' demands (Eden, 1994). Companies are trying to synchronize three components of the basic of sustainability model: economy, social and environment (Keiner, 2005). In addition, the elements of the sustainability model will be more various in the future following the sustainable development goals of the United Nations. Achieving a better and more sustainable future for all are the aims of this campaign. Therefore, the components of the sustainable development goals of the United Nations propose 17 points which highlight issues related to poverty, inequality, climate, environmental degradation, prosperity, and peace and justice (The United Nations, 2018).

This study presents an example of a business model of pure wild honey product of Huay Hin Lad Nai Village, Chiang Rai Province in the North of Thailand. The business model can interconnect three basic components of the sustainability concept, which are challenges for most businesses today. Observation and depth interview are the main research methods in this study. As a result, this study can describe the supply chain of pure wild honey product and can illustrate how the villagers can add value into the products that come from nature. Moreover, the margin at the end of the value chain is focused on also. This model can be used as a guideline for others businesses, especially the communities that need to produce a community enterprise. The community enterprise at Huay Hin Lad Nai Village, Chiang Rai Province makes the sustainable development concept become tangible. Expanding this concept to other businesses and communities is the greatest purpose of this study.

### LITERATURE REVIEW

This part presents a review of previous studies that can be adapted in this study. There are three main categories: understanding the concept of community enterprises, value creating ideas, and the sustainable development concept.

#### *1) Understanding the community enterprises*

Community enterprises are enterprises that are based on communal objectives. Mostly, the entrepreneurs are people in those communities. The core of the community enterprises are driven by community participation. Thus, member should focus on making relationships between members in the community (Somerville and McElwee, 2011). Normally, businesses are focused on profit and getting a competitive advantage but this is not generally the case for community enterprises which are concerned with how to synchronize the business with society/community. In addition, reducing environmental impact is part of this enterprise pattern (Wallace, 2005). There are many kinds of social enterprise such as non-profit organizations, cooperatives, and mutual societies (Mikami, 2014). Nowadays, social problems are increasing continuously, so governments in many countries are trying to solve the problems rapidly. Engelke, et al., (2015) investigated the opportunities for social enterprise in Germany by using an online Delphi survey conducted with the experts who gauged the potential of social enterprises. They categorized the social enterprise experts into five different groups: academia; governmental agencies, associations and NGOs; social enterprise investors; social

enterprise entrepreneurs; and traditional for-profit companies. The expert survey results suggested that future social enterprises will have a high chance of success and the development of social enterprise will influence industrialized countries.

National resources management is a crucial point for many countries. For example, forest management is difficult to accomplish because of its complexity. Caballero, G (2015) and Ambrose-Oji, B., et al., (2015) reported that forest management is related to governmental and legal policy. Moreover, there is a lacking of earnestness and cooperation among all sections such as the government, private sectors, industrial sectors and populace; this is the key limitation for forest management. Nevertheless, there are going to have to be changes as forest management will need to be more flexible. The community will play a pivotal role for forest management more than in the past while the government will support them to find innovative solutions to manage the capital. In addition, the community will need to suggest some techniques or skills that can be applied to managing the forest including advice regarding policies which are important for community-based forest management.

In Thailand, various communities create small businesses as community enterprises which are managed by the local people. Some of the communities are supported by the Thai government or the private sectors. Community enterprises are common in Thailand because the local community members need to promote their communities' products which reflect the story of their cultural and traditional heritage. Furthermore, they expect to produce income from the local products and aim to eliminate poverty in the community. Therefore, they try to use the resources in the community worthily to integrate with traditional knowledge, creativity and innovation to create value into their products (Wongwirach and Thechatakeng, 2015 ; Jandasang, 2018). Collective activity is the key to success for economic and social advantage. Creating the sustainable regeneration for economic, social and environmental problems is the greatest target of the community enterprise (Sriprasert, 2013). In general, the marketing approach is often a constraint of community enterprises because the local people do not have enough marketing knowledge or skills. Puangpejara, et al., (2016) studied and analyzed the Small and Micro Community Enterprise of Rai San Fan Community Enterprise, Muang District, Lop Buri Province to improve the marketing problem by observation, depth interview, questionnaire and focus group techniques.

They summarized the root causes of the marketing problems are related to unsuitable packaging, labels and trademarks. Additionally, the community entrepreneurs often do not set standard prices for products. Few distribution channels and discontinuation of marketing plans are limitations, also. Therefore, the researchers recommend some improvements based on the Marketing Mix Model (4 Ps): Firstly, they should improve packaging and labeling. Then, the entrepreneurs should set standard prices of products and have discount promotions. Finally, the enterprises should increase the number of distribution channels and use sales and marketing strategies such as creating brochures, making billboards and advertising through local radio or newspaper and internet websites. Moreover, the study of Distanont, et al., (2017) emphasizes the importance of marketing development for community enterprises. They combined local knowledge with the modern management and presented the marketing innovation that has three main solutions: identify market segmentation, develop handmade products to customize and make sale planning. Knowledge transfer and applying the innovation into the new product development process was integrated with marketing innovation. As a final point, that leads to increase in revenue and creates brand awareness, which both would contribute to the success of the community enterprise (Figure 1).

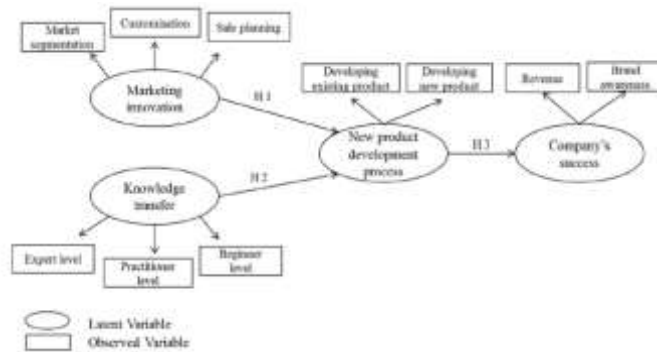


Figure 1. Research model of Innovations in a social enterprise in Thailand

Source: Distanont, et al., 2017

Normally, the key factors that make a community enterprise successful can be summarized in five factors: driving the membership in the community for business ownership, managing a business as systematically, recording accounts continuously, having a great marketing plan and strategy and having a guarantee such as some kind of quality certification (Ruengdet and Wongsurawat, 2010). Furthermore, the important indicators for measuring the real achievement of community enterprises come from the satisfaction of two main factors: job and life satisfaction (Sriprasert, 2013).

In the future, community enterprises have an opportunity to expand around the world. It can help to improve the living conditions of local people (González, et al., 2017). However, the driving the community enterprise will completely be performed the development of knowledge, marketing and innovation. Additionally, connecting the people in the community to work as a team is the most important key for a strong and sustainable community enterprise.

## 2) Value Chain and Value Creation

Supply chain management is important for businesses because at present most companies cooperate with their stakeholders as a network. The purpose of supply chain management is collaboration among all participants and increasing customers' satisfaction. Thus, communication and data interchange are the keys that make all participants along the business chain able to connect together. Furthermore, collaboration is significant to value creation in the supply chain (Horvath, 2001).

There are many ways to create value in the supply chain. Value chain is a strategy that companies use for analyzing their chain from the beginning. Value chain focuses on processes and how inputs are changed into the outputs purchased by consumers (Porter, 1985). After analysis of the value chain, companies will know value added activities in the chain and how they operate.

Elements in Porter's value chain are divided into primary and support activities. Primary activities are inbound logistics, operations, outbound logistics and marketing/sales. Support activities are secondary activities and can drive a role in primary activities. These include procurement (purchasing), human resource management, technological development and infrastructure. Even though the value chain of each business is different, producing customers' satisfaction and managing relationships with stakeholders are the main points of value chain analysis (Walters and Lancaster, 2000).

However, for the new generation of companies, becoming global businesses affects their process; therefore, value chain analysis is not only for internal operations, but also for external links with the stakeholders along the chain. Consequently, the concept of value chain analysis has been developed into the value network. The value network can be defined that the value is co-created by players in the network. The concept of a value network implies that each player is not independent —all players operate together in the network. As a result, understanding all participants in the network is essential to gaining competitive advantage. Analyzing value networks is important for improving performance and businesses'/industries' evolutions, too (Peppard and Rylander, 2006). In addition, various businesses invite their customers to co-construct value in the supply chain (Pralhad and Ramaswamy, 2004; Gibbert, et al., 2002). They share their experience together. The firms believe customers know the problems as well because they are the end user of products and services. Thus, they can jointly identify problems and solve them together as a co-creation experience. The co-creation concept can produce the building blocks of interactions for co-creation of value, as shown in Figure 2.

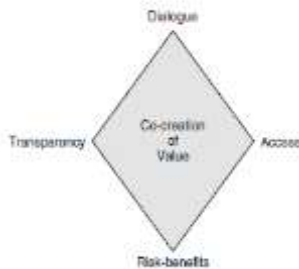


Figure2. Building Blocks of Interactions for Co-creation of Value  
(Source: Prahalad and Ramaswamy, 2004)

Pralhad and Ramaswamy (2004) described the co-creation of value as providing a way for customers to access the business chain. They can give some suggestions and be involved in creating create value together with the business by establishing a dialogue. Moreover, the co-creation solution can build high transparency and reduce risk in supply chain management. Thus, focusing on all participants in the network is important for creating value at the present. Managing the relationships in the network is the key to making a strong business chain and helping the business to achieve sustainable supply chain management.

### 3) Sustainable development concept

In general, businesses focus on economic advantage. However, in the globalization perspective, only the economic dimension is insufficient for being the business push. Among high competition, most businesses use more material resources that impact the population and contribute to global climate change. Therefore, social responsibility and reducing environmental impact are becoming essential components that businesses have to consider.

Jamali and Mirshak (2007) presented the idea that corporate social responsibility (CSR) is a concept that businesses are becoming more interested. This idea introduces three main pillars on which the companies should focus: economic, social and environmental. In addition, there are three more components shown in the pyramid of corporate social responsibility: legal responsibility, ethical responsibility and philanthropic responsibility (Carroll, 1991). The core of CSR is making all participants in the supply chain collaborate and creating win-win situations along the chain. The businesses will achieve more than the social benefits; in doing so, they will get a competitive advantage in the global economy. Moreover, CSR projects a good image for the organization and it is the commitment of business to contribute to sustainable development (Jamali and Mirshak, 2007).

At present, CSR is advancing to the sustainable development concept. The sustainable development model has the same three pillars (economic, social and environment) as CSR, but the sustainable development concept aims for long-term benefits. In general, CSR is just a policy of the companies that choose to focus on social or environmental objectives (combined with economic objectives). On the other hands, sustainable development concentrates on living conditions with regard to human rights by creating and maintaining the widest possible range of options for freely defining life plans. Moreover, it addresses fairness among and between present and future generations; they should be taken into account when considering the use of environmental, economic and social resources.

In summary, the equation to achieve sustainable development is the combination between human well-being and ecosystem well-being (Keiner, 2005). Furthermore, there are a set of indicators for measuring the accomplishment of sustainable development by categorizing indicators into three dimensions as the human system (individual development, social system and government), support system (infrastructure and economy) and natural system (environment and resource). Indicators can describe the performance of each system and its contribution to other systems by analyzing the complexity of sustainability to numerical and graphical data that is easy to understand (Bossel, 1999).

By reviewing previous studies, the concept of community enterprises were described in such issue as the business framework, the purpose of the business, the conditions or weakness, the solution of the problems, and the prediction of the business trends. Collaboration of all participants and creating value into local products integrated with an appropriate marketing strategy and producing new innovation can make the community enterprises successful. In addition, the community enterprises should concentrate on making equilibrium of humanity with nature while acheiving economic growth, which synchronizes with the

sustainable development concept (Hopwood, et al., 2005). Nowadays, sustainable development is expanding because warnings of climate change has influenced many countries' concerns about the quality of human life and conservation of the environment. Although, this concept seems difficult to implement, it is possible if many people take concrete steps toward the goal. For example, this study investigates the business model of pure wild honey product from the community enterprise in Huay Hin Lad Nai Village, Chaing Rai Province. The local people try to add value into pure wild honey by value added activities and they do not forget to conserve their traditional knowledge and way of living. Moreover, they are concerned about the environmental effects also. This business model is consistent with the sustainable development concept. Therefore, the previous studies can serve as a guideline and be applied to this study to create the sustainable business role model; these details will be shown in the next parts of this article.

## RESEARCH METHODOLOGY

This study attempts to review and introduce best practices of the community enterprise in Huay Hin Lad Nai Village, Chaing Rai Province the origin of pure wild honey product under the brands “Kue Nae Jor” and “Hostbeehive”. As a result, this study may be used as a guideline for others communities for creating community enterprises. The methodology of this study can be described as follows:

### 1) Preliminary Data Collection

This section is a review of Huay Hin Lad Nai Village, Chiang Rai Province where pure wild honey product is created as a community enterprise. Data was collected from secondary databases and documents such as academic research, websites, and journals. The preliminary data collection helped the researcher to plan and design the research methodology to achieve the research objectives. Moreover, it guided the researcher for preparing and creating the interview questions before the observations and depth interviews in the next step.

### 2) On-site observations and depth interviews

The researcher conducted on-site observations and interviews in Huay Hin Lad Nai Village, Chaing Rai Province with stakeholders such as the leader of the community and representative local people in depth for more details about their community enterprise.

### 3) Analysis value added activities and margin of pure wild honey product

Value added activities analysis started from on-site observations and was followed by analysis of the activities which occurred. Two categories were identified: primary activities and support activities (following the basic concept of value chain analysis). This part will show value added activities of the pure wild honey product supply chain (how to create value to pure wild honey product). After that, in-depth interviews of stakeholders (same groups following step 2) were conducted to investigate value added in the chain. Value added of the pure wild honey product is focused on by looking at the margins that resulted.

### 4) Discussion and Report

This step will sum up the results and give some suggestions for applying this study to others communities that are interested in and need to create their own community enterprise. Furthermore, it will show development ideas for future study.

## RESULTS

### 1) Overview of the pure wild honey product at Huay Hin Lad Nai Village, Chaing Rai Province

The major income of people in this community is mainly gained from the pure wild honey produced by two species of wild bees: Giant Honey Bees and Asiatic Honey Bees. Giant Honey Bees are regularly discovered on the big and high trees in the forest from December to January every year. Local people who take honey from Giant Honey Bees must have some skills and techniques combined with traditional knowledge. Currently, there are five persons in the community who take honey from the Giant Honey Bees. Normally, they take honey from the Giant Honey Bees around May or before the rainy season. After they take honey from the Giant Honey Bees, they usually filter it to separate the contaminants. Then, they bottle the honey into 1,000-gram bottles. Finally, a local agent buys the honey from the local people who have the honey, and the agent re-bottles it into 130-gram and 290-gram bottles under the brand “Kue Nae Jor” before selling it to customers. Figure 3 shows an overview of pure wild honey product supply chain from Giant Honey Bees.

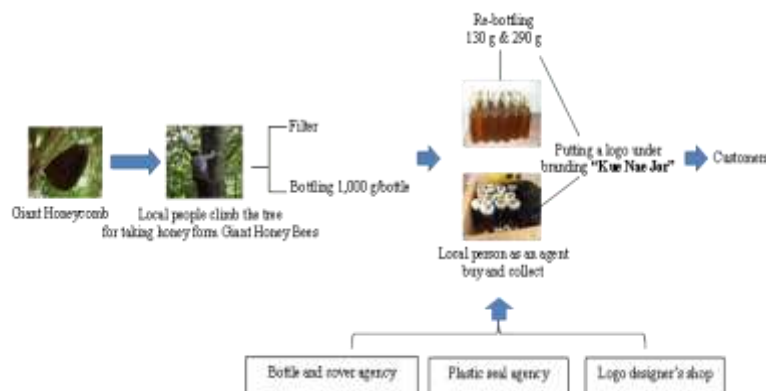


Figure 3. The overview of the pure wild honey product supply chain from Giant Honey Bees

Asiatic Honey Bees come from nature (like the Giant Honey Bees), but they usually build their beehive inside the hollow of the trees. At present, local people in Huay Hin Lad Nai Village can breed Asiatic Honey Bees in man-made bee boxes. There are 20 families that breed Asiatic Honey Bees in this community. Local people make bee boxes and bring them into the forest from December to January every year. Then, Asiatic Honey Bees will come and produce honey in the bee boxes. In May or before the rainy season, local people go to the forest to collect the honey from their bee boxes. Filtering and bottling the honey into gallons or 1,000-gram bottles is the next processes. After that, local people sell the honey from the Asiatic Honey Bees to the leader of the village. The leader re-bottles the honey into 240-gram and 450-gram bottles of pure wild honey without beehive and 230-gram and 475-gram bottles of pure wild honey with beehive, as well as 7,000-gram containers for delivery to the restaurant customers groups. Honey from Asiatic Honey Bees is sold under the “HOSTBEEHIVE” brand. Figure 4 illustrates the overview of the pure wild honey product supply chain from Asiatic Honey Bees.

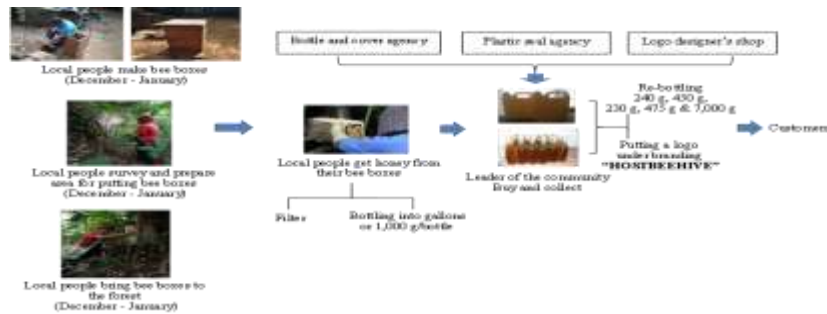


Figure 4. The overview of the pure wild honey product from Asiatic Honey Bees

2) Value added activities analysis

On-site observations and interviews with stakeholders in the community were conducted to find value added activities in the processes. This section applies the basic value chain concept to categorize the activities into two groups; primary activities and support activities (Porter, 1985). Important value added activities of pure wild honey products in Huay Hin Lad Nai Village beginning with primary activities are as following: inbound logistics related to the processes of taking honey from the beehives and selecting good quality packaging. In addition, marketing and sales activities which use marketing strategies such as introducing products at exhibitions and inviting target groups or customers to join workshops that teach about honey and traditional knowledge of the community. Workshops can connect customers with the brand of the community enterprise and allows the participants to know about local people’s ways of living and more details related to the community.

Thus, the workshop leads to the marketing strategy known as “brand storytelling”, which helps to create value into pure wild honey product. Moreover, the community infrastructure supports business activity by having a good leader, cooperating with all participants in the community, and setting aside the honey funds to collect the money for forest ranging, and developing activities in the community. Besides of the above components, the other one making the enterprises completely accomplished is ‘communication’. Both intra-community and inter-community communications allow flowing of critical required information that helps encourage the achievement and reduces the conflicts and problems within the community enterprise. These activities all add value also. In conclusion, the strength factors that make this community enterprise successful are the effective internal and external communication. Table 1 shows value added activities of pure wild honey product in Huay Hin Lad Nai Village, Chiang Rai Province.

Table 1. Value added activities analysis of pure wild honey product

Primary Activities
<p><b>Inbound Logistics</b></p> <ul style="list-style-type: none"> <li>Local people collecting honey from beehive</li> <li>Local people selecting good quality packaging and safety for delivery</li> </ul> <p><b>Operations</b></p> <ul style="list-style-type: none"> <li>Filtering honey to separate the contaminants</li> <li>Bottling and labeling with logo</li> </ul> <p><b>Outbound Logistics</b></p> <ul style="list-style-type: none"> <li>Distribution through multiple channels such as direct sale, partnership’s shop, social media, online shopping</li> <li>Delivering products through multi-mode transportation depending on the customers</li> </ul> <p><b>Marketing and Sales</b></p> <ul style="list-style-type: none"> <li>Creating brands and logos for the community’s products</li> <li>Increasing social media, online marketing and sales channels</li> <li>Joining the product exhibitions</li> <li>Invited customers to join honey workshops to learn about honey and local people’s ways of living and their traditional knowledge</li> <li>Using the “Brand Storytelling” marketing strategy</li> </ul> <p><b>Services</b></p>

<ul style="list-style-type: none"> <li>• Offering multiple distribution channels for customers</li> <li>• Offering multi-mode transportation for customers</li> <li>• Giving good suggestions and details about honey to customers</li> </ul>
<b>Support Activities</b>
<p><b>Firm Infrastructure</b></p> <ul style="list-style-type: none"> <li>• Producing collaboration with all participants in the community</li> <li>• Having a good leader</li> <li>• Setting aside honey funds deducted from the revenue for forest ranging and developing the community</li> </ul> <p><b>Human Resource Management</b></p> <ul style="list-style-type: none"> <li>• Knowledge and traditional transfer to the new generation in the community</li> <li>• Integrating the community enterprise with local people’s ways of living</li> </ul> <p><b>Procurement</b></p> <ul style="list-style-type: none"> <li>• Procurement and purchasing materials with concerned for quality and worthiness</li> <li>• Selecting packaging with a good quality, which is comfortable to carry and cost effective</li> <li>• Procurement of a good logo with good quality and minimum cost</li> </ul> <p><b>Technology Development</b></p> <ul style="list-style-type: none"> <li>• Using social media and online marketing</li> <li>• Using a plastic seal machine to cover the honey bottles</li> </ul>

3) *The revenue and margin from pure wild honey product*

Pure wild honey from nature can be upgraded to premium organic products by value added activities as shown in the previous section. This product can increase revenue for local people in Huay Hin Lad Nai Village. Moreover, some of the revenue from pure wild honey product is deducted into the two honey funds. The funds are spent on forest ranging, which conserves the origin of quality of the pure wild honey products. In addition, the funds are spent for community development.

There are five people in the community who get honey from the Giant Honey Bees. They filter and bottle honey into 1,000-gram bottles and sell them to a local agent in the community at the price of 300 Baht per kilogram. Pure wild honey product from Giant Honey Bees can provide about 60,000 Baht of total yearly revenue for local people in Huay Hin Lad Nai Village. The deduction of the sale of the product from Giant Honey Bees is 20 Baht per bottle, which in total contributes around 4,000 Baht to the fund per year. Thus, net revenue of honey from Giant Honey Bees is about 56,000 Baht per year or 11,200 Baht per person per year.

After that, a local agent re-bottles honey into 130-gram bottles and 290-gram bottles with covers and plastic seals. Finally, bottles are labeled with logos under the “Kue Nae Jor” brand before being distributed to the customers via multiple channels. Cost of the new packaging, plastic seal and logos are 20 baht per bottle on average. Thus, the total costs of pure wild honey from Giant Honey Bees in the new packaging for the 130-gram bottles and 290-gram bottles are around 57.5 Baht per bottle and 120 Baht per bottle respectively. Therefore, pure wild honey from Giant Honey Bees in new packaging can create maximum value at 73.91% from 130-gram products size (Table2). The summary of margins of pure wild honey product from Giant Honey Bees is shown in Table2.

*Table2. Margin of pure wild honey product from Giant Honey Bees*

Packaging size (grams/bottle)	Total cost (Baht/bottle)	Sell price (Baht/bottle)	Margin (%)
130	57.5	100	73.91
290	120	200	66.67

Nowadays, Asiatic Honey Bees are bred in bee boxes that are made by around 20 families of local people in Huay Hin Lad Nai Village. They make bee boxes and bring them into the forest and then Asiatic Honey Bees come inside for reproducing and honey producing. In May or before the rainy season every year, local people go to the forest to collect honey from their bee boxes. They filter and bottle the honey from the Asiatic Honey Bees into gallons (7,000 grams) or 1,000-gram bottles and transfer them to the leader of the community. The leader buys the honey from local people at a price of 250 baht per kilogram. In total, pure wild honey product from Asiatic Honey Bees provide around 175,000 baht in yearly revenue to local people. The 30% deduction of the sale of the product from Asiatic Honey Bees cumulatively contributes around 52,500 Baht per year to the fund. Thus, net revenue of the honey from Asiatic Honey Bees is 122,500 Baht per year or 6,125 Baht per person per year. However, the revenue per person depends on the quantity of bee boxes that the local people made.

The leader then re-bottles the honey from Asiatic Honey Bees to new packaging including 240-gram and 450-gram bottles for pure wild honey without beehive and 230-gram and 475-gram bottles for pure wild honey with beehive as well as 7,000-gram containers for restaurant customers groups. After that, bottles are covered and sealed with plastic seals. Finally, labels are applied with logos under the “HOSTBEEHIVE” brand. Costs of new packaging, plastic seals and logos are 20 baht per bottle on average, so total cost of pure wild honey from Asiatic Honey Bees in the new packaging for the 240-gram and 450-gram (without



beehive) options, and 230-gram and 475-gram (with beehive) options are around 82.5 Baht per bottle and 145 Baht per bottle respectively. Packaging as a gallon (7,000 grams) for restaurants costs amount to about 1,800 baht per gallon. Pure wild honey from Asiatic Honey Bees in new packaging can create a maximum value of 347.27% from the 240 grams without beehive, and the minimum margins come with products in gallons with a margin of 94.44% (Table3). The summary of margins of pure wild honey product from Asiatic Honey Bees is shown in Table3.

**Table3: Margins of pure wild honey product from Asiatic Honey Bees**

Packaging size (grams/bottle)	Total cost (Baht/bottle)	Sell price (Baht/bottle)	Margin (%)
240 (w/o beehive)	82.5	369	347.27
450 (w/o beehive)	145	510	251.72
230 (w/t beehive)	82.5	349	323.03
475 (w/t beehive)	145	439	202.76
7,000	1,800	3,500	94.44

### SUMMARY AND DISCUSSION

This study investigates a business model of pure wild honey product in Huay Hin Lad Nai Village, Chiang Rai Province by on-site observations and depth interviews with stakeholders in the community. As a result, the major income of local people is mainly gained from the pure wild honey produced by two species of wild bees: Giant Honey Bees and Asiatic Honey Bees. The proportion of pure wild honey from Asiatic Honey Bees is larger than that of Giant Honey Bees because the reproduction of the former is easier. The Asiatic Honey Bees can survive and breed in bee boxes built by the villagers. Honey product from Giant Honey Bees is branded under “Kue Nae Jor” while honey product from Asiatic Honey Bees is branded under “HOSTBEEHIVE”. Average net revenues of honey from Giant Honey Bees and Asiatic Honey Bees are 56,000 Baht per year and 122,500 Baht per year respectively. The maximum margin of honey from Giant Honey Bees occurs in the 130-gram product size at 73.91% while honey from Asiatic Honey Bees has a maximum margin of 347.27% with a packaging size of 240 gram without beehive. Pure wild honey product is not only beneficial for local people because they consider the environmental effects of their business activities. Some of the revenue is deducted into two honey funds (Giant Honey Bees and Asiatic Honey Bees) for forest razing and community development. The deduction of the sale of product from Giant Honey Bees is 20 Baht per bottle; this cumulatively contributes around 4,000 Baht per year to the fund. The deduction of the sale of the product from Asiatic Honey Bees is 30% of the whole revenue, which cumulatively contribute around 52,500 Baht per year to the fund.

Value added activities that are important for this community enterprise include transferring the traditional knowledge to the new generation and having good leadership that promote cooperation among participants and make a strong community. In addition, local people set up the community enterprise and create branding combine with re-packaging their product; this helps to increase value into pure wild honey product. Finally, local people apply marketing and sales strategies such as brand storytelling and inviting customers to join workshops that help customers to understand about pure wild honey product from Huay Hin Lad Nai Village, and they can learn traditional knowledge and local people’s ways of living. These strategies can encourage and convince customers to support the community enterprise because they need to collaborate with the community brand and need to help local people to conserve the forest and develop the community. In this case, co-creation value will occur.

The business model of pure wild honey product at Huay Hin Lad Nai Village, Chaing Rai Province is a good example of an enterprise that achieves goals of the sustainable development concept by interconnection among economic (business), community and environment objectives. As for the economic dimension, local people can add value into pure wild honey product by value added activities and therefore increase income for their community. However, local people also deduct some of the revenue from pure wild honey into two honey funds for forest ranging and community development because they are concerned about environmental problems. Lastly, for the social or community dimension, they focus on the relationship among all participants in the community and build good leadership structures with the main point focusing on promoting quality of life. In conclusion, the business model of pure wild honey product in Huay Hin Lad Nai Village, Chiang Rai Province, can be a good example model for other communities to create their own community enterprises. They can adapt the model of pure wild honey product enterprise to their resources and goals. For further research, indicators for sustainable development should be applied to measure and confirm the achievement of this community and clarify the complexity of the sustainable development concept in each dimension.

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*Somboon, J. The Study of the Business Model Related to Local People's Ways .....*

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## Study of Import-Export (Shipping) Personnel's Capacities: A Case Study on International Trading Companies ,Thailand

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**Abstract:** The research on studying of import-export (shipping) personnel's capabilities: a case study on international trading companies is a quantitative research. Propose of this research is to examine factors that related to working abilities of personnel in import-export (shipping)field of international trading companies. Variables have been indicated, which are 1) Independent variables, such as personal factors (sex, age, educational levels, experiences, and working sector); 2) Dependent variables, such as capacity factors, capability factors, knowledge factors, and practicing factors of import-export (shipping) personnel. The result shows that, the percentage of respondents to the questionnaire are female more than male (54% female, 46 % male), 56 % of the respondents are in between 21-30 of age, 56 % have lower and bachelor degree educational levels, and 65% are working as operation officers or messengers. Furthermore, most of the respondents indicated that obtaining customs broker licence is the first indicator (4.72%) for capacity and capability. The second important indicator is resourcefulness and intelligence (4.62%), and the least important indicator is foreign languages and good inter-personal relationship skills. Whereas, on working efficacies, most of the respondents agreed that knowledge on legal and custom regulation is the most important (4.76%), the second most important factors are import-export knowledge, knowledge on dealing with international trading documents, and knowledge on rules and regulations (at equal percentage of 4.72). For shipping practices, most of the respondents admitted to have abilities for negotiation (4.76%), experiences related to import-export (4.72 %), the third is proficient on reading and preparing documents for dispatching (4.68 %), and the least is versatility on work related (4.56%)

*Keywords:* Import-Export (Shipping), Personal's Capacities, Customs Brokers, Shipping Labours.

### INTRODUCTION

Nowadays, expansion of economics, of importing-exporting, started to show a better result. International business, import and export, are therefore growing. Work positions for customs formality is increased, Kabali, I. M. ,2014. following the expansion of international trading companies, import-export business. Helseth, M. H., & Coulson, D. W. ,2013 As the result, shipping labours is insufficient and under effective. In consequence of hard work and unreliable working time for the shipping, as well as several specific trainings and licence to be obtained, there are only small numbers of those who are interested and passed the training working in this field. As oppose to worker requirement and world's business growth. Aforementioned, study of shipping personnel are important to world business. On top of that, shipping resources have to be screened; when AEC is started in which ability to deal with load work burdens, and competency and work experiences are considered to support the expansion of economics. Araque, C. E. ,2011, Danai Tianphut,2002

McClelland 1993, cited in Panorpan Jaturongkul, 2550, page4 defined "competency" as personalities inside an individual that push forward the person to produce a good work or as specified. Hoge, Tondora, and Marrelli (2005, p.517, cited in Panorpan Jaturongkul, 2550 identified structure of competency as KSAPs, which are Knowledge; Skills; Abilities; and Personal Characteristics. Which is linked to end results and can be compared with benchmark They have high power over an achievement of work of a person, are a character or responsibility, also they are able to be improved by trainings. Narongwit Sangtong (2547, page27) added that competency is capability, or competency of a person in a position. Not only competency is behaviours, but also believes, attitudes, and inner personalities. Nonetheless, Jramporn Prathomboon (2547, page23 cited in Panorpan Jaturongkul, 2550) said that competency is what explaining a person's characteristics and particularities, as well as knowledge; behaviours: skills; and, in which quality and higher standard works are expressed. Corresponding to idea of Sutat Nampulsuksan (M.P.P. cited in Panorpan Jaturongkul, 2550) where the meaning of competency is characteristics, both in knowledge and skills and individual's behaviours, which are important for successfully working in each position. Wu, J., & Haasis, H. D,2013 As you can see, from above theories, competent worker is able to increase production or improve business processing, which will be a way to help solving shipping worker shortage problems. Concisely, this research has been studied for a better shipping worker screening, as a result for improving the quality of work and preparing for the growing world's economics and step forward to the AEC. Lin, H. S., & Hsieh, L. Y. ,2011, , Fayle, C. E. ,2013.

### RESEARCH OBJECTIVES

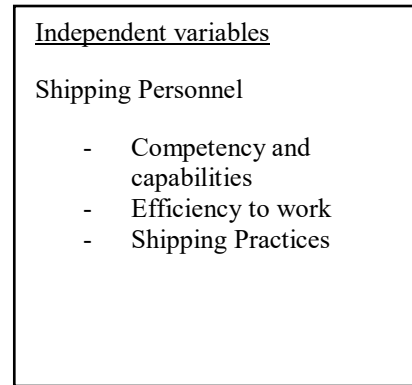
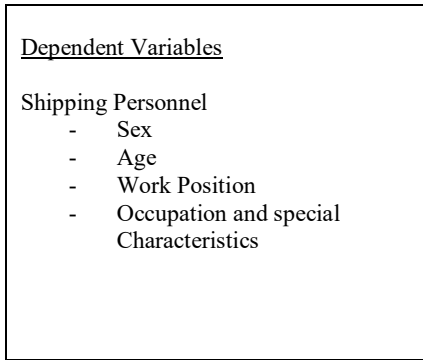
1. Advised standardized properties for shipping personnel in companies of Thailand.
2. Study relationships between competencies and personal factors of shipping personnel in companies of Thailand.

### RESEARCH METHODOLOGY

To work in the shipping field, one needs to have specific knowledge of the vocation. Therefore, this research is conducted to identify special characteristics that are needed in a shipping worker for international trading companies.

VARIABLES IN THE RESEARCH

Research Framework



POPULATION

*Samples*

Sampling method – selecting 25 persons on every work department, considering simple probability where population in each department have equal chance to be selected, and group will be indicated for the population.

*Data Collection Process*

- Researcher contacts the companies for list of population/samples and information for the study. Interview is conducted to gather information and identify problems that are often occurring in the company. Then review to design the study process, using self-ministered questionnaire.
- Data is collected in international trading companies.
- Data collection period: 6 months.
- Correcting and completing the questionnaire before analyses.
- The corrected and completed questionnaires are selected by each tool's criteria, and will then be analyses and evaluated.
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*Data Collection Tool*

Data collection tool for this research is questionnaire for international trading companies in Thailand.

Rating scale questionnaire is used, given points dividing into 5 levels:

- 5 = It is the most important
- 4 = It is important
- 3 = It is fairly important
- 2 = It is rather important
- 1 = It is the least important

There are 3 steps in designing the questionnaire for Thai's merchant maritime.

- Step 1: information prior to designing the questionnaire
- Step 2: identifying the needs for shipping personnel in international business
- Step 3: general suggestions, which the data will be self-collected

RESULTS AND DISCUSSION

For competencies and capabilities, the study showed that the respondents obtained a certificate for custom broker licence, are resourceful and intelligence in solving problems, have good inter-personal relationship, foreign language skills, and responsible to organization and customers. It means that the population consider the important of competencies and capabilities; total mean is 4.67 4.83 with standard deviation of . 0.37, has the highest total opinion. The reason is that working as shipping required adequate knowledge, including academic skills, knowledge, and desire for success. Which is correlated to McClelland theory (1993 cited in Danai Tepnuput, 2545, page4); competency is clusters of knowledge, attitude ,skills and of an individual, which greatly affecting successes of work for that person, roles or responsibilities which corresponding to success, and can be compared with standard criteria, as well as is able to improve by training. Office of the civil service commission indicated that competency is group of knowledge, skills, capabilities, behaviors, and result of practice, which part of these are resembled from knowledge ,skills, capabilities personalities, attitudes, and popularity of each individual. Duangjai jandasang,2015.

For knowledge, the study found that the respondents have knowledge about legal and customs regulation, knowledge of importing-exporting, knowledge of dealing with international trading documents, and have knowledge of rules and regulations. To conclude, the sample considering the importance of work efficiency; total mean is 4.76 4.93 with standard deviation of 0.25, has the highest total opinion. Because knowledge of the work are required to work as shipping, as well as experiences and expertise in remembering, making decisions, differentiation of each section. This correlated to Prapapen Suwan (cited in Aksorn Sawasdee, 2542, 26) concept, explaining that knowledge is an initial behavior that learners are remembering from recognizing, seeing, hearing. This level of knowledge is knowledge of definition, meaning, rules of structure, truth, and problem solving. Understanding may expressed in the form of skills in "translation"; which means ability in describing about such information using their own language; and "definition" that expressed in the form of opinions and conclusion; as well as ability for "estimation" or expectation of what going to happen. Benjamin S. Bloom (cited in Sawasdee 2542, 26-28) has given the meaning of knowledge as recalling of a specific

thing, procedure, and method. In 1965 Bloom and friends have also studied about human's cognitive domain, which comprise of 6 knowledge levels from the lowest to the highest. Explanation of each level as follow:

1. Knowledge means learning that emphasized of remembering and recognizing for thoughts, things and events. These memories are from simple memories and liberated from each other to complex memories with relation to other memories. To reasonably expanding this memory knowledge is to play, respond, translate, conclude, or interpret it.
2. Comprehension is intellectual abilities to reasonably extend knowledge and memories, responding to meaningful stuffs, conclude, and abilities to translate, or interpret something.
3. Application is abilities to use the knowledge, understanding, and comprehension of stuffs to solve new problems. By using of knowledge, especially comprehension, together with ability to translate, conclude, or interpret of the stuff.
4. Analysis is abilities and skills higher than understanding and application, which is able to differentiate things that being considered, which correlated, also investigating relationship between sections to identify whether each composition is compatible to each other, and generate thoroughly understanding of one thing.
5. Synthesis is abilities to compile compositions for produce single story or thing. Synthesis has the property of gathering information and detail of various stories together, firstly in order to form an unclear structure, which requires creativities within selected limitation.
6. Evaluation is abilities to decide about thoughts, popularities, results, answers, strategies, and substances for some objectives. Criteria are created for evaluation and consideration. This is the highest of characteristics of cognitive domain, where knowledge, understanding, application, analysis, and synthesis are used for evaluation of one thing.

About shipping practices, the applicants have negotiation abilities, experiences related to import-export, expertise in reading and preparing documents for dispatching. It can be concluded that shipping practices is considered important; total mean is 4.68 with standard deviation of 0.30, has the highest total opinion. To explain this, shipping practices has the power over success of the organization, which conform to theory of Schermerhon (1966, p785), said that working practice means behaviors that a person has successfully done under their responsibilities. Working practice of a person depend on

- 1) Personal characteristics, knowledge, skills, and experiences of work, which related to working practice;
- 2) Attempt to work of a person, meaning the willingness to work of a person, which related to grateful to work, whereas depending on motivations to work. Tongzon, J. L., & Lee, S. Y. ,2015 When a person has motivation to work, they will try their best to successfully done it;
- 3) support from the organization, payment, materials for work, and facilities on the workplace. These supporting stuffs are connecting to providing the chance of a person to do the work. Embassy, U. S. ,2014

#### SUGGESTION

The companies should encourage the employees for gaining of knowledge and expertise in logistics, by sending the workers to trainings or courses arranged by the government, in order to help the workers getting better understanding of practices and attaining new knowledge to improve their work and life. Consequently, producing fewer errors and reduce the time of work. Zhao, G. ,2014, September.

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## Factors Affecting Usage of KTC Credit Card of Consumers in Nakhonpathom

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**Abstract:** This research to study Marketing Mix Factor Lifestyle Acknowledgment of the benefits of using KTC credit card in Nakhon Pathom province. The closed-ended questionnaire was tested for reliability and content validity. The data collected from consumers in Nakhonpathom. The sample size was 400 samples. The instrument used for the study was a questionnaire with a reliability of 0.905 and the content validity was verified by the experts. Statistics used in data analysis are: Descriptive statistics were percentage, mean, standard deviation and reference statistics. The hypothesis test was used to test the hypothesis at the significance level of 0.05. The study indicated that most respondents were male, aged 31-40 years, with the majority being undergraduates. Average income per month: 20,001 - 30,000 baht. It was found that the marketing mix and perceived benefits of KTC credit card consumers in Nakhonpathom Statistically significant at the 0.05 level. The lifestyle model did not affect the consumers' decision to use KTC credit cards in Nakhonpathom

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*Keywords:* Marketing Mix Factors, Lifestyle, KTC Credit Card.

### INTRODUCTION

Credit card is a financial tool. The so-called benefits for disciplined people spend money. If you use credit card properly. Have discipline in spending money. Control Spending can be used as scheduled. Know your status and financial liquidity. Also known as money management. In order to be able to pay off your credit card debt in accordance with the billing cycle caused by spending. It will not cause a problem of interest. And the liability that follows if it can do so as already mentioned. Credit card is also a financial product. The answer to the people in the Cashless Society, so if you explore yourself then find. Can all of the above. You will find that using credit cards is very useful. The benefits of using a credit card include: credit cards help reduce the burden of using cash. Reduce the risk of theft or money loss. Reduce time to run ATMs, use online payments through mobile applications. Make money abroad is a matter that we can do without spending time to exchange currency around the world (Information from: MoneyGuru.co.th).

Credit cards have a grace period of 45 days from the account summary date. So if you can manage your financial liquidity well and pay your credit card debt on the bill, you can postpone your cash payment up to 45 days. You can choose to invest money to make money, such as working capital to sell. Or invest in short-term funds. In addition, spending on credit cards each month is spent on summary invoices. It is like a summary of expenses each month. So we can evaluate whether we spend too much extra money on necessities. Customers can apply for the promotion of goods and services with 0% interest rate for up to 3-6 months, so we have the opportunity to invest cash to make money can save the money for emergency use. (Information from <https://moneyhub.in.th/article/no-debt-for-credit-card/>)

Most shops And bank credit card providers. They have jointly organized many promotions. This is a discount on purchases and services, or choose to receive a cash back when spending on a certain amount, or even to accumulate points to redeem for a gift if you have a credit card. It is regarded as a person with moderate financial credibility. Because credit card approval is clearly defined candidates. If you are a person who is considered a credit card from the bank and discipline to spend, have a good credit bureau. It is one of the guarantee that you have a history or what we call. "Have a good credit"

So, other credit transactions. Such as loans to buy homes, cars or investment, can be easier. Credit Cards In addition to being a source of working capital, increasing liquidity in business or in daily life. It can also be an emergency source of money if you need to make emergency payments, such as emergency medical treatment. If you need a large cash, you may need to wait for the bank to open. Time to trade shares / funds or to borrow from others.

The credit card is a tool to meet the demand for money in an emergency as well. There are several types of credit cards available today. (From: Bank of Thailand, 2018) The number of credit cards issued in March 2018 was 20,601,876. The popularity of credit cards is widespread in many banks in Thailand. All credit cards are available to meet the needs of consumers. There are a variety of card face. There are promotions. With the credit card there are plenty. Many of the banks are offering special privileges. Comes with a credit card. Just take the card and get the privilege. Today, we will see advertisements of the merchant inviting credit cardholders of various banks. Join the discount store or shop. The discount may be in the form of cash rebate from the price of goods or cash back to credit card account, etc., depending on the conditions of each type of card will be determined. Consumers There are more options and from the past. The information for the latest February 28, 2018 is the income from credit, whether it is a credit card. Or increased loan and income from bad debt recovered with. Profit this year was 2,966 million baht, 23% more than last year. The net profit is Bt11.87 / share.

The company's revenue this year is 18,663 million baht, up 5% over the previous year. Credit card revenue increased 5%. Loan income increased 6% year on year. The company also promotes sales and benefits to customers throughout the year. For KTC credit card customers, 58% of credit card income is 2.14 million credit card customers. Of this figure, 69% came from the provinces, 31% from Bangkok. KTC's loan portfolio customers accounted for 36% the two types of loans are personal loans. Proportion of income is 23%. (Such as buying mobile phones, refrigerators, etc. through department stores) accounted for 13% of hire purchase loans. Revenues are down 1%. Revenue is down 6%, but the company is ready to expand its second-hand car loan business. This revenue is 10%. This year, the company has increased the revenue from the bad debt recovered. Up 21% from last year. Core expenses increased by 4%. Key issues came from marketing. With Big C, which increased by 26%, personnel costs increased 12% by number of employees. And to expand the branch. The company's debt loss this year is down 9% (data from <https://www.kfc.co.th/kTC/cards/kTC-classic-card>).

The researcher should consider the research. Factors affecting the decision of using KTC credit card of consumers in Nakhon Pathom. This suggests that a considerable amount of customers and the direct impact of this research. To know the behavior of KTC credit card users and to know about the problem of using KTC credit card to use the information from this research. To the Marketing Department, public



relations. Or affiliates and the people involved. It is used as a guideline to solve problems, improve and improve the use of KTC credit card services to increase efficiency of service use.

RESEARCH OBJECTIVE

1. To study the marketing mix factors that affect the decision to choose a credit card , KTC Consumer Credit Card in Nakhonpathom.
2. To study the problems of consumer use in Nakornpathom..

RESEARCH FRAMEWORK

Independent Variable

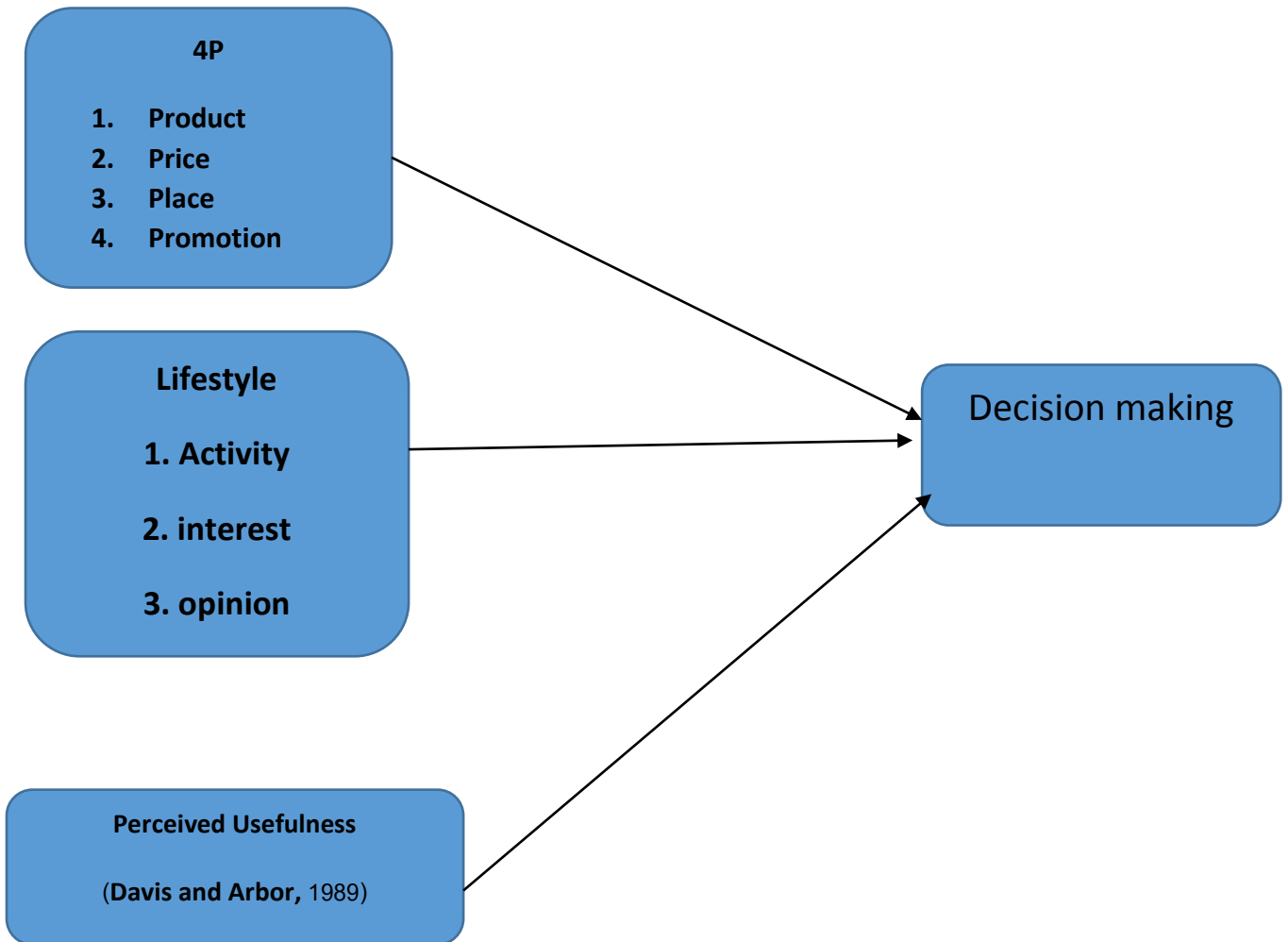


Figure 1. Research framework

METHOD

Demographics and population groups are the people who asked for KTC credit cards from consumers in Nakhonpathom in January-May 2018. There were 550 people. Big C, Nakhon Pathom: July 2018)

The samples were people who applied for KTC credit cards in Nakhonpathom. In January-May 2018, 275 persons were obtained by calculating the Taro Yamane formula, determining the 0.05 tolerance and the Proportional Stratified Random Sampling.

RESEARCH METHODOLOGY

The analysis of data from marketing mix on KTC credit card consumer choice in Nakhonpathom. The results are as follows.

1. Most respondents are female, aged from 31 to 40 years old, have a bachelor's degree, bachelor's degree. career civil servants and more than 20,001 baht or more.

2. The study of opinions on marketing mix factors on the use of KTC credit cards of consumers in Nakhonpathom province was at a high level. The highest mean is Physical characteristics followed by process. Products and the lowest is the marketing promotion. Respectively.

2.1 Products at the high level ( $x = 4.33$ ) When considering each item, it was found that items 1, 6 and 7 were at the highest level, while the other items were at the high level. The highest mean is item 1, reputation and reliability of the company ( $\bar{x} = 4.76$ ), followed by item 6. The payment can be made in installments ( $\bar{x} = 4.63$ ).item 7. choose to pay in full or partial payment ( $\bar{x} = 4.50$ ) and with the lowest average is item 9. SMS service is always available when using the credit limit ( $\bar{x} = 3.73$ ). The lowest

2.2 The overall price was at a high level ( $x = 4.13$ ). Considering each item, it was found that item 10 was at the highest level, while the other items were at high level. The highest average is 10, except for the entry fee and the annual fee ( $\bar{x} = 4.57$ ), followed by item 11, high credit line and low interest rate ( $\bar{x} = 4.28$ ). Item14 fee for a cash advance at a reasonable rate ( $\bar{x} = 4.21$ ) and with an average minimum of item15 paying overdue fines can be waived ( $\bar{x} = 3.82$ ).

2.3 The overall distribution channel was at a high level ( $x = 4.13$ ). When considering each item, it was found that all items were in high level. Item 17: There are places to pay for credit cards, such as banks, Counter Service ,ATMs, etc. ( $\bar{x} = 4.48$ ), followed by item 18. The number of branches covers the service ( $\bar{x} = 4.18$ ). Item 19 can apply for the card holder via the Internet ( $\bar{x} = 4.11$ ) and with an average minimum of item 23 channels can contact staff by telephone 24 hours a day worldwide ( $\bar{x} = 3.88$ ).

2.4 The overall marketing promotion was at the high level ( $x = 4.00$ ). Considering each item, it was found that all items were in high level with the highest mean of item 32. You can pay installments in installments at 0% interest within the specified period. item 35. Sponsorship on radio programs ( $\bar{x} = 4.34$ ). The second is item 25 Collect points for rewards ( $\bar{x} = 4.15$ ). item 24 can be used for discounts on purchases from stores ( $\bar{x} = 4.10$ ) section with an average minimum of 28 have the income to pay the credit card, some donating items to charity ( $\bar{x} = 3.72$ )

2.5 The overall staffing was at a high level ( $\bar{x} = 4.14$ ). All of the above is to a large extent by item with the highest mean score. The item 33 employees responded clearly ( $\bar{x} = 4.40$ ), followed by item 36. The service was courteous and fast ( $\bar{x} = 4.30$ ). item 34 had a 24 hour service staff ( $\bar{x} = 4.17$ ). item 38. Contacting front-line employees is convenient, fast, accurate ( $\bar{x} = 3.98$ ).

2.6 Physical aspects Overall, the high level ( $\bar{x} = 4.35$ ) when the item is found item 41. was at the highest level, while the other items were at the high level. The highest mean is item 41. The cardholder's protection system ( $\bar{x} = 4.62$ ), followed by item 42, has a secure code and card ( $\bar{x} = 4.47$ ). Item 44. provides convenient parking and access to the contact ( $\bar{x} = 4.36$ ) and with an average minimum of 43 computers are used to enhance and services ( $\bar{x} = 4.19$ ).

2.7 Process Overall, it was found that the level of satisfaction was high ( $x = 4.34$ ). All items are in very high level. The highest mean is item 50. The information related to the use of credit cards ( $\bar{x} = 4.44$ ), followed by item 53, Quick and easy way to request form information. By fax or email. ( $\bar{X} = 4.42$ ) item 49 is the process of adding a credit card, temporary ( $\bar{x} = 4.40$ ) and with an average minimum of item 47 steps, easy application. Fast approval ( $\bar{x} = 4.20$ )

#### *Summarize and discuss the findings.*

Based on research. Factors Affecting Credit Card Selection of KTC Consumer Credit Card in Nakhonpathom. Can discuss the results as follows.

The results of the research on the factors affecting the selection of KTC credit card consumers in Nakhon Pathom. The marketing mix is a major factor in the choice of credit cards. Because marketing mixes are factors that can meet the needs or needs of customers to satisfy the product. And influence the purchase or use of customer service. The important factor is the physical aspect. Must be convenient and easy to purchase goods and services. Applicable to all ATMs in the country. Secondly, the service factor. There are many branches covering the service and can pay for several credit cards. To create credibility, customers are more confident in using the service. Price factor Exemption of entry fee and annual fee for using the card. Satisfy customers. And personnel factors. Courteous staff Fast and enthusiastic service. This will impress the customers to use the service. The results of this research are as follows: 1).The overall marketing mix was at a high level. The overall technology adoption factor was at a high level. 2) People in Bangkok metropolitan areas with different demographic, gender, age, status, and educational backgrounds were not significantly different in using credit cards. Demographic factors, occupation, income and number of family members are different. There are different credit cards. Statistically significant at .053 level)

Marketing mix factors that can predict credit card usage in Bangkok. Include marketing promotion factors. Factors Affecting Credit Acceptance Technology of People in Nakhonpathom. 1) The perceived benefits of using the service, 2) the speed of service, 3) the attitude of the user, and 4) the personal service, Norapat Sathansathit (2558). The factors that affect the choice of credit card holders are the high level of credit card membership. And a variety of participating stores. The average value of the questionnaires was 3.94 The respondents rated at a moderate level as the design / style of the card, such as the pattern color, was 3.88. Respondents rated at a low level is the amount of approval. The average is 3.85. Trithip Boonyam (2009) study on marketing factors related to credit card use of low income people in Bangkok and its vicinity revealed that the service of credit card. The convenience of paying for credit cards. Promotion credit card advertising Presenter of Credit Card The beauty of credit cards Recommendations of the people around the news about the card company and the personality or the credit card salesman.

Meanwhile, the market factors affecting the decision to use credit cards of low income people in Bangkok metropolitan and suburbs were statistically significant at the .05 level. And the first entry fee Kate Vitruathip (2014) studied about. Factors influencing the decision to use the online financial transaction service case study of CIMB Thai Bank Public Company Limited found that the convenience of mobile transactions and tools via the Internet. It is popular and trusted by more and more users. As a result of the increase in the number of financial transactions via internet or mobile, there are many. And increasingly relentless. Whether it is payment for goods or services by transferring money to your bank account after agreeing to purchase goods or services, cutting expenses directly from your debit card, credit card, even the money into the electronic wallet before the transaction. Or service these transactions are related to the services of commercial banks. Kanokporn Truktrong (2017) studied

factors influencing the decision of using credit cards of Siam Commercial Bank Public Company Limited, Branch See Yake Hua Thanon The factors that influence the decision of using credit card of Siam Commercial Bank Public Company Limited branch at See Yake Hua Thanon . Overall, the mean was very high. On the side of the sample, it was found that the factors influencing the decision of using the bank credit card are more than other aspects of location and convenience.

Sirintra Jumpatuch and Prongsak Auttaphut (2016) studied factors Summary of opinions on the process of selling products via Facebook case study of cosmetics retailers by SCOR theory as Plan, Source, Make, Delivery and Return that the overall rating is very favorable.

The Bank has a number of other channels. For payment such as post office via ATM via Internet Banking, followed by the price. Especially with the exception of annual credit card fees. The subjects considered that the factors that affect the credit card decision of Siam Commercial Bank Public Company Limited branch intersection. At the lowest level is the physical environment. Especially with the box to listen to comments. Or customer feedback For hypothesis testing, it was found that sex Education And the difference in monthly income affects the credit card used by the customers of Siam Commercial Bank Public Co., Ltd. In terms of products, price, location and convenience. The promotion of marketing, personnel, process, service, age, marital status and occupation did not affect the credit card decision of the customers of Siam Commercial Bank Public Company Limited branch at the intersection of See Yake Hua Thanon Roads in Kanokwan Panyathanapat (2015). Factors affecting the decision to use Thai credit cards in Bangkok and its vicinities Credit cards are the cards used by commercial banks (Ban k) or non-financial credit card issuers to member consumers. It is a symbol of cash used to pay for goods or services from a merchant or credit card business instead of cash. The advantage of credit cards is that consumers can use the purchase of goods or services first and can pay later. Discount from participating merchants. You can earn points or redeem your card spend. Reduce carrying large amounts of cash, which is risky for loss or theft. With so many benefits, credit cards become one of the most valued social statuses of consumers. Jinda Kuanpan (2010) Credit Card Decisions Consumer behavior in Chiang Mai Municipality.

### SUGGESTION

The purpose of the study was to determine the factors affecting KTC credit card consumer choice in Nakhon Pathom.

1. This research found that the marketing mix factors on the use of KTC credit cards of consumers in Nakhon Pathom. The customer is well aware of the needs of customers. This will make marketing for KTC credit card business more successful.

2. Should be arranged to choose the payment of goods and services to meet the needs of each person such as installments, interest rates are lower than normal. Choose payment method.

3. Payment at various payment points. There are no fees for payment.

4. Should add additional payment channels from existing to facilitate payment. And protect interest and penalties will occur if the overdue payment.

5. 0% interest installment period of 10 months should be added to the list of participating merchants and more to cover more.

6. Should have developed a modern technology to ensure the customer.

7. It is advisable to follow the procedure when applying for a credit card. What are the steps to ensure the customer.

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## Factors Influencing the Level of Problem for Rail Transport Supply Chain: A Case of Transport Route from ICD Ladkrabang to Laem Chabang Port, Thailand

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**Abstract:** The purpose of study factors that influencing the level of problem for rail transport supply chain. A case of transport route from ICD Ladkrabang to Laem chabang port in Thailand consisted of (1) to study the causes of supply chain problems in rail transport. A case studied of the route from Ladkrabang ICD to Laem Chabang Port. (2) to study the solution to supply chain problems in rail transportation. A case studied of the route from Lat Krabang ICD to Laem Chabang port. The samples used in the research were: The tools used for data collection were 214 questionnaires and statistics used for data analysis consisted of frequency, percentage, mean, and standard deviation. The research found that, Overall, The factors that influencing the level of problem for rail transport supply chain: A case of transport route from ICD Ladkrabang to Laem chabang port Thailand. There are moderate problems. The most important was operational management ( $=3.53$ ,  $S.D.=0.72$ ). Secondly was the environment ( $=3.20$ ,  $S.D.=0.66$ ). The sequential were worker/personnel ( $=2.94$ ,  $S.D.=0.69$ ) and the machines or equipment ( $=2.93$ ,  $S.D.=0.63$ ).

**Keywords:** Service Quality, Tourism Logistics, the State Railway of Thailand.

### INTRODUCTION

State Railway of Thailand (SRT.) was a state-owned enterprise under the ministry of transport. They was responsible for overseeing the rail transit business of the country. It provides passenger transportation services to destinations. In addition, another important mission is to transport goods using a freight train in transit. Contains cement carts. Cargo Finished Goods Crude car Passenger Cargo Liquid Petroleum Gas Freight train And general cargo trains The service includes both convoy and charter. It has both domestic transportation and international export. Also links with neighboring countries. Nong Khai station connects with Lao PDR, Aranyaprathet station connects to Cambodia. Padangbazar and Susaihong stations connect with Malaysia (Source: <http://www.railway.co.th/main/>, 10 April 2018)

The vision of the State Railway of Thailand is "to upgrade modern rail transport services. (1) Focus on providing services that meet the needs of users to generate revenue and profit for the organization. (2) Carrying out social transportation services for the benefit of the people and the public. (3) Meeting the government's policy to develop, expand and link the transportation network of passengers and goods. The objectives are (1) to create excellence in service provision; (2) to improve performance; (3) To develop the organization and personnel in line with the investment plan, infrastructure, and signal system. (4) To integrate the work of the various units of the railway to drive the vision of the railway. (5) To develop the organization to be integrated in order to make the operation more effective. P.Suthicharuvatan (2016) proposed the concept of rail transport industry development through the development of appropriate strategies. In Asset Management and Operation and Maintenance, it is found that the key elements that need to be considered and planned to support each other are 5 parts: (1) policy formulation and supervision; (2) Asset Management (3) Operations (4) Design, the system of manufacturing and assembly (5) Maintenance. Focus on education and training for lead to fine-tune organization, adjust policy, set conditions. As well as adjusting and developing government procurement as shown in figure 1

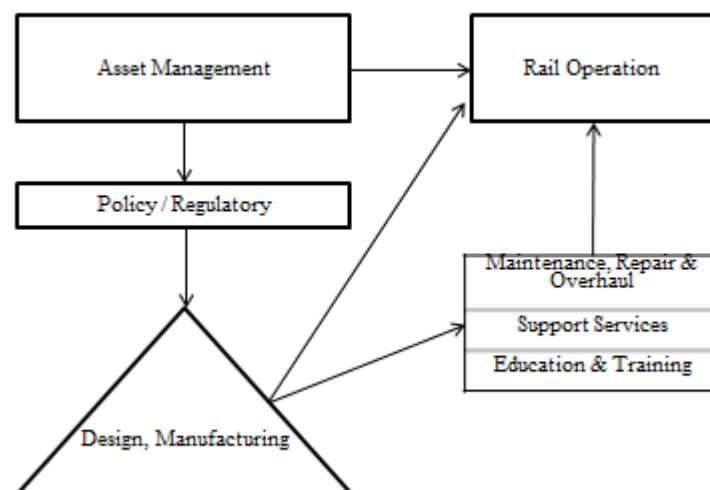


Figure 1 Rail industry is defined by five constituents based on their activities. Source; P.Suthicharuvatan, (2016)

The delivery of goods at the freight terminal in Lat Krabang is one of the main transportation services of the State Railway of Thailand. There are more than 50 rails along the 4 km route, 40.5 km from Bang Sue Railway Station, located at Kamphaeng Phet 2 Road - Chatuchak, Bangkok. Opposite to Mo Chit 2 Bus Terminal, there are more than 25 trains per day to transport goods to Laem Chabang port. Delay is causing the car to leave the goods in the delivery area Lat Krabang. Impacts cause

damage to operators, both the recipient and the shipper, ie if the product is cement, it may cause the cement to be trapped into the silo. In case of fresh produce such as fresh vegetables, fruits, etc., it will cause spoilage. And when the problem is very delay it may not be determine the customer's need. When will the product arrive? The operator has to pay for a crane / crane to pay for the crane. I have to pay daily or hourly. In case of delivery to the destination terminal with export ports such as Bangkok port or Laem Chabang port, it will make the goods to the vessel. So a vessel entrepreneur must pay for storage space cost incurred.

