

**THE STUDY OF CRITICAL SUCCESS FACTORS OF CROSS-BORDER
E-COMMERCE FREIGHT FORWARDER FROM CHINA
TO THAILAND: A CASE STUDY OF BMJ CARGO**



**A Thesis Submitted to the Graduate School of Naresuan University
in Partial Fulfillment of the Requirements
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Thesis entitled “The Study of Critical Success Factors of Cross-border E-commerce
Freight Forwarder from China to Thailand: A Case Study of BMJ Cargo”

By Ting Sun

has been approved by the Graduate School as partial fulfillment of the requirements
for the Master of Science Degree in Logistics and Supply Chain
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ABSTRACT

In the past 10 years, cross-border online shopping on China's e-commerce platform is extremely increasing in Thailand. Therefore, the cross-border e-commerce freight forwarders play as an intermediary to provide purchase services and cross-border shipping services for Thailand's customers. The continual growth of cross-border e-commerce raises the need to understand more about cross-border e-commerce freight forwarders in Bangkok and surrounding area, especially identifying critical factors that affect their success. Therefore, this research intends to explore the critical success factors by using Critical Success Factor (CSF), which is particularly formed for e-commerce business. After that, Analytic Hierarchy Process (AHP) is used to identify the influence level of all critical success factors and examine the effect of service on four working processes. Lastly, this research applies BMJ Cargo as a case study to analyse process efficiency. The work efficiency in current and redesign purchase process is compared by utilizing simulation model.

The numerical results in this research indicate that service, ICT system, talent, cross-border logistics, business process, customs clearance, innovative awareness and ability, and after-sales services are eight critical success factors for cross-border e-commerce freight forwarder from China to Thailand. In addition, service has most significance in order-making process and logistics process. Furthermore, ICT system

plays a more important role in medium-scale cross-border e-commerce freight forwarders than small-scale cross-border e-commerce freight forwarders. According to the case study analysis, improving ICT system function and combining pre-order department and order-making department as purchase department are good choices for improving work efficiency and control number of employees. In summary, this research puts forward CSF model, AHP models, and empirical implication to evaluate the effect of critical success factors on working process. The outcomes of this research may enable managers to make better decisions on constructing strategies in promoting cross-border e-commerce freight forwarder performance effectively.



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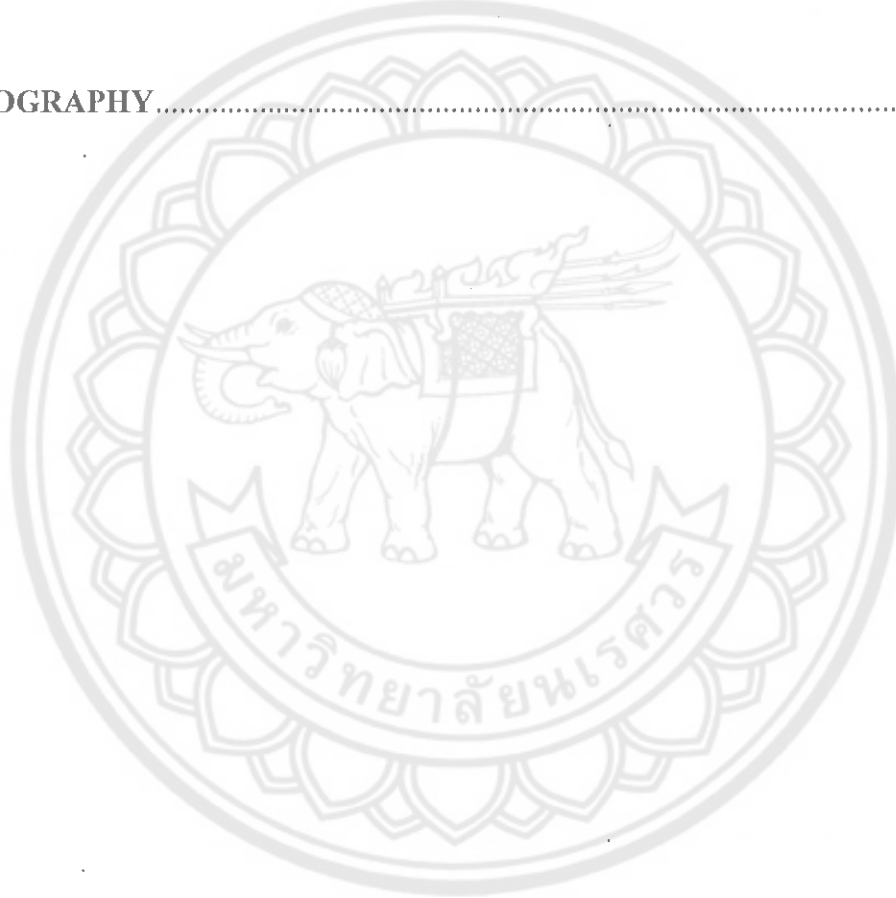
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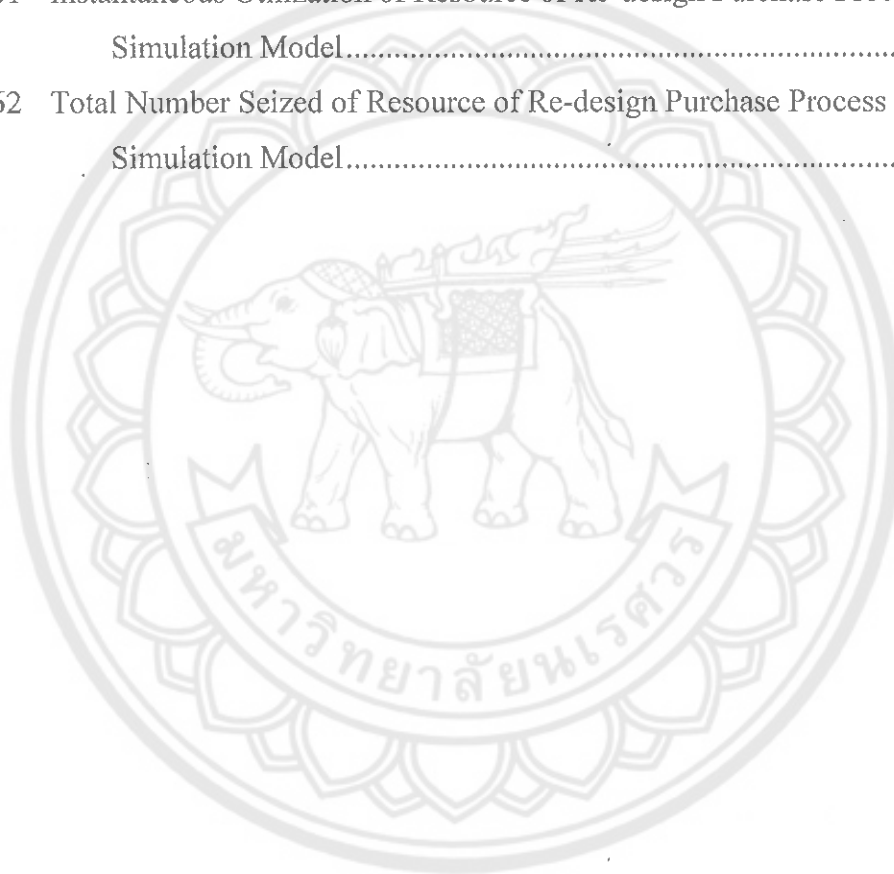
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ABBREVIATIONS



AHP	=	Analytic Hierarchy Process
ASEAN	=	Association of Southeast Asian Nations
ASS	=	After-sales Service
B2B	=	Business to Business
B2C	=	Business to Customer
BK	=	Bangkok
BP	=	Business Process
CBL	=	Cross-border Logistics
CC	=	Customs Clearance
CECRC	=	China E-Commerce Research Center
C.I	=	Consistency Index
CNKI	=	China National Knowledge Infrastructure
CNY	=	China Yuan
C.R	=	Consistency Ratio
CSFs	=	Critical Success Factors
CTQ	=	Critical-to-Quality
Dep.	=	Department
EXPO	=	Exponential
FIATA	=	International Federation of Freight Forwarders Associations
GZ	=	Guangzhou
IAA	=	Innovative Awareness and Ability
ICT	=	Information Communication Technology
KPI	=	Key Performance Indicator
KPIVs	=	Key Process Input Variables
NP	=	Number of People
QTY	=	Quantity of Paper
R. I	=	Random index
SIPOC	=	Suppliers, Inputs, Process, Outputs, Customers

ABBREVIATIONS (CONT.)

SMEs	=	Small and Medium-size Enterprises
TNSO	=	Thailand National Statistical Office
TRIA	=	Triangular
Wh. BK	=	Warehouse Bangkok
Wh. GZ	=	Warehouse Guangzhou



CHAPTER I

INTRODUCTION

Background

In recent years, foreigners gradually interested in shopping on China's electronic commerce platform, which include USA, EU, ASEAN, Japan. Thailand is one of them too. China E-Commerce Research Center (CECRC) released that, China's cross-border e-commerce export transaction size of 4.49 trillion Yuan in 2015. ASEAN has become China's third largest e-commerce importer, accounting for 11.4%, as shown in Figure 1. The imported products mostly are electronic product, fashions, outdoor products, health and beauty product, and jewellery, as shown in Figure 2 (CECRC, 2016). Online shopping is no longer limited by geographical location, if the overseas products are superior to local products in quality, cost-effectiveness, various styles, and diversified latest designs, consumers may be subject to great temptation. Thailand's customers can buy favourite items on China's e-commerce platform, through international carriers' transport to the destination for their own consumption, retail, or wholesale. With the advancement of e-commerce, as well as the improvement of consumption level of residents, many consumers are increasingly strong demand for cross-border online shopping. Further, more and more convenient logistics is also one of the driver to promote the progress of cross-border e-commerce. Therefore, the organizations began to rise to help Thailand's customers shopping on taobao.com, 1688.com, and other e-commerce platform, online payment, and look for international carriers. The number and scale of organizations are increasing year by year in the past 10 years, eventually developed into the cross-border e-commerce freight forwarder industry. Freight forwarders play as an intermediary to help Thailand consumers to shop smoothly and happily, which provide translation services, purchase services, exchange services, cross-border shipping services, and after-sales service and so on.

The Thai government make account of the progress of e-commerce, which is propitious to decrease transaction costs, improve the quality of life and assist Small and Medium-size Enterprises (SMEs) to exploit new opportunities in the new global economy (Limstit, & Keretho, 2002). Thailand's population aged 6 years and over used

computer, internet and mobile phone in Thailand all have steadily rising from 2009 to 2013, as shown in Figure 3 (TNSO, 2014). However, there was only 3.1 percent of establishments purchasing via internet, and about 1.9 percent selling via internet in Thailand in 2015, as shown in Figure 4 (TNSO, 2016). Thailand has some domestic e-commerce platforms, such as lazada.co.th, shopee.co.th, 11street.co.th, wemall.com, weloveshopping.com, and so on. Thailand's local e-commerce industry is developing, whereas the public cross-border online shopping is active, it's an interesting phenomenon.

Nevertheless cross-border e-commerce also encounters some problems in transaction process in the fast development. Customs clearance, cross-border logistics, cross-border online payment and language are main challenges for cross-border e-commerce. As cross-border e-commerce sellers and customers cannot communicate face to face, the limited language skills may become barrier for negotiation, tracking logistics information, after-sales service, and resolving dispute. Moreover, payment and parcel delivery systems gain in prominence for online transactions in trade cost. The prices to customers for cross-border deliveries are three to five times higher than for domestic deliveries (Okholm, Thelle, Moller, Basalisco, & Rolmer, 2013). Cross-border e-commerce freight forwarders industry is one of the fastest growing cross-border trade industries. There are new companies to set up, but also have some companies gone to the wall. Accordingly, the continual growth of cross-border e-commerce raises the needs to understand more about cross-border e-commerce freight forwarders, especially identifying factors that affect their success.

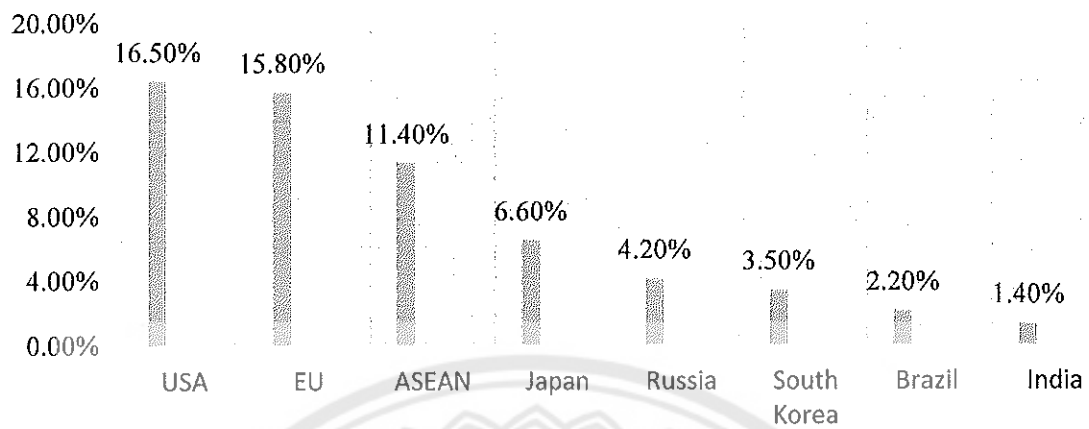


Figure 1 Export Distribution of China's Cross-border E-commerce in 2015

Source: China E-Commerce Research Center (CECRC). "2015-2016 Export of Cross-Border E-Commerce Development Report."

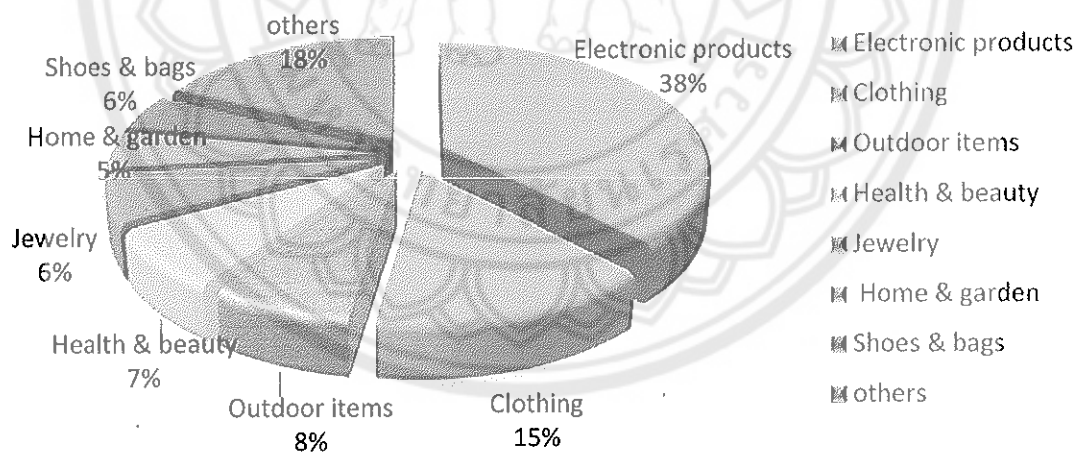


Figure 2 Categories of Goods in China's Cross-border E-commerce Export Market in 2015

Source: China E-Commerce Research Center (CECRC). "2015-2016 Export of Cross-Border E-Commerce Development Report."

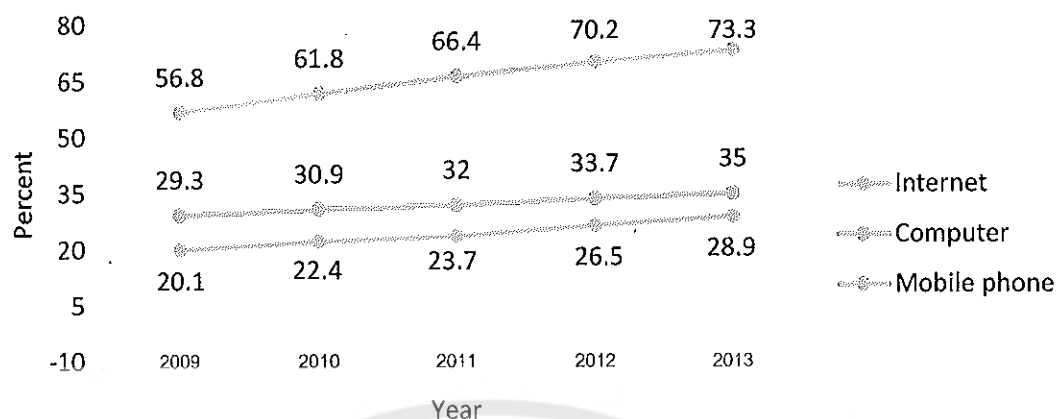


Figure 3 The Percentage of Population Aged 6 Years and Over Used Computer Internet and Mobile Phone in 2009-2013 in Thailand

Source: National Statistical Office of Thailand (TNSO), “The 2013 Information and Communication Technology Survey in Household.”

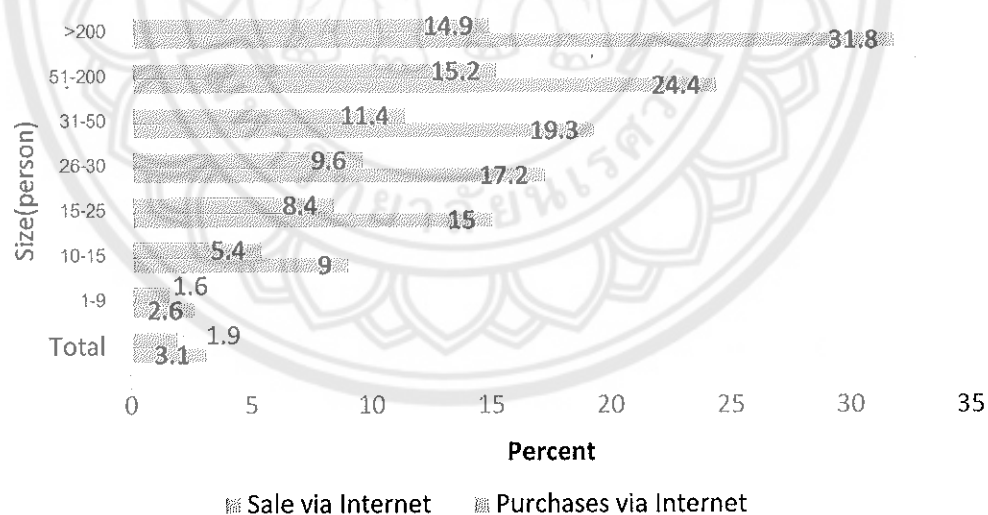


Figure 4 The Percentage of Establishments Purchasing and Selling via Internet by Economic Activity in 2015

Source: National Statistical Office of Thailand (TNSO), “The 2015 Household on the use of Information and Communication Technology.”

Objectives

This research has 4 main objectives as follows:

1. To study the critical factors effect on the success of cross-border e-commerce freight forwarder from China to Thailand.
2. To determine the influence level of critical success factors of cross-border e-commerce freight forwarder.
3. To identify the process of cross-border e-commerce which is the most critical success factor most effect on.
4. To analyze the process efficiency by improving the working process which is the most critical success factor most effect on.

Significance

There is limited literatures deal with the critical factors effect on the success of freight forwarder in cross-border e-commerce from China to Thailand, so this research intends to make up this gap. Moreover, this research hopes to call the organizations' attention of the importance of critical success factors and its effects, along with provide guidance for the development of relevant industries. Furthermore, researching cross-border e-commerce freight forwarder development from the perspective of critical success factor is conducive to boosting the development of cross-border e-commerce SMEs between Thailand and China.

Scope

This research aims at freight forwarding enterprises in Bangkok and surrounding area, which help Thai customers import commodities from China's e-commerce platform. It intends to select a freight forwarder in Bangkok as a case study. At the same time, this research focuses on entire processes, which include pre-order process, order-making process, logistics process, until the completion of after-sales process.

Research Framework

Based on the objectives, the study steps of this research are shown as research framework (see Figure 5).

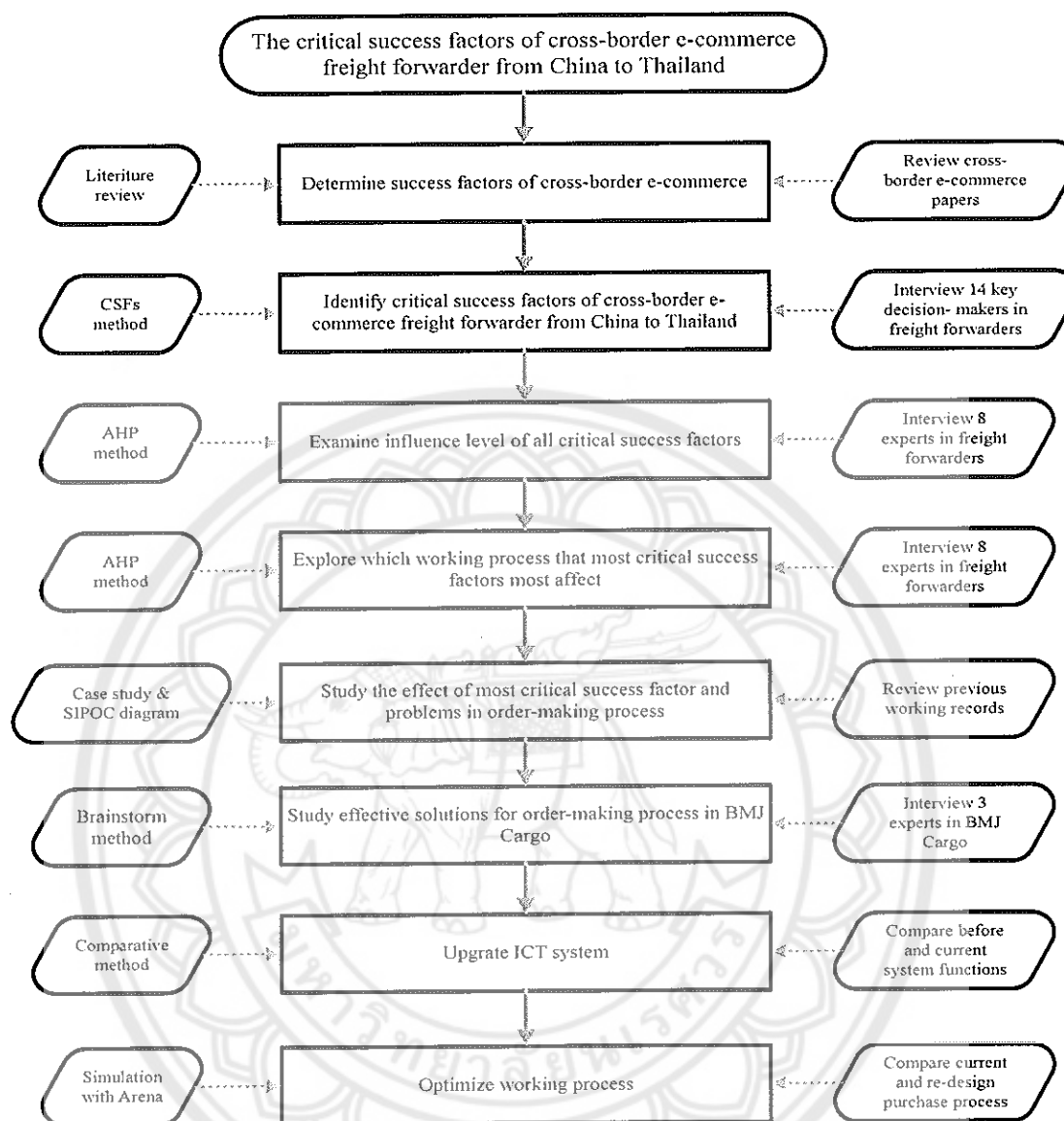


Figure 5 Research Framework

Research Flowchart

This thesis is divided into six sections, as shown in Figure 6: Research flowchart. Section II briefly reviews the statement of cross-border e-commerce, as well as cross-border e-commerce freight forwarder. Meanwhile, the research tools Critical Success Factors (CSFs), Analytic Hierarchy Process (AHP), SIPOC mapping, simulation model and Arena are also retrospect.

Section III proposes the research approaches, research frame and model, as well as the main research content. Section IV analysis practical data and presents the meaningful results. Section V applies theory to practice. A cross-border e-commerce freight forwarder in Bangkok which import merchandise from China to Thailand is used as a case study. Section VI draws this research to a conclusion and discussion; some recommendation and future research directions are pointed out.

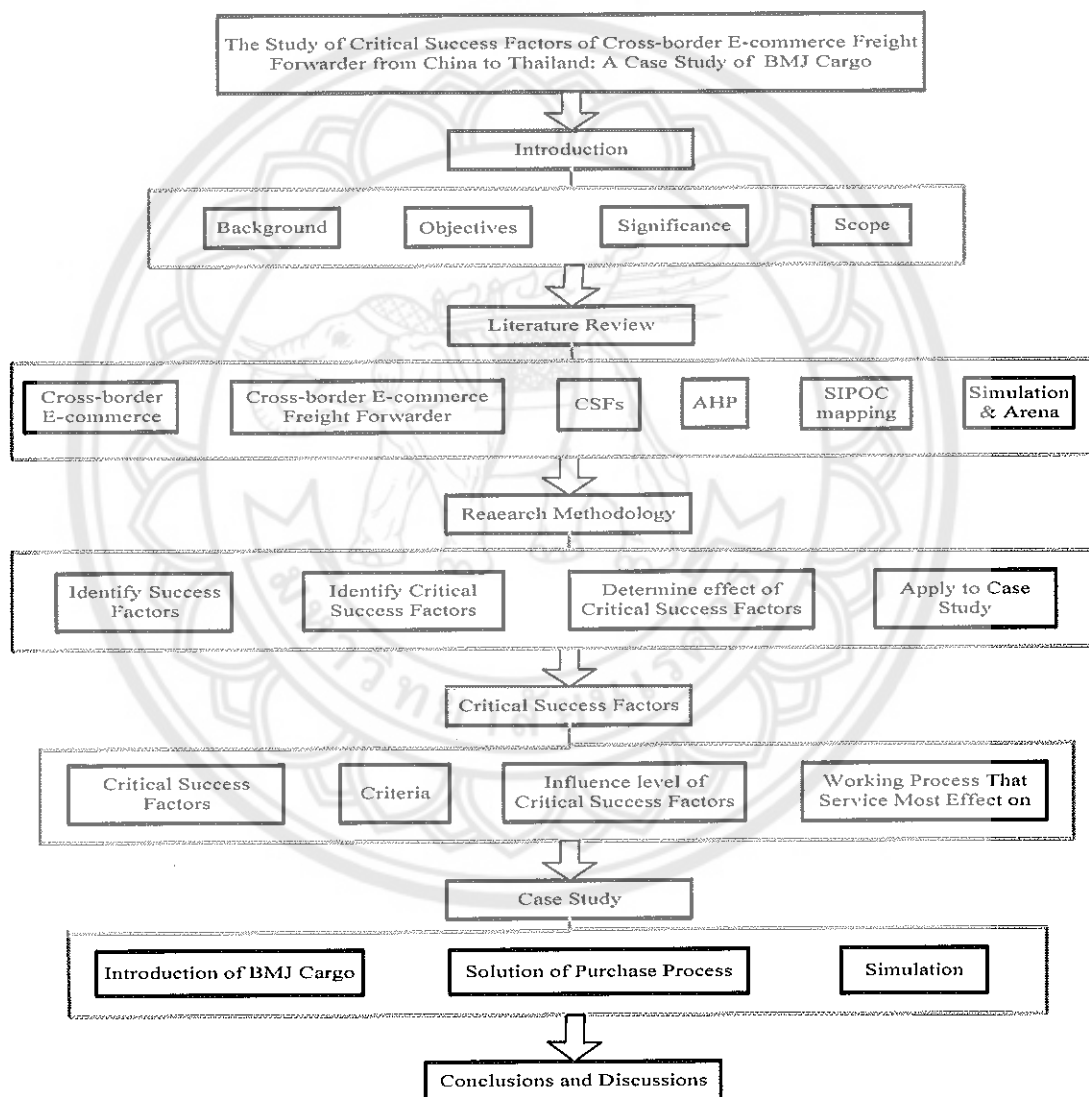


Figure 6 Research Flowchart

CHAPTER II

LITERATURE REVIEW

Cross-border e-commerce, freight forwarder, critical success factor, analytic hierarchy process, simulation and Arena are used as keywords to search for related English and Chinese papers in Scopus, Google Scholar, CNKI, CQVIP, WANFANG DATA and other databases respectively. This section aims to answer the following questions: 1) what is cross-border e-commerce freight forwarder? 2) What are the success factors of cross-border e-commerce freight forwarder from China to Thailand? 3) How to determine the critical success factors and their effect.