Thailand floods serious situation. Many transport operators could not move some cargos to a branch in the province because of flood. Around November 2011, the operators came to contact the freight service with the railway. For the first time and very satisfied. Rail transportation can carry up to 32 containers of 40 feet. Compared to trucking, it will require up to 32 towed trains to reduce the cost of transportation. The initially sent from the delivery of goods to Lat Krabang to Chiang Mai branch. And later to the Udon Thani branch to another. Until January 2012, flood events return to normal. But it appears that the trains of goods of entrepreneurs. It is still delayed, unable to travel at the scheduled time. Make the goods reach the destination late. As a result, customers in Chiang Mai and Udon Thani branches have to shorten their products to be sold to consumers. The carrier decided to cancel the freight service with the train. The loss of customers of the train (Division of Commerce: Department of Commerce, 2012) caused the train find a solution to the problem.

From this problem, Researcher was interested in studying the problems that influence in the rail transport supply chains. A case study of goods delivered from ICD Lat Krabang to Laem Chabang seaport. The study's results can be used as a guideline for the improvement and development of the shipping model of the shipping office to be more effective.

### RESEARCH OBJECTIVE

The problems influencing in rail transport supply chain. A case study of transport routes from ICD Ladkrabang to Laem Chabang port. The main objectives are as follows

1. To study the causes of problems in rail transport supply chain. A case study of transport routes from ICD Ladkrabang to Laem Chabang port.
2. To study the supply chain to fix problems in rail transport. A case study of transport routes from ICD Ladkrabang to Laem Chabang port.

### RESEARCH FRAMEWORK

Research framework of this research is shown in figure 2.

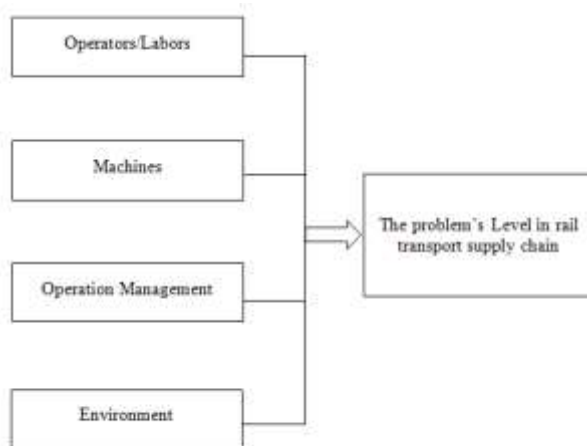


figure 2. Research framework

### RESEARCH QUESTIONS

Based on the research framework above therefore the questions of this research are as follows:

1. How do employees perceive the level of problems affecting the supply chain; a case studied of transport routes from ICD Lat Krabang to Laem Chabang port?
2. What are the implications for transport operators on the supply chain; a case studied of transport routes from ICD Lat Krabang to Laem Chabang port?

### LITERATURE REVIEW

Taochalee.s, Pitakaso.s., (2007) study of logistics management in rice supply chain for the Northeast of Thailand The purpose to analyze problems and propose management approaches for logistics and rice supply chains in Northeastern Thailand. The results show that there are several groups that are part of the rice supply chain. Consists of farmers Rice Suppliers include middlemen, middle-class farmers, rice producers, rice mills, agricultural cooperatives. As the rice supplier, Composed of merchants for wholesale and retail about the logistic costs incurred in each group of rice supply chains are different, but the logistic costs of almost every group are concerned about the transportation costs. Therefore, it should focus on transportation management in order to improve the overall system performance in logistics and supply chain of rice in Thailand.

Laoharatnahiran.S and Panyapong.R, (2012) studied on improving and enhancing marine cargo transport. A case studied of ABC Company limited is a study of problems and approaches to improve and solve problems in the work process of the agency to reduce the working time and adjust the work process more effective. The study indicated that the work process in the agency is

delayed. As a details of the data are not complete. Communication is not effective. And lack of follow up work Therefore, we must find ways to improve and solve the problem. As of the process of work, it was taken about 1 1 -1 2 days to complete the work. Therefore, the guidelines are set out in four ways: 1 ) Prepare a checklist. 2 ) Bring electronic information exchange system. Electronic data interchange (EDI) is used in the work process. 3 ) Supplier performance evaluation. 4 ) Customer relationship management. By taking the approach to solve the problem, it can reduce the working time from the original time of 1 1 -1 2 days reduced to 1 0 -1 6.5 days. In short, the three reduced the time from the arrangement. The documents were taken 1 -2 days after the Checklist has been used to reduce the operation time to 0.5 days after the exchange of information. The EDI can be used to reduce operating procedures. Then, in mid-term fixes, performance assessments of suppliers of each type of product were conducted to find ways to improve the process in the same way in addition to increasing the efficiency of ocean freight, the level of relationship with the suppliers of each type of goods. In the long term, we have built a customer relationship management (CRM) that uses ocean freight services. The Gantt chart is used to plan customers' visit to get feedback from customers to improve the work process and to meet the needs of customers.

A Morant, Westerberg, Larsson-Kraik (2012) study of knowledge management in railway network: case of signal system The rail network is a complex system with multiple technologies and a wide range of stakeholders working together to solve the problems that arise by increasing demand, capacity, speed and agility in freight and passengers. However, there are many stakeholders, knowledge management and broadcasting. The purpose of this article is to analyze the potential for improving the knowledge management between organizations in the maintenance of rail signaling systems and provide concrete guidance. Also the logistics process can clearly disseminate knowledge about the maintenance of the railway signal system. They could not handle implicit knowledge transfer, which is often important. The study found that there is great potential for improving the knowledge management process. Describe the possible measures and recommendations for future studies.

Lekovic, Maric (2013) Studies on Benefits as Motivation Global economic development has resulted in multinational companies operating in all parts of the world. Transnational corporate migration was important data sources to other countries where there is a profitable business. The influence of international economic growth has become a major driver of business and human resource management. This is a fact that must be adjusted and confronted with all multinational corporations, including coordinating policies and procedures to balance the needs and needs of citizens of host countries in the countries of their parents, nationalities and nationalities. Compensation is one of the most complex areas in the international management of human resources. The reason for this complexity is the need to coordinate the payment system with local laws and traditions to compensate for the employee's wages, which must be consistent with international policies of multinational corporations. Outside Going from a payment system, it is important to carefully consider whether incentives are incentive and reward schemes for people working in one of the three categories mentioned above.

Marinov et al (2013). Study on railway logistics in higher education to analyze the current status of supply and demand for higher education in rail transport, especially the study presented, consists of two surveys: The first survey was a supply survey for surveying existing data, transportation and transportation related to curricula and educational programs offered in higher education institutions. Second Survey Demand survey Examine the requirements for rail logistics studies and to understand the current needs of higher education. This article shows that there are programs and programs to use. Transportation, rail freight and logistics are, but there is a strong demand for more specific training and education that offers operational management skills. The need of improve the company's efficiency and quality of service.

Smith, Kyriakidis, Majumdar, Ochieng (2013) studied on the impact of the European rail traffic management system on human performance on rail operations. The safety in the operation of the railway system depends on several internal and external factors including rail traffic rules, infrastructure, reliability, stocks of rolling stock, corporate safety and human factors. Railway systems in Europe, North America and Australasia have been significantly improved in technology to increase capacity and efficiency. Europe is implementing the European Rail Traffic Management System (ERTMS). However, switching to an automated traffic management system will require changes to the rolling stock infrastructure or operational procedures, or all three. On the operational stage, this document shows that train drivers, signals and controls affect the maximum safety of the rail network. Therefore, the reliability and integrity of the rail network security mainly depends on human factors, especially the performance of human operators. This performance has been affected by many factors, which are known as PSFs, which have a communication deficiency of more than 90 percent of the incidents in conventional rail systems. This study examines the influence of ERTMS and, in particular, the Global Mobile-Communications (Railway) (GSM-R) system in the operations of education providers. 74 train accidents before and after using GSM-R from many European railway organizations. They find address communication-related factors that affect the performance of human trains in traditional railways and improve them based on the existing PSF railroad taxonomy plus of GSM-R usage in carrier operations.

Sadraoui, Mchirgui (2014) studied on supply chain optimization management in information system development. Supply chain concepts have become a concern due to global competition and increased customer demand, as companies seek to improve the industry's performance in terms of cost, delay, adaptability, diversity, and traceability. Therefore, data must be available in real time in the supply chain could not be achieved without integrated software systems for supply chain management. Members in the supply chain must work together to share information to improve customer satisfaction. The purpose of this article is to present the impact of information systems on the performance of SCM with a framework that is based on predictive control with the predictive module. The relationship between information systems and supply chain management (SCM) for this purpose, we have developed a new model used to control model predictions, once accepted as a standardized approach to industrial control and Process This article attempts to explain the relationship between supply chain management and information systems. The proposed framework determines the effectiveness of the methodology and the impact of accuracy on predicting the overall control effect of the supply chain.

Xiang Liu et al. (2014). To studied on the optimization of ultrasound rail defects detection for improving safety and efficiency in rail transport. The damaged rail is the most significant cause of freight trains in the United States. Therefore, the reduction is a very important issue for the US railways and railroad administration. Current practice is to detect rails to detect defects using non-destructive technologies, such as high frequency auditory detection. Determining the optimal track frequency is critical to the efficient use of resources, efficient management of infrastructure, and increased safety benefits. Reducing the risk of derailment, the cost of performing vehicle inspection, repairing rail defects, and delays in all relevant trains are affected by the

frequency of track inspections. However, no previous research has included all these factors in the integrated framework. This research aims to develop an analytical model to find the pros and cons among various factors related to the frequency of rail defect detection in order to increase the safety and efficiency of train use. The analysis shows that the best inspection frequency will vary according to traffic density, age of train, reliability of technology, monitoring and other factors. It is used to help develop better and more effective infrastructure management policies and practices

Chimusoro et al. (2017) studied the effect of supply chain management on the operation of rail passenger transport systems: a case study of passenger rail transport from 2009-2015. Supply chain management in the implementation of Passenger Transport Company in Southern Africa This case analysis uses data from desktop research in the PRASA Annual Report 2009-2015, as well as the No. 2 organizational plan. From 2015-2019, successes and challenges found in the organization will be analyzed. Chitpong Ayasanond. (2017) support that the areas to be analyzed include technical skills, decorating programs, patronage growth, customer satisfaction, and passenger safety among others. This article covers the impact of supply chain management (SCM) in general companies to performance analysis of the risks and disruptions caused by various supply chains that undermine supply chain performance and promoting the use of best practices in supply chain management.

### RESEARCH METHODOLOGY

This research was a quantitative research and data collection by questionnaires. Sample used in this research determine the sample regardless of probability (nonprobability sampling) with 400 simple sampling is from train service users using Taro Yamane's prepared table according to the recipe with the likelihood of error tolerance 0.05. Researcher had defined the characteristics of the tools used to collect data and construct the tools used in this research. Questionnaires had been developed based on objectives and conceptual frameworks of research on tourism logistics service model management. The questionnaire was divided into 3 parts.

Part 1 the service user's personal factors on sex, age, education level, occupation, average income per month and the average monthly cost of subscribers varies.

Part 2 the questionnaire involve the level of problems affecting the supply chain. The questionnaire was derive in Likert's rating scale of 24-item delivery study.

Part 3: Problems and Suggestions. Researcher had created tools to collect data. The steps were as follows

- Study concepts and theories from academic papers, textbooks, websites, and related research of similar nature to bring information from various sources as a guideline to create a questionnaire.

- Analyze the objectives, content and structure of the research to determine the guidelines and scope of the questionnaire.

- Create a draft questionnaire, by defining the scope and scope of the question in accordance with the objectives of the research.

- Bring the draft questionnaire to the advisor for review, consideration and correction, and provide the experts with knowledge and experience in rail transportation. The statistics research and consider the questionnaire for 3 persons to review and make further recommendations as well as content validity to understanding and using the language to evaluate the results of the decision to find the index of Item Objective Congruence (IOC).

- Complete a complete questionnaire for use in the research sample.

The researcher selected the questions with the IOC value of over 0.6 as a question. As well as improving the questionnaire was clear and comprehensive for the purpose of this research. The researcher used a questionnaire that was subjected to expert review and tried out the sample with the similarity to the sample with the similar characteristics.

The data analysis was a statistical computer analysis program. Compare the difference between the personal data of the sample, the mean and standard deviation of the opinions on the management of the rail transport model, using T-test and One Way Anova statistics to test hypotheses that the users of sex, age, education level, occupation, average income per month and the average monthly cost of subscribers varies.

### RESEARCH RESULT

The research found that most of the users were male (175 persons as 89.29 percent) followed by female (21 person as 10.71 percent). The most work experience was 5-10 years 37.75 percent followed by 11-15 years as of 26.02 percent and the last was the person who had the most working year more than 15 years was 13.78 percent. The results of the problem level that influence rail transport in the route from ICD Ladkrabang to Laem chabang port as following

Table 1: factors influencing in rail transport operators

Rail transport operators	Mean	S.D	Factors influencing in rail transport SCM
Employees are motivated to work well. Employees are responsible for the assignment.	2.76	0.65	Moderate
	2.44	0.61	Low
Employees have the knowledge and experience. Employees have the skills to solve problems.	2.37	0.56	Low
Employees are coordinated between supervisors and subordinates	2.43	0.73	Low
	3.24	0.77	Low
Employee know modern rules and comply with the work.	4.38	0.84	Highest
Average	2.94	0.69	Moderate



Table 2: factors influencing in machines and equipment

Machines and equipments	Mean	S.D	Factors influencing in rail transport SCM
The number of locomotives to leave the train. Locomotive and trailer equipment are available. Always maintenance of locomotive and trailer equipment	3.34	0.58	Moderate
	3.06	0.56	Moderate
	3.08	0.58	Moderate
The amount of litter is sufficient for the needs of customers.			
The tracks are in standard and quality condition to accommodate the weight and speed of the train.	3.54	0.72	Most
	2.24	0.69	Less
Average	2.93	0.63	Moderate

Table 3: factors influencing in rail transport operational management

Operational management	Mean	S.D	Factors influencing in rail transport SCM
Coordinate with the cargo division to set up a train and trailer correctly	3.33	0.75	Moderate
Flexibility to resolve customer plans.	4.14	0.78	Most
Efficiency in document storage and transport data management.	3.12	0.51	Moderate
Access to the car quickly.			
Accuracy in transporting goods or towing goods to customers at destination.	3.88	0.86	Most
	2.04	0.63	Less
Accuracy in the transportation of goods or trucks to the customer on time.	4.66	0.79	Highest
Average	3.53	0.72	Most

Table 4: factors influencing in rail transport environment

Environment	Mean	S.D	Factors influencing in rail transport SCM
Luminous intensity in night operation.	3.69	0.64	Most
The workplace is safe.	3.16	0.72	Moderate
The workplace is clean.	3.30	0.73	Moderate
The quality of infrastructure and work well.	3.22	0.64	Moderate
The tracks maintenance to prevent accident.	2.54	0.65	Less
The quick response to rescue when the accident.	3.27	0.60	Moderate
Average	3.20	0.66	Moderate

Comparison of expectations and perceptions of individuals with different major factors toward the factors that influence to rail transport supply chain of the State Railway of Thailand classified by transport operators, machines and equipment, operational management and environment. There was a difference opinions option.

#### DISCUSSION

This research found that *the operation management* was the most problems affecting the supply chain, rail transport ICD case studied at Lat Krabang area. The results show that ICD Ladkrabang is very problematic and operational management. It is the

main activity of logistics. Consequently, the concepts of logistics management and supply chain management should be introduced. It is used in operational management to reduce supply chain problems such as shorten delivery time can meet the customer's satisfaction and corresponding to the research of Sansakra, Charee and Panapan Puttakas (2012) studied on Logistics and Supply Chain Management in the Northeast of Thailand. The focus should be on logistics management to improve the overall efficiency of logistics and supply chain. Study on the performance of employees: A case study of transport business in Chiang Rai found that the concept of organizational management to achieve the goals set by the priority to more workers or employees. Chimusoro et al. (2017) Studied on the Impact of Supply Chain Management on Rail Passenger Transport Operations: Analysis of Rail Transport Case Study 2009-2015. Influence on Supply Chain. The results of the study revealed major problems in operational management. Contains the following topics were (1.1) Flexibility or agility in resolving client's plans is a lack of flexibility in solving problems or revising client plans because of the overload process. In line with the research of Thuya Khamkam (2016), a studied on warehouse management optimization.

The case study of Warehouse 2 in Ratburana showed that the approach to solve the problem of warehouse management by using flow charts by considering the process of redundancy and inefficiency. (1.2) The efficient management of vehicle storage can reach the car conveniently and quickly find the problem of storage because of the importance or frequency of use of the car. Obstruction or take a long time to find a car to be transformed into a train. In line with the research of Thuya Khamkam (2016), a studied on warehouse management optimization case study of warehouse 2, The Ratburana had a storage problems therefore the new warehouse layout should be designed. The storage method is ABC based on divided into categories that are stored first to make it easy to map 20 of all products. Group B is 30% and Group C is 50%. The product placement is appropriate for warehouse size easy-to-goods. (1.3) Coordinate with the cargo division to set up the train or trailer properly according to the customer's plan, found that the error was due to incomplete information and communication problems. Most of them use paper in order to due to the rules that need to be kept for tracking the lack of tracking and the lack of information technology used to manage transport information. Supattra Laohaatananiruk and Rajaraj Panyapong (2012) study on improvement and enhancement of marine cargo transport. A case study of ABC Company Limited is a study of problems and approaches to improve and solve problems in the work process of the agency. Case study ABC Company Limited found that the work process in the agency was delayed. The details of the data are not complete. Communication is not effective.

And lack of follow up work In line with Morant, Westerberg, Larsson-Kraik (2012) research on knowledge management in rail network: case of signal system. The technology to solve the problem was increase speed and agility. Marinov et al. (2013) studied on supply chain needs for railway logistics operations in higher education. This article shows the use of programs related to rail transport, freight and logistics. Smith et al. (2013) investigated the impact of the European rail traffic management on human performance on rail operations. It founded that railway systems in North America were technologically advanced to increase capacity and solve problems with technology. And the results of the study found major problems in *the environment*. It contains the following topics. (2.1) The level of illumination in night operation is not sufficient to operate. It caused work to delay because it is rarely seen. And also frequent accidents. (2.2) a workplace is clean. Free from obstructions and sewage. There are many obstructions. This is due to the construction of Bang Sue Junction. There is no storage space such as pillows, concrete pillars, electric poles, iron bars, etc., so the operation is delayed due to obstructions. (2.3) Maintenance of the track to prevent derailment, the environmental problem of the track is the frequency of maintenance to prevent overcrowding. The advantage is to prevent accidents. But the disadvantage is that it hinders the work. There are delays in the operation, such as compressed rock, compressed rock in the way. Xiang Liu et al. (2014) Studied on the optimization of ultrasound railroad fault detection for safety improvement and Efficiency in rail transport. It found that excessive frequency maintenance. And the results of the study found the main problems in rail operators. It contains the following topics. (3.1) The rules are modern and consistent with the operation is easy, fast, the problem is the most because it is very old, because it has not been updated for a long time. This is not in line with the current situation. And there are too many working procedures.

Workers have to work with difficulty and inconvenience. In line with the research of Thuya Khamkam (2016) studied on warehouse management optimization Case study of Warehouse 2, Ratburana showed that the operation procedures were duplicated and ineffective and impact on performance. (3.2) The coordination between the supervisor and the subordinate in the work well, found that lack of good communication. Most communication is one-way communication. Cause Corresponding to the research of Supinee Ngamlert and Weerasak Sirikul (2015). Studied on delayed delivery problems and delayed delivery solutions. Case study of ABC Plaster Co., Ltd. Good communication One-way communication can cause problems. (3.3) Employees are motivated to work well. As a result, there is no shortage of sick leave to work or leave work. Lack of work In terms of remuneration is less because of the low salary. On average, get a salary. But in the opposite direction, the workload is very responsible. Employees lack motivation to work. In accordance with the research conducted by Chattana Sunthorn Project (2014, in order to increase efficiency and reduce costs, Truck drivers lack motivation to work and in line with the research by Lekovic, Maric (2013), "Motivation is a motivation," saying that global economic development needs to carefully consider what it takes to motivate and reward employees. And the last results of the study found the main problems in *the machins. and equipmenst* Contains the following topics. (4.1) The number of litter boxes is sufficient for the needs of customers to handle the loading and unloading of containers. It is found that the number of litters is not enough for the needs of customers to support the loading and unloading of containers because of the need to send a large number of merchants and many.

This causes the opportunity cost. In this paper, we discuss the relationship between the two factors. The first is a case study of C-Pro Logistics and Distribution Co., Ltd. shows that the current rate of customer growth. Therefore the company's transportation services not enough to meet the needs of the customer, resulting in a lot of opportunity cost. (4.2) Maintenance of locomotives and trailer equipment can be done to meet the needs, of that maintenance because of the old car condition long life of 35-40 years, which is very old, causing frequent damage. Including full car maintenance, and from the accident. The car was waiting for a repair. In this paper, we discuss the relationship between the two factors. A case study of C-Pro Logistics and Distribution Co., Ltd. found that maintenance problems were caused by over-repairing time and the problem of service accidents. (4.3) Locomotive and trailer equipment is available, locomotives and trailers are not fully available. Due to the lifetime of 35-40 years, it can be damaged at any time. The study was carried out by Prachakam Ngamkasak, Suwann and Chet Pattanalee Srisiri (2015).

## CONCLUSION AND RECOMMENDATIONS

The study indicated that Problem Management, Most problems directly affect the supply chain. A case studied of the ICD Lat Krabang area, so as to be an important shipping unit of the railway to support the shipment to the terminal and achieve the highest efficiency. It also allows for a definite time to deliver the goods to reduce damage to operators, both recipients and senders. As a result, entrepreneurs have confidence in using the service and satisfaction as a source of competitive advantage in business. Researchers propose to provide suggestions as a way to solve problems in transport supply chains. The problem is as follows. (1.1) Logistics management and supply chain management should be implemented to adapt operational management to reduce transportation problems. (1.2) Reduced unnecessary work procedures to increase the speed of operation. (1.3) Implement advanced information technology to help manage transportation information to reduce delays and reduce errors. 2. **Suggestions for future research.**

(2.1) Comparative studied on transportation services of ICD Phaholyothin Bangkok in order to evaluate the strategy of the management approach to reduce transportation problems and to create competitive advantage of the State Railway of Thailand. (2.2) Studied population and sample should be expanded. This study is just a study of the opinions of the railway employees who are responsible for the delivery of ICD Ladkrabang and internal transport operators within the ICD Phaholyothin. There are many components and agencies involved in many organizations within the organization. In the next study, the sample should be related to the performance of the other ICD. (2.3) Network Multi Model Transportation should be studied to improve rail transport efficiency and to develop a rail transport system capable of delivering door to door transport. Due to the limitations of rail transport, it is only from the station to the other station that caused to unable to ship to the customer. If the research is to develop a transportation network, it will increase the shipping options for new operators. It is a pleasure to work with our customers and to create a competitive advantage in the business of the State Railway of Thailand. (2.4) The impact of the policy, ministerial regulation order or the other regulation should be studied including unions of the effect of operation management of the other ICD such as Phaholyothin ICD.

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## Factors Affecting Business Management of Fruits Selling Entrepreneurs in Nakhornpathom: A Case Study of Pathommongkol Market

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**Abstract:** This research has the following objectives: 1) To compare factors affecting business management of fruits selling entrepreneurs in Nakhornpathom when classified by personal factors; and 2) To study relationship in business management of fruits selling entrepreneurs in Nakhornpathom, when classified by shop management, marketing management, financial management, and human resources management. Sample group consisted of 400 samples using convenient sampling method. Questionnaire was used as research tool. Results were derived from data analysis using frequency counts, percentage, average, standard deviation, t-test, one-way ANOVA, and Pearson product-moment correlation coefficient. The research results found that: (1) Business management of fruits selling entrepreneurs in Nakhornpathom was different in age, education and duration of business management, while there was no difference in gender, status, and earning. (2) Business management of fruits selling entrepreneurs in Nakhornpathom related at a statistically significant level in every aspect, with the relationship between human resources management and marketing management factors at ( $r_{xy} = 0.574$ ). Next to that, the relationship between financial management and marketing management factors was at ( $r_{xy} = 0.555$ ), and financial management and human resources management was at ( $r_{xy} = 0.546$ ), in that order.

*Keywords:* Entrepreneurs, Fruits Market, Business Management.

### INTRODUCTION

In overall, Thailand is so abundance in nature. Thailand's location is in tropical rain region with appropriate rain fall and climate to yield good tropical fruits and vegetables. In the past, there were not many people in Thailand. Natural fruits and vegetables were sufficient for people's consumption. However, at present, Thailand's population has grown which also increases the needs of fruits and vegetables consumption. Along with that, production of fruits and vegetables for consumption has changed to production for distribution (Siritavanakul, 2011, p.1) For this, Thailand has produced fruits and vegetables for both internal consumption and foreign exports.

At present, Thai fruits can bring several million baht into the country and are popular among consumers of Thailand and other countries. Fruits that are important economically and worth high value in exports, are popular among foreign consumers, i.e. Longan, Durian, Mangosteen, Lychee, Mango, Pomelo, Rambutan, Pineapple, Coconut, Tamarind, etc., and future potential fruits, or local fruits, or native fruits, with more domestic consumption than exports, i.e. Santol, Rose apple, Custard apple, Jujube, Sweet, Guava, Wollongong, Fairy, Salacca, Jackfruit, Lemon, Grape, and Banana, etc. When fruits are popular among people, now fruit markets appear in most towns of Thailand. The sizes of fruit markets depend on the different conditions of the provincial or regional fruit plantation and how much of their agricultural yields.

There are many large and acceptable fruit markets in Nakhornpathom at present and one of them is Pathommongkol market. In the past, before the construction of Pathommongkol market, agricultural products sellers had their makeshift stalls on the banks of the canal causing traffic congestion and filthy scenery. The town municipality decided to clear out the marketplace and let the land owner find a new appropriate empty lot to construct a marketplace. The 60-rai empty lot was bought and construction started. Pathommongkol market consists of commercial buildings and indoor empty stalls for agricultural products. Pathommongkol market has been managed as private business distribution center for fruits and vegetables both domestic and foreign exports by Market System Promotion and Management Division (Market System Promotion and Management Division, Department of Internal Trade, 2560: online).

Pathommongkol market has developed itself to get ready to join the system of ASEAN Economic Community (AEC) setting a budget of 5 billion baht for the improvement of the new internal structure to push the market to be the retail and wholesale trade center for fruits and vegetables for Bangkok and the perimeter, and the South, including the opportunity to connect and do international business with Myanmar. Pathommongkol market is open for service 24 hours a day. There are 1,300 stall renters with a 100% rent rate. The trade of fruits and vegetables is over 10,000 tons/day and market value worth of 5 billion baht/year (Prachachart Business, 2556) (which clearly shows the success of fruit business entrepreneurs in Pathommongkol market at present. For such reason, the researchers have been interested in studying the factors affecting the management of the fruits business entrepreneurs in Nakhornpathom, a case study of Pathommongkol market, to benefit the efficiency of the management, and to learn of the direction of successful management of new beginners or on-going entrepreneurs in the future

### RESEARCH OBJECTIVES

1 ( To compare factors affecting business management of fruits selling entrepreneurs in Nakhornpathom when classified by personal factors.

2 ( To study relationship in business management of fruits selling entrepreneurs in Nakhornpathom, when classified by shop management, marketing management, financial management, and human resources management.

HYPOTHESES

The research on factors affecting business management of fruits selling entrepreneurs in Nakhornpathom, a case study of Pathommongkol market has the following hypotheses:

- 1 ( The different personal factors of gender, age, education, status, monthly earning, and duration of business management affect business management of fruits selling entrepreneurs in Nakhornpathom, a case study of Pathommongkol market.
- 2 ( The business management of fruits selling entrepreneurs in Nakhornpathom in shop management, marketing management, financial management, and human resources management are related.

RESEARCH FRAMEWORK

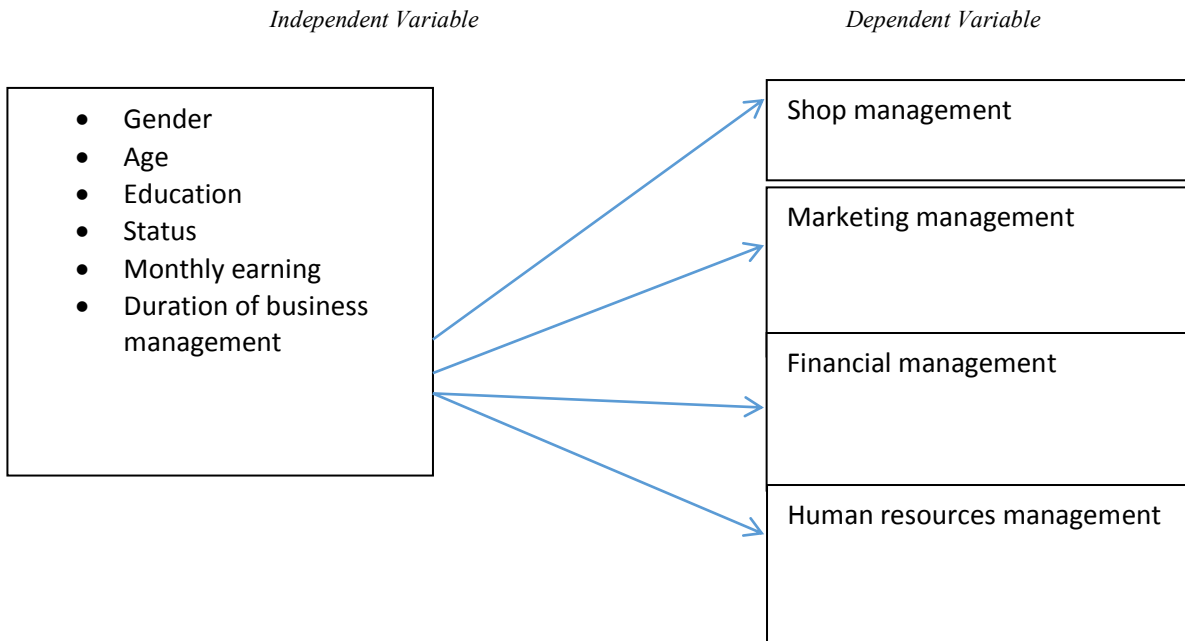


Table 1 Research Framework

REVIEW OF LITERATURE

The researcher has studied researches related to factors affecting business management of fruits selling entrepreneurs in Nakhornpathom, a case study of Pathommongkol market, including others related researches as follows.

1. Concepts on management factors

Management procedure consists of 5 main management obligations realized by all managers in administration of work and man power in any business organization for the effectiveness and efficiency of their set goals. They are: 1 . Concepts management which is keeping analysis of situations of changing external environment so that the organization can “plan” for the best choice of plans; 2 . Object management which is the management of the organization so that activities and resources can be arranged in order and grouping for effective coordination of all division; and 3 . Human resources management which is the management of man power for the achievement of the set goals. There are usually 3 aspects of human resources management: putting best capable personnel into the right jobs, making appropriate authorization so personnel are motivated by the arts of good governance, and applying control and evaluation by supervision to keep to good standards.

2. Concepts on marketing management

Kotler and Keller (2009, p. 787) explained that marketing meant a social procedure, a form of management on personal and as a whole. Marketing had an objective to respond to needs and necessity of consumers of that marketplace so marketing was a creative procedure which established development, exchange, and gave added values to products and services. Sereerat (2007, p. 38) explained that marketing factors or marketing mixture meant marketing strategy which business had to used together with marketing decision to respond to the market’s satisfaction. Marketing goals consisted of product, price, place and promotion or 4P’s. Samerjai (2007, p. 52) had said that marketing mixture was an important element in responding to the market appropriately beginning with business had something to present to customers or had product, set up suitable price, and delivered to customer effectively by managing distribution channel and communication mean for advertising and motivating purchase through promotion strategy which was called marketing tools. Čhitraktham (2007, pp. 163-164) gave the meaning of service business marketing mixture as follows. Management of marketing mixture of service product was different from marketing mixture of substantial product. The marketing mixture of substantial product consisted of 4 P’s but the marketing mixture of service product consisted of 7 P’s which were price, service product, place or distribution channel, service promotion, service personnel, process and physical evidence.

3. Concepts on financial management

In business competition, in order that the firm will survive and grow to be a secure organization, it needs to be prepared and strong in all aspects and finance is an important aspect. If the financial strategy is managed well, the firm would be able to reach the utmost goal. If the firm is able to seek the capital from low interest source, with an acceptable risk, invest in profitable institutions and get good yields, to achieve highest goal of financial management which is to maximize the value of the firm. The obligations of financial management consist of the following steps: 1 . Plan and set goals; 2 . Consider quantity and duration of investment; 3 . Investigate for available capital resources; 4 . Allocate the capital; and 5 . Supervise and evaluate. Meanwhile, Sakkittimalai (2005, pp. 2-4( has concluded the obligations of financial manager in 3 ways as follows: 1. Analysis and Planning; 2. Raising Fund or Financing; and 3. Allocate of Assets.

4. Concepts on human resources management

Gilley, Eggland, and Maycunich (2 0 0 2 ( has said that human resources management were both formal and non-formal procedures for learning, increasing performance and for human change through creative activities and management activities to increase efficiency in work, potential in people, including readiness to cope with change and adaptation. Swanson, and Holton (2009( defined human resources management as a procedure of development and releasing power of knowledge and ability to build efficient working system and internal procedure such as group therapy, working system, and personnel individual working performance. Sutthitham (2 0 0 9 , p. 1 2 5 ( has said that human resources management and self-development were very important things for local retail shop owners in the province had to observe since retail selling was mainly customer service. However, service was something which could make difference and selling point for retail shops. The service of a shop in each activity needed a person to take care to get it well done. Therefore, shops should emphasized human development in every position and place more emphasis on the person taking care of customers directly. Human resources management had to begin correctly first from enrollment. When the entrepreneur could make appropriate selection to fit the position, it was the beginning of employee development into having better service mind. Retail shops had to set into a compact organizational structure, getting every employee to understand and acknowledge his or her own role and responsibility, including accepting the do’s and don’ts of the organization’s policy. Moreover, important things that the entrepreneurs had to emphasize were keeping efficient employees with the organization as long as possible and keeping personnel development all along.

RESEARCH METHODOLOGY

The population for this research was fruits entrepreneurs at Pathommongkol market. Since the exact size of the population was not known, the researcher used Cochran’s uncertain population formula (Cochran (1 9 5 3 ( ) to come up with the sample group of 4 0 0 entrepreneurs using convenient sampling. A questionnaire passed a content validity test by 3 experts and reliability test by 20 fruits entrepreneurs from four-city-corners markets with a reliability value between 0.77-0.82. Descriptive statistics were analyses from percentage, average, and standard deviation. On the other hand, conclusive statistical analyses consisted of t-test, one-way ANOVA, and Pearson correlation.

RESEARCH RESULTS

Part 1 Analytical results of questionnaire respondents

Most questionnaire respondents were female or 71 per cent, most were between 31 – 40 years of age or 37 per cent, education at elementary level or 27 per cent, next to that was at bachelor level or 26 per cent, marital status was married or 68.0 per cent, monthly earning was between 30,001 - 50,000 baht or 49 per cent, and duration of fruits selling was between 11 – 15 years or 43 per cent.

Part 2 Analytical results of the business management of fruit entrepreneurs in Nakhornpathom, a case study of Pathommongkol market

Table 2.1 Business Management of Fruit Entrepreneurs in Nakhornpathom, a Case Study of Pathommongkol Market

Business Management	Mean	SD	Order	Result
1. Shop management	3.44	0.42	2	High
2. Marketing Mgmt	3.12	0.72	4	Mid
3. Financial Mgmt	3.41	0.65	3	High
4. Human resources Mgmt	3.65	0.53	1	High
<b>Total</b>	<b>3.40</b>	<b>0.46</b>		<b>Mid</b>

Business management of fruit entrepreneurs in Nakhornpathom was at a medium level. The first 3 factors evaluated were human resources management )Mean = 3.65(, shop management )Mean = 3.44(, and financial management )Mean = 3.41(, in that order.

*Part 3 Business management of fruit entrepreneurs in Nakhornpathom, a case study of Pathommongkol market, classified by personal factors*

*Table 2.2 Business Management of Fruit Entrepreneurs in Nakhornpathom, a Case Study of Pathommongkol Market, Classified by Personal Factors*

Business Mgmt of fruit entrepreneurs	Gender		Age		Education		Status		Earning		Duration	
	t	sig	F	sig	F	sig	F	sig	F	sig	F	sig
1. Shop Mgmt	0.59	0.56	2.44	0.07	1.02	0.41	1.21	0.31	0.35	0.84	2.39	0.07
2. Marketing Mgmt	0.62	0.54	4.03*	0.01	5.49*	0.00	0.16	0.93	1.4	0.24	2.85*	0.04
3. Financial Mgmt	0.29	0.77	1.34	0.27	1.16	0.34	1.87	0.14	1.43	0.23	5.78*	0.00
4. Human resources Mgmt	0.36	0.72	2.61	0.06	6.23*	0.00	1.16	0.33	1.59	0.18	5.49*	0.00
<b>Total</b>	<b>0.62</b>	<b>0.54</b>	<b>2.79*</b>	<b>0.04</b>	<b>3.93*</b>	<b>0.00</b>	<b>0.74</b>	<b>0.53</b>	<b>1.38</b>	<b>0.25</b>	<b>6.03*</b>	<b>0.00</b>

\* Significant level at 0.05, \*\* Significant level at 0.01

The research results found that business management of fruit entrepreneurs in Nakhornpathom were different in age, education, and duration of business management while gender, status, and earning were not different.

When classified by factors, it revealed that on shop management there was no difference. When classified by personal factors, on marketing management there were differences at a significant level in age, education, and duration of business management. On financial management there was difference at a significant level in duration of business management; and on human resources management there were differences at a significant level in education and duration of business management.



Part 4 Relationship in business management of fruit entrepreneurs in Nakhornpathom  
 Table 2.3 Relationship of Business Management of Fruit Entrepreneurs in Nakhornpathom

	Shop Mgmt	Marketing Mgmt	Financial Mgmt	HR Mgmt
<b>Shop Mgmt</b>	1			
<b>Marketing Mgmt</b>	.433**	1		
<b>Financial Mgmt</b>	.419**	.555**	1	
<b>HR Mgmt</b>	.339**	.574**	.546**	1

Business management of fruit entrepreneurs in Nakhornpathom had a relationship at a statistically significant level in every aspect with human resources management related to marketing management at  $r_{xy} = 0.574$ . Next to that, financial management related to marketing management at  $r_{xy} = 0.555$ . And financial management related to human resources management at  $r_{xy} = 0.546$ , in that order.

#### RESEARCH RESULTS DISCUSSION

##### **Conclusion and discussion**

Business management of fruit entrepreneurs in Nakhornpathom were different in age, education, and duration of business management; and when considered management factors individually, it was found that marketing management, financial management, and human resources management were all different in duration of business management since fruits selling needed accumulated experience to have an edge in competition. Nevertheless, important personal factors next to that was education (Boonmalert, 2018) Business management of fruit entrepreneurs in Nakhornpathom related at a statistically significant level in all aspects since success in business management needed integration of quality management skills to achieve success in competition.

##### **Suggestions on policy**

1. Differences in personal factors in age, education, and duration of business management will affect business management of fruit entrepreneurs in Nakhornpathom since those factors will relate to experience and learning which will affect business management, financing, marketing, and self-development. Therefore, if one needs to develop how to manage business for quality, giving education either formally or non-formally will be able to promote quality of business management.
2. The research results found the relationship between marketing factor, financial factor, and human resources management factor. Therefore, emphasis should be put on such factors when planning business management. These factors will promote each other in building success in fruits business.

##### **Suggestions on future researches**

1. This research limited the study only on business management of fruit entrepreneurs in Nakhornpathom, at Pathommongkol market, which was a large fruit market of the province. If data gathering had expanded, different research results could be expected.
2. The study put emphasis on descriptive research. Interested parties could do qualitative research or mix-research which should make the research derive more and clearer in other dimensions.
3. The sampling was only non-opportunity statistically. If sampling extended more systematically, more reliable results could certainly be expected.

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## Change Management, Human Capital Development, Business Partner, Competitive Advantage for Orchid Enterprises

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**Abstract:** This research aims 1) to study change management, human capital development, business partnership 2) to study the influence of change management to the human capital development and business partnerships 3) to study the influence of human capital development and business partnerships, which affects the competitive advantage. The samples were 242 orchid enterprises with using a questionnaire as a research tool. Statistics used in data analysis were percentage, mean, standard deviation and correlation coefficient. The hypothesis was tested by using regression analysis. The study found that change management, human capital development, business partnership and competitive advantage the overall level is very high. The results of the hypothesis test showed that change management has a positive influence on human capital development. Change management has a positive influence on business partnerships. Human capital development has a positive influence on the competitive advantage, business partnerships have a positive influence on the competitive advantage. And change management has a positive influence on the competitive advantage. The results of this research revealed that the true relationship of enterprise change management to human capital development and business partnerships. And human capital development, business partnership Influence on competitive advantage. It is also a guideline for the management of the enterprise in the policy planning to develop change management. To create human capital development, business partnership will be the cause of the enterprises have an competitive advantage in the most effective and efficient way

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**Keywords:** Change Management, Human Capital Development, Business Partnership, Competitive Advantage, Orchid Enterprises, Enterprises, Organization Performance.

### INTRODUCTION

According to today rapidly changing in business environment affecting to organizations in both the public and private sectors, organizations need to adjust their operations to harmonize with the changing environment (Al -Haddad & Kotmour, 2015) (Burnes, 2004). (By, 2005). Organizational or entrepreneurial personnel are the most important factor in achieving these successes (Kotter & Cohen, 2012). The changes that occur depending on dissatisfaction with the current perform and a new style in organization management, planning process for change management and the value of change for individuals and groups in the organization (Beer & Elise, 1990: 46). However Organizational change in the 21st century is in a state of normal to help organizations survive, and organizations need to understand their roles and the importance of change as opportunities and learning how to change patterns. The nature and content of the material are different (Drucker, 1999: 73). The purpose and behavior of the organization to lead to the goal of change. And the change is a process of improving the current state of the organization, with a focus on structural change. And focus on the integration of activities. In order to manage the change, it is necessary to apply the principles of human capital development in the management of human capital development to create a good performance. (Daft, 1992: 18)

The Twelfth National Economic and Social Development Plan (2017-2021) the National Economic and Social Development Board (NESDB) has prepared on the basis of the 20-year national strategy (2017-2036). This is the main plan for the country's development and sustainable development goals (SDGs), as well as the restructuring of Thailand into Thailand 4.0 by the preparation of human resources and the development of civilian capacity. The focus is on improving the quality of human capital in the country. As a result, the country's development is balanced and sustainable. And one way to do that is. Increased use of knowledge, technology, innovation and creativity as the main tools to drive development in all sectors. (Office of the National Economic and Social Development Board, 2017). One of the principles that drives economic development in the country relies on business partners. This is a business relationship model that relies on each other to create a good performance.

While business partners are one of the most important and popular strategies. Increasingly, in the current business. Because of business partnerships, which are exchanges and sharing. Resources and capabilities between businesses to develop a product or service together. And with increased competition. However, the results of using strategic partnerships are both unsuccessful businesses. In addition, the successful implementation of this strategy (Anand and Khanna, 2000; Kale, Dyer, and Singh, 2002). And the value of cooperation between partners will result in a competitive advantage over competitors (Gulati, 1999). Experience the Alliance Experience (Anand and Khanna, 2000; Simonin, 1997). It is one of the ways in which partnerships or businesses collaborate. Many in various forms. As a result, the relationship between the two groups is enhanced (Walter et al., 2006) that leads to the competitive advantage.

Competitive advantage is a competitive advantage in creating a marketing position for the business. Based on organizational resources and organizational capabilities. It is a common strategy used in competition in the field of cost leadership. Strategy to make a difference and specific marketing strategies. Because competitive strategy is very important to business. However, because of the increasing competition, traditional concepts have been applied to maximize efficiency and effectiveness. This is an important part of the strategy. (Porter, 1980). Competitiveness will lead to income generation for SMEs entrepreneurs who drive the domestic economy to increase with the potential of competing levels. All intellectual capital resources are used. To push for competency. Creative with the ability to innovate in. Product development, modification work process And seeking market management (Kianto, Andreeva and Pavlov, 2013) to create value added products for entrepreneurs to create competitive capabilities (Beverly and Robert (2003).

Thailand is the number one exporter of orchids in the world for a long time and export value has continued to grow. In the production of commercial or commercial orchids, basic information must be studied first, including technology and innovation, packaging, transportation and marketing, which many entrepreneurs neglect. The problem is the high cost of production. Loss of productivity during transit and the price is not high. It is important for the concerned parties to realize that Thailand's orchid exports face more intense competition from rival countries such as Taiwan, Singapore and Malaysia, as well as new competitors such as Vietnam and New Zealand. This accelerates the development of production technology to increase the quality of orchids, cut flowers and orchids. The export of orchids is facing new challenges, with those involved needing to accelerate to maintain existing markets and accelerate new markets to gain competitive advantage (Pimonratanakan, Sudarat, 2017).

For these reasons, researchers are interested in studying about change management, human capital development, an ability to create business partnerships, competitive advantage for state-run Universities It will be used to set policies and plans. For state-run universities within the organization. It is also a guideline to improve and develop the change management factors and an ability to create business partnerships. Encourage people to draw on the potential to be creative in their ability to compete. The results of this research will be important for those involved in developing and improving policies and strategies to increase their capabilities and performance. This will help drive state-run universities to achieve their goals efficiently and effectively. And to make the organization constant and sustainable.

## RESEARCH'S OBJECTIVE

1. To study the change management, the human capital development, the business partnerships and the competitive advantage for orchid enterprises.
2. To study the influence of change management affected to the human capital development and business partnerships
3. To study the influence of the human capital development and the business partnerships affected to the competitive advantage.

## LITERATURE REVIEW FOR CONCEPTUAL FRAMWORKS AND RESEARCH HYPOTHESES

### *Change Management*

Robbins & Coulter (2008: 164-165) said that organizational change has three key themes:

Issue 1 Structural change is consistent with the change. Possible causes of external factors or internal factors. That means changing the components. The organizational structure, such as expertise, change, organizational structure, and department. Command line arrangement Or new command range modifying the level of power organize the event new design or the overall organizational restructuring of the organization.

Issue 2 Technology change .This is a change or modification of work processes, methods of work, including the introduction of machinery. New tools modern and automatic replacement of the original machine. And provide control by the computer instead of using the staff.

Issue 3, Changing people. Executives must try to change employees in such areas as attitudes, expectations, perceptions and behaviors so they can work together more effectively.

Schermerhorn (2005: 473) stated that change management focuses on five main goals

1. Changing the behavior of employees. This includes mission, goals, strategy of an organization including the new design of work.
2. Personnel, attitudes and abilities of employees. Human resource management system of the organization supporting the work of the employees.
3. Organizational culture, values, practices, leading to desirable new behaviors of each employee and teamwork.
4. Technology, work systems and information technology used to support the system in the organization.
5. Organizational Structure, Chain of Command and Communication in Organization. This will raise doubts about the real intentions of the executives in this change.

And Daft (2008: 348-357) discussed the changes that occur in organizations, often changing four things: 1. Technology changes or production systems. 2. Changes in productivity. 3 structural changes. 4 culture change or people when faced with change, the organization will negatively and positively impact the organization's personnel and always resist.

From that said, the researchers concluded that change management refers to the actions taken to reduce the impact of the change. It promotes adaptation and acceptance. And create new potential. To accommodate changes to achieve the goals set.

### *Human Capital Development*

Mondy and Noe (2005: 6) stated that it is the primary function of human capital management. Consists of training professional development and planning corporate development and evaluation training activities are designed to increase the knowledge and skills required for the current job.

Nadler and Nadler (1989: 3-6) developed human capital as a learning experience 3 for employees in the future. In order to improve the performance. or to progress in the job. It is a learning focused.

In addition, Gilley and Egglan (1989) argued that human capital development refers to aim to improve current performance. And the future of the individual to improve the effectiveness of the organization. The effectiveness of the organization is measured by its ability to compete. Human capital development activities include individual development, career development, and organizational development.

From that said, the researchers concluded that. Human capital development refers to the experience, skill, expertise, expertise creativity .And that person has the ability to create economic value to achieve the goals set by the organization.

*Alliance or Business Partnerships*

Ireland, Hoskinsson & Hitt (2013: 235). Said that business partnerships are a collaborative strategy and process of managing partnerships that are critical to the success of an organization. It enables businesses to manage resources and Knowledge of self is available appropriately. Along with the development of additional resources and capabilities. To lay the foundation for a competitive advantage over competitors. In general, Kale and Singh (2007) business partners, including the alliance learning process, include: defining clear knowledge, knowledge processing, sharing knowledge and the learning process. It is a factor that influences the level of success of business partners. It is a mediation activity. The relationship between alliances and business partnerships. You will see that the company is successful in becoming a partner. In addition to the factors that contribute to the formation of partners. The company must have a good partner-learning process. To exchange and learn from the knowledge. Partner to use to improve the performance of the Alliance. The organization of the learning process from the partners should be able to promote the organization more successful partners.

The researchers concluded that, creating a business partner it means having a partner or business partner working together for the success of the business, focusing on being a business partner as a partner in the business. The ability to help build a strong business and bring the business to the common success. By reviewing the concepts, theories, and related research, one can assume the following assumptions:

- The first hypothesis: Change management has a positive influence on the development of human capital.**
- The second hypothesis: Change management has a positive influence on business partnerships.**

**Competitive Advantage**

Barney (1991) stated that creating competitive advantage arises from the implementation of value-added strategies and the benefits to the company. Competitive advantage can be achieved by using resources or groups of resources within a company. Castelo and Rodrigues (2006) state that the current study of CSR is a source of competitive advantage. Companies should use their competitive advantages and seek better benefits.

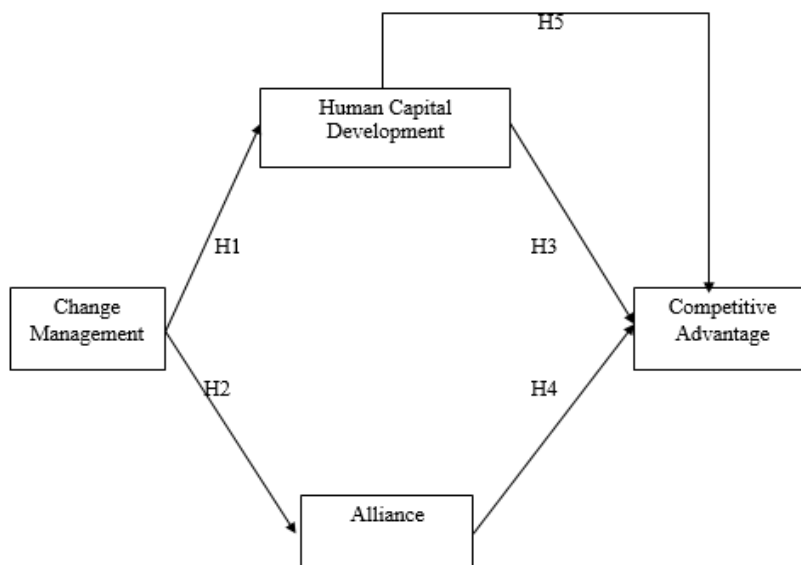
Porter (2011) has stated that it is a business that is superior to competitors. Which must be used to suit the changing situation. Be consistent with the resources and readiness of the business. The strategy to create a competitive advantage all 3 strategies are strategies that 1. Cost leadership provides benefits equal to competitors at a lower cost strategy 2. Making the difference. 3. Market focus is a strategic organization that used to fit the needs of that market. There are differences in product requirements, product variations, colors, quality and expectations in a different way . And Davol, Mayor and Hera (2011) stated that the ability to compete with the definition at 3 different levels: organizational level, the national industry by offering a definition of ability. National competition. This is a macroeconomic variable. Based on the exchange rate indicators, the proportion of the country's exports to participation in the global market. It defines the competitiveness of microeconomics with indicators of income and standard cost of living.

From that said, the researchers concluded that. Competitive advantage It means differentiating between competitors in terms of innovation, cost, speed, and the quality of the product.

- From the review of theories and related research can be summarized as hypotheses.**
- The third hypothesis: Human capital development has a positive influence on the competitive advantage.**
- The fourth hypothesis: Business partnerships have a positive influence on the competitive advantage.**
- The fifth hypothesis: Change management has a positive influence on the competitive advantage.**

Based on a conceptual review of theory, document, throughout the relevant research, a framework for research on human capital development has been established. Features of the operator, Change management, Creating a Business Partner, Innovative Management Capabilities, Achieving Marketing Success. The results of this study are as follows.

*Results Of This Study Are As Follows.*



Picture 1 Conceptual Framework

RESEARCH METHODOLOGY

*Population and sample*

The population used in this study included: Farmers planted orchids. Nakhon Pathom In this research, the researcher selected the samples of orchid farmers. It is registered with the Nakhon Pathom Provincial Agricultural Extension Office and is still active in the year 2017. There were 653 cases (Nakhon Pathom Provincial Agricultural Extension Office, Agricultural Information, 2017). Krejcie & Morgan (Robert V. Krejcie and Earyle W. Morgan, 1970: 608-609). The researcher selected a specific sample (Purposive Sampling).

*Tools used to gather information.*

This research uses the questionnaire is a tool to collect data. The questionnaire was divided into 5 parts. General Information, Change Management, Human Capital Development, Business Partnerships, and Competitive Advantage. The questionnaire was designed by Likert (Rating Scale), each of which was divided into 5 levels, the highest, high, average, low and the lowest.

*Researchers have examined the quality of tools.*

1) The Content Validity by bringing the questionnaire to the experts for consistency. Coverage of questionnaire with objectives of research, terminology and language suitability of the questionnaire. By definition, the index of consistency of each question with the objective (Index of Item-Objective Congruence: IOC) from 0.50 to (Pasunon Prasopchai, 2012: 224), then consider the question. The recommendation of the experts. And develop a model of tools to suit the next use. From the test, the IOC value is 0.85 or higher.

2.) The Reliability of the questionnaire was used to collect data from 50 samples. The data were tested by Cronbach's Alpha (Srisaard Boonchom, 1999). It was found that the reliability coefficient of alpha 0.90, which means that the reliability of the questionnaire is greater than 0.7, indicating that the test population has a consistent score of close to 1, indicating that the test has a high confidence level.

3) The Data analysis in this research. Descriptive statistics consisted of frequency, percentage, mean, standard deviation (SD). The score was 4.21-5.00. Score of 3.41-4.20 indicates that the level is very high, 2.61-3.40 score is moderate, 1.81-2.60 score is low and 1.00-1.80 score is the lowest level(Srisaard Boonchom, 1999) and Pearson's Product Moment Correlation Coefficient was used to analyze the influence of the variables by simple regression analysis. Input can describe the meaning of the abbreviation.

- CM is Change Management
- HCD is Human Capital Developmant
- AL is Alliance
- CA is Competitive Advantage

RESEARCH RESULT

The study of change management. Human capital development. Creating a Business Partner and Competitive advantage for orchid farmers. Quantitative research is used as a tool. In the sample survey, 242 orchid farmers were interviewed. Data were analyzed using statistical program. Researchers have summarized the results as follows.

1. Most of the samples were male. Aged between 40-49 years. Experience in orchid farming 11-20 years, with more than 10 rai of acreage, average annual income more than 500,001 baht.
2. Change management was high. The mean was ( $\bar{x}$  = 3.69, S.D. = 0.72)
3. Human capital development was high. The mean was ( $\bar{x}$  = 3.70, S.D. = 0.74)
4. Business partnerships was high. The mean was ( $\bar{x}$  = 3.72, S.D. = 0.70)
5. Competitive advantage was high. The mean was ( $\bar{x}$  = 3.75, S.D. = 0.69)
6. Results of hypothesis testing

*Table 1 : Standard deviation and correlation analysis of change management, creating a business partnership, human capital development that affects the competitive advantage.*

Variable	CM	HCD	AL	CA
Mean	3.69	3.70	3.72	3.75
Standard Deviation	0.72	0.74	0.73	0.69
Change Management (CM)	-			
Human Capital Development (HCD)	0.72**	-		
Alliance (AL)	0.75**	0.76**	-	
Competitive Advantage (CA)	0.74**	0.75**	0.76**	-

\*p <0.05, \*\*p <0.01, \*\*\* p <0.001

Table 1 shows the results of the standard deviation. The correlation coefficients of the variables were correlated with the variables of business partners. The business partner variables were correlated with the development variables. At the 0.01 level, the learning organization variables were correlated with organizational development variables. Statistically significant at the 0.01 level

Table 2: Simple regression analysis

Independent Variable	Research Hypothesis/Dependent Variable				
	H1 (HCD)	H2 (AL)	H3 (CA)	H4 (CA)	H5 (CA)
Change Management (CM)	0.549*** (0.053)	0.552*** (0.050)	-	-	0.570*** (0.066)
Human Capital Development (HCD)	-	-	0.558*** (0.070)	-	-
Alliance (AL)	-	-	-	0.565*** (0.065)	-
Adjusted R <sup>2</sup>	0.435	0.352	0.363	0.441	0.385

\*p <0.05, \*\*p <0.01, \*\*\* p <0.001

Table 2 is a simple regression analysis for hypothesis testing. This can be explained as follows.

1. Change management had a positive influence on the human capital development at the level of 0.001 ( $\beta = 0.549$ ,  $P < 0.001$ ). The results were in accordance with the first hypothesis.
2. Change Management Positive influence on business partnerships was significant at the level of 0.001 ( $\beta = 0.552$ ,  $P < 0.001$ ). The results were in accordance with the second hypothesis.
3. The development of human capital has a positive influence on the competitive advantage at the level of 0.001 ( $\beta = 0.558$ ,  $P < 0.001$ ). The results were in accordance with the third hypothesis.
4. Business partnerships had a positive influence on the competitive advantage at 0.001 ( $\beta = 0.565$ ,  $P < 0.001$ ). The results were in accordance with the fourth hypothesis.
5. Change management has a positive influence on the competitive advantage. ( $\beta = 0.570$ ,  $p < 0.001$ ). The results were in accordance with the fifth hypothesis.

## DISCUSSION

The results of the test. Change management Human capital development Creating a Business Partner Therefore, it is found that accepting the first hypothesis, which is consistent with the concept of Kotter & Cohen (2012) found that participation, enthusiasm and commitment. Will help find the right person to join the team. Create a descriptive example of trust and teamwork. Creating a working team approach to reduce conflict and increase trust in work. And in communicating that vision to the people in the organization. However, the results of the research are based on the assumption that the change influences human development in the training activities, which is to encourage the employees to learn to develop themselves. Future work is different from the present.

Based on the findings, it is accepted that the second hypothesis corresponds to the concept with Uddin & Akhter (2011), which states that the creation of a competitive partner can be made from the simplest possible with customers, suppliers and service companies. It can develop and succeed in the competition. But cooperation. And the use of collaboration to achieve maximum efficiency. However, the results of the research are based on the assumption that business partnerships are more effective for the organization as they understand the learning process from business partners.

The study found that accepting the third hypothesis, which is consistent with the concept of the college (2009) found that the development of human capital and technology Thailand has focused on expanding the amount of education and focus on developing people. Technicians with current technology expertise focus on the application of existing technology to support the development. In line with the needs of the manufacturing sector, the country's competitiveness, technological dependence both in terms of quality and quantity, with a focus on sustainable development. However, the research results are based on the assumption that human capital development can increase competitive advantage and self-reliance.

The study found that accepting the fourth hypothesis, which corresponds to the concept of Pranee Tapaneworawong (2010), found that the linkage of the affiliate business network affects Competitiveness However, the results of the study are based on the assumption 4 that the operator has to reduce raw material costs, transportation taxes by establishing partnerships with raw material producers or contract farming with raw material suppliers. Raw materials shortage and affect the cost of production.

The result of the study found that accepting the fifth hypothesis, which corresponds to the concept of Thongchai Thongma and Teerawat Chantuk (2015), found that change management is a preventive approach. Globalization in the Organization: Keeping pace with the competitive environment. However, the results of the study are based on the assumption 5 that change management in the organization is a change in the majority of the sub-components, which are able to recognize the change leadership at a high level, with the issue. In high motivation, everyone is involved in inspirational leadership. This workshop will be conducted successfully.

## CONTRIBUTIONS

### 1. Management Contributions for Research

Managing change has made executives aware of the importance of developing the ability to change the workforce to accommodate the changes that are taking place today and in the future. And the creation of effective performance appraisal systems. Management and personnel in other organizations can apply this approach to their organization. To maximize efficiency and effectiveness. It is a guideline that emphasizes human resource management to be the most important driving force for sustainable change in the organization today and in the future.

For the development of human capital, the entrepreneur should plan to apply the principle of human capital development to be more effective. This will positively affect the organization's operations, allowing employees to be involved in self-

development activities. Career development Corporate Development. The demand for staff and management directly. To find a gap in human capital development, compare the performance that the organization expects and develop in order to accommodate the changes that will occur in the future.

Creating a business partnership makes the entrepreneur aware of how to make a successful business partner a business. The business needs to understand the learning process from the partner to bring the knowledge. Obtained whether it is in the work process. Innovation or technique of work. It can not be learned if it is not a business partner. It is defined as the knowledge gained through the processing of knowledge. Sharing knowledge and the exchange of learning. In order to promote the success of the organization as a business partner.

Competitive advantage for agro-operators is that operators should increase their competitiveness and encourage clustering. Because of the small and medium size of the cluster, there should be an incentive model for entrepreneurs to increase their knowledge of the business. Smaller entrepreneurs should start with smaller ones, and then expand to smaller ones. The first, and then be extended to small groups.

## *2. Theoretical Contributions*

This study confirms the composition of change management, human capital development, creating a business partnership affecting the competitive advantage for orchid farmers of Nadler (1989) and Mondy and Noe (2005). Concepts and theories of change management. Daft (2008). Concept and theory of change management. Cullen & Johnson, (2000); Kingshott (2006) to create variables and paradigms in research and to apply Li's theory of competitive advantage and Xie (2013) to apply. The study was conducted in the form of casual research to prove the relationship and influence between variables, change management, human capital development, creating a business partner .The focus of the test is the median or the mediator. It is also a study in the context of the orchid farmer, who has not much research to study as a medium or variable transmission. In the past, most researches have studied the development of human capital. Antecedent variable and competitive advantage are variables. These findings can be used to study the influence of this variable on other variables.

## FUTURE RESEARCH DIRECTION

This study confirms the composition of change management, human capital development, creating a business partnership affecting the competitive advantage for orchid farmers. In the next research, both quantitative and qualitative data were collected and the results of this research could be clearly and effectively answered. But the data stored is a one-time data collection called cross-sectional studies. The operation of the operator will change as well. Therefore, in the next study should consider long-term study. (Longitudinal Study) to study the change or development in the operation of the operator.

The research methodology used was a mixed method. The questionnaire was used as a tool to collect data from agricultural operators. Statistics used in data analysis was the frequency distribution, percentage and structural equation modeling with the LISREL program and to improve the competitiveness and competitiveness of agri-business operators. This is a study of the ways and means of enhancing knowledge and skills. The policy is directed to agencies that represent the public and private sectors that implement the policy. The policy is to promote and assist farmers and related operators in enhancing competitiveness in the agricultural industry in each area.



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## Innovative Organization: Innovative Organization Development Model in Thailand 4.0 of SMEs Manufacturing Industries in Nakhon Pathom Province, Thailand (Phase 1)

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**Abstract:** The objectives of this research were (1) to study the important level of factors affecting the innovative organization development model in Thailand 4.0 of SMEs manufacturing industries in Nakhon Pathom province (2) to study the positive linear relationship of the factors affecting on the innovative organization development model in Thailand 4.0 of SMEs manufacturing industries in Nakhon Pathom province (3) to develop the model of innovative organization development in Thailand 4.0 of SMEs manufacturing industries in Nakhon Pathom province, This research was divided into two phases, as following: phase 1; to study the important level of the factors affecting innovative organization development model in Thailand 4.0 of SMEs manufacturing industries in Nakhon Pathom province, and phase 2; to build up the model of the innovative organization for SMEs manufacturing industries. For the methodology part, this research used mixed methods research that combined between the quantitative research and the qualitative research. The quantitative research was used for the phase 1, by using descriptive statistics and inferential statistics by using multiple regression analysis from the 450 samples of the SMEs business from SMEs manufacturing industries in Nakhon Pathom province. Furthermore, the qualitative research was conducted in phase 2, by using an indebt interview with the 10 SMEs manufacturing entrepreneurs'. The findings of this research found that the important level of factors affecting the innovative organization development model in Thailand 4.0 of SMEs manufacturing industries in Nakhon Pathom province depends on the important factors such as innovative leadership, research and development collaboration, organizational culture focusing on innovation as well as government sector support which are statistically significant ( $p$ -value  $< .05$ ) to the result. This research could be used as a model for other organization in order to develop an innovative organization as an SMEs industrial type, in another province to elevate the ability in developing an innovative organization, their competitiveness and competency accordingly.

*Keywords:* Innovative Organization, R&D in SMEs, Thailand 4.0.

### INTRODUCTION

#### *Background*

SMEs are the group of manufacturing that is very important in driving Thailand's economy, according to the statistics of the Office of Small and Medium Enterprises Promotion (OSMEP) in 2014, the total number of SMEs is 2,736,744, or 99.7% of the total enterprises, employing 10,501,166 people or 80.3% of all employment, this can build up Gross Domestic Product (GDP) amount at 5,212,004 million bath or 39.60 % of GDP of the country. However, last year, SMEs business generated 13.0 percent of GDP in Thailand which considered relatively as a low income SMEs business in Thailand. Compared with the high-income countries in the world, SMEs business accounted for 50% of GDP, indicating that Thai SMEs lacks the ability to compete in the global marketplace. It can also be developed to reach at the level 3 in ASEAN countries. If SMEs get supported by the government, it will help strengthening the SMEs' ability to survive and be competitive with foreign country accordingly. At present, SMEs businesses are directly affected by government policy to bring Thailand into the Thailand 4.0 Era, using the strength of the industry to create innovation in order to drive the country to a sustainability economy development by linking all dimensions of production systems to information technology for communication and industrial development, SMEs business in Thailand need to accelerate the adaptation in all aspects, especially the continuous in research and development in innovation development to support the Thailand 4.0 Era industry as the standard of production and marketing as well as a competitiveness on a global scale. On the other hand, most of SMEs businesses still lack the knowledge of the model of business management towards an innovative organization during the Thailand 4.0 Era, which is still needed to be in concerned. The researcher is realizing that Thailand is entering Thailand 4.0 Era and need to strengthen the innovative organization to drive the economy of the country; they need to speed up the adjustment in all aspects, especially in research and development to create the innovation towards an innovative organization during Thailand 4.0 Era. Therefore, the researcher brings these research questions into research process to study and develop proper SMEs business model in Thailand 4.0 Era accordingly.

### RESEARCH QUESTIONS

*The research questions are as follows.*

Q1:What should be the qualification of factors affecting on the innovative organization development?

Q2:How will various factors such as innovative leadership, research and development collaboration factor, government sector support factors, affecting on the innovative organization development?

Q3:How will the created innovative organization development model in Thailand 4.0 of SMEs manufacturing industries be suitable for SMEs manufacturing industries in Nakhon Pathom province, Thailand?

### RESEARCH OBJECTIVES

*This research aims to:*

O1: To study the importance level of factors affecting on the innovative organization development model in Thailand 4.0 of SMEs manufacturing industries in Nakhon Pathom province

O2: to study the positive linear relationship of the factors affecting on the innovative organization development model in Thailand 4.0 of SMEs manufacturing industries in Nakhon Pathom province

O3: to develop the model of innovative organization development in Thailand 4.0 of SMEs manufacturing industries in Nakhon Pathom province

## RESEARCH HYPOTHESIS

*The research hypotheses are as follows:*

The hypothesis for the answers of research objectives No.2 as following:

H1: The various factors such as innovative leadership factor, research and development (R&D) collaboration factor, organizational culture focusing on innovation factor, and government sector support factor have a positive linear relationship to SMEs innovative organization development in case of research and development for innovation

H2: The various factors such as Innovative leadership, Research and development (R&D) collaboration, Organizational culture focusing on innovation and Government sector support factors have a positive linear relationship to SMEs innovative organization development in case of Innovation development in leading the modern production and services

## RESEARCH CONTENT

In this research, the researcher investigates the Innovative Organization Development Model in Thailand 4.0 Era of SMEs Manufacturing Industries in Nakhon Pathom Province (Phase 1). The researcher studied the concepts, theories and related research to Innovative leadership, Research and development collaboration, Organizational culture focusing on innovation. Government sector support and the innovative organization for finding out the answer of research objectives No.1 and 2 as following:

## CONCEPT AND THEORIES

*Innovative leadership:*

is a philosophy and technique that combines the differences in leadership styles that influence employees in innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries to create ideas, create new products and services. The important role of innovative leadership is to lead the organization to the innovative era which related to lead the organization in 3 aspects, as to lead the organization to an innovative management, to lead the organization to the innovative working environment, to lead the organization to the innovative leadership via an important process which are leading to learn, leading to think, leading to change and leading to create innovative thinking. (Dess, G. G., & Pickens, J. C. , 2000); (McEntire, L. E., Greene-Shortridge, T. M., 2011); (Sarros, J. C., Cooper, B. K., & Santora, J. C., 2008); Shipton, H., Fay, D., West, M. A., Patterson, M., & Bird, K., 2005); Tushman, M., & O'Reilly, C., III.,1996)

*Research and development collaborations:*

is the collaboration on research and development between private and government sector to develop the process of new product development or improve the existing product or service of SMEs manufacturing industries. Wherewith, the government must prioritize national strategies as a guideline for many research institutes to conduct the research in the same direction, as well as invest seriously in infrastructure and research funding to develop research and create innovation in science, technology, social sciences and more, to response to human needs, society, environment and region around the world (Investopedia, 2003) (Suthiporn Chitmitrapab, 2014)

*Organizational culture focuses on innovation:*

is a business as an SMEs industrial factory type that their organization culture focusing on innovation which emphasized on research and development to achieve the new concept, new product, new service and new production process, as well as promoting the organization's employee to be more creative in workplace. The management must accept the difference opinion (Diversity) of their employees, which consists of: the participation of their employee (Challenge and Involvement), the independence and the freedom to initiate their idea, the ability and freedom to set the rules of working (Freedom), the trust and openness among employee (Trust and Openness), the time to think new things and the time contemplation to create new things or new idea (Idea Time), the atmosphere at work is relaxed, friendly and festive environment (Playfulness/Humor), the ability to solve problems and conflict (Conflict Resolution), the ability to debates (Debates) and ability to take risk (Risk Taking) (Hofstede, 1997) (Ravasi & Schultz, 2006) (Robbins, 2001); Schermerhorn (1999); Samaporn Phuvichit, Yupaporn Yupak and Sanya Kenaphom (2558, p. 76)

*Government sector support:*

promotes innovation from government to SMEs in Thailand according to government policy article 8 of the development and encouragement of the use of science and technology, research and development as well as innovation. The government pays attention to research and to the further development, including to the innovative creation in order to lead the modern production and services. The government also administered by follows the policy, as shown in the performance report of the Prime Minister General Prayuth Chan-O-Cha. (1<sup>st</sup> Annual Government Performance Report, 2016)

*Innovative organization:*

means a business as an SMEs manufacturing industrial that have been improved and changed in the process of thinking to create something different and useful by introducing new ideas into the organization, whether it is the product, the production process, the service protocol, including the organization's management, operation, and marketing activities which consists of research and development to create innovation that lead to modern production and services. (Gibbons, 1997) (Laundy, 2006) (Quinn, 1991, pp. 17-28); Irin Rojanarak (2015)

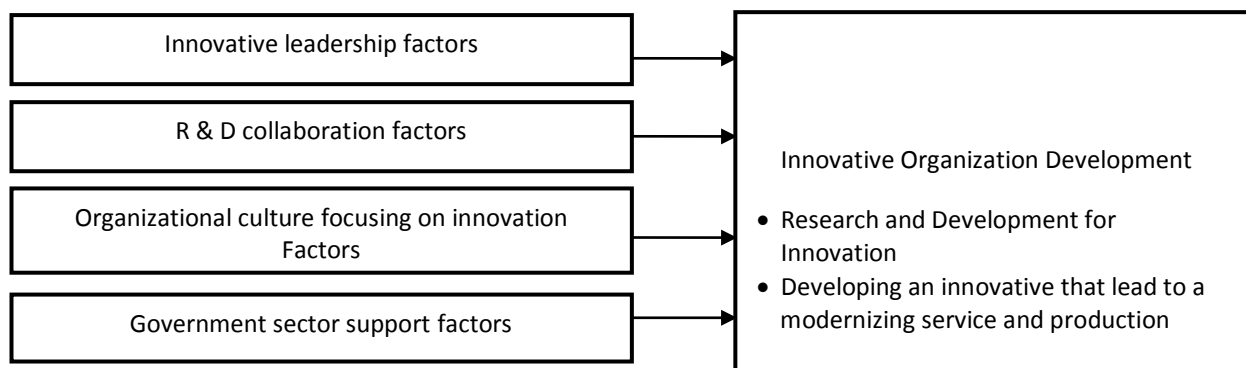
## VARIABLE USED IN THIS RESEARCH

In this research, the researcher determines the variables used in the research as follows:

The four independent variables: consist of – Innovative leadership factor, Research and development collaboration factor, Organizational culture focusing on innovation factor, and the Government sector support factor. The one dependent variable: consist of - the innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province, which consists of research and development to create innovation that lead to a modernizing services and productions.

## RESEARCH FRAMEWORK

In this research, a conceptual framework based on the results of the analysis and synthesis of the concept, the theory and the research results in literature review. (As shown in Figure 1).



*Figure 1 Variable relationship Framework*

From Figure 1, shown the relationship between independent variables which are – Innovative leadership factors, Research and development collaboration factors, Organizational culture focusing on innovation factors, the Government sector support factor and the dependent variable, which is the the innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province, that consists of research and development to create innovation that lead to modern production and services.

## RESEARCH METHODOLOGY

In this research, the researcher conducted a research on the the innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province by divided the research process into 2 phases. The first phase is to study the factors that affect the the innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province and the second phase, is to establish the innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province.

### *Research Model:*

This research, researchers conducted the research using mixed methods (Ratana Buasont, 2013), beginning with quantitative research by using descriptive statistics method, followed by qualitative research by using inferential statistic method. Quantitative research, the researcher collected cross-sectional field data only once, in a large area and described characteristics or relationships among difference substances. For qualitative research, researchers collected and analyzed data from the in-depth interview (Suchart Prasitranasin, 2001).

## DATA COLLECTION

*This research was designed as follows:*

**Population:** This study, the researcher investigated the target population which are supervisors, executive level, the entrepreneurs of the SMEs Industrial Type, in Nakhon Pathom District, Kamphaeng Saen District, Don Tum District, Nakornchaisri District, Bang Len District, Phutthamonthon District and Sam Phran District, Nakhon Pathom Province total 2,988 firms (the data gathered as of 13<sup>th</sup> July, 2018, excluding manufacturers that have not registered to operate and temporary stop their operation or out of business, source from - Industrial Information Center Division from the Department of Industrial Factory)

**Samples:** In this research, the researcher defined the sample, which represents the total population used in the study by selecting the sampling type, using non-probability sampling method (Non-probability Sampling) and used many sampling methods such as quota sampling method (Quota sampling) and purposive sampling method (Purposive Sampling) by using the researcher judgement (Judgment Sampling) in order to get both broad and in – depth information (Wacharaporn Suriyabhiwat, 2007, p.147)

**Sample Size:** In this research, the researcher calculated the sample size (Sample Size) to be used for descriptive statistics (Descriptive Statistics) in order to analyze the general characteristics of the respondents and the significance level of the variables. Moreover, to be use for inferential statistics (Inferential Statistics) that are based on the rules of thump for determining sample size, by Roscoe (1975), which stated that, the size of the sample in a multivariate analysis (Multivariate analysis) and multiple regression analysis (MRA) need to be exceeded more than 10 times from the variable used in the research. The appropriate sample size should be no less than 30 samplings and not exceeding to 500 samplings. From this research, the researcher used 450 samplings for data analysis.

**Unit of Analysis:** In this research, the researcher used the organizational unit level analysis by defining the executives or entrepreneurs of SMEs manufacturing business in Nakhon Pathom province as the respondents, each of them will give their feedback by filling in the questionnaire form either in hard copies or in Google forms, by using one questionnaire per one person and one questionnaire per one organization only.

**Tools Design and Monitoring Tools:** The researcher designed the questionnaire for quantitative research as follows: Questionnaire for quantitative research was designed to measure the opinions of respondents either hard copies or Google forms, the questionnaire was divided into 3 parts with the total of 35 questions.

**Quality Inspection Tools (Survey Form):** Based on the results of the content validity tests, the results of the IOC evaluation and calculation in the questionnaire with 16 variables and 28 questions were answered by 3 business organization' expertise and the researcher found out that the highest IOC was 1.00 and the IOC minimum score was 0.67, where the IOC of all questions were > 0.50, indicating that all questions were consistent and covered the content that the researcher wanted to measure.

After the researcher conducted a content validity check, the researcher used 40 questionnaires to try out the reliability of these questionnaires (Reliability Test) (Suwimol Tirakanan, 2003, p.153-158). Based on the reliability test results, the alpha coefficient ( $\alpha$ ) of the questionnaire used to measure 16 variables were .837 > 0.70, indicating that all questionnaires had a high level of reliability. Therefore, it was appropriate to use this questionnaire as a tool in this survey and to collect the data accordingly.

**Measurement Tool:** The researcher created a measurement tools to collect data in quantitative research by designing the positive attitude questionnaire (Positive) in accordance with the indicators, operational definition, variables, conceptual frameworks, research objectives, and research questions. The questionnaire was used to measure the level of feedback of the respondents to obtain the Nominal Scale (Nominal Scale) from Questionnaire Part 1 and Interval Scale (Interval Scale) from Questionnaire Part 2.

**Measurement and Meter:** This research is a quantitative research. The researcher used the Nominal Scale (Nominal Scale) and Interval Scale (Interval Scale) by using the 1-5 Scale from Likert Scale (Scale 1-5) as well as using the range (Range) equal to 0.80 and ranged up to determine the average scores. The lowest average mean was 1.00-1.80 and the highest mean was 4.21-5.00, respectively.

**Data Collection:** The researcher collected quantitative data and qualitative data from the field using questionnaire as a tool to collect data. The samples were small and medium enterprises (SMEs), Industrial Type in the city of Nakhon Pathom District, Kamphaeng Saen District, Don Tum District, Nakornchaisri District, Bang Len District, Phutthamonthon District and Sam Phran District in Nakhon Pathom Province. The researcher delivered questionnaire forms as a Google form via the Internet and also delivered questionnaires as a hard copy format to SME business organizations in Nakhon Pathom Province. The data collection period was 66 days in total.

**Data Analyze:** The researcher used the statistics and techniques to analyze the data and the relationship of two variables and divided into two parts. Part 1, By using descriptive statistics (Descriptive Statistics), this statistic and technique was used to analyze the data as well as to evaluate the frequency, percentage, mean (X) and standard deviation (SD). Part 2, By using inferential statistic (Inferential Statistics), this statistic and technique was used to analyze the data to evaluate the relationship of the variables using the multiple regression analysis method. (MRA)

## RESEARCH RESULTS

This result is to report the first phase of the research. The research is divided into two parts: Part 1: Descriptive Statistic results. This result presents the general characteristics of the organizations that were sampled together with the significance level of the variables, in order to answer to the research objective No.1 by dividing into 2 sections. Section 1, Analysis of general characteristics of the respondents and Section 2, Analysis of the importance level of variables and Part 2: Inferential Statistic. This result presents the study of variables result which were divided into 2 sections. Section 1, present the test results of the research hypothesis No.1 (H1) and section 2, present the test results of the research hypothesis No. 2 (H2) to answer the research objectives No. 2.

### *Research Result Part 1: Descriptive Statistic*

#### *Section 1 The general characteristics of respondents (SMEs business organization) analysis results*

Based on the results of the analysis of general characteristics of the respondents from the sample of 450 firms are as follows:

**Size of SMEs business,** the researcher found that the majority of the respondents were medium enterprises which were 264 firms (58.70%), followed by the Small enterprise at 186 firms (41.30%), respectively.

**Duration of SMEs Operation,** the researcher found that the majority of the respondents were 219 firms run their business between 5 years – 10 years (48.70%), 105 firms run their business lower than 5 years (23.30%), followed by 101 firms (22.40%) run their business between 11 years - 20 years and 25 firms (5.60%) run their business more than 21 years, respectively.

**Annual revenue reveals** that the majority of the respondents were 147 firms organizations generate their annual revenue between 50 - 100 million Baht (52.20%), followed by an annual revenue lower than 50 million Baht 141 firms (31.30%) and annual revenue between 101 million baht - 200 million Baht 74 firms (16.40%), respectively.

**Research and development (R & D),** the researcher found that the majority of the respondents were 360 SMEs firms (80%) have not conducted the research and development (R & D) followed by the 90 SMEs firms (20%) have conducted research and development (R & D), respectively.

**Status of the respondents,** the results indicated that the majority of the respondents were entrepreneurs 263 persons (48.30%), followed by 187 executives (41.60%), respectively.

#### *Section 2: The importance level of Variables analysis results*

Based on the data analysis of the importance level of variables towards innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province by using descriptive statistics to calculate mean (X) and standard deviation (SD) of the variables used in the analysis from the sample of 450 firms who were the respondents, it was

found that overall factors affecting innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province, was at high to the highest level (X = 4.175- 4.471; SD = .483 - .607). When considering each variable, it was found that the majority of the respondents focused the most on innovative organizational culture at (X = 4.471; SD = .483) which consists of a creativity organization culture, challenge and participation including the freedom to initiate their work and also their creativities, moreover, a culture to create mutual trust and finally the time frame utilization organization culture that giving time for their employee to think new things.

Follows by, the Government sector support factor (X = 4.272, SD = .539), consists of the use of science and technology development, research and development support, innovation support that lead to modern production and services. Innovative leadership factor (X = 4.239, SD = .557), consist of the lead to innovative organization and the lead to organizational management culture. Followed by, research and development collaborative (X = 4.175; SD = .607), which consist of research and development collaborative in the organization, research and development collaboration between government and private sectors respectively.

*Research result Part 2: Inferential Statistic.*

**Section 1: The research results from hypothesis 1 (H1)**, this is to analyze the relationship between independent variables and dependent variables. From hypothesis test result; the data were analyzed by using the mean scores of multiple regression analysis (MRA) to find out the relationship between these two variables with computer program from Information & Technology Data Center, Suan Sunandha Rajabhat University, to get the standardized coefficients score. The pre-analysis of the data was analyzed by researcher and the basic terms of the multiple regression’s analysis (see Table 1) was examined as following

Table 1

*The results of multiple regression analysis. Based on the test of hypothesis 1(H1) (n = 450)*

Variable Factors	b	SEb	β	t	Sig.	Tolerance	VIF
Innovative Leadership (INLD)	.186	.028	.296**	6.711	.000	1.000	1.000
Research and Development Collaborations (INCC)	.093	.028	.148**	3.350	.000	1.000	1.000
Organizational culture focusing on innovation (INCU)	.107	.028	.171**	3.866	.000	1.000	1.000
Government Sector Support (GOVS)	.057	.028	.091*	2.067	.039	1.000	1.000

Eigenvalue= 1.000, R= .399, R<sup>2</sup> = .159, R<sup>2</sup>adj. =.149, SEest. =.57997, F=16.340, Sig=.000, a = 4.213

\* A statistically significant <0.05, \*\* statistically significant <.01.

a. Dependent Variable: the innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province, in Research and development for innovation aspect. (INOR1).

From the results of multiple regression analysis, the equation can be written in standardized form to test the research hypothesis1. The researcher defined the equations to 1 and 1.1 as follows:

$$\hat{ZY} = \beta_0 + \beta_1 Z_1 + \beta_2 Z_2 + \beta_3 Z_3 + \beta_4 Z_4 + \epsilon \quad \dots\dots\dots (1)$$

(t)      (t)      (t)      (t)

$$\hat{INOR1} = 4.213 + .296**INLD + .148**INCC + .171**INCU + .091*GOVS + .57997 \dots\dots\dots (1.1)$$

(6.711)      (3.350)      (3.866)      (2.067)

R= .399, R<sup>2</sup> = .159, R<sup>2</sup>adj. =.149, SEest. =.57997, F=16.340, Sig=.000, a = 4.213

Remarks: In ( ) is the value of t score, \* statistically significant <.05, \*\* statistically significant < .01

The results of the first hypothesis test with the multiple regression analysis (Table 1) from the sample of 450 organizations found that there was a direct positive relationship between the cause and the effect of variables.

The Independent variables correlation was not high, so there was no Multicollinearity problem (Multicollinearity).

Independent variables, the highest standard of regression coefficient (β) was the innovative leadership factor (INLD), which was .296 \*, followed by organizational culture focusing on innovation factor (INCU) was at .177, and research and development collaborations factor (INCC) was at .148 \*\*, followed by government sector support factor (GOVS) at .091 \*\*, respectively. The correlation coefficient (R) was .399; the multiplicity square root of the correlation coefficient (R<sup>2</sup>) was equal to .159.

All of the 4 Independent variables could be related to the dependent variable which was the innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province in research and development for innovation aspect (INOR1) was at 15.90% with statically significant at .05 (p <.05), there was a coefficient of quadratic correlation (R<sup>2</sup>adj.) at .149 and a standard error in forecasting (SEest.) was equaled to .57997

This result can be simplified that the innovative leadership factor, research and development collaborations factor, organizational culture focusing on innovation factor, government sector support factor, were statistically significant as a positive linear relationship with the innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province in research and development for innovation aspect at .05 level. (*p*-value <.05)

**Section 2: The research results from hypothesis 2 (H2)** This is to analyze the relationship between the independent variables and dependent variable. From the hypothesis test result, the data were analyzed by using inferential statistic (Referential) to analyze the data from the multiple regression analysis in order to find the relationship of variables by using computer program from Information & Technology Data Center of Suan Sunandha Rajabhat University, to get the standard coefficient ( $\beta$ ) score. The pre-analysis of the data was analyzed by researcher and the basic terms of the multiple regression’s analysis (see Table 2) was examined as following:

**Table 2**

*The results of multiple regression analysis based on the research hypothesis test 2 (H2) (n = 450)*

Variable Factors	b	SEb	$\beta$	t	Sig.	Tolerance	VIF
Innovative Leadership (INLD)	.221	.027	.302**	8.075	.000	1.000	1.000
Research and Development Collaboration (INCC)	.118	.027	.161**	4.318	.000	1.000	1.000
Organizational culture focusing on innovation (INCU)	.162	.027	.221**	5.911	.000	1.000	1.000
Government Sector Support (GOVS)	.131	.027	.179**	4.774	.000	1.000	1.000

Eigenvalue= 1.000, R= .630, R<sup>2</sup> = .397, R<sup>2</sup>adj. =.389, SEest. =.57232, F= 47.335, Sig=.000, a = 4.080

\*Statistically significant <.05, \*\* statistically significant < .01

a. Dependent Variable: The innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province, in developing an innovative that lead to a modernizing service and production aspect. (INOR2).

From the results of multiple regression analysis, the equation can be written in standardized form to test the research hypothesis1. The researcher defined the equations to 2 and 2.1 as follows:

$$\hat{ZY} = \beta_0 + \beta_5 Z_5 + \beta_6 Z_6 + \beta_7 Z_7 + \beta_8 Z_8 + \varepsilon \dots\dots\dots(2)$$

(t)      (t)      (t)      (t)

$$\hat{INOR2} = 4.080 + .302** INLD + .161** INCC + .221** INCU + .179** GOVS + .57232 \dots\dots\dots(2.1)$$

(8.075)      (4.318)      (5.911)      (4.774)

R= .630, R<sup>2</sup> = .397, R<sup>2</sup>adj. =.389, SEest. =.57232, F= 47.335, Sig=.000, a = 4.213

Remarks: In ( ) is the value of t score, \* statistically significant <.05, \*\* statistically significant.

The results of the first hypothesis test with the multiple regression analysis (Table 1) from the sample of 450 organizations found that there was a direct positive relationship between the cause and the effect of variables.

The Independent variables correlation was not high, so there was no multicollinearity problem (Multicollinearity). The Independent variables, the highest standard of regression coefficient ( $\beta$ ) was the innovative leadership factor (INLD), which was .302\*, followed by organizational culture focusing on innovation factor (INCU) was at .221\*\*, and government sector support factor (GOVS) at .179 \*\*, followed by research and development collaborations factor (INCC) was at .161 \*\*, respectively. The correlation coefficient (R) was .630; the multiplicity square root of the correlation coefficient (R<sup>2</sup>) was equal to .397.

All of the 4 Independent variables could be related to the dependent variable which was the innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province in developing an innovative that lead to a modernizing service and production aspect (INOR2) was at 39.70% with statically significant at .05 (*p* <.05), there was a coefficient of quadratic correlation (R<sup>2</sup>adj.) at .389 and a standard error in forecasting (SEest.) was equaled to .57232

This result can be simplified that the innovative leadership factor, research and development collaborations factor, organizational culture focusing on innovation factor, government sector support factor, have statistically significant to a positive linear relationship with the innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province in developing an innovative that lead to a modernizing service and production aspect at .05 level. (*p*-value <.05)

## RESEARCH RESULTS

In this research, the researcher investigated the innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province (Phase 1) and found out that the innovative organization for SMEs manufacturing industries, in research and development for innovation, and developing an innovative that lead to a modernizing service and production were statistic significantly based on an innovative leadership, organizational culture focusing on an innovation, government sector support, and research and development collaborations at .05 level ( $p$ -value <.05).

## RESULT DISCUSSIONS

This research, the researcher investigated the innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province (Phase 1) and found the interesting point to note that the respondents who were SMEs firms has paid a lot attention to the factors that affect innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province, and the average highest score was at high to the highest level. When considering to each variable, the researcher found that the respondents who were SMEs firms prioritized the organizational culture focusing on innovation at the highest level (Hofstede, 1997) (Ravasi & Schultz, 2006) (Robbins, 2001); Schermerhorn, 1999); (Samaphan Phuvichit Yupas and Sanya and Kenabhum Contract, 2015), followed by, the support from the government sector support factor (the report from government annual report, 2016), and innovative leadership factor (Dess, GG, & Pickens, JC, 2000) (McEntire, LE, Greene-Shortridge, TM, 2011); , J., Cooper, BK, & Santora, JC, 2008); Shipton, H., Fay, D., West, MA, Patterson, M., & Bird, K., 2005); Tushman, M., & O'Reilly, C., III., 1996) and research and development collaborations factor (Suthipong Jitmittrapap, 2014 and Piya Tantivejchayanon, 2018) respectively.

The relationship of the variables was found that innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province in the aspect of research and development for innovation, as well as in the aspect of developing an innovative that lead to a modernizing service and production were based on the innovative leadership factor, research and development collaborations factor, organizational culture focusing on innovation factor, government sector support factor with the statically significant at .05 level ( $p$ -value<.05) which was related to the research hypothesis and research purposes.

This may be the reason from the current entrepreneurs and executives of SMEs business, has the knowledge and understand the context of business survival method, and the excellency and sustainable growth of the SMEs business organization in Thailand during 4.0 Era, which focusing on driving the economy with innovation. The development of an innovative organization will not be successful unless the business organization transforms the organization into an innovative culture-oriented organization with a supportive from government sector, with an innovative leadership and together with the research and development collaborations.

## RECOMMENDATIONS

In this research, the researcher recommended to put an important components of innovative organization development model in Thailand 4.0 Era of SMEs manufacturing industries in Nakhon Pathom province in Phase 2, and next research should consists of research and development for innovation that lead to a modernizing service and production which consist of innovative leadership component, organizational culture focusing on innovation component, research and development collaborations component, government sector support components and the innovative organizational development models as following:

- 1. Leadership innovation:** Executives or entrepreneurs should play the leadership role by delegating task to subordinate in order to achieve the objectives of SMEs business organizations, which means to lead the organization to task-oriented management organization and lead to the innovative organization.
- 2. Organizational culture focusing on innovation:** Executives or entrepreneurs should change the organization into the challenging and participatory organization; create the culture of freedom thinking and the initiative. Moreover, build the mutual trust culture and timeframe to think new thing accordingly.
- 3. Research and development collaboration:** Executives or entrepreneurs should change the organization to research and development collaboration; furthermore, create the research and development collaboration between private organizations from the government sectors.
- 4. Government sector support:** Executives or entrepreneurs should encourage the linkage of government support in science and technology development aspect as well as, developing an innovative that lead to a modernizing service and production aspect.
- 5. Innovative organizational development models:** Executives or entrepreneurs should implement each key components of the finding to the step and to the process of developing innovative organization model into the process of creating a new organizational of innovation.

## FUTURE RESEARCH RECOMMENDATIONS

From the result of this research, the researcher recommends to implement innovative organization towards innovation of innovative organization and this innovation could be beneficial to the future innovative organization accordingly.

## ACKNOWLEDGEMENT

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## Causal Factors Development Suppliers That Influence Supply Chain and Affect the Performance of the Suppliers Local Department Store in Thailand

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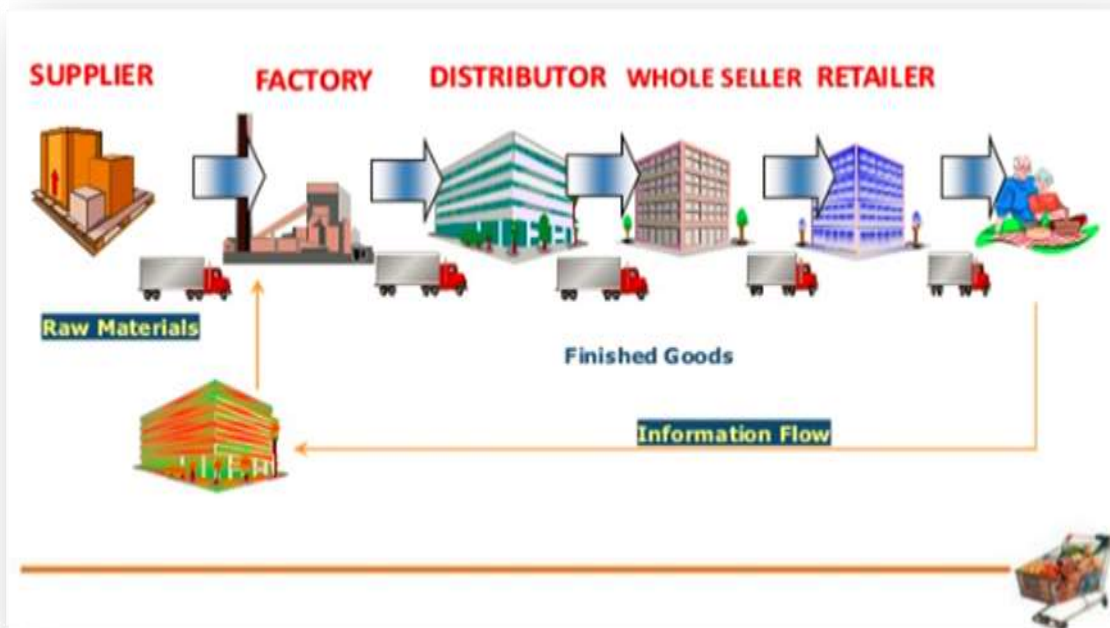
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**Abstract:** Consumers have changed their buying habits from the past. Nowadays popular online shopping. And buy from the modern mall. Customers can access anywhere, anytime, 24 hours. Expansion of investment in Thailand in the retail industry. There is competition for open department stores. The distribution to all provinces. As a result, the local bus operators. Must be adjusted The competition in the business increased. Some of the sales have been reduced. While another part is still in operation. However, the main factor that made the local department store. Survive to get it. The entrepreneur must understand the changing circumstances. And adapt to the competition. The key features that a local department store can do initially is accelerate adaptation, reduce weaknesses, increase strengths, and build close supplier relationships. Through the network of business cooperation. To deliver goods and services. In the supply chain business operations to meet the needs of customers and aims to optimize the performance of the business. This research aimed to study concerns about the supply chain and its operations between suppliers and buyers from the viewpoint of buyers in the Local Department in Thailand. Questionnaires were used to collect data and opinions from a total of 400 company at the purchasing departments of Local Department Store. The study used exploratory and confirmatory factor analysis for data analysis. Further, to test the hypotheses and to fit the theoretical model, structural equation modeling techniques were used. Affected the increasing level of overall supply chain operations between suppliers and buyers. Moreover the increasing levels of cooperation and communication between suppliers and buyers resulted in and increase in the effectiveness of supply chain operations between suppliers and buyers. This study, thus, has the objectives of 1) Analyze elements the development of supply chain suppliers in the supply chain. The effect suppliers on performance. In the Local department store in Thailand 2) Analyze relationships Factors related to the development suppliers. Impacts on the performance of suppliers in the Local department store in Thailand. 3) Find a model Causal factor Development of suppliers. The effect of the raw material suppliers on their performance. In the Local department store in Thailand.

**Keywords:** Supplier Development, Supplier Relationship, Local Department Store..

### INTRODUCTION

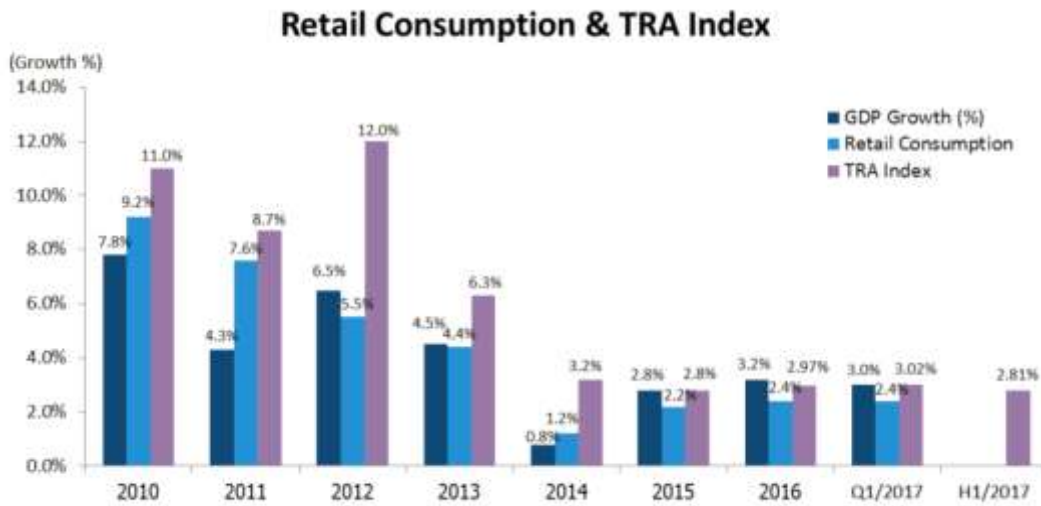
Consumers have changed their buying habits from the past. Nowadays popular online shopping. And buy from the modern mall. Customers can access anywhere, anytime, 24 hours. Expansion of investment in Thailand in the retail industry. There is competition for open department stores. The distribution to all provinces. As a result, the local bus operators. Must be adjusted The competition in the business increased. Some of the sales have been reduced. While another part is still in operation. However, the main factor that made the local mall. To survive it. The entrepreneur must understand the changing circumstances. And adapt to the competition. The key features that a local department store can do initially is accelerate adaptation, reduce weaknesses, increase strengths, and build close supplier relationships. Through the network of business cooperation. To deliver goods and services. In the supply chain business operations to meet the needs of customers and aims to optimize the performance of the business.



*Supply Chain in Retail.*

Source : Suyash Jain. 2017. *The Retail Marketing Mix, Distribution channel and Supply Chain.*

Entrepreneurs must be ready to manage the decoration. And facilities to differentiate themselves from competitors and attract customers. It also serves the needs of diverse customers. Part in the price though. Local department stores will cost more to buy than modern shopping malls. Local malls have the advantage of relatively low operating costs. Compared to modern department stores. Because no advertising budget public relations Or investment in transportation. Opportunities in price competition are still not possible. Planning and marketing strategies that focus on local people. Do it for the locals. And the store is different from the competition. To create a shopping atmosphere. The local department store is a local couple forever. Although the retail business will have a large department store from Bangkok. And foreign expansion. To open more local branches.



The Retail Industry Index for the First Half of 2017

Source : Thai Retailers Association

The retail industry index for the first half of 2017 grew only 2.81%, as retail sales in the second quarter began to decelerate from 3.02% in the first quarter, mainly due to a shopping spree. In general, it started to rise in the fourth quarter. Continued growth in the first quarter. Then the second and third quarters will gradually slow down and start moving up again in the fourth quarter. It is also a result of economic stimulus measures through weak government spending. This is the third quarter of the budget. As a result, retail sales in the first half dropped slightly to 2.81 percent for the second quarter. The growth of product categories. It is concentrated in Bangkok, its vicinity and major cities. Tourism in 2-3 provinces accounted for only 30% of all branches. On the other hand, 70% of the branches are in the provinces. There will be a significant decline in growth. As a result, the index in the second quarter. And retail sales down slightly in the second half. The situation reflects that. The people in the province are in good hands. Because the economy will not recover. But to weaken again. So the government may need more stimulus measures. And to focus more clearly.

Supplier development in the specialized literature Improving the relationship between buyers and suppliers. Lead to competitive advantage. Profitability . For the first author for the development of raw material suppliers, It is a very effective procurement tool Leenders research has become increasingly attractive for the development of raw material suppliers. It has evolved to the present. "The company's efforts. improve the potential (Krause, 1997). In particular, Krause's study found that short-term focus is often focused on the short-term and long-term needs of the company. Implementation of the raw material supplier development project. There are limits to the process of the relationship. The process of purchasing. studied the relationship and relationship development with suppliers. In many industries in India, such as the automotive industry. Steel industry If the supplier of the raw materials develops together with the company, it will be beneficial. The overall efficiency of the operation. In addition, considerations from many suppliers to reduce Risks in the production process. The development of communication within the supply chain. This has a direct effect on the company's performance. which is also studied in India. Over the years, there have been studies. Theories and concepts of raw material development by Jin Su. found that strategic procurement affected the relationship with major buyers. Supplier evaluations have a strong influence on the relationship between buyers and suppliers. The factors are. Long-term supply plan aligns with company's plan. Develop long-term supplier relationships. And management emphasizes the development of raw material suppliers. It is the company's supply strategy. The focus is on developing a common relationship between buyers and suppliers of raw materials. Prakash J. Singh Damien Power found that there were influential factors such as long-term relationships with suppliers. Considering the benefits of raw material suppliers. Get information to improve the quality and quick response of raw material suppliers. Together, the company gains more benefits. In Thailand, there is a study in the context of cluster development, increasing the capacity industry in Thailand, and studying the influence of competitive advantage factors of business organizations. The impact on the increase of revenue from sales of goods or services of business organizations. After joining the cluster group (Benchapol, 2008).

Basically, SCM involves collaboration, co-ordination and integration across internal departments, external organizations and throughout the supply chain. A supply chain is a network of processes and facilities that performs the functions of procurement of materials, transformation of these materials into products, and the distribution of these finished products to customers. Further, Christopher (1988) defined SCM as "the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole". The theory of supply chain management is governed by the belief that value must be added to a process faster than cost, for the product or services to be advantageous to the organizations involved in its creation. To improve performance, organizations have to adopt SCM approach and consider the supply chain as a whole. SCM has the potential to assist the organization in achieving both cost and profit maximization Supplier development can be

considered as an indicator of a cooperative buyer-supplier Buyer- supplier relationships have started to be researched but have not been linked to supplier development specifically. The effect of an improved relationship needs to be studied for achieving CAs

The current study attempts to identify what are the success factors for supplier-buyer relationship from the supplier's perspective and supplier development and how the supplier-buyer relationship can be improved under the condition of supplier development and the supplier-buyer relationship from the supplier's perspective. Hence, the aim is to develop a more thorough understanding of the outcomes of a supplier-buyer relationship improvement from both buyer's and supplier's perspective, under the conditions of supplier development to achieve competitive advantages, leading to profitability. Furthermore, the study analyses the effect of the improved supplier-buyer relationship for achieving competitive advantages leading to profitability.

Supplier relationship management Managing relationships with suppliers is a concept that focuses on The main supplier Burns (1998). "SRM as a customer and supplier develop a close and long-term relationship. The development of close relationships and long-term collaboration. As a long-term collaborative partner, technology means exchanging information. As well as development or design. Joint products. Speaker of the Advisory Center of Excellence National Institute for Productivity. A well-executed SRM approach can provide competitive advantage, fuel growth and brand development, reduce cost, improve efficiency and effectiveness and reduce supply side risk or at least help understand it so it can be mitigated. However, SRM is not something that can simply be 'bolted on' , it is an organization-wide philosophy that needs to be embraced by all if it is to deliver these benefits and so we start by understanding what SRM is and how it works in practice.

The way organizations look after, interact and manage their suppliers is not a single subject, but forms part of the literature on purchasing, logistics, operations management and also marketing. It is perhaps no surprise that there is some confusion regarding the various different approaches and terminology that seem to exist. To make sense of this we need to look at how these approaches have evolved. Rewind the clock to the 1960s and the intervention with suppliers was decentralized to the extent of focusing on warehouse management, transportation and operations management). In the 70s and 80s 'centralization' drove new ways for supplier management and as the 'quality' movement' arrived organizations embraced Deming, Kiazan, Total Quality Management, Total Cost Management and Continuous Improvement. The way organizations viewed suppliers began to change and objectives to optimize cost, quality and customer service came to the fore. The Japanese showed the world how partnerships with suppliers could add great value to an organization. Companies slashed the number of suppliers, awarding contracts to survivors and empowered the winners to manage lower tier suppliers. The rest of the world tried to copy the model but something got lost in cultural translation. Amongst these were American companies who made some superficial changes to supply chains but the fundamental nature of the relationship with suppliers changed little and relationships remained largely adversarial. Today some automobile giants continue to have adversarial relationship with their suppliers whilst others including Toyota and Honda can boast effective partnering models

The concept of 'supply chain management' gained momentum in the 1990s where, for the first time, the supply base was seen as an important enabler to help organizations achieve their aspirations and targets. Companies started to develop strategies for their entire supply chains with visions, objectives and goals being set; a new type of relationship with certain important suppliers was emerging. The development of logistics capabilities in the relationship of the various groups will result in rapid. And mobility within the supply chain. The combination of different acting individuals. Exchange of information Satisfaction and good relationship. (Saninmool V.(2017).

The Philosophy of supplier relationship management (SRM) emerged around the millennium as a single, overarching strategic approach to bring some order to the different types of supplier intervention that enabled the firm to reach its goals. The concepts of 'supplier management', 'supplier performance measurement' and 'supply chain management' naturally fell under the SRM umbrella as approaches relevant for certain groups of suppliers. Furthermore, organizations began to recognize that by focusing on developing better relationships with the critical few most important suppliers they could create huge value from the supply base. Again this became part of the SRM approach for many organizations. In 2010 the world's first formal standard for supplier collaborative relationships was launched, initially as a British Standard (BS11000) and then an international standard (ISO11000) defining, for the first time, a framework for establishing and improving collaborative relationships between organizations enabling firms to achieve internationally recognized accreditation for putting such arrangements in place.

There are many different types of relationship we can choose or wind up in with a supplier. The challenge is ensuring we have the right one and we are as in control of the process as we can be. There is also much terminology out there with a variety of different labels that seem to mean different things according to who is using them; one person's strategic supplier is another's preferred supplier and so on. The point is, amongst these labels is a recognition that there are different types of supplier relationship. It doesn't matter what label is used, it matters that within this we adopt the right relationship with the right supplier and for the right reasons and we all understand what we mean. Table as below lists those commonly found and these are mapped according to the importance to the business.

Table 1  
Type of Relationship

Relationship type	Explanation	Typical nature of relationship
Arm's length supplier	A simple and commonly found Buyer/seller transactional Arrangement for named goods or Services.	Contractual fulfilment only, perhaps no or little interaction  Beyond communicating the requirement and fulfilment.
Relationship type	Explanation	Typical nature of relationship
Subcontractor	A supplier, usually of services, Engaged to complete a specific Task or supply a package of work, Perhaps as part of a bigger Project or to deliver the entire Project. Examples might include Construction trades on a building Site, software contractors.	- Typically involves Communication of detailed Requirements and interaction Regarding technical or Specification matters. -May be working alongside Our people and other Subcontractors. -Can gain know-how of our Needs that can afford them An advantage.
Preferred supplier	Supplier who has a formally or Informally recognized status as One who is mandated or selected In preference of other suppliers.	-Potentially defined within A framework or master Agreement where the terms Of engagement, and perhaps Even commercial terms have Been agreed in advance. -Preferred status might be Defined within a list or Instruction to those with Buying authority. -Assumes and requires A degree of centralized Control over the companies

		Procurement.
Outsourced provider	A supplier who has taken on Responsibility to fulfil a core Activity and requirement or Function of a company, perhaps One previously fulfilled in-house. Examples include outsourced call Centre, cleaning, data management IT support.	-Close, day-to-day interaction at An operational level. -Relationship and contract built Around performance and Operational management.
Critical supplier	A supplier who fulfils a Requirement that we cannot do without, and where we cannot easily switch suppliers or source elsewhere.	Should be one where we work to develop a good relationship with the supplier, however many companies fail to identify critical suppliers and place themselves at risk.
Strategic supplier	A supplier who is of strategic importance and has something that can help enable our business to realize our goals and aspirations, eg innovation, complementary offerings, capacity, know-how, coverage.	Needs to be very close and collaborative in order to realize the potential but this often falls short.
Partner	Perhaps called an Alliance Partner, Technology Partner or Creative Partner, Parties have agreed to work together, perhaps with some sort of exclusive arrangement. The arrangement could be informal contract and even incentives might exist.	-Needs to be very close and collaborative in order to realize the potential but this often falls short. -Close day-to-day interaction in the area concerned
<b>Relationship type</b>	<b>Explanation</b>	<b>Typical nature of relationship</b>
Group company	A supplier who we own or is owned within the group.	Relationship should be as if one of us however if the company is separated by distance, culture or organizational structure of has recently been incorporated into the group the relationship can be no different to that of a preferred supplier.

Supplier performance In purchasing we seem to be very keen to measure things. Sindhuja PN, (2014) studied the concept of performance of suppliers. Data Security Within organizations and between organizations that are positively correlated with supply chains . This affects the performance of the supply chain. Factors that affect performance include: Agility (agility) Reliability (Cost) and Cost (Various responses) Ahimbisibwe, that factors affecting performance Operation of raw material suppliers. The research found that outsourcing contracts. Trust from buyers and suppliers opportunistic behavior is an important indicator of supplier performance. The factors that affect the performance . It is similar to Sindhuja's study in 2014. It found that it

was possible to add value to the industry by focusing on the support of all stages. From start to finish, the competitiveness of a supply chain depends on the performance of the supplier for quality, price, and on-time deliveries. Although new product development will be important. The ability of suppliers. But most research will focus on the ability of raw material suppliers. Cusumano and Takeishi (1991) have studied and found that the involvement of raw material suppliers in the development of new products will contribute to the reduction of workload. Departmental and core competence Of suppliers Improve the quality of the supplier. It will be a starting point to improve the quality of production. Getting involved from the beginning will make Understand more about the capabilities of suppliers by leveraging their knowledge of design. To help reduce the cost of production. There are several researches on the development of new products in the automobile industry.

Be Focused on Practices for Developing Business Capabilities Research on production will differ. Business Capabilities and Capabilities Of suppliers And to identify variables that are indicators of the ability of the raw material supplier. It will focus on analyzing and improving the supplier's ability to supply more raw materials by identifying its ability to deliver products. Quality parts The three components are important for the supplier to consider using suppliers. Add value to the company. Cost of production Nowadays, many companies are looking for ways to reduce costs. Reduce time to introduce products into the market. Improve product quality, reduce cost. The suppliers of raw materials must work under the requirements. Strict rules It is a challenge. To maintain competitiveness in the value chain system. The ability to deliver competitive in the supply chain value system. The ability to deliver in the automotive industry. More than 70 percent of the total value is attributable to the ability of raw material suppliers to deliver on time and as a metric. One of the suppliers' ability to work and also contributes to the process. Early engineering changes To increase the production capacity as planned. Quality of finished products of raw material suppliers. Capacity of quality suppliers will lead to success in reducing production costs.

## METHODOLOGY

Research methodology is a crucial part in research which facilitates researchers in achieving the objectives. This study consists of three phases: item generation, pilot study and large-scale data analysis. The research design of this study was quantitative and qualitative Analyze the results on the main Quantitative approach to qualitative The unit of analysis chosen for this study was company level (specifically Thailand textile manufacturing and garment industry company) and each manufacturing company was represented by either production or SCM manager (respondent). The sampling frame was derived from the Thai Retailers Association Directory 400 sampling responses were analyzed using the SPSS package.

The primary purpose of the research was to To analyze elements The development of supply chain suppliers influences the performance of raw material suppliers by confirmatory factor analysis (CFA). Analyze the relationship of factors. Development of raw material supplier relationships. The effect of raw material suppliers on performance by path analysis. And Search for causal factors. The development of raw material suppliers that affect the performance of raw material suppliers by structural equation modeling (SEM)

Data collection using questionnaire. The process is 4 steps.

Researchers contact us for research cooperation. And contact for research cooperation from the Ministry of Industry.

Researchers have prepared a questionnaire that has been tested. The questionnaire was packed in the envelope. And attach a blank envelope. The addressed to the researcher. For the convenience of returning the questionnaire.

Researchers call for a return questionnaire by phone. The first two requests were sent after the second 6-week questionnaire, after the 8-week questionnaire.

The researcher collected the questionnaire that collected the data to verify the accuracy. And data integrity. Then complete the questionnaire for coding (Coding) for further analysis.

### *Research framework and hypotheses*

This section summarizes the theoretical framework (Figure 1) and hypotheses. For the current study, the following three hypotheses are quoted:

*H1.* Development of raw material suppliers Positive influence. The efficiency of the suppliers of raw materials in the Local Department Store in Thailand.

*H2.* Development of raw material suppliers Positive influence. The supplier's relationship with the buyer.

*H3.* Supplier relationship with the buyer Positive influence. The efficiency of the suppliers of raw materials in the Local Department Store in Thailand.



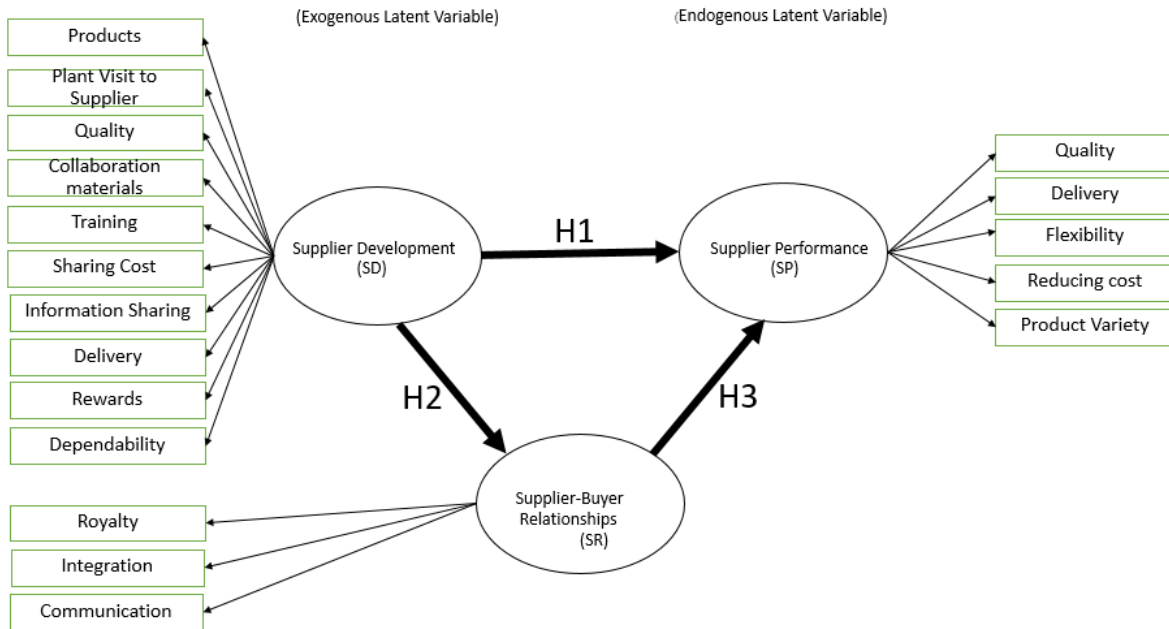


Figure 1 A framework for Supplier development Linking supplier-Buyer relationships and Supplier Performance

### RESULTS

A SEM model was employed to investigate simultaneous linkages that allowed researcher to determine the relative strength of relationships between variables. Supplier development (SD), supplier – buyer relationship (SR) and Supplier performance (SP). were depicted in the model shown in Figure 1. To support the overall hypothesis regarding the fitness of the SEM model with the empirical data, the acceptance of the null hypothesis of the overall model was expected. Hence, in this test of goodness of fit for the structural equation modeling, the resulting probability should be higher than 0.05 to support the overall null hypothesis of the model.

### CONCLUSION AND FUTURE WORK

The theoretical framework of supplier devolvement show that supplier development is an important activity that has gotten a lot of attention from large firms and academia. It can also be noted that this review of supplier development research is quite narrow as it excludes a lot of the purchasing research that at least implicitly deals with these aspects, and that the number of studies focusing on supplier development are limited. The importance of the purchasing function is growing. It is also so that the purchasing function has a crucial role in supplier development. Therefore purchasing research can help us when it comes to the cross functional nature of this activity.

Supply chain management provides a vision that focuses everyone in an organization on product, production and quality improvements. The pursuit of these improvements is not only requested by the market but also driven by the need to survive. The contributing effects of ‘information sharing between SCM partners’ and ‘strategic supplier partnership’ are highlighted by utilizing SEM. The associations and effects of these two SCM practices are also evaluated . The results of the study assist in the understandings of how ‘information sharing between SCM partners’ and supplier buyer relationship dimensions influence supplier performance. The result indicates that manufacturing companies should emphasize greater attention to ‘sharing of production information and plan with suppliers’ in supplier development programs as well as involve in ‘quality and continuous improvement programs with suppliers performance’.

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## Biomass Energy by Rubber Wood at Ranong ,The case study of ABC Co.Ltd.

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**Abstract:** At present, the energy consumption is increasing continuously. Many countries around the world. It is seeking new sources of renewable energy. In order to secure long-term energy from a research the case study of biomass energy by rubber wood at Ranong The purpose is as follows: (1.) to study the production of biomass energy by rubber wood chips and agricultural waste (2). to study the possibility of processing biomass energy made from rubber wood chips. Researchers using qualitative research and ask the head of the Energy Ministry at Ranong and ABC Co., officials of Surat Thani province. The data were taken from document and related website and also collected from actual structural interviews. Research results have studied the data production process biomass energy of ABC Company as follows: 1. A company purchased scrap wood by rubber farmers transport rubber wood chips sales at company and provide services to take rubber wood chips in the area of Surat Thani and Ranong. 2. The large lumber has to hash process, there is a small for crushing convenience. 3. Crushing Process the company hack into the machines to grind it into dust. 4. Mixing Process, use sawdust and scrap lumber mixing together. 5. Drying Process reducing the moisture content in wood, rubber samples gives a proper humidity to the compression process. 6. Compression Pelleting Process on the sawdust in the mixing process, making the meat of it is introduced into the raw materials, forming processes is. Small diameter 6-10 mm length 6-9 cm or according to customer's requirement. 7. Cooling process is the process of cooling rubber wood chip to reduce moisture. 8. The finished product to prevent moisture in wood, company will get a stick in size 6-9 cm. 9. Packing Process is the process of packaging in bags the size according to customer requirements. 10. Shipping company transport finished product to Japan and Korea through maritime transport. From research of agricultural waste, wood, rubber, scrap wood, roots. Stubby sawdust will be sold on the cheap, or burn them without the use of these materials can be used in the production of biomass energy. Biomass power is energy production. Generate output to effectively

*Keywords:* Renewable Energy , Biomass Energy, Rubber ,Production.

### INTRODUCTION

The less energy is the big problem in the country that violent effect on the development of Thailand . Other fuels that are brought to use to produce the electric current such as; the oil, the natural gas, the coal etc. As days go by, this will have less quantities every time and this will have to be used up in the future. Besides, the price of fuel will have the fluctuation in the higher trend according to the economic and politics situation of the world. And although this will have the production of the electric current with the water power that is the renewable energy but this will have the less proportion including this have less water sources that can be developed to produce the electric current and this have to face opposing problems of other organization groups also. Hence, this will have the attempt to discover new energy sources that are safe and endless. Some kinds of energy sources will be brought to use already such as; Tidal phenomena waves, the ocean heat, the sunlight, the wind and the geothermal energy etc. But this will have the limitation in the development such as; this will have the expensive price and use the long time for the construction or some countries have no enough potential energy sources etc. (Pawee Korn Daotong, Faculty of Agriculture, Program in Natural resources and the environment, Naresuan University, 2015). In the current situation, this has used more energies continuously for many countries in worldwide. This will have to search for the new form of renewable energy sources for being the security in the long term. Important renewable energies such as; the wind power, the solar energy, the water power, the energy from the biological process etc. Biomass is one kind of the renewable energy source for using to replace and reducing the use of the fossil fuel. Countries in the ACMECS group (such as; Cambodia, Laos, Myanmar, Thailand and Vietnam) have the same target in producing and using the biomass for being the energy for reducing the dependence on the fossil fuel. But this will still have the limitation and this will always use the traditional form that has the low efficiency. Hence, the transmission of the technology and the knowledge including the development of the investment will be important factors that will make to create the success and the sustainability of the production and the benefit use of the biomass for the energy in the regional.

Thailand has given the importance with the use of the renewable resource for replacing the existing energy and the energy that is being used up in the future. Thailand is held in the developing country group that has given the importance more on the industrial system. The target is for developing the country to have the progress to be the developed country. Government will try to find the new interesting energy source for develop Thailand to have more capacity. It is a biomass fuel pellets such as, the husk, the rice straw, the leaf and the top of the sugarcane, the cassava rhizome, the cob, the corn trunk, the palm leaf, the palm bunch, the soybean trunk, the green bean, the peanut, the coconut bunch, the coir. The coconut shell, branches, wood scraps from rubber trees, many agricultural residues of Thailand will be another one choice that will be brought to use to be the renewable energy and this will be the management of wastes for the another one method. By the biomass in each type will have the suitability in bringing to use differently that is depended on the qualification of the biomass and the capacity of each type of the biomass. Those good points of biomass fuel pellets are; the convenience in the transportation, the energy that is friendly to the environment, this will help to reduce the global warming. It will make the biomass fuel to be the interesting thing ( Thai business will step forward to the international level, SEO, AEC, Asian, [http://www.enerjikongresi2012.com/?tag=the renewable energy](http://www.enerjikongresi2012.com/?tag=the%20renewable%20energy)).

The development of the fuel from the biological object is the accumulated wisdom in every society worldwide in each time period continuously. The concept is the transformation of other categories of biological object conditions for increasing the efficiency and the capacity in the usability such as; bringing wood scraps to make the charcoal or especially for changing the biological object condition that had been developed in the time period from the 19<sup>th</sup> century to the beginning of the 20<sup>st</sup> century such as; the production of the fuel gas from the sewage or the production of the diesel fuel that is extracted from the plant (the biodiesel) including the gasoline from the ethanol (the gasohol) that is the result to give the fuel from the biological object to start to have the importance for the energy world and there is the attempt broadly to develop the technology to produce the energy from the fuel in many ways until to the current situation. The energy that is produced from the fuel from this biological object; is called, "The

biological energy and the biomass energy". The biological energy and the biomass energy is important renewable energies that will help to contribute the security of the energy. Especially in developing countries that are trying to develop agriculture as the main career. This will make to have high material costs such as; in Thailand, this will have the contribution of the development of the renewable energy from the biological energy and the biomass energy as well. By this will focus to the production of the fuel for the engine and the fuel in the industrial sector. Although this will be used in the scope but this will be able to saving price for the community sector and the private sector that have the capacity to grow. For the research of utilization of agricultural wastes and aquatic weed for renewable energy production in Amphawa district, Samut Songkram province. (Asst. Prof. Chaisri Tharasawatpipat, Kowit Suwannahong, 2012 Suan Sunandha Rajabhat University) found the high volume of agricultural waste (10-15 tons of coconut shell, 2-4 tons of pomelo peel) and aquatic weeds (1-3 tons/ month) that useless. In this research, researcher focus on agricultural waste of rubber wood value added to be biomass energy. This will prepare by giving the importance for the standing timber and this will make the revenue for Ranong province such as, the coffee, the rubber tree, the cashew nut and the oil palm. By the question of this research is consisted of agricultural residues that are wood scraps from rubber trees. The researcher has foreseen that Ranong province has many cultivating rubber trees. The study of the application of scrap wood from the waste to produce energy biomass. Renewable energy that will disappear in the future. The researcher has selected Ranong province and Suratthani province to be the place for studying the information.