Thus, this section briefly reviews the previous studies from aspect of cross-border e-commerce, the freight forwarder which operate cross-border e-commerce business between China and Thailand, as well as research tools critical success factors, analytic hierarchy process, SIPOC mapping and simulation model respectively.

The Statement of Cross-Border E-commerce

By geographical range, e-commerce is divided into domestic business and cross-border e-commerce business. Cross-border e-commerce comprises cross-border business to customer (B2C) e-commerce and cross-border business to business (B2B) e-commerce. Cross-border e-commerce is a new type of international business, which conducts product display, negotiation and transaction by way of the Internet (iResearch, 2015). Cross-border e-commerce is a kind of international trade, which transaction parties in different countries trade and settle business activities on the e-commerce platform (Sun, & Wang, 2015). It delivers the goods through cross-border logistics. Cross-border e-commerce have fewer links, lower cost, shorter cycle and other advantages. These superiorities help cross-border e-commerce won a place in international trade (Chen, 2016). Cross-border e-commerce simplifies the transaction process and saves the costs of goods circulation effectively. It enables cross-border online shoppers to contact with retailers, wholesalers and even producers directly (iResearch, 2015). The e-commerce platform provides tangible product and intangible

service for customers. E-commerce is one of the tools which enable SMEs to expand to world market (Chooprayoon, & Fung, 2007).

In terms of the export flow of cross-border e-commerce, there are 3 main channels (see Figure 7). The first channel is that, producers display their products on cross-border e-commerce platforms. After the products are selected and paid by customers, they will be sent to logistics corporations by cross-border e-commerce operators for delivery. The products will finally reach the customers after two inspections at customs. In the second channel, third-party comprehensive service platforms are one of the good choices for some cross-border e-commerce operators. They cooperate and share resources in logistics, customs clearance and other procedures. The third channel is studied in this research, which is different from the first two ways. The manufacturers display their products on e-commerce platform. The cross-border e-commerce freight forwarder purchase and pay on the e-commerce platforms on behalf of the overseas customers. Meanwhile, they are responsible for cross-border logistics, customs clearance, warehouse and a series of process, until the goods are delivered to the customers.

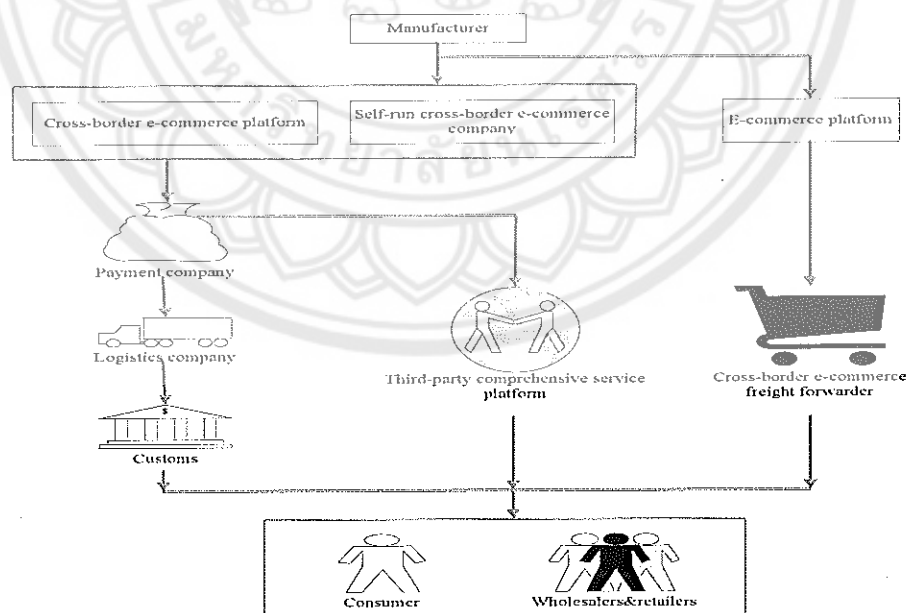


Figure 7 Cross-border E-commerce Flow

From the viewpoint of consumer, the basic procedure of online shopping generally incorporate three stages: pre-purchase, purchase and after-sales contact procedure (Wang, 2002). This research divided purchase procedure of cross-border e-commerce from China to Thailand into 4 basic processes, which include pre-order process, order-making process, logistics process and after-sales process (Ma, 2012). Pre-order process involves collecting products information, filling in orders in cross-border e-commerce freight forwarder platform system. Order-making process cover creates the purchase orders (ORDERS), response purchase orders (ORDESP), change purchase orders (ORDCHG), transport instruction (IFTMIN), negotiation and payment. Logistics process includes domestic transport and cross-border shipping, customs clearance and cargo tracking. After-sales process involves after-sales service, handling complaints, products returned and resolving disputes.

In recent years, Thailand's growing market has a strong demand for consuming, even though domestic e-commerce is developing. The participants pay increasingly commit to cross-border e-commerce. As a main trend in global trade, B2C is taking a bigger share in the cross-border e-commerce market (iResearch, 2015). Cross-border e-commerce from China to Thailand shows some new characteristics, including the following aspects:

From the perspective of participants, more and more enterprises move into this industry due to low market entry barriers. Previously the shoppers mainly are individual merchants and online merchants. Up till now, they have gradually formed certain scale. The number of orders is larger, and the volume of order is increasing. Cross-border e-commerce is the most important pattern for overseas shopper to get cheap but good-quality product. However, it gradually appears shortage for cross-border e-commerce talents. The potential market is demand non-common language and international online trading talent increasingly. However, most cross-border practitioners are good at English.

As the development of logistics and Internet technology, B2C is moving on a smoother way in cross-border e-commerce market. Customs clearance, commodity inspection, cross-border logistics and online payment process easy encountered problems, which may affect the growth of cross-border e-commerce. Concerning that, cross-border e-commerce freight forwarders keep expanding their services and try to

provide integrated services by combining various resources. The whole industry chain and the service chain of the industry are getting clearer and sounder. Some companies have try to build their own platforms and sold oversea product directly.

The traded products are more categories; the regions of trading objects are wider range. The product are mainly easily-transported products in the before, but up to now, gradually extended to household and gardening product, auto parts and automobile. As solutions to technology and logistics are getting more innovative, cross-border e-commerce is playing a cumulatively significant role in e-commerce market. The cross-border e-commerce market not only emerges in Bangkok and surrounding area, but also expands to other cities in Thailand like Chiang Mai and Khon Kaen.

Mobile and PC platforms interact further with each other through combined purchasing. Due to mobile shopping enables consumer to shop anywhere and anytime, mobile business greatly stimulates market demands and provides more opportunities for cross-border e-commerce.

The Freight Forwarders Which Operate Cross-border E-commerce Business

Freight forwarder, or freight agent, is a person or organization that specializing in arranging storage and conducts shipments for individuals or corporations (Random House Unabridged Dictionary, 1997). The freight forwarder supplies a complete range of services, involving but not limited to tracking demotic transportation, arrangement of shipping and export documents, warehousing, booking cargo space, negotiating freight charges, freight consolidation, cargo insurance and filling of insurance claims (Business Dictionary, 2016). The freight forwarder takes delivery goods securely and quickly according customer's instructions. They serve as third party embrace the benefit of customers, but not a practical carrier. The International Federation of Freight Forwarders Associations (FIATA) describes the freight forwarder as "the architect of transport", which demonstrate the commercial status of the freight forwarder relative to its customer. Freight forwarders play as a specialist in the logistics network, cooperate with a conveyor or multiple carriers to ship the cargo. A considerable part of the international freight forwarder masters a variety of means of transport and storage land, air and sea freight, processing customs effectively. In this research, the cross-border e-commerce freight forwarder refers to the organization which operate business import

commodities from China's e-commerce platform to Thailand, they service as a thirty-party via providing procurement service, cross-border logistics and cross-border settlement service for Thailand customers.

In 2008, some organizations began to rise to help Thailand's customers conduct cross-border procurement on China's e-commerce platform. The number and scale of organization increasing year by year, evenly develop into cross-border freight forwarder industry in Thailand. At present, cross-border e-commerce freight forwarder industry has certain quantity and various size, most are SMEs. Freight forwarding companies act as a third party, which provide the related services in cross-border online shopping transaction. They participate in the transaction but do not have the ownership of the goods. They employ the international carrier to responsibility for cross-border shipping and clear customs between China and Thailand. They provide the translation service, exchange service, payment service, shipping service and other auxiliary services for the China's producers and Thailand's customers. With the thriving of Thai residents shopping in websites of China, this phenomenon has attracted the attention of scholars. This research defines cross-border e-commerce freight forwarder as a third-party import commodity from foreign country's e-commerce platform into Thailand, through providing purchase service, exchange service, online payment service, cross-border logistic service and after-sales service.

There are around 30-40 freight forwarders in Thailand, which most of are SMEs, such as Vcanbuy, Ezbuy Thailand, Teatmall, WeShop China, Taobao China Cargo, BMJ cargo, BTC Cargo, Taobao2you, and so on. They prefer shopping on taobao.com, 1688.com, Tmall.com, JD.com, alibaba.com, globalsources.com, Made-in-China.com, and so on. Online shopping need adopt logistics and transportation to be finalized. From China to Thailand, land transportation spends around 3-5 day, maritime transport spends around 7-15 day (see Figure 8). The cross-border online shopping take start from the international customers to international freight forwarders. Freight forwarders make the communication between the customers and producers; they make order and payment as per negotiations. According the order instruction, the producers deliver the merchandise to freight forwarder warehouse which located in Guangzhou, China. Afterwards, the freight forwarders ship the commodities from China to Bangkok warehouse in Thailand by international carrier. International carrier is responsible for

customs clearance. The goods are delivery to the destination by third party logistics. This all process has some pros and cons which are more important for making a cross-border online trading decision. If there is in place the e-commerce facility, customers can make the order by themselves excluding the role of third-party. However, they need depend on cross-border shipping, online payment and foreign language skill for following all this process.

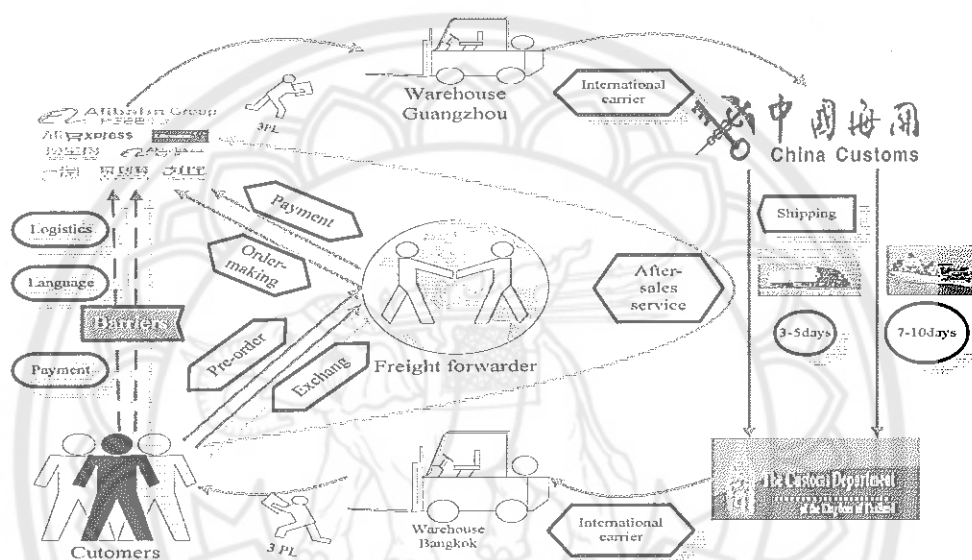


Figure 8 The Cross-border E-commerce Business Procedure from China to Thailand

Critical Success Factor

Critical success factor (CSF) is a management terminology, which is essential element for an organization or project to realize its mission. It was initially used to determine the information most needed in data analysis and business analysis. In 1961, the notion of "success factors" was put forward by D. Ronald Daniel. Between 1979-1981, the "success factors" was refined into "critical success factors" by John F. Rockart. Critical success factors are the few key areas that must be reliable to assure successful competitive performance for individual, department or organization, and must be afford extraordinary and continual consideration to achieve better performance. CSF issues are vital to an organization's current operating activities and future success (Boynton, & Zmud, 1984). Growth rate, sales volume, business stability, and overall

satisfaction are measured standard for e-commerce entrepreneurs' success (Sebora, Lee, & Sukasame, 2009). The procedures of CSF application involve 3 vital steps. The first is identifying the strategic objectives of the enterprise. And then identify all the success factors by analyzing core factors and sub-factors which influence specific objectives and strategy. The last is identifying critical success factors. CSFs are usually controlled by five or six factors, which are determined by decision-makers (Bullen, & Rockart, 1981).

The industry critical success factors, competitive strategy and industry position, environmental factors, temporary factors, and managerial position are five prime sources of CSFs. The individual situation of every organization is defined by its history and current competitive strategy. Environment factors are those little control field of organization, such as the fluctuation economy and national politics. The organization must achieve its mission even though environmental change. Due to something out of the ordinary has appeared, some fields become critical in a special period time, which are temporal factors. CSFs associated with functional managerial position closely. For instance, most of all service managers are concerned with service quality and customer satisfaction. From a company viewpoint, industry CSFs, corporation CSFs, sub-organization CSFs, individual CSFs are four different hierarchical levels of CSFs which must be considered. Industry CSFs are determined by the organization's key requirements, industry's competitive structure and economic, political and social environment. There are 8 methods for identifying CSFs, for example environmental analysis, industrial structure analysis, business expert method, competitive analysis, industry leader analysis, enterprise ontology analysis, sudden factor analysis, and profit impact of market strategy results analysis. At present, interviews method is commonly used to examine the most critical success factors (Bullen, & Rockart, 1981).

There are many opportunities and challenges affect the development of cross-border e-commerce. EUROSTAT (2014) determined the obstacles obstruct SMEs get into the industry of e-commerce in EU, these are suitable enterprise's goods or services, logistics, payments, information communication technology (ICT) security or data protection, awareness about e-commerce, e-commerce business models, knowledge of e-commerce, trust and confidence, legal and regulatory framework, and information

infrastructure. Gessner and Snodgrass (2015) pointed that differences in customs and duty regimes and tax laws are substantial barriers to doing business across international borders. Apart from that exchange rate fluctuation is critical barrier that government program cannot overcome. Since cross-border e-commerce mostly are small-volume B2B and B2C, which is a big challenge for quick customs clearance, exchange settlement and tax reimbursement (iResearch, 2015).

Lendle, Olarreaga, Schropp, and Vezina (2012) found that online payment system, shipping cost and language have great effects on trade costs of eBay. With the credit card information theft and other criminal acts on the rise, many consumers concern about credit card security. The adoption of efficient and flexible cross-border payment systems growth 1% could enhance as much as 7% in cross-border e-commerce (Gomez-Herrera, Martens, & Turlea, 2014). The main payment channels are credit card and third-party payment, such as Alipay, PayPal, MoneyGram, WESTERN UNION, VISA and Master card (CECRC, 2016). Credit card payment can be realized instant transfer, but the transaction lack of security. The third-party payment is more security but have long-term account period. Upstream and downstream enterprises have to face the increased pressure on capital.

Domestic transportation and cross-border shipping are two significant parts in cross-border e-commerce. Cross-border e-commerce requires at least two courier companies to be responsible for the transport of goods. Cross-border logistics is time-consuming and unstable (iResearch, 2015). The average transport time of domestic online shopping around 3-4 days, cross-border shopping generally takes more than 7 days, sometimes even two or three months (Xiang, 2016). In the UPS dimensional weight computation, a 20% increase in shipping costs of crossing the border (Gessner, & Snodgrass, 2015). Due to the long distance and long transportation time, the information can't be effectively tracked during transportation. The loss and damage of parcels are serious problem, which makes the enterprises encounter great difficulties in improving the user experience.

Gomez-Herrera et al. (2014) found that language as an information-related trade costs become more obvious in e-commerce business. Besides, language is beneficial to established long-term relationships in offline B2B cross-border trade environment. Limited language skill has become one of the obstacles of cross-cultural

communication, which is an essential element to respond rapidly and flexibly to changing circumstances (Victor, 1992). Information which is not smoothly transferred may lead to longer time process and even lead to misunderstanding. Language is a powerful business driver for increased cross-border e-commerce profits (Kraemer, Dedrick, Melville, & Zhu, 2006; J. Wang, 2014).

One of the methods most commonly used for studying the factors that affect e-commerce development is CSFs. CSFs concept can use to aid an organization frame guidelines for monitoring organization's activities, as well as determine critical issues associated with implementing strategic plans to improve performance (Bullen, & Rockart, 1981). CSFs method can directly guide the executive to analyze relationship between enterprise strategy, information strategy and business processes. CSFs are a business-based, logical, time-sparing, inexpensive line management planning tool. The CSFs relevant to all organization operating within the same industry, but typically differ between industries (Sebora et al., 2009).

For this research, CSFs of cross-border e-commerce freight forwarder refer to the limited number of specific elements of commerce implemented that must go right so as to the cross-border e-commerce flourish. They must meet the key requirements of businesses, as well as successfully compete against competitors in meeting the needs of customers. Therefore, this research intends to identify critical success factors of cross-border e-commerce freight forwarder by use CSFs.

This research applies the success factors of cross-border e-commerce found in literature as a guideline to identify critical success factors of cross-border e-commerce between China and Thailand. According to existing cross-border e-commerce related literatures, 18 success factors of cross-border e-commerce summarized from 75 English papers and 52 Chinese papers. There are cross-border logistics, online payment and foreign exchange, credit system and trust, information communication technology (ICT) infrastructure, after-sales service and dispute resolution, product and service, global business risk control, business process, e-commerce awareness of manager, customer experience, talent, foreign language, legal systems and Intellectual Property Rights (IPRs), customs clearance, government policy, taxation, economy situation, cultural difference (see Table 1). The explanations of 18 success factors of cross-border e-commerce are shown in Table 2.

Table 1 The Success Factors for Cross-border E-commerce Development

Success Factor	QTY	Author
Cross-border logistics	48	Abdallah (2014); Lendle et al. (2012).
Online payment & foreign exchange	36	Gomez-Herrera et al. (2014); Savrul, Incekara, & Sener (2014).
ICT infrastructure & Privacy security	24	Aye et al. (2013); Desai, Ashrafi, Kuilboer, & Koehler (2009).
Credit system and trust	20	Aslam (2013); Kai (2015).
Legal systems & IPRs	41	Bieron, & Ahmed (2012); Hertig (2000).
Customs clearance	20	Gessner, & Snodgrass (2015).
Talent	14	Zhang, Guan, & Wu (2016); Bao (2012).
Foreign language	14	Jarrar, Verlinden, & Meersman (2003).
Government policy	18	Kraemer, Dedrick, Melville, & Zhu (2006); Alexandru, Irina, & Alice (2014).
Product & service	11	Deng, & Wang (2016); Savrul, Incekara, & Sener (2014).
After-sales service & dispute resolution	10	Cortés, & de la Rosa (2013); Jarrar et al. (2003).
Taxation	8	Agrawal, & Fox (2016).
Economy situation	4	Savrul, Incekara, & Sener. (2014).
Customer experience	4	Abdallah (2014); J. F. Li et al. (2015).
Global business risk control	4	Arnold, Benford, Hampton, & Sutton (2012); Kraemer et al. (2005).
Business process	4	Asosheh, Shahidi-Nejad, & Khodkari (2012); N. Chen, & Yang (2017).
E-commerce awareness	4	Savrul, Incekara, & Sener (2014); Chen, Y. (2013).
Cultural difference	2	Sinkovics, Yamin, & Hossinger (2007).

Notes: QTY: Quantity of Paper

Table 2 The Explanation of Success Factors of Cross-border E-commerce

Success factors	Explanation
Online payment (foreign exchange)	Online payments system has significant effect on boost cross-border e-commerce while costly systems like cash-on-delivery reduce it. It's important to promote compatibility and interoperability of online payment systems for cross-border payments.
Credit system (trust)	Social credit system includes personal credit system, enterprise credit system, and government credit system. Its focuses on credit in four areas, include administrative affairs, commercial activities, social behavior, and the judicial system.
Cross-border logistics	The management process for planning, implement and control the effective flow and storage of physical and information on both sides of different countries customs.
Foreign language	Thai, Chinese and English are 3 main language which use in working process of cross-border e-commerce from China to Thailand.
After-sales service	The service provided by sellers after the customers bought the product or service.
Information communication technology infrastructure	Stresses the role of unified communications and the integration of telecommunications, computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to access, store, transmit, and manipulate information.
Global business risk control	The risk of trade frictions, cross-border logistics, exchange rate fluctuations, and the risk of electronic payments.
Business process	A collection of related, structured activities or tasks that produce a specific service or product for particular customers, which main include management processes, operational processes, and supporting processes.
Product and service	Core products and services are most directly related to company's core competencies. It's refers to the use, benefit or problem-solving service that the consumer is really buying when purchasing the product.
Customer experience	An interaction between an organization and a customer over the duration of their relationship, people's perception and response to products, or services that are used or intended to be used.
E-commerce awareness	Manager's awareness of e-commerce directly affects the acceptance degree of cross-border e-commerce.
Talent/ employee	Employees' ability directly affects the work efficiency; talent management plays an important role in company development.
Legal systems and intellectual property rights	Diversified law, legal and regulation for import and export commodity between different countries.
Government policy	The principled guide to action taken by the administrative executive branches of the state with regard to a class of issues, in a manner consistent with law and institutional customs. Public policy is considered strong when it solves problems efficiently and effectively, serves justice, supports governmental institutions and policies, and encourages active citizenship.
Customs clearance	The process of preparation documents or electronic submissions, the calculation and payment of taxes, duties and excises, and communication between government authorities.

Table 2 (cont.)

Success factors	Explanation
Taxation	Compulsory or coercive money collection by a levying authority, usually a government.
Economic situation	The macroeconomic performance and trends of a country or region.
Cultural differences	Cultural differences can be divided into six dimensions: power distance index, indulgence versus restraint, uncertainty avoidance index, individualism versus collectivism, masculine versus femininity, long-term orientation.

Analytic Hierarchy Process

The analytic hierarchy process (AHP) is a mathematics and psychology method for managing and analyzing complex decisions. In the 1970s, Thomas L. Saaty proposed the concept of AHP. It is a structured technique that composes of an overall objective, a group of alternatives, and a group of criteria that link the alternatives to the objective. The criteria can be further resolve into many levels as the problem demand. AHP can be applied in prioritization, choice, ranking, resource allocation, benchmarking, quality management, and conflict resolution when the decision maker has multiple alternatives. Besides, AHP can be applied to establish hierarchy structure, construct the pairwise comparison judgment matrix of the decision elements, and then check for consistency, capture priorities from the matrix as its principal eigenvector, and finally provide decision-making basis for decision-makers (see Figure 9). Pairwise comparison has the advantage of focusing merely on two objects at a time and study the relationship of each other. Otherwise, since each object is methodically compared with every other, it generates more information than is indeed (Saaty, 1980).

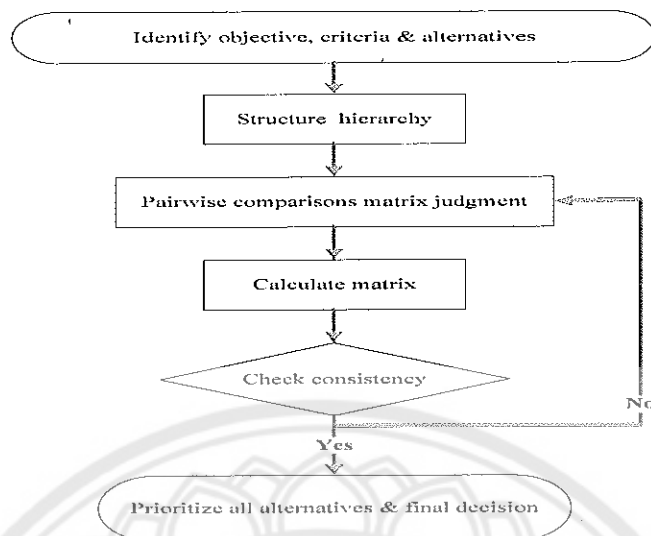


Figure 9 AHP Procedures

1. State the problems; identify the objectives, the criteria for assessing the alternatives, and the alternatives for reaching the objective. Structure the problem as a hierarchy as shown in Figure 10.

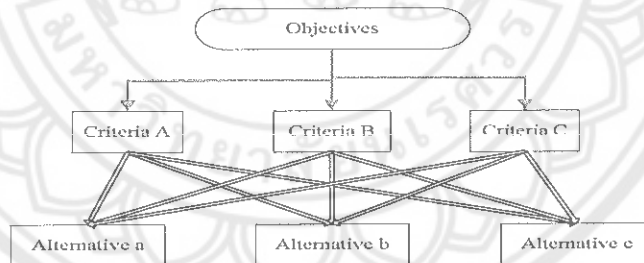


Figure 10 AHP Structure

2. Making pairwise comparisons matrix by using a nine-point scale which is given by Thomas L. Saaty, as shown in Table . Input pairwise comparison judgments and force their reciprocals. Determine the priorities of the elements in one level with respect to their impact on the next level. The pairwise comparisons are obtained by questioning of experts or who are familiar with the problem directly. If several people are involved, they can assist each other in sharpening their judgments and divide the task to provide the judgments in their expertise areas.

Table 3 Priority Scale from 1 to 9

Numerical Rating	Verbal Judgment
1	I factor and j factor are equally important
3	I factor is weakly more important than j factor
5	I factor is strongly more important than j factor
7	I factor is very strongly more important than j factor
9	I factor is absolutely more important than j factor
2,4,6,8	Compromise between slightly differing judgments
Reciprocal	The row of i meets the column of j, the column of i meets the row of j

3. Calculate matrixes; find the eigenvector and maximum eigenvalue. When matrixes normalized become the vector of priorities, the principal eigenvector is computed. The eigenvector shows the ordering of weight, and the eigenvalue is a scale of judgment consistency. It assumes that all the alternatives are specified in advance, and that not all the variables need to be under the control of each of parties involved in affecting the outcomes of the alternative.

4. Check the consistency of the judgments. Consistency is a central question in concrete measurement and judgments. Consistency index (C.I) represented by $(\lambda_{max}-n)/(n-1)$. Random index (R.I) is the consistency index of a randomly generated reciprocal matrix, which is reciprocal forced (see Table 4). The consistency ratio (C.R) is the ratio of C.I to the average R.I for the same order matrix. The Value C.R is 0.10 or less that is considered admissible (Saaty, 1980).

Table 4 RI Value Table

1	2	3	4	5	6	7	8	9	10	11	12
0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48

It's assume that $a_{ij} > 0$, $a_{ij} = \frac{1}{a_{ji}}$, $U = (u_1, u_2, u_3, \dots, u_n)^T$

$$U_k = \frac{\sum_{j=1}^n a_{kj}}{\sum_{i=1}^n \sum_{j=1}^n a_{ij}}$$

$$\lambda_{\max} = \frac{1}{n} \sum_{i=1}^n \frac{(AU)_i}{u_i}$$

$$CI = \frac{\lambda_{\max}(A) - n}{n - 1}$$

$$CR = \frac{CI}{RI}$$

5. Prioritize all alternatives; obtain final decision based on the analysis results.

AHP is a powerful and understandable methodology that allows groups or individuals to associate qualitative with quantitative factors in multi-criteria decision-making process. It is possible to elicit the hierarchy judgments by questionnaire. AHP is scalable method and doesn't have data intensive. Hierarchy structure is beneficial to research functional interactions of components as well as their impacts on the entire system, along with easily adjust to fit many sized problems (Saaty, 1980).

Ramanathan (2012) proposed a new mathematical programming model for evaluating the significance levels of performance criteria based on the AHP. Shen, Li, Zhang, & Zhou (2014) applied AIIP to the evaluation of network marketing performance in O2O model of enterprises. Y. Wang, Liang, & Zhang (2014) researched online shopping satisfaction evaluation of e-commerce platform based on the factor analysis and AHP. X. Li, Li, & Ma (2014) distributed various indicator weights of buyer reputation of C2C e-commerce platform by used AHP. Singh, Kumar, & Dash (2016) proposed a hierarchy structural model of consumer decision making in digital market based on AHP. Dey, Jana, Gourisaria, & Nandan (2015) applied AHP to weight the evaluation criteria of Indian B2C e-shopping websites. Yimin Zhang et al. (2016) built the talent evaluation model of cross-border e-commerce by use AHP methods. Liu (2016) proposed an improving AHP algorithm to evaluate and study the service of the cross-border e-commerce logistics. T. Sun, & Xue (2015) used AHP to verify e-commerce logistics distribution mode. Alharbi, & Naderpour (2016) used AHP to analysis the problem structure and examine the weights of e-commerce development

risk factors. X. Wang, Jia, & Guo (2015) studied on the function of computer technology in the e-commerce environment security and risk assessment. Zhang, Deng, Wei, & Deng (2012) proposed a new model to assist e-commerce practitioners in the assessment of e-commerce security based on AHP and Dempster–Shafer (DS) theory. Lokhande, & Meshram (2016) applied AHP to find most probable web attack on an e-commerce site. Xu, & Zhang (2009) presented a new credit evaluation method to determine the credibility of the e-commerce participants based on the AHP and the set pair analysis (SPA). Chen, Windasari, & Pai (2013) utilized AHP method to examine IT readiness priority which critical to support the adoption of SMEs in South-East Asia.

The AHP is an effective method in prioritization, especially when the decision maker has multiple alternatives or criteria. Therefore, AHP is suitable apply to determine the influence level of all critical success factors and examine the cross-border e-commerce process that most critical success factor most effect on.

SIPOC Mapping

SIPOC mapping, value stream mapping, and “as-is” and “to be” spaghetti diagram are three key lean six sigma tools for process improvement (Pyzdek, & Keller, 2014). This research selects SIPOC mapping to draw the work stream and their inter-relationships of cross-border e-commerce freight forwarder. SIPOC is a process improvement tool that summarizes some process within a table form. SIPOC is an acronym which stands for suppliers, inputs, process, outputs, and customers (Simon, 2007; Shankar, 2009). Suppliers mostly cover significance internal and external suppliers to the process. Inputs refer to significance inputs to the process, such as material, forms, information and equipment. Process is a defined sequence of activities, usually adds value to inputs to produce outputs for the customers (SKS, 2007). One block representing the entire process. Outputs include critical outputs to internal and external customers, such as tangible product, intangible services, and information. Customers are not only consisting of the important internal customers, but also the external customers to the process.

The SIPOC mapping enable organization to have a high-level overview with a process and understand the major key process input variables (KPIVs). Additionally, it can be used to define the critical-to-quality (CTQ) elements and key inputs and outputs

of the process. The SIPOC mapping describes spatial and dynamic relationships among all process activities. It takes an initial insight into the vital inputs that have significant impact on critical outputs of a process (Sanjaya, 2007). The SIPOC mapping has greater capability to focus on customer requirements. It provides a single common language within the organization to control, manage and improve key process (Marques, & Requeijo, 2009). SIPOC is helps to select a core process to re-design. It focuses on the complex interrelationships between activities, rather than how the process is completed (Parkash, & Kaushik, 2011). SIPOC is mostly begin with identification of process, followed by outputs, customers, inputs and suppliers' definition (SKS, 2007). Base on the analysis of SIPOC, non-value-added outputs, the ineffective processes, and unsatisfactory performance suppliers should be improved or eliminated (Parkash, & Kaushik, 2011).

Simulation Model and Arena

Simulation is the process of designing and creating a computerized model of a real or proposed system to conduct numerical experiments. Simulation is a versatile and powerful tool in deal with very complicated models of correspondingly complicated systems, since it can give us a better understanding of the behavior of system. During the 1990s, simulation really began to mature and was applied in many non-traditional areas, such as service industry. Today's simulation projects concentrate on strategic decision making, typically around the design or re-design of complex systems (Kelton, Sadowski, & Swets, 2010). Simulation is used to provide confidence in decision making which can simultaneously evaluate multiple performance measures. Simulation is an action of performing experiments on a model of a given system (Schmidt, & Taylor, 1970). Simulation is a model mimics the operation and response of the real-world process or system to events that take place over time (Schriber, 1969; Jerry, 1984). Simulation is a presentation of the dynamic behavior of the system by moving it from state to state in accordance with well-defined operating rules (Pegden, Alan, & Pritsker, 1979; Ören, 2011). Simulation is a problem-solving technique by observing over time the performance of a dynamic model of the system (Gorden, 1969; Maria, 1997). In summary, simulation is a methodology for evaluating system performance by

establishing models on computer. The system state is defined by a number variable that change their values as time progresses.

Simulation can be applied to analysis, design and optimize the process. Simulation is also used when the real system cannot be engaged, because it may not be accessible (Sokolowski, & Banks, 2011). Simulation can be used to evaluate and compare complex system with probabilistic components which cannot be solve by mathematical model. However, simulation cannot provide best solution for the problem. It can be used to show the eventual real effects of alternative conditions and courses of action. Besides, simulation is assist organization to diagnose process and recognize the problems. According the simulation results, the process performance is compared and evaluated to select relatively reasonable optimization decisions. Simulation is credible since the model results are compared with real system. Simulation can provide overall view or executive when improvement is made to the system. Moreover, simulation can be used in analyzing new work flow, reducing workload in process and increasing throughput. Simulation model is easily built on computer and easy to understand. The model building takes less time than other techniques. In addition, simulation just needs historical data, empirical distribution or theoretical distribution without interrupting the real system. The most important thing is that the data collection of simulation should serve the project goal.

Simulation is often involved in studying dynamic condition of a system. System is an integration of components working together to reach some common goals. Model is a simplification, and abstraction of a system which always introduce approximations and assumptions. It's a representation of real or non-existed system to be able to understand, analyze and control the system. The objective of model building is to create a representation of system that is sufficiently "simple" with appropriate detail, in order to find optimal conditions for an examined process. Simulation model can be used to conduct what-if analysis, which has friendly communication, highly flexible and easy to implement. Simulation model is a better representation for key characteristics, behaviors and functions of selected real processes or system. The model represents the system itself, whereas the simulation represents the operation of the system over time. Key issues in simulation include acquisition of valid source information about the relevant selection of key characteristics and behaviors, the use of

simplifying approximations and assumptions within the simulation, and fidelity and validity of the simulation outcomes. Simulation has a lot of possible output performance measures, such as total production, average waiting time in queue, maximum waiting time, time-average number of parts waiting in the queue, maximum number of parts that were ever waiting in the queue, average and maximum total time in system, and utilization of resource (Kelton, Sadowski, & Swets, 2010).

Simulation has 2 type models, which are discrete and continuous model. When system states or variables change as a particular point in time, it is discrete events. While system states or variables vary all the time, it is continuous events. Arena adopt discrete model, which will be applying to build re-design working process simulation model for case study in this research. Arena provides transparency into business processes, as well as the centralization of corporate business process models and execution metrics. Modelling and simulation functionality allows for pre-execution "what-if" modelling and simulation. Decisions are made with stochastic. The simulation procedures cover process modeling, simulation running, analyzing and evaluating simulation results, and process optimization and improvement (Zeng, 2010). Step in discrete-event simulation modeling include problem and scope definition, data collection, input data modeling, model building, output analyzing and presentation and implementation (see Figure 11). Data perform preliminary analysis can be done with the help of Arena's input analyzer. The analysis results are shown by mean, standard deviation, histogram, cross-correlation or autocorrelation. Arena internally handles generation of observations from specified distribution. It not only makes the model more realistic, but it also can explore more situations that didn't observe and doing the simulation logic (Kelton, Sadowski, & Swets, 2010).

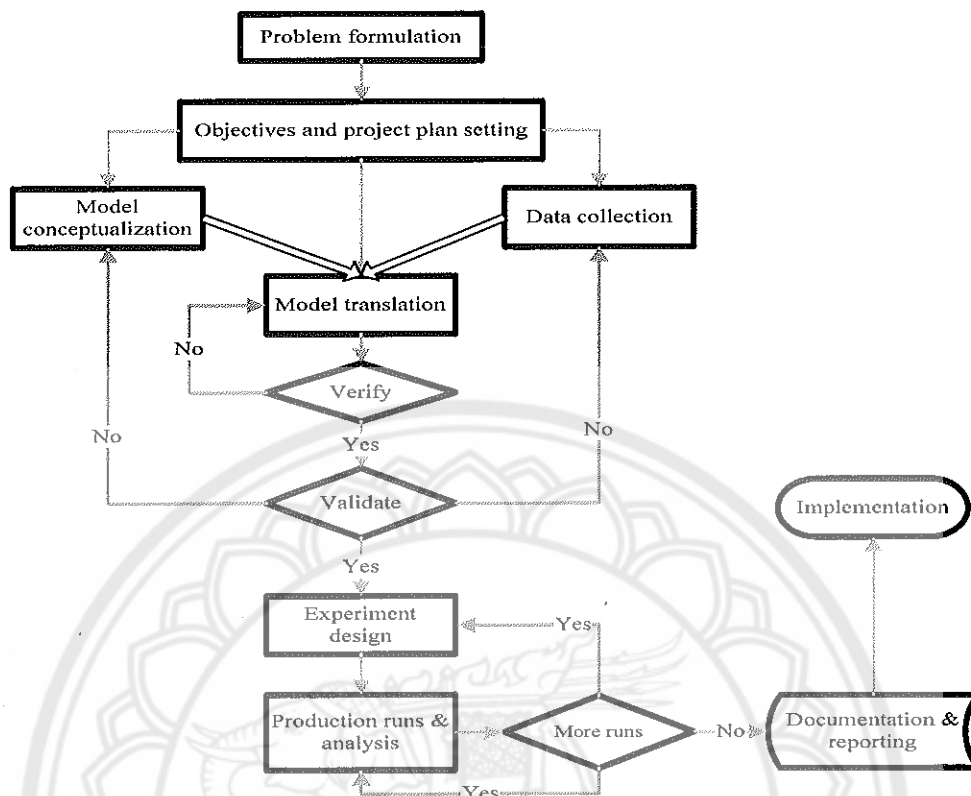


Figure 11 The Step of Simulation Modeling

CHAPTER III

RESEARCH METHODOLOGY

This chapter discusses methodology from both quantitative approach and qualitative perspectives, as shown in Figure 12. This research intends to identify the critical factors effect on the success of cross-border e-commerce freight forwarder from China to Thailand by use CSFs, which are particularly formed for e-commerce business. In addition, the AHP is used to identify the influence level of all critical success factors. Furthermore, the AHP is used to examine the cross-border e-commerce process that most critical success factor most effect on. Meanwhile the case study approach is utilized to investigate the effect of most critical success factor in work process in freight forwarder. Thus, this research intends to examine the problems in working process and propose some strategic suggestions for improve process efficiency by SIPOC diagram. The before and after work efficiency are compare by using simulation. By using this method, the organization will be noticed an importance of critical success factors and its effects.

The interview and questioner are conducted with experts who come from various size enterprises including small and medium-size enterprises of cross-border e-commerce freight forwarders in Thailand. The sample selection was based on the criteria that experts are key decision maker, owner, or manager who tied directly with cross-border e-commerce strategies and implementation. The experts must have more than 2-year work experience of cross-border e-commerce projects.

Identify Critical Success Factors of Cross-border E-commerce Freight Forwarder

1. This research used “cross-border e-commerce” and “critical success factor” as keywords to search for related precious studies conducted by other researchers in Scopus, CNKI and other databases respectively. Literatures from the fields of “cross-border e-commerce” are used to determine candidate factors that might influence the success of cross-border e-commerce freight forwarder.

2. CSFs are a structured technique designed to determine the information most needs. Hence, CSFs concept is used to explore the critical factors effect on the cross-border e-commerce freight forwarder success. Base on the CSF and cross-border e-commerce theories, the 18 success factors obtained from previous research use as a foundation to explored CSFs through categorized into 4 components. The four-prime source that constitute the conceptual framework of critical success factors of cross-border e-commerce freight forwarding entrepreneurship are labeled as industry critical success factors, competitive strategy and industry position factors, and managerial position factors and environmental factors. Temporary factors cannot be considered in this research, because they are characteristic, timed and changing in each different period. Industry critical success factors involve cross-border logistics, online payment and foreign exchange, credit system and trust, ICT infrastructure, foreign language skills, and after-sales service and dispute resolution. Competitive strategy and industry position factors cover business process, global business risk control, product and service, and customer experience. Managerial position factors consist of talent, team work, manager's ability, innovative awareness and ability, and e-commerce awareness of manager. Environmental factors comprise legal systems and IPRs, customs clearance, government policy, taxation, economy situation, and cultural difference. The overall perspective for the conceptual model is examining the impact of those components on the success of cross-border e-commerce freight forwarder.

3. In-depth interview is conducted with experts in cross-border freight forwarder industry. Additionally, semi-open questions are used to investigate what factors interviewees believed are critical to the success of cross-border e-commerce freight forwarder. This research used face-to-face interviews, telephone interviews, and online interviews to collect information. The success factors which over 50% interviewees believe are critical factors are selected as critical success factors. Thus, the critical success factors and criteria of cross-border e-commerce freight forwarder are obtained by interviewing freight forwarding operators in Bangkok and the surrounding area. There are around 40 freight forwarders in Bangkok and surrounding area. This research has contacted with 40 cross-border e-commerce freight forwarders, and finally received answer from 14 experts in 12 freight forwarding enterprises, which account for about 32.5%-43.33%.

Determine the Effect of Critical Success Factors in Related Process Activity

Based on the results of CSFs and the synthesis of the experts' opinion, AHP conceptual model guiding the present study is developed to examine the effects of all critical success factors. The AHP is a powerful measurement in manage quantifiable and intangible problems. The criteria for evaluating the alternatives are obtained by inquire experts. There are around 40 freight forwarders in Bangkok and surrounding area. This research has contacted with 14 experts in 12 freight forwarders, and gotten reply from 8 experts in 6 freight forwarders, which account for about 15%-20%.

1. Firstly, the AHP model is designed for identify the influence level of all critical success factors, the pairwise comparison is applied to determine the weight of criteria and all critical success factors by using Satty's 1-9scale. The experts from cross-border e-commerce freight forwarding company score each alternative and criteria within this range.

2. Calculate matrixes; find the eigenvector and maximum eigenvalue of all critical success factors. At the same time, check the consistency of the judgments of interviewee. If the value of CR is larger than 0.1, it need to give score for pairwise comparison again until the CR is lower than or equal 0.1. Thus, the priorities of all critical success factors are obtained.

3. After the most critical success factor is determined, another AHP model is designed to identify the process that most critical factor most effect on. Base on the cross-border e-commerce theories and Ma Xiaorui's (2012) opinion, this research divided procedure of cross-border e-commerce from China to Thailand into 4 processes, which include pre-order process, order-making process, logistics process and after-sales process. The key decision makers in cross-border e-commerce freight forwarder give each process a score according to the influence level of most critical success factor. By computing the eigenvectors and checking the CR, the 4-basic process will be ranking through quantifying the weight.

Apply to a Case Study

Base on the result of CSF and AHP models, the effect of most critical success factor in working process is examine in this session. This research is hopes to study the main problems in the working process that most critical factors most affect. Therefore,

this research intends to select a cross-border e-commerce freight forwarder as a case analysis. The interview is conduct with experts who come from case company.

At the same time, this research is attempts to propose the solutions for improve process efficiency. The problems generate in working process are examine by SIPOC analysis. The strategy solutions will be given by interview 3 experts in BMJ cargo. The current and re-design process performance are compared by simulation. Thus, not only the effect of critical success factor is identified, but also the solutions are discussed.

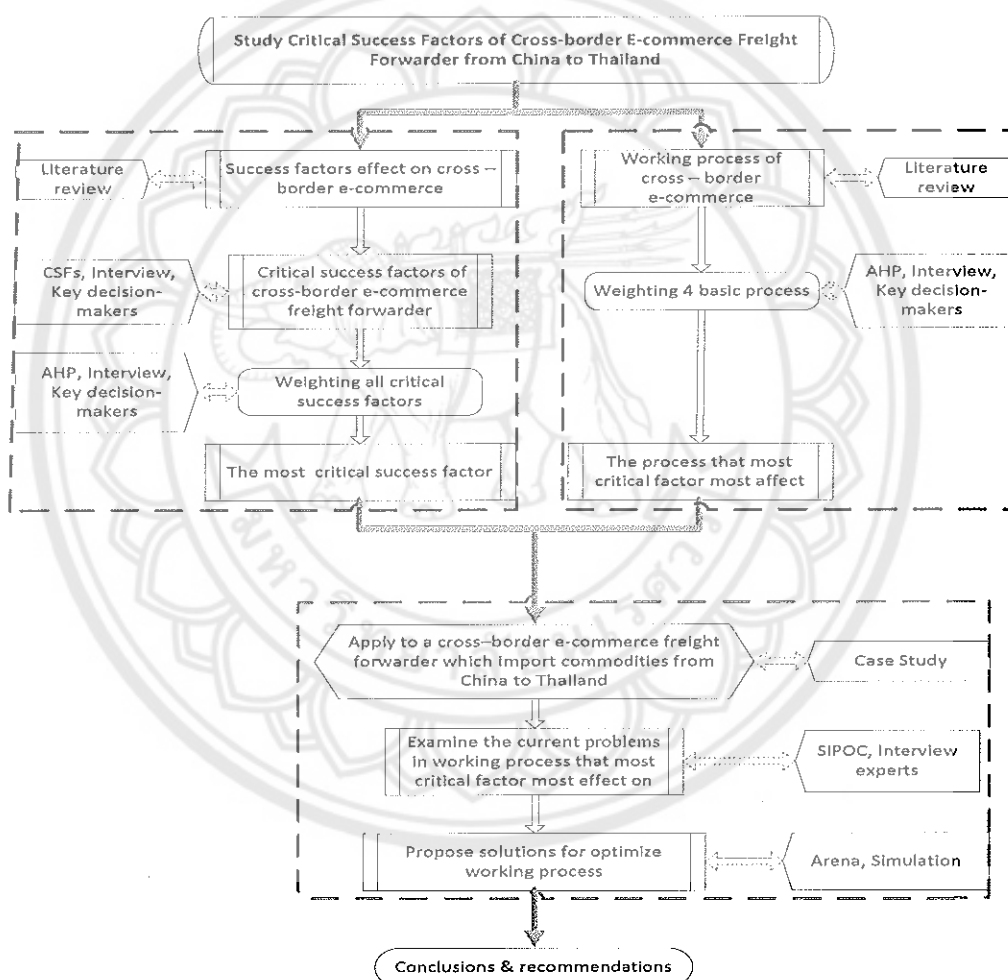


Figure 12 Research Methodology

CHAPTER IV

THE CRITICAL SUCCESS FACTORS OF CROSS-BORDER E-COMMERCE FREIGHT FORWARDER

This chapter aims to finalize what are critical success factors of cross-border e-commerce freight forwarder and how they affect the working process. The CSFs and AHP method are applied to collect and analysis the practical data in this chapter. Firstly, this chapter determines the critical success factors and criteria by interview experts. After that, the influence level of critical success factors and the process that most critical factors affect are examined by AHP models.

The Critical Success Factors of Cross-border E-commerce Freight Forwarder

This research has interviewed 14 experts from 12 freight forwarding companies in Bangkok and surrounding area. The interviewees consist of 9 managers and 5 owners of cross-border e-commerce freight forwarder. Among that, there are 3 interviewees have 2-3 year work experience, 10 interviewees have 4-8 year work experience, 1 interviewee has 12 year work experience (see Figure 13). According to the interviewees' suggestion, some variables are added, such as teamwork, manager's ability, innovative awareness and ability, and cost control. Cross-border e-commerce needs Thai pre-order staff cooperate with Chinese order-making staff to complete one order, hence, some interviewees pointed out that teamwork is a considerable factor for cross-border e-commerce freight forwarder. Manager's ability is related to the development planning and daily management of freight forwarder. Thus, manager's ability is selected as success factors. Due to cross-border e-commerce is a fast development industry, innovative awareness and ability is a competitor which cannot be neglected. Some interviewees regarded that operation cost and human cost are huge cost for freight forwarder. Therefore, cost control is another factor for the success of cross-border e-commerce freight forwarder. The product is eliminated. Because the freight forwarders serve as the intermediary, they provide services but don't have specific products. The ICT infrastructure for cross-border e-commerce freight

forwarder is ICT system which use in daily work. Thus, there are total 22 success factors are examined in this session (see Figure 14). After a series of interviews and consolidate all the interview results, finally, the 8 critical success factors of cross-border e-commerce freight forwarder and 4 criteria for evaluating them are determined.

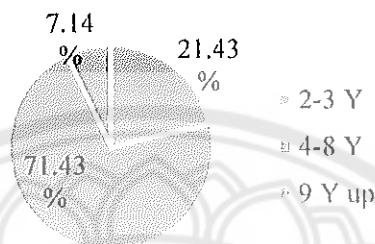


Figure 13 The Work Experience Composition of Interviewees

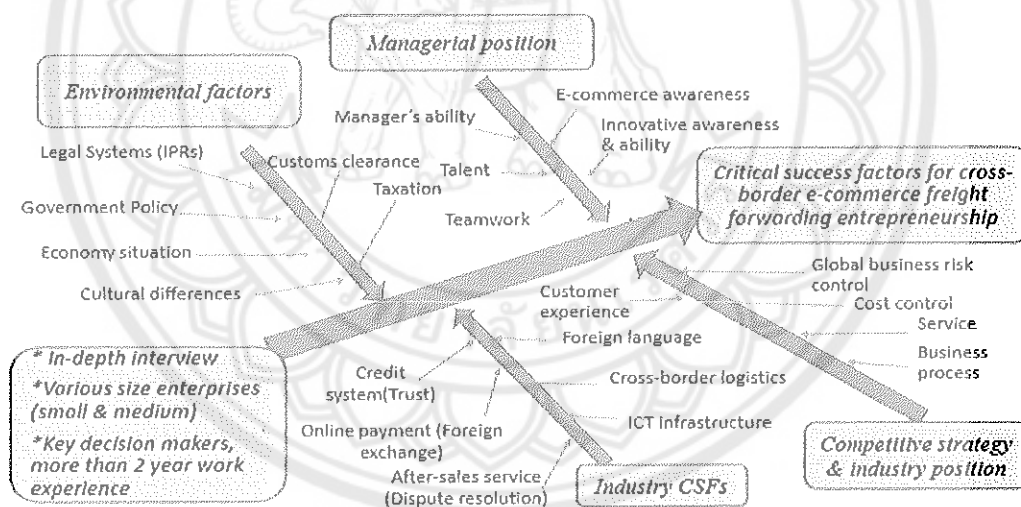


Figure 14 The Critical Success Factor Model for Cross-border E-commerce Freight Forwarder

Base on the result of interview, there are over 50% respondents agreed with the importance of service, ICT system, customs clearance, after-sales services, talent, cross-border logistics, business process, and innovative awareness and ability (see Figure 15). It indicates that they are critical success factors of cross-border e-commerce freight forwarder. Besides, teamwork, foreign language, online payment and foreign exchange,

credit system and trust, customer experience, global business risk control, e-commerce awareness of manager, cost control, comprise legal systems and IPRs, government policy, taxation, cultural difference, and economy situation are not considered as critical success factors. At the same time, there're over 50% interviewee believed that customer satisfaction, work efficiency, performance growth and business stability are key performance indicator of cross-border e-commerce freight forwarder (see Figure 16). Thus, this research selects them as 4 criteria to determine the effect of critical success factors. The cost reduction and other criteria are eliminated, due to the agreed rate is under the half part of all interviewees.

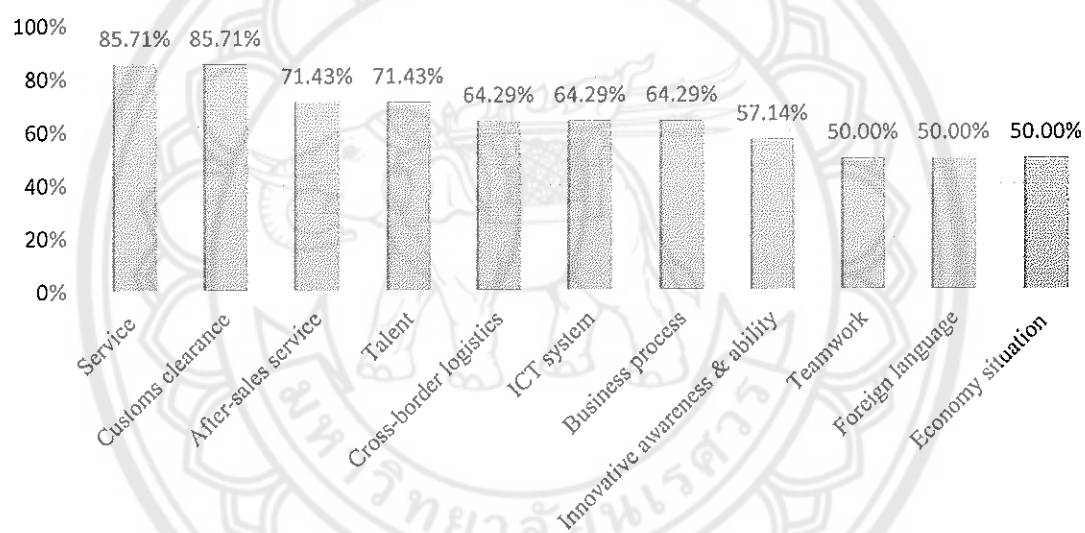


Figure 15 The Approval Rate of Success Factors

1. There are 12 interviewees believed that service is key factor for the operation of cross-border e-commerce freight forwarder, which account for 85.71%. The service of cross-border e-commerce freight forwarder from China to Thailand mainly encompass a series of pre-order service, order-making service, online payment service, exchange currency service and domestic logistics service. Warm and attentive service is conducive to attract customers.

2. At the same time, there are 12 interviewees agreed that customs clearance is uncontrolled but must pay more attention on this process, which account for 85.71%. Customs clearance refers to the clearance process when the goods move from China's customs to Thailand's customs, which need to spend some time. Furthermore, some kinds of goods have a relatively high tax rate, such as the brand name and skin care products. The law, legal and regulation of import and export commodity are diversified between different countries.

3. There are 10 interviewees regard that after-sales service is complex but important for cross-border e-commerce, which accounts for 71.43%. After-sales service refer to the service provided by freight forwarder after the customer receive the commodities, such as resolve the dispute, due to incomplete goods or sending incorrect items. The handle way of after-sales problems directly cause the customer's retention rate.

4. Meanwhile, there are 10 interviewees agreed that talent is essential sector for the development of cross-border e-commerce freight forwarder, which account for 71.43%. Talent plays the lead spot in the daily operation, by reason that human cost is one of the major costs in total cost of cross-border e-commerce freight forwarder. Human resource management, or team management, relates to the staff's centripetal and cohesive force. Staffs' professionalism and service attitude connects the company's reputation and word of mouth. Cross-border purchase needs to rely on multi-lingual talent to complete. Meanwhile, as an important part of logistics, warehousing badly need skilled personnel.

5. There are 9 interviewees believed that cross-border logistics is one of the critical factors for the success of cross-border e-commerce, which account for 64.29%. Cross-border logistics refers to the management process to implement and control the effective flow and storage of commodities and information from China to Thailand. Cross-border logistics cover cross-border transportation and logistics information. The logistics and transportation level reflected in transport safety, transport time, the package intactness, information transparency and visualization.

6. At the same time, there are 9 interviewees agreed that ICT system is indispensable for the development of cross-border e-commerce freight forwarder, which account for 64.29%. ICT system refers to the information communication technology

system on cross-border e-commerce freight forwarder platform. Advanced system makes operation easier and faster, which is beneficial to make order, online payment, and tracking logistics information. The freight forwarder needs to have independent research and development plus improve and perfect the ICT system continuously. The maintain cost of ICT system take a large part of operating cost.

7. At the meantime, there are 9 interviewees believed that business process is one of the critical success factors, which account for 64.29%. Business process refers to a series of related, structured activities of freight forwarder that provide a specific service for Thailand's customers. Business process in cross-border e-commerce mainly include management, operation, and supporting processes, such as order-making process, payment process, logistics process and after-sales process. Fewer links contribute to shorten the lead time, improve efficiency, and save intermediary costs.

8. Lastly, there are 8 interviewees agreed that innovative awareness and ability is important for the long-term development of cross-border e-commerce freight forwarder, which account for 57.14%. Innovative awareness and ability refers to absorb new ideas, discover, guide, and meet the needs of consumers. As we know now, cross-border e-commerce is a fast development industry. Thus, if the freight forwarders don't want to be eliminated, they need to keep reform and innovation in management, platform, and services continuously.