## RESEARCH OBJECTIVE

1. For studying the production of biomass energy by rubber wood scraps and agricultural residues.
2. For studying the possibility in transforming of the biomass fuel that has been made from wood chip from rubber trees.

## LITERATURE REVIEW

Wiboonsawad and his group (2009) have studied Thailand use the energy. The study is Thailand use the natural gas and the coal to be the main energy source. This will produce the electric current approximately to 70% and 20% respectively. For the remaining part will be from the water power and the biological energy, the use of the fossil fuel that will create many side effects such as; the security of the energy source in the environment especially for the greenhouse gas that has the index of releasing the gas quite high in the country. The natural gas has been separated for using in the transportation sector. The use of the coal and the lignite will make to create carbon dioxide that is the main greenhouse gas. The government has rushed to develop the renewable energy in the country. This will use to produce the electric current more in the revised edition of the development plan of the electrical energy. By this will determine to bring the renewable energy in the country to produce the electrical energy more at least 13,000 megawatts within the year of 2021. For the first nuclear power plant of the country is expected to be ready after the year of 2021. The development plan of producing the electric power is at 1,300 megawatts. This has the possibility by having the evaluation from the research result of the capacity of the latest wind power in provinces in the Thailand's northern and the coast of the Thailand's southern with the additional price to purchase the electric current that is determined at 3.50 baht per unit. The water power is contained in the development plan for only 770 megawatts.

For the latest research result in the river basin of Ping, Yom, Chee and Mool, the fundamental evaluation has shown the possible capacity of the water power from the small size water power dam including irrigation dams from all main 25 river basins of the country at least 1,500 megawatts with the additional price to purchase the electric current for the water power from the small size dam for only 1.5 Baht per unit. The additional price to purchase the electric current for the water power has been reviewed closely to the additional price to purchase the electric current for the wind power, the possible capacity from the water power in the country may be high to 3,000 megawatts. In using many kinds of fast-growing trees such as; the eucalyptus, the lead tree; that are sustainable fuels, the research result and the latest development has shown to see about the possibility of the small size biomass power plant. But the additional price of the electric current for the small size biomass power plant shall receive the review closely to the additional price of the electric current for the wind power as well as for increasing the production capacity of the electric current from the biomass according to the development plan. Other obstacles in using the sustainable renewable energy source can be eliminated by the suitable research, development and supportive measure in the finance and tax such as; the pollution tax, the mechanism in the development that is clean. Other issues must be considered deliberately; such as; the effect on various environments in different areas.

Sutheera Prasertsan has studied the capacity of the biomass from rubber trees in the Southern Thailand for producing the biomass energy from the rubber plantation that is the important energy source. Currently, this has use the biomass from rubber trees to have the limitation for only the local industry such as; the burning of bricks and limes, the investment of producing the electric current from the biomass that would like to have the cautious plan especially for purchasing the fuel and the suitable site condition. This studied project has transformed the aerial photograph that has shown the cultivating area of rubber trees of the research institute to be the digital file and then this will bring 110 pictures to connect to be the big picture that will show the cultivating area of rubber trees in the Southern Thailand. Later, this will use the AutoCAD program together with the program that is developed to calculate existing biomass quantities in other areas and calculate the purchasing price of the biomass fuel that the power plant would like to purchase. If this would like to let the business to produce the energy and has the suitable compensation, the studied result is found that the price of the biomass fuel will be depended on the moisture of the annual existing fuel quantity according to other areas (the area-base annual availability), the Internal Rate of Return (IRR); that would like to have the size and the type of the power plant to be in the form of producing mutual heat and electric power or in the form of producing the electric current only. Generally, this is found that the power plant in the form of producing the mutual energy; will be able to purchase the biomass fuel in the higher price than the power plant has produced the electric energy only. The size of the power plant will be depended on the moisture of the biomass fuel very much. The power plant is needed to have the surrounding rubber plantation in the radius of 25-35 km. for letting to have the biomass fuel source that has the security for the production capacity of the electric current in the level of 20 megawatts. The study for determining the suitable position of the power plant will use the highway No. 41, 409 and 404 as main highways. By this will postpone the position of the power plant from Suratthani province to Narathiwat province for every distance of 50 km for finding the suitable position of the power plant for the investment. The studied result is found that all of distances for more than 700 km have the suitable position for setting 8 power plants that have the total production capacity of the electric current approximately for 186.5 megawatts. By this will have the highest production capacity of the electric current at 27 megawatts in Songkhla province and the lowest production capacity of the electric current at 19.1 megawatts in Suratthani province. This study

has concluded that the biomass power plant of rubber trees shall decentralize according to the position that has the suitable cultivating area.

Orawan Chatchan (2004) has studied the cost and the compensation of producing the economic charcoal from the cob, the case study of the artificial charcoal Sor Thaweekoon, Dokketai District, Phayao province that is the independent study by having the objective for studying the cost and the compensation, the producing of the charcoal, the possibility in the investment. By this will study about the basic information in the numerical form, the production quantity, the cost and the revenue including noticing the production procedure, gathering of the financial information and this will bring to analyze the cost structure and the production compensation, the economic charcoal from the cob. By this will use the measuring criteria that is the payback period, the net present value and the internal rate of return. The studied result is found that the project has enhanced the production capacity of the business that has the payback period for 11 months 3 days. The net present value of the net compensation is equal to 2,102,268 baht and the intrinsic value of the internal rate of return is equal to 109.35 % per year.

Teerapoj Putthikeekotveewong (2006) has studied the production of charcoal briquettes from soybean trees to be agricultural residues to be used to create the benefit in the form of the fuel. This will bring the soybean tree to be burned to be the charcoal. And then this will be grinded to be the bar and use the fresh cassava to be the joiner. This will have the best ratio of the joiner that is the ratio of 1:8. The weight has the heat value at 21.30 megajoules per kgs that has the heat value less than the eucalyptus charcoal approximately at 26%. This has less quantity of the stable carbon and the volatile. But this has more ash quantity than the eucalyptus charcoal. Charcoal briquettes from the soybean can be brought to use to be the fuel for cooking in the household. This will replace the use of the firewood and the charcoal quite well.

Asst.Prof.Chaisri Tharasawatpipat,Kowit Suwannahong,(2012) For built up the participation of the community were consisted of four stages which were identify the problem , set up the guideline , select the pilot area and consultation with 11 community representative to produce biogas plant from the agricultural wastes and aquatic weeds. The result shown that 85.5% were satisfied to use Bang nang li distirict as a pilot plant due to high volume of agricultural waste (10-15 tons of coconut shell, 2-4 tons of pomelo peel) and aquatic weeds ( 1-3 tons/ month ) that blocked the water traffic. From the laboratory scale was shown that the biogas can be produced from coconut nata wastes , pomelo peel , aquatic weeds and cow feces in the1:0:0:0:1.ratio in 10 litre tank at 101.44 ml in 45 days and the highest concentration methane gas was77.70 % which lead to built the small scale of biogas production plant at the size of 4000 litres. It was found that the previous mentioned plants can produce methane at rate of 115.86 Litre and the highest concentration of household gas 80.5 % satisfactory were achieved in this study by the 11 community.

### RESEARCH METHODOLOGY

The research of biomass energy with wood scraps from rubber trees at Ranong province, the researcher has prepared the quantitative research by the gathering of the information. By this research has requested the cooperation in the interview of interview the information from staffs in Ministry of Energy at Ranong province and ABC Co., Ltd. that is the company producing biomass fuel pellets and this has researched the information from other documents, books, theses and related researched jobs with the renewable energy and the biomass energy. The population t is used in this research; is the head of Ministry of Energy, staffs of Ministry of Energy and staffs of ABC Co., Ltd. for 15 persons. The researcher has studied and gathered the information in the area of ABC Co., Ltd. that has produced biomass fuel pellets at Suratthani and Ministry of Energy of Ranong province.

### RESEARCH RESULT

The research has study and gathered the information from ABC Co., Ltd at Suratthani .The qualification of the biomass with rubber wood scraps that are used in the company. The saw dust will be brought to be rubber wood scraps. The company will purchase rubber trees from the rubber plantation or the customer group that have joined the Forest Stewardship Council. The FSC does this by setting standards on forest products, along with certifying and labeling them as eco-friendly. By rubber trees that are brought to use; will be the tree root, the tree stumps, wood scraps and timber. Purchasing sources will be in Suratthani and Ranong. The company will receive wood scraps for process of cutting woods and grinding to be the saw dust for bringing to the process biomass wood pellets.The materials that company are used for working; are the saw dust, the slab and the timber. Those of it will be produced to be wood pallets and wood chips to deliver to customers. After produce the company will have stored for rubber wood scraps in the ground. The company will store the saw dust in the warehouse. The company will store wood pallets to contain in bags according to sizes of customer requirements in the warehouse.

#### Product

*Wood Pallet*



*Wood Chip*



*The researcher found the production process of biomass rubber wood scraps energy as following*

1. The company has purchased rubber wood scraps from the farmer group. By the farmer group have carried rubber wood scraps to sell at company or let the company to carry rubber wood scraps in the area of Suratthani and Ranong.
2. The rubber wood scraps, this will have the unsuitable size for bringing into the process to cut for making rubber wood scraps to be wood chips.
3. The crushing process is easily for the pelleting process. The company will bring wood chips for grinding to be the saw dust by use machine.
4. The mixing process, the company will bring the saw dust and small size wood scraps to mix with materials to be the same wood piece.
5. The drying process, this is the drying process for rubber trees to have the suitable moisture with the compressing process by use rotary drum dryer machine to baking materials to be dried and have the moisture in the standard criteria that is depended on the requirement of the customer group. The general qualification of the purchaser will always be the determination in purchasing.
6. The pelleting process, when this has brought the saw dust to mixing process to make the wood piece to be fragile, this will bring to the process of forming materials to be the biomass wood pellet with size from 6 to 10 mms, the length from 6 to 9 cms or according to the customer requirement. By using machines will be in many categories such as; flat die pellet mill, ring die pellet mill, vertical ring die pellet mill etc.
7. The cooling process is for the biomass wood pellet being cooled down. This will form the fuel for reducing the moisture.
8. Finished products, the company will get the biomass wood pellet at the size from 6 to 9 cms. Ready to transfer to customer.
9. The packing process is the containing process in the bag according to the size, the customer requirement.
10. The last process is ready in the delivery to Japan and Korea by the sea transportation.

*production process*



*For studying the possibility in processing the biomass fuel that is made from wood scraps from rubber trees*

For bringing of the biomass energy for using to create the benefit, we will be able to bring the energy from the biomass and the biological process. For the use of the biological energy by the process that has used the heat, we will see that it is general in the aspect of bringing the charcoal or the firewood for bringing to use in cooking foods or another benefit. The problem in the current situation is lacking of the forest resource, the charcoal and the firewood. All of it is difficult to find and have the higher price. Hence, we will need to develop use the energy from the biomass to create the highest efficiency and has the least energy lost without the benefit. The possibility in producing the biomass wood pellet at Suratthani and Ranong has given the importance for the biomass due to many companies have services of producing the biomass wood pellet. Because Suratthani and Ranong, rubber planters will cultivate rubbers as the main career. ABC Co., Ltd. is the large size company that has given the importance of producing the biomass wood pellet for using to be the renewable energy.

LITERATURE & THEORY

ABC Co., Ltd. is located on Moo 3, Tarua Sub-District, Ban Na Derm District, Suratthani 84240. This is the company producing biomass fuels, biomass energies, wood pellets and wood chips. This company has 60 staffs , 47 groups of customers, the production capacity of 72,000 tons per year. The company has planned to expand the production capacity to 144,000 tons per year. The company has foreseen that 1 Rai of rubber trees will use timber to bring for the benefit use for only 50% . For the another remaining of 50% are wood scraps, branches and the sawdust. In the past time, scraps of wood is waste woods that couldn't be used for the benefit at all. The company will invent and bring wood scraps to make wood chips for using in manufacturing of wood pallets for producing the biomass. The company has produced wood pallets to export to Korea and Japan.

ABC Co., Ltd. has the machine to use in the production process for creating the efficient biomass wood scraps and wood pellet . The company will delivery to purchase rubber wood scraps from farmer in the area of Suratthani province and Ranong province or the farmer bring rubber wood sell to the company. The company will offer the purchasing price of wood scraps from rubber trees in the price of 0.50 baht per kg. And if the farmer or external customers would like the company to carry wood scraps from rubber woods. The company will purchase wood scraps from rubber wood in the price of 0.75 baht per kg.

At present, the statistic of the area for cultivating rubber trees, this will make the industrial producing biomass fuel pellets within the country to have the interest more in the past of 2-3 years due to the fuel aspect is the fuel that has brought agricultural residues and fast-growing plants to be producing materials for 100%. Especially for investors interesting in the industrial of biomass fuel pellets because wood scraps, the wood root, the tree trunk and the saw dust it will be sold in the cheap price or burned by having not brought for the benefit use. From the study of the area cultivating rubber trees in Thailand for the total area approximately for 19 million rai. Those of rubber trees will produce latexes approximately for 3.6 million tons per year. Those of it will have the value approximately for 315,994 million. The trend of the area for cultivating rubber trees will be increased continuously. By this will cultivate most in the Southern Thailand. The second is the North Eastern Thailand. 10 provinces that have the most cultivation of rubber trees will be Suratthani, Songkhla, Nakhon Si Thammarat, Trang, Yala, Narathiwat, Phang Nga, Rayong, Krabi and Bueng Kan respectively.

#### CONCLUSION

This research study is the case study of the biomass energy with wood scraps from rubber trees in Ranong province. By this has researched the information from Ministry of Energy at Ranong. And ABC Co., Ltd. is the company that has produced biomass wood scraps and wood pellet. The researcher use qualitative research by record information from the head of Ministry of Energy, Ranong province, staffs who have operated in Ministry of Energy, and staffs of ABC Co., Ltd. for 15 persons. By the researcher has studied the production process of rubber wood pellet. The researcher has studied the possibility in bringing rubber trees to produce the biomass energy for replacing the energy that is used up and will be ended including evaluating the biomass capacity.

From the study of the production process of the biomass wood scraps and wood pellet, this is found that Ranong province is the city of eight months of rain and four months of sunshine. This will have the plentiful rain for all the year. In the production of the biomass wood scraps and wood pellet have the problem of rubber trees that have the high moisture. But when research the information and interview experts in ABC Co., Ltd. and Ministry of Energy. This will make to know that rubber trees have the moisture but the company can solve those problems by the bringing of rubber trees into the drying process by using the Rotary drum dryer machine to baking to let materials dried and have the moisture in the standard criteria that the customer require. This will make the company to be able to produce the biomass wood scraps and wood pellet in every season. Ranong province has most of farmers will cultivate rubber trees and palm trees. This will make to evaluate the capacity for the entrepreneur to invest related to the biomass energy that Ranong province has many rubber resources that can be brought to produce to be the biomass wood scraps and wood pellet.

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## Development Guidelines For Value Added of Rubber Supply Chain of Rubber Planters in Ranong Province: Case Study of Rubber Farmers in Ranong

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**Abstract:** Thailand is the producer and the exporter of rubber trees as the first rank of the world. But Thailand has no role in determining rubber prices. Rubber prices in the country will have to refer from Singapore and Japan. For the local market, the daily price of the rubber sheet will be transformed from the purchasing price of exporters as the main issue. Those things will give the effect to make gardeners to lack of negotiating power. They will lack the opportunity in the recognition of marketing news. This will make the selling price of rubber trees to create the injustice. Under the situation that rubber prices are fallen at this time, this will make gardeners of the rubber plantation in the area of the Southern Thailand to receive the trouble. Consequently, the researcher will have the interest in studying the guideline of the development to increase the value of the supply chain of rubber trees in Ranong province. This research is the qualitative research. The tool that is used in gathering the information; is the in-depth interview. The population sample is the gardener group who do the rubber plantation of Ban Fai Klong Nam Jued in Ranong province. This research has the important objective as follows; (1) For studying the problem of rubber gardeners, (2) For studying the method in increasing the value of the supply chain of rubber trees, (3) For studying the how to improving the quality of life gardeners in Ranong province. The study indicated that the problem faced by rubber farmers is rubber prices fall. Thai and foreign labour costs are high. Natural disaster caused rubber plantation damage. Farmers need for the government and the private sector to help about price of rubber. The way to increase the value of the rubber chain and improve the quality of life of rubber farmer is to have a knowledgeable service provider in the area. Public and private should encourage organic farmers to use organic fertilizers in rubber plantations to reduce production costs. To develop the supply chain management model from the upstream which are rubber farmers, the main products are rubber latex, rubber sheets, rubber cups and rubber scraps. The raw rubber and rubber cup in the middle of the water is a group of farmers, rubber plantation cooperatives. They will collect the rubber and manage process of raw rubber or send to the rubber plant in order to increase the downstream value, such as rubber processing plant and rubber plant. At the final production process achieve a cost-effective to reduce the cost of marketing and increase the value of rubber.

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*Keywords:* Value Added, Supply Chain, Quality Of Life, And Rubber Gardeners.

### INTRODUCTION

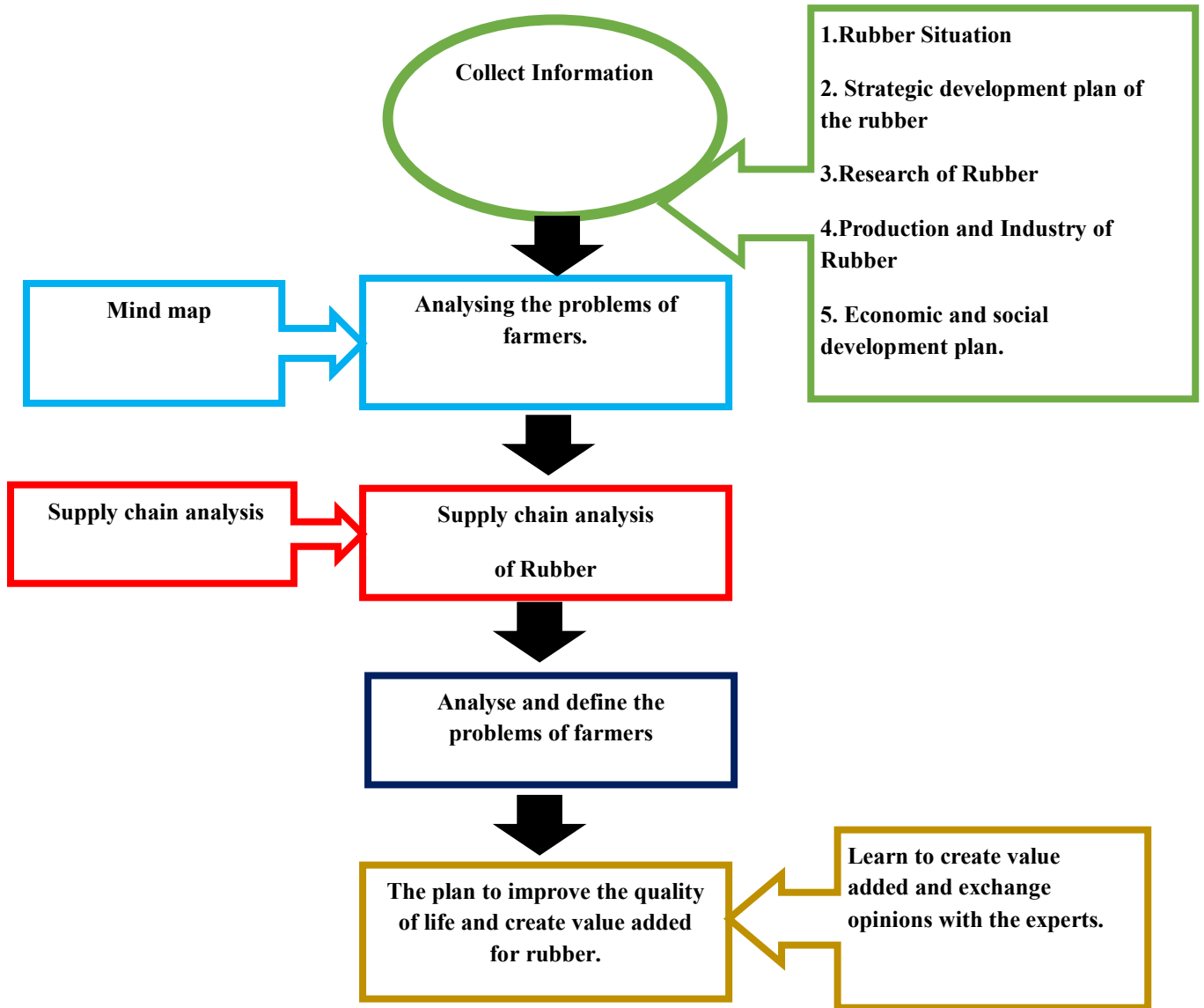
Ranong province has the cultivating area of 345,053 rais. The harvesting area is 274,690 rais. Most of those areas will be in the form of preliminary processing materials such as; the raw rubber sheet, Natural rubber latex. But in the current situation, rubber gardeners have problem of the declining rubber price. This problem will give the effect on the economy, the society of many million rubber gardeners. By the main cause that rubber trees have the declining price due to almost of Thailand will cultivate rubber trees by having not set the zoning and controlling the suitable quantity. China has reduced the importing and the storing of rubber sheet to adjust the role from the purchaser to be the producer, Thailand is the country has the production and the export in the form of agricultural products but this has no processing to create the value added, the financial crisis and the recession of U.S.A., the guided price of the world market and speculators have sold off rubber sheet. From the study of the problem of rubber gardeners in Ranong province. This is found that the production cost of rubber trees will have the high price. But in the same time, the market price of rubber trees in the market will have the lower price than the production cost of products. Revenues that the gardeners have received; aren't enough for their costs of living for their families. This is lack from the support from public agencies in creating the value added and contribution seriously in the viewpoint of the research and the development for gardeners. Gardeners can't adjust the method in producing agricultural products or materials for supporting the change of the market condition, the problem in finding sources to release products and finding the selling point including creating the brand, the problem in lacking of labors. This research will be the guideline in the development of the capacity and this will create the value added for the rubber trees gardener group.

### RESEARCH OBJECTIVE

- (1) For studying the problem of rubber gardeners.
- (2) For studying the method in increasing the value of the supply chain of rubber trees.
- (3) For studying the how to improving quality of life gardeners in Ranong province.

### RESEARCH FRAMEWORK

From the research study of the information, related literatures, the researcher will bring the information to create the conceptual framework related to the development for increasing the value of the supply chain for rubber gardeners at Ranong province.



RESEARCH METHODOLOGY

The research of Development guidelines for value added of rubber supply chain of rubber planters in Ranong Province: Case Study of Rubber farmers in Ranong, the researcher has prepared the quantitative research by the gathering the information the interview opinions and including studying documents, books, articles, additional news. The population that researcher has interview are executives and the rubber gardener member group of Ban Fai Klong Nam Jued in Ranong province.

LITERATURE REVIEW

Thaweesak Thepphithak (2007) the logistics management that is the one part of the supply chain that is the planning process, the presentation and the flowing controlling that has the efficiency, the effectiveness, the storing of products, services and related information from the starting in the production to the last of the consumption for responding the requirement of consumers. Thaphana Boonlah and Nongluck Nimitphuvadol (2012) has said that logistics is the planning process, the working operation and the controlling of products with the efficiency and the effectiveness for both in advance and the turning back of the movement and the storing of products. The information technology service related since the starting until to the consuming products for responding the requirement of customers. The Logistics management will be the element of the supply chain management. Simchi-Levi and Kaminsky (2003) has given the meaning of the supply chain management that means the set of the management method with the overall efficiency by the supplier, the producer, the warehouse and the shop for letting the product that is produced and distributed in the correct quantity to be delivered to the right place and in the right time under the low operating cost. While this can create the satisfactory for customers in the service level that the customer requires.

Schroeder, Goldstein and Rungtusanatham (2011) has given the meaning of the logistics management mean the management of the movement of products or delivery services in the organization by cover the activity, the operation, the purchasing and the working of logistics within the organization supporting the supply chain management for delivering products or services to respond requirement of customers. Chidchob, Sompen, Yaowasakunmat and Dungwak (2014) has studied the development of the simulation of the supply chain of the organic jasmine rice in Thailand. This has the objective for study the logistics system and the supply chain of the organic jasmine rice from the upstream middle stream and downstream by use the SCOR Model to measure the efficiency of the logistics system and the supply chain.

Smith & Colgate (2007) has explained that the development of the new product, it can connection to the delivery of the value added to the consumer. For the creation of the value added for the consumer is the idea that is related to the principle of the value chain of Porter (1985) that is the integration of other processes continuously and this will conform to each other. The aforementioned idea will be operated by having the objective in the economy as the main issue that will make the organization to be able to operate the business further from the happening profit. Chutidech Visalkitti (2012) has said that the model of the supply chain is the tool that help in starting the development of the supply chain. Because the SCOR Model has the development for explaining the aspect and show the business activity in all supply chains this will relate to the response to the customer satisfactory that will help in solving the problem of lacking the language, the standard, the framework in the development and the adjustment of the supply chain.

Council of Supply Chain Management Professional, (2006) has explained that the management of the supply chain means the planning and the design of the internal system of the supply chain for both in the procurement, the production, the logistics transportation and the distribution etc. By this will focus on the coordination upstream middle stream and downstream to be continuously, rapidly and has the efficiency. Moreover, this will operate the study to consider other strategies for bringing to apply to use with the management of the activity in each procedure. Australian Centre for International Agricultural Research (2012) has explained that, "The value chain", is the procedure of the creation of the activity during the production process and the design until to the marketing by this will have the increasing of the value in each activity for the final product that will deliver to the hand of consumers. David Young and Moses Pelomo (2014) has studied and analyzed the value chain of the business of the coconut industry at the Solomon archipelago. This is found that there are 7 factors that will help to increase the product value as follows; 1) This will increase the profit for coconuts by adjusting the quality working together between the enforcement of the rule or the regulation, the contribution of the strength in the connection between sellers and other supporting departments, 2) This will make the sector that control of the coconut productivity to have the strength (Gardeners who have cultivated, harvesters), 3) Finding the service process for supporting the development for gardeners who cultivates coconuts, 4) Develops the possibility support the financial service for the business chain, 5) This will make to create the support in the place, other techniques that will lead to the commercial alliance between gardeners with other related persons by this will focus on the variety of products and increase the value, 6) Develops the infrastructure of the local area that is the obstacle in the transportation. 7) Invents the cultivating plan in the long term.

RinaMaria Rosalesa, Robert Pomeroy, Ina Judith Calabio, Mabel Batong, Kimakarla Cedon, Nestor Escara, Vivien Facunla, Anecita Gulayan, ManuelNarvadez, Madzni Sarahadil and Maria Aimee Sobrevega (2017), the study related to the management of the value chain of the small size Fishery business has said that the recommended measure that can help to increase the business value will be consisted of the strictness in the practice according to the rule, the regulation related to the size of aquatic animals that has been allowed to be caught. There is the controlling plan to process in catching aquatic animals correctly and this has received the certification in the suitable place for storing the productivity. There is unseasonal in harvesting periodically. There is building the entrepreneur to be the related community enterprise that will give the help and the cooperation. Sarinthip Pussadawong (2005) has studied factors that will make the operation of the business in the category of gift products and decorations to be successful. This is found that the product design is the most important factor that will give the effect to let the organization to be successful due to this can increase the product value in the consumer's view. Warunee Soonthorncharoenngarm (2013) has specified the value added is the value that the consumer has received from consuming the product or the service. It not will be the physical touch or physical contact "creating the value added", this isn't only the product design. But this is the opportunity in all processes. Some cases, this may focus on the one point. But some cases may have to do in many points at the same time for getting the final success that is getting the product and the service that has, "the value added".

Campbell (1976: 117-124) has given the meaning of the life quality in the topic that is related to the well-being. This isn't only the meaning of the abundance such as; having enough food or living well. But this will include about the value in the importance of the mind or the feeling that can't be touched such as; the feeling of being the community owner, the success in the job career, the security etc. Suwannee Simakornpin (2011) has given the meaning of the life quality that this will mean the life that has the abundance for both the body and the mind. This can adjust to match with the environment and the society as well. And people can give benefit for the society and the nation. Sudarat Pimonratnakan (2017) The study results showed that Farmers are mostly male, aged 41-50 years of experience in making agriculture an orchid 11-20 years in space, the cultivation of more than 10 acres and the annual average income of the farmers more than 500,001 baht studies to find the characteristics of the supply chain management of Orchid. In Budhamonthon, Nakhon Pathom province, found that production. Types of orchids that grow a wicker type The use of greenhouses, cultivation manner as a standard. How to expand relations using tissue culture method. Materials that are grown using Coconut husk briquetting or sailing Coconut husk pickup. Use of water resources as water, pond or canal water. How to prevent and get rid of the pests, workers. The characteristics of employment is employment, all labour 2 stationary and temporary labour. Establish the model of supply chain management of orchids in Budhamonthon, NakhonPathom province it found that the opinions of farmers in many levels, overview. By average descending follows planning by an average value equal to 3.96 transport by an average value equal to 3.82 side by side with equal average return by 3.72 average equal to the return side by 3.72 average equal to 3.72 and the procurement by an average value equal to 3.66.

## RESEARCH RESULT

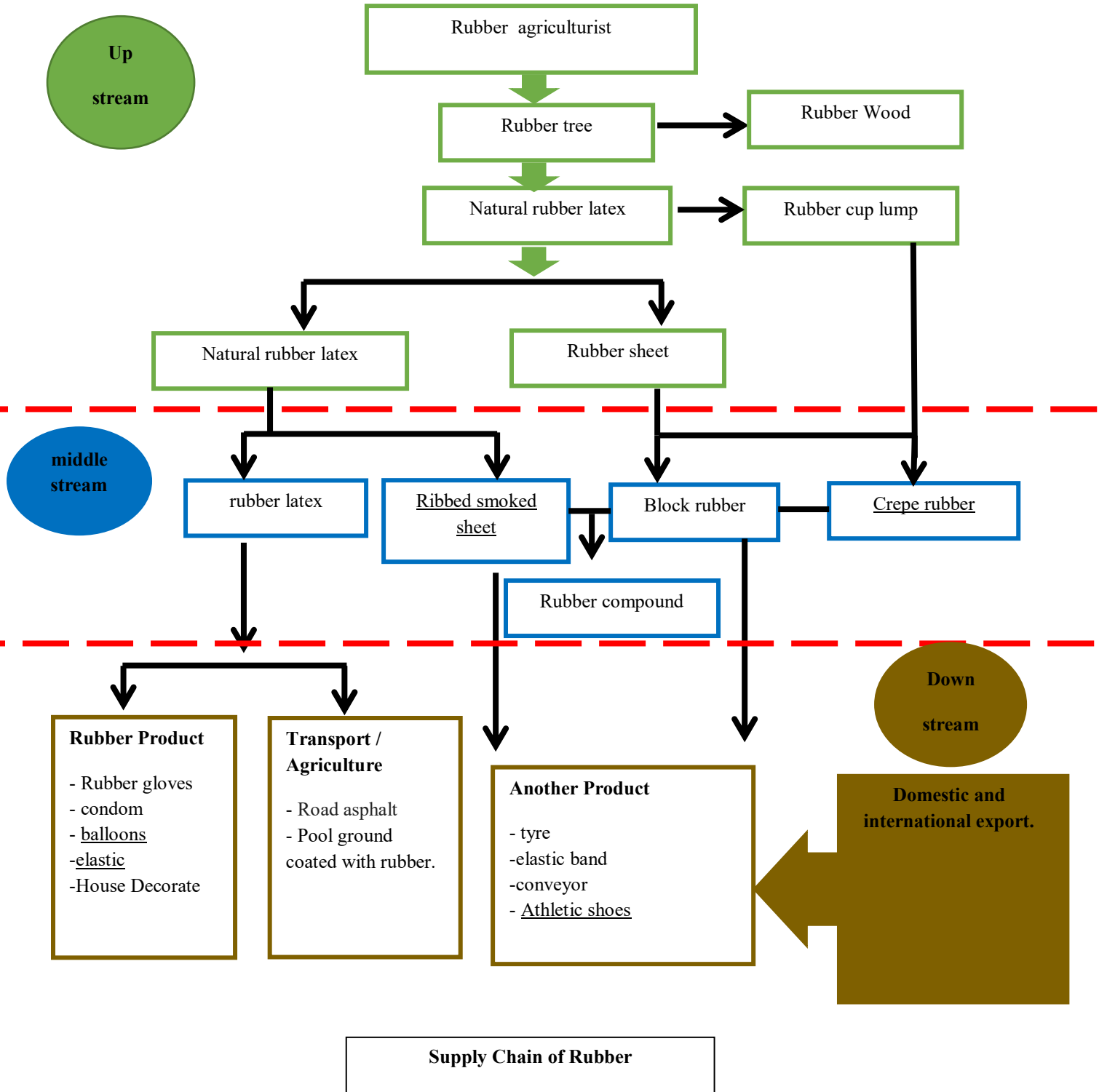
From the study, the interview and listening of opinions of the rubber gardener group of Ban Fai Klong Nam Jued that has specified the problem and the happening effect from the condition of the recessing price of rubber trees as follows;

1. Gardeners have lacked of their capitals from the recessing price of the productivity. The cost of transforming to be rubber tree products that have high prices. Many rubber group aren't enough capital. This will not pay the advanced money to purchase the rubber productivity for gardeners that are members.
2. The rubber price will be declined and uncertain. Rubber gardeners will be exploit from middlemen and Thailand has no regulation in control the rubber price in the world market. This will make the rubber price in the important central market of the world such as; the Tokyo, Singapore, the Shanghai to have the high influence on determining the rubber price in Thailand due to this has no the international central market of rubber trees.
3. This will lack of the knowledge, the understanding in transforming rubber trees. And also lack of news information and the technology to development rubber trees.
4. This will have competitors from neighbor countries.

- 5. In the marketing, there is low negotiating power. The purchase can determine the price. This will lack of factories purchasing rubber trees. The futures contract system will lack of the stability.
- 6. There are less people to create the value added due to there are no users. Processing rubber trees will have more than the creation of products from rubber trees. The export will be in the form of the high preliminary processing but the transformation to be products for the usability will be less.
- 7. There are less researches and developers in the process of products from rubber trees.
- 8. This will lack of leaders of the agricultural institute that aren't strong.
- 9. This will lack of labors. Thailand has labors from neighbor countries and unskilled labors in cutting rubber trees.

RESEARCH FRAMEWORK

For studying the method in increasing the value of the supply chain of rubber trees.



From the study of the supply chain system of rubber trees, this is found that the method in creating the value added of rubber trees will be as follows;

- 1. The gardener group should join training, seminar, the field trip (This will visit the factory/ the educational institute) for creating the inspiration in creating the value added in rubber trees for letting gardeners to understand the process and understand

clearly such as; the training of making of the rubber pillow, Pool ground coated with rubber for storing the water, Athletic shoes, and decorations product .

2. This will contribute the grouping of gardeners such as; the cooperative, the agricultural institute or the network group, the research study and the development group for being the power in driving the community economy to have the strength and create the power in negotiating.

3. This will cooperate with public agencies of the province and the gardener group to plan forward the fundamental processing or the setting of the factory transforming the rubber latex or the rubber sheet to create rubber products for exporting and using in the country such as; the supporting for the low interest loan.

4. Enhance the capabilities of gardeners in the production and the marketing for creating the capacity in the agricultural career of rubber trees.

*For studying the method in the development of the life quality gardeners in Ranong province.*

1. This will contribute the additional career in the plantation for increase revenues by this will adjust the cultivating area to cultivating of other plants such as, the coffee, the cocoa, the bitter bean, bean, the, the herb plant, vegetable, the perennial plant etc.

2. Public Government will contribute the processing to transform the knowledge and technology in every area by this will pass the process of using rubber teachers for supporting in the processing to create the value added to product the crepe rubber, the rubber sheet, the rubber chip, the ribbed smoke sheet, the production of the natural rubber latex, the production of products from natural rubber trees that will use the uncomplicated technology such as; the rubber band, the boot, the rubber doll, the rubber sheet of the futsal field, the rubber glove etc.

3. This will contribute gardeners who have cultivated rubber trees; to do the household account.

## CONCLUSION AND RECOMMENDATION

From the interview, the study of the supply chain of rubber trees and the finding of the method of helping gardeners who have cultivated rubber trees in Ranong province. This can conclude the problem and the requirement as follows;

1. This has adjusted the idea of gardeners who have cultivated rubber trees to turn to live according to the Philosophy of Sufficiency Economy apply to improve quality of life.

2. Gardeners have foreseen that the government has lacked the clarity in solving the problem of gardeners.

3. This will lack the clarity in the government policy in supporting production factors of the technology that will help gardeners in the processing and creating the value added. This will lack the management in the productivity price, the purchasing source of products. This will lack of the knowledge in transforming rubber trees including lacking of labors. This will have to use foreign labors that have the high labor price. Hence, the government shall have the setting of the fund for helping gardeners without the condition and complicated gardeners .This will support the knowledge in the production, the setting of the training, the study to observe activities and this has to start training and seminar.

4. The government must build the stability in the revenue for gardeners. The government has to adjust the efficiency of producing rubber trees to have the standard to be accepted internationally. This will have to develop the marketing system when gardeners have produced products and they shall find the market to support agricultural products .This will support to let to increase the value of natural rubber trees by processing and bringing natural rubber trees to another product. This will increase the requirement rubber products in the country and this will increase the exporting channel including building the strength and increasing the capacity of the agricultural institute for being the strength power in the processing industry to connect with entrepreneurs of the rubber industry to improve product of Thailand rubber tree products with the quality.

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## The Factors Determining Students' Dormitory Consuming Behaviors and Economic Costs of Students' Dormitory in Phutthamonthon District Nakhon Pathom

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**Abstract:** The purpose of this research is (1) to determine the determinants of dormitory consumption behavior of students (2) to find the economic cost of dormitory operation. The dormitories of the students in Phutthamonthon District, Nakhon Pathom Province were used for statistical analysis, frequency, percentage, mean and standard deviation. The qualitative variables were gender, age, occupation, and relationship to the variables in the satisfaction of the dormitories. In general, the benefits of dormitory consumption are the satisfaction of the service. The location of the establishment. The study found that the sample of 400 people, mostly female, aged 18 to 22 years old, had monthly income of 5,000 to 10,000 baht. They were domiciled in the central region and most of them studied at Mahidol University, Salaya. The students' opinion about the importance of the factor used to decide the dormitory rental was at a moderate level. The dates (month) in the most important, followed by the satisfaction obtained from the Student Services. It is very important. Student earnings per month Income other than current income. Benefits of using the room. Satisfactions of Student Dormitory Service Promotional items for promotion, age, gender were moderately important. A study of the average cost of doing business in dormitories found that 60% of businesses operate for 3-5 years, most of them borrow from financial institutions.

*Keywords:* Dormitory, Consuming Behaviors, Economic Costs.

### INTRODUCTION

According to Phutthamonthon District, Nakhon Pathom is the location of the school, which is another province that is important in education. Many universities are established. It was found in Phutthamonthon. There are four higher education institutions, which are government universities namely Mahidol University, Rajamangala University of Technology Rattanakosin, Royal College of Salaya, National Institute of Development Administration, Salaya, Suan Sunandha Rajabhat University Nakhon Pathom Education Center. For this reason, the expansion in all aspects shows that each year there will be students from different provinces. Transportation to and around some of them have their own shelter, but there are plenty of shelters. These individuals need temporary housing during their studies. This demand has made the business of building more and more dormitories. Especially in the neighborhood near school or community. It may be due to the migration of people living in other provinces to live in order to be able to study. Including traffic jam problems, people who are close to the school must turn to dormitory more. So many types of rental housing happen. Whether it is a dorm, a house, an apartment, a mansion, it happens to meet a growing demand every year.

Dormitories are the most popular choice for students as they are the second home of the student body that is experiencing life outside the classroom. It is a place where students will spend more time in the school. Dormitory operators or managers are required to act as parents of students, as they have to maintain dormitories for environmental education. And to encourage students to develop their lives during the most complete education. Learn to live a wide life. And create a positive attitude to life.

Therefore, the dormitory should be arranged in a beautiful and comfortable. Create privacy area for the students, security, the environment for students to stay in order, and does not cause noise pollution. Follow the regulations that the dormitory has set. And dormitory can organize activities. Social skills development Responsibility within the dorm Promote leadership and sports. Because dormitories affect the academic performance of these students.

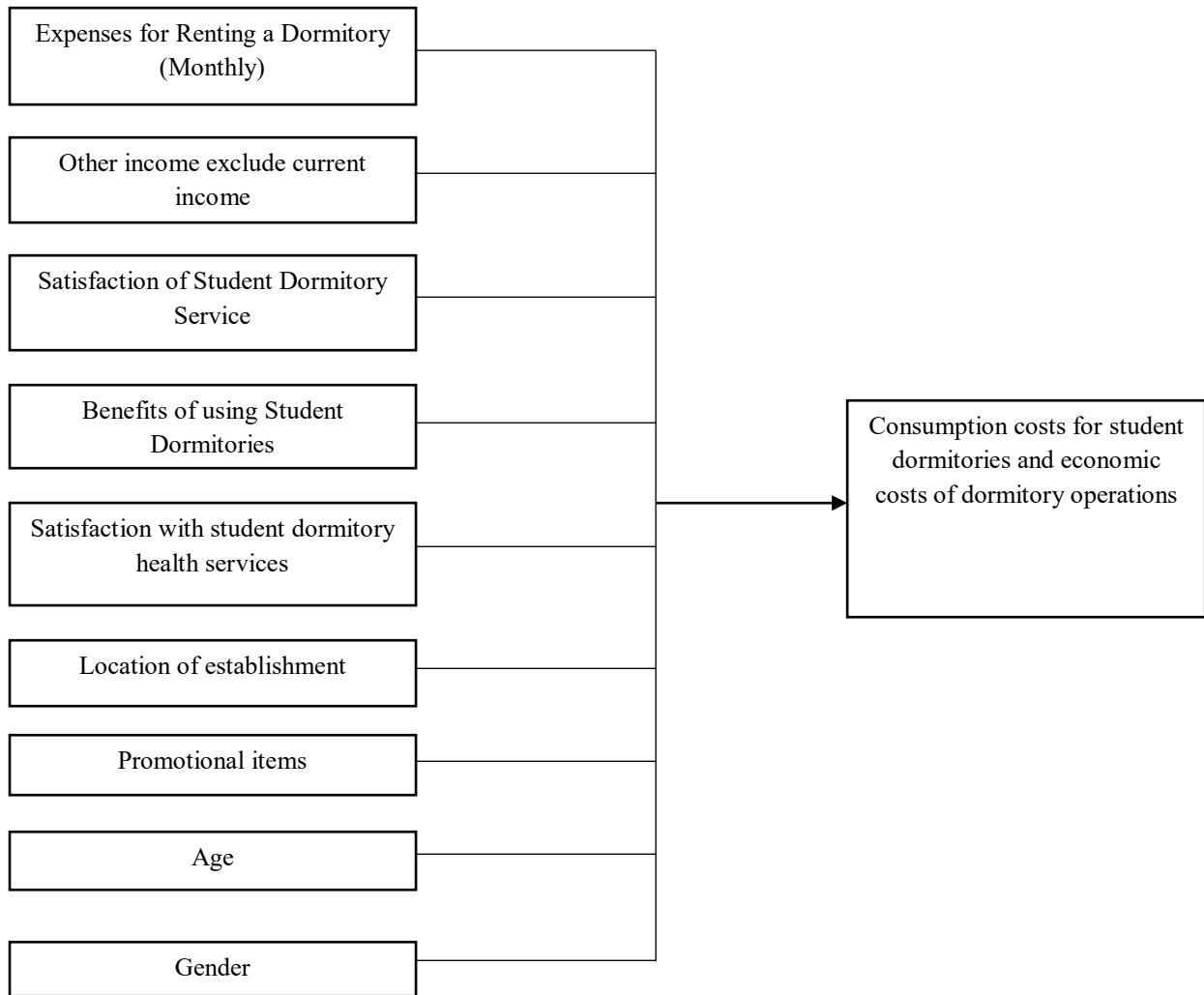
At present, the housing built for rent in Phutthamonthon District, Nakhon Pathom province has been formed. Especially in the area near the school, students are more concerned with the factors that make the decision to choose a dorm. Students look at the other side. This is a good way to make a decision. Rent price Location Security For this reason, the student must have knowledge and study habits of student dormitories. The cost of living of students in Phutthamonthon, Nakhon Pathom. The researcher collects information to bring the concept of education to the problems that arise in relation to what students need today and to benefit the dormitory business. The service is satisfactory to the students.

### OBJECTIVE

1. To determine the determinants of dormitory consumption behavior of students
2. To find the economic cost of dormitory operation

### CONCEPTUAL FRAMEWORK

Based on the study of the literature and related research, the researcher set out a conceptual framework for the study of the determinants of dormitory consumption behavior and the economic costs of student dormitories in Phutthamonthon. Nakhon Pathom. Each conceptual framework has both quantitative and qualitative dimensions, adding a dimension of research covering all aspects of the study.



HYPOTHESIS

1. Expenses for Renting a Dormitory (Monthly), Other income exclude current income, Satisfaction of Student Dormitory Service, Benefits of using Student Dormitories, Satisfaction with student dormitory health services, Location of establishment, Promotional items, Age and Gender affecting to the students' dormitory consuming behaviors.

2. Expenses for Renting a Dormitory (Monthly), Other income exclude current income, Satisfaction of Student Dormitory Service, Benefits of using Student Dormitories, Satisfaction with student dormitory health services, Location of establishment, Promotional items, Age and Gender affecting to the economic costs of students' dormitory.

RELATED LITERATURES

Sittichai Orapun (2006) studied the determinants of Day Spa's consumption behavior and economic cost of Day Spa in Bangkok. The objectives of this research are 1) to determine the determinants of the Day Spa's consumption behavior and 2) to determine the economic cost of the Day Spa operation by population and sample. Target audience is consumers, ie, the general public who used spa services at various establishments. In Bangkok and entrepreneurs, including owners of Day Spa facilities certified by the Ministry of Public Health. The duration of the data. From July to September 2005, the content of this study was to study the importance of factors influencing consumer spending on consumer daycare. General distribution in various areas. Of Bangkok Also, study the average total cost of economics. For those interested in doing spa business in the future. Study of factors. Influence of consumption expenditure on spa consumption of consumers in Bangkok. The statistical method is the Multiple Classification Analysis (MCA). The study of the cost of the Day Spa in economics. It is determined by the average cost equation. Contain with The sum of the average fixed cost Average cost variance and opportunity costs. The qualitative variables were gender, age, occupation, and relationship to variables. The satisfaction of the spa services in general. Benefits of using the spa. Satisfaction with health spa services. Location of establishment and special promotions. A study of influencing factors determining the amount of spending spent on a day spa and the economic cost of a day spa operation.

Yaithet Suchada (2012) conducted a feasibility study to invest in the apartment business in Thanyaburi District, Pathum Thani Province. The objective is to study the feasibility of investing in apartment business, which is an 8-storey apartment for rent of 25 rooms. The data were analyzed by using financial analysis. The duration of the project is 15 years, the discount rate is 8% and the repayment of the loan is made by the reduction method. The result of the study shows that the feasibility of investing in the project apartment business. This has a payback period of 4 years 1 month 25 days. 23,732,206.11 Baht Internal Rate of Return on Investment was 23.73% the yield was 21.83% and the sensitivity analysis of the project was 1%. Variable cost increased 5%. Fixed rental income Project analysis has a payback period of 4 years 3 months 2 days. The internal rate of return on investment was



22.71% and the book yield was 18.55%. In the second case, rental income declined by 5% while fixed variable cost was 18.55%. The analysis of the project has a payback period of 4 years 6 months 29 days net present value the internal rate of return on investment was 20.29% and the return rate was 14.30%. Case 3: Rental income decreased by 5%. Variable cost increased by 5%. The analysis of the project has a payback period of 4 years, 8 months and 29 days. The net present value is 8,141,601.19 Baht. The internal rate of return on investment is 17.84% and the yield is equal to the percentage. 11.01

Prakobmool Laddawan (2013) studied the subject. Factors influencing the decision to rent dormitories of university students in Pathumthani province. The purpose of this study was to investigate the factors influencing the decision to rent dormitories of university students in Pathumthani province. This is a decision-making information for the dormitory business. And to meet the needs of tenants dormitory products on the price channel. The promotion of physical marketing. The samples were 400 students in the area of Thanyaburi and Klong Luang. The questionnaire was used as a tool to collect data. The results showed that the sample was mostly female, aged 18-22. Yearly income is 5,000-10,000 baht, is domiciled in the central region. Most of them studied at Thammasat University. (Rangsit Center) in the overall. The students' opinions on the importance of the decision making factors for the seven dormitories were at a moderate level. The opinions on price were at the highest level, followed by product level was very important. The distribution channel. The promotion of physical marketing. And the process aspect was moderately important.

Lerdejdechana Thanachporn (2013) studied a student dormitory project near Mae Fah Luang University. Chiang Rai by the organizers to see the business opportunities to create a dormitory for students. The land is close to the university and the community. The plan consists of business objectives, objectives, analysis of factors, strengths, weaknesses, opportunities and obstacles. A 400-question questionnaire was used to collect data. According to studies, it has been found that the needs of today's students are not very satisfying. The advantage over other dormitories is to create students' needs such as facilities. External environment - within the security, high speed internet, etc., which meet the needs. To be able to compete with existing dormitories. This project uses the total land cost of 68,333,000 million baht, which is their own investment, no borrowing from financial institutions. There is a payback period of 7 years 33 days. The IRR of the business is 16.6%, which is 8% higher than the discount rate and higher than the inflation rate. The NPV of the 15-year project is 133,788,105 million baht. High possibility of investment due to low cost compared to other contractors.

Wongsuphachartkul Fonthip (2015) studied the factors affecting the decision to rent rooms for living in Bangkok and the provinces. To provide information for entrepreneurs, reduce business risk or strategic planning to maximize profit. The population used in the study was those who are renting a condominium room for rent or apartment. For living in Bangkok and its suburbs, the researcher has taken into account factors such as marketing mix for service products (7P's) as well as concepts related to demographic characteristics. As a conceptual framework for study after factor analysis, it was found that factors influencing the decision to rent room for living in Bangkok. 1) Internal management factors, creation and presentation of physical characteristics, 2) Location factors, respectively.

## METHODOLOGY

A study on the Factors determining students' dormitory consuming behaviors and economic costs of students' dormitory in Phutthamonthon District Nakhon Pathom focus on qualitative data collection. The data was collected from the questionnaire of students who rented a dormitory in Phutthamonthon. Accidental sampling was performed by collecting questionnaires. (Questionnaire) The questionnaire was designed to be a closed-end question and an open-ended questionnaire with five criteria and a rating scale. The most agreeable was the agreement. With minimal the tourists are Thai tourists. And entrepreneurs focus on qualitative data collection. The data were collected from questionnaires, 400 students from dormitory and students from dormitory. When the researcher created a questionnaire the questionnaire was distributed to the sample. And the data was collected. The data is processed from a computer. The software program (Vanichbuncha Kalaya, 2016) helps in data analysis. The statistics used for data analysis are: Frequency and percentage Use of demographic characteristics. And student dormitory consumption behavior. And entrepreneurs Use the mean and standard deviation. To explain the satisfaction of using the service. It also includes analysis of problems and obstacles in using the services of the users. The standard deviation is used in conjunction with the mean. The t-test, one-way analysis of Variances, and chi-square were used at the 95% confidence level for the results. The instrument used to collect this data was a questionnaire related to satisfaction. Consumption behavior and behavioral trends. Creating research tools. This is a questionnaire with the following tools in the following order.

1. Research and research papers. Related to consumer behavioral satisfaction. And behavioral trends. This is a guideline for creating a questionnaire.
2. The data collected from the collection of the questionnaire. This is a guideline for creating a questionnaire, divided into 4 sections.  
Part 1: The personal characteristics of the respondents were gender, age, occupation, income per month. And education this is a closed-end response question.  
Part 2: Questionnaire about consumption of student dormitory in Phutthamonthon District Nakhon Pathom Rating scale method: Likert scale questions are used to measure the level of interpersonal information (Interval scale) divided into 5 levels.  
Part 3: Information on the Economic Costs of Student Dormitory in Phutthamonthon District Nakhon Pathom  
Part 4: Suggestions and Additional Opinions of Student Dormitory Students and the student dormitory in Phutthamonthon. Nakhon Pathom Open-ended questions are used to measure the Ratio Scale.

## DATA ANALYSIS

*Descriptive statistics are used.*

- Percentage for analysis of data from the questionnaire. Demographic characteristics And the main reason to use the service.
  - Mean for the analysis of data from dormitory consumption questionnaire and economic cost of student dormitory in Phutthamonthon district. Nakhon Pathom
  - Standard Deviation (S.D.) for Satisfaction Analysis. And the opinions of students who dormitory.
- Inferential Statistics the statistics used in hypothesis testing are as follows.

- Independent t-test was used to compare the mean of two independent samples. To test hypothesis 1 on gender
- One-way analysis of variance (F-test). One-way analysis of variance was used to compare the mean of the two groups to test hypothesis 1: age, occupation, marital status, income Month and Education Level
- Statistics coefficient Pearson Product Moment Correlation coefficient to find the relationship between two independent variables to test hypothesis 2

## RESEARCH RESULT

The results of the study on The Factors determining students' dormitory consuming behaviors and economic costs of students' dormitory in Phutthamonthon District Nakhon Pathom. Discuss the results as follows. Gender, Age, Expenses Dormitory Rental (monthly), other income exclude current income, Satisfaction of Student Dormitory Service Benefits of using Student Dormitories Satisfaction with student health services. Location of establishment Promoting special programs to promote the age of the sample affected the selection of student dormitories. The average income or income per month. And the monthly rents of student dormitories affect student housing rents. By the high income. And the monthly rental price of high-priced student dormitories will pay more attention to student housing rents than those with lower incomes.

Student Dormitory Selection The marketing mix of the student dormitory consumption. The focus of the study was to select student dormitories from the product and personal aspects, followed by location and physical presentation. Price and marketing promotion services, respectively. The samples focus on the cleanliness of the room as much as possible. Secondly, the size of the room and interior space. Internet access and telephone in room. Room amenities include a balcony, a walk-in wardrobe, etc. Room facilities include telephone, and the reputation of the residence. Security system such as key card, CCTV, security guard the sample price paid attention to the most noticeable amount of money before the payment, followed by the rent of the room at the rate appropriate to the room. The tariff rate - the cost of electricity, the Internet phone clear. Advance deposit the damage insurance is appropriate in order of location. The most convenient and safe way to travel, followed by convenient parking. Safe and sufficient for the guests. The samples were rated as the most trustworthy of the owners or caregivers, followed by the care of the security staff. The care of the cleaning staff. The honesty of the staff at the care of the room. And the humanity of the owners of the rooms and staff, respectively. Service Process The sample featured on the subject. Dormitory is staffed throughout. 24 hours, the most is the dormitory. The hostel has daily housekeeping staff. Fast service when there are problems. Happened inside the room. Security of rooms and property when the students finish the semester. And rules and prohibitions in the room, such as not all animals in the order. Physical presentation Give the sample Important in The cleanest living environment is most comfortable, followed by the entrance and the stairs. Accommodation has ample parking. The accommodation has a layout, space, interior, room, modern, beautiful, garden, trees, chairs. The rooms are clean, shady, have fire escapes, and are equipped with fire and smoke detectors and alarms in order.

## DISCUSSIONS

A study of the Factors determining students' dormitory consuming behaviors and economic costs of students' dormitory in Phutthamonthon District Nakhon Pathom Discuss the results as follows.

Research hypothesis 1 Dormitory rental expenses (monthly) other income exclude current income Satisfaction of Student Dormitory Service Benefits of using Student Dormitories Satisfaction with student health services. Location of establishment Organizing special programs to promote the sale of sex, age, occupation, student dormitories The result of this study is consistent with Boonpak Kanchana (2011) studied the choice of dormitory of students of King Mongkut's Institute of Technology Ladkrabang. A comparison of the opinions revealed that the male and female students had an opinion about the factors that significantly affect the selection of dormitories at different locations at the statistical significance level of 0.05. The female will give. More important than the male. The results of this research are in line with the research conducted by Lerdejdecha Thanachporn (2013) The marketing factors influencing the selection of private dormitories of the university students Mae Fah Luang The results show that students place emphasis on location factors. Facilities and the surrounding environment. Therefore, those who are interested and interested in investing in the dormitory business must pay attention to the above mentioned will be satisfied. Because students and parents want a better quality of life. Facility Factor Affecting Student Dormitory Service the results of this research are consistent with the research conducted by Parasuraman et al. (1985), which states that access to the service is an easy way to communicate. The service provided to the customer must be convenient in time and place, not to wait long time. Must be appropriate Comfortable to travel. Environmental factors the results of this research are in line with the research conducted by Hygeur Kannikar (2012). The market is moderate. The physical characteristics of the dormitories were found at a moderate level. And consistent with Sittichai Thammasane (2011) have studied about Spa Business Management in Amphoe Muang, Chonburi Province. Customers consider that the important factors highly influence their choices of spa service including spa products, price, location, promotion, staffs, physical environment and service providing process. Customers also provide their opinions that each aspect mentioned above has high level of influence to their decision-making. (Service users perceived the overall factor and the factor of each factor were the price of the location. Promoting human resources in the physical environment. And the service process is very important for decision making. And the user sees that the individual factors of each. Mostly The decision to choose a spa business was at a high level)

Research hypothesis 2 Dormitory rental expenses (monthly) other income exclude current income Satisfaction of Student Dormitory Service Benefits of using Student Dormitories Satisfaction with student health services. Location of establishment Promoting special items to promote sales, gender, affecting the cost of living of student dormitories. Studies have shown that increasing academic institutions and increasing number of students It is an important factor in supporting the demand, but for entrepreneurs who have invested in building student dormitories. To meet the demand. With new dormitories increasing, so the return on investment is not satisfactory for high-rent dormitories or loans from financial institutions when comparing revenues and expenses, then have little return and not worth the money. The investment cost of constructing an apartment is relatively small because of the net present value of the internal return on investment. The response rate is not the same. Dormitories entrepreneurs can invest in normal situations, but they must compare the returns of other projects to make a decision, but if long-term returns are needed. When operating expenses increase, the net present value of return on investment Reduced Accounting Returns Long payback period the project to build a student dorm is less likely. The cost of investing in building student dormitories in each area must be different because of land price and location. This kind of project should be considered. Consider the feasibility of investing

in different construction values to compare the construction value for clarity in projected construction costs to reflect investment and interest rates. The calculation depends on the economic situation in each stage at any level. This affects the economic cost of operating a student dormitory. Corresponding to Piriyesayangkul Thanarat (1998). Sensitivity analysis of the project. The results show that the reduction in rental rates and the increase in the cost of the lease resulted in lower NPV and IRR of the project, and the decrease in rental rates also had a greater impact on profit than the reduction. Down of costs and expenses. Therefore, the investment in the project is not worth investing.

## SUGGESTIONS

The results of the study on The Factors determining students' dormitory consuming behaviors and economic costs of students' dormitory in Phutthamonthon District Nakhon Pathom has the following suggestions.

1. The study found that the price factor the student dormitories are most satisfied with other fees, such as electricity bills, internet bills. Therefore, dormitory operators should maintain the price level. Consumption of dormitories is the most important. And in order to adjust prices should analyze the situation. And have understanding communication. And agree with the consumer dormitory to understand the match.
2. The study found that Student Dormitory Factors The student dormitories are most satisfied with the convenience of staying in a dormitory. Therefore, dormitory operators should maintain quality and standards in terms of comfort and convenience.
3. The study found that the location of the student residence, the most satisfied student accommodation in the vicinity of the university, can be seen in the investment in student dormitories, location and surroundings in the near. The location is considered a major factor. Dormitory operators should be located in a community area near the campus to provide the dormitory with the opportunity to succeed.
4. The study found that the personnel factors that dormitory operators provide. Student dormitories are the least satisfied with their security staff. Dormitory operators should set up a 24-hour entrance and exit security system and set up a complaints service center to handle complaints from tenants. Ensure that student dormitories are accommodated in dormitories with services. And have a good security.
5. The study found that the facilitation factor Student dormitories are moderately satisfied with their services. The dormitory is appropriate. Therefore, dormitory operators should improve. And add the appropriate facilities to meet the needs of students more student dormitories.
6. The study found that the student environment was the most satisfying in terms of cleanliness. Therefore, dormitories operators should always maintain standards.

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## The Factors Affecting the Inventory Management of Grocery Store in Bangkok

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**Abstract:** This research work on the factors influencing the inventory management of grocery store in Bangkok aimed to study the inventory management of grocery store, and the factors influencing of inventory management of grocery store in Bangkok. Samples of study are grocery store operator from the random number of 170. This research has been used questionnaire as tool in research, type of question will be both open-ended question. Data were analyzed using selected statistical tools including percentage, mean, and standard deviation. The results showed that the sample were most female, aged 41-50 year with High school degree. Most of them were business owners with operated for 6-10 years. Most of inventory management of grocery store is self-purchasing at 94.11 percent. Second, there is a clear separation of categories at 85.29 percent. And in the last order is always made to purchase order at 14.71 percent. The level of factors affecting inventory management was at a high level that the average scores was 3.62. When considering each side, the results are as follows that the aim of having to an inventory is very important at 4.25, storage factor is very important at 3.92, and cost factor is very important at 3.50. The demand-side factors is medium importance at 3.40, and product attributes is medium importance at 3.19.

*Keywords:* Inventory Management, Grocery Store, Purchasing.

### INTRODUCTION

Grocery store is a popular business because it is an independent profession. It can be opened and sold easily with just the investment. In one community there are more than one grocery store. But there are many stores that have more opportunities for customers to choose is higher, so there is more competition in the area. The grocery store is an independent business that is easy to keep up with the store. Just watch the store, do not have to spend a lot of thought, check how many products are sold and how much inventory is left, and watch out for the thief. For this reason, the grocery business has received a lot of attention.

Nowadays, in the most industries business is critical competitive that made them create strategies to be advantage competitive to get larger market share. Business administrations aims to make the organization prosper, continuous and stable organization development. The important strategy is using in many firms are focus on maintain quality of products and services, price, reduce cost, meet customers need and satisfy customers. Thus reduce cost processing in organization is one procedure to support capacities in market competition. Many organization concentrate on build to reduce cost strategy in management

Business in the form of grocery stores or the general public known as “Shovel”, It is one of the oldest business in Thailand. In the past, the opening of this type of mall has been very popular with both the operators and end consumers, because consumers have access to all groups. There are also a variety of products ranging from baby candy to chili curry. But nowadays, who would believe that the popular grocery business was in crisis? The cause is that it is well known that it comes from convenience stores and stores that have a good model store, both from Thai and foreign brands to compete more. The way entrepreneurs survive at this time is to adjust and start doing business in a structured way. And one of them is inventory management. Inventory is important because it is a revenue-generating business. The more diverse the product, the higher the chance of earning revenue. It is an indication of its reliability. Grocery stores need to find strategies and guidelines for effective inventory management. Inventory management is efficient, it depends on many factors as well. Space constraints Investment restrictions the demand for various products.