9. There are 7 interviewees regarded that teamwork, foreign language and economy situation should not be ignored factors for cross-border e-commerce freight forwarder, which account for 50%.

10. There are 6 interviewees agreed with that government policy is critical for the normal running, which account for 43%.

11. There are 5 interviewees agreed with that online payment, credit system, global business risk control, and cost control are significant for long term operation, which account for 35.71%.

12. There are 4 interviewees believed that taxation plays a vital role in logistics cost reduction, which merely account for 28.57%.

13. There are just 3 interviewees regarded that e-commerce awareness plays an important role in conducting and improving cross-border e-commerce business, which account for 21.43%.

14. There are only 2 interviewees believed that manager's ability and legal systems and IPRs are considerable for cross-border e-commerce business, which account for 14.29%.

15. Beyond expectation, almost all of interviewees consider that culture difference is easy to overcome factor.

The Criteria for Evaluating the Critical Success Factors

1. All the interviewees agreed that customer satisfaction is the most critical criteria for evaluating the performance of cross-border e-commerce freight forwarder. Customer satisfaction is an important measure of services which supplied to meet or exceeded customer expectation by a company. At present, the market competition is mainly in the competition for customers. "Customer is God" has become the consensus of service industry. The number and loyalty of customers depends on the relationship between the enterprise and customers, along with depends on the customer's satisfaction with the enterprise's services. Higher customer satisfaction contributes to the greater market share and better performance of freight forwarder.

2. There are 10 interviewees believed that work efficiency is an important measurement for daily operation, which account for 71.43%. Work efficiency refers to the ratio of useful work output to total input of organization or individual. The work efficiency reflects the work ability of employee. The improving of work efficiency is conducive to improve enterprise's productivity and economic benefits, and increase the personal income of employees. Meanwhile, the higher work efficiency helps to shorten working hours, optimize labor combination, and keep right-sizing of organization.

3. The below is performance growth, which account for 64.29%. There are 9 interviewees agreed that performance growth in one of significance indexes. Performance growth refers to the growth of operation performance, financial performance and management performance. Profitability and business growth are a portion of financial performance growth of freight forwarder. The pursuit of profit is the essence of every company.

4. The last is business stability, which account for 57.14%. There are 8 interviewees believed that business stability is essential for the normal running of cross-border e-commerce freight forwarder. Business stability is an ability to maintain

the normal operation and development of cross-border e-commerce business, withstand a temporary issue and fluctuation, such as the reduction of order, loss of a key employee or customers.

5. There are 4 interviewees agreed with that cost reduction is performance indicator for cross-border e-commerce freight forwarder operation. Cost reduction is the process of calculate, readjust and supervise various costs which incurred in the production and operation process. Meanwhile it's a process for finding weaknesses, looking for possible ways to control costs.

6. The other criterion is convenient service, which 1 interviewee applies as a performance indicator. Quick and responsive customer support is beneficial to win customer trust and reputation from the customers.

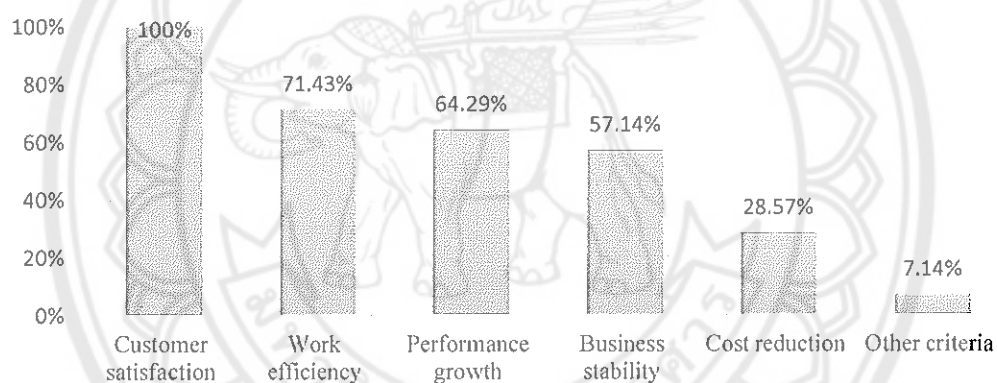


Figure 16 The Approval Rate of Criteria

The Influence Level of Critical Success Factors in Cross-border E-commerce Process

The hierarchy of the influence level of all critical success factors has been identified as shown in Figure 17. This chapter synthesizes the priorities of criteria and critical success factors of hierarchy by using nine-point scale. The experts are managers, or owners of freight forwarding companies in Bangkok and surrounding area. This research has interviewed 8 experts who come from 6 different cross-border e-commerce freight forwarders in Bangkok and surrounding area. According the opinion of 8 experts, the pairwise comparison judgment matrixes of 4 criteria are entered and force their reciprocals. After calculating criteria weights, 4 decision matrixes are

developed for 8 critical success factors regarding 4 criteria respectively, afterwards calculate the weighted normalized decision matrix. The weight's priority means that important level of factors and which should be focus on.

The pairwise comparison matrixes of all critical success factors and criteria that 8 interviewees give judgments have been computed respectively, shown as Table 6-Table 9. According to AHP theory, all the value of CR is under 0.1, therefore, all of the results of pairwise comparison matrix are available.

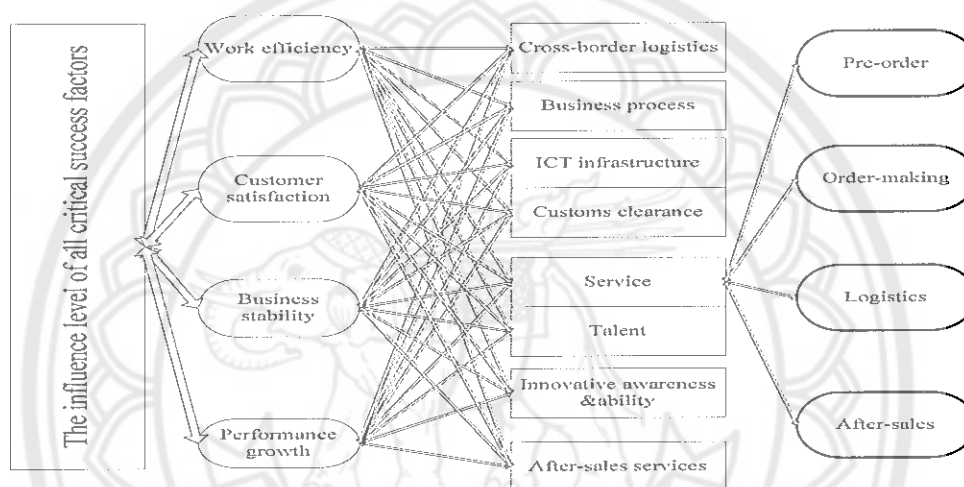


Figure 17 The AHP Structure of Critical Success Factors

The Table 5 shows the weight of criteria of interviewee 1, the Table 6-Table 9 show the weight of 8 critical success factors in work efficiency, customer satisfaction, business stability, and performance growth respectively. The priority of all critical success factors of interviewee 1 is shown in Table . The priority of criteria is customer satisfaction, business stability, performance growth, and work efficiency. The work efficiency is most influenced by ICT system. The customer satisfaction and performance growth most affected by service. The business stability is most influenced by talent. On the other side, the ICT system mostly affects work efficiency. The after-sales service and service most affect customer satisfaction. The cross-border logistics, talent and customs clearance most influence the business ability. The business process and innovative awareness and ability mostly affect performance growth. According the summary results, interviewee 1 believe that service is most critical success factor for

cross-border e-commerce freight forwarder, followed by ICT system, cross-border logistics, business process, talent, after-sales service, customs clearance, and innovative awareness and ability. The business process and talent have a same summary weight.

Table 5 The Pairwise Comparison Matrix of Criteria of Interviewee 1

Interviewee 1	Work efficiency	Customer satisfaction	Business stability	Performance growth
Work efficiency	1	1/3	1/3	1/3
Customer satisfaction	3	1	1	1
Business stability	3	1	1	1
Performance growth	3	1/3	1	1
Weight	0.097	0.384	0.291	0.228
λ_{max}	4.154	CR	0.06	
RI	0.9	CI	0.051	

Table 6 The Pairwise Comparison Matrix of Work Efficiency of Interviewee 1

Work efficiency	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1	2	1/2	1/3	2	3	1
ICT system	1	1	3	1	3	1	3	3
ASS	1/2	1/3	1	1/2	1	1/2	1	1/2
BP	2	1	2	1	2	1	2	2
Service	3	1/3	1	1/2	1	1/2	1	1/3
Talent	1/2	1	2	1	2	1	3	3
IAA	1/3	1/3	1	1/2	1	1/3	1	1/3
CC	1	1/3	2	1/2	3	1/3	3	1
Weight	0.140	0.189	0.067	0.165	0.098	0.164	0.059	0.118
λ_{max}	8.866	CR	0.09	RI	1.41	CI	0.124	

Notes: CBL: cross-border logistics; BP: Business Process; ASS: After-sales service;
IAA: Innovative awareness & ability; CC: Customs clearance

Table 7 The Pairwise Comparison Matrix of Customer Satisfaction of Interviewee 1

Customer satisfaction	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	3	2	1	1/3	1	2	1
ICT system	1/3	1	1/3	1	1/2	2	2	2
ASS	1/2	3	1	2	1/3	1	1	1
BP	1	1	1/2	1	1/2	1	1	2
Service	3	2	3	2	1	2	3	3
Talent	1	1/2	1	1	1/2	1	1	2
IAA	1/2	1/2	1	1	1/3	1	1	1
CC	1	1/2	1	1/2	1/3	1/2	1	1
Weight	0.141	0.116	0.123	0.104	0.250	0.105	0.083	0.077
λ_{max}	8.645	CR	0.07	RI	1.41	CI	0.092	

Table 8 The Pairwise Comparison Matrix of Business Stability of Interviewee 1

Business stability	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	2	1	1	1	2	3	1
ICT system	1/2	1	3	1	1	1	2	2
ASS	1	1/3	1	1/2	1	1/2	3	1
BP	1	1	2	1	1/2	1/3	1	1
Service	1	1	1	2	1	1	3	1/2
Talent	1/2	1	2	3	1	1	3	2
IAA	1/3	1/2	1/3	1	1/3	1/3	1	1/3
CC	1	1/2	1	1	2	1/2	3	1
Weight	0.164	0.148	0.102	0.106	0.133	0.167	0.054	0.126
λ_{max}	8.673	CR	0.07	RI	1.41	CI	0.096	

Table 9 The Pairwise Comparison Matrix of Performance Growth of Interviewee 1

Performance growth	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1	2	1/3	1/2	1	1	2
ICT system	1	1	3	2	1	1	1	3
ASS	1/2	1/3	1	1/3	1/3	1	1	3
BP	3	1/2	3	1	1	3	1	1
Service	2	1	3	1	1	3	1	2
Talent	1	1	1	1/3	1/3	1	1	1
IAA	1	1	1	1	1	1	1	1
CC	1/2	1/3	1/3	1	1/2	1	1	1
Weight	0.111	0.170	0.088	0.170	0.176	0.090	0.116	0.080
λ_{max}	8.696	CR	0.071	RI	1.41	CI	0.099	

Table 10 The Weight of Critical Success Factors of Interviewee 1

Interviewee 1	Work efficiency	Customer satisfaction	Business stability	Performance growth	Summary weight
Weight	0.097	0.384	0.291	0.228	
Cross-border logistics	0.140	0.141	0.164	0.111	0.141
ICT system	0.189	0.116	0.148	0.170	0.145
After-sales service	0.067	0.123	0.102	0.088	0.103
Business process	0.165	0.104	0.106	0.170	0.126
Service	0.098	0.250	0.133	0.176	0.185
Talent	0.164	0.105	0.167	0.090	0.126
Innovative awareness & ability	0.059	0.083	0.054	0.116	0.080
Customs clearance	0.118	0.077	0.126	0.080	0.096

The priority of all critical success factors of interviewee 2 is shown in Table 11. The priority of criteria is customer satisfaction, performance growth, business stability, and work efficiency. The work efficiency is most influenced by talent. The customer satisfaction and performance growth are most affected by service. The business stability is most influenced by cross-border logistics. On the other hand,

the ICT system and service most affect performance growth. The after-sales service and customs clearance most effect on customer satisfaction. The cross-border logistics and innovative awareness and ability most influence the business ability. The business process and talent most effect on performance growth. According the summary results, interviewee 2 believes that service is most critical success factor of cross-border e-commerce freight forwarder, followed by ICT system, cross-border logistics, talent, customs clearance, business process, innovative awareness and ability, and after-sales service. The cross-border logistics has a same summary weight with ICT system.

Table 11 The Weight of Critical Success Factors of Interviewee 2

Interviewee 2	Work efficiency	Customer satisfaction	Business stability	Performance growth	Summary weight
Weight	0.123	0.376	0.156	0.344	
Cross-border logistics	0.139	0.169	0.178	0.138	0.156
ICT system	0.171	0.151	0.112	0.177	0.156
After-sales service	0.056	0.068	0.057	0.048	0.058
Business process	0.158	0.103	0.134	0.131	0.124
Service	0.057	0.184	0.131	0.219	0.172
Talent	0.198	0.132	0.163	0.065	0.122
Innovative awareness & ability	0.107	0.047	0.144	0.113	0.092
Customs clearance	0.115	0.145	0.081	0.109	0.119

The priority of criteria that interviewee 3 select is customer satisfaction, work efficiency, performance growth and business stability. The weights of 8 critical success factors in 4 criteria are computed respectively. The priority of all critical success factors of interviewee 3 is shown in Table . The work efficiency is most influenced by cross-border logistics. The customer satisfaction and business stability are most affected by service. The performance growth is most influenced by ICT system. Furthermore, the cross-border logistics, business process and innovative awareness and ability most affect performance growth. The after-sales service and customs clearance most affect customer satisfaction. The service and talent most influence the business ability. The ICT system mostly affects performance growth. According the summary results,

interviewee 3 believes that ICT system is most critical success factor for cross-border e-commerce freight forwarder, followed by service, cross-border logistics, talent, customs clearance, business process, innovative awareness and ability, and after-sales service.

Table 12 The Weight of Critical Success Factors of Interviewee 3

Interviewee 3	Work efficiency	Customer satisfaction	Business stability	Performance growth	Summary weight
Weight	0.355	0.373	0.107	0.165	
Cross-border logistics	0.174	0.134	0.090	0.140	0.145
ICT system	0.173	0.140	0.205	0.259	0.178
After-sales service	0.058	0.060	0.045	0.044	0.055
Business Process	0.150	0.104	0.124	0.078	0.118
Service	0.084	0.199	0.231	0.214	0.164
Talent	0.131	0.138	0.154	0.091	0.129
Innovative awareness & ability	0.133	0.064	0.054	0.054	0.086
Customs clearance	0.097	0.162	0.096	0.119	0.124

The Table 13 shows the judgment and summary weight of interviewee 4. The criteria weight is sorting as customer satisfaction, business stability, work efficiency, and performance growth. The work efficiency has same weight with business stability. The work efficiency and business stability are most affected by ICT system. The customer satisfaction and performance growth are most influenced by service. On the other hand, the business process, innovative awareness and ability, and customs clearance most affect work efficiency. The after-sales service and service most effect on customer satisfaction. The ICT system and talent most influence business stability. Cross-border logistics mostly affects performance growth. The interviewee 4 agrees that service is most critical success factor of the cross-border e-commerce freight forwarder, followed by ICT system, cross-border logistics, talent, business process, customs clearance, innovative awareness and ability, and after-sales service.

Table 13 The Weight of Critical Success Factors of Interviewee 4

Interviewee 4	Work efficiency	Customer satisfaction	Business stability	Performance growth	Summary weight
Weight	0.122	0.473	0.122	0.283	
Cross-border logistics	0.067	0.152	0.147	0.168	0.145
ICT system	0.225	0.161	0.230	0.194	0.187
After-sales service	0.048	0.071	0.043	0.040	0.056
Business Process	0.133	0.108	0.096	0.114	0.111
Service	0.063	0.280	0.140	0.263	0.232
Talent	0.179	0.083	0.211	0.092	0.113
Innovative awareness & ability	0.150	0.044	0.057	0.051	0.061
Customs clearance	0.134	0.102	0.076	0.077	0.095

Table 14 The Weight of Critical Success Factors of Interviewee 5

Interviewee 5	Work efficiency	Customer satisfaction	Business stability	Performance growth	Summary weight
Weight	0.051	0.410	0.192	0.347	
Cross-border logistics	0.057	0.149	0.074	0.111	0.117
ICT system	0.276	0.225	0.216	0.221	0.225
After-sales service	0.033	0.125	0.040	0.045	0.076
Business Process	0.149	0.085	0.083	0.062	0.080
Service	0.041	0.264	0.272	0.237	0.245
Talent	0.105	0.067	0.156	0.167	0.121
Innovative awareness & ability	0.113	0.038	0.127	0.090	0.077
Customs clearance	0.226	0.048	0.032	0.066	0.060

The Table 14 shows the judgment and summary weight of interviewee 5. The criteria weight is sorting as customer satisfaction, performance growth, business stability and work efficiency. The work efficiency is most affected by ICT system. The customer satisfaction, business stability and performance growth are most influenced by service. Besides, the ICT system and business process most affect work efficiency.

Cross-border logistics and after-sales service most effect on customer satisfaction. The service and innovative awareness and ability most influence business stability. The talent and customs clearance most effect on performance growth. The interviewee 5 agree that service is most critical success factor of the cross-border e-commerce freight forwarder, followed by ICT system, talent, cross-border logistics, business process, innovative awareness and ability, after-sales service, and customs clearance.

Table 15 The Weight of Critical Success Factors of Interviewee 6

Interviewee 6	Work efficiency	Customer satisfaction	Business stability	Performance growth	Summary weight
Weight	0.057	0.127	0.253	0.563	
Cross-border logistics	0.084	0.079	0.119	0.092	0.097
ICT system	0.226	0.202	0.258	0.219	0.227
After-sales service	0.048	0.101	0.041	0.049	0.053
Business Process	0.202	0.063	0.062	0.087	0.084
Service	0.049	0.242	0.213	0.220	0.211
Talent	0.183	0.214	0.158	0.169	0.173
Innovative awareness & ability	0.127	0.040	0.100	0.125	0.108
Customs clearance	0.080	0.059	0.048	0.039	0.046

The judgment and summary weight of interviewee 6 are shown in Table 15. The pairwise comparison judgment matrix of 8 critical success factors in 4 criteria is calculated respectively. The work efficiency and business stability are most affected by ICT system. The customer satisfaction and performance growth are most influenced by service. From the other side, the business process, innovative awareness and ability, and custom clearance most effect on work efficiency. The after-sales service, service and talent most influence customer satisfaction. The cross-border logistics and ICT system most affect business stability. As the Table 15 shown, interviewee 6 believes that ICT system is most critical success factor of cross-border e-commerce freight forwarder, followed by service, talent, innovative awareness and ability, cross-border logistics, business process, after-sales service and custom clearance.

The Table 16 shows the judgment of interviewee 7. The pairwise comparison judgment matrixes of 8 critical success factors in 4 criteria are calculated respectively. The work efficiency and business stability are most affected by talent. The customer satisfaction and performance growth are most influenced by service. Besides, ICT system and business process most effect on work efficiency. The after-sales service most influences customer satisfaction. The talent, innovative awareness and ability, and custom clearance most affect business stability. The cross-border logistics and service most influence the performance growth. As the Table 16 shown, interviewee 7 believes that ICT system is most critical success factor of cross-border e-commerce freight forwarder, followed by talent, service, cross-border logistics, after-sales service, custom clearance, innovative awareness and ability, and business process. The business process has same weight with innovative awareness and ability.

Table 16 The Weight of Critical Success Factors of Interviewee 7

Interviewee 7	Work efficiency	Customer satisfaction	Business stability	Performance growth	Summary weight
Weight	0.104	0.459	0.201	0.236	
Cross-border logistics	0.118	0.106	0.088	0.121	0.107
ICT system	0.224	0.216	0.212	0.221	0.217
After-sales service	0.039	0.090	0.052	0.088	0.077
Business Process	0.164	0.051	0.043	0.062	0.064
Service	0.088	0.218	0.120	0.244	0.191
Talent	0.256	0.198	0.266	0.159	0.209
Innovative awareness & ability	0.060	0.047	0.119	0.053	0.064
Customs clearance	0.052	0.074	0.099	0.051	0.071

The Table 17 shows the judgment of interviewee 8. The pairwise comparison judgment matrixes of 8 critical success factors in 4 criteria are counted respectively. The work efficiency and customer satisfaction are most affected by cross-border logistics. The business stability and performance growth are most influenced by ICT system and custom clearance. Moreover, the ICT system and custom clearance have same influence level in business stability. On the other side, the cross-border logistics, service and custom clearance

most effect on work efficiency. The after-sales service, talent and innovative awareness and ability most influence customer satisfaction. The business process and innovative awareness and ability most affect business stability. The ICT system, after-sales service and innovative awareness and ability most influence performance growth. As the Table 17 shows, interviewee 8 believes that cross-border logistics is most critical success factor of cross-border e-commerce freight forwarder, followed by ICT system, custom clearance, innovative awareness and ability, business process, service, after-sales service and talent.

Table 17 The Weight of Critical Success Factors of Interviewee 8

Interviewee 8	Work efficiency	Customer satisfaction	Business stability	Performance growth	Summary weight
Weight	0.250	0.250	0.260	0.241	
Cross-border logistics	0.152	0.139	0.136	0.139	0.141
ICT system	0.140	0.134	0.139	0.141	0.139
After-sales service	0.107	0.112	0.110	0.112	0.110
Business Process	0.107	0.117	0.123	0.121	0.117
Service	0.120	0.119	0.113	0.112	0.116
Talent	0.109	0.112	0.108	0.108	0.109
Innovative awareness & ability	0.123	0.132	0.132	0.132	0.130
Customs clearance	0.141	0.134	0.139	0.136	0.138

Table 18 The Weight of 8 Critical Success Factors in 4 Criteria

	Work efficiency	Customer satisfaction	Business stability	Performance growth
Cross-border logistics	0.158	0.394	0.200	0.296
ICT system	0.214	0.480	0.297	0.484
After-sales service	0.075	0.263	0.107	0.146
Business Process	0.169	0.264	0.151	0.243
Service	0.098	0.641	0.260	0.516
Talent	0.178	0.354	0.264	0.300
Innovative awareness & ability	0.135	0.169	0.159	0.235
Customs clearance	0.133	0.287	0.143	0.187

The Table 18 shows the numerical result of 8 critical success factors which effects on work efficiency, customer satisfaction, performance growth and business ability respectively. According the result, the weight of ICT system, talent, and business process are top three in work efficiency. It shows that ICT system, talent, and business process are most important for work efficiency.

From the perspective of customer satisfaction, clearly, the service, ICT system, and cross-border logistics are in top three positions. It means that service, ICT system, and cross-border logistics are most critical for improve customer satisfaction. Considering business stability, the ICT system, talent, service and cross-border logistics have highest weight. Thus, ICT system, talent, service and cross-border logistics are most indispensable for business stability.

From the aspect of performance growth, it's evident that service, ICT system, and talent are in first three places. Hence, service, ICT system, and talent are play an important role for improve the performance growth.

Table 19 The Priority of 8 Critical Success Factors of Cross-border E-commerce Freight Forwarder from China to Thailand

	1	2	3	4	5	6	7	8	Normalize Average.
Cross-border logistics	0.141	0.156	0.145	0.145	0.117	0.097	0.107	0.141	0.131
ICT system	0.145	0.156	0.178	0.187	0.225	0.227	0.217	0.139	0.184
After-sales service	0.103	0.058	0.055	0.056	0.076	0.053	0.077	0.110	0.074
Business Process	0.126	0.124	0.118	0.111	0.080	0.084	0.064	0.117	0.103
Service	0.185	0.172	0.164	0.232	0.245	0.211	0.191	0.116	0.190
Talent	0.126	0.122	0.129	0.113	0.121	0.173	0.209	0.109	0.138
Innovative ability & awareness	0.080	0.092	0.086	0.061	0.077	0.108	0.064	0.130	0.087
Customs clearance	0.096	0.119	0.124	0.095	0.060	0.046	0.071	0.138	0.094

As the Table 19 shown, the summary weight of all critical success factors is determined. It's indicates that, service, ICT system, talent and cross-border logistics are in top four places, followed by business process, customs clearance, innovative awareness and ability, and after-sales services. The difference between the values of various factors is not obvious (see Figure 18). The service has the similar value with ICT system. Fortunately, the talent has the similar value with cross-border logistics. These results represent that service is most critical success factor for cross-border e-commerce freight forwarder from China to Thailand. Meanwhile, the ICT system has similar significance with service in freight forwarders performance. At the same time, the talent and cross-border logistics have alike effect on the freight forwarders operation. The order of critical success factors has some changes. In the CSF interview, ICT system is in sixth place, however, which is upgrade to the second place in AHP analysis. Customs clearance is in second place in CSF interview, but in AHP analysis has fell to the sixth place. After-sales is in third place in CSF interview, while it is in eighth place in AHP analysis.

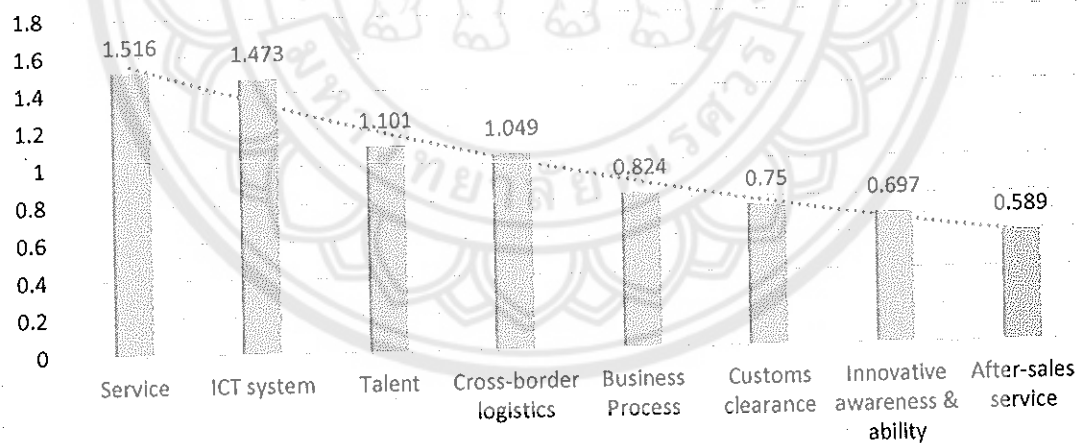


Figure 18 The Priority of Critical Success Factors

The Working Process of Cross-border E-commerce That Service Most Effect on

The pairwise comparison judgment matrix of working process under the influence of service of interviewee 1 is shown in Table 20. The final priority of working process of cross-border e-commerce freight forwarder from China to Thailand is shown

in Table 21. According satty's AHP theory, the value of CR is less than 0.1 represent that the judgment is reasonable, thus, all of the results are acceptable.

From the Table 21, it represents that interviewee 1 and interviewee 6 agree that service most influence after-sales process. Interviewee 2 and interviewee 7 believe that service most affect order-making process. Interviewee 3 regards that service has same influence level both in pre-order process and logistics process. Interviewee 4 and interviewee 8 agree that service most effect on pre-order process. Interviewee 5 believes that service most affect logistics process.

Table 20 The Pairwise Comparison Judgment Matrix of Working Process Under the Influence of Service of Interviewee 1

Interviewee 1	Pre-order	Order-making	Logistics	After-sales
Pre-order	1	1/3	2	1/4
Order-making	3	1	3	1
Transportation	1/2	1/3	1	1/3
After-sales	4	1	3	1
Weight	0.140	0.362	0.106	0.392
λ_{max}	4.098	CR	0.036	
RI	0.9	CI	0.033	

Table 21 The Weight of Service in Working Process

Service	Pre-order	Order-making	Logistics	After-sales
Interviewee 1	0.140	0.362	0.106	0.392
Interviewee 2	0.108	0.431	0.394	0.066
Interviewee 3	0.32	0.15	0.32	0.22
Interviewee 4	0.359	0.217	0.305	0.120
Interviewee 5	0.158	0.284	0.400	0.158
Interviewee 6	0.154	0.137	0.299	0.410
Interviewee 7	0.214	0.358	0.094	0.335
Interviewee 8	0.273	0.242	0.250	0.235
Average weight	0.215	0.273	0.270	0.242

As the Table 21 shown, the order-making process has the highest weight, followed by logistics process, after-sales process, and pre-order process. The order-making process and logistics process have similar values. It indicates that service mostly affects order-making process of cross-border e-commerce freight forwarder from China to Thailand. Further, the service in the order-making process and logistics process has similar significance for cross-border e-commerce freight forwarder from China to Thailand (see Figure 19).