If the entrepreneur has an effective inventory management, the company can reduce costs and meet the needs of customers in a timely manner. For this reason, the researcher is interested in studying the factors affecting the inventory management of grocery store in Bangkok. Based on a study of concepts and research related to inventory management and grocery stores as a guide for this research. This research aimed to study the inventory management of grocery store, and the factors influencing of inventory management of grocery store in Bangkok. This is a guideline and recommendation for grocery store operators.

### RESEARCH METHOD

This research is to study the inventory management model, the factors influencing the inventory management of grocery store in Bangkok, and analyze the approach to optimize inventory management. The results of the research were passed on to grocery store operators in Bangkok. The researcher uses qualitative research methodology with the following details:

1. The sample population is Grocery store operators in Bangkok incorporated 295 stores. The sample was determined by specifying the sample and area using the Taro Yamane schedule from the designated area. By simple sampling method at 0.05 error tolerance and 95% confidence level, 170 samples were collected as follows.

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

n = the size of the sample.

N = the total population.

e = the tolerance of sample selection at a significance level of 0.05

2. The research tool was a questionnaire. The researcher has created a questionnaire. The first step is researching information and related research papers from books, periodicals, publications related to inventory management. Second, define the scope and content of the content to determine the structure of the tool, by allowing inventory experts to comment on the relevant factors. Last step, the research tool was a questionnaire, and the questionnaire was sent to the research consultant for review and correction.

Then the researcher improves the tool according to the instructions. The questionnaire is divided into 3 parts. Part 1 General information in the business of the respondents. Part 2 Inventory management of grocery store. And Part 3 The level of factors affecting inventory management.

3. The researcher collected data from the survey area and asked the grocery store operators to distribute the questionnaires to obtain the actual information and understand the meaning of each question by filling in the form and answering questions during the questionnaire. In some of you, who cannot read out, the researcher used the questionnaire to read and record the actual data in the questionnaire. The researcher checked the completeness of each questionnaire until 170 questionnaires were collected to obtain the complete data, which will be further analyzed.

4 The data analysis was based on frequency and percentage, mean and standard deviation obtained from the sample. The researcher analyzed the data using the software package on the personal computer. Divided into Part 1 and Part 2 analyzes using Frequency and Percentage for Characteristics and Inventory Management. And Part 3, the researcher used an average of 5 levels, which determined the range of scores from highest score at 5 points and lowest score at level 1. The criteria for the interpretation of the score. The mean score was determined by the following scale:

$$\text{Width of each level} = (\text{most points} - \text{lowest score}) / \text{number of levels}$$

$$\text{Width of each level} = (5-1)/5 = 0.8$$

The interpreter was defined by the width of each level of 0.8. The scoring range and mean interpretation criteria are as follows:

Score between 4.21-5.00 is the highest level of importance.

Score between 3.41-4.20 is very important.

Score between 2.61-3.40 indicates a moderate level of significance.

Score between 1.81-2.60 is significant in the low level.

Score between 1.00-1.80 is the least significant.

## RESEARCH RESULT

A study of the factors influencing the inventory management of grocery store in Bangkok. The questionnaire was used as a research tool. And the information to evaluate with the program. The research results were divided into 3 parts as follows:

### **Part 1** General information in the business of the respondents.

The results showed that the sample were most female, aged 41-50 year with High school degree. Most of them were business owners with operated for 6-10 years.

### **Part 2** Inventory management of grocery store.

The management of grocery store inventory, which was classified as activities from 170 respondents, was as follows:

Table 1: Inventory Management Of the grocery store

Inventory Management Of the grocery store	Frequency	Percentage
1. Self-purchasing.	160	94.11
2. Clear separation of categories.	145	85.29
3. The forecast demand for products with their own experience	131	77.06
4. Maintained properly, not damaged goods.	110	64.71
5. Arrange the goods appropriately for picking or counting.	92	54.12
6. Check the product quality weekly.	69	40.59
7. Every purchase plan is planned.	65	38.24
8. Discount for expired goods.	43	25.29
9. Prepare table of entry - exit of goods.	30	17.65
10. Always made to purchase order.	25	14.71

Table 1 shows that 170 retailers responded to the questionnaire on grocery store inventory management. Most of inventory management of grocery store is self-purchasing at 94.11 percent. Second, there is a clear separation of categories at 85.29 percent. And in the last order is always made to purchase order at 14.71 percent.

### *Part 3 The level of factors affecting inventory management.*

The analysis of the factors affecting the management of grocery store inventory, which is classified into various factors. From the sample of 170 respondents, the results are as follows:

Table 2: Results of analysis on factors affecting inventory management of grocery stores.

Factors affecting inventory management of grocery stores	Mean	S.D.
The aim of having to an inventory	4.25	0.70
Storage factor	3.92	0.71
Cost factor	3.50	0.71
The demand-side factors	3.40	0.62
Product attributes	3.19	0.62
<b>Total</b>	<b>3.62</b>	<b>0.66</b>

Table 2 provides an overview of the factors affecting grocery inventory management average was 3.62, S.D. was 0.66. When considering each side, the results are as follows that the aim of having to an inventory is very important at 4.25, storage factor is very important at 3.92, and cost factor is very important at 3.50. The demand-side factor is medium importance at 3.40, and product attributes is medium importance at 3.19.

## DISCUSSION

The analysis of general information and inventory management of grocery stores from the sample of 170 respondents found that most inventory management was by manual purchasing. Because there are 1 employee in the grocery store. The owner of the business must be the order. But grocery shopping is not a good place to place orders because lack of understanding and no knowledge of the purchase order.

Storage of goods by type is clearly the most commonly used grocery store inventory management because most of the storage space is in front of the store. Sorting products will make it easier for customers to find the product they are looking for. Self-Product Forecasting Because the seller is aware of the popularity of each product sold, sellers use their forecasts in their own experience.

As a result of the analysis of the factors affecting inventory management of the grocery store, the respondents emphasized the importance of the objective of inventory. Grocery stores need to have a variety of products to meet the needs of most customers. This will bring satisfaction to customers to return to the next service.

Storage factors, sample respondents are very important because the grocery store must have enough space to store and sell products. If the storage space is small, it will keep inventory low, which will affect the number of purchases and customer needs. More research is available from the research “A Study of Process and Perception of an Advantage of using a Warehouse Management System” (S.Varaporn, 2015)

Product characteristics, sample of the respondents was rated at a moderate level. And that is the factor that matters most. Grocery stores need to have a variety of products to meet customer needs. And there are a variety of choices. Therefore, it is not possible to select only qualified products for sale. But inventory management is beneficial both in terms of space and the availability of a variety of inventory.

The study of inventory management model and factors affecting inventory management highlight important issues that grocery stores need to prepare and develop inventory management for maximum benefit, can compete with other types of businesses nearby, can meet the needs of customers, and build credibility for the grocery business.

## CONCLUSION AND RECOMMENDATIONS

Based on a general study and inventory management of grocery stores. It is concluded that most of the entrepreneurs are female, aged 41-50 year with High school degree. Most of them were business owners with operated for 6-10 years. Inventory management is self-managing, both in terms of purchasing and forecasting needs, from their own experience. There is a clear pattern for storing goods by type, and most of them do not record the entry and exit of goods, including making a purchase order at all times. Is in the final position of the grocery store management model.

Based on a study of the factors affecting grocery inventory management, it is concluded that the objective of inventorying is the most important factor. The factor of product quality is the factor that respondents rated in the last position.

Suggestions for the next research should be the effectiveness of the grocery store inventory management process. Research in other areas should also be included in the data collection. In-depth interviews should be provided to obtain more useful information.

## ACKNOWLEDGEMENTS

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## Factors Affecting the Consumer Buying Decision Toward Smartphone in Udon Thani

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**Abstract:** Factors affecting the consumer buying decision toward smartphone in Udon Thani aims to study 4Ps marketing mix : product, price, place and promotion factors that affecting the consumer buying smartphone decision in Udon Thani province of Thailand. The distribution of paper based on 400 questionnaires from Udon Thani consumer. The research instruments were close ended and rating scale questionnaire. For data analysis, descriptive statistics includes frequency, percentage, mean, standard deviation, Variance, Minimum and Maximum were applied and Inferential statistics includes Analysis of Variance and T-Test were applied. The study found that most answerer were females, ages not over 20 years old, bachelor's degree education, student and income not over 10,000 baht. The study found Product was in very high. Price Place and Promotion were in high.

*Keywords:* Smartphone, 4Ps, Buying decision.

### INTRODUCTION

Communication is essential for mankind in today's world, the era of the borderless world (Globalization). Communication would make a quick development in every country and make it grow rapidly. Communication helps to spread knowledge and information among people. Humans communicate with others not only by face-to-face communication, but also by giving information via the Internet and printed products such as books and newspapers. Current technology has developed and evolved over time. In particular communication tools like mobile phones, smart phones and tablets. These technologies have an important role in our lives as much as these technologies become essential factor to life. Smart phone is a tool that helps to communicate at ease. The evolution of phones are evolving all the time, whether it is developing in design, function, connection, photography and others. With the increased functionality of mobile phones in the past used just to make calls and receive calls. It has added more fashionable; The Social Network Applications and other applications on Android and IOS rather than using a direct call

Udon Thani, a province of Thailand, where the shopping mall which have mobile phone retailer and a wholesaler were located and its was a hub of mobile phone wholesaler in the province of Udon Thani, Nong Khai, Nong Bua Lamphu (Eng Jueg Huat, 2015), the smartphone's market has a variety of brands to be sold, whether a big company, Apple iPhone or the Android mobile phone manufacturers with a diverse brands. With brands such as Samsung OPPO Huawei Vivo etc., each brand has a wide range of prices and functions according to usage. Each user will have a choice to buy. If you do not study well or consult who have knowledge about this products its will make a mistake decision to buy some mobile phone or wrong usage objective. Thus, Researcher interests in a "Factors affecting the consumer buying decision toward smartphone in Udon Thani" for beneficial of consumers to buy smart phones to suit the needs and interests, as well as entrepreneurs can also apply to such needs and plan for meet customer needs.

### RESEARCH OBJECTIVE

1. To study the factors affecting the consumer buying decision toward smartphone in Udon Thani
2. To compare personal factor opinions classify by product, price, place and promotion.

### RESEARCH FRAMEWORK

*Research framework of this research is shown in figure 1.*

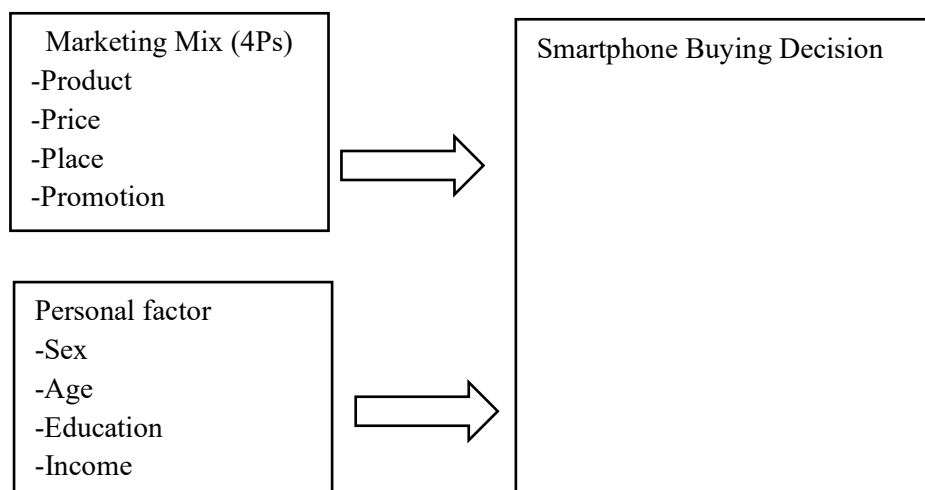


Figure 1. Research framework

## LITERATURE REVIEW

Kerdkarn, S. (2016) studied the Factor that affect the smart phones selection Behavior using mobile smartphones of the people in Pathum Thani Found that Communicate with reasonable prices Samsung AIS network operating system, the Android model purchased from service centers. For less than 5000 baht cash payment and a monthly fee lower than 500 baht. Technical factors that impact buying habits. In general, the overall difference is statistically. At a high level. The factors of the media affect buying behavior. In general, the overall difference is statistically. At a high level.

Khajornthawong, S. (2015), studied Factor Affecting The Purchase Of Chinese Smartphones In Thailand , Found that Product and suitable price were of primary importance. Then, camera quality and weight. Price, maintenance fees and reliability of the online distributor were the third and fourth points of consumer concern. Shop reliability and distribution were less influential. And education level of consumer had affected to consumer purchase decision in Chinese smartphones.

Nocomepor, P. and Tantiprapa, P. (2015) studied the Behaviors of Generation B in Mueang Chiang Mai District Toward Buying Smartphones. Found that the respondents decided and paid for smartphone by themselves. They would purchase the smartphone when the old one was broken. The duration for buying the smartphone was 18.00 p.m. on Saturday and Sunday. The duration for changing the phone was approximately 1 – 2 years, and the respondents mostly paid for the new one by credit card. Moreover, the respondents would ask the staff in the shop in order to help deciding, and would purchase the smartphone after comparing between its quality and the need of oneself. The main quality of the smartphone that the respondents decided to purchase was the brand. If the respondents were satisfied after using the smartphone, they would definitely suggest to other people.

Vipuro, S. and Kimphakorn, N. (2015) studied the Marketing Mix Factors Affecting Consumers Buying Decision Smart Phone in Municipality Samutsakhon. The marketing mix factors affecting consumers buying decision smart phone in municipality Samutsakhon was found that In Product factor was for the convenience to use. In Price factor was for the reasonable price and function of the smart phone. In Place factor was for the bought from the authorized dealer such as authorized dealer Iphone, Samsung, Nokia etc. In the promotion factors was for the after service.

Itthichan, S. and Phakdeenuan, A. (2013) studied the Factor that influence Smartphone Selection in Udon Thani Provincial. Found that A buying decision factor when classified by sex and education have same result of 0.05 significant level. Ampawanwong, W. (2012) studied the Marketing Factors Involved in Buying Decision of Smartphone with Android-operating System. Found that the marketing mix (4P) products have highest influence to their decision making to purchase. In additional, price, distribution and promotion have influence to the decision making to buy product at a high level. The comparison of the marketing factor that affect the buying decisions of users in Bangkok separated by demographic showed that the different of demographics do not influencing for decision to buy product.

Boonphitak, W. (2011) studied the factor Affecting the Consumer Buying Decision toward Iphone 4s in Rangsit. Found that the market mix, i.e. product, price, place, promotion, was associated with the buying decision as follow. Quality and standard of the product in a class with a vibrant, beautiful and stylish product influenced the buying decision with respect to the phone memory size. Special discount on the product influenced the buying decision with respect to use of the phone and phone memory size. Moreover, store with advice to customer and test products affected the buying decision with respect to the use of the phone. The premium provided by vendor affected the buying decision with respect to the phone memory size. Lastly, the monthly fee ad special offers by dealer also influenced the buying decision of the iphone.

Sirichotpundit, P. (2011) Marketing mix is a marketing tool used in various businesses. In particular, the marketing management of most executives. In order to achieve the marketing objectives in the target market has been placed. Marketing mix is considered a marketing strategy with 4 Ps: product, price, channel and distribution.

## RESEARCH METHODOLOGY

This research was a quantitative research and data collection by questionnaires. Sample used in this research determine the sample regardless of probability (nonprobability sampling) with 400 simple sampling is from people in Udon Thani Province. Using Taro Yamane's prepared table according to the recipe with the likelihood of error tolerance 0.05. Researcher had defined the characteristics of the tools used to collect data and construct the tools used in this research. Questionnaires had been developed based on objectives and conceptual frameworks of research on marketing mix (4Ps). The questionnaire was divided into 2 parts.

Part 1 Personal factors on sex, age, education level, occupation and average income per month

Part 2: Smartphone buying decision factors. It covered product, price, place, and promotion

Part 3: Suggestions.

Researcher had created tools to collect data. The steps were as follows

- Study concepts and theories from academic papers, textbooks, websites, and related research of similar nature to bring information from various sources as a guideline to create a questionnaire.

- Analyze the objectives, content and structure of the research to determine the guidelines and scope of the questionnaire.

- Create a draft questionnaire, by defining the scope and scope of the question in accordance with the objectives of the research.

- Bring the draft questionnaire to the advisor for review, consideration and correction, and provide the experts with knowledge and experience in marketing and information technology. By statistics research and consider the questionnaire for 3 persons to review and make further recommendations. As well as content validity. Understanding and using the language to evaluate the results of the decision to find the Index of Item Objective Congruence (IOC).

- Complete a complete questionnaire for use in the research sample.

The researcher selected the questions with the IOC value of over 0.6 as a question. As well as improving the questionnaire was clear and comprehensive for the purpose of this research. The researcher used a questionnaire that was subjected to expert review and tried out the sample with the similarity to the sample with the similar characteristics.

The data analysis was a statistical computer analysis program. The mean and standard deviation of the opinions on marketing mix factors, using T-Test and One Way ANOVA statistics to test hypotheses that the users of sex, age, education , occupation, and income.

RESEARCH RESULT

The research found that most of the users were female age between 21-30 years old with a bachelor's degree, occupation as a student and income was not over 10,000 baht

The results of the analysis of opinions about factors affecting the consumer buying decision toward smartphone.

Table 1: Product

Product	Mean	S.D	Buying decision level
Product have good design	4.17	0.64	High
Product suitable for more application	4.15	0.71	High
Used a good material	4.53	0.65	Highest
Find your missing spare parts quickly and easily	4.07	0.69	High
Great front camera	4.18	0.73	High
Great rear camera	4.47	0.73	High
Light weight	4.04	0.75	High
Warranty period suitable for a particular use	4.55	0.50	Highest
Trusted Brands	4.44	0.70	High
Functions meet the requirements.	4.55	0.56	Highest
Stable Operating system	4.33	0.84	High
Long life battery	4.51	0.75	Highest
Average	4.33	0.37	High

Table 2: Price

Price	Mean	S.D	Buying decision level
Good price with quality.	4.43	0.82	High
Good service price.	3.81	0.83	High
Good accessory price.	3.74	0.92	High
Good Price for second hand.	3.84	1.03	High
Average	3.95	0.77	High

Table 3: Place

Place	Mean	S.D	Buying decision level
Trusted shop	4.20	0.89	High
Multichannel sales	4.25	0.75	High
Outstanding shop	3.93	0.67	High
Have a good Location	4.04	0.73	High
Multiple payment options	4.11	0.72	High
Average	4.11	0.58	High

Table 4: Promotion

Promotion	Mean	S.D	Buying decision level
Discount sale promotion	4.49	0.63	High
Salesperson have good product knowledge.	4.32	0.80	High
Interesting ads	4.25	0.71	High
Interesting brand ambassador	3.65	0.88	High
Interesting free gift and accessory	3.93	0.84	High
Average	4.13	0.61	High

Comparison of opinions of individuals with different personal factors toward buying decision of smartphone in Udon Thani, classified by product, price, place and promotion, there was a difference opinions about buying decision if the sex, age, education level, occupation, and average income per month of subscribers varies.

### DISCUSSION

This research found that the opinions about the buying factor toward smartphone in Udon Thani, classified according to Product Price Place and Promotion at the average score in the *high level*. Consistence with Kerdkarn, S. (2016) research found that good product, low price trusted store and media affected buying decision of smartphone in Phatumthani

When comparing personal factors and opinions about factor affecting the consumer buying decision toward smartphone in Udon Thani. In terms of product, price, place and promotion when considering each side, it was found that different sex, age, education level, occupation, and average income per month had different opinions. Inconsistent with Itthichan, S. and Phakdeenuan, A. (2013) and Ampawanwong, W. (2012) they found that different of demographics had same opinions for buying decision, Therefore personal factor do not influencing for decision to buy product because of the results vary by area

### CONCLUSION AND RECOMMENDATIONS

For the smartphone store suggestions; based on the study of opinions of buying decision with sex, education levels, occupations, and average income per month. Seller have to select a best product from trusted brands that have a reasonable price and use a difference promotions depend on store location and demographics. For example if store located in outskirts of Udon Thani they will sell a low price smartphone or entry level smartphone

Suggestions for the next research

1. There should be comparative research on buying decision on other area to evaluate factor to meet the needs of consumer.
2. Research should be compare between 2 operating system (IOS and Android) consumers. For a higher detail to evaluate buying decision.

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## An Application of Forecasting Technique for Process Management Case Study of ABC Company Limited

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**Abstract:** Realizing the importance of all logistics aspects is the way to understanding about job operation's detail. Many business also emphasize the expansion to make the long term profits. In this case study was tested by using forecasting techniques of moving average method compared with exponential method to reduce the finished good error of frame type f 70x200 gray, f 70x200 cream, f 70x180 gray and frames type f 70x180 cream to be used in Navigation Products which is used in the component of company's PVC frames product. From the company original forecasting which indicated of frame products f 70x200 gray predicted by end of August 2018 which have the planning production at 2,000 units. But when doing the forecasting moving average method, the 4- Month moving average as 1563 units by actual number on August as 1,540 units also can be reduced tolerances as 21.85 %. For the frame products f 70x200 cream which predicted by end of August 2018 according to planning production as 2500 units. However when using the forecasting moving average method, the 4- Month moving average as 1851 units by value equal as 1810 units. Which reduced the tolerance 25.96 %. For the frame products f 70x180 gray which predicted by end of August 2018 according to planning production as 2500 units. However when using the forecasting moving average method, the 4- Month moving average as 2291 units by value equal as 2274 units. Which reduced the tolerance 8.36 % and the frame product f 70x180 cream which predicted by end of August 2018 according to planning production as 2850 units. Following with doing the forecasting moving average method, the 4- Month moving average as 2404 units by value equal as 2382 units and reduced the error as 15.64%. Finally the company found the information of forecasting the tolerance reduce as 17.95% by averaging. Therefore, the company was able to use the method and analysis for next operation in order to determine how to decrease costs of Logistic in both internal and external organization, including help to decrease damage from the mistakes of management.

*Keywords:* Forecasting, Moving Average forecasting technique, variation, Exponential, Error Reducing.

### INTRODUCTION

In current situation, the business must emphasizing of the point of long term profit belongs with suitable and effective administrative which admit as the guideline to create understanding on job operation detail, problem's cause accurately analyzing to clear problem which important to using others theory to be applied by dependon what kind of problem in each organization. Nowadays the case study of company have manufacture forecasting by using experience but still have a lot of tolerances. Some part of product selling was from prediction and from planning department experience was the main point also because of the company manufactured from customer's order with forecasting it followed with a lot of stock amount of raw material which cause the high cost of product parts purchasing and stocking. If we use the forecasting techniques it will help a lot of benefit in planning and making the decision in job operation in short and long term. And the forecasting is the one of equipment which can be received the information in the future to making the component of effective job operation planning.

### RELATED THEORY

The researcher studied about notion and many kinds of theory and review the knowledge organization to be the basement and guideline for studying as.

1. Forecasting techniques, Moving average method is forecasting techniques which using the past information to forecast the future like predict the demand of product using to plan in the future purchasing in the future from the amount of using product in the past by Chawaree(2556) said,(Simple Moving Average :SMA) this method will balance the weight of all calculated values to be equally significant by using the time established information and make the average. The moving average is the averaging method when have no trend or have a little. The method is very useful when we can assume that the marketing demand is stable all the time and use equation as

$$\text{Moving Average} = \frac{\text{Demand in previous } n \text{ periods}}{n}$$

The n is the period amount in moving average like 3,4,5 months continueingly

2. Exponential Method is the averaging of weight balance and the value of calculated forecast which calculated from the forecast value before and plus the difference percent between forecast value and real value of serie at that point which is the next period

$$\text{forecast value} = \text{The forecast value before} + \alpha (\text{real value} - \text{the forecast value of the period before})$$

by (The real forecast value -The forecast value of the period before) Instead of the mistake in the forecast and  $\alpha$  is the percentage of forecast's mistake thus

$$\text{Exponential} = F_t = F_{t-1} + \alpha (A_{t-1} - F_{t-1})$$

by  $F_t$  = forecast value for t period

$F_{t-1}$  = forecast value for t-1 period

$\alpha$  = Smoothing constant

$A_{t-1}$  = demand of the real sales volume for t-1 period

3. Forecasting Correctness Analyze : the accuracy in forecasting is the important thing and have a significance in two kinds to be considered which is the tolerance of forecasting which happened in the past, The ability of forecasting result which can be respond with changing to analyze. The measuring method the error of forecasting the past information which to be used generally and it has 2 methods thus mean absolute deviations: MAD and mean squared error :MSE The error finding that use for comparing with forecasting value by MAD(Mean Absolute Deviation)method From formula

$$MAD = \frac{(\sum |real\ value - forecast\ value|)}{N}$$

The finding method of mean squared error value to use for comparing with forecasting value by using MSE method(Mean Squared Error) From formula

$$MSE = \frac{(\sum Ireal\ value - forecast\ value)^2}{N}$$

The error finding that means how many percent of error that can happen in forecasting to use in the conclusion to prove that prediction have the correctness enough.

4. Having inventory to supply suitable amount of product can be reducing the risk from demand and supply variation by Pimnisa Dechkarnchanasil said the inventory is products that we manufactured or bought for distribute. The inventory management is the important thing to service customers to have the product that they want to buy all the time they need. On the other hand it can lead the high cost in an operation thus many organizations realized this kind of problems and find the solving problem method to reduce the inventory cost in supply chain system, the effectiveness of inventory can balance the product level with customer's satisfy such as order fill rates. However the risk that happen from inventory management might be the overload of product stocking and the stocked product is not the one that customers need.Nukrak(2551) researched in the thesis about the suitable amount of purchasing to reduce the expense of dynamic flow line company limited inventory management. It is the Cast Steel Value import business which found that it had too much stock that cost the budget of purchasing and expenseof inventory more than necessary also without purchasing amount calculation method.Nukrak's research had the objective to find the suitable amount of purchasing to reduce the expense from product collection and decrease the product stock amount. Kraiwit (2017).Hence, this study use Continuous Review System policy (s, Q\*) in order to compare the cost to that from the current situation

5. Purchasing means the operating activity to bring in products or service ,raw material along with machine, equipment to achieve the business's objective. Normally in business can divide the purchasing into two category by purchasing to sell and purchasing to use or transform this protocol is very important especially in the generation which every environment change so rapidly ,the competition to reduce product's cost and operation cost, Staff and purchasing responsible unit have to realize how to develop job task and job protocol to connect with another unit in an organization and to connect with business supply chain in effective way and can be response with needs in the right way and right time.

**OBJECTIVE**

- To study inventory forecasting form
- To improve forecasting method and product demand forecasting model
- To plan and reduce the risk of raw material according with needs

**HYPOTHESIS**

To get the forecast value nearly with the real manufactured value more than company's originally forecast method.

**CONCEPTUAL FRAMEWORK**

The idea about reduce the forecast deviation guideline establishment by researcher did the experiment of using moving average method compared with exponential method to test the forecast value as figure 1

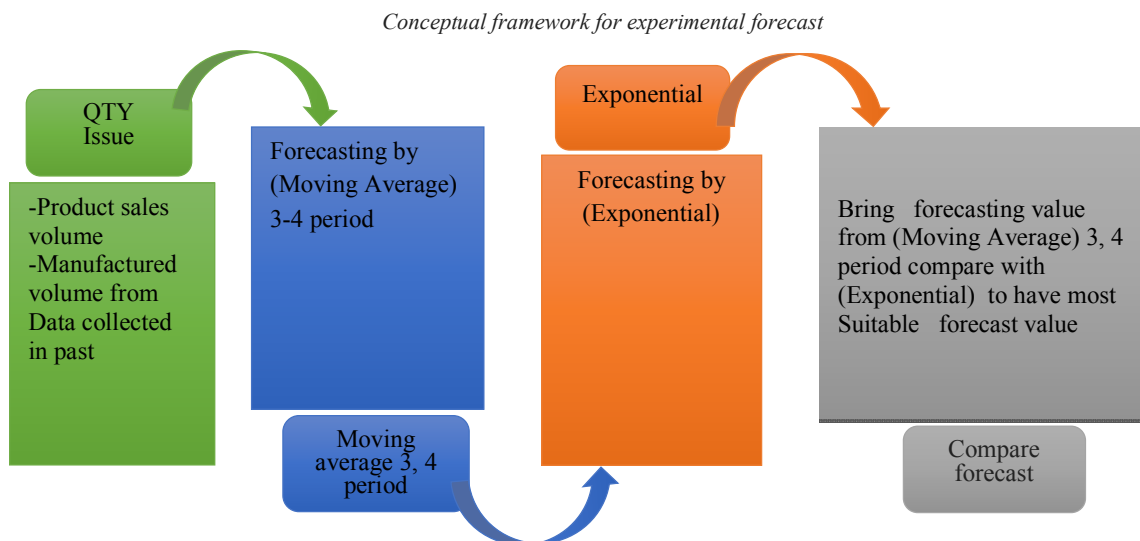


Figure 1. Conceptual framework for experimental forecast



**ADVANTAGE POINT**

- To reduce the forecast deviation
- To set the guideline of forecast system improvement to plan the guideline of developing current job operation.
- To increase efficiency of planning the company manufacturing in the future.

**THE RESEARCH PROCESSING**

Westarted the research by collect the company's information for case study which consist of main business namely manufacturing and distribute the finished pvc products such as pvc doors, window ,door frame,synce pane door and pvc wall as shown as figure 2-3



*Figure 2. Sample of pvc doors, synce pane pvc and pvc wall*



*Figure 3. Sample of pvc doors manufacturing parts*

This research use the secondary data ,the researcher collected information of frame type f 70x200 gray, f 70x200 cream, f 70x180 gray and frames type f 70x180 cream namely the real amount of production, including raw material using in the past which was calculated by company forecasting ,Inventory, Inventory holding volume,Forecasting information, pattern of purchasing and stocking in current. The related information collecting to compare between forecasting value and the real value of manufacturing order from the collected product list by doing monthly and used information backward for 1 year and 8 months to do forecasting .To analyze about forecasting process of company as shown as figure 4



*Figure 4. Sharing analyzation and data collecting*

From standard data collecting of doors group by backward 1year and 8 months found that the amount of frame type f 70x200 gray, f 70x200 cream, f 70x180 gray and frames type f 70x180 cream have too much. And the case study's company provided the data as shown as the table no.1 to compare with forecasting and the real use value. The result let us know for the main reason was the high value of inventory, the forecasting was not accurate thus we chose the navigable raw material in 4 items to test the forecasting techniques. Using moving average 3periods and 4 periods to compare with exponential method subject to the 4 items frame type f 70x200 gray, f 70x200 cream, f 70x180 gray and frames type f 70x180 cream to analyze for predict the purchase order according with real need to decrease the order manufacture. This three items was ordered in domestic and had high frequency ordering. Because of the company want to decrease the over raw material inventory which cause many error forecasting like the raw material purchasing was not enough for need . Therefore research chose to use frame type f 70x200 gray, f 70x200 cream, f 70x180 gray and frames type f 70x180 cream to be a navigation products of forecasting in table 1.

Table 1: Data about manufactured volume conclusion frame type f70x200 gray, f 70x200 cream, f 70x180 gray and frames type f 70x180 cream

Fram		2017												2018							
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
70x180	cream	1,939	2,318	2,875	1,560	2,577	2,613	1,731	2,103	2,840	1,893	2,261	2,940	1,606	2,763	2,909	1,990	2,914	3,038	1,282	2,382
	gray	1,737	2,230	2,332	1,412	2,512	2,064	1,667	1,708	2,278	1,584	2,142	2,594	1,605	3,664	2,638	2,058	2,762	2,629	1,498	2,274
70x200	cream	2,046	2,054	3,014	1,425	1,972	2,890	2,228	3,039	2,263	2,184	1,948	2,821	1,529	2,626	2,318	1,752	1,648	2,334	1,611	1,810
	gray	1,898	1,593	1,821	828	1,656	1,835	1,418	1,492	1,589	1,325	1,421	2,132	2,027	1,904	2,294	1,384	1,523	1,819	1,368	1,540

Note: Data between 2017-2018

POPULATION AND EXAMPLE

This case study chose to use the data of raw material need in group frame type f 70x200 gray, f 70x200 cream, f 70x180 gray and frames type f 70x180 cream previously one year and eight months to be predicted as navigable product for forecasting by assume selling volume in the future from manufactured volume in the past ,Forecasting data and collected related data to make comparison of historical data.

EQUIPMENT

Use forecasting techniques (Moving Average) 3 periods and 4 periods compare with (Exponential) which using past information forecasting techniques.

Use balanced score card to analyze an organization or current unit to find something that cause problems in job operation.

Use Microsoft Excel 2013 to make mathematic model shown about forecasting data as shown as figure 5.

f 70x200 gray						Exponential	
year	เดือน	At	FT mov 2	FT mov 3	FT mov 4	0.1	0.5
2017	Jan	1,898				2,000	2,000
	Feb	1,593	1,746			1,990	1,949
	Mar	1,821	1,746	1,771		1,950	1,771
	Apr	828	1,707	1,414	1,535	1,937	1,796
	May	1,656	1,325	1,435	1,475	1,826	1,312
	Jun	1,835	1,242	1,440	1,535	1,809	1,484
	Jul	1,418	1,746	1,636	1,434	1,812	1,660
	Aug	1,492	1,627	1,582	1,600	1,772	1,539
	Sep	1,589	1,455	1,500	1,584	1,744	1,515
	Oct	1,325	1,541	1,469	1,456	1,729	1,552
	Nov	1,421	1,457	1,445	1,457	1,688	1,439
	Dec	2,132	1,373	1,626	1,617	1,662	1,430
2018	Jan	2,027	1,777	1,860	1,726	1,709	1,781
	Feb	1,904	2,080	2,021	1,871	1,741	1,904
	Mar	2,294	1,966	2,075	2,089	1,757	1,904
	Apr	1,384	2,099	1,861	1,902	1,811	2,099
	May	1,523	1,839	1,734	1,776	1,768	1,741
	Jun	1,819	1,454	1,575	1,755	1,743	1,632
	Jul	1,368	1,671	1,570	1,524	1,751	1,726
	Aug	1,540	1,594	1,576	1,563	1,713	1,547

Figure 5. The example of using Microsoft Excel to calculate

DATA ANALYZATION

To establish a guideline of reduce errors of forecasting from group frame type manufactured information type f 70x200 gray, f 70x200 cream, f 70x180 gray and frames type f 70x180 cream (navigable product) by using forecasting techniques moving average 3periods and 4 periods compare with exponential method to reduce forecasting error. The monthly of product demand prediction previously in a year and 8months of year 2560 until August 2561 to previously compare between real manufactured value of moving average 3 periods and 4 periods compare with Exponential method as shown as figure 6-9

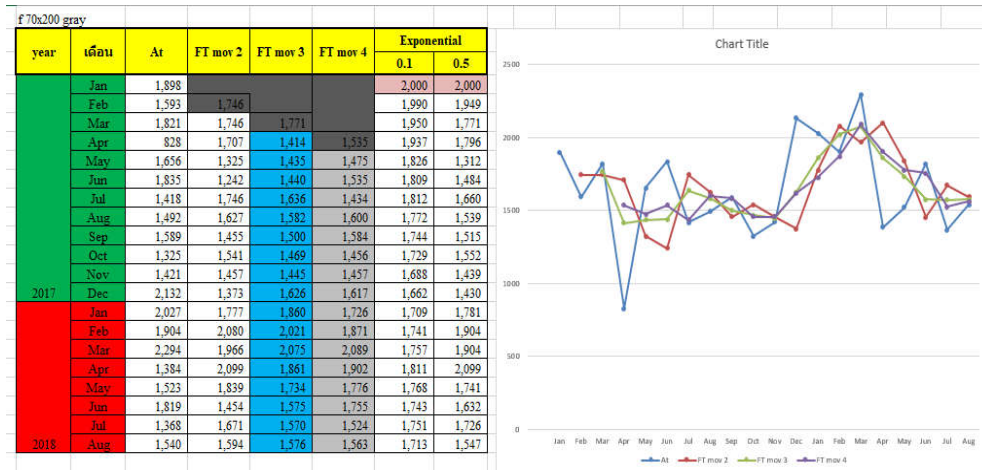


Figure 6. Forecasting frame type f 70x200 gray compare with moving average 3periods and 4 periods compare with exponential

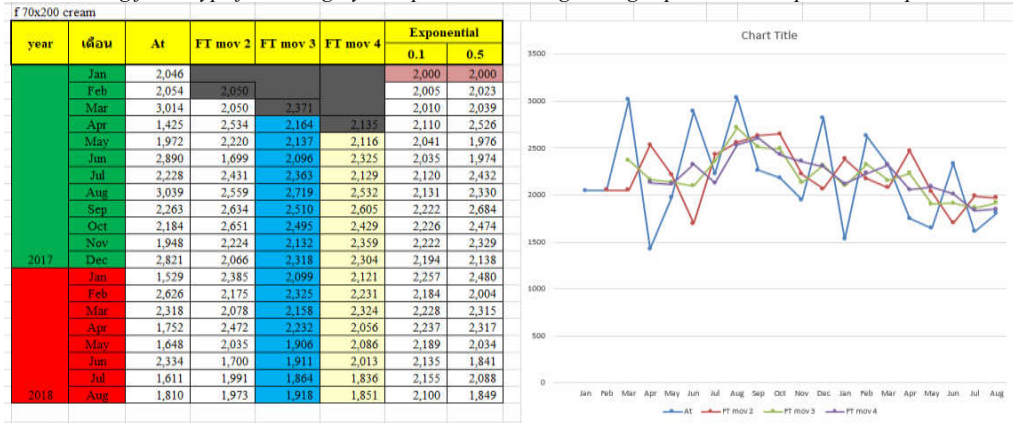


Figure 7. Forecasting f 70x200 cream compare with moving average 3periods and 4 periods compare with exponential

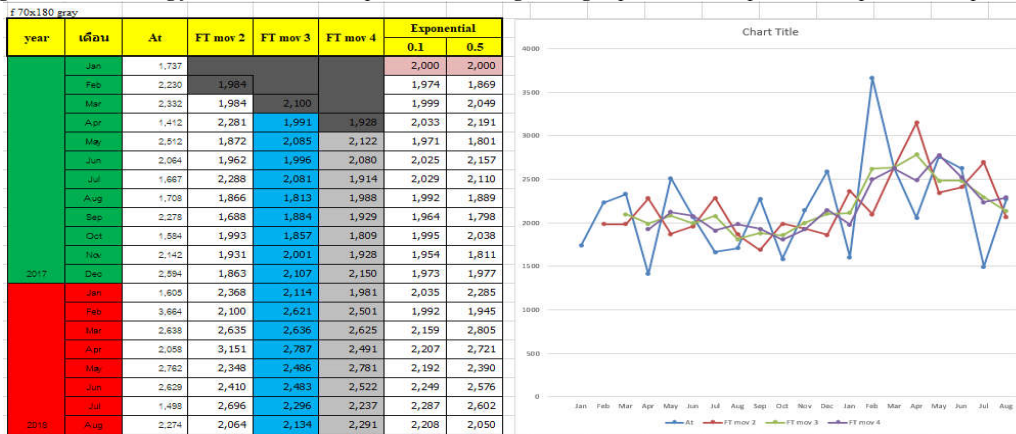


Figure 8. Forecasting f 70x180 gray compare with moving average 3periods and 4 periods compare with Exponential

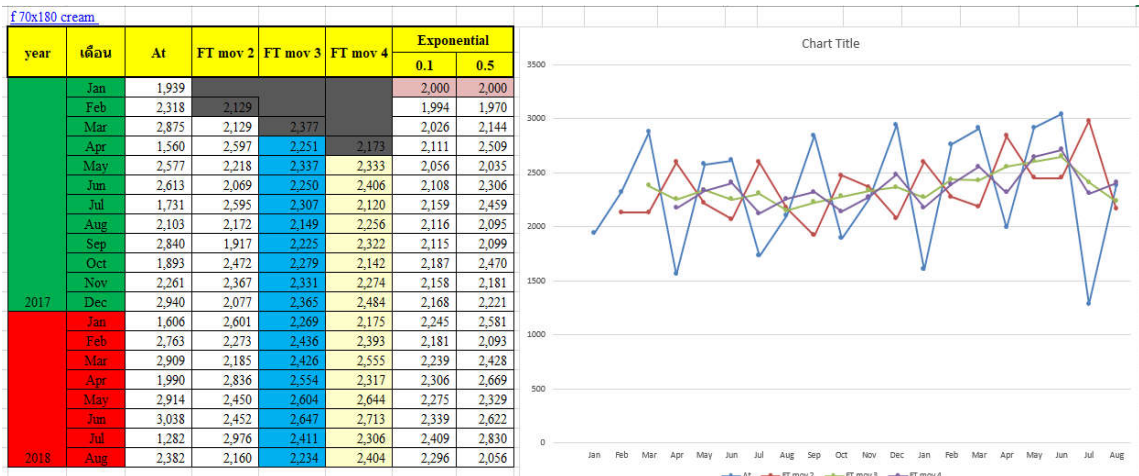


Figure 9. Forecasting f70x180 cream compare with moving average 3 periods and 4 periods compare with exponential

Thanakorn (2555) said normally in prediction , the forecast doing person always create model more than one model in each topic .For choose the model which assume that it had the lowest error. Thus for model choosing might choose to calculate of each error forecasting value model and bring the value to compare by use the lowest error model which using the most important factor with others(Accuracy) so it can get the lowest of forecasting value. All in all of real value for error and forecasted value by using various kind of coefficient or many data, researcher considered from error finding of forecast value comparing with testing by

MAD (Mean Absolute Deviation)

From formula  $MAD = \frac{(\sum |real\ value - forecast\ value|)}{N}$

And MSE (mean squared error)

From formula  $MSE = \frac{(\sum |real\ value - forecast\ value|^2)}{N}$

The real value which nearest of forecast value or causing the lowest error is the suitable value of accurately result of forecasting as shown as figure 9

year	เดือน	At	FT mov 2	FT mov 3	FT mov 4	AMD mov 4	AMD mov 3
2017	Jan	1,939				0.00	0.00
	Feb	2,318	2,129			0.00	0.00
	Mar	2,875	2,129	2,377		0.00	0.00
	Apr	1,560	2,597	2,251	2,173	551.18	949.38
	May	2,577	2,218	2,337	2,333	520.94	542.31
	Jun	2,613	2,069	2,250	2,406	504.85	307.16
	Jul	1,731	2,595	2,307	2,120	427.64	728.42
	Aug	2,103	2,172	2,149	2,256	12.88	7.79
	Sep	2,840	1,917	2,225	2,322	725.41	740.89
	Oct	1,893	2,472	2,279	2,142	294.13	576.55
	Nov	2,261	2,367	2,331	2,274	103.28	79.72
	Dec	2,940	2,077	2,365	2,484	771.96	718.86
2018	Jan	1,606	2,601	2,269	2,175	639.24	974.57
	Feb	2,763	2,273	2,436	2,393	581.68	669.72
	Mar	2,909	2,185	2,426	2,555	669.52	480.86
	Apr	1,990	2,836	2,554	2,317	316.44	678.57
	May	2,914	2,450	2,604	2,644	639.21	584.71
	Jun	3,038	2,452	2,647	2,713	699.29	416.36
	Jul	1,282	2,976	2,411	2,306	1126.64	1547.82
	Aug	2,382	2,160	2,234	2,404	86.02	326.09
					8670.29	10329.78	

Figure 9. Error finding to compare with forecast value

RESEARCH RESULT

The result of forecasting improvement found that we have to use many techniques to support executive team in making decision ,The suitable technique must harmoniously with each objective cost accurately.The forecast value which received from math model shown for forecast value is nearly to the real use value. From this experiment researcher found that Forecasting method by moving average method have the result of calculation better than exponential for weight balance value at 0.1 , 0.5 by notice from

MAD value is lower by the equation of moving average method can bring power of forecast better because it close with real value which have withdraw for navigable product. When compare with original method of forecasting on sample factory the result is frame products frame products f 70x200 gray predicted by end of August 2018 which have the planning production at 2,000 units. But when doing the forecasting moving average method, the 4- Month moving average as 1563 units by actual number on August as 1,540 units also can be reduced tolerances as 21.85 %. For the frame products f 70x200 cream which predicted by end of August 2018 according to planning production as 2500 units. However when using the forecasting moving average method, the 4- Month moving average as 1851 units by value equal as 1810 units. Which reduced the tolerance 25.96 %. For the frame products f 70x180 gray which predicted by end of August 2018 according to planning production as 2500 units. However when using the forecasting moving average method, the 4- Month moving average as 2291 units by value equal as 2274 units. Which reduced the tolerance 8.36 % and the frame product f 70x180 cream which predicted by end of August 2018 according to planning production as 2850 units. Following with doing the forecasting moving average method, the 4- Month moving average as 2404 units by value equal as 2382 units and reduced the error as 15.64% Finally the company found the information of forecasting the tolerance reduce as 17.95%as shown as table 2.

Table 2: Present the result of error forecasting value by exponential and weight balance at 0.5

Amount Indicator Navigable product	August 2017			Forecasting Value 2018
	planned	real used	forecast	
frame type f 70x200 gray	2,000	1,540	1,563	reduced error as 21.85%
frame type f 70x200 cream	2,500	1,810	1,851	reduced error as 25.96%
frame type f 70x180 gray	2,500	2,274	2,291	reduced error as 8.36%
frame type f 70x180 cream	2,850	2,382	2,404	reduced error as 15.64%
				The holding inventory amount reduced As 17.95% by average

If we use the pattern as explain before, It can help a company to decrease of forecasting error as 17.95 by average. And the number of value which receive from math model shown that the using amount is nearly with the real use amount and can be used for considered data, planning the navigable product and planning for suitable job of company as study case.

### CONCLUSION AND RECOMMENDATIONS

From the research of forecasting moving average 4 periods compare with exponential it provide the result that moving average in 3 periods is the most close with real used value more than originally forecasting method of company .Therefore the moving average 4 periods can be applied in planning of raw material purchasing to be correct with demand, however for the method's effective is depend on others factors such as economics politic, competitor etc.

For the point of knowledge advance for using or do research by before using the moving average 3 periods and 4 periods compare with exponential it should be tested with each company testing group one more time to approve of suitable error value and can be applied for highest efficiency. The company was able to use the method and analysis for next operation in order to determine how to decrease costs of Logistic in both internal and external organization, including help to decrease damage from the mistakes of management. From the forecasting found that have to use many kinds of technique to help executive team in making suitable decision and must realize about following cost objective with correctness.

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## A Study of Factors Affecting to Influence on The Selection of Thai Ornamental Fish Export Service Providers.

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**Abstract:** This research aimed to study priority of factors influencing selection of transportation firms of Thai ornamental fish exporters and compare level of importance of factors influencing selection of transportation firms of Thai ornamental fish exporters, as classified by company background. The survey research methodology was used. The research population was ornamental fish exporting companies in Bangkok and Nakhon Pathom and the Krejcie and Morgan's table was used to determine the sample size. The sample, then, was 66 companies derived by simple random sampling. The research instrument was a questionnaire and the statistics used for data analysis were frequency, percentage, mean, standard deviation, one-way ANOVA, Scheffé's LSD test and content analysis. The research results showed that, in selecting transportation firms, Thai ornamental fish exporters gave importance to financial aspect at the highest level. In other words, they gave priority to the suitability of transportation cost. The factors with a high level of importance were the aspects of speed, safety, facility, reliability and punctuality, and personnel. As for comparison of level of importance as classified by company background, it was found that overall the companies with differences in term of the registered capital, period of operation, and number of time to use the service differed in factors influencing selection of transportation firms with a statistical significant level of .05.

*Keywords:* Transportation Firms, Exporting Company, Ornamental Fish.

### INTRODUCTION

The businesses of exporting ornamental fish in the present are still opportunities to expand export markets, demanding in the global market tend to expand continuously; according statistics results that in year 2013 ornamental fish industries have a worldwide export value of about \$ 350 million (UNcomtrade database, 2014). Thailand is third in ranking that exporting value is about 40 million US dollars (Department of fisheries Thailand, 2014) and 12.80 percentages in market share. The ornamental fish export industries export about 75 countries in global trade (UNcomtrade database, 2014).

Ornamental fish exporting companies operate with core business activities which related to packaging and repacking procedure including inventory management that ornamental fish exporting companies are receiver from middle man as called Customer's Perspective then ship products to customers overseas as called Supplier's Perspective. There is main support exporting activities in ornamental fish companies. However, at present occurs high competitive in the markets condition, so the ornamental fish exporting companies concentrate on the ability to compete in the markets more for existing business in long term including outsources from other company which is expertise each parts activities in exporting. The ornamental fish exporting companies usually use Freight Forwarder service or shipping agent companies who provide transport ornamental fish service from company to airport, booking and arrange customs clearance documentation.

Efficient transportation is not only able to receive and deliver ornamental fish to right time but also products must are good condition without damage or dead including costs should be appropriate. In addition, efficient transportation is also corporate image building to their organization. So customer satisfaction and reliability in service can meet the needs of their customers that are very important to establish competitive advantage at the present (Kraiwit Sintukammoon, 2017: 4). Because when customer dissatisfaction and distrust in service, organization will not able to maintain their business. This is reason why researcher interested to study factors influencing selection of transportation firms of Thai ornamental fish exporters and advices the results of study to provider services firms for improving and determining strategies management compete and run business with more stability.

### RESEARCH OBJECTIVE

1. Study to the importance of factors influencing the selection of transportation service provider of Thai fish exporters.
2. Compare level of importance of factors influencing selection of transportation firms of Thai ornamental fish exporters, as classified by company background.

### LITERATURE & THEORY

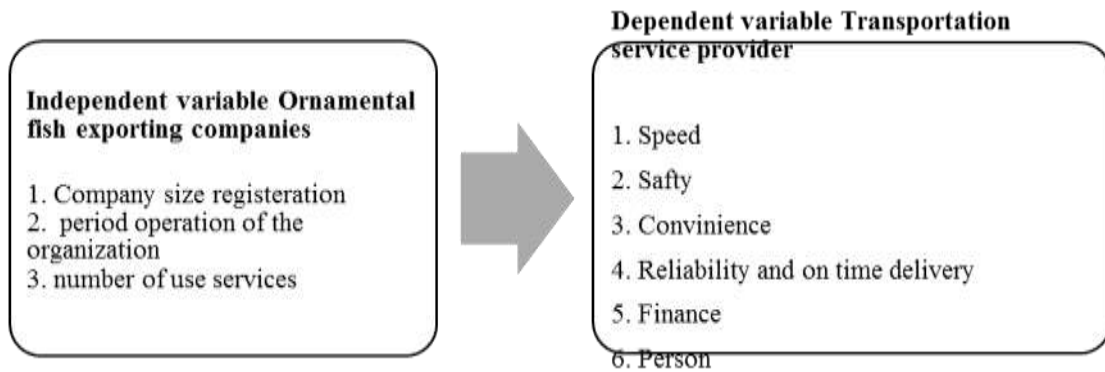
Researcher review relevant theories and literatures to adapt conceptual frameworks and create instrumentation research by classified concepts and theories as below;

1. Theory of transportation, efficient transportation performance as follow (Thanasan Khangsopha, 2014 : 243). 1) Speed 2) Safety 3) Convenient and Kumnay Aphipahschayasakun (2007 : 108) said the efficient transportation consists of 1) Speed 2) Economy 3) Safety 4) Convenience 5) Certainty and punctuality, the efficient transportation means entrepreneurs will accomplish transportation purposes management by considering speeding, economy, safety, convenience and others that influence archive goals and meet customer's satisfaction.

2. Theory of service is concepts mean a procedure in organization to meet the needs of other people in right time to be happy, convenient and satisfaction in this procedure. Buyer attempts to find quality of services to building trust in buying of location, person, material tool, communication, brand and price. All of these, services provider must to provide to their customers

for ensure that make them can quick decision making as follow (Siriwan Sarirat. (1988 : 95-96). 1) Place, must be able to build reliability and convenient to contact person 2) People, staffs must have good personality, good looking smiling, speak polite communication to customers impress and trust. 3) Equipment, office equipment must be modern and new to provide fast service to customer satisfaction. 4) Communication material, communication Materials, advertising materials and advertising materials must to relate to offer sale service and customer characteristics. 5) Symbols, brand or trade mark provide services and should have a good definition of service for consumers to call the well-known name. 6) Price, setting price of services should be appropriate to the level of service, and should be easy to classify.

3. Related research found that the factors influencing the selection of logistics service providers can be summarized that automotive components manufacturer group the most concerned safety is very importance. Because of safety is core of all activities if occurs any damage will impact to products and services directly. That means their customers will claim compensation for their products and services but the damaged products and services may have an impact on other parts involved in logistics activities in the next processing. So may necessary to stop the process, which have a lot of hidden costs. (Tichthong Tongnak. 2013 : 43 ) They also concentrate on marketing, equipment and technology, person and finance. Person problems are lack of knowledge, products expertise skill. Quality service problems are sloe delivery not meet customer’s need. So, that can create conceptual framework as follow.



RESEARCH METHODOLOGY

Population

Population for this research is executive of ornamental fish exporting companies in Bangkok and Nakorn Pathom. In Bangkok has 32 companies and in Nakorn Pathom has 39 companies, total is 71 companies (Department of fisheries Thailand, 2014)

Sample Group

Sample group or this research is executives of ornamental fish exporting companies in Bangkok and Nakorn Pathom by random sampling method considerate to probability and simple random sampling. However, this method is suitable for sample grouping is small size and has roster. Researcher used Krejcie and Morgan’s table to determine the sample size is 66 companies

Research Instruments

The instrument used in this research is questionnaire divided by 4 parts with open end and close end question. There is created from related theories and concepts. The instrument was considered and revised by a professional and it is tried out 30 questionnaires with sampling group of executive of ornamental fish exporting companies for testing reliability of questionnaires instrument in Rating Scale. The result of this testing that the reliability of this questionnaires is 0.840 in level of Coefficient Alpha means the questionnaires can be used.

Gathering Information Methodology

This research, researcher gathered information as follow.

- Step 1 requested the letter of cooperation to response the questionnaire to executives of ornamental fish exporting companies in Bangkok and Nakorn Pathom.
- Step 2 sent 66 questionnaires to sampling group and received back in 30 days.
- Step 3 Checked the questionnaires are completed.
- Step 4 Classified of data to analyze in next process.

Analysis Information

When questionnaires data is collected and checked the questionnaires are completed. Then gave the rating and brought processing data by computer that is analyzed statistically.  
 Questionnaires Part 1: General information questions of ornamental fish exporting companies and bring the data calculate to Frequency and Percentage of variable.  
 Questionnaires Part 2: Transportation service management questions of ornamental fish exporting companies and bring the data calculate to Frequency and Percentage of variable.  
 Questionnaires Part 3: เป็นคำถามเกี่ยวกับ Attitude’s hiring company to factors influencing selection of transportation firms and bring data calculate to Arithmetic Mean and Standard Deviation.

RESEARCH RESULT

Factors influencing selection of transportation firms of Thai ornamental fish exporters in priority. The first is finance, it is most important especially transportation cost is reasonable, discounts condition and payment times.



The result of analysis of compare level of importance of factors influencing selection of transportation firms classified by data of Thai ornamental fish exporters and hypothesis testing.

*Hypothesis 1*

The difference of Company size registration, will affect to different selection of transportation firms.

*Table 1 comparison the difference between factors influencing selection of transportation firms of Thai ornamental fish exporters classified by Company size registration.*

Factors influencing selection of transportation firms of Thai ornamental fish exporters	P-Value
Speed	0.034*
Safety	0.000*
Convenience	0.000*
Reliability and on time delivery	0.013*
Finance	0.000*
Person	0.427
Total	0.022*

*\* statistical significance 0.05*

*From Table 1 result that there are all difference in each factors with statistical significance 0.05.*

*Hypothesis 2*

The difference of period operation of the organization, will affect to different selection of transportation firms.

*Table 2 comparison the difference between factors influencing selection of transportation firms of Thai ornamental fish exporters classified by period operation of the organization.*

<b>Factors influencing selection of transportation firms of Thai ornamental fish exporters</b>	<b>P-Value</b>
Speed	0.700
Safety	0.000*
Convenience	0.004*
Reliability and on time delivery	0.126
Finance	0.011*
Person	0.074
<b>Total</b>	<b>0.014*</b>

*\* statistical significance 0.05*

*From Table 2 result that there are all difference in each factors with statistical significance 0.05.*

*Hypothesis 3*

The difference number of use transportation services, will affect to different selection of transportation firms.

Table 3 comparison the difference between factors influencing selection of transportation firms of Thai ornamental fish exporters classified by number of use transportation services

Factors influencing selection of transportation firms of Thai ornamental fish exporters	P-Value
Speed	0.313
Safety	0.001*
Convenience	0.003*
Reliability and on time delivery	0.275
Finance	0.002*
Person	0.116
Total	0.045*

\* statistical significance 0.05

From Table 3 result that there are all difference in each factors with statistical significance 0.05. Thus, this research can describe that the results of comparison level of importance of factors influencing selection of transportation firms of Thai ornamental fish exporters. There are classified by Company size registration, period operation of the organization and number of use transportation services of Thai ornamental fish exporting companies, the results found that there are all difference in each factors with statistical significance 0.05.

### DISCUSSION

The difference of factors influencing selection of transportation firms of Thai ornamental fish exporters, result is the difference of Company size registration affect to different selection of transportation firms. That means it depend on different company size registration if it is medium size company will give priority to having a network of various transportation mode for supporting together, information checking back immediately, following up transportation status, having responsibility to products such as buy transportation insurance to their customers and products information recording, maintaining client confidentiality including informing news to their customer more than small size companies. There is relate to research of Pattarakorn Tongyam (2007 : 90) studied factors influencing the selection of logistics service providers of automotive components manufacturer group in Eastern Industrial Estate, the results found that large and medium size company need more responsibility of products and services than small size company. Also related to research of Pharinton Sricongchot (2008 : 89) studied the behavior and decision of the users of container transportation services provider in Thailand , Malaysia and Singapore route, the results that users have different level of decision making to selection of transportation service providers, insurance of loss or damage goods and one stop services providing

### CONCLUSION AND RECOMMENDATIONS

Problems and solution about transportation services, most problems of Thai ornamental fish exporters is delivery not on time that because transportation service providers have to deliver many places or because of staffs. The second problem is convenience and speed of service may cause by staff do not well know the route to delivery, service providers lack of connection or outsources for supporting together or lack of services which continues to delivery. In addition, they face problems about lack of communication in providing accurately information to their customers such as they cannot know the products are reached to their customers, service providers communicate wrong information to customers affect to send wrong products to them. So that make Thai ornamental fish exporting companies need to have a precise communication system and also need service providers guarantee the damage of products when it is damaged. Including problem about transportation reasonable costs and number of trucks are not enough to customer’s need but not so much.

### ACKNOWLEDGEMENTS

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## Study of Improving the Quality of Operations, Appropriate Parties :A Case of Terminal in Laem Chabang, Thailand

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**Abstract:** This research is quantitative research objective is to (1) to study the business services company warehouses (2) To study the factors of a quality operation Side storage, Side delivery, Reliability, Service staff (3) to find suggestions on improving the quality of the company's operations, A case of Terminal in LaemChabang. Using research tools is the query the statistics used for data analysis were frequency, percentage, mean and standard deviation a total of 60 sets. The quality of warehouse operations overall was at the highest level ( $\bar{x} = 4.32$ ,  $SD = 0.24$ ), considering It is found that the quality of the storage level is the best ( $\bar{x} = 4.40$ ,  $SD = 0.41$ ) ranked second. The service staff ( $\bar{x} = 4.39$ ,  $SD = 0.31$ ) 3rd reliability ( $\bar{x} = 4.28$ ,  $SD = 0.45$ ) and 4th on delivery ( $\bar{x} = 4.20$ ,  $SD = 0.40$ ) respectively Suggestions on improving the quality of operations side delivery. The proposals are as follows (1.) the employee must have expertise in the delivery of the goods (2) Communication with the customer. (3) Document preparation (4).Coordination with drivers

**Keywords:** Quality, Feature Operations, Warehouse.

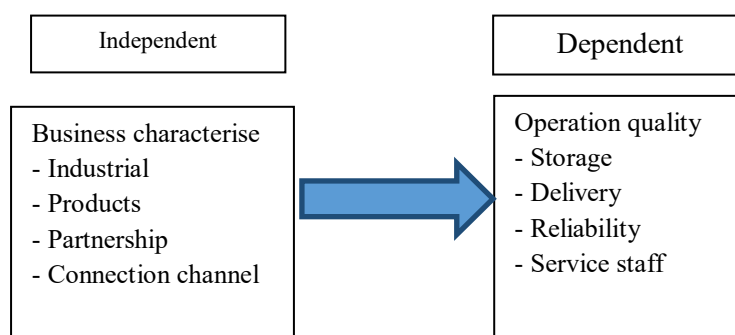
### INTRODUCTION

Maritime transpiration is an important mode of the international trade system. Since it has low transportation costs and suitable for large quantities or volume, sea freight is mainly shipped in Thailand. LaemChabang Port is a major trading gateway in Thailand, which it plays an important role in the country's economic development. By connecting Thailand to ASEAN in which provides vessel and shipping services in Southeast Asia. Currently, maritime transportation has become more popular, thus increasing the number of customers who want to use the service. As a result, many products have to go through the warehouse process, causing delays in the work. For example, the problem of non-systematic storage has led to operational errors and delivery problem. Therefore, the service needs to increase the customer reliabilities and the service staffs. However, a company in LaemChabang Port is looking to improve the quality of operations which has varied service. This is the reason that this research focus on the development of quality operations to suit with the company's business in LaemChabang Port. To study the quality of operations, storage, delivery, reliability, and service staff to find a proposal to improve the quality of operations of a company in LaemChabang Port.

### RESEARCH OBJECTIVE

- (1) to study the characteristics of warehouse service for a company in LaemChabang Port company.
- (2) To study the factor of operations quality for a company in LaemChabang Port. In terms of delivery, reliability, and service
- (3) to find suggestions for improving the quality of operations for a company in LaemChabang Port.

### RESEARCH FRAMEWORK



### LITERATURE REVIEW

#### *Concepts and theories*

This research focused on the development of quality operations to suit the business. Quality operations Requirements or conform to requirements, quality of design and operation. Operation is a study to analysis, determination of practices and the process control (inputs or resources). In order to effective in form of goods or services. Quality in the concept of practitioners and academics, there is no generally agreed definition of it, since different definitions of quality are appropriate under different circumstances (Sebastianelli and Tamimi, 2002; Ojasalo, 2006). (Ojasalo, 2006; and Zu et al., 2008) described the five basic quality definition was (the transcendent approach; the product based approach; the manufacturing based approach; value- based approach; and the user-based approach). These approaches have been adapted, refined and expanded throughout the literature to define quality.