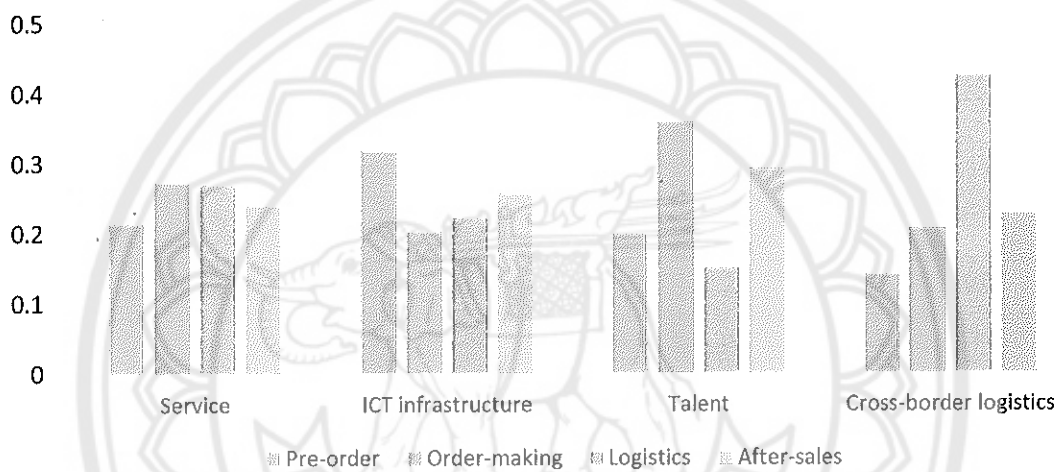


Figure 19 The Priority of Critical Success Factors in Working Process

The Conclusions of Data Analysis

Regarding to the comprehensive analysis of CSF interview, the critical success factors of cross-border e-commerce freight forwarder from China to Thailand are service, ICT system, customs clearance, after-sales services, talent, cross-border logistics, business process, and innovative awareness and ability. According to the AHP analysis result, service is the most critical success factors, follow by ICT system, talent, cross-border logistics, business process, customs clearance, and innovative awareness and ability, and after-sales services. The cross-border e-commerce freight forwarder belong to service industry, which as a communication intermediate between China's e-commerce producers and Thailand's customers. They help both sides to overcome obstacles in language, online payment, exchange currency, cross-border logistics, and

after-sales process. The freight forwarders act as a platform to provide order-making service, transportation of the batch and scattering commodities from China to different destination in Thailand. Hence the service quality plays a most critical role in the development of cross-border e-commerce freight forwarder industry.

ICT system move from the sixth place in CSF analysis to the second place in AHP model. In cross-border e-commerce freight forwarder industries, some companies have been having matures ICT system, some small organizations need to start from the very beginning to explore and develop system by themselves. ICT system is a platform which supports online transaction for freight forwarders and customers. Most of the medium-scale freight forwarders give more consideration to the ICT system. However, some small-scale freight forwarders have not realized the importance of ICT system. The interviewees in AHP models most of are experts who come from medium-scale freight forwarders. Hence, the priority of ICT system in AHP model is higher than in CSF analysis.

Customs clearance fell from the second place in CSF analysis to the sixth place in AHP model. Customs clearance is an unavoidable and significance process in cross-border e-commerce purchase. However, it's an uncontrolled process. Customs clearance belongs to the environmental factor. Moreover, the cross-border logistics service is outsourced to professional international shipping company.

After-sales service fell from the third place in CSF analysis to the eighth place in AHP model. After-sales problems are big challenges for every cross-border e-commerce freight forwarders that must meet. After-sales service is hard to manage. Sometimes the products are incomplete or sent wrong goods. Due to the long distance and complex customs clearance, returning product has a higher returning logistics fees than logistics fees, along with the longer returning shipping time. Therefore, most of customers and freight forwarders prefer to take compensation, which is a facilitation way for three sides. The service quality has great influence in customer satisfaction and rate of second glance.

On the basic of data analysis results, order-making process is one of the points which cannot be neglected. The freight forwarder provides ordering service, exchange currency service, and online payment service in order-making process. In this process, the freight forwarder on behalf of Thailand's customers, inquire the inventory, price,

transportation cost, and delivery time. Since the two countries use different currency, the buyers need to exchange currency in order to pay for the Chinese products. If the customers don't have Chinese bank card, the freight forwarder can pay the money for them. Without the accurate and timely service in order-making process, the cross-border e-commerce procurement could not be smoothly complete.

Meanwhile, the service in logistics process is also important for freight forwarder, in particular, the cross-border logistics service. Due to the producer and the customer belong to different countries. There is a long trip from China to Thailand. The customs clearance and transport time is instability not only influence the lead time, but also influence the normal operation of cross-border e-commerce freight forwarder. Anyway, purchase service, online payment service, and cross-border logistics service are core business of cross-border e-commerce freight forwarder. At the same time, the service in order-making process and logistics process are most critical for satisfying customers' demands.

Therefore, in order to improve customer satisfaction and performance growth, the managers ought to pay more attention on improving the service quality, reducing cross-border transport time and cost, enhancing ICT system performance continuously. Furthermore, comprehensive talent, simple business process, and intelligent ICT system are beneficial to improve work efficiency. The managers should concentrate on team management and training of employees along with recruiting multilingual cross-border e-commerce talents. Moreover, the freight forwarder is supposed to simplify the working process and payment process, improve business stability and realize that logistics information can be tracked in real time.

CHAPTER V

CASE STUDY

This chapter proposes an actual case to demonstrate the effect of most critical success factor in working process and analyze process efficiency. Since freight forwarder in cross-border e-commerce industry in Thailand dominated by SMEs. Criteria for considering the subject company depended on whether its' engage in importing commodities from China's e-commerce platform to Thailand, and economic benefits performance has steadily rising at least 2 years. On account of these reason, BMJ cargo is applied as a case study to explore the effect of service and problems in order-making process. This case study collects data by taking a field trip, interviewing 3 managers from BMJ cargo and using brainstorming method. This chapter intends to use SIPOC model to analysis the problems in order-making process and make some suggestions for optimize work efficiency. Furthermore, this chapter tries to explore the effective solutions through simulation. Thus, the organization will notice an importance of superior service in related working process and its effects.

The Introduction of BMJ Cargo

The case enterprise in this research is BMJ cargo, which play as an intermediary to help Thai customers import the commodities from China's B2B and B2C platform to Thailand. BMJ cargo was established in 2015, which have pre-order department, order-making department, warehouse Guangzhou, warehouse Bangkok and finance department. The employees increase from 10 people to more than 34 people. The department setting of BMJ cargo is shown as Table , which represent the department name, number of people and responsibility. BMJ cargo is one of the enterprises that developed rather rapid among its contemporaries in the past two years, which economic benefits performance has steadily rising within 2 years. "The best service, the highest efficiency" is the mission of BMJ cargo. BMJ cargo has more than 2,500 regular customers, about 61.7% customers are inclined to use importing services. Whereas, there are about 38.3% customers tend to use both purchasing and importing services.

The customers of freight forwarder mostly are wholesalers, retailers and consumers. The average monthly purchase amount is more than 1.2 million China Yuan in 2016. The average number of orders exceeds 3900 orders per month in 2017. Procurement goods mainly cover fashions, electronic products, health and beauty products, toy and decorations, such as cloth, shoes and bags, and so on. BMJ cargo has stable business and the performance is increasingly. Staffs have a good service attitude, so customer satisfaction is higher.

Table 22 The Department Setting of BMJ Cargo

Department	NP.	Responsibility
Pre-order Dep.	5	Pre-order, request payment, place order, record orders information, deal with after-sales problems
Order-making Dep.	5	Order-making, negotiation, urging delivery, record logistics information, deal with after-sales problems
Warehouse GZ	10	Acceptance inspection, sorting, storage, records logistics information, packaging, prepare shipping documents
Warehouse BK	10	Acceptance inspection, sorting, storage, record logistics information, packaging, prepare delivery orders, distribution
Finance Dep.	4	Online payment, financial accounting, prepare financial reports, cost analysis and control, funds management, personnel labor and salary management, exchange currency

Notes: NP.: number of people; Dep.: department; GZ: Guangzhou; BK: Bangkok

Because of information asymmetry, BMJ cargo is third-party which just facilitating this international trade. BMJ cargo provides cross-border e-commerce related services, which include translation service, purchase service, exchange service, online payment service, and cross-border shipping service from Guangzhou to Bangkok, urban delivery service in Bangkok, after-sales service and so on. The cross-border shipping is outsourced to professional international carrier, who responsibility for duties and taxations process. The international logistics plays a most critical role in the complete of cross-border e-commerce, due to uncontrolled of logistics fluctuation.

There are five service modes in BMJ Cargo are available as following:

1. Cross-border logistics+ domestic logistics
2. Cross-border logistics+ exchange currency service+ domestic logistics
3. Cross-border logistics+ exchange currency service+ translation service+ domestic logistics
4. Cross-border logistics+ exchange currency service+ translation service+ online payment service+ domestic logistics
5. Cross-border logistics+ purchase service+ online payment service+ domestic logistics

The most common service model is “purchase service+ online payment service+ cross-border shipping service+ domestic logistics”. The purchase process provides pre-order service, order-making service, and online payment service. Online order-making service contain inquire inventory, price, transportation cost, delivery time, and delivery urging, and so on. If e-commerce producer could not fulfill requirements, it needs to change and confirm orders repeatedly. Work efficiency is one of the key performance indicators (KPI) of purchase process, which include monthly working time and completed orders quantity, and error rate.

The Figure 20 shows the workflow and problems of BMJ cargo which operates cross-border procurement business on China’s e-commerce platform.

From the diagram, it shows that BMJ cargo is encounter some problems in purchase process. With the continuous development of business, the freight forwarder need to place over 150 orders on average every day. However, the long waiting time and low work efficiency may result in failure to timely payment, even result in the accumulation of orders.

Besides, if the customers cannot respond or remittance in time, it’s possible to cause order accumulation or order timeout to close. Currently, the major communication channels between BMJ cargo and customers are e-mail, Line, telephone and mobile phone.

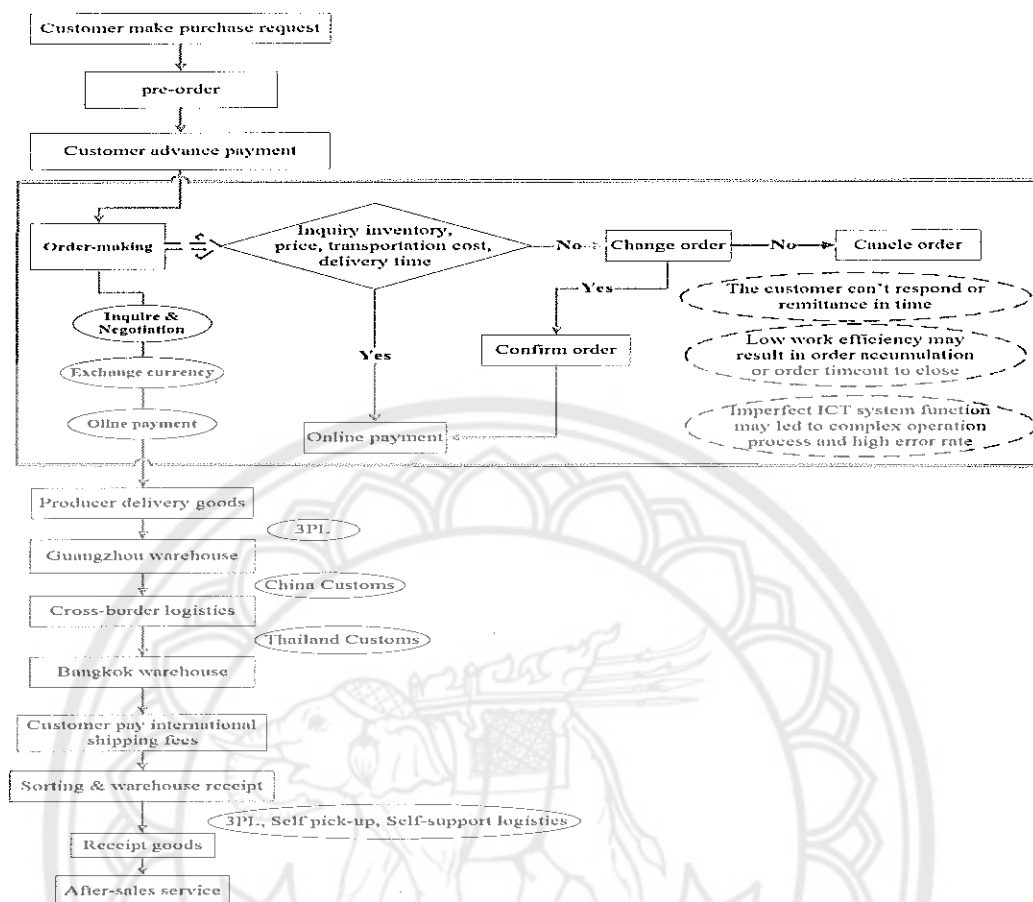


Figure 20 The Workflow of BMJ Cargo

Further, sometimes the e-commerce producers cannot respond or change the shipping cost or total cost timely may lead to the orders accumulation.

In addition, the Alipay has a highest limitation for online payment amount within a day. If online payment is frequently within a day, the payment function of Alipay may be locked. While, alternative plan can be considered, such as credit card, online banking, Union Pay, Tenpay and WeChat Pay. Moreover, the exchange rate is fluctuant every day. The cross-border purchase most relates to the exchange currency. Online shopping on China's e-commerce platform is mostly settled in China Yuan (CNY). It's inevitable to take the foreign exchange rate risk for BMJ cargo. The cross-border e-commerce freight forwarder in this industry has homogeneous services, the customer conversion costs is lower.

These are the problems generated in the purchase process that BMJ cargo needs to face and resolve. Therefore, the SIPOC model is applied to explore the reasons of the low efficiency. The SIPOC diagrams of the working process of BMJ cargo draw the complete procedure from the pre-order process, purchase process, until the completion of the logistics process, as shown in Figure 21 and Figure 22.

The Figure 21 shows the relationship between functions and flow from the pre-order process to the order-making process, which has much more information transfer links and complex working procedures. There are more uncertainties that lead to long waiting time, even impact work efficiency. A complex operation process may lead to low work efficiency. The orders are accumulated due to the low work efficiency. As a result, the employees often need to work overtime to clear accumulated orders.

Meanwhile, the function of the ICT system is imperfect, which may increase staffs' workload, even cause lower work efficiency. The ICT system is essential in almost every procedure, which is a requisite tool for cross-border freight forwarder. However, as the ICT system function is imperfect, it cannot fulfil the growing demand of customers and may cause a high error rate.

Moreover, BMJ cargo has greater personnel fluidity. Some management talent and skilled staffs resign out because of heavy workload but has a lower remuneration level. It is a problem that must be settled seriously.

Lastly, the Figure 22 analyses the logistics procedures from e-commerce producer to warehouse in Guangzhou, to warehouse in Bangkok, until to the destination of customers. Due to the long transport distance and unstable policy, customs clearance and cross-border logistics process encountered some problems easily, such as the unstable cross-border logistics transit time. As the strict customs scrutiny inspections and low professional clearance capacity of international carrier, the shipping time is too long to delay delivery. Low logistics processing capacity of warehouse is another factor that affects the smooth operation of logistics.

In order to ensure the safety and stability of cross-border transportation, it's proposed to look for multiple cross-border logistics providers. There is very necessary to track policy changes timely to ensure the smooth flow of goods. It also needs to improve the hardware facilities in warehouse, such as logistics operation venues, logistics handling machinery.

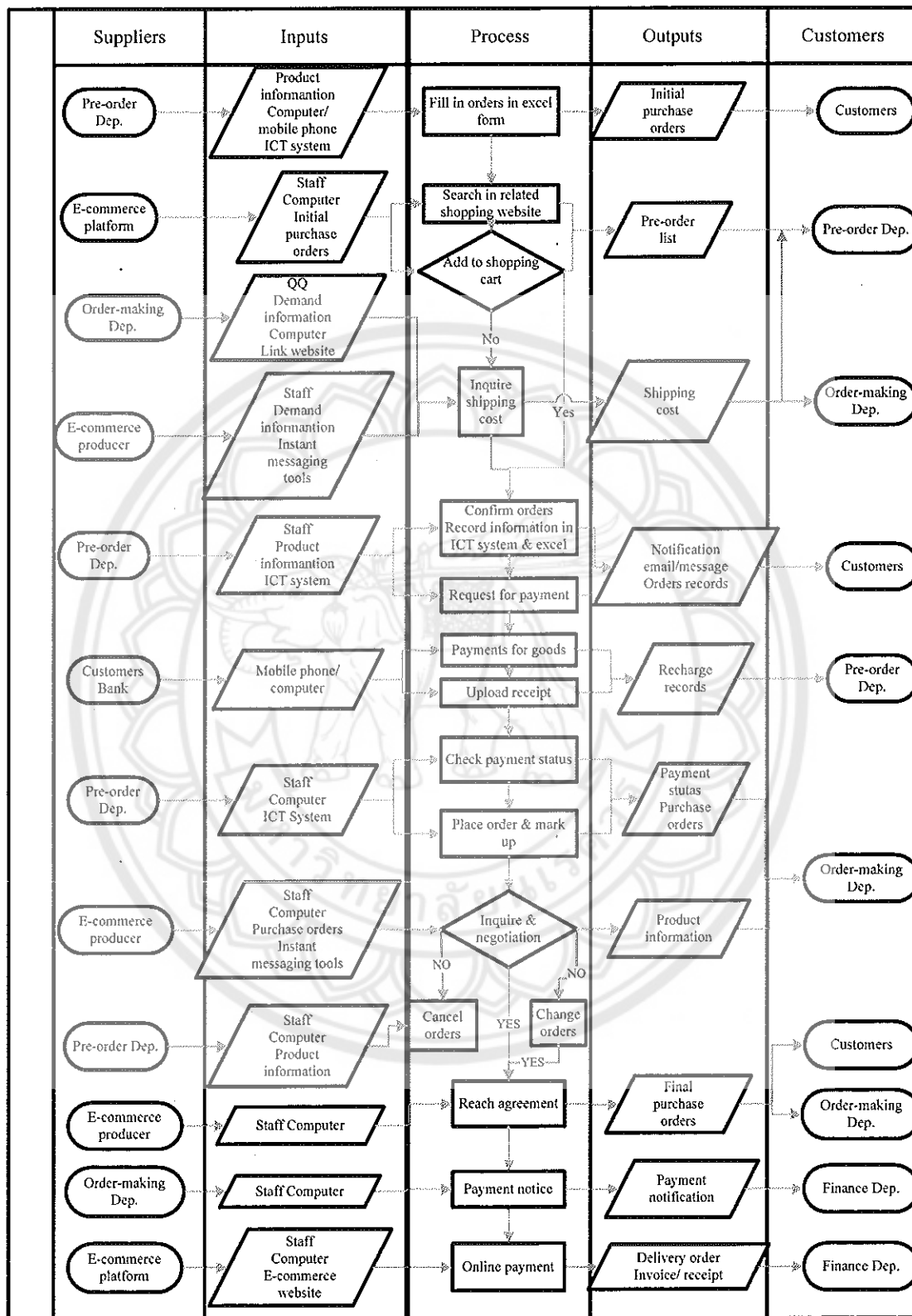


Figure 21 The SIPOC Diagram of Purchase Process of BMJ Cargo

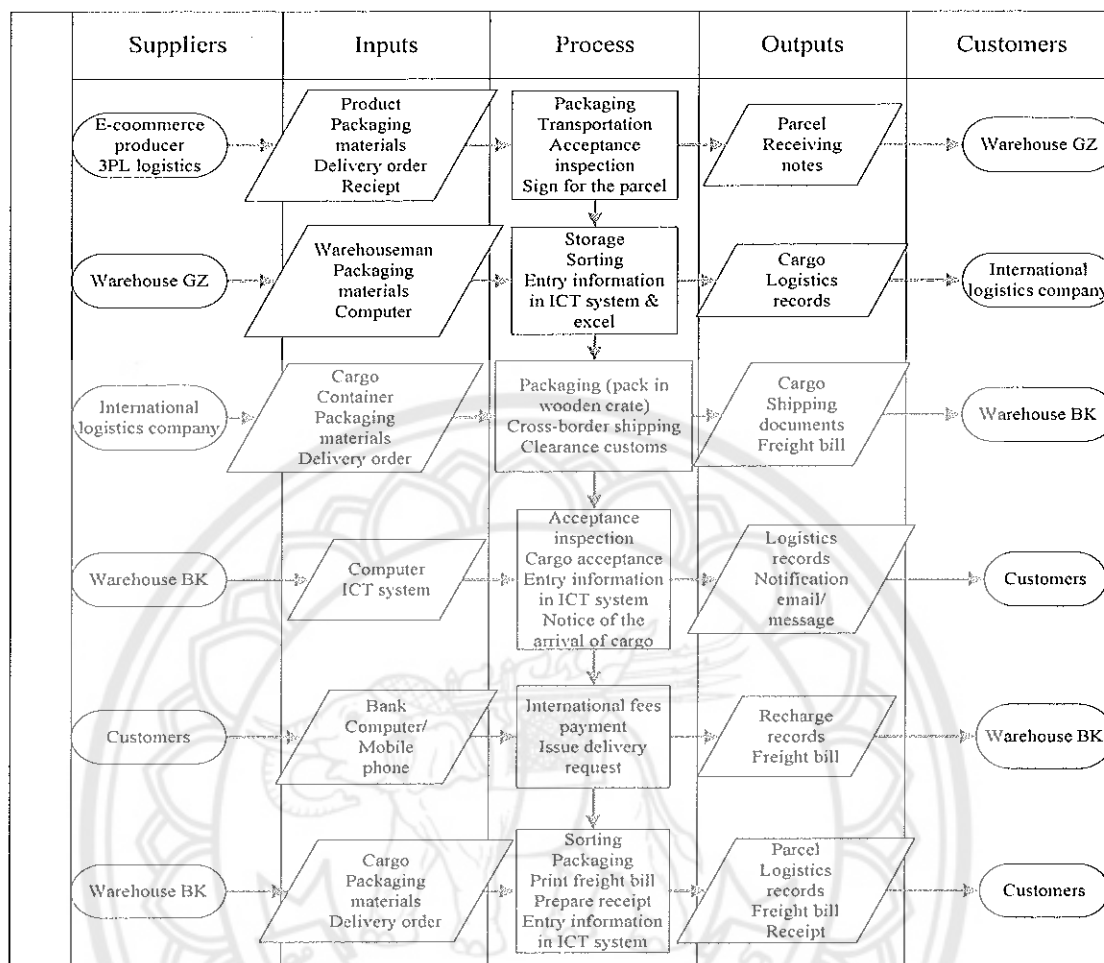


Figure 22 The SIPOC Diagram of Logistics Process of BMJ Cargo

Table 23 The Pre-order Form Sample

Tell	xxxxx
E-mail	xxx@gmail.com
BMJ	bmjcargo@163.com
E-mail	

Image	Product name & code	Size & color	Quantity	Unit price (CNY)	Total Cost (CNY)	Link
	xxxxx	xxxxxx	xxxxx	xxxxx	xxxxx	http://www
	xxxxx	xxxxxx	xxxxxx	xxxxx	xxxxx	http://www

Table 24 The Orders Record Sample on Online Excel

Code	Nan#4199		Rose#4238		
No.	1	2	1	2	3
Suppliers	xxxxxx	Out of stock	xxxxxx	xxxxxx	xxxxxx
Order number	2123591850587988	Cancel order	2161913914237988	2143705884037988	2163850912237988
Tracking number	518177496401		70518315380499	Out of stock	536318126772
Wh. GZ	8/8/2016		12/8/2016		15/8/2016
Container					
Wh. BK					
Platform	1688	taobao	taobao	taobao	1688
Remark	ping	ping	bang	bang	bang
Marker				Refund	

Notes: Wh. GZ: warehouse Guangzhou; Wh. BK: warehouse Bangkok

The pre-order form that customers use to place order is shown in Table 24. The content that customer need to complete include personal information and product information. The personal information covers code, place time, customer's name, consignee address, phone, and e-mail address. The product information contains image, product name and code, size and color, quantity, unit price and total cost, and link of shopping website.

In general, the pre-order department not only record the product and order information in ICT system, but also need to record the orders information in online excel again (see Table 24). Whereas, the logistics times are recorded by order-making department staff. Online excel is helpful to prevent data loss which caused by instability ICT system. However, it too consumes time and energy.

The Solutions of Cross-border E-commerce Freight Forwarder

According to the actual situation of BMJ cargo, this research intends to propose some reasonable solutions from improving process performance perspective, which is quantifiable and necessary. This chapter applies the simulation model to compare current and re-design process performance of purchase process.

The cross-border e-commerce industry is in the growth stage and has a great development potential. The e-commerce recognition and acceptance of Thai people is gradually increased in recent years. Over time though, BMJ Cargo has a good relationship with Chinese e-commerce suppliers. And, most importantly, BMJ cargo is an entrepreneurial enterprise, the organizational structure is easy to adjust at present stage. Thus, this research intends to propose suggestions as follow aspects:

1. Upgrade ICT system and gradually perfecting the multi-function of system. The easy and efficient ICT system is convenient for making orders, instant messaging, query, tracking and tracing.

2. Simplify and optimize the purchase process, which is helping to improve the workflow efficiency. Adjust and improve the organizational structure and function reasonably.

3. Recruit more multi-language and high-quality comprehensive talents. Improve remuneration level to retain key management talents. Set up human resources department, strengthen human resources management. At the same time, establish reasonable performance appraisal and compensation system. Develop training programs to enhance staff capacity, which is contributing to improve work efficiency and reduce error rate continuously. Cross-border e-commerce requires talent who are familiar to the negotiation skills, instrument of international payment, international trade and e-commerce business. The employee training could conduct in basic PC skills, e-commerce knowledge, international business knowledge, foreign language skills, and logistics knowledge aspect.

4. Diversified payment channels. Sometimes third-party payment account has transaction amount limit, diversified payment channels are good for ensure the payment smoothly. Multiple payment channels such as Alipay, TenPay, Online banking, mobile bank and credit card. Update exchange rate in real-time, it's in favor of protect loss from the fluctuant foreign exchange risk.

5. Develop and implement management standards, definite service content and processes, identify customer's responsibilities and obligations clearly, so as to improve customer coordination and customer satisfaction.

Upgrading and Improving ICT System Function

BMJ Cargo attaches great importance to system function upgrade and improvement continuously. ICT system supports both Thai and Chinese language. ICT system’s functions gradually improving, and services gradually expanding and multiple. In addition to the basic purchase service, logistics information tracking and after-sales service, BMJ cargo also offers diversified service, such as settle shipping cost, recharge on Alipay, transfer to China’s bank account, and pre-payment on Taobao. The client can inquire recharging, transferring and refunding records on ICT system. It is worth mentioning that newly added ShopMall service. The product on ShopMall most of are from wrong orders or overtime unclaimed goods.

After upgrading the ICT system, BMJ cargo supports online place orders for customers (see Figure 23). Because it’s more efficient, convenient, standardization, and easier to operate and manage than excel form and e-mail. As a result of the improvement of system stability, pre-order and purchase department don’t need to record orders information in online excel again. The online excel recording procedure was eliminated, which can save about 2 hours working time in every day. It’s a wise choice to save time and effort, reduce the workload and increase effective working hours of staff, and even reduce the personnel fluidity.