The efficiency can be achieved under the conditions of maximizing the results of an action in relation to the resources used by comparing the effects obtained in their efforts and measuring the effectiveness requires then comparing the two. (Diana Marieta MIHAIU.2010) Wattanarungsun, P (2015) Increasing Performance Efficiency of Employees in 4-Star Hotels in Siam Square (87 pp.) The purposes of this research were to study the performance efficiency of employees in 4-star hotels in Siam Square area and investigate obstacles and recommendations for performance improvement. 218 questionnaires for employees and interviews with 3 executive officers were analyzed. Employee's performance efficiency was revealed to be high ( $X= 3.96$ ). From analyzed information, approaches to improve the performance efficiency were summarized as followed: (1) provide authority to promote division of labor, allowing employees to participate in decision making process and systematically analyze the causes and find appropriate solutions (2) set clear organizational goals and assign responsibilities appropriately (3) develop capacity building for employees to fill vacant positions if necessary. The obstacles related to employees were as followed: (1) Response to customer needs (2) employee's responsibility (3) foreign language communication (4) hiring process of employees and interns. To overcome the mentioned obstacles, hotels should improve the hiring process and encourage trainings e.g. customer service skills in 2015, followed by Chinese in 2016. Executive officers should address immediate errors and endorse policies, encouraging employees to obtain skills to accommodate different position if needed. Services and accommodations should be adapted to suit Chinese customers. Chief of each division should closely supervise subordinates to minimize errors and encourage employees to improve their skills or try different positions with similar requirements. Employees should be more attentive, especially tasks involving servicing customers, and be educated regarding Chinese culture.

(Debpitak, K. 2016) The Value Chain Affect Performance In The Businesses of Exporting Fruits Processed Enterprises of Thailand on The World Market (92 pp.) This research has purposed to study a value chain that affect toward an effectiveness of processed fruits business by Thai exporter in the global market. Questionnaire was used as a tool for collecting data and samples in this research. Also, the research was used a simple random for 60 business owners who export a processed fruits. The statistical methods used: Percentage, Mean, Standard Deviation, Simple Regression Analysis, and Multiple Regression Analysis. From the study had found that, the most respondents were female, graduated a bachelor degree, and being a middle executive position. Mostly, they were producers who export to Asian market, and the most popular processed fruit was pineapple. The result of hypothesis has found that the value chain affected the effectiveness of processed fruits by Thai exporter. Once, took into consideration by divided into small factors of value chain has found that human resource management was the most effect to a business's effective. The rest were sourcing of export, import, marketing, and sales respectively.

Xiang Liu et al. (2014) had studied on the optimization of ultrasound rail defects detection for improving safety and efficiency in rail transport. The damaged rail is the most significant cause of freight trains in the United States. Therefore, the reduction is a very important issue for the US railways and railroad administration. Current practice is to detect rails to detect defects using non-destructive technologies, such as high frequency auditory detection. Determining the optimal track frequency is critical to the efficient use of resources, efficient management of infrastructure, and increased safety benefits. Reducing the risk of derailment, the cost of performing vehicle inspections, repairing rail defects, and delays in all relevant trains are affected by the frequency of track inspections. However, no previous research has included all these factors in the integrated framework. This research aims to develop an analytical model to find the pros and cons among various factors related to the frequency of rail defect detection in order to increase the safety and efficiency of train use. The analysis shows that the best inspection frequency will vary according to traffic density, age of train, reliability of technology, monitoring and other factors. It is used to help develop better and more effective infrastructure management policies and practices.

Sadraoui, Mchirgui (2014) studied on supply chain optimization management in information system development. Supply chain concepts have become a concern due to global competition and increased customer demand, as companies seek to improve the industry's performance in terms of cost, delay, adaptability, diversity, and traceability. Therefore, data must be available in real time in the supply chain and can not be achieved without integrated software systems for supply chain management. Members in the supply chain must work together to share information to improve customer satisfaction. The purpose of this article is to present the impact of information systems on the performance of SCM with a framework that is based on predictive control with the predictive module. The relationship between information systems and supply chain management (SCM) For this purpose, we have developed a new model used to control model predictions, once accepted as a standardized approach to industrial control and Process This article attempts to explain the relationship between supply chain management and information systems. The proposed framework determines the effectiveness of the methodology and the impact of accuracy on predicting the overall control effect of the supply chain.

Anon Wongchieng (2002) studied the techniques to increase the quality of small and medium size hotel business in HuaHin. The objective of his study was to study the quality operation business in the hotel. The main factors were customer and process balance, the equilibrium of customer service, staff and process. For hotel feature was age and standard of hotel in which it related to the operation quality. The suggestions for hotel development were technology systems and training to develop knowledge and skills in the workplace. Kittititikanrat (2013) studied the quality of work performance Sunshine International Co., Ltd. The purpose of his research was to study the level of opinions on the quality of employees' performance affecting the production planning department. Personal factors were gender, age, education and age. The sample size of the sample was 70%.

Regarding to previous researchers found that the quality of the organization's operations must be improved continually. In order that to made the maximum benefit, work fully, to produced quality work in a fixed form and always accepted new concept and keep developing. By using the space and resources in the organization, it is most cost-effective, and the organization can apply the methods of operation to meet the objectives for achieving the goals. It will result in the organization that improved the quality and efficiency of the operation quality development.

Chimusoro et al. (2017) study on the effect of supply chain management on the operation of rail passenger transport systems: a case study of passenger rail transport from 2009-2015. Supply chain management in the implementation of Passenger Transport Company in Southern Africa This case analysis uses data from desktop research in the PRASA Annual Report 2009-2015, as well as the No. 2 organizational plan. From 2015-2019, successes and challenges found in the organization will be analyzed. The areas to be analyzed include technical skills, decorating programs, patronage growth, customer satisfaction, and passenger safety among others. This article covers the impact of supply chain management (SCM) in general companies.

Performance analysis of the risks and disruptions caused by various supply chains that undermine supply chain performance. And promoting the use of best practices in supply chain management.

Smith, Kyriakidis, Majumdar, Ochieng (2013) studied on the impact of the European rail traffic management system on human performance on rail operations. Safety in the operation of the railway system depends on several internal and external factors. Including rail traffic rules, infrastructure, reliability, stocks of rolling stock, corporate safety and human factors. Railway systems in Europe, North America and Australasia have been significantly improved in technology to increase capacity and efficiency. Europe is implementing the European Rail Traffic Management System (ERTMS). However, switching to an automated traffic management system will require changes to the rolling stock infrastructure or operational procedures, or all three. On the operational stage, this document shows that train drivers, signals and controls affect the maximum safety of the rail network. Therefore, the reliability and integrity of the rail network security mainly depends on human factors, especially the performance of human operators. This performance has been affected by many factors, which are known as PSFs, which have a communication deficiency of more than 90 percent of the incidents in conventional rail systems. This study examines the influence of ERTMS and, in particular, the Global Mobile-Communications (Railway) (GSM-R) system in the operations of education providers. 74 train accidents before and after using GSM-R from many European railway organizations. The findings address communication-related factors that affect the performance of human trains in traditional railways and improve them based on the existing PSF railroad taxonomy. Plus of GSM-R usage in carrier operations.

## RESEARCH METHODOLOGY

After the concept was collected, theories and previous research were the guide tools to used in the study from the conceptual framework of this research. The data was collected by following these steps: The research instruments were both open and close ended questions. The questionnaire was divided into 3 parts, 1) Business characterise 2) Operation quality 3) Suggestions.

Researcher had created tools to collect data. The steps were as follows

- Study concepts and theories from academic papers, textbooks, websites, and related research of similar nature to bring information from various sources as a guideline to create a questionnaire.
- Analyze the objectives, content and structure of the research to determine the guidelines and scope of the questionnaire.
- Create a draft questionnaire, by defining the scope and scope of the question in accordance with the objectives of the research.
- Bring the draft questionnaire to the advisor for review, consideration and correction, and provide the experts with knowledge and experience in the application of information system program and air transportation service. By statistics research and consider the questionnaire for 3 persons to review and make further recommendations. As well as content validity. Understanding and using the language to evaluate the results of the decision to find the Index of Item Objective Congruence (IOC).
- Complete a complete questionnaire for use in the research sample.

The researcher selected the questions with the IOC value of over 0.6 as a question. As well as improving the questionnaire was clear and comprehensive for the purpose of this research. The researcher used a questionnaire that was subjected to expert review and tried out the sample with the similarity to the sample with the similar characteristics.

The data analysis was a statistical computer analysis program. Descriptive statistics includes frequency, percentage, mean and standard deviation were applied.

## RESEARCH RESULT

Survey Research, by using 60 questionnaires to collected data from sample who used the warehouse.

Part I Business characterise was industrial, products, partnership and connection channel

Part II Quality production of warehouse in LaemChabang Port was storage, delivery, reliability and staff.

Data analyzed by using SPSS and statistic was  $\bar{X}$ , S.D.

Summary

Part I the majority of 23 representative represented 38.3% of the businesses. The main products were 38.3 agricultural products and the long-term partnership was 3-5 years with 26 companies, 43.3%. For the connection channel was 28 companies by 46.7 % introducing.

Part II the quality factor of warehouse operations was at the highest level ( $\bar{X}$  =4.32, SD=0.24). The storage was highest level ( $\bar{X}$  = 4.40, SD=0.41), the secondly was service staff ( $\bar{X}$  = 4.39, SD=0.31). The reliability was the third level ( $\bar{X}$  = 4.28, SD=0.45) and delivery was at the low level ( $\bar{X}$  = 4.20, SD=0.40), respectively.

Summary and discussion

A study of business characteristics that affect the quality of warehouse operations in storage, delivery, reliability and service staff. The results showed that the customers who came to use the service had the highest level of opinion on the quality of their storage operations. Staff, reliability and delivery in descending order affecting a company in LaemChabang Port. When considering in detail about this, the results are as follows.

### Storage

The quality of the operation found that the customers (Ayasanond C, 2018) who came to warehouse service had the highest opinion in terms of storage and considering factors in each of the following categories in descending order. 1. The storage of goods in the system. 2. Clear classification of goods. 3. Storage of goods is safe and 4. There is sufficient space for storing the products. The company wants to know the level of quality.

### Service staff

The quality of operation of a company in LaemChabang Port shown that the customers who came to the warehouse service had the highest opinion in the aspect of the service staff and the factors in each of the following areas, in descending order. 1. Employees were knowledgeable and can be given advice on various matters. 2. Employees were polite and fluent. 3. Employees were professional in solving problems. 4. Dress appropriately good personality. As mentioned above, the company wants to know the level of quality.

*Reliability*

The quality of operation of a company in LaemChabang Port found that the customers had the highest opinion on the reliability and the factors in each of the following aspects, in descending order. 1. The company assesses or evaluates the concrete work and they have the right to evaluate the service. 2. The Company constantly develops the quality of the service process. 3. The company has a clear and standard working procedure and 4. The company has a quality and efficient tool. From the above mentioned, the company needs to know about the level of operation quality.

*Delivery*

The quality of operation of a company in LaemChabang Port shown that the customers in the warehouse service had the most opinions on the dimension of delivery of goods and considered the factors in each of the following in order of descending order (Ayasanond C, 2018) . 1. Deliver the goods according to the document. 2. Deliver the goods in full amount. 3. No damage and 4. Delivero9y on time. From this point of view, the company wants to know the level of quality, operation and operation problems, which was in line with the research of Studied on the effect of logistics management efficiency on the advantages. The competitiveness of the food industry in Thailand has been highlighted by the importance of high level of customer satisfaction. The place and the goods were not damaged in any way

SUGGESTION

The result shows that almost responders rate the lowest delivery comparing to the average of four dimensions.

The researcher suggested guidelines for improving the quality of operations;

1. The employee must have delivery skill to avoid the delay, is to create job description to be guide for training employee delivery skill.
2. To make the exact date and time with customers and charged the fine from the customer who make delayed inventory over time.
3. To prepare product in advance with directing documentation for the customer before due time.
4. To coordinate with the deliver staff for the delivery time to avoid traffic jam.

*Future research suggestions*

1. To get feedback from customers and stakeholders for improving products and services to respond consumers' requirement.
2. Studies specifically on delivery dimension, it is the most important of inventory operation, in order to improve operation of the company to respond customers' requirement and be able to compete.

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## The Marketing Strategy Development of Cultural Tourism: A Case Study of Thung Bua Daeng Floating Market at Banglana, Banglen, Nakhon Pathom

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**Abstract:** This study aims (1) To study the level of motivation in tourism of cultural tourists. (2) To compare the level of motivation in tourism of cultural tourists; and (3) the marketing strategy for promoting cultural tourism in Thung Bua Daeng at Bang Len, Nakhon Pathom province. Use quantitative integration research. And qualitative. Using quantitative sampling from accidental sampling. The research instruments were both open and close ended questions. For data analysis, descriptive statistics includes frequency, percentage, mean and standard deviation were applied. The evaluation results of the applications performance, it was found that (1) Level incentives in the tourism market of tourists visit Thung Bua Daeng Floating Market at Banglana overall, are moderate and considering it was found that the motivation is moderate on all sides. Sorted by following; travel, in tourism attractions, service, facilities and public relations. (2) Compare the level of incentive travel traveling tourism market Thung Bua Daeng Floating Market at Banglana by personal factors that tourists with sex, age, education, occupation, income and marital status have different incentives for different tourism Thung Bua Daeng Floating Market at Banglana statistically significant at the .05 level at the tourists domiciled different level incentive travel market capital is no different. (3) A guideline for the development of a community-based cultural tourism marketing strategy in Thung Bua Daeng market at Banglana, Banglen, Nakhon Pathom province. Community tour Finance or Budget There should be support from local or district administration. And the relevant agencies. They should be grouped together to provide coordinated and informative assistance. Link to other attractions. To build the next network.

*Keywords:* Marketing Strategy, Cultural Tourism, Floating Market.

### INTRODUCTION

Cultural Tourism is the factual one of tour that focuses on tourism. Related to Heritage, tradition, succession and culture attracted. There are many museums, galleries, theaters, musicals, folk music, folk rituals, crafts and other activities. This is a very important part of the culture (Kongsawat Juthamas, 2007). Tourism has meaning as well. Man-made attractions include historic landmarks, ancient objects, artifacts, museums. Assembly outstanding career venues, traditions, local handicrafts, local arts and crafts also the way to live.

Tourism in Nakhon Pathom There are many researchers. The study and the potential of Nakhon Pathom. In terms of tourism, such as Boonkum Podjana(2013), we have studied the development of ecotourism. Ayutthaya Waterfront Market in Nakhon Pathom The study shows that Nakhon Pathom Province has potential tourism resources in terms of location, atmosphere, culture and cooperation of people in the area. As with the research of Fangsang Duangsamorn (2009), a study of social capital and route planning was conducted. Cultural tourism of community in Salaya district municipality. Nakhon Pathom the results of social capital analysis revealed that the residents of Salaya district community were closely related. It will be seen by people in the community to do activities. Traditional merit the unique of the Salaya, such as boat racing traditions, children's day, Songkran festival. As well as help In addition to supporting activities or activities such as weddings, weddings, etc., and the community of Salaya. Meetings are held at the Floating Market, which is a unique lifestyle of the local community. The life of the Thai people in the past as well. It is of interest to both Thai and foreign tourists. The food is sold. Local souvenirs. It is a place where tourists visit a lot. Currently, the floating market is becoming more and more popular, making the floating market a more attractive place in many provinces. Thung Bua Daeng floating market at Bang Len is located on the edge of the big red lotus. The area is 44 rai, 24 rai of lotus pond that can travel all the year.

### OBJECTIVES

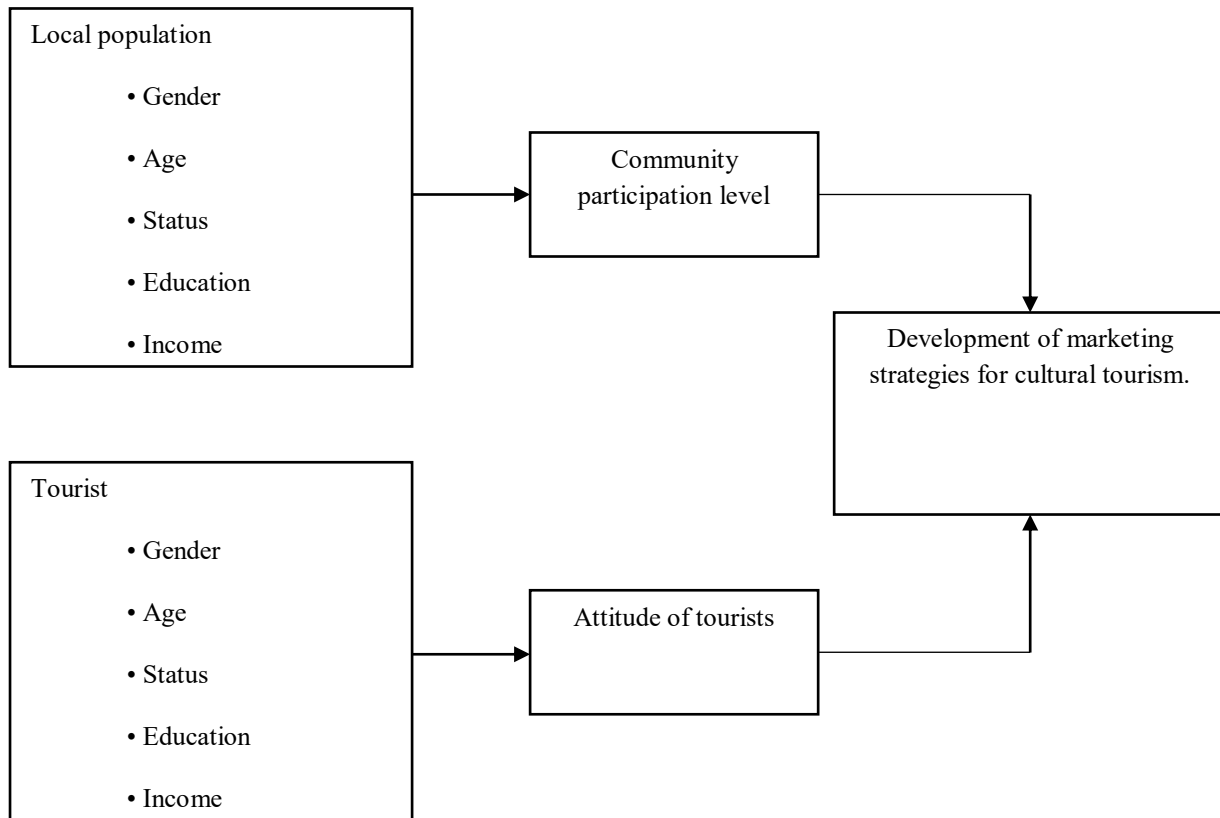
1. To study the level of motivation in tourism of cultural tourists in case of Thung Bua Dang Floating Market at Bang Len, Bang Len, Nakhon Pathom.
2. To compare the level of motivation in tourism of cultural tourists in the case of Thung Bua Daeng Floating Market at Bang Len, Bang Len, Nakhon Pathom by personal status of tourists.
3. To study the marketing strategy in promoting cultural tourism in case of Thung Bua Daeng Floating Market at Bang Len, Bang Len, Nakhon Pathom.

### CONCEPTUAL FRAMEWORK

Based on the study of the literature and related research, the researcher set the conceptual framework in the research on the development of marketing strategies for cultural tourism: a case study of Thung Bua Daeng floating market at Bang Len.

Banglana, Nakhon Pathom, Thailand. The research framework was set up in two aspects: the level of local community participation and the attitude of tourists towards the Thung Bua Dang Floating Market at Bang Len, Banglana

Each conceptual framework has both quantitative and qualitative dimensions, adding a dimension of research covering all aspects of the study.



HYPOTHESIS

1. The development of marketing strategies for cultural tourism in the attitude of gold tourists should develop the most environmental aspects.
2. The development of marketing strategies for cultural tourism in the attitude of entrepreneurs should develop the most economic aspects.
3. Gender, age, domicile, occupation, income, education Factors related to attitude toward marketing strategy development, cultural tourism of gold tourists.
4. Gender, age, domicile, education Occupation The duration of stay is a factor that correlates with entrepreneurial attitude.

RELATED LITERATURES

Klinmuanwai Kittisak (2011) Research on tourism development in Lampang community. To study the opinions of tourists and the public on the development of community tourism. Including the government's tourism management policy and the opinion of community leaders in Lampang. To use as a guideline for tourism development in Lampang. The results showed that tourists. Most respondents had a need for community-based tourism components. facilities Travel Programs Tourism activities and value added services. The majority of the respondents rated the tourism development in Lampang community at a high level and wanted to participate in planning. Tourism management, community and tourism resources in the community were at a high level. In addition, most interviewers agreed that planning for community tourism should be planned.

Munklun Piyaphong (2011) The objective of this study was to investigate the status and potential of tourism resources of three floating markets in Nonthaburi Province, namely Wat Sangsiritham Floating Market Wat Takian Floating Market Compare the potential of such attractions. It also provides tourism management advice based on 4 main factors, including 12 indicators. As a whole, all three floating markets had average scores. Sainoi Floating Market had the highest average score of 3.67, followed by the Wat Takian Floating Market with an average score of 3.50 and Wat Sutiritham Floating Market with the lowest score of 3.25. That the resources. Wat Sutthisan is the most prominent. The average score was 4.33, in particular, access to the tourist with a maximum score of 5.00, while in the service. Sai Noi Floating Market has the highest average score of 3.50 and is outstanding in the tourism services, with the rating of 4.00 for the management. Floating the Sai Noi. The average rating is the same. The value of 3.00 and the outstanding in the group and the participation of people in the community with the rating of 3.00 equal and in marketing, it is found that Wat Takian floating market has the highest average. 4.25, distinguished from other tourist destinations in relation to other tourist destinations. The score is 4.00.

Rattanapong Preeyaporn (2013) Study on the development of tourism in communities and places around the canal floating market. The samples used in this study were divided into the respondents were 400 Thai tourists who came to the community around Klong Lad Mayom floating market. The data were analyzed for percentage, mean, standard deviation T test statistics One-way analysis of variance and analysis for Pearson product moment correlation coefficient. Interviews the total number of participants was 6. The research found that the tourist attractions should be able to accommodate the increasing number of visitors, such as adding parking places and bathrooms. Should promote more marketing, such as advertising. Informs visitors to use the service. Manage the environment for the community to be beautiful. Provide activities that allow visitors to participate in everyday activities of the community. It should instill a sense of community in protecting the environment of the community and canals. People involved in community attractions. There should be policy planning. To develop serious tourism. Both short and long term. To develop tourism as a way of life for the people in the community.

Sawangphol Kalayakorn (2015) The purpose of this research is to study the participation of people in the community on the tourism market Sai Noi, Sainoi District, Nonthaburi. To study the attitude of tourists towards Sai Noi Floating Market, Sainoi

District, Nonthaburi Province. And to explore the attractions and study the development of Sai Noi floating market for sustainable tourism. The population are 50 traders in the Sai Noi market and 400 tourists in the market. Merchants participated in a low level of participation in acknowledging the most problematic issues. Based on the hypothesis testing, the research found that Traders with different periods of stay and income will have different levels of involvement in planning. And participation in different actions. Participation in acknowledgment of problem study. Participation in planning activities. Participation in monitoring and evaluation was not significantly different. On the attitude of tourists, the tourists have attitude towards the market. Moderate the tourists have the attitude of travel, transportation and facilities most. Stay in good Tourist Attitude towards activities and attractions in travel. The attitude of product quality and price were moderate. Based on the hypothesis testing, it was found that tourists with personal factors, such as age, status, education, occupation, income, Sex differences were not different in tourism.

## RESEARCH METHODOLOGY

A study on *The Marketing Strategy Development of Cultural Tourism: A Case Study of Thung Bua Daeng Floating Market at Banglane, Banglen, Nakhon Pathom* by Accidental sampling. (Questionnaire) The questionnaire was designed to be a closed-end question and an open-ended questionnaire with five criteria and a rating scale. The most agreeable was the agreement. With minimal the tourists are Thai tourists. And entrepreneurs focus on qualitative data collection. Data were collected from 200 Thai tourists and entrepreneurs at Tung Bua Daeng Floating Market, Banglane, Banglen, Nakhon Pathom Province. The questionnaire was distributed to the sample. And the data was collected. The data is processed from a computer. The software program (Vanichbuncha Kalaya, 2016) helps in data analysis. The statistics used for data analysis are: Frequency and percentage Use of demographic characteristics. And the behavior of the tourists who are tourists. And entrepreneurs Use the mean and standard deviation. To explain the satisfaction of using the service. It also includes analysis of problems and obstacles in using the services of the users. The standard deviation is used in conjunction with the mean. The t-test, one-way analysis of Variances, and chi-square were used at the 95% confidence level for the results. The instrument used to collect this data was a questionnaire related to satisfaction. Consumption behavior and behavioral trends. Creating research tools. This is a questionnaire with the following tools in the following order.

1. Research and research papers. Related to satisfaction, consumption behavior and behavioral trends. This is a guideline for creating a questionnaire.

2. The data collected from the collection of the questionnaire. This is a guideline to create a questionnaire, divided into 4 sections.

Part 1: the questionnaires of the respondents were gender, age, occupation, marital status, monthly income and education, this is a closed-end response question.

Part 2: Development of marketing strategies for cultural tourism: A case study of Thung Bua Daeng floating market at Banglane, Banglane, Nakornpathom Province. The questionnaire was a rating scale method. Likert scale questions. The level of interval measurement is divided into 5 levels.

Part 3: Information on Strategic Factors, Marketing mix, Cultural tourism 8 P's

Part 4: Suggestions and Opinions of Tourists at Thung Bua Daeng Floating Market, Bang Len, Bang Len, Nakhon Pathom. Open-ended Questionnaire was used to measure the Ratio Scale.

## DATA ANALYSIS

*Data analysis Descriptive statistics are used.*

- Percentage for the analysis of data from questionnaire 1, demographic characteristics, and section 4 are the main reasons for using the service. The person you come to use. The person who influences your decision most. And most of the day you use the service.

- Find the average (Mean) for the data from the questionnaire. Tourists traveling to Thung Bua Daeng Floating Market, Bang Len, Nakhon Pathom, Thailand. Part 3: Factors related to strategic factors of tourism marketing mix of Tung Bua Daeng Floating Market at Bang Len, Bang Len, Nakhon Pathom 8 P's Part 4 is the frequency of service. And the average cost of travel.

- Standard deviation (SD) for the analysis of data from the questionnaire. Part 2: Customer satisfaction in marketing mix. Part 3: Factors related to strategic factors, marketing mix, cultural tourism. 8 P's Episode 4: Suggestions and additional opinions of visitors to the promotion of Thung Bua Daeng floating market at Bang Len, Nakhon Pathom.

*Inferential Statistics the statistics used in hypothesis testing are as follows.*

- Independent t-test was used to compare the mean of two independent samples. To test hypothesis # 1 on gender

- One-way analysis of variance (F-test). One-way analysis of variance was used to compare the mean of the two groups to test hypothesis 1: age, occupation, marital status, income Month and Education Level

- Statistics coefficient Pearson Product Moment Correlation coefficient to find the relationship between two independent variables. To test hypotheses 2, 3 and 4.

## RESEARCH RESULT

1. Motivation level for tourist arrivals. Cultural tourism: A case study of Thung Bua Daeng floating market at Banglane, Banglen district, Nakhon Pathom province. When considering each aspect, the motivation was at a moderate level. They can be arranged as follows. The attraction in tourism. Service Facility and public relations respectively.

2. Comparison of tourist incentives for cultural tourists: A case study of Thung Bua Daeng floating market, BangLon, BangLon, NakhonPathom, by personal factors. It was found that tourists who had sex, age, education level, occupation, income and marital status were different in level of motivation for cultural tourism: the case of Thung Bua Daeng market at Bang Len, Bang Len, Nakhon Pathom was significantly different. The level of motivation for tourism was not significantly different among tourists with different domicile.

3. Guidelines for promoting cultural tourism Community Participation in Cultural Tourism: Case Study of Tung Bua Daeng Floating Market at Bang Len, Banglen, Nakhon Pathom. Tourism development must be developed with volunteerism in

tourism development in the community. Finance or Budget There should be support from local or district administration organizations and related organizations. Materials, equipment or items. Language and communication are important tools in communicating with foreigners. Management Nakhon Pathom Province. Not far from Bangkok. They should be grouped together to provide coordinated and informative assistance. To be a network and to support each other and the way to promote participatory tourism of the community should have a press conference to allow people in the community to play a role in the management of the market. And promoting local products to market.

## DISCUSSIONS

Research hypothesis 1 Sustainable development in the attitude of tourists should develop the most environmental dimension. In the study of data and data analysis, Laipun Nittarin (2007) and Sirimanaphong Wanee (2006) were found that the development of environmental dimension was lower than that of social dimension and dimension. Because of the flood. The development of the inconvenience of the sign is unclear. Lapluechai Patchara (2003) has insufficient waste disposal equipment. There are no signs of trash.

Research hypothesis 2 Sustainable development approaches in entrepreneurial attitudes should be most economically developed. The study found that attitudes towards environmental dimension development were lowest. That is, the sustainable development approach in entrepreneurial attitudes should develop the most environmental dimension. Because of the economic. Entrepreneurs continue to make a profit from the continued popularity of tourists. However, entrepreneurs began to worry. Environmental factors will affect the income of the operator. This is in line with Sayananont Worapat (2009). Ecotourism Management by Community at Klong Lad Mayom Market, Taling Chan District, Bangkok It was found that the occurrence of the floating canal floating market had a significant impact on the economy of the people in the community as a result of the increase in income. The villagers in the community have increased their income from the transition to being a merchant.

Research hypothesis 3 Age, Domicile, Occupation, Income, Education, Travel style and the number of visits was correlated with the significance of the development dimension at 0.05 significance level. The youngest gold will pay attention to the environmental dimension most. High income tourists who work for private companies. And tourists who come for the first time. These people consider the importance of environmental management. Should work for sustainable development. However, when considering high-quality samples, the social dimension is most important. Because these people are concerned about their identity. And the identity of the community will be lost. Gender factors were not correlated with developmental weight. In accordance with Thongma Weerapol and Aumnat Prajet (2004), the definition of community tourism is a common learning experience for local people and visitors. To maintain the resources of the existing community. It is a tool for community development to be sustainable.

Research hypothesis 4 Age and education level Factors related to attitude toward marketing strategy development for cultural tourism: A case study of Tung Bua Daeng Floating Market at Bang Len, Bang Len, Nakhon Pathom. Age is between 21-40 years, it should be developed in a more environmental dimension. Like a high school education or equivalent. Diploma or equivalent and the bachelor. Because these entrepreneurs are through the education system and have to follow the environmental impact. And be aware that if the person is involved. Poor environmental management will reduce their performance. This is consistent with the research of Thianum Nakrob (2009) who studied the strong community from the floating market management. Phra Pradaeng District Samut Prakarn Province It has been found that creating a brand image for tourism is one of the factors that make market management and success. The result of Research hypothesis 4 was similar to the work of Kevin Wongleedee, Sakul Jariyachamsit, Opal Pongpanitch Surarak (2011) that studied the Satisfactions of Marketing Factors that Make American Tourists Choose to Revisit Thailand. Their results found that Thai foods, cultural and Thai beaches were the most attractive for the tourism image, respectively.

## SUGGESTIONS

*1. Suggestions from this research consider the issues. To achieve success in tourism were.*

1.1 The findings show that there is lack of incentive and lack of budget for tourism development. Local and state agencies should motivate tourist attractions and budgets in all areas. To solve the problem of different people to create common understanding.

1.2 From the results found that. Cultural tourism is lacking. Consequently, stakeholders should improve and develop tourist attractions, landscapes / attractions. Facilities for tourists, cleanliness, parking facilities, car parking facilities. Including the orderly, beautiful, clear signs.

1.3 The results of the research. Cultural tourism is still lacking in public relations and personnel development. Therefore, the agency and the concerned parties should continue to disseminate the publicity of every part of every agency to participate in the promotion of tourism or the host as a joint. There are newsletters through travel brochures. Including public relations through mass media. And the website. Tourism development should be developed. Development Officer / Local Guide Provide knowledge, skills, service with the mind in tourism and have good manners.

1.4 From the results found that. Cultural tourism still lacks the knowledge and communication with tourists, so agencies and related people should provide educational institutions as an academic source. In training with the relevant stakeholders, operators, officials and guides. To provide travel and language knowledge. Including a central academic coordination unit. Organize local training courses and provide important language training to personnel of Bang Luang market.

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## Factors Affecting to Decision of Transportation Service at State Railway of Thailand

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**Abstract:** This research is study factor that is affect to decision of rail transport in Hualumpomg Station. The methodology of this research includes 3 parts. The part 1 relates to theory, research and model in rail, transportation and marketing. The part 2 is population selection. The population is customers who use the rail to delivery products to another province in Hualumpomg station. They are approximately 1,500 person per day. The sample group is selected by Taro Yamane method at 95% confidence level. They are 316 person. The part 3 is results and suggestion. The questionnaire was distributed from June to November 2017. The results shown that most people who used rail transport was male at 72.50% and worked as officers at 60%. They used rail transport because the cost was the cheapest at 90%. The frequency of transport was every month at 69%. The customer selected Hualumpomg station as the employee were support and had good service. Promotion and physical evidence were not attractive for customers. Process of transportation should be solved and applied technology in track system for example barcode and RFID systems

**Keywords:** Rail Transport, Hualumpomg Station, SRT

### INTRODUCTION

The State Railway Transport (SRT) is a rail transport in Thailand. It has station all part of Thailand. It has passenger and products transport. The mission of SRT in 2017, it enhances the service of SRT. Suan Sunandha Rajbhat University is the consult of SRT. The researcher is in charge of quality and develop the staff of SRT for 1 year. The part of research is study affecting factors of rail transport in Hualumpomg station.

Harris K. Elaine (2010) suggested that the services to the customer, then there are many factors that impede services to clients. It is a corporate management services when the problems occur. Then customers are difficult to access or do not have the staff to assist customers. Device support is not effective. The policy that there is no flexibility towards customers. The terms in the user's manuals, warranties or difficult to understand. Customer service process. That is not up to date, and the company lacks an understanding of the unique value from the service. A part control's services or contact face to face with customers directly. However, there are other obstacles, threats, or messages that are associated with the service providers directly, which can be controlled by a service provider. Dedicated to the care of those duties, threat messages include idleness. The lack of communication skills. Time management is not effective. The lack of a good attitude towards emotional state of service providers. The lack of a proper battle baking Lack of skills, lack of control over the tense management authority fully. The customer service and the proportion of employees with abusive customers. This is to deal with the problems mentioned above are that employees provide services to customers must have self-develop assessment.

#### *Technical service expectations of the customer*

1. Knowing the customers, that is to know that a customer who has a passion and what customers don't like
2. Find out the real value that customers really want, and not what the organization already has
3. The Mission of the Organization, communication, customer acknowledges
4. Customer service in accordance with the Covenants given to customers and to meet the expectations
5. Maintain service levels are regularly and do not make promises to customers want. Organizations can not be done because the customer wants to get a good experience every time you visit the service.
6. Customer communications via customer communication paths, such as certain customers may prefer to communicate directly with the employee. Some groups may prefer to communicate via online, etc.

Jamal Naser (2002) suggested that customer satisfaction are feeling better from expectations and customer experience. Kotler (2003) mention that the service is satisfactory to the user service. It will lead to results 3 reasons. Increasing the number of service users. The service will vary depending on whether a user response services individually, or as a response a user and business. This service provider will be required to provide and develop services that are appropriate for the user. To strive the number of users and affect customer satisfaction and retention. Therefore, from a study on improving the service regardless of the 8 factors led to differentiation in service.

Income for organizations or agencies established to provide services. Typically, you need to consider the purpose of a service provider that is a model of organization, non-profit, or not business and specific needs of the individual service users. They should have the skills and abilities to provide services. They focus on quality rather than quantity, or to provide a service that is different from other business differentiation and satisfaction in using the service to.

1. Quality of life in the service and in consideration of the service provider must correspond to the needs of the user. Make the service user satisfaction, because the quality of service measured by satisfaction. Practices are incomplete if an error occurred, it is difficult to make a satisfactory service for users. Providing fast service on schedule is important. Consider the hustle of user services and respond quickly to catch up before the scheduled as needed-such. It should focus on the benefits of service providers or the users of the service do not have enough to think about society and the environment.

#### *The quality of service measurement*

The tools use to assess the quality of service metrics (Hotrawaisaya, 2014). They are 5 aspects as follows;

1. *Reliability: R means a service provider must demonstrate credibility and acceptable in providing services as promised to meet the need of customer. There is no error between service occurs. The indicators of reliability are 5 elements.*

- 1.1 The ability of service providers according to the contract.
- 1.2 The record's data of customers and using the data to improve service.
- 1.3 No error while service
- 1.4 Hardware and tool should be always maintenance.
- 1.5 The number of service provider should be enough for customer.

2. *Assurance: A means service providers need to build confidence so that people feels confidence to use the services. They will receive good services from expertise. This part of assurance service has 4 quality indicators.*

- 2.1 The service providers have the ability and knowledge to provide news and information services as well
- 2.2 The trust and confidence include security in service
- 2.3 The polite and gentle of service providers
- 2.4 The service provider must build confidence and service rules.

3. *Tangibles: T refers to something that will serve as a convenient device. The service providers are professional in service by using the tools of quality indicators in the service of physical.*

- 3.1 Modern equipment
- 3.2 On-site environmental services
- 3.3 Personnel of service providers
- 3.4 availability of the document in the service

4. *Empathy: E means understanding the needs of the recipients of services. That is always important. The service instrumentation on the quality of care services are as follows;*

- 4.1 The service provider empathy to customers who receive the service.
- 4.2 Time service, it shows open and closed service clearly correct.
- 4.3 Channels and the opportunity receive newsletters of organizations.
- 4.4 The service provider is interested in customer needs.
- 4.5 The service provider should have the knowledge and the ability to access data from an extensive service.

5. *Responsiveness: R refers to service provider who serves with dedication, deliberately and carefully, including faster response for people in the service. By having a quality measurement tools in the service of the response,*

- 5.1 There is a rapid response system to provide services.
- 5.2 The service provider are ready and have the knowledge to provide information for people in the service correctly.
- 5.3 The service provider are agility in providing the services.
- 5.4 The service provider are ready immediately when customers need help.

### METHODOLOGY

This research study the affecting factors of rail transportation in Hualumpung station. The methodology includes as follows;

**Population**

The population of this research is the customers who use rail transportation for delivery products in Hualumpung station.

**Sample group**

The sample group is calculated by Tara Yamane method at 95% confidence level. The simplified formula proportion ;

$$n = \frac{N}{1 + N(e)^2}$$

The sample are approximately 316 person and use Stratified Random Sampling. The questionnaires were distributed from June to November 2017 at Hualumpung station. The data is collected and analyzed in percentage, mean and standard deviation.

### RESULTS

The result of this research is summarized in Table 1 and Table 2. There are personal information and affecting factors of rail transport.

*Table 1: Personal Information*

Age	Female	Male
15-20	2	5
21-30	15	20
31-40	60	169
41-50	5	32
50 up	5	3
Total	87	229

Table 2: Factors of rail transportation

	Male	Female
<b>Product</b>		
The product is distributed every day.	3.75	3.50
The time table is various.	3.90	3.50
The delivery is on time.	3.75	2.50
The product is kept safety and clean.	3.00	3.00
<b>Price</b>		
The freight price is reasonable compared with distance	4.75	4.25
The freight price is reasonable compared with package	4.75	4.70
The freight price is clarify.	4.50	3.50
The freight price is reasonable compared with quality	4.25	3.50
The fright price is the most cheapest	4.75	4.75
<b>Place</b>		
Facility for loading	4.00	3.25
Information for transportation	3.50	2.25
Online information	3.00	2.00
Call center	3.00	2.15
<b>Promotion</b>		
Image of SRT	3.00	2.50
Advertisement	2.50	2.50
Discount and promotion	2.25	2.00
Special gifts and cooperation	2.00	2.00
Reliability	2.75	2.15
<b>People</b>		
Staff uniform	3.10	3.15
Hospitality	3.55	3.25
Clearly notice and information	3.75	3.10
Staff service	3.75	3.75
Friendly	3.95	3.80
<b>Process</b>		
Packaging is comfortable	3.25	3.00
Item registration is fast	3.50	2.75
Item collection is correctly	3.75	3.00
The item transport is convenient	3.15	3.00
The item is delivered in right destination	3.50	3.55



<b>Physical Evidence</b>		
Station is decorated clean and beautiful	2.75	2.25
Station has own unique	2.50	2.75
Station has the delivery process	2.75	3.35
Station is clean and safety	2.75	3.00
Station has a capacity to collect the items	3.00	3.10

### CONCLUSION AND FUTURE WORK

The researcher summarized that most customers used rail transportation because of freight price. This is the cheapest price as compared with another transport. Most of them are familiar to delivery items for a long time. However, they prefer information technology and digital screen for tracking system. These can support customers to check all products for security and right destination. The SRT has to focus develop IT and skill of staffs. In the future research should study in heavy items or bogies transport that is the highest profit for SRT.

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## Satisfaction and problems of farmers towards rubber business in Udon Thani

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**Abstract:** This research on the satisfaction and problems of farmers related to the rubber business in Udon Thani has the objective to study the contexts of behavior, opinion, satisfaction, resolution of problems, and suggestions from farmers in Udon Thani. According to the study, it was found that the farmers who are interested in growing rubber discussed the problems of each person and searched for the solutions, and conducted the arrangement of field studies to learn with those who succeed in farming the rubber, which resulted in the increase of knowledge and comprehension. However, the rubber production of farmers is not satisfactory as the price in the market is low, and, In the area, there are a few options with regard to selling the products. The behaviors of rubber farmers in Udon Thani are that they come into contact with dust from fertilizer and receive too much heat due to the sunlight; moreover, the air ventilation in the production process is insufficient for the chemical hazards. The main problems result from: 1) low production, 2) low prices, 3) the information provided by officers and related units is not accessible to all, and 4) the lack of sources of funds and the management for farmers to invest in the farming, including the regular training and meetings of farmers. The problems of farmers originated from the instability of the group, as it has been found to be without a budget to support the expenses. There is only the title and the members without any operations; therefore, the related units should provide the support budget for the farmers so that they can distribute the products of the group without going through an agent in order to reduce the problems regarding the rubber prices permanently. The farmers still lack knowledge and experience in latex tapping, farm maintenance, and producing rubber sheets; and the support regarding production factors is too minimal. In consequence, the training on farm maintenance and protection should provide suggestions about the diseases and the insects to the farmers. In addition, the Department of Agricultural Extension and the Office of the Rubber Replanting Aid Fund should arrange the training and development of agriculturalists in order for them to gain experience and instruction in production technology and rubber management, so that they can improve their career and increase the quality of workers to support the opening of more rubber farms in the future. The findings of the study will help the health personnel understand the quality of life, problems, and obstacles of rubber farmers, and be able to support the participation of the community until it can analyze and set the methods for the life quality development of rubber farmers.

*Keywords:* Farmers, Rubber Farms.

### INTRODUCTION

Udon Thani is a province in the northeastern region of Thailand, where the civilization is regarded as one of the world's most ancient according to the discovery of the habitats and cemeteries of pre-historic people in the bronze age approximately five thousand years ago. Udon Thani has been developed in terms of culture and technology since these ancient times. Furthermore, the area has the interesting multi-cultural heritage because there are many communities that have been settling from the past to the present. Significantly, Udon Thani is a prosperous land of resources, forests, rock gardens, nature, waterfalls, ponds, and rock salt. The prosperity also includes religions and cultures. Udon Thani has an area of 11,730.75 sq.km or 7,331,438.74 rai. or 6.948% of the northeastern region and 2.286% of Thailand. It is the fourth largest province of the region and the eleventh largest province of Thailand. The elevation from the sea level is approximately 385 meters on average. The population on 31st December 2006 was 1,527,562 people with 764,577 men and 762,985 women. The variety of communities has existed since the foundation of Udon Thani when it was called Ban Mak Khaeng until 1938 when Udon Thani was given its present name.

The research is to study the contexts of behavior, opinion, satisfaction, resolution of problems, and suggestions from farmers in Udon Thani. According to the study, it was found that the farmers who are interested in growing rubber discussed the problems of each person and searched for the solutions, and conducted the arrangement of field studies to learn with those who succeed in farming the rubber, which resulted in the increase of knowledge and comprehension. However, the rubber production of farmers is not satisfactory as the price in the market is low, and, In the area, there are a few options with regard to selling the products. The behaviors of rubber farmers in Udon Thani are that they come into contact with dust from fertilizer and receive too much heat due to the sunlight; moreover, the air ventilation in the production process is insufficient for the chemical hazards. The main problems result from: 1) low production, 2) low prices, 3) the information provided by officers and related units is not accessible to all, and 4) the lack of sources of funds and the management for farmers to invest in the farming, including the regular training and meetings of farmers.

### RESEARCH OBJECTIVE

The research on the satisfaction and problems of farmers related to the rubber business in Udon Thani has the objective to study the contexts of behavior, opinion, satisfaction, resolution of problems, and suggestions from farmers in Udon Thani.

### LITERATURE REVIEW

A Study on Farmers Satisfaction and Problems on Rubber Business in Udon Thani Province. The researcher studied the relevant documents and research on the following issues Satisfaction is one of the important factors that affect the success of the work to meet the goals laid out effectively. This is the result of being motivated. Or individual needs in the way he wishes. Researchers have studied the meaning of satisfaction with many meanings.

Siripong Preuthipan. (2016) Behaviors, Marketing Mix Factors and Customer Satisfaction of Riders among Airport Rail Link (ARL), Bangkok Mass Transit System Public Company Limited (BTS) and Mass Transit Authority of Thailand (MRT). This study is to compare behaviors, marketing mix factors and customer satisfaction of riders among Airport Rail Link (ARL), Bangkok Mass Transit System Public Company Limited (BTS) and Mass Transit Authority of Thailand (MRT). The convenience sampling is used with 1,200 questionnaires. Reliability and validity of data are tested by factor analysis

and Cronbach's Alpha before both descriptive and inferential statistics are exploited to find the difference and relationship between independent variables (demographic and marketing mix factors) and dependent variables (riders' behaviors and customer satisfaction). The result shows that most of 3 mass transit rail systems respondents are female, single, an age between 20 and 30 years old, a bachelor degree, pupils/students, and incomes below 5,000 Baht. Behaviors of respondents are 2 times/day in travel frequency, travel time between 8.01 and 10.00 A.M., journey purpose for studying, buying daily tickets, main purpose using the system to avoid traffic jams and to repeat the services. The customer satisfaction of riders is very satisfied (3.80-3.87). Furthermore, in various aspects of customer satisfaction and marketing mix factors, there are mean differences of customer satisfaction and marketing mix factors among 3 mass transit rail systems at the statistically significant level of 0.05

Somyot Navarat (1979) gave the meaning of satisfaction. It is the intensity of the need for one result. That's a good thing. It is the feeling of the person to the agency. This may be a positive, neutral, or negative feeling. These feelings affect the performance of the function, ie, if the inclination is positive. Performance is high. If you feel inclined to go negative. Performance is low. Pinng Poon (1986) said that satisfaction is the feeling of love, willingness, willingness or good attitude of the person he receives from the act. Kitti Priddadilok (1989) states that satisfaction is the sense of pleasure or pleasure that has elements and motivations. And he has responded to his needs.

Studies related research. Prem Viroon Ratchasuwan Meththiothi (2 0 1 4 ) This research aims to study the general characteristics of rubber plantations and the opinions of local farmers. Northeastern Region on the operation and services of the Office of Rubber Welfare Fund, and compare the differences of the opinions of rubber planters towards the operation and service. The Office of Rubber Welfare Fund, which is classified by the general characteristics of rubber plantations and general characteristics. Of different farmers The research found that Rubber growers with the characteristics of rubber plantations as follows. 1 ) Different soil characteristics. Different water conditions Different soil problems And farmers who are and are not members. Rubber plantings in the community have commented on the inadequacy of planting materials. And the material received from the project. 2) Different area conditions. And different soil characteristics. There are insufficient opinions about The number of employees from the project. In giving advice Through the transfer of knowledge needed to farmers. Different proportions and 3 ) different soil characteristics. There was insufficient opinion on the inadequacy of the farmer's survey (2 times a year). Different proportions

## RESEARCH METHODOLOGY

### 1. Type of research

#### *Quantitative research*

Quantitative research is the research that analyzes the quantitative data. In other words, it employs figures for the analysis, conclusion, and presentation. Consequently, this type of research aims at explaining the situation with figures to confirm the quantities instead of an interpretation to explain reasons.

### 2. Populations and Sample Group

The population in the research includes the rubber farmers who are able to tap rubber in Udon Thani. There were 300 persons who provided information. To maintain the quality of the results, the authors applied the sampling to the selection of the sample group.

The hypothesis is a process to prepare the repairmen of the components of the animal feeding machine to gain the capacity for the demand that conforms to the limits of production capacity.

For the data used in the study, the authors selected Udon Thani as the study area due to it being one of the target locations where the rubber growing projects aim at increasing the income and stability of the farmers in the new rubber farms of the northeastern region. There are growing numbers of farmers who are interested in rubber farming.

#### *Data Collection and Research Problems*

Primary data came from the questionnaire in the field. The information includes demographic data such as gender, age, and education, as well as economic characteristics such as education, career, household, size of rubber farm, the status of possessing the land, being a member of the rubber farmer institute, contacting officers, and attending the academic training on rubber farming. Secondary data came from the state sector, the private sector, and the related websites.

### 3. Tools

Research studies require tools for data collection. Sometimes, researchers might consider the existing tools to gather data in accordance with the objective, or if they do not have one, they need to create a new tool, which will help them identify more techniques for data collection because each one has specific characteristics with advantages and limits depending on its method. The researchers need to study and understand the tools in order to select the right one. The five most popular tools are a questionnaire, interview, observation, test, and scale.

### 4. Data Collection

There are two approaches to data collection, which are primary data and secondary data. The steps of collecting data are as follows:

#### *Primary data*

1) Observations are used to study the operations of assembly officers and production officers to obtain the data that is able to indicate the inconsistency problem with the demand, focusing on roller assembly.

2) Interviews are used to ask the operation officers about the operational process and the problems during the operations, for example, during assembly and food production.

Secondary data is information gathered from related documents such as books, magazines, theses, related research, articles from the internet, and company information.

### 5. Data Analysis

Data analysis will examine the integrity of the data obtained from the questionnaire and decode it with the computer program. Statistics for the analysis are as follows:

1) Personal, economic, and social status of the informants. Statistics for analysis are frequency, percentage, mean, standard deviation, and range.

2) Gathering data related to the satisfaction of farmers regarding the activities of the state sector, the private sector, and the farmers. The weight means the score for analyzing the satisfaction and problems of farmers with regard to rubber farming with the set score in accordance with the Likert Scale (referred to in Kispredarborisuthi, 1988 : 249).

## RESEARCH RESULTS

In this research, four levels of satisfaction were identified: 1) To summarize the problems and suggestions of farmers in Udon Thani Province. 2) To study the opinions of rubber growers in Udon Thani Province. Behavior of rubber farmers in Udon Thani 4) Satisfaction level of rubber farmers in Udon Thani province.

The results of the research. Rubber growers in Udon Thani Moderately satisfied with rubber plantation. If training is provided. View more jobs The visitation of staff more often. Educating farmers about rubber plantation maintenance regularly. The level of satisfaction will increase with. Especially if training is provided on how to use fertilizer and pesticide properly. Protecting and preserving rubber plantations Including the supply of cheap fertilizer and funding sources for farmers. Farmers will be more satisfied with it.

1. For the problems and suggestions, the overall satisfaction level is 78.87%, which is at the medium level. The farmers have interest in the rubber farming and discuss and help to solve the problems, but the field studies to learn from the successful rubber farmers will increase their understanding.

2. In terms of opinions, it was demonstrated that the rubber production of farmers is not satisfactory. The price in the market is low while the number of markets provides few choices of where to sell their products. Therefore, the management of rubber farming should be supported for latex tapping, storage, and the founding of the cooperatives to gain power in negotiating with the merchants. The support of the state agencies will lead to achievement.

3. In terms of behavioral context, the behavior of farmers in Udon Thani is that they come into contact with the dust from fertilizer and receive the heat impact from the sunlight. Moreover, the air ventilation when producing the rubber sheets is insufficient. For the chemical hazard, it was found that most farmers are affected by dust from the chemical fertilizers, the mosquito and insect repellent, and formic acid during the production of the rubber sheets. Regarding biological terms, they risk being affected by insect bites.

4. Regarding the satisfaction, it was found that: 1) the rubber production quantity is low, 2) the rubber price is quite low, 3) the responsible units and officers provide knowledge in the specific areas rather than covering all locations, and 4) the source of investment and the distribution of funds for investment of the farms and regular arrangement of the training and meetings among farmers are insufficient.

## DISCUSSION

The results of the study on the satisfaction and problems of farmers in the rubber business in Udonthani Province in four aspects were the problems and suggestions of farmers in Udon Thani. Opinions of rubber growers in Udon Thani. The context of rubber farmers in Udon Thani province. The satisfaction of rubber farmers in Udon Thani province showed that the overall satisfaction was 63.70%, indicating that the research results were consistent with the objectives.

With regard to the research results, it was discovered that the rubber farmers in Udon Thani have the satisfaction towards rubber farming at the medium level. If there is the training or field studies, meetings and visiting of officers, and providing of knowledge to farmers about regularly maintaining the farm, the level of satisfaction shall increase, especially if there is the training on how to use the fertilizer and pesticides correctly, the protection and maintenance the farm, including the resource of reasonably priced fertilizer and funding resources for farmers.

## CONCLUSION

The agriculturalists that are interested in rubber farming have discussed and searched for the solutions, but the field studies to learn from the successful farmers will increase their knowledge and understanding.

The rubber production of farmers is not satisfactory. The price in the market is low while the number of markets provides few choices to sell their products. Therefore, the management of rubber farming should be supported for latex tapping, storage, and the founding of the cooperatives to gain power in negotiating with the merchants. The support of the state agencies will lead to achievement. For their behavior, the rubber farmers in Udon Thani are affected by the dust from fertilizer and receive the heat impact from the sunlight. Moreover, the air ventilation when producing the rubber sheets is not sufficient. For the chemical hazard, it was found that most farmers come into contact with dust from the chemical fertilizers, the mosquito and insect repellent, and formic acid during the production of the rubber sheets. For biological terms, they risk being bitten by insects.

Factors affecting satisfaction

- 1) Low quantity of products
- 2) Low price
- 3) Information from officials and related units are not accessible to all.
- 4) The sources of investment and the distribution of funds for investment of the farms and regular arrangement of the training and meetings among farmers are insufficient

## SUGGESTIONS

In regard to this research, it results in the realization of the satisfaction of rubber farmers in Udon Thani. Thus, the authors would like to provide the following suggestions.

For the farmers, according to the research, the problem is the instability of the groups, which may be founded without the budget to support the expenses, but has only the title and members, and none of the operations brings any benefits. In consequence, the related units should provide the financial support, so that the farmers can distribute their products without depending on the agents or merchants in order to reduce the problem regarding rubber prices in the long term.

In this research, it was found that farmers had difficulty in cutting open rubber. Rubber face is damaged by improper tapping. Therefore, rubber plantation fund staff should provide training to educate. How to tap rubber. Tire opening Caring for rubber latex, as well as diseases that occur, officials should build confidence. Have training to educate Always consult the advisor.

For the problems and suggestions of the farmers in Udon Thani, according to the research, it was found that the farmers still lack knowledge and experience in latex tapping, farming maintenance, producing rubber sheets, and having several production support factors. For this reason, the training on farming methods and protection should be arranged. The farmers should also receive the advice about diseases and insects, while the officers should visit the rubber farms. In addition, the Department of Agricultural Extension and the Office of the Rubber Replanting Aid Fund should arrange the training and the development of agriculturalists to gain experience and instructions on production technology and rubber management, so that they can improve their careers and increase the quality of workers to support the opening of more rubber farms in the future.

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## Supplier Selection in Thai Automotive Industry

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**Abstract:** Now a day the importance of suppliers in the Thai automotive industry have on the success and progress of the industry in Thailand, very little empirical research has so far been performed to examine aspects of the suppliers. This research article is an attempt to investigate the relative importance of relevant factors in the supplier selection decisions. The results show that the relative importance of factor which have been found to affect supplier selection decisions, ranked in order of importance, are product quality, price, after-sales service, delivery time, and product information. In addition, the most influential departments in supplier selection were purchasing, top management, production, and finance.

**Keywords:** Purchasing, Procurement, Logistics, Supply Chain, Thai Automotive Industry.

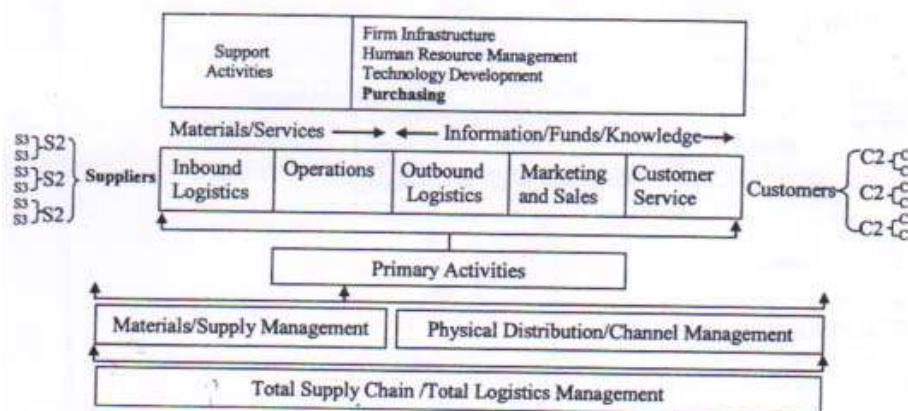
### RATIONAL FOR STUDY AND BACKGROUND

In spite of the importance of supplier selection decisions, relatively few research studies have been conducted in Asia to investigate the topics of supplier selection attributes and relative influence of buying center members. A few exceptions are : a study by Mummalaneni et al. (1996) which examined six attributes frequently used as performance criteria by Chinese purchasing managers in the People's Republic of China to understand how these managers made their supplier choice decisions; a study of Lau et al. (1999) which investigated purchase- related factors and the structure of the buying center in Singapore; and a study of Millington et al.(2006) which interviewed senior and purchasing managers in the People's Republic of China regarding their perception of supplier performance evaluation and relationships. How ever, in the context of business firms in Thailand, no published empirical research dealing specifically with supply selection decisions is found, especially in the Thai automotive industry. This study is an attempt to fill this gap by studying six factors and their attributes used in supplier selection decisions and the relative influence of the persons involved in automotive firms' buying process in Thailand.

### REVIEW OF THE LITERATURES

Purchasing is considered a support activity in a value chain which is composed of primary and support activities that can lead to competitive advantage when configured and executed properly. Figure 1 illustrates a modified version of the extended value chain model. In the value chain, purchasing provides a service to a firm's internal customers and is the central link with outside suppliers that provide direct materials (Monczka et al., 2005).

Figure 1: The Extended Value Chain

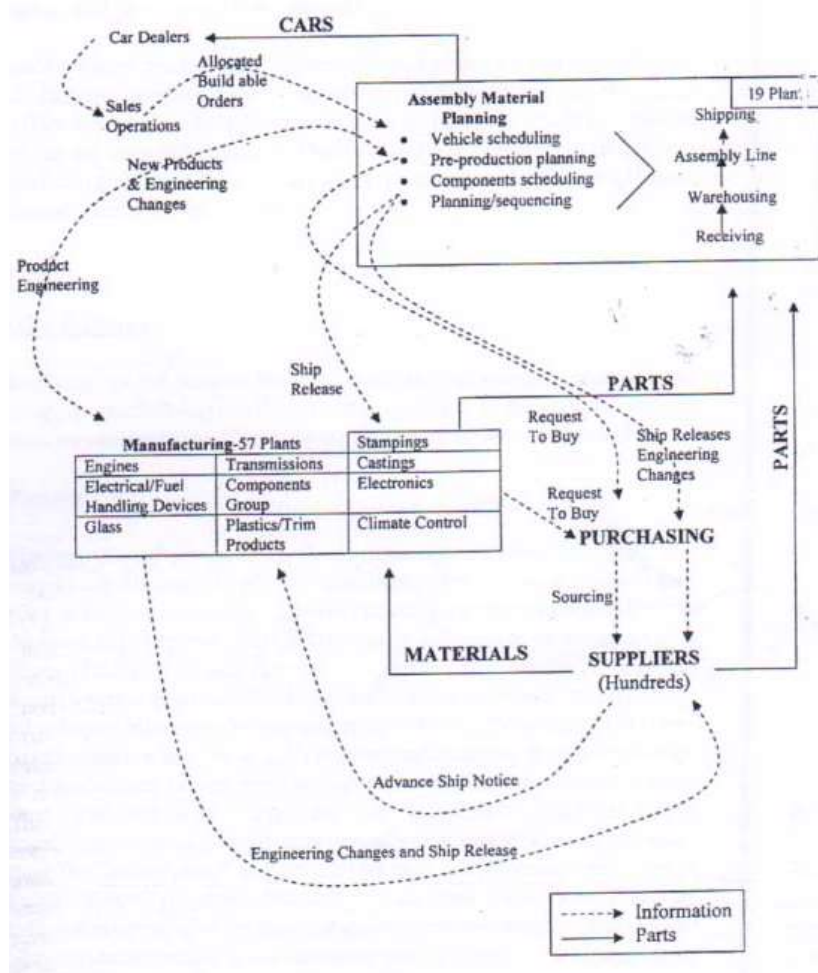


Source: Monczka et al., 2005

In the automobile industry, the process of manufacturing cars involves selecting qualified and reliable suppliers. The materials, planning, and logistics for an automotive company are shown in Figure 2 which demonstrates the complexity of an automotive supply chain. The automotive company's supplier network includes thousands of firms that provide items ranging from raw materials, such as steel and plastics, to complex assemblies and subassemblies, such as transmissions, brakes, and engines (Monczka et al., 2005). Purchasing staff need to regularly communicate and coordinate with other functions in the company during the purchasing process for the acquisition of parts, components, and supplies of the company.



Figure2: *An Automotive Supply Chain*



Source: Monczka et al., 2005

### DEVELOPMENT OF THE PROPOSED MODEL

#### Operationalization and Instrument Development

This part explains how the six constructs derived from previous research were integrated in the proposed model of supplier selection and how the research instruments were developed and operationalized. The dependent factor is the supplier selection decisions which are supposed to be affected by the six independent factors. The six important factors are (1) individual factors, (2) group factors, (3) organizational factors, (4) purchase-related factors, (5) seller factors, and (6) buyer-seller relationship factors.

#### The Proposed Model

The proposed model of supplier selection (Figure 3) is simply a basic relational model which contains merely a dependent variable and some independent variables. The purpose of the proposed model is to simplify the factors that are believed to affect supplier selection decisions in the Thai automotive industry. Intervening variables are not included in the model so as not to complicate the research, in particular the data analysis parts and the survey questionnaire was designed to make it relatively easy and convenient for respondents to fill out. In addition, as the Spearman rank order technique is used to find out the relative attribute importance rankings of the six factors, it is not meant to examine any causal relationships between the six factors/their attributes and the supplier selection decisions.

#### Sampling Design

For this study, the target population consists of 518 automotive firms, all of which are members of Thailand Automotive Institute (TAI) (Thailand Automotive Institute, 2004). Out of the 518 firms, 475 firms or 92 percent are auto-parts producers and 43 firms or 8 percent are auto manufacturers. The sample group comprises 350 member firms of the TAI randomly selected from its list. Sekaran (2000) suggested that if the population size is 550, the sample size should be 226. Thus, the 350 sample firms in this study were appropriate. Two groups of managers of the 350 firms, purchasing and production, were the units of analysis in this study. These two groups were chosen because previous research results show that they were among the most influential and involved in the organizational purchase and supplier selection (e.g. Erickson and Gross, 1980; Johnston and Bonoma, 1981; Jackson et al., 1984; Naumann et al., 1984; Lau et al., 1999).

### DATA COLLECTION METHOD

After the completed questionnaires from the pretesting were returned, they were checked to find out whether the respondents filled them out accurately. Then, 700 questionnaires were sent to 350 sample firms for the study. Each firm received a cover letter and two sets of the same questionnaires, one for the purchasing manager and the other for the production manager. The

purchasing manager and the production manager were chosen as respondents because they are among the most influential persons in the supplier selection process as found in previous research.

## CONCLUSINOS

The importance of vendor or supplier selection has been recognized as a focal topic of research for more than two decades in western countries (e.g. Erickson and Gross, 1980; Jackson et al., 1984; Naumann et al., 1984; Patton, 1996). However, the topics of industrial purchasing, and in particular supplier selection, have received relatively little attention by academics in Thailand. This research project made an attempt to examine the six factors and attributes that have been found in previous studies to affect supplier selection decisions in the automotive industry. The overall results indicate that the six factors and their attributes were relevant for the sample automotive firms. Product quality, price, after-sales service, delivery time, and product information were ranked as the most important respectively by both purchasing and production managers in their supplier selection decisions.

Furthermore, purchasing, top management, and production were mostly involved in the supplier selection while top management, purchasing, and production were ranked as most influential in selection decisions by both purchasing and production managers. The results of this study are in line with those of previous research.

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## Logistics Service Provider Capability of Entrepreneurs Ramps Palm Oil in Suratthani Province, Thailand

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**Abstract:** The purposes of this research were to study the level of relationship administration between supply chain administration of oil palm industry and capability in logistics service, to study the level of administration of entrepreneurs in relationship administration between supply chain administration of oil palm industry and capability in logistics service. Instrument used in data collection from sample was 300 sets of questionnaire who were palm yard entrepreneurs in Suratthani Province. Statistics used in data analysis were percentage, mean, standard deviation and Chi-Square.

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*Keywords:* Logistics, Entrepreneurs Ramps Palm oil, Supply Chain.

### INTRODUCTION

The competition has intensified over the past decade. Corporate executives are under pressure to make the organization more cost effective. Business competition focuses on customer satisfaction. Responding to the rapidly changing needs of customers, and on the basis of low production costs, maximum profitability, produced in moderation. Therefore, it is very necessary to bring the tools to manage the organization efficiently, and the tools that can help entrepreneurs in today's competitive environment.

The objectives of the research are as follows.

1. To study the level of relationship management between oil supply chain management and service capabilities.
2. To study the management level of entrepreneurs in managing the relationship between the management of the oil supply chain and the ability to provide services.
3. To study the personal factors of courier operators and their ability to provide logistics services.
4. To study the relationship between management and service capabilities.

### LITERATURE REVIEW

1. Plan is a part related to the planning of supply and demand, consisting of collection and prioritization of requirements, inventory planning demand for distribution, raw material production, and the overall capacity of products and channels. Deciding on the purchase or production of parts and products. Defining the supply chain Long-term resource planning and capacity business planning production scheduling or cancel the production of the original product. Production line the planning process will provide an overview of the various supply chains before they are implemented.

2. Procurement of raw materials (source) is the part that manages raw material procurement. (1) Procurement of raw materials. (2) Management of the basic elements of the raw material supply. Including the supplier's certification system, raw material and communication, operational data. Quality of supply sources inbound transport engineering systems in various parts, contract for raw material supply to production system, payment of raw materials purchased.

3. Make is the part that manages the operating part of the production system. There are the following components: (1) production operation system it is related to requesting or picking raw materials, raw material handling, production and testing, packaging, storage and delivery of products. (2) Management of the basic components of production. Public utility system production equipment status of production system quality of production system sorting and scheduling production real-time capacity planning.

4. Delivering is the management part in response to orders from customers. (1) Order management consists of the process of entering an order. Bidding documentation defining related product components creating and maintaining customer and product databases, accounting management system, accounts receivable, customer credit, collection and billing. (2) Warehouse management, product management, product packaging and collection (3) management of the basic components of the delivery comply with the rules of distribution channels, rules for ordering quality management of shipping.

5. Return is the management part of the management of the return of goods from the customer. This will include a return on business terms, analysis of product damage.

6. Tangibles, tangible features or items such as materials, equipment, tools, buildings, places, people.

7. Reliability and Trust (Reliability) ability to display the works and services promised in a quality and accurate.

8. Responsiveness, willingness to help and able to serve the user, or customers in a timely manner.
9. Assurance is derived from the combination of competency, courtesy, reliability, credibility and security.
10. Empathy comes from the integration of accessibility, communication, (Communication) and customer understanding. (Understanding Customers)
11. Supply Chain Management is a way to integrate (Integrate) various agencies, from suppliers, suppliers, warehouses and shops. To be effective, the production and distribution of goods must proceed in the right quantity, right place, and right time, with the goal of reducing the cost of both. System to the lowest and still respond to the level of customer service.
12. Palm oil is a single stem palm plant, the stem is about 12-20 inches at the age of 1-3 years, the stem is covered with a leaf base, but at the age of the base, the leaves will fall off, see the stem clear, the surface of the trunk is similar to the palm tree.

## POPULATIONS AND SAMPLES

Population studies is entrepreneurs to pour all the oil palm courtyard patio 3 3 8 (Office technician measuring suratthani 2 5 5 3) The sample in this research have the sample by the method Krejcie and Morgan's success to open the table comparing the sample by sector in each district. From the number of yard number 3 6 3 yard pour pouring samples number 3 0 0 yard so no Teda aberration analysis of data collected, the data already made studies to analyze quantitatively by studies, have taken the information from the questionnaire, received a number of 3 8 5 series to run statistical analysis include frequency, percentage, and average, and then summarizes the findings presented in table's characteristics.

Part 1 . General information about respondents by gender, age, occupation, income analysis classified by level of education. Data analysis will use the descriptive statistics (Statistics Description) to use the statistical percentage (Percentage).

Part 2 . Information about supply chain management, information about relationships between the industry's supply chain management, Palm, water.

The results of the study can be explained. Hypothesis testing in this study, the researcher used a confidence level of 95% or a statistically significant level of 0.05. The hypothesis were as follows.

Supply Chain Management with Logistic Management Capabilities. The relationship of the study. Logistics management is part of the supply chain management system, with the goal of minimizing the cost of the entire system, and still respond to the level of customer service. This is in line with the research conducted by the Thailand Research Institute of Science and Technology (2008). The research project was to study the logistics and supply chain of agricultural products in order to expand export markets to Asia. Export logistics must be systematically linked, both domestic and international transportation. It is found that the proportion of logistics costs in road transport from production to export and from port to destination is quite high. However, international transportation through Laos, Vietnam and China in the future can reduce this cost. This makes land transportation more advantageous compared to shipping. Land transport also has the advantage of being fast, due to the reduced transit time. The quality of goods on the destination market improved, price adjustment of the market up to the situation. The key factor to make a profit for all levels involved, especially farmers. It also corresponds to Chayanan's research. Paritak et al. (2009). Study on Increasing Competitive Advantage through Logistics Strategies in the palm oil industry, the use of logistics strategies is important for increasing the competitiveness of the palm oil industry, including the use of strategic relationships between buyers and sellers, continuing the relationship.

There is an emphasis on the importance of each other, and communication is good enough. It has a direct effect on the organization to work. The impact of collaboration between organizations is to create a link between organizations. Improving collaboration requires planning, benefit sharing it also has to be the use of information technology to assist in the work, which includes the use of technology. In organizations, the development of information technology, communication with information technology in this relationship, it is found that this factor results in the organization to work in the moment. The ability to adjust flexibility and speed. These issues lead to higher competitiveness, both advantages in cost reduction, rapid cost advantage the oil palm industry is capable in higher competition. Therefore, the development of organizations through the use of logistics strategies is very important. It is an important factor in the business. What happens when a workflow is modified? To suit the organization. However, the analysis can indicate that the organization will operate to succeed with the advantage over competitors. Logistics helps to manage and is consistent with the research of Apichart. Saha-Padaeng et al. (2008) Study on Supply Chain Management system of longan in Thailand the methodology for evaluating supply chain operations has been developed. The concept of SCOR model is combined with the Value Chain, starting with an overview of the supply chain, and from those involved in the supply chain from farmers to exporters and to assess the relevant agencies in all sectors of the supply chain, including farmers, middlemen, drying plants, shipping companies, import-export companies.

Value chain analysis is divided into main activities and support activities. inbound logistics, operations, outbound logistics, and supportive activities in the supply chain. The study found that most organizations have the best logistics operations, ie, delivering goods to suppliers in the supply chain, especially in the wholesalers. (Wholesalers) are implemented, support factors include advertising, public relations the lowest customer service, especially among farmers. The research also identifies problems and obstacles to the longan supply chain, productivity is uncertain. The operation of the state was unsuccessful, longan yields no exact standard. This is in line with the research project on supply chain management and logistics of tapioca products in Thailand. (2009) It has been found that the improvement of the multimodal transportation system is of great importance to the development of the system. Thailand's logistics costs are very high compared to other countries (18.6% of GDP in 2008, while developed countries have logistics costs of 9-11% per GDP. ). Due to the fact that most of the freight in Thailand still rely on road transport, it does not use a form of transport with low transport costs with high fuel efficiency (such as rail transport and water transport) in a large

proportion. So if the government can improve infrastructure, the efficiency of multimodal transport services, especially for rail transport the performance will be good.

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## Factors Affecting the Decision to Using Ranong Port Transport Service in Ranong

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**Abstract:** The purpose to study general characteristics of the entrepreneur or consumers factors influencing the decision to using service including product, service, price, service rate, locations, distribution channels, marketing promotion, person, staff, service process, physical environment. All factors comparison affecting to service decisions classified by general characteristics of entrepreneur. In this research will guidelines for solution and improving the using decision.

The results showed that 1. General characteristics of the entrepreneur or consumers the most found that selling product/ general product. The business were big size and big income (sales exceeds 1,000,000 Baht / year). Businesses run 1-5 years. The locations of most businesses are in Ranong. Sea freight service or rent a warehouse directly end fuel and lubrication. On average, the amount of 1-50 tons is used between 1-2 times per week and sends the goods to Myanmar. 2. Factors influencing the decision to using service found that the importance degree of consumers consideration Ranong Pier about that all marketing mix factor of Ranong Pier were in high level when considering the location that is important to consider at high level. In each aspect, were personnel, secondary staff then service process, locations, channels, product, service, physical environment price, service charge and marketing promotion, respectively. Comments and suggestion to development of the service from the interview found that product and service it is the largest pier in the province and open for a long time respectful and transportation is safe. In part of price and service charge found that a satisfied customer and the service rate is neutral due to the government came into control service charge. The location and distribution channels location of the pier is close to with entrepreneur. It facilitates and reduces time and cost of transportation. Moreover, quick contact and shipping costs credit are in the satisfactory level. For the marketing promotion are rarely and contact is slow in sometimes

*Keywords:* Using Service Decision, Ranong Pier, Marketing.

### INTRODUCTION

The port is a place to accommodate ships and cargo in the loading and unloading. At present, the port is increasingly active as a part of international distribution. Because of, the volume of goods to transport through the ports, both import and export is 90 percent. Ranong Port is West Coast Port. Ranong Port managed by the Port Authority of Thailand. The Cabinet has resolved on March 25, 2003 to allow the Port Authority of Thailand to manage Ranong Port. It is the main port in Thailand's Andaman Sea linking trade routes with countries in South Asia, Middle East, Europe and Africa. By the reason of physical condition and location which located in the East side. Later, the Department of Water and Marine Transport has constructed of the first phase of Ranong Port, which received two 500 GT at the same time, Ranong Port was completed in 2000, while international trade in South Asia continued to expand. In the second phase of the terminal was built to increase the capacity of 12,000 DWTs of cargo and container ships by agencies that involved to development of infrastructure and utility services and also international trade organizations. Ranong provinces joint to development of Ranong Port in the second phase has been developed to support the expansion of cargo transportation to achieve the goal of the Ranong Development Strategy as a hub for cargo transportation on the Andaman coast. Ranong Port Phase 2 officially started in July 2006 (Ranong Port). (Port Authority of Thailand, 2561).

However, Ranong Port has many obstacles and not achieving in the target such as the problem of transport network, which many customers are requires and select on road transport. As a result, the cost of goods transportation is high and there are not enough good factors to attract the entrepreneur or customer to select service of Ranong Port. Meanwhile, the government has not cleared time frame for developing a transport infrastructure linking to Ranong Port. There is no industry support and no concept to support the Dawei Port project in linking goods to Laem Chabang Port as part of the East-West Economic Corridor in the GMS framework. Operators or service users Importers - Exporters have not decided to use Ranong (Tanithsorat, 2559).

Therefore, the researcher is aware of the factors that affect the decision to use transportation at Ranong Port. It also has to support in many aspects such as the physical condition of entrepreneurs and customers in part of route, speed, safety, and price. Moreover, other factors that need to increase the capacity for continuous expansion and include cooperation with relevant agencies. Furthermore, the researcher can also study in this research to improve more efficiency.

### RESEARCH OBJECTIVE

- To study the factors influencing the decision to use Ranong Port service.
- Comparison of Factors affecting decision making of Ranong Port transportation service, classified by general characteristics of entrepreneur.
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### LITERATURE REVIEW

Study the factors affecting the decision to use Ranong Port transportation service, at Ranong Province. The researcher studied concepts and theories are following below.

2.1 Concepts and theories of transport the meaning of transport means the movement of people, goods or services from one location to another. In the case of moving people, it is a matter of transporting most passengers (Somchai Prathomsira, 2010). According to (Somchai Pathomsiri, 2009) there are a lot of the objectives of management transportation. For instance, to reduce costs it is the critical goal of all logistics management that including transportation. The entrepreneur often set the first goal that good transportation management will reduce the cost in the business. It may be fuel, labor or truck maintenance.

2.2 Concepts and theories of service, according to Kotler and Armstrong (2000: 438). The quality of service is one of the significant ways to differentiate in the business. In the business of service who wants to win the competitors must deliver high quality services over the counterpart. What customers expect is based on past customer experience, word of mouth, and advertising of service businesses. After the customer receives the service, the customer will compare the service that the customer receives with the service that the customer expects. If the customer service is lower than the service the customer expects, the customer will lose interest in the service provider. If the customer service is equal to or exceeds the service expected by the customer, the customer will return to the service provider again.

2.3 Concepts and theories of response, according to Duanpan Krishchanchaisiritin and Tungchai Somboonwiwat (2011) said that the production of Quick Response Manufacturing (QRM). The concept of QRM has been developed following the principle of competition by time. Moreover, the flexible of production are important because the concept of sensitivity in response has been criticized as a very theoretical principle but lack of implementation. Rapid response production concept is the competitive principle by the time in practice. The principle of rapid response production is to focus on lead time and time in each activity.

2.4 Concepts and theories of consumer decision-making, the process of purchasing decision of the consumer as the process of choosing two or more alternatives. Consumer behavior is considered in relation to the decision-making process both psychologically and physically, Schiffman & Kanuk (1994). According to Tariq, Nawaz & Butt (2013) says that buying decisions are promised by counting where customers will buy again. Whenever the customer needs a product, purchasing decisions are very important because the companies want to increase sales of specific products. For the purpose or increase their profits intention to buy illustrates the impression of customer retention. There are certain functions of the brand that influence the buying decision.

2.5 Concepts and theories on marketing mix. The marketing mix it is a set of tools that management can use to urge sales and it is an important component that many businesses need to share to meet the needs of the target market, Philip Kotler (2003).

## RESEARCH METHODOLOGY

This research study about factors that influencing the decision to use transportation services in case of Ranong Port in Ranong Province. This research is a mixed method, consisting of quantitative research and qualitative research. The details are following in below,

In the qualitative research will focus on three steps, first about In-depth interview using structured interviewing style with key respondents, such as entrepreneurs or users about 10 people. Next step afterwards, record the interview, summarize and write the report. In the last step analyze of data from the content. In the quantitative research will focus on entrepreneur or customer about 1,063 people. (Ranong Port Transportation Statistics, 2560). The sample calculates the appropriate sample size. There are 1,063 operators or subscribers using Taro Yamane's formula (1967), which is referred to in Tanin Art Charuk 2012: 45 - 48).

## RESEARCH RESULT

The researcher presented the results of data analysis according to the objectives of the research and the test hypothesis. The presentation is divided into 4 sections.

Part 1: General characteristics of entrepreneur or users of Ranong port services, by frequency distribution and percentage. The results from data illustrate about characteristics of the entrepreneur and customers. The sample of this research was 300 persons.

1. The type of business was found that respondents who use Ranong Port. The majority of products sold (140 items), accounted for 46.67%, followed by other businesses (98%), or 32.67%. Retail and wholesale (40%), accounted for 13.33%, and retail / wholesale (22%) accounted for 7.33%.

2. The size and income of the business were found that the respondents who use the Ranong Port.

Most of the size and income of the business is large (sales exceed 1,000,000.- year), or 66.67 percent, followed by medium (sales exceeding 200,000 baht but not exceeding 1,000,000 baht / year). 74 persons or 24.67% and small (sales up to 200,000 .- Baht / year) 26 persons or 8.67%

Part 2: Factors influencing the decision to use Ranong port transport service in Ranong province. It found that the level of importance of the respondents, which is Ranong Port Operator About the Marketing Mix Factor of Ranong Port It was found that the importance of each aspect was at the high level in all aspects: personal / staff (= 4.47, SD. = 0.51). (= 4.44, SD. = 0.57). Place / distribution channel (= 4.43, SD. = 0.46). Product / = 4.38, SD = 0.54), and marketing promotion (= 3.92, SD = 0.54).

Part 3: Comparison of Factors Affecting Decision Making of Transport Service in Ranong Port, Ranong Province by General Characteristics of Employees by Using Statistical Analysis. From the data the different types of business. The opinions on the factors affecting the decision to use the Ranong Port Transportation Service in Ranong Province were different at the 0.05 level of significance. From the data it is difference between sizes and revenues. The opinions on the factors affecting the decision to use the Ranong Port Transportation Service in Ranong Province were different at the 0.05 level of significance.

Part 4 Interviews with entrepreneur or customer to use Ranong port. The researchers used the interview method by choose direct the customer it is a good thing to know what entrepreneur are going to do and how to improve and develop of services. The details are as follows below;

1. Product and service factors the opinion of the entrepreneur or customer to use the Ranong port. Because of, it is the largest port in the province, opens for a long time and transportation is safety as well.



2. Price and service rate factors the opinion from the customer and entrepreneur to use Ranong port, Because of price and service rates are satisfied and neutral. The government has come to control the tariffs.
3. Location or distribution factor from the opinion of the customer and entrepreneur to use Ranong port. Overall, the location of port is close to entrepreneur, facilitating and reducing the time and cost of transportation. To contact and can make the credit for shipping costs in a satisfactory level.
4. Marketing promotion factors the opinion of the customer and entrepreneur to use Ranong port. Overall, the publicity marketing is rarely available and also the ease of contact sometimes is slow.
5. Factors in service process the opinion of the customer and entrepreneur to use Ranong port. Overall, due to the location between the port and the place of loading and unloading is far. Consequently, the product is delay. It is complexity of loading goods because port with the goods (empty cabinets) is far so it is wasting time.
6. Personnel factor the opinion of the customer and entrepreneur to use Ranong port. Overall, the staff at the convenient and fast service moderately satisfied. It is convenient and fast to contact and provide services at a relatively good level. Sometimes the staff lacks the skills to answer and solve problems. It takes time to contact multiple departments.
7. Physical environmental factors the opinion of the customer and entrepreneur to use Ranong port. The total area of the port is not enough and the yard is far from the production and empty containers, so it takes waste time to load goods. On the other hand, due to the proximity of the location the geographically, it is the nearest port compared to the distance of the establishment.

### CONCLUSION AND FURTHER STUDY

This research will study about the factors of affecting to decision to use Ranong port. From the data it was found that the importance issue to decision use service of Ranong Port. The overall marketing mix of Ranong Port was at a high level. It is important to consider at all levels, such as the person, staff, the service process, location, product, physical, price, service rate and marketing promotion. According to research by Paisan Pattprathum (2556), the factors affecting the decision to use air transportation services in Phranakhon Si Ayutthaya province were studied air cargo users have decided from pricing, services, marketing promotion, physical characteristics and the process of service. In overall of the service was at a high level. According to Duangjai Jandasang(2558), the factors affecting the decision to use the outbound freight service of the Bangkok Port Authority were investigated. The research found that the reliability of Bangkok Port users was the best. According to Pichit Akdadee, Chansidae Khun Sunthorn (2559), studied the important factors to use transportation services of UEN Logistics (Thailand) Co., Ltd. It is important point to choose the transportation service U.S. Logistics (Thailand) Co., Ltd. Overall is a high level. The most important is reliability followed by safety, transport time, convenience, capacity and reduces cost. In the other significant issue to decision use service of Ranong Port is classified from the general characteristics of entrepreneur. As a result consists of the type of business, size and income of the business. The period of time to do the business that involve with location type of service, and average of shipment. The overall difference was statistically significant at the 0.05 level, which related with research by Benjaporn Suwannasawee (2557) to study the factors influencing the use transportation in Bangkok. As the result, illustrate customer service, rapid response, price and characteristics of entrepreneur that influence to decision making in transport logistics of food entrepreneurs in Bangkok metropolitan area statistics at 95%.

### SUGGESTION AND FURTHER STUDY

From the topic of this research, the researcher has concluded that the following research should be conducted in three points following in below;

1. To study the needs of each type for business customer regarding direction and trends satisfied with the transportation by water. By creating a questionnaire to be consistent, the data can be analyzed for weakness, strengths, opportunities, obstacles and increasing the potential of the organization.
2. To study of trend and direction and demand of entrepreneurs regarding in the future to use Ranong port. As a result, it can develop the information and improve the efficiency of various in operation areas to be more effective.
3. To study the whole management of Ranong Port System by analyzing weaknesses, strengths, opportunities and obstacles for develop in water transportation to move along with the continuously changing economy.

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## Mathematics Model for Container Ship Stowage Configuration Planning Problem

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**Abstract:** Research aims to explore the port management problem and find a mathematical model for the determining containers positioning. Research review of port management as a result weakness operation and mathematical for container ship stowage planning. Modify mathematical model for multiple container types, such as reefer containers, standard dry, flammable containers, and chemical containers. Supporting each type of quay crane operation. The objective equation changes to distance of movement of the crane operation. The results of paper make it possible to find a suitable container model for each type of container, well stability, minimize distance of crane operation and quickly computing in few minute

**Keywords:** Container Ship, Container, Mathematics Optimization, Quay Crane Operation, Container Ship Stowage Configuration Planning

### INTRODUCTION

Export and Import Information from Customs based on Information and Communication Technology Center of Thailand Annual Report 2009 - 2013. Thailand currently takes the form of shipping. This is the main route in international trade. This is the economic heart of the country. Imports and exports accounted for 68.2% or approximately 8,884,696 million baht. Laem Chabang Port have project to handle 10,000 TEUs, Researchers see the opportunity to increase the competitiveness of the country by stowage planning of container. It will enhance the capacity of the port to be convenient, Lower operating costs and support more container ship.

From preliminary studies, Container Ship have sizes range from 350 TEUs to 18,000 TEUs. It can to stowage 20-foot containers ranging from 350 to 18,000 container. Stowage planning must think Container Data and a lot of Conditions.

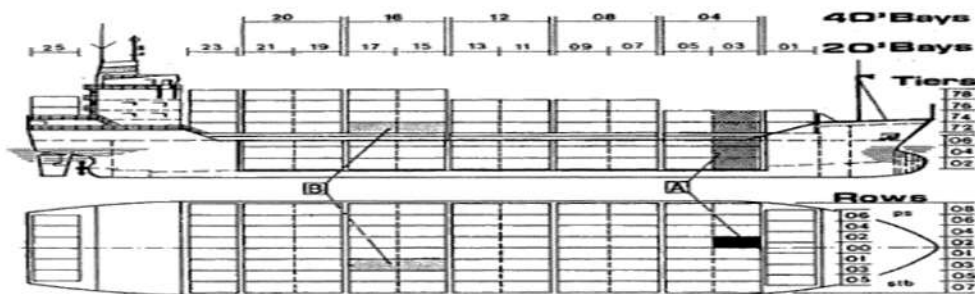


Figure 1 Structure of Container Ship size 560 TEUs.

Figure 1 depicts Containers Ship is 20-foot dived 40-foot. In each location dived Standard Dry and Reefer. Based on research, the researcher is find of the important causes of the problem of port management. This is because of the overlap of the container and conditions such as capacity weight, container specific area, weight balance, stack condition and bay condition together.

### RESEARCH OBJECTIVE

1. To explore the port management problem.
2. To find a mathematical model for the determining containers positioning.

### LITERATURE & THEORY

Ambrosino et al. (2004) selected a set of primary equations to stowing planning. Due to the mathematical equations of the container position, coordinates clearly, quickly to calculate and balancing equations same Liu et al. (2010). However, there is a lack of identification and classification of container sizes. Such as Containers Standard Dry, Reefer, Flammable, Chemical Containers and other containers. There are different power source and positioning requirements.

For example, Reefer Container need electricity location , Flammable Container must be in the center of the containership for prevent the target of pirates burning flammable containers in Indian Ocean, Chemicals Container some type do not closeness . Delgado et al. (2012) has been able to apply new equations to fit the position of each container.

Delgado et al. (2012) has been able to apply the new equation to fit the position of each type of container, and has the ability to determine the height limits similar to Maraš et al. (2013) to help determine the visibility of container height at the eye level for ship management and to maintain the stability of containership. Finally, Modify Objective function to distance of crane operation.

RESEARCH METHODOLOGY

In mathematical modeling, find optimization location of container. To reduce the time of moving containers. It is necessary to study a wide range of research topics related to water transport. Because to solve the problem of the placement of appropriate containers. We need to integrate a wide range of research. The researcher has a total of four levels of study guides, and is able to compile and adjust the set of equations to the appropriate level 5 as shown below

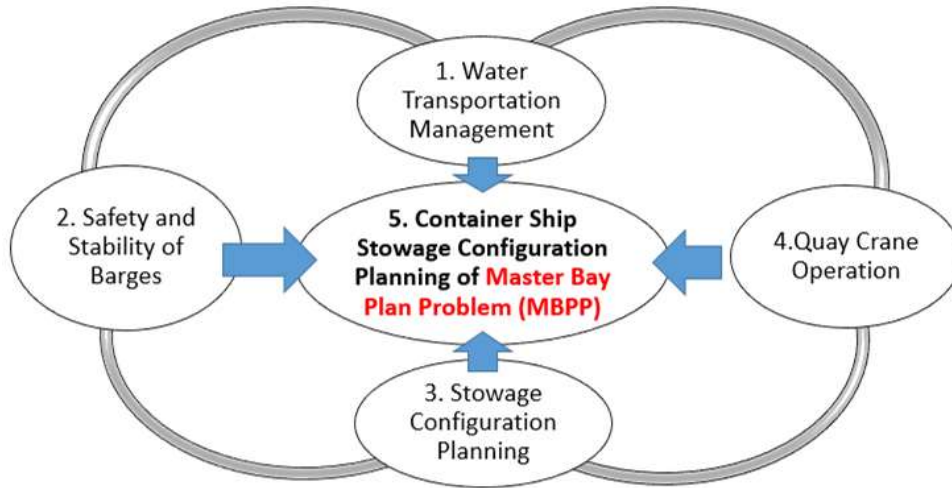


Figure 2 Steps in the study of all 4 research groups and improvements in the 5th.

From the above research, the researcher using mathematical model of Ambrosino et al. (2004) and integrated 4 research Water Transport Management, Safety factor and Stability of Barges Stowage Configuration Planning and Quay Crane Operation to minimum distance and most balanced.

RESEARCH RESULT

According to the Hiranphaet (2015), the problem that causes transport delays. When applied to the research of Bierwirth and Meisel (2010) and studied the problem of managing the port. The problem can be divided into 3 sections of the port, including the sea, the ground and the ground as shown in Figure 3.

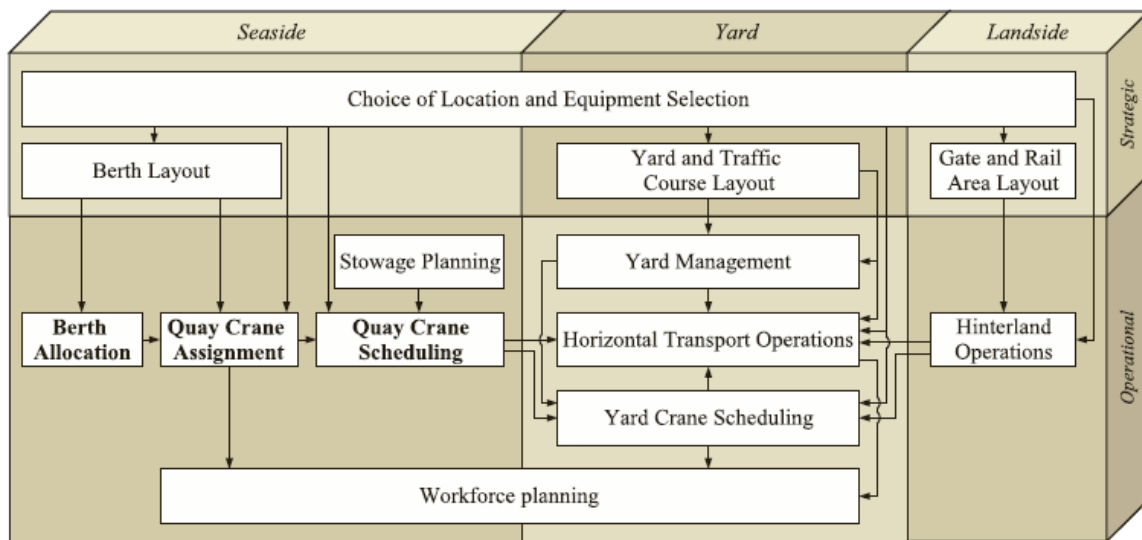


Figure 3. Planning problems in container terminals Christian and Frank (2010)

Model: Container Ship Stowage Configuration Planning of Master Bay Plan Problem (MBPP)

Basic conditions

According to Delgado et al. (2012) Chang et al. (2014) and Chen et al. (2014) Kim and Park (2004) and Diabat &Theodorou (2014), Stowage Configuration must have enough supporting area container, each container must have appropriate weight, don't hang container, appropriate weight, the heaviest container have not on upper deck, and The ship have stability etc.

Indices

$i$	Bay indices set
$j$	Row indices set
$k$	Tier indices set
$l$	Set of location $(i, j, k)$ by $l \in L$
$C$	Container indices set
$T$	20' container indices set
$F$	40' container indices set
$R_c$	Set of reefer container
$Flam_c$	Set of Flammable container
$CM\_A_c$	Set of Chemical A container
$CM\_B_c$	Set of Chemical B container

Parameter

$D_l$  Distance from Q.C to location  $(l)$  on barge

$Q.C_{Carry20'}$  Ability of Q.C carry container size 20'

$Q.C_{Row20'}$  Number Row of Q.C container size 20'

$Q.C_{Carry40'}$  Ability of Q.C carry container size 40'  $w_c$

Weight of container

$Q$  Total weight in carry container of barge

$Q_1$  Cross equilibrium is the weight on the right side must be equal tolerance  $Q_1$

$Q_2$  Horizontal equilibrium is the weight must be equal tolerance  $Q_2$

$Slot_l^{En}$  Number of location  $(l)$  to supporting energy to reefer container  $(R_c)$

$Slot_l^{Flam}$  Number of location  $(l)$  in center of the barge for supporting Flammable container  $(Flam_c)$

$Slot_l^{CM-A}$  Number of location  $(l)$  to supporting chemical type A container  $(CM\_A_c)$

$Slot_l^{CM-B}$  Number of location  $(l)$  to supporting

chemical type B container ( $CM\_B_c$ )

**Note:** [  $CM\_A$  and  $CM\_B$  don't close for

prevent chemical reaction

Decision Variable

$x_{lc} = 1$  select container  $C$  at location  $l$

0 other

$$\text{Objective Function Minimize Distance} = 2 * \sum_l \left( \left( \frac{\sum_c D_l x_{lc}}{Q.C_{Carry20'} * Q.C_{Row20'}} \right) + \left( \frac{\sum_c D_l x_{lc}}{Q.C_{Carry40'}} \right) \right) \quad (1)$$

St.

$$\sum_l \sum_c x_{lc} = m \quad (2)$$

$$\sum_l x_{lc} \leq 1 \quad \forall c \quad (3)$$

$$\sum_c x_{lc} \leq 1 \quad \forall l \quad (4)$$

$$\sum_l \sum_c w_c x_{lc} \leq Q \quad (5)$$

$$\sum_{c \in F} x_{ijkc} = 0 \quad \forall i \in O, j, k \tag{7}$$

$$\sum_{c \in I} x_{i+1,jkc} + \sum_{c \in F} x_{ijkc} \leq 1 \quad \forall i \in E, j, k = 1, \dots, |K|-1 \tag{8}$$

$$\sum_{c \in I} x_{i-1,jkc} + \sum_{c \in F} x_{ijkc} \leq 1 \quad \forall i \in E, j, k = 1, \dots, |K|-1 \tag{9}$$

$$\sum_{c \in I} x_{(i+1),j(k+1)c} + \sum_{c \in F} x_{ijkc} \leq 1 \quad \forall l \in E, j, k = 1, \dots, |K|-1 \tag{10}$$

$$\sum_{c \in I} x_{(i-1),j(k+1)c} + \sum_{c \in F} x_{ijkc} \leq 1 \quad \forall l \in E, j, k = 1, \dots, |K|-1 \tag{11}$$

$$\sum_{\substack{c, e \in C \\ w_c = w_e}} (w_c x_{ijkc} - w_e x_{ij(k+1)e}) \geq 0 \quad \forall i \in I, j, k = 1, \dots, |K|-1 \tag{12}$$

$$\sum_{\substack{c, e \in C \\ d_c = d_e}} (d_c x_{ijkc} - d_e x_{ij(k+1)e}) \geq 0 \quad \forall i \in I, j, k = 1, \dots, |K|-1 \tag{13}$$

$$-Q_2 \leq \sum_{i \in A, j, k} \sum_c w_c x_{ijkc} - \sum_{i \in P, j, k} \sum_c w_c x_{ijkc} \leq Q_2 \tag{14}$$

$$-Q_1 \leq \sum_{i, j \in L, k} \sum_c w_c x_{ijkc} - \sum_{i, j \in R, k} \sum_c w_c x_{ijkc} \leq Q_1 \tag{15}$$

$$\sum_{c \in I \cap R_i} x_{ic} + \sum_{c \in F \cap R_i} x_{ic} \leq Slot_i^{En} \quad \forall l \cap Energy \tag{16}$$

$$\sum_{c \in I \cap Flam} x_{ic} + \sum_{c \in F \cap Flam} x_{ic} \leq Slot_i^{Flam} \quad \forall l \cap Flammable \tag{17}$$

$$\sum_{c \in I \cap CM\_A} x_{ic} + \sum_{c \in F \cap CM\_A} x_{ic} \leq Slot_i^{CM\_A} \quad \forall l \cap Chemical\_A \tag{18}$$

$$\sum_{c \in I \cap CM\_B} x_{ic} + \sum_{c \in F \cap CM\_B} x_{ic} \leq Slot_i^{CM\_B} \quad \forall l \cap Chemical\_B \tag{19}$$

$$x_{ic} \in \{0,1\} \quad \forall l, c \tag{20}$$

(1) The objective function that minimizes the total stowage distance from quay crane (Q.C) to center of each container or container group on ship. Constraint (2) defines the number of locations to select for stowing the given containers. Relations (3) and (4) are assignment each container to be stowed only in one ship location and each location to have at most one container. The capacity constraint (5) establishes that the total weight of all containers cannot exceed the maximum weight capacity  $Q$  of the containership. Relations (6)–(11) are the size constraints, (6) 40’ containers to be stowed in even bays, (7) 20’ container to be stowed in odd bays, while (8) and (9) make unfeasible the stowage of 20’ containers in those odd bays that are contiguous to even locations already chosen for stowing 40’ containers, and inversely; (10) and (11) prevent 20’ containers being positioned over 40’ ones. Constraints (12) force heavier containers not to be put over lighter ones. The destination constraints (13) avoid positioning containers that have to be unloaded first below those containers that have a later destination port. Constraints (14) and (15) are the horizontal and cross equilibrium conditions, stating that the difference in weight between the anterior  $A$  and the posterior  $P$  bays and between the left  $L$  and right  $R$  side must be at most  $Q_2$  and  $Q_1$  tons respectively. Constraints (16)–(19) Location to supporting any type of container such as Reefer container, Flammable container, Chemical A container and Chemical B container. Finally, in (20) the binary decision variables of the problem are defined.

CONCLUSION AND RECOMMENDATIONS

The operational scenario: a maritime terminal in genoa

In this section we present a case study which motivated our analysis of MBPP. In particular, we consider the Chiwaua containership of the maritime terminal in Genoa (Italy). It is a 198 TEU containership, with 11 bays, four rows and five tiers (three in the hold and two in the upper deck, respectively). We test our MBPP by referring to 10 cases, reported in Table 1. Explain of weight container have 3 size include LW, MW and HW have weight following 10, 15 and 25 ton.

Case	Container	Size		Weight			Destination			Type Container					TEU	Full (%)
	Total	20'	40'	LW	MW	HW	1	2	3	Normal	Reefer	Flame	CM_A	CM_B		
1	100	62	38	45	30	25	47	53	0	39	17	16	18	10	138	73.40
2	120	75	45	50	44	26	55	65	0	44	28	16	18	14	165	87.77
3	130	85	45	58	45	27	62	68	0	52	30	18	20	10	175	93.09
4	130	75	55	23	46	28	60	70	0	60	15	40	10	5	185	98.40
5	135	84	51	55	50	30	60	75	0	71	15	34	10	5	186	98.94
6	140	100	40	65	47	28	61	79	0	91	25	11	5	8	180	95.74
7	140	95	45	60	50	30	65	75	0	99	5	10	11	15	185	98.40
8	148	108	40	62	53	33	69	77	0	54	41	35	10	8	188	100.00
9	150	120	30	62	55	33	65	85	0	67	31	23	15	14	180	95.74
10	158	128	30	62	63	33	75	83	0	67	36	26	15	14	188	100.00

Table 2 Result total distance and computation time of any type Quay crane

Case	Q.C (Type1) 1 Container		Q.C (Type2) 2 of 20' 1 of 40'		Q.C (Type3) 4 of 20' 2 of 40'		Q.C (Type4) 6 of 20' 3 of 40'	
	Distance (m.)	Comp. Time (s.)	Distance (m.)	Comp. Time (s.)	Distance (m.)	Comp. Time (s.)	Distance (m.)	Comp. Time (s.)
1	4335.10	28.45	3035.50	10.84	1104.88	9.49	646.29	15.65
2	5743.30	18.48	4093.00	60.45	1506.13	37.62	874.84	20.47
3	6216.50	85.83	4672.40	35.47	1578.18	93.80	916.26	89.78
4	6332.90	36.41	4945.20	21.10	1822.48	11.56	1093.18	45.76
5	6426.40	35.55	4902.20	18.26	1748.85	10.60	1015.69	14.73
6	6543.60	63.27	4418.20	44.01	1474.00	154.16	810.94	37.92
7	6783.10	38.00	4680.90	36.83	1642.15	66.02	895.80	71.15
8	7582.40	33.19	4964.90	53.01	1674.40	50.29	933.39	150.88
9	7329.20	84.62	4703.55	47.90	1479.08	12.38	776.13	22.62
10	7717.40	26.57	5019.80	29.30	1625.40	17.12	821.64	122.50

Note: the tolerance optimization is set at 5%.

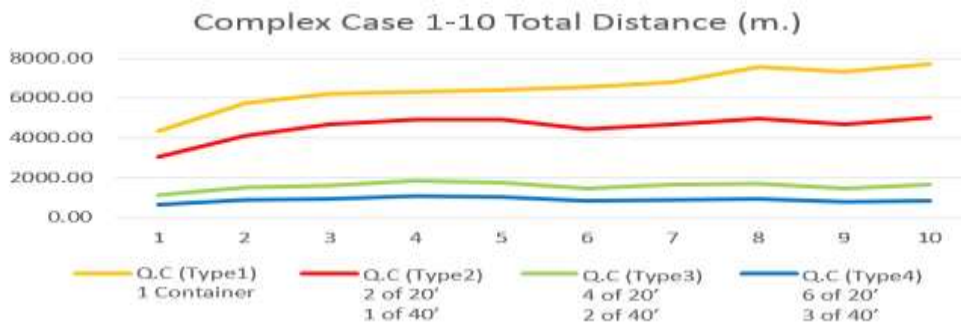


Figure 4: Total distance of stowage configuration planning container of type Quay crane



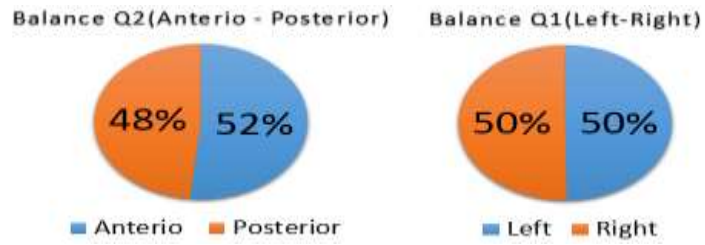


Figure 5: Example stability of container stowage planning of case 10 by Quay Crane (type 3)

The results are summarized in Figure 4 and Figure 5 show total distance of stowage planning each type quay crane and example stability of the barge. That can indicate of investment and selection type of quay crane on the barge properly. Therefore, Mathematical model can stowage configuration planning container to minimize distance of quay crane movement, correct supporting location and high stability of the barge, which results in finding the answers quickly in few minutes came from the tolerances optimization at 5%.

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## Value Chain Management of Ready Coconut Milk, Theppadungporn Coconut Company Limited

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**Abstract:** This study aims (1) to Study on Value Chain Management of Coconut Milk Company, Theppadungporn Coconut Co., Ltd. (2) to study and analyze the value chain management of coconut milk. Study on the development of value chain management of coconut milk, Theppadungporn Coconut Co., Ltd. Chain theory of values In analyzing core activities and supporting activities, each activity will focus on adding value to the company's products or services, including transportation and storage of raw materials. Production of goods or services Transportation and storage, Marketing and Sales, Service before and after sales. Firm Infrastructure, Human Resource Management, Technology Development and Procurement. The instrument used to collect data for quantitative integration research. And qualitative. The quantitative questionnaire was used as the basis for random sampling. Interview tools used to interview executives to collect semi-structured insights. The statistics used in the analysis were percentage, mean, standard deviation. The results showed that. The problem of raw materials is caused by insect pests that can not be controlled or prevented. Domestic raw materials are scarce because of their low productivity and reduced production, which leads to imports from abroad. Increased transportation costs and higher import duties. Importing raw materials from abroad can not control quality. Thailand's prices are higher than those of its competitors, because its competitors have more raw materials and lower production costs. Labor shortages in production and rising labor costs The impact of the baht appreciation.

*Keywords:* Value Chain Management, Ready Coconut Milk.

### INTRODUCTION

Coconut (Coconut = Coconut) is a scientific name that *Cocos nucifera* Linn. Is a plant of economic importance in Thailand. Because Thai people are familiar with and use coconut meat for consumption as a savory dish. And the daily life for a long time. Take advantage of all parts of the coconut, such as fresh fruit to eat. Meat and coconut meat from the fruit to cook food, sweet food, oil extraction for cooking, margarine and soaps from the coconut meat left over animals. Coconut shell is used to separate the rope. Upholstery and mattress Coconut tree used for planting materials. The shell is used to make liquids, buttons, ornaments, musical instruments, fuels or even activated carbon with high adsorption properties. The coconut leaves are soft and tender. Including the leaves of the roof. Machine Broom Used to make fences and fuel. Old trunk used in the fabrication of furniture. Soft shoots are used as food. Coconut or inflorescence is used as a drink or sugar. The fermented alcohol and vinegar used to make drugs, dyes and fuel. However, the coconut is generally used to bring the coconut meat to cook and extract the same oil as the palm.

Coconut is one of the economic crops of the country. Coconut products have been consumed both domestically and internationally. Demand for coconut and coconut products continues to grow. In the years 2010 - 2014, coconut plantation in the world has an average of 75.9 million hectares and the average yield is 68.8 billion per year. However, the area of cultivation and production is likely to decline, and most recently, in the year 2017, the world's major coconut producers have been experiencing productivity problems, such as the Philippines. The weather causes the coconut yield to drop. Sulawesi Province in Indonesia The major coconut growing areas have been experiencing lower yields. From the age of the coconut trees to lower yields. India is facing pest problems, so in the year 2017 coconut production in the world is likely to decline. The demand for coconut milk and coconut products in Thailand will continue to grow, with the export of coconut products expected to grow 18.5 percent to 16.4 billion baht. It is expected to grow by 16.5 percent to 12.7 billion baht (Kasikorn Research Center, 2560).

Consumption of Thai food is becoming more popular abroad. The demand for coconut milk increased as well. Because coconut milk is the main ingredient in Thai cooking. The expansion of the number of Thai restaurants abroad Especially in EU countries. And the United States. The demand for coconut milk is also expected to grow. In the year 2017, coconut milk exports will grow by 16.5 percent to 12.7 billion baht. The main markets in the European Union And the United States. The popularity of other types of coconut products. Demand for coconut products is expected to continue to grow in the near term. The export of coconut products is projected to grow 18.5% to reach 16.4 billion baht in 2017. However, Thailand is still relatively small compared to the world's leading coconut trade, Indonesia. Or the Philippines (Kasikorn Research Center, 2560).

Theppadungporn Coconut Co., Ltd. was established in 1976 by Mr. Ampol and Mr. Jarporn Theppadungporn, a farmer in Thonburi. Which began trading wholesale and retail coconut balls. After the Second World War, "Udom Coconut Partnership Limited" and developed into "Theppadungporn Coconut Co., Ltd." With the support of the Board of Investment (BOI), Theppadungporn Coconut Co., Ltd. has set up factories to produce products. Coconut milk pasteurized in canned bags and powder on Phuttamonthon 4 Road, Sam Phran District, Nakhon Pathom Province. It has expanded its capabilities and continuous production. It can create more than 200 varieties of products to meet the needs of both domestic and international markets.

The study of value chain management of ready-to-eat coconut milk company, Theppadungporn Coconut Co., Ltd., Conducted a study on the application of value chain management concepts in analytical studies to determine the value chain of coconut milk. Main Activities And support activities In order to be able to use the information to develop the value chain management of coconut milk in the future.

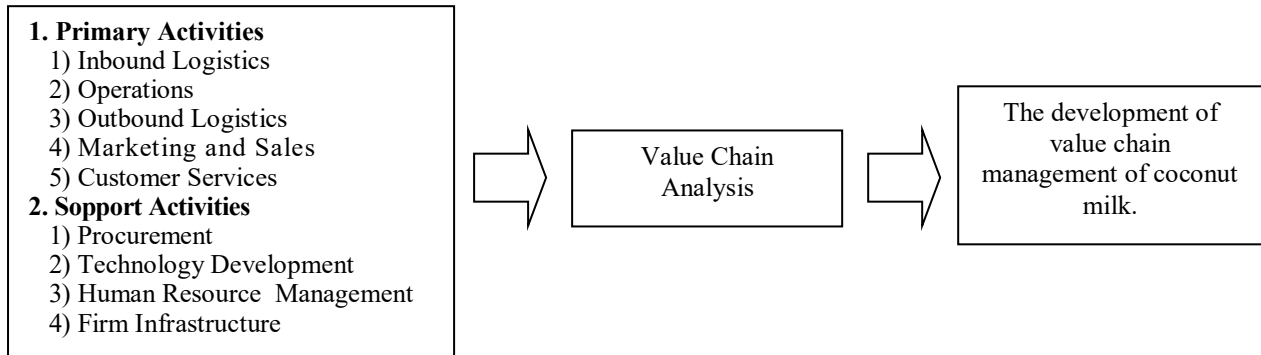
## RESEARCH OBJECTIVE

Study on Value Chain Management of Ready Coconut Milk, Theppadungporn Coconut Company Limited. The important objectives are as follows.

1. To study and analyze the value chain management of coconut milk. Theppadungporn Coconut Co., Ltd.
2. To study the development of value chain management of ready-to-eat coconut milk, Theppadungporn Coconut Co., Ltd.

## RESEARCH FRAMEWORK

Study on Value Chain Management of Ready Coconut Milk, Theppadungporn Coconut Company Limited. The researcher used the Value Chain Framework of Micheal E. Porter (Competitive Advantage: 1985) as a theoretical framework for analyzing primary activities and support activities.



## HYPOTHESIS OF RESEARCH

1. Study and analysis of value chain management in the core activities. And support activities Of coconut milk The factors that are related to the development of the product better.
2. Value chain management in both core activities. And support activities Of coconut milk Help develop a systematic workplace. Reduce losses and respond to consumers correctly.

## LITERATURE REVIEW

Bui Nguyen Phuc Thien Chuong (2011) The Value Chain Of White Leg Shrimp Exported to The U.S. Market in Khanh Hoa Province, Vietnam. This research aims to explore the value chain of freezing white shrimp exported to the US market from Khanh Hoa province, Vietnam. The research shows that before exporting to the US market, white shrimp are obtained. Procurement and processing Contains steps such as cleaning the pond. Shrimp Release and Care When the size of the shrimps comes, the middlemen will come to buy, which includes catching. Storage and transportation to shrimp processing plants to final products. Packing and storage to wait for export. During the shrimp farming of the farmer costs such as labor and other miscellaneous expenses in the procurement process. Apart from buying shrimp from farmers, middlemen need to increase other costs such as transportation, ice workers and other inputs to transport the shrimp to the next stage. Direct raw materials, direct labor, and other expenses are added to the accounting model. Farmers, middlemen and processors are exposed to profits. Depends on cost and revenue. Distribution of income (export prices), lack of facilities delay in payment policy and risk

Willem A. Rijpkema (2014) Effective use of product quality information in food supply chain logistics. This research aims to explore quality of related products. Information on logistics decisions in the food supply chain with a view to improving overall efficiency and consumer satisfaction. By conducting a supply chain analysis. Identify the most potential sources for improvement. And defines the methods or strategies that can be used to support a logistics decision using this data source, supported by a quantitative decision support model. Case studies show that the supply chain The result is optimization and simulation. Techniques have shown that it is helpful to get this insight. To support quantitative decisions that are used to validate strategies for using product quality information in the context of a complex supply chain. Specifically, use model optimization. Shows application restrictions. Opportunity to reduce uncertainty. And show new approaches to dealing with opportunities.

Anne Claire Louise TOUBOULIC (2014) Exploring How to Manage Supply Chain Relationships for Sustainability: An Action Research Project with PepsiCo and their Agricultural Suppliers in the UK. This thesis is a research work undertaken jointly with Pepsi of the United Kingdom and farmers to make a sustainable supply chain management (SSCM). The Action Research (AR) presents the many processes and results of this project, which have been modified. Corporate Governance among Sustainability Organizations and the Role of Individual Stakeholders in Changing Sustainable Practices in the State of South Carolina to Promote Better Development. Management to Implement Sustainable Development Guidelines. Supply chain related to large buyers and SME suppliers.

Wenbo Zhang (2014) Sustaining Export-Oriented Value Chains of Farmed Seafood in China. The aim is to improve understanding of seafood export development, and especially of shrimp oriented to China. And the tilapia culture value chain in southern China integrates the idea of system and interdisciplinary approach. Analysis of size indicators of tilapia and shrimp farms and their relation to farming systems and market orientation, farm productivity and increase have been made on both land and land. Land productivity is higher in terms of production. But no difference. Productivity and labor productivity are lower than medium and large farms. Culture system is related to land productivity and labor. Market orientation is linked to large farms. Factors identified by stakeholders include cost, productivity, profitability, availability, and quality. And most of the air outside the control. To improve the traceability product more as consumers want. Motivation, ability, and ability to perform tasks are related to data

storage. Storage and analysis of farm information storage requires advanced management tools, such as computer systems. Extending diversity and prolonging sustainability is proposed as a strategy. Safety and Environment Future consolidation and land reform have been identified as key to the necessary changes of farmed seafood chains.

Emily Huneycutt Morgan (2014) Value Chains for Nutrition: The Applicability of Value Chain Approaches to Address Low Fruit and Vegetable Consumption in Fiji. The purpose is to support the problem of nutrition, such as low fruit and vegetable consumption, respectively. Through case studies, strengths, limitations, and public health information to increase fruit and vegetable consumption. By Price Study And quality is important in food selection and quality considerations in terms of taste and appearance. Health awareness, refreshing and comfort High prices hinder consumption. Farmers access less agricultural inputs. Market infrastructure Opportunity to increase in consumption of fruits and vegetables. At economical prices And promoting the quality of fruits and vegetables. And strengthening the relationship of the parties. It shows the benefits of business strategy, management style, value chain analysis.

Hammad Badar (2014) Value Chain Performance Improvement for Sustainable Mango Industry Development in Pakistan. The purpose is to find ways in which value chain efficiency may be improved to bring sustainable development to the industry of Pakistani mangoes. Consumer information reveals the importance of both internal (Search and experience) and external (safety and marketing) quality features of mangoes purchased. Consumers seek value and pay close attention to mango lovers, security, mango lovers, concentrated in search and more secure and attached security features, attach importance to security related features. However, considering all the important features, the cost of organizing all the work on the consumer expressed dissatisfaction with the mangoes delivered. Because of the use of calcium carbide for cooked mangoes. Government regulations, especially in food safety and high mango prices. Restrictions on sustainable mango industry development come from weaknesses, not only in the value chain layer. But also in the value chain is the system and the ability of public stakeholders, delivery, promotion, marketing promotion. The flow of information within the value chain and improve the chain. Social and Environmental Participation Modern garden management and harvesting methods used for cardboard packaging. Ripening and safe ways to improve wholesalers, wholesalers and retailers.

Park Eun Kyun (2015) The Globalization of Value chain activities, Knowledge dynamics, and Innovation. The results show that value chain activities have a positive impact on the company's innovative performance in the modern economy. Can optimize Innovative access to new knowledge From various sources in different countries. By investing in innovation. Organize useful employee skills for innovation activities. The ability to change the base of organizational configuration and geographic distribution knowledge management, which supports the improved performance in terms of innovation after the event. Company Operations Transnational conflicts with the regional economic impact of the country. During the growth phase of multinational companies into the group. By merging a company with a problematic country. And bring financial resources and knowledge to these companies. However, foreign companies are less likely to be embedded in local environments than local companies, meaning that they are not actively involved in creating other capabilities and actions to overcome the threat posed by local companies. Disruptions in industry and marketing

Sultan Usman Mahamud (2016) ). Analysis of Wheat Value Chain: The Case of Sinana District, Bale Zone, Oromia Region, Ethiopia. This study focuses on wheat value chain analysis in the Sinana area of Bale County, with the aim of analyzing the structure and performance of the wheat market. Identifying indicators of wheat supply in the market and selection of market alternatives of wheat producers and wheat value addition at each stage of the marketing chain. The results show that land ownership and wheat volume have a significant effect on the amount of wheat sold to the market. The frequency of contact influences is enormous in choosing a retailer for the distance from the market. Affect price The opportunity to access the wheat market is greatly influenced by the price of the product. And the distance from the market compared to the secondary market access of entrepreneurs. The possibility of accessing the processor market is influenced by the price, ownership, transportation facilities and distance of the manufacturer from the production site. Market access data, wheat volume produced away from the market, access to market data. Access to credit extension and credit services has a significant impact on farmers' decision-making. Therefore, there should be a policy that focuses on raising farmers' awareness of the value added of wheat to increase the value added to strengthen the value chain.

Addisu Hailu (2016) Value Chain Analysis of Vegetables: The Case of Ejere District, West Shoa Zone, Oromia National Regional State of Ethiopia. This research aims to analyze the value chain of vegetables, focusing on potatoes, onions and vegetables, as it plays an important role in enhancing food security and income generation for poor Ethiopian farmers. Value chains are regulated by most wholesalers. With the help of middleman producers, the prices that farmers have been pressed for fear of loss after harvest. The system needs to be improved by increasing the knowledge and experience of vegetable farmers. Promotion of adult education through promotion services. Improve performance. And increase sales of vegetables. Relationships and interactions between stakeholders. Expansion in the market access of farmers. And to strengthen the infrastructure. To support the production.

Nellie Amosi (2018) Value Chain Analysis Of Baobab Products for Improved Marketing and Sustainability of Their Trade in Malawi. The purpose is to analyze the value chain of baobab. For product development, market and sustainability of trade in Malawi The value chain of baobab. Planned Trade and Relationship Analysis of benefits. Along the value chain and trading mechanism of baobab International, national and local levels. By evaluating the participants in the trade, the lobar correlation analysis was performed. To evaluate the benefits. By studying the trade using value chains, content and analysis. Used to evaluate the mechanisms of institutions and institutions that control the trade of baobab. Environmental and forest policy will be at the national level. Promotion of cooperative market connection The cooperative union is a district level, while at the local level there is a association of baobab. And the market commission, quality raw materials procurement and social welfare promotion, respectively, must work in horizontal integration because of the relationship. But increase market power, market share and economies of scale. Reduce production costs. Including the competition. As a major manufacturer of baobab.

## RESEARCH METHODOLOGY

### 1. Information and Resources

This study aimed to collect qualitative data from in-depth and in-depth interviews by interviewing administrators. Company and employee questionnaire. To analyze In order to clarify the data, the target population for the study is 2 groups.

- 1) The administrators of Theppadungporn Coconut Co., Ltd.
- 2) Employees of Theppadungporn Coconut Co., Ltd.

To find the primary activities in the operation of the operator. Activities include import and storage of raw materials. Production, delivery and warehouse management Marketing and sales and after sales service.

### 2. Sample (Sample)

In the study of value chain management of coconut milk, theppadungporn coconut Co., Ltd. in this group.

1) In-Depth Interview was used to collect data by interviewing key informants using in-depth interviews. Purposive Sampling was selected by interviewing key informants about corporate governance. Must be the key information (Key Information), which consists of the management of the company. Theppadungporn Coconut Co., Ltd.

2) Samples for questionnaire distribution. The questionnaire was used to collect data by questionnaire. The questionnaire consisted of the staff working in different divisions of Theppadungporn Coconut Co., Ltd. using random sampling. Nonprobability: Accidental sampling was performed by determining the sample size (n) by determining the sample size of Taro Yamane (Monsitch Sitthisomboon, 2007). This study cited the population of staff at various divisions in Theppadungporn Coconut Co., Ltd. At the 95% confidence level, the deviation is  $\pm 5\%$  of the standard deviation.

### 3. The tools used in the study.

1) In-Depth Interview. To study the contextual information of the management of Theppadungporn Coconut Co., Ltd. and the samples for in-depth interviews. Data were collected by interviews with key informants. In-Depth Interview, a group of administrators in Theppadungporn Coconut Co., Ltd., using in-depth tools as semi-structured interview. Semi-Structured Interviews define open-ended questions.

2) Questionnaire The tool to collect data to improve the performance of the main activities and support activities of the value chain by giving a questionnaire using random sampling, regardless of probability. Nonprobability Selects Accidental Sampling by defining the nature of the question as an open-ended question. Set the selection criteria for 5 levels of rating scale (Rating Scale). Most agree. Agree. Agree. Moderate. Agree and agree least.

### 4. Data Collection

The methods used to collect data are used both from secondary sources and primary sources. This will be collected in quantitative terms. Quantitative Method and Qualitative Method.

#### Secondary source

1) Literature Review By studying the research and education related to value chain management of various agricultural commodities. And documents The main activities are import and storage of raw materials. Production, delivery and inventory management, marketing and sales. After Sales Service Support activities include procurement, human resource management, research and development, technology adoption in corporate development. And organizational infrastructure management.

2) Data Analysis. Quantitative and statistical data analysis related to education. Based on basic statistical analysis and related models.

3) Primary storage This research will be conducted by the Explorative Interview of the management team of Theppadungporn Coconut Co., Ltd. The information obtained from the Explorative Interview will be used in the study. Design tools for data collection. The primary data collection method is divided into 3 parts.

3.1) In-Depth Interview Researchers know and understand the nature of the operation of the target population by in-depth interviews from the sample. And how to record and transcribe interviews. For complete information.

3.2) Questionnaire survey using Face to Face Survey

### 5. Data Analysis

Information obtained from interviews and observations of Entrepreneurs and the data collected from the questionnaire of employee. Qualitative data is used to analyze content (Content Analysis) by analyzing data. Along with field data collection. And bring the results. Used to adjust the concept Check the accuracy of the data. And how to keep data accurate to increase the accuracy of the research.

It is divided into categories according to content and presentation. Analytical Briefing Using a typological analysis, it is classified as a category or type. Use the data attribute criteria. There is a common identity. And how to create an Inductive Conclusion, which is a way to generate general conclusions. The relationship between two or more variables, using a case study or a specific source, is a general statement of the truth. Data record (Supong Chantavanich, 2006) Quantitative data analysis Use statistical processing. The statistical analysis of the correlation of the variables from the research. The data can be used to analyze the data effectively by analyzing Descriptive Statistics by displaying the data analysis in the naming convention or in the order. Use frequency distribution table. The results were percentage, mean and standard deviation. For the purpose of analyzing the general data of the sample, we used the Percentage to describe demographic and behavioral characteristics. Meaning (Mean) for interpretation Standard deviation (SD) is used to interpret the data in different ways using the formula.

## RESEARCH RESULT

Theppadungporn Coconut Co., Ltd. has products under the ChaoKoh brand. Coconut water Canned Coconut Juice 100% and crispy coconut meat, canned fruits and vegetables The highest selling product is coconut milk. The company has been established for more than 40 years and is a rising star of 100% pure coconut oil, as well as 100% coconut water, which has continued growth. Both at home and abroad

Strategy of the ChaoKoh brand. Use both offline and online marketing tools to build brand awareness across all segments. In addition, good relationship with both domestic and foreign partners and consumers is maintained. For the domestic market, the company has organized promotional activities. Food production Advertising Including the social projects that the company took and made for a long time. To bring benefits back to society in terms of health, education and quality of life. Overseas The company has

joined the overseas trade fairs to find new ways to enter the market, especially in the Middle East and China. This is a potential market and has an interesting growth rate.