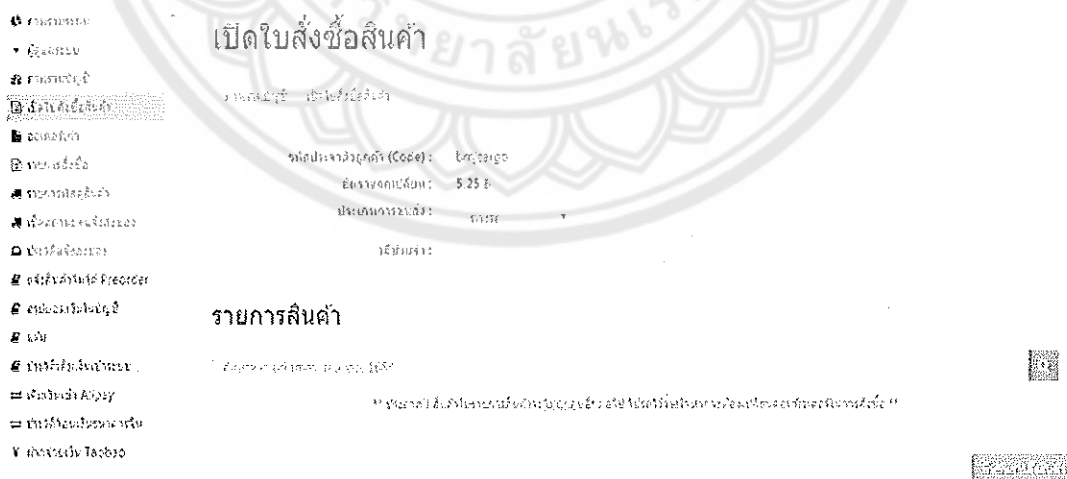


Figure 23 Place Order Page for Customer on ICT System

ประเภทครุภัณฑ์ : โทรศัพท์
 สถานะ : รอการตรวจสอบ
 รหัสช่วยจำ :
 [Redacted]
 รหัสช่วยจำส่วนเพิ่มเติม :

รายการสินค้า


1.	รายละเอียด	ราคาต่อหน่วย	จำนวน	รวม	รหัสวัสดุ	ชื่อ	หมายเหตุ
1.1	 手机壳手机壳 适用于联想 A7-30 手机壳: 硅胶 QQ: 1313131313 型号: A7-30	¥6.5	55	¥455 ต้นตำ: ¥455 สง: 0		ชื่อ: ชื่อ: ชื่อ:	

Figure 24 The Sample of Unaudited Orders in ICT System

สถานะ : รอการชำระเงิน
 รหัสช่วยจำ : Lenovo A7-30 Case + Button
 [Redacted]
 รหัสช่วยจำส่วนเพิ่มเติม : ใหญ่/พอ

รายการสินค้า


1.	รายละเอียด	ราคาต่อหน่วย	จำนวน	รวม	รหัสวัสดุ	ชื่อ	หมายเหตุ
1.1	 钢化膜 适用于联想 A7-30 手机壳: black tempered film 尺寸: 硅胶 QQ: 1313131313 型号: A7-30	¥31.5	1	¥31.5 ต้นตำ: ¥31.5 สง: 0		ชื่อ: ชื่อ: ชื่อ:	

Figure 25 The Sample of Unpaid Orders in ICT System

Additionally, both the client and staff are available to check and track the status of orders on ICT system. If the clients want to change or cancel the order, they can login in ICT system to edit demand information and order detail (see Figure 24). After calculating the total cost, the staff of pre-order department will send e-mail to clients for request payment. The total cost includes product price and shipping cost. The staff can view the payment status on ICT system and process to the next step at any time (see Figure 25). System upgrades is good to improve the transparency of information.

Afterwards, the orders process to the stage of waiting for the online payment on e-commerce platform, as shown in Figure 26. After the completed of place order, the order detail and logistics information are shown on the ICT system for checking and tracking (see Figure 27). At the same time, the clients can feedback after-sales problems on ICT system. The staff will verify the situation and contact e-commerce producer.

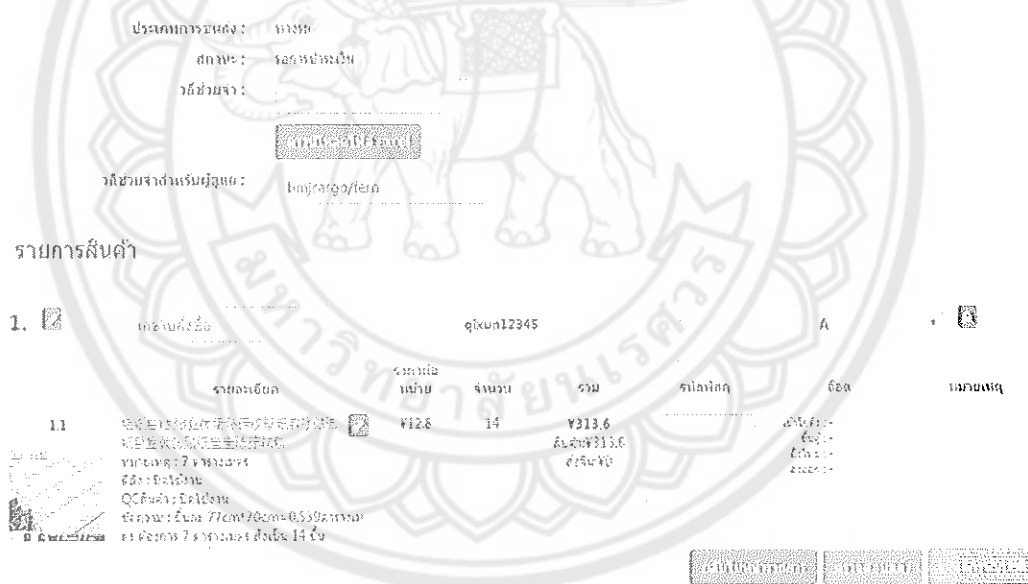


Figure 26 The Sample of Unfinished Online Payment Orders in ICT System

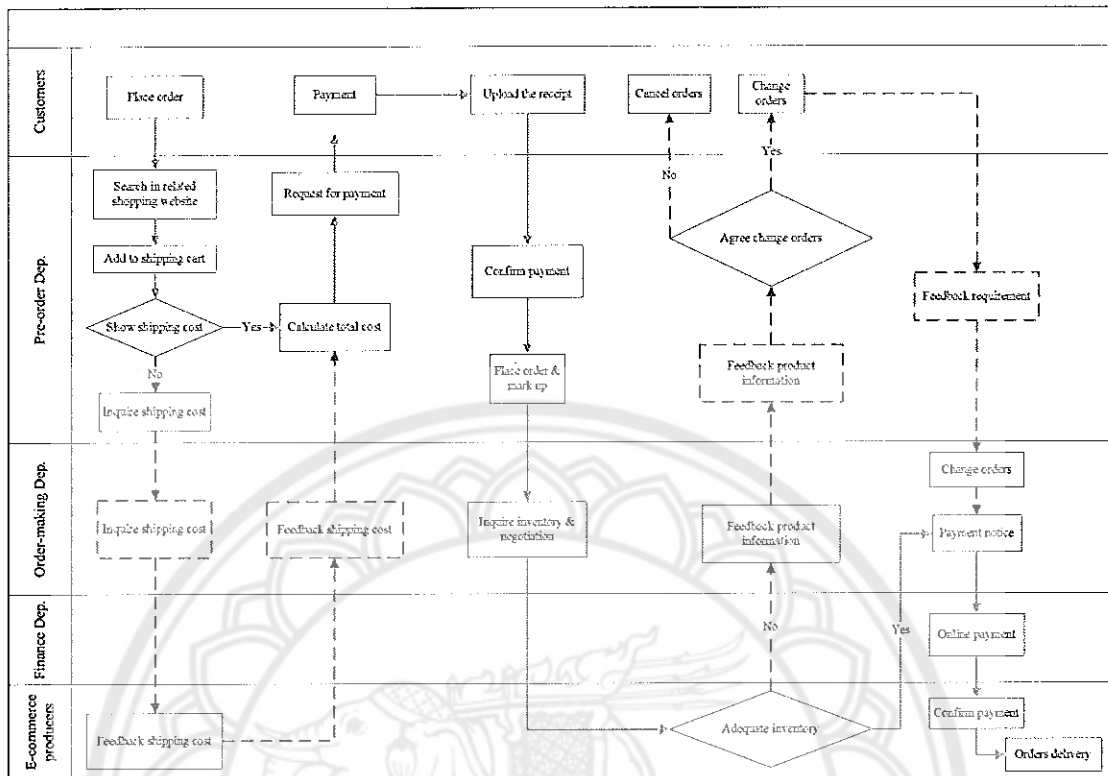


Figure 28 The Current Purchase Process of BMJ Cargo

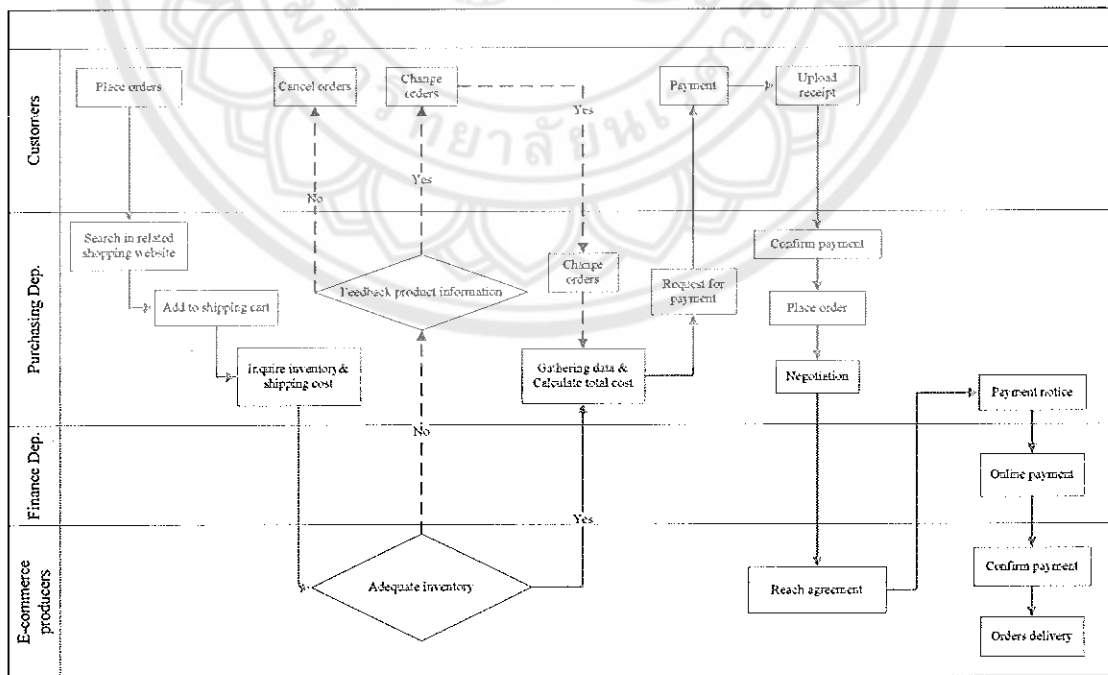


Figure 29 The Re-design Purchase Process

After determining the re-design purchase process, Arena simulation software is applied to construct simulation models, which can accurately reflect the working process. Base on this, the simulation results are analyzed and evaluated. The performance of re-design purchase process is examined by compare before and after difference at work efficiency. The data is collected by reviewing the previous working records and interviewing managers and staffs in corresponding posts both in pre-order and order-making department.

Business process has four performance evaluating indicators, which are business process cost, efficiency, quality and customer satisfaction (Hammer, & Champy, 2009). Business process efficiency refers to the throughput that can be provided in a period. Business process efficiency can be analysis from the working time and queue length. Working time include lead time, waiting time, transportation time. This research intends to select business process efficiency as a criterion to examine the performance of re-design purchase process.

In this simulation model, it is assumed that resource consistently be in a good operating environment, and relevant personnel can operate skillfully. The working process start from customer login account and place demand order on ICT system. After received the order request, the purchase staffs start to search product information and add to shopping cart in related online-shopping website. According the orders demand, the purchase staffs inquire e-commerce producers about the shipping cost and inventory by instant messaging tools, such as "WangWang". Base on the inquire questions, the e-commerce producers reply the product information and shipping cost. There may have 3 scenarios, the first is e-commerce producers have adequate inventory which can satisfy the demand. The second is that some commodities are in short supply, which needs to change or cancel orders. The last is goods are out of stock, which must cancel orders. If e-commerce producers can satisfy demand, the purchase staffs can calculate product price and shipping cost directly. But if e-commerce producer cannot meet all requirements, the purchase staffs need to inquire customers' opinion to change or cancel the order. It needs to spend some time to wait the feedback from customers. After receiving feedback from customers, the purchase staffs will gather information, calculate product price and shipping cost, and request for payment by e-mail or message. The customers pay for orders after confirming orders and upload the transfer receipt

onto ICT system. Once the purchase staffs confirm the payment status, they will place order and negotiate with e-commerce producers. Until the two sides reached an agreement, the purchase staffs will inform finance staff to conduct online payment. After completing the online payment, the e-commerce producer will arrange for dispatch.

The objective of this modeling is predicting system's efficiency from non-existing scenario. It's assumed that BMJ cargo has 10 staffs to support purchase service in purchase department. The working time is 8 hours within a day. One week need to work 6 days. Users can 24-hour access to the system and submit requests. The requests from customers are seen as product which waiting for processing. One customer is responsible by one staff. One staff can deal with one order at one time. The time when the user login to the system and submit requests is ignored as 0. The arrival time of system events and processing time of every procedure are expression distribution.

In order to ensure that the re-design purchase process simulation model is more realistic, this section building a simulation model according the current purchase process (see Figure 30). There are same parameters in the same process between current and re-design purchase process. This research collects arrive time of orders from 20 days in a month. This current purchase process simulation model has 1 create module, 1 assign module, 18 process modules, 3 decide modules, 2 record modules, and 2 dispose modules. The process data of current purchase process simulation model is shown as Figure 31.

One pre-order staff need to cooperate with one purchaser in order to complete one order. One group can complete 40-50 orders within a day. After running current purchase process simulation model, it shows that the range of number in of orders is 48 ± 2.60 to 70 ± 2.60 , and the range of number out of orders is 42 ± 1.11 to 52 ± 1.11 , which is similar with the actual situation of BMJ Cargo (see Figure 32). Hence, these parameters are suitable applied to re-design purchase process simulation model.

According to the result of report, the schedule utilization of staff in current purchase process is calculated (see Figure 33). The pre-order staff utilization is range from 0.7816 to 0.9816, and the average utilization is 0.8952. Purchase staff utilization is range from 0.6425 to 0.9301, and the average utilization is 0.7797.

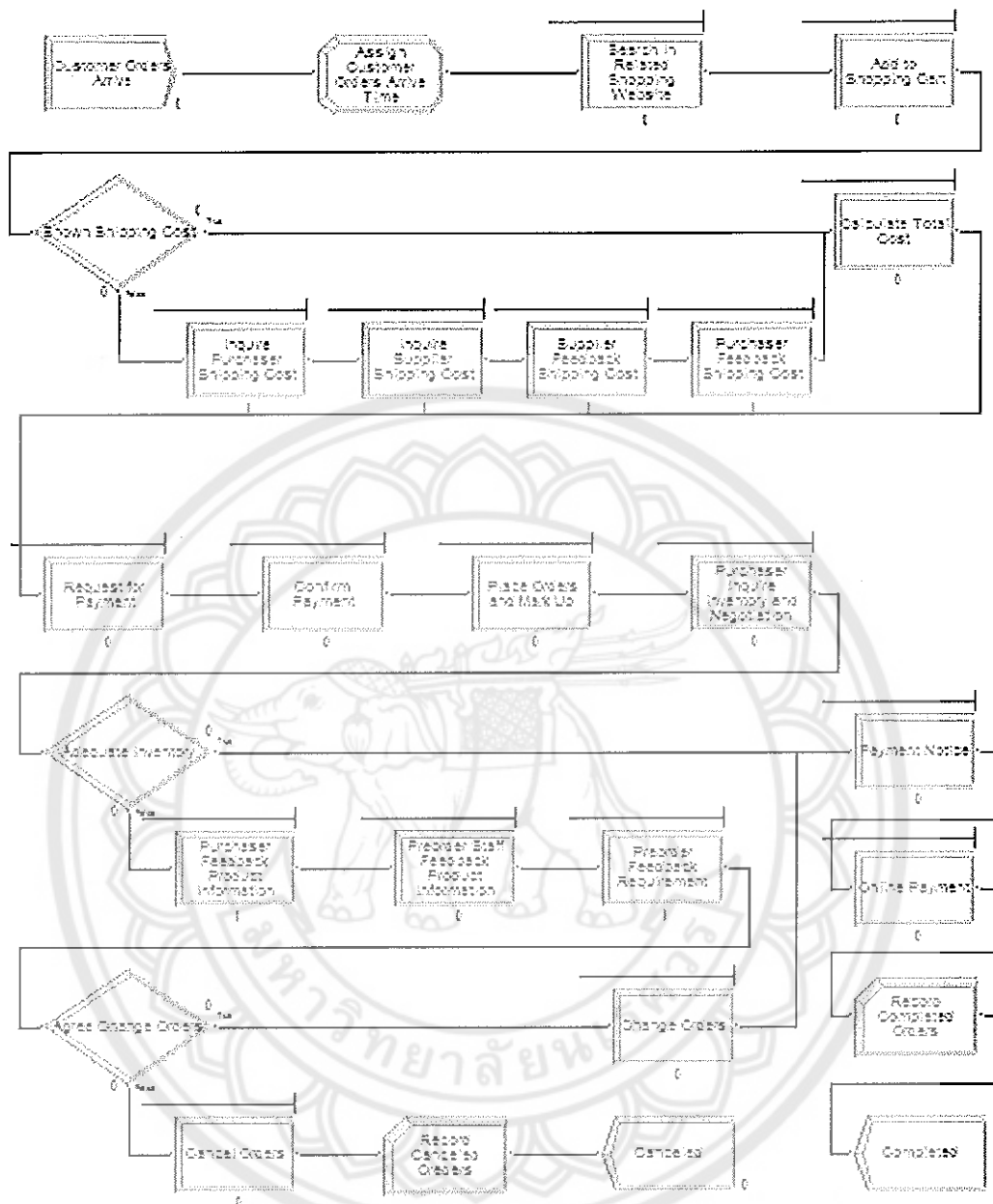


Figure 30 The Simulation Model of Current Purchase Process

Process Data Process												
	Name	Type	Action	Priority	Resources	Easy Type	Units	Allocation	Minimum	Value	Maximum	Report Statistics
1	Search in Related Shopping Website	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	25	0.5	1	☑
2	Add to Shopping Cart	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	25	0.5	2	☑
3	Require Purchaser Shipping Cost	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	0.25	0.5	0.75	☑
4	Require Supplier Shipping Cost	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	0.5	1	3	☑
5	Supplier Feedback Shipping Cost	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	1	1	10	☑
6	Purchaser Feedback Shipping Cost	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	0.25	0.5	0.75	☑
7	Calculate Total Cost	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	1	2	5	☑
8	Request for Payment	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	5	1	1.5	☑
9	Confirm Payment	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	5	1	5	☑
10	Place Orders and Mark Up	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	25	0.5	0.75	☑
11	Purchaser Require Quantity and Negotiation	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	1	0.5	5	☑
12	Purchaser Feedback Product Information	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	1	1	10	☑
13	Preorder Staff Feedback Product Information	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	0.5	1	1.5	☑
14	Payment Notice	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	1	0.5	0.75	☑
15	Preorder Feedback Requirement	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	0.25	0.5	1	☑
16	Cancel Orders	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	1	1.5	3	☑
17	Change Orders	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	1	2	5	☑
18	Online Payment	Standard	Seize Delay Release	Medium(2)	1 person	Triangular	Minutes	Value Added	5	0.75	1	☑

Figure 31 The Process Data Dialog Box

Number In	Average	Half Width	Minimum Average	Maximum Average		
Entity A	57.9815	2.60	48.0000	70.0000		
Number Out	Average	Half Width	Minimum Average	Maximum Average		
Entity A	47.2692	1.11	42.0000	52.0000		
WIP	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Entity A	7.6503	1.16	3.6291	14.1618	0.00	26.0000

Figure 32 The Entity Data of Current Purchase Process Simulation Model

Resource				
Usage				
Scheduled Utilization	Average	Half Width	Minimum Average	Maximum Average
Financial officer	0.06711602	.00	0.05617835	0.07777254
Preorder Staff 1	0.8952	.02	0.7816	0.9818
Preorder Staff 2	0.8952	.02	0.7816	0.9818
Preorder Staff 3	0.8952	.02	0.7816	0.9818
Preorder Staff 4	0.8952	.02	0.7816	0.9818
Preorder Staff 5	0.8952	.02	0.7816	0.9818
Purchaser 1	0.7797	.03	0.6425	0.9301
Purchaser 2	0.7797	.03	0.6425	0.9301
Purchaser 3	0.7797	.03	0.6425	0.9301
Purchaser 4	0.7797	.03	0.6425	0.9301
Purchaser 5	0.7797	.03	0.6425	0.9301

Figure 33 The Schedule Utilization of Staff in Current Purchase Process

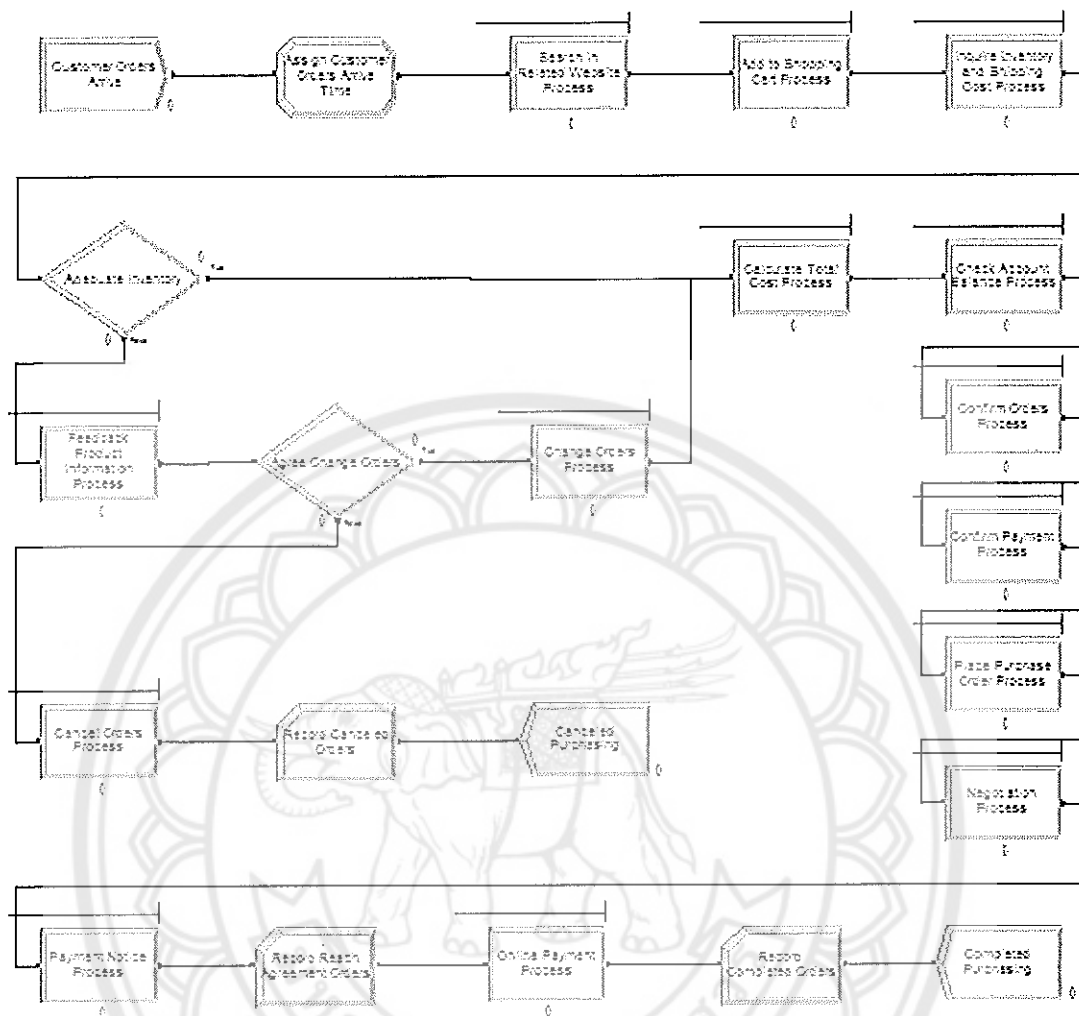


Figure 34 The Simulation Model of Re-design Purchase Process

The re-design purchase process simulation model is shown in Figure 34. This simulation model has 1 create module, 1 assign module, 14 process modules, 2 decide modules, 3 record modules, and 2 dispose modules. The Create Module is named as “customer orders”. The Entity Type is specified as “orders A”. The “time between arrivals” is Expression shown as “ $-0.001 + \text{EXPO}(8.51)$ ”, and the units are set to minutes. The entities reach one at a time. The “assign customer orders arrive time” is used to define the attribute of arrive time of customer orders and assign it with the value of TNOW.

The “search in related website” process is Seize Delay Release action, which has 10 purchasers (see Figure 35). The Delay Type is Triangular and assigned it a value from a TRIA (0.25, 0.5, 1) with the units of minutes. The Allocation is value added. The next is “add to shopping cart” process, which belong to Seize Delay Release action. The Delay Type is Triangular and assigned it a value from a TRIA (0.25, 0.5, 2) with the units of minutes. The Allocation is value added. The “inquire inventory and shipping cost” process is Seize Delay Release action. The Delay Type is Triangular, which is assign as TRIA (0.5, 1, 1.5) with the units of minutes.

The screenshot shows a dialog box titled "Process" with the following configuration:

- Name:** Search in Related Website Process
- Type:** Standard
- Action:** Seize Delay Release
- Priority:** Medium(2)
- Resources:**
 - Resource, Purchaser 2, 1
 - Resource, Purchaser 3, 1
 - Resource, Purchaser 4, 1
 - Resource, Purchaser 5, 1
 - Resource, Purchaser 6, 1
- Buttons:** Add..., Edit..., Delete
- Delay Type:** Triangular
- Units:** Minutes
- Allocation:** Value Added
- Minimum:** 0.25
- Value(Most Likely):** 0.5
- Maximum:** 1
- Report Statistics
- Buttons:** OK, Cancel, Help

Figure 35 The Search in Related Website Process Dialog Box

Due to the e-commerce suppliers have not adequate inventory on sometimes, this step use decide module to define it. The percent true of “adequate inventory” is 80, and the percent false is default as 20. If there are adequate inventory, the orders are going to the “calculate total cost” process directly. If there are shortage inventory, the orders are going to the “feedback product information and shipping cost” process. This process is Seize Delay Release action, which has 10 purchasers. The Delay Type is Triangular, which is assign as TRIA (1, 5, 10) with the units of minutes. If customers

agree to change orders, the orders are going to the “change orders” process and “calculate total cost” process. The percent true of “adequate inventory” is 50, another 50% orders is following the false branch to “cancel orders” process. The decide data module is shown in Figure 36. The “cancel orders” process is belonging to Seize Delay Release action. The Delay Type is Triangular and assigned it a value from a TRIA (1, 1.5, 2) with the units of minutes. The “record canceled orders” is used to record the total quantity of canceled orders. The canceled orders are going to the dispose module of “canceled”.

Decide - Basic Process			
	Name	Type	Percent True
1	Adequate Inventory	2-way by Chance	80
2	Agree Change Orders	2-way by Chance	50

Figure 36 The Decide Data Module

At the same time, the orders in “change orders” process will seize, delay, and release the purchaser. The Delay Type is Triangular and assigned it a value from a TRIA (1, 2, 3) with the units of minutes. After that, the orders are following to the “calculate total cost” process. The orders will seize, delay, and release the purchaser in this process. The Delay Type is Triangular with the value of TRIA (1, 3, 5) with the units of minutes. The next step is “check account balance” process, which belongs to the Seize Delay Release action logic. The Delay Type is Triangular with the value of TRIA (0.25, 0.5, 1) with the units of minutes. After finishing check account balance of customer, the purchaser is going to confirm orders. The “confirm orders” process is belonging to the Seize Delay Release action logic. The Delay Type is assigned as TRIA (0.25, 0.5, 0.75) with the units of minutes. After the customer complete the payment, the purchaser is going to confirm payment. The “confirm payment” process is belonging to the Seize Delay Release action logic. The Delay Type is Triangular with the value of TRIA (0.5, 1, 3) with the units of minutes. And then, the orders are going to the “place purchase orders” process. In this process, the orders delay following the TRIA (0.25, 0.5, 1) with the units of minutes distribution. The next step is “negotiation” process conduct between

purchasers and e-commerce suppliers. The orders delay following the TRIA (1, 2, 4) with the units of minutes distribution in this process.