For the production side ChaoKoh Factory A factory in the group. Theppadongporn Coconut Co., Ltd. was established in 1976. Throughout the past, the Company has focused on quality control at all stages. Consumers can be assured that their products are made from natural ingredients. Safe, no color, no preservatives. The company continues to develop its production technology to be internationally accredited. Apart from GMP, HACCP, ISO 9001: 2000, Halal certification As well as other standards, the ChaoKoh factory has also been investigated by agencies that have been commissioned by clients around the world, such as the US Food and Drug Administration The United States of America (BRC) and the British Retailer Association (BRC) are trademarks and registered trademarks of The ChaoKoh Group. At present, the ChaoKoh factory has a capacity of 20,000 tons / year of coconut water, which has recently expanded its factory and warehouse space. And there are plans to buy new machines to support the expansion of both domestic and foreign markets.

Company Cooperation Theppadungporn Coconut Co., Ltd., Has cooperated with the Department of Alternative Energy Development and Efficiency (DEDE) and the Department of Industrial Works to improve the steam system for the plant. The overall result of the energy saving is 1,264 ktoe / year, saving 13,727 million baht / year, for example, Theppadungporn Coconut Factory. The Smart Boiler system is based on the Energy 4.0 concept, which is a boiler system that is part of the Smart Boiler and is an example of a boiler system that can be connected to an online system. This means that the system helps to increase the efficiency of energy conservation. And according to the policy of Energy 4.0 with knowledge. Expansion to other factories in the future.

## DISCUSSION

Assumption 1 Study and analysis of value chain management in the core activities. And support activities Of coconut milk The factors that are related to the development of the product better. Increase productivity of coconut milk factory. With the promotion of production improvement. Efficient machine maintenance. The capacity is sufficient to meet the needs of customers. Continuous production plan design. But with high flexibility. Implement productivity improvement tools to continually improve productivity. We also supply quality raw materials to the production process. Knowledge management Encourage the use of innovation to enhance competitiveness. It is in line with the ideas of Oglesby, Parker, and Howell (1989) and Phitthapon Phithak (2009).

Assumption 2 Value chain management in both core activities. And support activities Of coconut milk Help develop a systematic workplace. Reduce losses and respond to consumers correctly to increase productivity of coconut milk factory. The organization must set a vision that can be tangible, as well as formulate policies and goals that are aligned with the vision. Is clear enough to give employees the same understanding. We focus on all employees. Has a policy to promote development training. Communicate performance Include and encourage employees to understand. And comment to improve performance on a continuous basis. In line with the concept of Oulton, Nicholas (1990) and Mason and Finegold (1997), and the organization's promotion of efficiency. With the improvement of speed and accuracy and quality products to transport to meet the needs of customers in a timely manner. The cost is competitive. And reduce the damage of goods during transportation for quality goods delivered to customers.

Thomas, H., David R. Riley, and Victor E. Sanvido. (1999) and Pronchai Mamee and Sasithorn Puangjang (2011) and Reudee Niyomrath. (2010) Logistic Management of Benjarong Industry in Samut Songkhram Province found that the establishment has customer service activities. Planning on the location of the factory building. Procurement activities. Raw material movement Packaging Transportation and delivery Reverse Logistics Distribution channel management and recycling activities. Logistic activities at the establishment are less active, such as warehousing activities and warehousing. And forecasting; Demand planning Quality performance is at a competitive advantage. For time efficiency, we found that At the level of the problem is the time to submit orders within the organization. Duration of holding and packaging Including the time to store finished goods to meet the needs of customers. Cost effectiveness Found at the competitive advantage level. And at a normal level compared to competitors.

## ACKNOWLEDGEMENTS

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## Service Quality Factors Affecting Trust and Expectation: -A Case Study of Chiang Mai International Airport

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**Abstract:** This research aims to investigate the influences of service quality of Chiang Mai International Airport on customer trust and expectation. A questionnaire survey collected from 400 customers in Chiang Mai International Airport. The questionnaire was used for collecting the data and statistical approach such as frequency, percentage, standard deviation, Multicollinearity and Multiple Regression analysis were used for analysis the data by using .05 significant level. The research results showed that service quality affected the trust of employees Chiang Mai International Airport at a statistically significant level of 0.01 in 4 aspects such as reliability, tangibles, responsiveness and empathy. That service quality affected the expectation of employees Chiang Mai International Airport at a statistically significant level of 0.01 in 3 aspects such as dimension of tangibles, dimension of responsiveness and dimension of empathy

*Keywords:* Service Quality, Trust, Expectation.

### INTRODUCTION

Air transportation is a basic facility essential to economic development. It is generally faster and more reliable than other means of transportation. Developed countries therefore employ policies that facilitate their air transportation, assigning the responsibility to a governmental organization or support private aviation industries. World airports compete to improve their services, improving customer satisfaction level, which will bring about success, reputation, and income, which, in turns, will lead to economic development of the country. The investigators thus are interested in statuses of airport services, aiming to use the data for improving future services. In addition, Kankaew, K., (2013) found that the overall importance and performance levels high for both ground and onboard services. The result fell on IPA's grid 'keep up the good work'. And the factors behavior passengers' choice toward airlines are safety, variety of flight schedule, spacious seat, price, ease of reservation, Efficiency of baggage handling, courtesy and professionalism of staff.

*Table 1 Increased volume of flights and passenger at six airports in Thailand*

Airport	Number of passengers					Total in percentage	Increase in passenger volume
	2013	2014	2015	2016	2017		
Suvarnabhumi	66,463,450	65,874,198	80,973,529	90,162,911	96,263,167	45.73%	6.50%
Don Mueang	15,562,753	19,349,941	28,589,312	34,689,890	37,183,617	28.78%	7.19%
Chiang Mai	5,172,742	6,213,463	8,069,918	9,208,256	9,973,449	7.72%	8.31%
Hat Yai	2,465,370	2,944,259	3,568,093	3,871,468	4,347,130	3.36%	12.29%
Phuket	10,979,537	11,275,805	12,538,042	14,722,010	16,230,431	12.56%	10.25%
Mae Fah Luang	1,053,863	1,291,708	1,640,332	1,959,353	2,385,224	2.05%	21.74%

*Source: Airports of Thailand PLC. (2017)*

Chiang Mai province is an economic centre of the northern region of Thailand. It is also an important commercial port, having widely available accommodations, tourist destinations, and other essential facilities. Air transport is one of the important latter, giving customers convenience and more choice. Chiang Mai International Airport is one of the six international airports run by Airports of Thailand (AOT), can accommodate up to eight million people per year. It is a main airport that facilitates air travels in the northern region of Thailand. Data from the Airport of Thailand in table 1 shows that the demand between 2013 to 2017, continually increases in the volume of passengers. Especially, Chiang Mai airport continually expands at 8.31 percent between 2016 and 2017, also is the fourth number of Thai airport passengers having 7.72 percent from the total rate. This demonstrated a change in demand, revealing that more passengers chose Chiang Mai airport.

Nowadays, it is very important for ASEAN member nations to compete each other in terms of tourism. It becomes the priority of many hotel and tourism industry in Thailand to improve their standard quality. (Choovanichchannon, C., 2015) Service quality is an important achievement indicator. Airline business organizations set strategies and develop service quality to win the kudos for its organization of being at the top level and globally recognized. They use service excellence as a main organizational strategy to inspire and assure the passengers that their service quality is excellent. In addition, it establishes satisfaction, reliability, distinction, organization image, and loyalty of passengers or new customers who are interested in using their service (Heskett, Sasser, & Schlesinger, 1997, p. 75). This research assessed the quality of service in Chiang Mai airport, by determining the factors affecting trust and expectation in order to propose improving service quality in the airport.

RESEARCH OBJECTIVE

1. To study how factors affecting quality of service to customers affect staffs of Chiang Mai International Airport
2. To study how factors affecting customers' trust affect staffs of Chiang Mai International Airport
3. To study how factors affecting customers' expectations affect staffs of Chiang Mai International Airport

LITERATURE REVIEW

Providing service quality to customers while understanding the customers' requirements has been very important in increasing airline business survival and success (Chen & Chang, 2005, pp. 79-87). Currently, focusing on satisfaction and customers loyalty leads to better airport service quality. Airport also more explicitly and concretely present their service quality so that customers can use this basic information in making a decision when selecting a service (Tolpa, 2012, p. 33). Pakdil and Aydin (2007, pp. 229-237) state that service quality can be measured by employees, tangibles, responsiveness, reliability and assurance, image, and empathy. Furthermore, Babbar and Koufteros (2008, pp. 804-830) considered that the most visible service to the customer is the service that contact staff provide. The level of concern and civility between service staff and customers is important; for example, listening and understanding, individual attention, friendliness and courtesy.

Researchers and scholars have developed a number of measurement tools. The well-known instrument in service quality measurement is the SERVQUAL model (Parasuraman, Berry, & Zeithaml, 1985, p. 46). In this model, service quality results are derived by comparing consumer perceptions and expectations with evaluating service quality based on the following five main categories:

1. Reliability-the ability to perform the promised service dependably and accurately. The service is performed correctly on the first occasion, records are up to date, and schedules are kept. Reliable service effectiveness is the customers' expectation that the service must be completed punctually and usually without any mistakes in all flights.
2. Responsiveness-the willingness to help customers and to provide prompt service.
3. Assurance-the knowledge and courtesy of employees and their ability to convey trust and confidence, the promise to customers, politeness and respect, effective communication, and the neat appearance of the service provider.
4. Empathy-the provision of care as well as individualized attention to customers that includes approaching customers speedily and making an effort to understand the customer's individual needs.

RESEARCH FRAMEWORK

Research framework of this research is shown in figure 1.

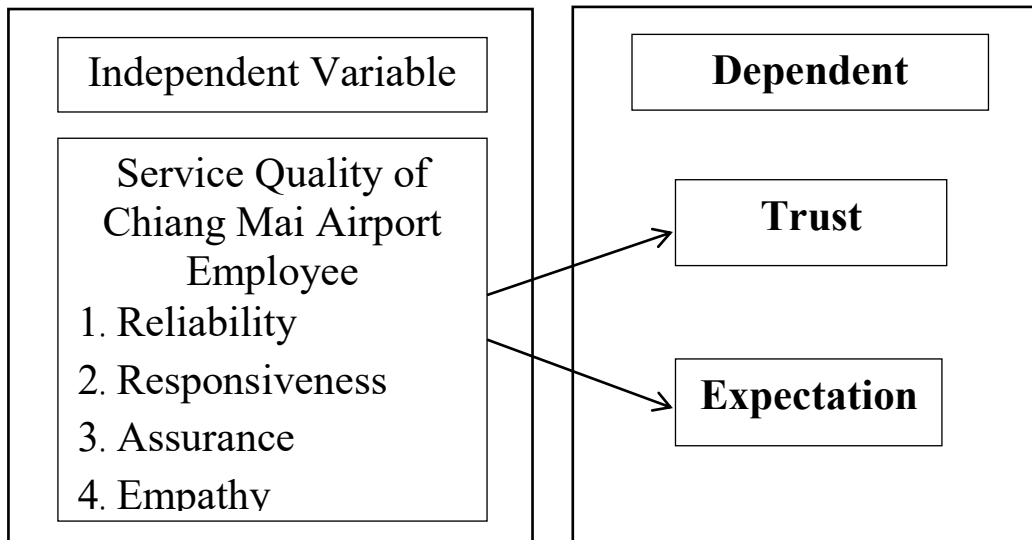


Figure 1. Research framework

HYPOTHESIS OF RESEARCH

Based on the research problems and framework above therefore the hypotheses of this research are as follows:

- Assumption H1: Quality of service of the Chiang Mai International Airport, in terms of staffs' reliability (REL) to customers correlate positively to customers' trust.
- Assumption H2: Quality of service of the Chiang Mai International Airport, in terms of staffs' responsiveness (RES) to customers correlate positively to customers' trust.
- Assumption H3: Quality of service of the Chiang Mai International Airport, in terms of staffs' assurance (AUS) to customers correlate positively to customers' trust.
- Assumption H4: Quality of service of the Chiang Mai International Airport, in terms of staffs' empathy (EMP) to customers correlate positively to customers' trust.

Assumption H5: Quality of service of the Chiang Mai International Airport, in terms of staffs' reliability (REL) to customers correlate positively to customers' trust.

Assumption H6: Quality of service of the Chiang Mai International Airport, in terms of staffs' responsiveness (RES) to customers correlate positively to customers' trust.

Assumption H7: Quality of service of the Chiang Mai International Airport, in terms of staffs' assurance (AUS) to customers correlate positively to customers' trust.

Assumption H8: Quality of service of the Chiang Mai International Airport, in terms of staffs' empathy (EMP) to customers correlate positively to customers' trust.

RESEARCH METHODOLOGY

Details of each of the process are as follows:

Questionnaire survey: This study was a survey research. Questionnaire survey was selected as an appropriate method for data on service quality with factors affecting trust and expectation. Theoretical aspects will be employed from existing literature. A survey consisting of 10 questions will be distributed to 400 people who used Chiang Mai International Airport.

Reliability analysis: This was conducted for each factor in order to the reliability of the questionnaire, thus unreliable factors were discarded.

Factor analysis: Factors were classified into clusters. The clusters that were properly classified during the literature review were examined, and those that were not classified were reclassified, thus they can represent the factors properly.

Likert-type scale was applied in this study to the questionnaire design, running from 1 (very low) to 5 (very high). Before the distribution of the questionnaire, a pilot test was performed to confirm that the questionnaires were phased appropriately. Respondents in pilot testing process were asked to comment on the readability, accuracy and comprehensiveness of the questionnaires.

Analysis technique: Descriptive statistical tools, including frequency, per cent, mean value, and standard error, as well as multiple regression analysis will be employed.

RESULTS

From the 400 responders, 46.25 per cent were male, 30 per cent aged between 31 and 40 years old, 55.25 per cent were single, 39.75 per cent hold bachelor's degree or equivalent, 62.26 per cent were employed in the private sector, 38.5 per cent had income in the range of 20,001 - 30,000 THB as shows in Table 2.

Table 2. Overall Information

Gender		Age		Marital Status		Education		Career		Monthly Incomes	
Sex	In %	Age	In %	Status	In %	Level	In %	Career	In %	Amount (Baht)	In %
Male	53.75	<20	6.75	Single	55.25	<High School	16.75	Student	6.75	< 15,000	10.00
		21 – 30	27.75	Married	39.00	Vocational School	38.00	Officialdom	19.25	15,000 – 20,000	21.00
Female	46.25	31 – 40	36.00	Divorced/ Separated	5.75	Bachelor's degree	39.75	Private Employee	62.25	20,000 – 30,000	38.50
		41 – 50	29.50			Graduate School	18.75	Owner	11.75	> 30,000	30.00

The responders rate Chiang Mai International Airport staff as having high reliability (REL), high responsiveness (RES), high assurance (AUS) and high empathy (EMP) to customers and rate themselves as having high trust and expectation for the staffs and services.

Table 3. Multiple Regression Analysis of Affecting Trust Factor

Variable	Standardized Coefficients	T - value	P
REL	.102**	3.128	.002
RES	.060*	2.071	.039
AUS	.039	1.536	.125
EMP	.094**	2.700	.007

n = 400, R2 = .816, F= 340.774, Sig = 0.00

\*having Coefficient at .05

\*\*having Coefficient at .01

Analysis result showed that R<sup>2</sup> rate .816, all variable was 81.60 percent to encourage the hypothesis number 1, 2, 3 and 4 with Coefficient ( p < .05). It meant the quality of service of Chiang Mai International Airport, in terms of staffs' reliability, responsiveness, assurance and empathy to customers correlate positively to customers' trust.

Table 4. Multiple Regression Analysis of Affecting Expectation Factor

Variable	Standardized Coefficients	T - value	P
REL	-.023	-.507	.613
RES	.643**	15.869	.000
AUS	-.002	-.046	.063
EMP	.162**	3.306	.001

n = 400, R<sup>2</sup> = .641, F = 140.907, Sig = 0.00

\*having Coefficient at .05

\*\*having Coefficient at .01

Analysis result showed that R<sup>2</sup> rate .641, all variable was 64.10 percent to encourage the hypothesis number 5, 6, 7 and 8 with Coefficient ( p < .05). It meant the quality of service of Chiang Mai International Airport, in terms of staffs' reliability, responsiveness, assurance and empathy to customers correlate positively to customers' expectations.

### DISCUSSION

In this section we present the results, discuss them, and show concordance between the results and the assumptions of this study. We will also discuss how the results support related theories.

The quality of service, in terms of reliability, correlates positively with customers' trust in the staffs of Chiang Mai International Airport, having statistical significance of 0.01, regression coefficient of 0.102. This agrees with studies of Chiu, Hsu, Lai & Chang, (2012) and Han & Hyun (2013). Garbarino & Johnson (1999) claims that trust and reliability influence the rate of returning customers.

The quality of service, in terms of attention to customers, correlates positively with customers' trust in the staffs of Chiang Mai International Airport, having statistical significance of 0.01, regression coefficient of 0.094. This agrees with studies conducted by Doney & Cannon (1997), Giffin (1967) and McKnight & Chervany (2002). These report that attention to customer and trust – the maintaining of good relationship between Chiang Mai International Airport staffs and customers – are key to customer satisfaction.

The quality of service, in terms of responsiveness, correlates positively with customers' trust in the staffs of Chiang Mai International Airport, having statistical significance of 0.01, regression coefficient of 0.060, in agreement with Crosby, Evans & Cowles (1990), which report that responsiveness is related customers' trust, as it implies that their needs are important.

The quality of service, in terms of responsiveness, correlates positively with customers' expectation in the staffs of Chiang Mai International Airport, having statistical significance of 0.01, regression coefficient of 0.643. This is in agreement with Victor Vroom (1964). That is, customer expectation, in terms of responsiveness to their needs, and in terms of swiftness of the responses, correlate with customer loyalty.

The quality of service, in terms of attention to customers, correlates positively with customers' expectation in the staffs of Chiang Mai International Airport, having statistical significance of 0.01, regression coefficient of 0.162. This agree with a study which states that expectation means feeling, opinion, perception, or prediction of events that are yet to happen.

### FUTURE RESEARCH SUGGESTIONS

1. Studies on other airports could be conducted such that satisfaction level could be measured and used to improve staffs' performance.
2. Other studies on Chiang Mai International Airport, such as, on word of mouth of customers or customers' loyalty, could be conducted.

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## A Study of Specific Features that Required for Partners that Effectuated to Operational Efficiency of Custom Clearance: Case Study OOCL Logistic (Thailand) Co., Ltd

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**Abstract:** This research is quantitative research. Aims to investigate (1) Study in the performance factors of Custom clearance about the cargo delivery, service staff, documents handling procedure, working reliability and finance (2) Comparing the differentiation between the organization characteristics and working performance. (3) Recommendation of the solutions in operational efficiency improvement of Custom Clearance of OOCL logistics (Thailand) co., Ltd. Questionnaires are given to 60 custom clearance partners. Statistics are included the frequency value, percentage, mean and standard deviation. Test the hypotheses by using One-Way ANOVA F-test statistics. The evaluation results of performance factors shown that the customs agent working performance is the best (mean = 3.91, SD = 0.31). The studies of working procedures found that documents handling procedure is the best (mean = 4.06, S.D. = 0.50). Follow by service staff (mean = 4.04, SD = 0.40) then financial (mean = 4.00, SD = 0.49) and working reliability (mean = 3.90, SD = 0.40). By the way, cargo delivery are located on high levels as well. Study results found that comparing the organization characteristics with working performance of OOCL logistics co., Ltd. (Thailand) shows that there are no differentiate in all sides by the significant of (0.303, 0.551, 0.389, and 0.631) respectively by statistical significance at the 0.05 level

*Keywords:* Specific Features, Operational Efficiency, Custom Clearance.

### INTRODUCTION

In 2016 Thai logistic cost raised to 13.9% per GDP, which was very high among ASEAN country. The main reason why all the countries around Thailand had less logistic cost because of their speed up in developing their information data systems in import and export call National Single Window. The Office of The Nation Economic and Social Development Board, 2016 commented that ratio of logistic cost per GDP that are include management cost, storage cost and transportation cost raise by expanding of import and export in high rate. By this reason, custom clearance cost that are parts of management cost tend to increase every year too. Thus, lack of knowledge worker and technology become the worst situation. By the way, Thai Licensed Customs Brokers are occurred to substitute. OOCL Logistics (Thailand) CO, Ltd. establish in 1989, the main idea of the company is making things convenient in import and export, reduce delay delivery and solve the problem of missing understanding by being an expert in import and export. Licensed Customs Broker give the service of co-operating both inside and outside client firms. Inside client firms OOCL Logistics harmonize from manager to member. Outside client firm OOCL Logistics integrate to serve among the government department such as Customs Department, Foreigner Trading Department, Food & Drug Committee, Industry Department, Airport and Agent for example. For 20 years in experience, OOCL Logistics find that client are in different industry and client's behavior are not the same too. Some client glad to pay more for fast delivery. Other like to make tax refund, cash discount from The Office of the Board of Investment or others benefit even that delay their operation. This research aim to find the specific characteristics that necessary for Thai Licensed Customs Brokers. Independent variable are quality of delivery operation, quality of co-ordinator officer, quality of document operation, quality of work process and quality of financial reliability of Thai Licensed Customs Brokers.

### RESEARCH OBJECTIVE

1. To study the specific characteristics that necessary for Thai Licensed Customs Brokers. Independent variable are quality of delivery operation, quality of co-ordinator officer, quality of document operation, quality of work process and quality of financial reliability of Thai Licensed Customs Brokers.
2. To compare between the specific characteristics that necessary for Thai Licensed Customs Brokers and firm's work efficiency.
3. To recommend the developing model for Thai Licensed Customs Brokers of OOCL Logistics (Thailand) CO, Ltd.

### HYPOTHESIS OF RESEARCH

1. The clients from different industry have different opinion in work efficiency of Licensed Customs Brokers
2. The clients who have different product have different opinion in work efficiency of Licensed Customs Brokers
3. The clients who have different long-standing relationship have different opinion in work efficiency of Licensed Customs Brokers
4. The clients who have different communication channel have different opinion in work efficiency of Licensed Customs Brokers.

### LITERATURE & THEORY

Efficiency combines with economy of cost, economy of resource, economy of time, economy of speed, on time process and quality of product & service. Efficiency has significant as economize in consuming resources to reach the firm target goal. Logistic & Supply chain is vary complicate and complex because it involve not only all department in organization but also authority and agency outside organization. By the reason, efficiency of each supply chain is not depend on one of each organization in the supply chain but involve in every step on movement of product & service inside the supply chain. Efficiency is how to make higher quality by reasonable lower cost.

Jomborbin, 2007 working efficiency has the meaning in social science that input factor that descript attempt, readiness, capability and agility on working compare with executive satisfaction or to reach the settle objective.

Kochakorn, 2007 working efficiency means creation of achievement or accomplishment by receiving value more than used resources. More product by same cost or more product by less cost.

Prusya, 2007 gave three definitions for working efficiency that

- About work itself: Output finish faster than assigned or output has more quality than design
- About executive: Executive can work continuously and has skill in management, planning, organizing, ordering and controlling by systematic method
- About Employee: Be a good and happiness co-worker, No argument, good relationship, good co-ordinate and well communication.

Jitema, 2013 said that working efficiency is the heart of working in organization through leading of work achievement. If organization would like to have satisfy output both production and service, they should have both customer satisfaction and employee satisfaction that depend on 3 important component.

- Outside Organization Environment such as customer demand, nation economic & social changes, technology change, international trade and the competitors.
- Inside Organization Environment such as policy, vision and organization aim that will lead the direction of working efficiency, organization culture and office atmosphere that can drive employee achievement.
- Organization Readiness such as workplace, working tools, technology, capital and employee's potential. By the way, employee's potential is the key factor of the organizations that can make the organizations reach their goal.

Panida, 2003. Studied about The Factor of Personal, Mental characteristics and Relationship to The Organization that Effect to Teamwork. She found that 1) The Bank older employee had more working efficiency than the Bank younger employee by statistical significance. 2) The Bank employees who have more working experience. Their working efficiency did not difference from the Bank employees who have less working experience. 3) The Bank employees who have high level of 5 element of mental aspects had more working efficiency than the Bank employees who have low level of 5 element of mental aspects by statistical significance. 4) Personal age factor had positive relationships with team efficiency. But working efficiency did not have positive relationships with team efficiency. 5) Mental aspects and relationship with organization could predict team efficiency.

Sonyost, 2008. Found in his thesis of factor that effect to employees working efficiency of Asian Marine Service Co., Ltd. that employees had very high level in thinking opinion about working environment. Other opinions as relationship between executive and employee, relationship among employees themselves and the support working equipment had high level in thinking opinion. Employees working efficiency in quality, quantity and output, each of them in overall view had good level in potency. Result of this study conform to the work of Sakkarin, 2009. Factors that Effect to Working Efficiency of Crime Investigation and Defeat Operation of Police in The 7<sup>th</sup> Metropolitan Police Department.

Ayasanond, 2017. He had conclusions about his study of Forming Tourism Logistics Service Quality of the State Railway of Thailand: A Case Study of the Special Train Tour Death Railway Route that there had also a gap between expectations and perceived service. By comparing personal factors and opinions about the tourism logistics service quality management of the State Railway of Thailand. In terms of the train station location, service model, service staff, duration of service and safety & security service safety, when considering each side, it was found that service users with different sex had different opinions in all topics. Except for the service staff had a good personality, dress appropriately and security service in the cabin topics.

Never the less, from the study above, Efficiency means procedures to modify and develop the most benefit for organization. The procedures may include strategies and techniques that can make the organization had good outcomes. Also the organization could run by worthy resources. By the reason, Efficiency organizations could let themselves to meet their goal objective, vision and mission easily. Even though, in the perspective view of organization's member, efficiency could make them have worthy conscious mind to meet customer's expectation. Faster, cheaper and better.

## RESEARCH METHODOLOGY

By studied literature review and theory, researcher collect data by questionnaire. Questionnaire sort out by Likert Scale method and used Cronbach Alpha to test reliability. Reliability Statistics is 0.787. Primary data is an in-depth interview (In dept. Interview) using an open question. Data analysis for this study was done by qualitative data that is collected through questionnaire. The software program SPSS for Windows was used for analyze percent (%), mean ( $\bar{x}$ ) and standard deviation (S.D.). Onaway ANOVA (F-test) was used to test differentiate of the hypothesis.

## RESEARCH RESULT

**1<sup>st</sup> hypothesis** is the clients from different industry have different opinion in work efficiency of Licensed Customs Brokers

H<sub>0</sub>: Client who have different industry have different opinion in work efficiency of Licensed Customs Brokers

H<sub>1</sub>: Client who have different industry have no different opinion in work efficiency of Licensed Customs Brokers

Table 4-1 show the result of Onaway ANOVA (F-test) that compare the difference level of opinion to working efficiency of Licensed Customs Brokers of OOCL Logistics (Thailand) C0, Ltd.

Level of opinion to working efficiency	F	Sig.
Cargo delivery	0.469	0.631
Service mind	2.591	0.093
Document preparation	4.221	0.025*
Work reliability	0.078	0.925
Financial	10.008	0.992
Overall level of opinion	1.249	0.303

\*Statistic significant as 0.05

Result from analysis shown that only Document preparation duty had the differentiation by Statistic significant as 0.05 that show as table 4-2

Table 4-2 show the result of Onaway ANOVA (F-test) that compare the difference level of opinion to working efficiency of Licensed Customs Brokers of OOCL Logistics (Thailand) C0, Ltd. in document preparation duty

Level of opinion to document preparation duty	F	Sig.
Standard of documents preparation process	2.912	0.720
Standard of documents delivery timeline	0.192	0.827
Standard of documents accurateness	4.803	0.016*
Overall level of opinion	1.249	0.303

\*Statistic significant as 0.05

Result from analysis shown that only Standard of documents accurateness duty had the differentiation by Statistic significant as 0.05.

2<sup>nd</sup> hypothesis is the clients who have different product have different opinion in work efficiency of Licensed Customs Brokers

H<sub>0</sub>: Client who have different product have different opinion in work efficiency of Licensed Customs Brokers

H<sub>1</sub>: Client who have different product have no different opinion in work efficiency of Licensed Customs Brokers

Table 4-3 show the result of Onaway ANOVA (F-test) that compare the difference level of opinion to the specific characteristics that necessary to partner of Licensed Customs Brokers of OOCL Logistics (Thailand) C0, Ltd. device by the core product of client's industry.

Level of opinion to working efficiency of Customs Brokers of OOCL	F	Sig.
Cargo delivery	1.566	0.214
Document preparation	1.611	0.205
Service mind	0.716	0.589
Working reliability	2.079	0.114
Financial	0.377	0.823
Overall level of opinion	0.776	0.551

\*Statistic significant as 0.05

Result from analysis shown that client who have different product have no different opinion in work efficiency of Licensed Customs Brokers by Statistic significant as 0.05.

3<sup>rd</sup> hypothesis is the clients who have long-standing relationship have different opinion in work efficiency of Licensed Customs Brokers.

H<sub>0</sub>: Client who have long-standing relationship have different opinion in work efficiency of Licensed Customs Brokers

H<sub>1</sub>: Client who have long-standing relationship have no different opinion in work efficiency of Licensed Customs Brokers



Table 4-4 show the result of Onaway ANOVA (F-test) that compare the difference level of opinion to long-standing relationship of Licensed Customs Brokers of OOCL Logistics (Thailand) C0, Ltd. by long-standing relationship

Level of opinion to long-standing relationship	F	Sig.
Cargo delivery	3.430	0.032*
Document preparation	0.338	0.798
Service mind	0.738	0.539
Working reliability	0.578	0.635
Financial	1.046	0.389
Overall level of opinion	0.776	0.551

\*Statistic significant as 0.05

Result from analysis shown that only cargo delivery duty had the differentiation by Statistic significant as 0.05. Shown in table 4-4

Table 4-4 show the result of Onaway ANOVA (F-test) that compare the difference level of opinion to long-standing relationship of Licensed Customs Brokers of OOCL Logistics (Thailand) C0, Ltd. by cargo delivery

Level of opinion to different long-standing relationship by cargo delivery	F	Sig.
Correct delivery	1.432	0.256
Completely delivery	1.731	0.185
On time delivery	8.085	0.001*
Right place delivery	6.534	0.002*
No damage or lost during delivery	0.365	0.779
Overall level of opinion	3.430	0.032*

\*Statistic significant as 0.05

Result from analysis shown that on time delivery duty and right place delivery had the differentiation by Statistic significant as 0.05.

4<sup>th</sup> hypothesis is the clients who have different communication channel have different opinion in work efficiency of Licensed Customs Brokers

H<sub>0</sub>: Client who have different communication channel have different opinion in work efficiency of Licensed Customs Brokers

H<sub>1</sub>: Client who have different communication channel have no different opinion in work efficiency of Licensed Customs Brokers

Table 4-5 show the result of Onaway ANOVA (F-test) that compare the difference level of opinion to different communication channel of Licensed Customs Brokers of OOCL Logistics (Thailand) C0, Ltd.

Level of opinion to different communication channel	F	Sig.
Cargo delivery	0.223	0.801
Document preparation	1.669	0.207
Service mind	2.251	0.125
Working reliability	0.325	0.725
Financial	0.593	0.560
Overall level of opinion	0.468	0.631

\*Statistic significant as 0.05

Result from analysis shown that different communication channel had no different opinion by Statistic significant as 0.05.

## CONCLUSION AND RECOMMENDATIONS

**1<sup>st</sup> hypothesis:** The clients from different industry have an affect in work efficiency of Licensed Customs Brokers. Result from analysis shown that only Document preparation duty had the differentiation by Statistic significant as 0.05 and conform to the work of Isaranun, 2014. He study the factors that effect to working efficiency of Nakhon Pratom Production Co Operative. His work point that different kind of organization have no effect to overview of working efficiency by Statistic significant as 0.05

**2<sup>nd</sup> hypothesis:** The clients who have different core product have no different opinion in work efficiency of Licensed Customs Brokers. This study conform to research of Nuttawut, 2012. He study about Factors that Effect to Business operation of Small to Medium Enterprise of Nontaburi. The research shown that the clients who have different core product have no different opinion in work efficiency too.

**3<sup>rd</sup> hypothesis:** The clients who have long-standing relationship effect to working efficiency of cargo delivery duty. By the way, over all view of this hypothesis found that the clients who have long-standing relationship have no different opinion in work efficiency of Licensed Customs Brokers.

**4<sup>th</sup> hypothesis:** The clients who have different communication channel have no different opinion in work efficiency of Licensed Customs Brokers in all aspect. Nattamon, 2012 studied about Awareness and Attitude of Domestic Passenger against Information of Auditing of Standard of The Thai Airways International by International Civil Aviation Organization. He found that Passengers have not interested about the information. By the reason, the result of standard audit gave no effect to services of the Thai Airways International.

Because Standard of documents accurateness duty, on time delivery duty and right place delivery had the differentiation by Statistic significant as 0.05, Job analysis and Job description are advice to review

### Recommendation:

#### 1) Working reliability Factor

- Try to make clear job description.
- Arrange a job analysis seminar once a year.
- Always make clear employee evaluations.

#### 2) On time delivery factor

- Develop the process to predict the in-coming cargo.
- Develop the process to engage the receiving truck for punctuality.
- Develop the process to communicate with the port controller.

#### 3) Service mind factor

- Try to make a seminar among checker, inspector, controller and customer to find solutions in work process.

#### 4) Standard of documents accurateness factor

- Recheck documents every time before sending out
- Always make sure that each invoice have entirely documents.

#### 5) Financial factor

- Make clearly condition of payment with the client.
- Analyst truly expense of each invoice before sent out.
- Communicate with the client about excess expense immediately.

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## A Decision-Making Framework for the Choice of the Production Line Concept in the Automotive Seat Fabrication

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**Abstract:** In order to compete in successfully in today's competitive global markets and driven by a rising complexity of products, automotive seating producing companies are forced to have an efficient manufacturing. Therefore, a constant improvement is necessary. A lean and target-costing reaching quotation process is one factor to be successful in the market. Within the decision on the organizational layout of new production facilities, a structured planning approach is essential to reduce the time to customers request, to drive agile projects and increase the production efficiency. An approach for a seating manufacturing company is presented in this paper. By using the DMAIC (Define-Measure-Analyze-Improve-Control) approach, the case study investigates possible solutions and researches the most influencing input factors on the decision of production line concepts. After the data collection of feature data sets, this paper gives a hierarchical, transparent decision tree driven procedure to transform the most influential rated input criteria into a production line concept within a complex factory planning environment to give manufacturing planners a tool at hand.

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*Keywords:* Factory Planning, Multi-Criteria-Decision Approach, Process Improvement, Lean, Factory Layout, Graphical Decision

### INTRODUCTION

Over the last decades the complexity of global production systems has been rising. The world-wide trend of mass-customization in the automotive industry has led to design a huge variant of cars and thereover swapped the trend to the suppliers of the Original Equipment Manufacturer. (Wiendahl et al, 2014). Seats are a high complex system with lots of electric devices, like electric seat adjustment, memory-function, pneumatic lumbar support system, massage-function, airbags, park heating technology and so on. Together with the variety of forms, materials, colors and design, a customer can nowadays choose from up to 10.000 different combinations, which together with a wide range of OEMs requirements rises the complexity even more.

On the other hand, the automotive industry is characterized by high competition of the manufacturing companies, which leads to a broad use of lean techniques, pull-based request systems and advantaged information systems. A variety of actions is constantly taken to decrease the complexity of manufacturing, to find methods to increase the transparency on the shop floor and establish efficient manufacturing for being competitive.

This case study investigates the layout planning of production facilities. It describes a way to generate an easy to handle, quick implementable decision process on the production layout by identifying the most relevant criteria on a defined set of possible alternatives (Outcome). First, after the literature review, the Define-Measure-Analyze-Improve-control process is discussed and executed to define the possible alternatives as extracts from the approaches in the literature. Within the process, an Ishikawa problem solution approach with production planning experts was conducted to find the most reasonable criteria. They are then put in an order to find the best guessed layout in case of an OEMs request to start a production and build a new plant.

### LITERATURE REVIEW

The tendency of high and global competitiveness has put a lot of stress on production efficiency and therefore on production planning. (Argoneto et al., 2008) Factory planning problems are due to the high impact on competitiveness a key element to be considered (Grundig, 2014) in market differentiation. With the target of fulfilling the individual requirements of the local customer, the processes and products have been customized to more and more specified customer segments. Especially the automotive industry has put high efforts on market segmentation, product differentiation and marketing strategies. This trend increased the complexity of production networks and lead to decentralized production planning (Argoneto et al., 2008). Also the development and spread of holistic production systems and lean manufacturing has been steadily rising since the 2000s. (Dombrowski & Mielke, 2015) Beside that, the market diversification lead to more and more customer segments and vehicle classes. Their individual specifications lead to a range of production principles.

Schenk et al. (2014) defines a factory as the location, where added value through manufacturing of industrial goods by use of factors of production is taking place. Schenk et al.(2014) furthermore defines factory planning as the systematic, target-orientated, in successive phases structured and by use of methods and tool executed process for the planning of a factory from the first idea until the start of production. A facility layout is according to Heragu (2016) an arrangement of everything needed for production of goods or delivery of services. A facility therefore is an entity that facilitates the performance of any job. It may be a machine tool, a work center, a manufacturing cell, a machine shop, a department, a warehouse, etc. (Heragu, 2016). Layout planning (also known as in-house location decision) decides the type, amount and location of potential factors and production systems. Layout design is a method for factory planning and production line planning to reach short transportation distances and a transparent working steps.

Schenk proposes, that the survey area of factory and factory planning can be determined by three axes, which are Planning Level, Planning stage and planning phases of the factory lifecycle (Figure 1, Schenk et al., 2014). The scope of the planning task is identified by the planning object. Schenk separates the range of planning objects from the whole enterprise network structure to a single workplace into six categories of scope. The planning phase includes the assignment of a planning task into the

lifecycle of a factory, which are generally Development, Installation, Ramp-up, Operation and Dismounting (Schenk et al., 2014). The planning stages subclassify the planning phases and are underpinned by planning steps and planning tools are theories, models, methods, instruments, which can be used within the planning phase. (Schenk et al., 2014)

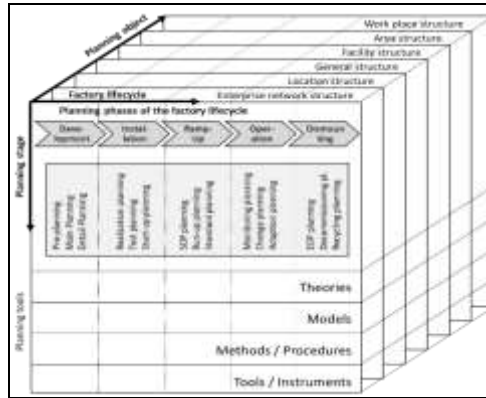


Figure 1: Factory contemplation model (Schenk et. al, 2014)

This case study focuses on the planning of a factory before anything is installed. According to the cube model of Schenk, this is called the development lifecycle phase of the factory. Moreover, this paper investigates the design of the production line on the shop floor, which relates to the facility structure. The conceptualization for a production line is according to Schenk (2014) part of the Main planning. With the method of decision making the classification in the factory contemplation is therefore completed and the model has given the reader an idea of the planning problem.

Drira et. al. (2006) gave an overview on facility layout problems. They suggested a general decision tree for classifying layout problems. According to them the research question in this paper can be classified in the categories: →Facility Layout problem → Material handling system → Layout configurations (Drira et. al 2006). General possible layout configurations following their research are shown in 2. According to them, the layout configurations can be separated into single row layout, which is an own research field and described in detail in their paper, loop layout, multi-row layout and open field layout. (Drira et. al. 2006)

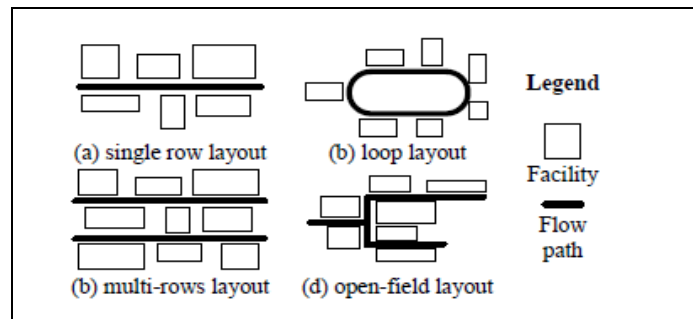


Figure 2: Layout design considering material handling device (Drira et al., 2006)

In their review study, Hosseini-Nasab et al. (2018) classified facility layout problems in four different ways. These are layout-evolution, workshop characteristics, problem formulation and resolution approach. (Hosseini-Nasab et al 2018). Following their model, the workshop characteristics of the problem discussed in here can be seen as a material handling problem or a shape-and-dimension problem. According to them, the seven general alternatives on the level of regular and irregular shape and the configuration of the layout are to be considered. They suppose the alternatives as Single Row, Double Row, Multi-Row, Parallel Row ordering problem, Loop Layout, Open field layout and Multi floor layout.

Kulkarni et. al. (2015) came up with a classification of factory planning problems. They suggested to separate factory planning into plant location planning and plant design planning. Plant design planning can therefore be separated into structural design planning, layout design and handling system planning. They discussed four different facility layout scenarios: the fixed position layout, the product orientated layout, the process orientated layout and the cellular layout. (Kulkarni et. al. 2015). Furthermore, they separated layout configurations into single-row, loop-layout, multi-row, open field and multi-floor. Within the single-row, they propose a differentiation into linear, semi-circular and U-shaped layouts. (Kulkarni et. al. 2015)

Abdou and Dutta (2007) developed an expert system approach to determine the optimal layout for a specific case. They combined manufacturing and material handling systems by expert’s knowledge of six criteria, which are product variety and quantity, degree of flexibility, level of automation, material handling systems, work-in-process and environmental considerations (Abdou & Dutta, 2007). Their decision program used the criteria which were evaluated on a low-medium-high scale for their eligibility.

Shang & Jen (1993) faced in their journal article a multi-criteria facility layout problem by the use of an analytical hierarchy process. They gained a relative weight for each qualitative criterion and found a way to consider subjective factors as well. Abdul-Hamit et al. (2005) also used an AHP for the choice of a manufacturing layout, in which they investigated three main types of layout. They didn’t investigated specific layout variants, but they analyzed the functional (process) layout, the group technology (cellular) based layout and the transfer lines (flow) layout (Abdul-Hamid et al., 2005) and they used a two stage attributes hierarchy. Flexibility, volume and cost with 10 sub-attributes were used in their research. Yang and Kuo (2003) also

solved a facility layout problem by an analytical hierarchical process as well. They used a computer aided layout planning to generate several layout alternatives. They didn't focus on the production line, but they arranged functional areas like sewing, trimming, inspection and packaging by the use of an AHP in a production facility.

Westkämper and Decker classified several production principles and types in their framework as shows in figure 3. (Westkämper & Decker, 2006). The production type is determined by the number of products which are produced. Five general types were introduced by them, which are: Single-item production and repeated production with together are the so called "non-repetitive production". The opposite of that is the repetitive production with production types "Production of variants", "serial production" and "large-scale production".

Whereas production principles are characterized and identified by the areal and organizational structure and the labor divisional apparel. (Westkämper & Decker, 2006). Their model names six alternatives: A fixed site production is identified by not moving the product (local manufacturing). All resources are brought to the construction site and there is also the manufacturing of components or pieces done. The job shop production principle is characterized by segmented technological areas. The machines and work spaces are not organized according to the order, but for an effective use of the space. In a production cell several machines are placed together for a better division of work. Flexible manufacturing systems are organized according to the most common production sequence. They do not work in a flow principle. The flow-shop is characterized by the movement of the products, products can be transported without a predefined tact. Flow shops can also have a fixed tact. (Westkämper & Decker, 2006)

The Production principle and the production types can be drawn into a XY-Diagram, which was done in the following Figure 3. Theoretically every combination is possible. Westkämper and Decker (2006) pointed out the most common and used combinations of production principle and production type. They are marked with a grey dot in the Figure 3.

		Production Principle					
		fixed-site production	job-shop production	Production cells	flexible systems	flow shop without tact	flow shop with tact
Production Type	Single-item production	●	●				
	Repeated production	●	●	●			
	Production of Variants		●	●	●		
	Serial production				●	●	●
	Large-scale production					●	●

Figure 3: Production Types and Production Principles (Westkämper & Decker, 2006)

As shown before, the production types are either serial production or production of variants, the picture gives the information, that the production principles job-shop production, production cells, flexible systems, flow shop with and without tact should be considered in further research.

A classification of decision models, which are used in this research can be done according to Rommelfanger and Eickemeier (2002) into five categories, as the following:

- Number of People: One / group / rational acting antagonists
- Number of objectives: Single / multiple
- Level of Information of the decider on the real conditions: Deterministic models with secure information / Risk situation with given probabilities (stochastic models) / Situation of uncertainty / Risk situation with fuzzy probabilities / Risk situation with possibility distribution
- Information of the decider about consequences: Real number or tuple / Probability distribution / Fuzzy results
- Level of decision: Single level or static decision models / Multi-level or dynamic decision models

The handling of complex decision problems is for humans quite difficult, because of the consideration of several alternatives and the different consequences of each alternatives. Mkrkdth and Surksh (1986) mentioned in their article about justification techniques, that unweighted models assume that every criterion is same important. They proposed to use a 1-5 scale to weight criteria. They found that the more criteria are compared, the more inconsistent the human judgement is

Because the decision of selecting a suitable layout is dependent on many factors in the manufacturing environment, the use of multi-criteria decision-making is a suitable approach (Abdul-Hamid et al., 2005)

Lean production is a business philosophy of producing goods in large numbers using methods, that avoid waste in its production processes. (Cambridge Dictionary) Lean Production, also known as the Toyota Production System has been developed by Taiichi Ohno in 1978. (Ohno, 1978) His philosophy focused on eliminating waste, empowering workers, reduce inventory and improve productivity. The ten rules, which were developed are to eliminate waste, to minimize inventory, to maximize flow, to use pull production from a customer demand, to meet customer requirements, to do it first time right, to empower works, to design for a rapid changeover, to partner with suppliers and to create a culture of continuous improvement.

The Toyota Production system has it highest spread in the automotive industry. About 80% of all manufacturing companies use the TPS (Dombrowski & Mielke, 2015) From Ohno's 10 principles for lean production, he derived his 7 types of waste, (Japanese: Muda) which are: (Ohno, 1978)

- Waste of transportation: moving products that are not actually required

- Waste of inventory: all components, work in process and finished product not being processed
- Waste of motion: People or equipment moving or walking more than is required to perform the processing
- Waste of waiting: waiting for the next production step
- Over-production: production ahead of demand
- Over processing: resulting from poor tool or product design creating activity
- Defects: the effort involved in inspecting for and fixing defects

Later, the 8th type of waste, the so-called waste of labor skills was added.

To conclude the literature, there are several classifications of basic production line concepts shown in the literature according to the production type. They are quite general and need to be adapted in practical uses. As shown, several researchers had tried to find suitable multi criteria decision approaches. This research is another one to find a lean decision methodology within a specific industry.

### CASE STUDY

Within a quotation phase, the company’s new business and project calculation department processes automotive origin equipment manufacturer’s requests for the development and build of seating systems or components into a business plan. The business plan contains various information, like cost structures, bill of material, suppliers, quality requirements, location strategy, etc. One of them, is also the so-called manufacturing concept. This concept describes how and with which equipment and with how many people, with which technological manufacturing technique and so on the assumed serial production on the shop floor will be done according to the current quotation information. The main point of the manufacturing concept is the choice of the so-called manufacturing layout. It describes the organizational structure of the future plant layout. Several types of production line concepts are explained in the result chapter. They were extracted from the literature review.

It is known that the choice for a production line layout depends on several factors and is highly special for each planning case. Nevertheless, the research objective was to investigate the underlying empirical, but rarely documented processes and to find a way for a decision methodology, which are used to be investigated input-parameters and transfer them into a production line concept. The Figure 4 **Error! Reference source not found.** uses an Input-Throughput-Output-Model for visualizing the research problem. On right hand side is the Output, the production line concept as part of the manufacturing concept. Within the Analysis phase of the DMAIC, the possible alternatives are researched. On the left-hand side is the input into the decision. These are all the criteria, which have a significant input into the decision. They must be identified with a suitable approach. The box in between the input and the output boxes is the decision itself with a corresponding decider supporting tool. Within this decision the raw data from the identified input parameter are used, transformed, and a logical and structured decision process was designed to gain a single output suggestion. This so called most-applicable solution gives the business development team a deeper insight into the consequences of their decision for one alternative.

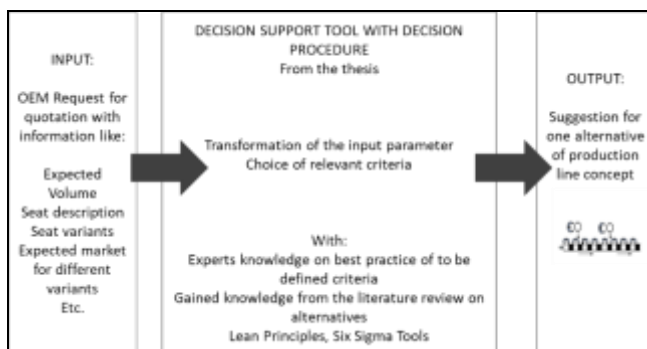


Figure 4: Input-Throughput-Output-Model of the research problem (Source: Researchers)

In several previous planning project for the quotation to an OEM, the current decision logic was executed. In some cases, after several rounds of negotiation, the company received the offer to build the seating manufacturing plant and supply the OEM within the automotive project lifetime duration, which is usually seven years. The reasons for nomination are various and not always clear. The most obvious reason is, that the offer was the best and/or the cheapest one. But it can also be, that strategic sourcing approaches lead the OEM to accept the given quote. In case of nomination, the company follows the assumptions, calculations and manufacturing concepts written in the business plan.

Within previous and compiled studies of the controlling department on the real investment costs of manufacturing projects, it was found out, that there are quite big deviations of investment costs in some projects compared to the business plan. The outcome was, that previous projects sometimes had much higher investment cost than expected, which lead to low profitable or even negative business cases. On the other hand, there were projects that had much lower costs than expected, which resulted in a high risk of non-nomination.

The current procedure of decision is neither standardized, nor is it data-driven. Instead the experienced expert’s guesstimate what the production line concept should be in their opinion. This procedure led to lots of discussions, which concept might be the most applicable and especially why to use it. Sometimes the comparable business case is transferred by just adding a factor of X% (e.g. 5%) on the previous quote based on the feelings, that this project might be X% more complicated/expensive. It was found, that this current decision methodology of guesstimation the costs from previous projects isn’t exact enough.

METHODOLOGY

Within the research, the DMAIC approach is used as the overall process improvement process. It is structured by the project steps Define, Measure, Analyze, Improve and Control, which form a close loop and help to reveal the root causes of deficiencies in any process. (Costello, 2008)

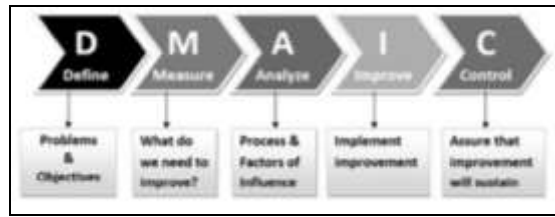


Figure 5: DMAIC-Approach

This generally project orientated approach seeks to reach according to Hahn (1999): Quantified financial impact, Continued top management support and enthusiasm, The emphasis on a quantitative and disciplined approach, the value placed on understanding and satisfying customer needs, combining the right projects, the right people and the right tools. The five stages of the DMAIC approach are as followed:

- 1) Define: Within the first phase, all relevant information about the project were collected. This relates to appropriate selection of projects, problem definition, and defining the metrics with their baseline. For example, it includes Cost of poor quality, rolled throughput yield, and capacity productivity, and methods for their valid estimation. A project team is to be set up and the scope of the project (goal, range of improvement), the key measures, the project milestones, the project structure plan and the goals. (Hahn, 1999) To get a first understanding of the underlying processes and the associated customer requirements, a SIPOC-chart (Supplier, Input, Process, Output, Customer), as a high-level process map was proven as a suitable analytical instrument. By the use of SIPOC, customer’s, both internal and external, main process steps and the input and output variables were determined with a systematic approach.
- 2) Measure: The objective of the measure in the DMAIC methodology is to generate reliable data on the project's progress towards the prospected objective. This phase selects the appropriate responses (the “Y’s”) to be improved, based on customer inputs and other considerations, such as product yield, ensures that they are quantifiable, and that they can measured accurately (Key Performance Indicators – KPIs). It is also determined what is unacceptable performance (i.e., a “defect”). Gather preliminary data to gauge current performance by the use of statistical methods, process visualization or sampled tests. (Hahn, 1999) It was examined, that the previous guestimation process to find a manufacturing layout is quite inexact.
- 3) Analyze: In the analyses-phase, the preliminary data is used to document current performance (baseline process capability), and to begin identifying root causes of defects (i.e., the “X’s”, or independent variables, independencies, root-cause-analysis) and their impact, and act accordingly. (Hahn, 1999) This phase leads to the start of improvement approaches. With an Ishikawa analysis, the main driver of the decision process were identified in the research. By data collection of previous feature data sets, the incoming and possible outcoming were sampled.
- 4) Improve: The Improvement-phase determines how to intervene in the process to significantly reduce the defect levels. Then, the most promising approaches of improvement are selected and executed by the DMAIC project team. Several rounds of improvements may be required. Recently, special emphasis has been given to reducing variability. (Hahn, 1999) At last, the improvement phase contains the implementation of the selected problem solution approaches in the daily business processes of the company or the department. In the research, the decision method was improved with the newly defined input and output values and an applicable decision process with a decision tree was defined
- 5) Control: To verify the effectiveness of measures taken and secure a sustainable solution to the problem, regular and targeted control techniques are inevitable. This control takes place in the last step of the DMAIC cycle - once the desired improvements have been made, this phase is on the one hand the documentation and on the other hand a system is put into place to ensure, that the improvements are sustained, even though significant resources may no longer be focused on the problem. (Hahn, 1999) In the research, a specific planning case was simulated with the new decision approach

Another methodology that was used is the Business Process modelling notation version 2.0 (BPMN). BPMN is a graphical representation for specifying business processes in a business process model. BPMN is a relatively recent method, which is suited for the illustration of complex processes due to a variety of symbols and the possibility of a clear distinction. Business Process modeling is used to communicate a wide variety of information to a wide variety of audiences. BPMN is designed to cover many types of modeling and allows the creation of end-to-end Business Processes. The structural elements of BPMN allow the viewer to be able to easily differentiate between sections of a diagram.

The Ishikawa-diagram, also called fishbone diagrams, herringbone diagrams, cause-and-effect diagrams, or Fishikawa) are causal diagrams created by Kaoru Ishikawa that show the causes of a specific event. (Ishikawa, 1996) Common uses of the Ishikawa Diagram are product design and quality defect prevention to identify potential factors causing an overall effect. Each cause or reason for imperfection is a source of variation. Causes are usually grouped into major categories to identify and classify these sources of variation

RESULT

For the output of the decision, the right-hand side of the figure 4 (Input-Output-Throughput-Model), the possible alternatives were identified. Therefore, the already in the company existing production line concepts were classified by the general layout types as shown in the literature review part. In addition, some cases which were existing in the literature but were not implemented in the company were chosen as well to generate the pool of alternatives as shown in the figure 6. They are (in the



order in the figure): single line, single line with offside workstations, double line, double line with offside workstations, (multiple lines), side flow layout, merging lines, isolated production cells, circular layout and individual production.

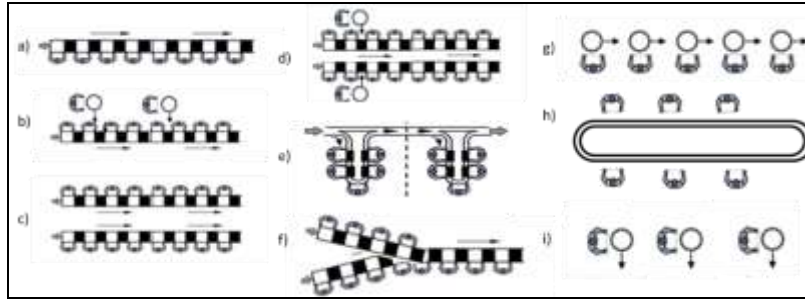


Figure 6: Pool of nine outcome alternatives (Source: researchers)

For the left side of the input-output-throughput figure, the most influential impact factors were needed to be identified. Therefore, an Ishikawa workshop with senior experts was concluded. The results are shown in the following figure 7.

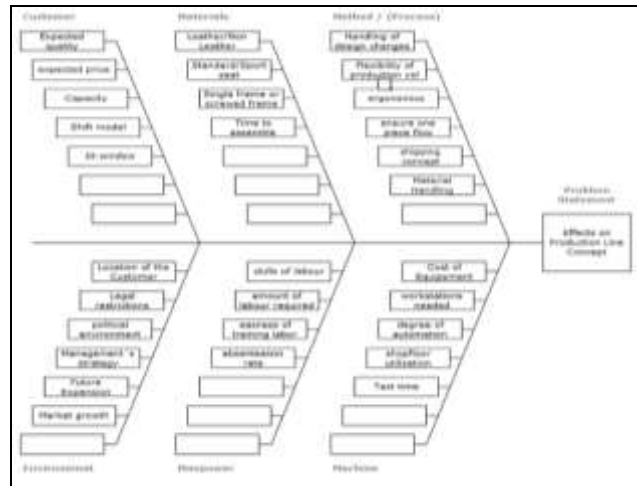


Figure 7: Result of Ishikawa analysis (Source: Researchers)

After a rating of the result of the Ishikawa by the in-company experts, the most influential input parameters were identified as:

1. Distance between Customer’s production plant and proposed own production plant.
2. JIT-Window, the time between an order arrival and the time of arrival of the finished good
3. Number of working shifts
4. Capacity of the factory
5. Assembly time of a standard seat
6. Variance of the assembly time of the seats
7. Proposed tact time
8. Number of workstations at the line
9. Shipping concept to the customer

To generate the last part of the input-output-throughput-model, the nine identified criteria had to be matched with a logic to generate a solution for finding the most applicable of the nine layout alternatives of figure 6. As the input criteria are quite divers, a mix of nominal, ordinal and ratio-scaled criteria, the decision tree approach as shown in figure 8 with the Business Process Modelling Notation was considered a well course of action. The investigated company was quite focused on showing the deviations of an investigated quote from the company’s standard business cases.

In order to comply with this requirement, the process route is from top to bottom and the centered box represents the normal business case. The nine input criteria are chronological enquired and whenever a deviation appears, the decision tree gives information of what to be considered and which of the alternatives might be taken.

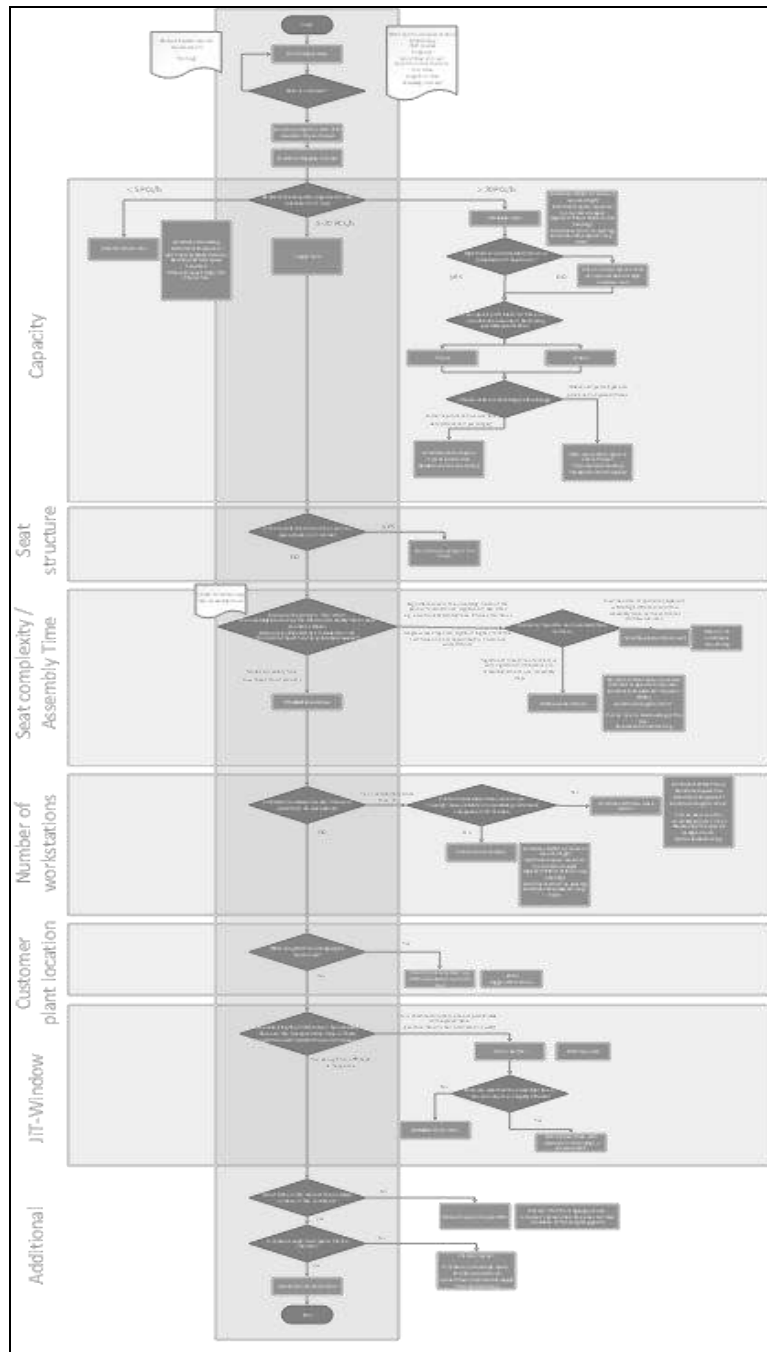


Figure 8: Decision approach with the input-criteria and the centred standard business

### CONCLUSION

The research showed an approach of dealing with uncertainty in the quotation process of a 1<sup>st</sup> tier automotive supplier by the use of the DMAIC improvement process. From the theory and in the investigated, nine possible production line layouts were identified. By doing an Ishikawa analysis, the nine main input factors of the relevant process were identified. With a standardized and applicable approach of a decision tree, a solution was found to give manufacturing planners in the automotive industry a tool at hand. It has to be said, that it was quite difficult to agree on general planning principles and influencing factors. Due to the fact, that every factory is an own project with own special restrictions and given requirements it is hard to find general rules. Therefore, not an exact calculation could be done, but a qualitative decision tree was created. If it would be possible in the future to integrate the special requirement of every customer or location in the consideration as well as to quantify every criterion, it might be possible to use quantitatively approaches.

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