After both two sides reaching agreement, the orders follow to the “payment notice” process. The Delay Type is assigned as TRIA (0.25, 0.5, 0.75) with the units of minutes in this process. According to the notice of payment, the financial officer is going to conduct the “online payment” process. In this process, the orders delay following the TRIA (0.5, 0.75, 1) with the units of minutes distribution. The “record completed orders” module is used to count completed orders in this purchase process. Finally, the completed orders following to the dispose module of “completed purchasing”. The process data is shown in Figure 37.

Process - Basic Process												
	Name	Type	Action	Priority	Resources	Delay Type	Units	Allocation	Minimum	Value	Maximum	Report Statistics
1	Search in Related Website Process	Standard	Seize/Delay/Release	Medium(2)	10 rows	Triangular	Minutes	Value Added	0.25	0.5	1	<input checked="" type="checkbox"/>
2	Add to Shopping Cart Process	Standard	Seize/Delay/Release	Medium(2)	10 rows	Triangular	Minutes	Value Added	0.25	0.5	2	<input checked="" type="checkbox"/>
3	Invoice Inventory and Shipping Cost Process	Standard	Seize/Delay/Release	Medium(2)	10 rows	Triangular	Minutes	Value Added	0.5	1	1.5	<input checked="" type="checkbox"/>
4	Calculate Total Cost Process	Standard	Seize/Delay/Release	Medium(2)	10 rows	Triangular	Minutes	Value Added	1	3	5	<input checked="" type="checkbox"/>
5	Feedback Product Information Process	Standard	Seize/Delay/Release	Medium(2)	10 rows	Triangular	Minutes	Value Added	1	5	10	<input checked="" type="checkbox"/>
6	Check Account Balance Process	Standard	Seize/Delay/Release	Medium(2)	10 rows	Triangular	Minutes	Value Added	0.25	0.5	1	<input checked="" type="checkbox"/>
7	Change Orders Process	Standard	Seize/Delay/Release	Medium(2)	10 rows	Triangular	Minutes	Value Added	1	2	3	<input checked="" type="checkbox"/>
8	Confirm Orders Process	Standard	Seize/Delay/Release	Medium(2)	10 rows	Triangular	Minutes	Value Added	0.25	0.5	0.75	<input checked="" type="checkbox"/>
9	Confirm Payment Process	Standard	Seize/Delay/Release	Medium(2)	10 rows	Triangular	Minutes	Value Added	0.5	1	2	<input checked="" type="checkbox"/>
10	Place Purchase Order Process	Standard	Seize/Delay/Release	Medium(2)	10 rows	Triangular	Minutes	Value Added	0.25	0.5	1	<input checked="" type="checkbox"/>
11	Cancel Orders Process	Standard	Seize/Delay/Release	Medium(2)	10 rows	Triangular	Minutes	Value Added	1	1.5	2	<input checked="" type="checkbox"/>
12	Negotiation Process	Standard	Seize/Delay/Release	Medium(2)	10 rows	Triangular	Minutes	Value Added	1	2	4	<input checked="" type="checkbox"/>
13	Payment Notice Process	Standard	Seize/Delay/Release	Medium(2)	10 rows	Triangular	Minutes	Value Added	0.25	0.5	0.75	<input checked="" type="checkbox"/>
14	Online Payment Process	Standard	Seize/Delay/Release	Medium(2)	1 row	Triangular	Minutes	Value Added	0.5	0.75	1	<input checked="" type="checkbox"/>

Figure 37 The Process Data Module

Resource - Basic Process									
	Name	Type	Capacity	Busy / Hour	Idle / Hour	Per Use	StateSet Name	Failures	Report Statistics
1	Purchaser 1	Fixed Capacity	1	0.0	0.0	0.0		0 rows	<input checked="" type="checkbox"/>
2	Purchaser 2	Fixed Capacity	1	0.0	0.0	0.0		0 rows	<input checked="" type="checkbox"/>
3	Purchaser 3	Fixed Capacity	1	0.0	0.0	0.0		0 rows	<input checked="" type="checkbox"/>
4	Purchaser 4	Fixed Capacity	1	0.0	0.0	0.0		0 rows	<input checked="" type="checkbox"/>
5	Purchaser 5	Fixed Capacity	1	0.0	0.0	0.0		0 rows	<input checked="" type="checkbox"/>
6	Financial Officer	Fixed Capacity	1	0.0	0.0	0.0		0 rows	<input checked="" type="checkbox"/>
7	Purchaser 6	Fixed Capacity	1	0.0	0.0	0.0		0 rows	<input checked="" type="checkbox"/>
8	Purchaser 7	Fixed Capacity	1	0.0	0.0	0.0		0 rows	<input checked="" type="checkbox"/>
9	Purchaser 8	Fixed Capacity	1	0.0	0.0	0.0		0 rows	<input checked="" type="checkbox"/>
10	Purchaser 9	Fixed Capacity	1	0.0	0.0	0.0		0 rows	<input checked="" type="checkbox"/>
11	Purchaser 10	Fixed Capacity	1	0.0	0.0	0.0		0 rows	<input checked="" type="checkbox"/>

Figure 38 The Resource Data Module

Figure 39 The Run Setup Replication Parameters

Every purchaser and financial officer is fixed capacity. Every process has 10 purchasers, except the online payment process has only one financial officer (see Figure 38). Order processing follow the rules of first in first out. Since the purchaser works 8 hours a day and 26 days a month, the replication length is set as 8 hours, the base time units to minutes (see Figure 39).

Resource

Usage

Scheduled Utilization	Average	Half Width	Minimum Average	Maximum Average
Financial Officer	0.04035445	.00	0.02835961	0.05267256
Purchaser 1	0.9719	.01	0.9004	1.0000
Purchaser 10	0.9719	.01	0.9004	1.0000
Purchaser 2	0.9719	.01	0.9004	1.0000
Purchaser 3	0.9719	.01	0.9004	1.0000
Purchaser 4	0.9719	.01	0.9004	1.0000
Purchaser 5	0.9719	.01	0.9004	1.0000
Purchaser 6	0.9719	.01	0.9004	1.0000
Purchaser 7	0.9719	.01	0.9004	1.0000
Purchaser 8	0.9719	.01	0.9004	1.0000
Purchaser 9	0.9719	.01	0.9004	1.0000

Figure 40 The Resource of the Category Overview Report

Process

Other

Number Out	Average	Half Width	Minimum Average	Maximum Average
Add to Shopping Cart Process	49.0769	1.77	40.0000	61.0000
Calculate Total Cost Process	37.8462	1.01	33.0000	43.0000
Cancel Orders Process	4.0769	.74	1.0000	8.0000
Change Orders Process	3.8077	.73	0.00	8.0000
Check Account Balance Process	35.2692	.78	32.0000	38.0000
Confirm Orders Process	32.7692	.87	28.0000	36.0000
Confirm Payment Process	30.8462	1.11	24.0000	36.0000
Feedback Product Information Process	8.4615	.96	4.0000	14.0000
Inquire Inventory and Shipping Cost Process	45.6154	1.28	40.0000	53.0000
Negotiation Process	26.8846	1.48	18.0000	34.0000
Online Payment Process	25.6538	1.47	17.0000	33.0000
Payment Notice Process	25.6923	1.48	17.0000	33.0000
Place Purchase Order Process	28.9231	1.27	22.0000	35.0000
Search in Related Website Process	52.2692	2.26	41.0000	67.0000

Figure 41 The Number Out of Orders in Every Process

Number In	Average	Half Width	Minimum Average	Maximum Average		
Orders	55.6154	2.91	41.0000	71.0000		
Number Out	Average	Half Width	Minimum Average	Maximum Average		
Orders	29.7308	1.36	22.0000	39.0000		
WIP	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Orders	13.3949	1.95	3.6641	22.4147	0.00	44.0000

Figure 42 The Entities of the Category Overview Report

According to the result of report, the average utilization of purchaser is 0.9719 (see Figure 40). The number out of orders in every process is shown in Figure 41. Every purchaser can complete about 22 ± 1.36 to 39 ± 1.36 orders within a day (see Figure 42). 1 pre-order staff corporate with 1 purchase staff can finish 40-50 orders within a day,

5 pre-order staffs corporate with 5 purchase staffs can finish 200-250 orders within a day in BMJ Cargo. In re-design simulation model, 1 purchaser can complete 22-39 orders within a day, 10 purchasers can complete 220-390 orders within a day. The average daily work efficiency of staff in current purchase process is 23 orders, but in re-design purchase process is 30 orders, which is higher than 30.43%. Therefore, the re-design purchase process has higher work efficiency than current purchase process (see Table 25). Obviously, applying the re-design purchase process is a good choice for BMJ Cargo.

Table 25 The Comparison of Current and Re-design Work Efficiency

Comparison	Current	Current simulation	Re-design simulation
Working hours	8	8	8
Staffs	5+5+1	5+5+1	10+1
Total daily complete orders	200-250	210-260	220-390
Daily complete orders per group	40-50	42 ± 1.11, 52±1.11	22±1.36, 39±1.36
Average daily work efficiency	23	23.5	30
Rate of improvement	0	0	30.43%

CHAPTER VI

CONCLUSION

This chapter is the summary of research result based on the previous five chapters. Based on the results and analysis of AHP methods and simulation model, suggestions are made to enhance the performance of purchase process of cross-border e-commerce freight forwarder between China and Thailand effectively. The discussions, conclusions and recommendations for future study are presented.

The Discussions of Cross-border E-commerce Freight Forwarder

This research's findings propose new theoretical grounds for study critical success factors of cross-border e-commerce freight forwarder between China and Thailand. Meanwhile, this research puts forward an empirical implication to appraise the effect of critical success factors on working process. Further, BMJ Cargo is applied as a case study to examine the process efficiency in purchase process from the service perspective. Finally, the outcomes of this research may enable managers to make better decisions on constructing strategies in promoting cross-border e-commerce freight forwarder performance effectively.

However, this research has not study the combined effect of all critical success factors. At the same time, since the limits of searching engines and resources, it is unavoidable that some literatures are disregarded. Another side comes from the data collection. Much more interview should be taken for more objectiveness of the result. In addition, more data should be collected for support the solutions in purchase process of cross-border e-commerce freight forwarder.

The Conclusions of Cross-border E-commerce Freight Forwarder

As indicated in chapter 1, there are four targets of this research, namely, 1) to study the critical factors effect on the success of cross-border e-commerce freight forwarder; 2) to determine the influence level of critical success factors; 3) To identify the process that most critical success factor most affect; 4) to analyse the process efficiency that most critical success factor effect on.

Regarding that, this research utilizes CSF concept to determine the critical success factors of cross-border e-commerce freight forwarder from China to Thailand. The 14 experts from 12 e-commerce freight forwarders are interviewed. AHP approach is proposed to determine the influence level of 8 critical factors and priority of 4 working process under the influence of service. The effect of critical success factors is examined by interviewing 8 experts who come from 6 cross-border e-commerce freight forwarders. The critical success factors and working process are synthesizing the priorities by using nine-point scale. Pairwise comparison is used to examine the priorities of each pair of factors.

The numerical results in this research found that service, ICT system, talent, cross-border logistics, customs clearance, after-sales services, business process and innovative awareness and ability are critical success factors for cross-border e-commerce freight forwarder from China to Thailand. Service, ICT system, talent, cross-border logistics are top four critical factors for the success of freight forwarder. Among that, service is the most critical success factors for cross-border e-commerce freight forwarder from China to Thailand. Thus, the organization should concentrate more on improving the level of service, ICT system, and cross-border logistics, particularly the good service. In addition, service has most significance in order-making process and logistics process for cross-border e-commerce freight forwarder.

Medium-scale cross-border e-commerce freight forwarders have more mature ICT system than small-scale cross-border e-commerce freight forwarders. Therefore, small-scale cross-border e-commerce freight forwarders plays more important role in medium-scale cross-border e-commerce freight forwarders than small-scale cross-border e-commerce freight forwarders.

According the case study analysis, upgrading and improving ICT system function is one of the greatest choices for improving work efficiency of cross-border e-commerce freight forwarder. Furthermore, this research proposes that combining pre-order department and order-making department as purchase department by employ multiple language talents. From that, it is beneficial for cross-border e-commerce freight forwarder to improve work efficiency and control number of employees.

To sum up, according the results of data analysis and case study, the cross-border e-commerce freight forwarder need to be improved in the following aspects:

At the first place, service is not a specific product, but it is the main source of income of cross-border e-commerce freight forwarder. The long-term development is relationship to the services awareness of freight forwarder. Therefore, obtaining customer recognition and trust is the key for long-term development.

Besides, talent is basic flowing blood of freight forwarder. In respect that talent is practitioner and manager in routine operation, each department should do business training for employee. Cross-border e-commerce is an emerging industry. If freight forwarder wants to keep growing in the future, in particular, it is necessary to retain the management talent of key positions. Cross-border e-commerce have high requirements for capacity, such as English and non-common language skill, knowledge about domestics and overseas markets, transaction modes, consuming habits, trading rules and characteristics of major platforms.

In addition, good management is conducive to control the operation of entire company. Good management can make the daily operation more standardized and efficient. Thus, it is necessary to set the department and distribute authority reasonable. Further, the system is the basis for routine work. The most important is that it is main exchange media between freight forwarder and customers. The customers can place orders, payment, track goods, and reflect problems on system. As a result, a relatively well-developed system can effectively improve the efficiency and quality of entire company. According to the actual operation and business development, the freight forwarder is supposed to upgrade the system continually.

At the same time, cross-border logistics is the protection to ensure the smooth flow of goods from China to Thailand. Cross-border e-commerce must rely on the cross-border transportation to complete. If the logistics is not smooth, may lead to the loss of goods, even the loss of customers. Hence, it's crucial to ensure the stability and safety of logistics channels.

Moreover, the external environment is a factor that must be considered. In order to ensure the smooth operation and obtain a safe development environment, the freight forwarder ought to give a well coordinate with the relevant inspection of government departments.

Lastly, the spring up of companies which providing third-party services and marketing service makes the whole industry and supporting facilities more comprehensive. To change the traditional business pattern and realize fast growth, cross-border e-commerce needs strong support from information flow, capital flow and logistics. Not only the support of e-commerce platform, cross-border e-commerce freight forwarder from China to Thailand but also needs upstream guide of information technology and downstream support of logistics.

Recommendations for Future Study

Some limitations and recommendations of this research are presented for further improvement in following aspects:

This research explores the critical success factors from the perspective of cross-border e-commerce freight forwarder, without involving the customers' and suppliers' opinion. The future research can explore the influence level of critical success factors from the perspective of foreigner customers.

Besides, this research only focuses on the freight forwarder in Bangkok and surrounding area, without involving the freight forwarder in other regions and cities. Hence, further research is needed to expand the investigate scope to other cities and counties, even the whole of Southeast Asia.

In addition, the effect of service was examined in this research. However, other critical success factors have not been study in deeply. The future research could in-depth study ICT system, cross-border logistics, talent and other critical factors respectively.

More to these, this research study the freight forwarder which imports common commodities from Chinese website, however, without distinguish the freight forwarder according to the category and specialty of commodities. If difference category and specialty of commodities could influence the development of cross-border e-commerce freight forwarders, it should be studied specifically.



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APPENDIX

มหาวิทยาลัยนครสวรรค์

APPENDIX A CRITICAL SUCCESS FACTORS INTERVIEW

Interview

Dear Sir or Madam,

Thank you for cooperation for this interview.

I am Ms. Sun Ting, a master student in School of logistics and supply chain, Naresuan University, Thailand. I am making a research titled as *the Study of Critical Success Factors of cross-border E-commerce Freight Forwarder from China to Thailand*, thus I need your kindly help for the qualitative analysis.

Your kind suggestion and help are highly appreciated.

Notes:

1. Please mark “√” for the answer you choose. And you can choose answers more than 2 except the questions in Part I.
2. Target group: The target population is “experts are key decision makers (manager, owner, CEO), who tied directly to cross-border e-commerce strategies and implementation of cross-border e-commerce projects.”

Part I: The General Background of Cross-border E-commerce Freight Forwarder

1. Name of organization.....
2. Address of organization.....
3. Which year the organization was established?.....
4. How many employees the organization have?.....
5. What is the main business of organization?.....
6. What is the mission of organization?
7. What is your position?.....
8. How many years have you work in cross-border e-commerce freight forwarder?
9. How many companies in this industry?.....
10. What is the role of organization in industry?.....

Part II: Critical Success Factors (CSFs) for Cross-border E-commerce Freight Forwarder

1. What do you think is the industry critical success factor (CSF) that affects the success of the business?
 - A. Online payment (foreign exchange)
 - B. Cross-border logistics
 - C. Credit system (trust)
 - D. Foreign language
 - E. After-sales service (dispute resolution)
 - F. Information communication technology (ICT) infrastructure
 - G. Other factors.....

2. What do you think is the competitive strategy and industry position factor that affects the success of the business?
 - A. Global business risk control
 - B. Product and service
 - C. Business process
 - D. Customer experience
 - E. Cost Control (Price)
 - F. Other factors.....

3. What do you think is the managerial position factor that affects the success of the business?
 - A. E-commerce awareness of manager
 - B. Talent / employee
 - C. Teamwork
 - D. Manager's ability
 - E. Innovative awareness and ability
 - F. Other factors

4. What do you think is the environmental factor that affects the success of the business?
 - A. Legal systems and intellectual property rights (IPRs)
 - B. Government policy
 - C. Customs clearance
 - D. Taxation
 - E. Economic situation
 - F. Cultural differences
 - G. Other factors.....

Part III: The Criteria for Determine the Critical Success Factors

1. What are the criteria of your judgment?
 - A. Performance Growth
 - B. Customer satisfaction
 - C. Cost reduction
 - D. Work efficiency
 - E. Business stability
 - F. Other criteria.....

2. For this research, what is important but has been forgotten in this whole interview?
(If necessary, please write down below)

.....

End of the Interview.

Thank you again for your very kind

APPENDIX B ANALYTIC HIERARCHY PROCESS QUESTIONNAIRE

Questionnaire I

Dear Sir or Madam,

Thank you for cooperation for this interview.

I am Ms. Sun Ting, a master student in School of logistics and supply chain, Naresuan University, Thailand. I am making a research titled as *the Study of Critical Success Factors of cross-border E-commerce Freight Forwarder from China to Thailand*, thus I need your kind help for the qualitative analysis.

Your kind suggestion and help are highly appreciated.

Notes:

1. Please mark “√” for the answer you choose.
2. Explanation: For presents a scale used for quantifying managerial judgments for AHP analysis. Scoring rules: The response scale is a nine-point rating scale, range from equally preferred score = 1, and extremely preferred score = 9, least to most dependent level 1-9.

Table 1 AHP Measurement scale (Saaty’s 1-9 scale)

AHP Saaty’s 1-9 scale	
Preference judgments	Numerical rating
Extremely Preferred	9
Very Strongly Preferred	7
Strongly Preferred	5
Moderately Preferred	3
Equally Preferred	1

The intermediate values of 2,4,6, and 8, provide additional levels of discrimination.

3. If A1 is strongly Preferred than A2, please select 5; If A3 is very strongly preferred with A1, please select 7; If A2 is equally preferred with A3, please select 1.

Table 2 AHP Pairwise Example

Saaty's 1-9 scale																		
A1	9	8	7	6	5 $\sqrt{}$	4	3	2	1	2	3	4	5	6	7	8	9	A2
A1	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7 $\sqrt{}$	8	9	A3
A2	9	8	7	6	5	4	3	2	1 $\sqrt{}$	2	3	4	5	6	7	8	9	A3

Part I: The Influence Level of Critical Success Factors

1. Please according to the important level, compare each pairwise criterion to select a most consistent score.

	Work efficiency	Work efficiency	Work efficiency	Customer satisfaction	Customer satisfaction	Business stability
Criteria	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
	2	2	2	2	2	2
	3	3	3	3	3	3
	4	4	4	4	4	4
	5	5	5	5	5	5
	6	6	6	6	6	6
	7	7	7	7	7	7
	8	8	8	8	8	8
	9	9	9	9	9	9
	Customer satisfaction	Business stability	Performance growth	Business stability	Performance growth	Performance growth

2. Please according to the influence level in work efficiency, compare each pairwise factor to select a most consistent score.

		Work efficiency (a)																
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	ICT system
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	After-sales service
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Business Process
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	After-sales service
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Business Process
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Business Process
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service

Work efficiency (b)

After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
Business Process	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service
Business Process	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
Business Process	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
Business Process	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
Service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
Service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
Service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
Talent	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
Talent	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
Innovative awareness & ability	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance

3. Please according to the influence level in customer satisfaction, compare each pairwise factor to select a most consistent score.

		Customer satisfaction (a)																
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	ICT system
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	After-sales service
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Business Process
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	After-sales service
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Business Process
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Business Process
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service

Customer satisfaction (b)																		
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
Business Process	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service
Business Process	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
Business Process	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
Business Process	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
Service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
Service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
Service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
Talent	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
Talent	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
Innovative awareness & ability	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance

4. Please according to the influence level in business stability, compare each pairwise factor to select a most consistent score.

		Business stability (a)																
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	ICT system
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	After-sales service
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Business Process
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	After-sales service
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Business Process
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Business Process
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service

Business stability (b)																		
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
Business Process	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service
Business Process	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
Business Process	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
Business Process	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
Service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
Service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
Service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
Talent	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
Talent	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
Innovative awareness & ability	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance

5. Please according to the influence level in performance growth, compare each pairwise factor to select a most consistent score.

Performance growth (a)																		
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	ICT system
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	After-sales service
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Business Process
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
Cross-border logistics	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	After-sales service
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Business Process
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
ICT system	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Business Process
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service

Performance growth (b)																		
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
After-sales service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
Business Process	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service
Business Process	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
Business Process	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
Business Process	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
Service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Talent
Service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
Service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
Talent	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Innovative awareness & ability
Talent	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance
Innovative awareness & ability	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Customs clearance

End of the questionnaire.

Thank you again for your very kind.

Questionnaire II

Dear Sir or Madam,

Thank you for cooperation for this interview.

I am Ms. Sun Ting, a master student in School of logistics and supply chain, Naresuan University, Thailand. I am making a research titled as *the Study of Critical Success Factors of cross-border E-commerce Freight Forwarder from China to Thailand*, thus I need your kind help for the qualitative analysis.

Your kind suggestion and help are highly appreciated.

Notes:

1. Please mark “√” for the answer you choose.
2. Explanation: For presents a scale used for quantifying managerial judgments for AHP analysis. Scoring rules: The response scale is a nine-point rating scale, range from equally preferred score = 1, and extremely preferred score = 9, least to most dependent level 1-9.

Table 1 AHP Measurement scale (Saaty's 1-9 scale)

AHP Saaty's 1-9 scale	
Preference judgments	Numerical rating
Extremely Preferred	9
Very Strongly Preferred	7
Strongly Preferred	5
Moderately Preferred	3
Equally Preferred	1

The intermediate values of 2,4,6, and 8, provide additional levels of discrimination.

Part I: The Influence Level of Service in Working Process

- 1. Please according to the influence level of service in working process, compare each pairwise factor to select a most consistent score.**

	Pre-order	Pre-order	Pre-order	Order-making	Order-making	Transportation
Service	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
	2	2	2	2	2	2
	3	3	3	3	3	3
	4	4	4	4	4	4
	5	5	5	5	5	5
	6	6	6	6	6	6
	7	7	7	7	7	7
	8	8	8	8	8	8
	9	9	9	9	9	9
		Order-making	Transportation	After-sales	Transportation	After-sales

End of the questionnaire.

Thank you again for your very kind.

APPENDIX C PAIRWISE COMPARISON MATRIX OF AHP INTERVIEW

Table 26 The Pairwise Comparison Matrix of Criteria of Interviewee 2

Interviewee 2	Work efficiency	Customer satisfaction	Business stability	Performance growth
Work efficiency	1	1/3	1/2	1/2
Customer satisfaction	3	1	3	1
Business stability	2	1/3	1	1/3
Performance growth	2	1	3	1
Weight	0.123	0.376	0.156	0.344
λ_{max}	4.119	CR	0.04	
RI	0.9	CI	0.04	

Table 27 The Pairwise Comparison Matrix of Work Efficiency of Interviewee 2

Work efficiency	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1/2	3	1/2	3	1	2	1
ICT system	2	1	3	1	3	1	1	2
ASS	1/3	1/3	1	1/3	1	1/3	1	1/3
BP	2	1	3	1	3	1/3	1	3
Service	1/3	1/3	1	1/3	1	1/3	1/2	1
Talent	1	1	3	3	3	1	1	3
IAA	1/2	1	1	1	2	1	1	1/3
CC	1	1/2	3	1/3	1	1/3	3	1
Weight	0.139	0.171	0.056	0.158	0.057	0.198	0.107	0.115
λ_{max}	8.714	CR	0.07	RI	1.41	CI	0.10	

Notes: CBL: cross-border logistics; BP: Business Process; ASS: After-sales service; IAA: Innovative awareness & ability; CC: Customs clearance

Table 28 The Pairwise Comparison Matrix of Customer Satisfaction of Interviewee 2

Customer satisfaction	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1	5	1	1	1	5	1
ICT system	1	1	5	1	1	1	2	1
ASS	1/5	1/5	1	1	1/3	1	2	1/3
BP	1	1	1	1	1/3	1/2	2	1
Service	1	1	3	3	1	2	3	1
Talent	1	1	1	2	1/2	1	3	1
IAA	1/5	1/2	1/2	1/2	1/3	1/3	1	1/3
CC	1	1	3	1	1	1	3	1
Weight	0.169	0.151	0.068	0.103	0.184	0.132	0.047	0.145
λ_{max}	8.480	CR	0.05	RI	1.41	CI	0.07	

Table 29 The Pairwise Comparison Matrix of Business Stability of Interviewee 2

Business stability	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	2 1/2	3 1/2	1	1/2	1	2	2 1/2
ICT system	2/5	1	2	1	1	1	1	1
ASS	2/7	1/2	1	1/2	1/3	1/3	1/2	1
BP	1	1	2	1	1	1	1/2	3
Service	2	1	3	1	1	1/2	1/2	1
Talent	1	1	3	1	2	1	1	3
IAA	1/2	1	2	2	2	1	1	1
CC	2/5	1	1	1/3	1	1/3	1	1
Weight	0.178	0.112	0.057	0.134	0.131	0.163	0.144	0.081
λ_{max}	8.557	CR	0.06	RI	1.41	CI	0.08	

Table 30 The Pairwise Comparison Matrix of Performance Growth of Interviewee 2

Performance growth	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	4/5	3	1	1/3	2 1/2	2	1 1/2
ICT system	1 1/4	1	3 1/2	1 1/2	1/2	3	2 1/2	2
ASS	1/3	2/7	1	1/3	1/4	1	1/2	1/3
BP	1	2/3	3	1	1	2	1	1
Service	3	2	4	1	1	2	2	2
Talent	2/5	1/3	1	1/2	1/2	1	1	1/3
IAA	1/2	2/5	2	1	1/2	1	1	3
CC	2/3	1/2	3	1	1/2	3	1/3	1
Weight	0.138	0.177	0.048	0.131	0.219	0.065	0.113	0.109
λ_{max}	8.498	CR	0.05	RI	1.41	CI	0.07	

Table 31 The Pairwise Comparison Judgment Matrix of Criteria of Interviewee 3

Interviewee 3	Work efficiency	Customer satisfaction	Business stability	Performance growth
Work efficiency	1	1	4	1
Customer satisfaction	1	1	1	5
Business stability	1/4	1/5	1	1
Performance growth	1	1/5	1	1
Weight	0.355	0.373	0.107	0.165
λ_{max}	4.123	CR	0.05	
RI	0.9	CI	0.04	

Table 32 The Pairwise Comparison Judgment Matrix of Work Efficiency of Interviewee 3

Work efficiency	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1	5	1	1	1	3	1
ICT system	1	1	3	1	3	1	1	3
ASS	1/5	1/3	1	1/3	1	1/3	1/2	1
BP	1	1	3	1	3	1	1	1
Service	1	1/3	1	1/3	1	1	1/2	1
Talent	1	1	3	1	1	1	1	1
IAA	1/3	1	2	1	2	1	1	2
CC	1	1/3	1	1	1	1	1/2	1
Weight	0.174	0.173	0.058	0.150	0.084	0.131	0.133	0.097
λ_{max}	8.517	CR	0.052	RI	1.41	CI	0.074	

Table 33 The Pairwise Comparison Judgment Matrix of Customer Satisfaction of Interviewee 3

Customer satisfaction	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1	3	1	1	1	1	1
ICT system	1	1	2	1	1	1	3	1
ASS	1/3	1/2	1	1	1/3	1/3	1	1/3
BP	1	1	1	1	1/3	1	1	1
Service	1	1	3	3	1	2	5	1
Talent	1	1	3	1	1/2	1	5	1/2
IAA	1	1/3	1	1	1/5	1/5	1	1/3
CC	1	1	3	1	1	2	3	1
Weight	0.134	0.140	0.060	0.104	0.199	0.138	0.064	0.162
λ_{max}	8.482	CR	0.049	RI	1.41	CI	0.069	

Table 34 The Pairwise Comparison Judgment Matrix of Business Stability of Interviewee 3

Business stability	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1/3	2 1/2	1	1/4	1/2	2	1
ICT system	3	1	3 1/2	1 1/2	1	1	3 1/2	3
ASS	2/5	2/7	1	1/3	1/5	1/4	1	1/2
BP	1	2/3	3	1	1/2	1	2	1 1/2
Service	4	1	5	2	1	1 1/2	3	2 1/2
Talent	2	1	4	1	2/3	1	3	1
IAA	1/2	2/7	1	1/2	1/3	1/3	1	1/2
CC	1	1/3	2	2/3	2/5	1	2	1
Weight	0.090	0.205	0.045	0.124	0.231	0.154	0.054	0.096
λ_{max}	8.166	CR	0.017	RI	1.41	CI	0.024	

Table 35 The Pairwise Comparison Judgment Matrix of Performance Growth of Interviewee 3

Performance growth	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1/3	4	2 1/2	1/2	1 1/2	3 1/2	1
ICT system	3	1	4 1/2	3 1/2	1	3	4	2 1/2
ASS	1/4	2/9	1	1/2	1/4	2/5	1	1/3
BP	2/5	2/7	2	1	1/3	1	1	1
Service	2	1	4	3	1	2 1/2	3 1/2	1 1/2
Talent	2/3	1/3	2 1/2	1	2/5	1	1 1/2	1
IAA	2/7	1/4	1	1	2/7	2/3	1	1/3
CC	1	2/5	3	1	2/3	1	3	1
Weight	0.140	0.259	0.044	0.078	0.214	0.091	0.054	0.119
λ_{max}	8.185	CR	0.019	RI	1.41	CI	0.026	

Table 36 The Pairwise Comparison Judgment Matrix of Criteria of Interviewee 4

Interviewee 4	Work efficiency	Customer satisfaction	Business stability	Performance growth
Work efficiency	1	1/3	1	1/3
Customer satisfaction	3	1	3	3
Business stability	1	1/3	1	1/3
Performance growth	3	1/3	3	1
Weight	0.122	0.473	0.122	0.283
λ_{max}	4.154	CR	0.057	
RI	0.9	CI	0.051	

Table 37 The Pairwise Comparison Matrix of Work Efficiency of Interviewee 4

Work efficiency	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	2/9	1 1/2	2/5	1	1/3	2/5	1
ICT system	4 1/2	1	4 1/2	1 1/2	3	1	1 1/2	2 1/2
ASS	2/3	2/9	1	1/3	1	1/4	1/3	2/5
BP	2 1/2	2/3	3	1	2	1/2	1	1
Service	1	1/3	1	1/2	1	1/3	1/2	1/2
Talent	3	1	4	2	3	1	1	1/2
IAA	2 1/2	2/3	3	1	2	1	1	1 1/2
CC	1	2/5	2 1/2	1	2	2	2/3	1
Weight	1	2/9	1 1/2	2/5	1	1/3	2/5	1
λ_{max}	8.300	CR	0.030	RI	1.41	CI	0.043	

Table 38 The Pairwise Comparison Judgment Matrix of Customer Satisfaction of Interviewee 4

Customer satisfaction	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1	3	1	1/3	3	5	1
ICT system	1	1	3	1	1/2	2	3	3
ASS	1/3	1/3	1	1	1/5	2	1	1/2
BP	1	1	1	1	1/2	1	2	1
Service	3	2	5	2	1	3	5	3
Talent	1/3	1/2	1/2	1	1/3	1	3	1
IAA	1/5	1/3	1	1/2	1/5	1/3	1	1/3
CC	1	1/3	2	1	1/3	1	3	1
Weight	0.152	0.161	0.071	0.108	0.280	0.083	0.044	0.102
λ_{max}	8.462	CR	0.047	RI	1.41	CI	0.066	

Table 39 The Pairwise Comparison Matrix of Business Stability of Interviewee 4

Business stability	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1/2	3 1/2	1 1/2	1	2/3	3	2 1/2
ICT system	2	1	4 1/2	2 1/2	2	1	3 1/2	3
ASS	2/7	2/9	1	2/5	1/4	1/5	1	1/2
BP	2/3	2/5	2 1/2	1	1	2/5	1 1/2	1
Service	1	1/2	4	1	1	1	2 1/2	1 1/2
Talent	1 1/2	1	5	2 1/2	1	1	4	3
IAA	1/3	2/7	1	2/3	2/5	1/4	1	1
CC	2/5	1/3	2	1	2/3	1/3	1	1
Weight	0.147	0.230	0.043	0.096	0.140	0.211	0.057	0.076
λ_{max}	8.118	CR	0.012	RI	1.41	CI	0.017	

Table 40 The Pairwise Comparison Judgment Matrix of Performance Growth of Interviewee 4

Performance growth	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	2/3	4 1/2	1	1/2	1 1/2	4 1/2	4
ICT system	1 1/2	1	5	1 1/2	1/2	2 1/2	4	3
ASS	2/9	1/5	1	1/3	1/4	1/3	1	1/3
BP	1	2/3	3	1	2/5	1	2	1 1/2
Service	2	2	4	2 1/2	1	3	4	3 1/2
Talent	2/3	2/5	3	1	1/3	1	1 1/2	1
IAA	2/9	1/4	1	1/2	1/4	2/3	1	2/3
CC	1/4	1/3	3	2/3	2/7	1	1 1/2	1
Weight	0.168	0.194	0.040	0.114	0.263	0.092	0.051	0.077
λ_{max}	8.227	CR	0.023	RI	1.41	CI	0.032	

Table 41 The Pairwise Comparison Matrix of Criteria of Interviewee 5

Interviewee 5	Work efficiency	Customer satisfaction	Business stability	Performance growth
Work efficiency	1	1/7	1/5	1/6
Customer satisfaction	7	1	3	1
Business stability	5	1/3	1	5/9
Performance growth	6	1	1 4/5	1
Weight	0.051	0.410	0.192	0.347
λ_{max}	4.065	CR	0.024	
RI	0.9	CI	0.022	

Table 42 The Pairwise Comparison Matrix of Work Efficiency of Interviewee 5

Work efficiency	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1/5	2	1/3	1	1	1/2	1/5
ICT system	5	1	7	2	6	4	3	1
ASS	1/2	1/7	1	1/5	1	1/3	1/4	1/6
BP	3	1/2	5	1	5	1/2	1	1
Service	1	1/6	1	1/5	1	1/2	1/3	1/5
Talent	1	1/4	3	2	2	1	1	1/3
IAA	2	1/3	4	1	3	1	1	1/2
CC	5	1	6	1	5	3	2	1
Weight	0.057	0.276	0.033	0.149	0.041	0.105	0.113	0.226
λ_{max}	8.344	CR	0.035	RI	1.41	CI	0.049	

Table 43 The Pairwise Comparison Judgment Matrix of Customer Satisfaction of Interviewee 5

Customer satisfaction	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1/2	1	2	1/3	3	5	4
ICT system	2	1	2	3	1	3	5	4
ASS	1	1/2	1	1	1/3	2	4	4
BP	1/2	1/3	1	1	1/4	1	3	2
Service	3	1	3	4	1	3	5	4
Talent	1/3	1/3	1/2	1	1/3	1	2	1
IAA	1/5	1/5	1/4	1/3	1/5	1/2	1	1
CC	1/4	1/4	1/4	1/2	1/4	1	1	1
Weight	0.149	0.225	0.125	0.085	0.264	0.067	0.038	0.048
λ_{max}	8.242	CR	0.025	RI	1.41	CI	0.035	

Table 44 The Pairwise Comparison Matrix of Business Stability of Interviewee 5

Business stability	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	2/5	1 1/2	1	2/7	1/2	1/3	3
ICT system	2 1/2	1	6	3	1	1	2	6
ASS	2/3	1/6	1	1/2	1/6	1/4	1/3	1
BP	1	1/3	2	1	1/4	1/2	1	3
Service	3 1/2	1	6	4	1	2	3	7
Talent	2	1	4	2	1/2	1	1	5
IAA	3	1/2	3	1	1/3	1	1	4
CC	1/3	1/6	1	1/3	1/7	1/5	1/4	1
Weight	0.074	0.216	0.040	0.083	0.272	0.156	0.127	0.032
λ_{max}	8.155	CR	0.016	RI	1.41	CI	0.022	

Table 45 The Pairwise Comparison Judgment Matrix of Performance Growth of Interviewee 5

Performance growth	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1/3	4	2	1/3	1/2	2	2
ICT system	3	1	5	3	1	1	3	4
ASS	1/4	1/5	1	1/2	1/5	2/5	3/5	1
BP	1/2	1/3	2	1	3/7	2/7	2/9	1
Service	3	1	5	2 1/3	1	2	3	4
Talent	2	1	2 1/2	3 1/2	1/2	1	2	3
IAA	1/2	1/3	1 2/3	4 1/2	1/3	1/2	1	1/2
CC	1/2	1/4	1	1	1/4	1/3	2	1
Weight	0.111	0.221	0.045	0.062	0.237	0.167	0.090	0.066
λ_{max}	8.571	CR	0.058	RI	1.41	CI	0.082	

Table 46 The Pairwise Comparison Matrix of Criteria of Interviewee 6

Interviewee 6	Work efficiency	Customer satisfaction	Business stability	Performance growth
Work efficiency	1	1/3	1/5	1/7
Customer satisfaction	3	1	2/5	1/5
Business stability	5	2 1/2	1	1/3
Performance growth	7	5	3	1
Weight	0.057	0.127	0.253	0.563
λ_{max}	4.095	CR	0.035	
RI	0.9	CI	0.032	

Table 47 The Pairwise Comparison Matrix of Work Efficiency of Interviewee 6

Work efficiency	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1/4	3	1/3	2	1/2	1/2	1
ICT system	4	1	5	1	4	1	2	3
ASS	1/3	1/5	1	3/7	1	1/4	1/3	1/2
BP	3	1	2 1/3	1	4	1	2	3
Service	1/2	1/4	1 1/4	1/4	1	2/5	1/3	1/2
Talent	2	1	4	1	2 1/2	1	2	2
IAA	2	1/2	3	1/2	3	1/2	1	2
CC	1	1/3	2	1/3	2	1/2	1/2	1
Weight	0.084	0.226	0.048	0.202	0.049	0.183	0.127	0.080
λ_{max}	8.202	CR	0.02	RI	1.41	CI	0.029	

Table 48 The Pairwise Comparison Judgment Matrix of Customer Satisfaction of Interviewee 6

Customer satisfaction	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1/3	1	2	1/4	1/3	3	1/2
ICT system	3	1	2	3	1	1	4	4
ASS	1	1/2	1	2	1/3	1/2	3	2
BP	1/2	1/3	1/2	1	1/5	1/4	2	2
Service	4	1	3	5	1	1	5	4
Talent	3	1	2	4	1	1	5	4
IAA	1/3	1/4	1/3	1/2	1/5	1/5	1	1
CC	2	1/4	1/2	1/2	1/4	1/4	1	1
Weight	0.079	0.202	0.101	0.063	0.242	0.214	0.040	0.059
λ_{max}	8.335	CR	0.034	RI	1.41	CI	0.048	

Table 49 The Pairwise Comparison Matrix of Business Stability of Interviewee 6

Business stability	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1/3	4	2	1/2	1	2/3	3
ICT system	3	1	5	4	1	2	3	5
ASS	1/4	1/5	1	1/2	1/4	2/5	1/3	2/3
BP	1/2	1/4	2	1	1/3	1/3	2/3	1
Service	2	1	4	3	1	1	3	5
Talent	1	1/2	2 1/2	3	1	1	2	4
IAA	1 1/2	1/3	3	1 1/2	1/3	1/2	1	2
CC	1/3	1/5	1 1/2	1	1/5	1/4	1/2	1
Weight	0.119	0.258	0.041	0.062	0.213	0.158	0.100	0.048
λ_{max}	8.215	CR	0.022	RI	1.41	CI	0.031	

Table 50 The Pairwise Comparison Judgment Matrix of Performance Growth of Interviewee 6

Performance growth	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1/3	2	1	3/5	1/2	2/3	3
ICT system	3	1	5	4	2/3	1	2	5
ASS	1/2	1/5	1	2/3	2/5	1/4	1/3	1
BP	1	1/4	1 1/2	1	1	1/3	1/2	2
Service	1 2/3	1 1/2	2 1/2	1	1	2	3	6
Talent	2	1	4	3	1/2	1	1	4
IAA	1 1/2	1/2	3	2	1/3	1	1	3
CC	1/3	1/5	1	1/2	1/6	1/4	1/3	1
Weight	0.092	0.219	0.049	0.087	0.220	0.169	0.125	0.039
λ_{max}	8.384	CR	0.039	RI	1.41	CI	0.055	

Table 51 The Pairwise Comparison Matrix of Criteria of Interviewee 7

Interviewee 7	Work efficiency	Customer satisfaction	Business stability	Performance growth
Work efficiency	1	2/7	1/3	1/2
Customer satisfaction	3 1/2	1	3	2
Business stability	3	1/3	1	2/3
Performance growth	2	1/2	1 1/2	1
Weight	0.104	0.459	0.201	0.236
λ_{max}	4.101	CR	0.037	
RI	0.9	CI	0.034	

Table 52 The Pairwise Comparison Matrix of Work Efficiency of Interviewee 7

Work efficiency	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1/3	4	2/3	1	1/3	3	3
ICT system	3	1	5	1	3	2/3	4	5
ASS	1/4	1/5	1	1/4	1/3	1/5	1/2	1
BP	1 1/2	1	4	1	2	1/2	3	3
Service	1	1/3	3	1/2	1	1/3	1	2
Talent	3	1 1/2	5	2	3	1	4	3
IAA	1/3	1/4	2	1/3	1	1/4	1	1
CC	1/3	1/5	1	1/3	1/2	1/3	1	1
Weight	0.118	0.224	0.039	0.164	0.088	0.256	0.060	0.052
λ_{max}	8.229	CR	0.023	RI	1.41	CI	0.033	

Table 53 The Pairwise Comparison Judgment Matrix of Customer Satisfaction of Interviewee 7

Customer satisfaction	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1/2	1	3	1/3	2/3	3	1
ICT system	2	1	3	4	2/3	1 1/2	5	3
ASS	1	1/3	1	2	1/3	1/2	3	1
BP	1/3	1/4	1/2	1	2/5	1/3	1	2/3
Service	3	1 1/2	3	2 1/2	1	1/3	5	4
Talent	1 1/2	2/3	2	3	3	1	3	2
IAA	1/3	1/5	1/3	1	1/5	1/3	1	1
CC	1	1/3	1	1 1/2	1/4	1/2	1	1
Weight	0.106	0.216	0.090	0.051	0.218	0.198	0.047	0.074
λ_{max}	8.462	CR	0.047	RI	1.41	CI	0.066	

Table 54 The Pairwise Comparison Matrix of Business Stability of Interviewee 7

Business stability	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1/3	2	3	1/2	1/4	2/3	1 1/2
ICT system	3	1	3 1/2	4	1 1/2	1	2	3
ASS	1/2	2/7	1	1 1/2	1/3	1/4	1/3	2/3
BP	1/3	1/4	2/3	1	2/5	1/4	1/3	1/2
Service	2	2/3	3	2 1/2	1	1/3	1 1/2	1/3
Talent	4	1	4	4	3	1	3	4
IAA	1 1/2	1/2	3	3	2/3	1/3	1	2
CC	2/3	1/3	1 1/2	2	3	1/4	1/2	1
Weight	0.088	0.212	0.052	0.043	0.120	0.266	0.119	0.099
λ_{max}	8.528	CR	0.053	RI	1.41	CI	0.075	

Table 55 The Pairwise Comparison Judgment Matrix of Performance Growth of Interviewee 7

Performance growth	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1/2	1 1/2	4	1/3	2/3	2	3
ICT system	2	1	3	5	2/3	1 1/2	4	5
ASS	2/3	1/3	1	3	1/3	1/2	1 1/2	2
BP	1/4	1/5	1/3	1	1	1/4	1	1/2
Service	3	1 1/2	3	1	1	2	4	5
Talent	1 1/2	2/3	2	4	1/2	1	3	3 1/2
IAA	1/2	1/4	2/3	1	1/4	1/3	1	1
CC	1/3	1/5	1/2	2	1/5	2/7	1	1
Weight	0.121	0.221	0.088	0.062	0.244	0.159	0.053	0.051
λ_{max}	8.635	CR	0.064	RI	1.41	CI	0.091	

Table 56 The Pairwise Comparison Matrix of Criteria of Interviewee 8

Interviewee 8	Work efficiency	Customer satisfaction	Business stability	Performance growth
Work efficiency	1	1	1	1
Customer satisfaction	1	1	1	1
Business stability	1	1	1	1 1/6
Performance growth	1	1	6/7	1
Weight	0.250	0.250	0.260	0.241
λ_{\max}	4.003	CR	0.001	
RI	0.9	CI	0.001	

Table 57 The Pairwise Comparison Matrix of Work Efficiency of Interviewee 8

Work efficiency	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1	1 1/2	1 1/2	1 1/8	1 1/2	1 1/2	8/9
ICT system	1	1	1 2/7	1 2/7	1 2/7	1 2/7	1	1
ASS	2/3	7/9	1	1	1	1	8/9	2/3
BP	2/3	7/9	1	1	7/9	1	1	7/9
Service	8/9	7/9	1	1 2/7	1	1 1/8	8/9	8/9
Talent	2/3	7/9	1	1	8/9	1	8/9	8/9
IAA	2/3	1	1 1/8	1	1 1/8	1 1/8	1	1
CC	1 1/8	1	1 1/2	1 2/7	1 1/8	1 1/8	1	1
Weight	0.152	0.140	0.107	0.107	0.120	0.109	0.123	0.141
λ_{\max}	8.032	CR	0.003	RI	1.41	CI	0.005	

Table 58 The Pairwise Comparison Judgment Matrix of Customer Satisfaction of Interviewee 8

Customer satisfaction	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1	1 2/7	1 2/7	1 1/8	1 2/7	1	1
ICT system	1	1	1 2/7	1 1/8	1 1/8	1 1/8	1	1
ASS	7/9	7/9	1	8/9	1	1	8/9	8/9
BP	7/9	8/9	1 1/8	1	8/9	1 1/8	8/9	8/9
Service	8/9	8/9	1	1 1/8	1	1	8/9	8/9
Talent	7/9	8/9	1	8/9	1	1	8/9	7/9
IAA	1	1	1 1/8	1 1/8	1 1/8	1 1/8	1	1
CC	1	1	1 1/8	1 1/8	1 1/8	1 2/7	1	1
Weight	0.139	0.134	0.112	0.117	0.119	0.112	0.132	0.134
λ_{max}	8.008	CR	0.001	RI	1.41	CI	0.001	

Table 59 The Pairwise Comparison Matrix of Business Stability of Interviewee 8

Business stability	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1	1 2/7	1 1/8	1 1/8	1 2/7	1	1
ICT system	1	1	1 2/7	1 1/8	1 2/7	1 2/7	1	1
ASS	7/9	7/9	1	8/9	1	1	8/9	7/9
BP	8/9	8/9	1 1/8	1	1	1 1/8	1	8/9
Service	8/9	7/9	1	1	1	1	8/9	7/9
Talent	7/9	7/9	1	8/9	1	1	7/9	7/9
IAA	1	1	1 1/8	1	1 1/8	1 2/7	1	1
CC	1	1	1 2/7	1 1/8	1 2/7	1 2/7	1	1
Weight	0.136	0.139	0.110	0.123	0.113	0.108	0.132	0.139
λ_{max}	8.005	CR	0.001	RI	1.41	CI	0.001	

Table 60 The Pairwise Comparison Judgment Matrix of Performance Growth of Interviewee 8

Performance growth	CBL	ICT system	ASS	BP	Service	Talent	IAA	CC
CBL	1	1	1 2/7	1 1/8	1 2/7	1 2/7	1	1
ICT system	1	1	1 2/7	1 2/7	1 2/7	1 2/7	1	1
ASS	7/9	7/9	1	8/9	1	1	8/9	8/9
BP	8/9	7/9	1 1/8	1	1	1 1/8	1	8/9
Service	7/9	7/9	1	1	1	1	8/9	7/9
Talent	7/9	7/9	1	8/9	1	1	7/9	7/9
IAA	1	1	1 1/8	1	1 1/8	1 2/7	1	1
CC	1	1	1 1/8	1 1/8	1 2/7	1 2/7	1	1
Weight	0.139	0.141	0.112	0.121	0.112	0.108	0.132	0.136
λ_{max}	8.007	CR	0.001	RI	1.41	CI	0.001	

Table 61 The Pairwise Comparison Judgment Matrix of Working Process Under the Influence of Service of Interviewee 2

Interviewee 2	Pre-order	Order-making	Logistics	After-sales
Pre-order	1	1/7	1/5	3
Order-making	7	1	1	5
Transportation	5	1	1	5
After-sales	1/3	1/5	1/5	1
Weight	0.108	0.431	0.394	0.066
λ_{max}	4.229	CR	0.085	
RI	0.9	CI	0.076	

Table 62 The Pairwise Comparison Judgment Matrix of Working Process Under the Influence of Service of Interviewee 3

Interviewee 3	Pre-order	Order-making	Logistics	After-sales
Pre-order	1	2	1	1 1/2
Order-making	1/2	1	1/2	2/3
Transportation	1	2	1	1 1/2
After-sales	2/3	1 1/2	2/3	1
Weight	0.32	0.15	0.32	0.22
λ_{\max}	4.00	CR	0.00	
RI	0.9	CI	0.00	

Table 63 The Pairwise Comparison Judgment Matrix of Working Process Under the Influence of Service of Interviewee 4

Interviewee 4	Pre-order	Order-making	Logistics	After-sales
Pre-order	1	2	1	3
Order-making	1/2	1	1	1 1/2
Transportation	1	1	1	3
After-sales	1/3	2/3	1/3	1
Weight	0.359	0.217	0.305	0.120
λ_{\max}	4.061	CR	0.02	
RI	0.9	CI	0.02	

Table 64 The Pairwise Comparison Judgment Matrix of Working Process Under the Influence of Service of Interviewee 5

Interviewee 5	Pre-order	Order-making	Logistics	After-sales
Pre-order	1	2/3	1/3	1
Order-making	1 1/2	1	1	1 1/2
Transportation	3	1	1	3
After-sales	1	2/3	1/3	1
Weight	0.158	0.284	0.400	0.158
λ_{max}	4.060	CR	0.022	
RI	0.9	CI	0.020	

Table 65 The Pairwise Comparison Judgment Matrix of Working Process Under the Influence of Service of Interviewee 6

Interviewee 6	Pre-order	Order-making	Logistics	After-sales
Pre-order	1	1	2/3	1/3
Order-making	1	1	1/3	2/5
Transportation	1 1/2	3	1	2/3
After-sales	3	2 1/2	1 1/2	1
Weight	0.154	0.137	0.299	0.410
λ_{max}	4.059	CR	0.022	
RI	0.9	CI	0.020	

Table 66 The Pairwise Comparison Judgment Matrix of Working Process Under the Influence of Service of Interviewee 7

Interviewee 7	Pre-order	Order-making	Logistics	After-sales
Pre-order	1	1/2	3	3/5
Order-making	2	1	4 1/2	4/5
Transportation	1/3	2/9	1	2/5
After-sales	1 2/3	1 1/4	2 1/2	1
Weight	0.214	0.358	0.094	0.335
λ_{max}	4.088	CR	0.033	
RI	0.9	CI	0.029	

Table 67 The Pairwise Comparison Judgment Matrix of Working Process Under the Influence of Service of Interviewee 8

Interviewee 8	Pre-order	Order-making	Logistics	After-sales
Pre-order	1	1 1/8	1 1/8	1 1/8
Order-making	8/9	1	1	1
Transportation	8/9	1	1	1 1/8
After-sales	8/9	1	8/9	1
Weight	0.273	0.242	0.250	0.235
λ_{max}	4.002	CR	0.001	
RI	0.9	CI	0.001	

APPENDIX D CATEGORY OVERVIEW REPORT OF CURRENT PURCHASE PROCESS SIMULATION MODEL

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Category Overview

-月 11, 2018

Values Across All Replications

Before Work Efficiency

Replications: 26 Time Units: Minutes

Key Performance Indicators

System
Number Out

Average
47

Figure 43 System Number Out of Current Purchase Process Simulation Model

Entity						
Time						
VA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Entity A	16.1038	.28	14.9805	17.3698	8.0947	34.9175
NVA Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Entity A	0.00	.00	0.00	0.00	0.00	0.00
Wait Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Entity A	48.9204	7.35	19.8599	83.4461	0.00	211.49
Transfer Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Entity A	0.00	.00	0.00	0.00	0.00	0.00
Other Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Entity A	0.00	.00	0.00	0.00	0.00	0.00
Total Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Entity A	65.0239	7.24	35.8190	99.23	9.6321	235.71

Figure 44 VA Time of Entity of Current Purchase Process Simulation Model

Process						
Time per Entity						
VA Time Per Entity	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Add to Shopping Cart	0.9160	.02	0.8507	1.0039	0.2613	1.9540
Calculate Total Cost	2.9891	.04	2.8164	3.1477	1.0535	4.9844
Cancel Orders	1.8227	.11	1.1254	2.3574	1.0902	2.9316
Change Orders	2.7109	.16	1.8685	3.6694	1.3927	4.9277
Confirm Payment	1.5126	.03	1.3959	1.6412	0.5200	2.9124
Inquire Purchaser Shipping Cost	0.4988	.01	0.4290	0.5418	0.2639	0.7239
Inquire Supplier Shipping Cost	1.4806	.05	1.2319	1.6910	0.5604	2.9185
Online Payment	0.7488	.01	0.7042	0.7827	0.5156	0.9893
Payment Notice	0.5016	.01	0.4646	0.5365	0.2658	0.7453
Place Orders and Mark Up	0.4984	.01	0.4499	0.5309	0.2547	0.7456
Preorder Feedback Requirement	0.5876	.02	0.5086	0.6593	0.2723	0.9692
Preorder Staff Feedback Product Information	0.9999	.04	0.8363	1.2330	0.5593	1.4363
Purchaser Feedback Product Information	5.1939	.34	3.7389	6.7690	1.1001	9.4433
Purchaser Feedback Shipping Cost	0.5035	.01	0.4369	0.5534	0.2677	0.7445
Purchaser Inquire Inventory and Negotiation	3.0017	.06	2.7327	3.2662	1.1170	4.9418
Request for Payment	1.0035	.01	0.9439	1.0801	0.5053	1.4876
Search in Related Shopping Website	0.5929	.01	0.5509	0.6298	0.2556	0.9956
Supplier Feedback Shipping Cost	5.3006	.19	4.2202	6.2559	1.1192	9.9944

Figure 45 VA Time per Entity of Current Purchase Process Simulation Model

Process						
Time per Entity						
Total Time Per Entity	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Add to Shopping Cart	5.9797	1.15	2.5327	12.7293	0.3236	29.5813
Calculate Total Cost	7.9881	1.17	4.3789	15.3232	1.0535	34.2935
Cancel Orders	7.7694	1.38	1.7080	15.4998	1.1456	28.9995
Change Orders	8.0580	1.30	3.4257	13.2185	1.5095	23.7439
Confirm Payment	6.9180	1.20	2.8788	13.9217	0.5616	33.2057
Inquire Purchaser Shipping Cost	5.7167	1.24	2.2257	13.4587	0.3169	26.0749
Inquire Supplier Shipping Cost	6.5490	.88	3.5773	12.1619	0.5604	33.1664
Online Payment	0.7978	.01	0.7456	0.6458	0.5179	1.6833
Payment Notice	6.9965	.73	3.3351	10.6591	0.2619	30.1979
Place Orders and Mark Up	6.0578	1.19	2.5114	12.7769	0.2547	29.9492
Preorder Feedback Requirement	5.6770	1.26	1.6664	12.6422	0.2723	19.6040
Preorder Staff Feedback Product Information	6.2414	1.22	2.0327	13.1542	0.6075	26.1550
Purchaser Feedback Product Information	10.2630	1.02	6.4873	16.0304	1.3365	32.2733
Purchaser Feedback Shipping Cost	5.6518	1.19	1.7094	12.3903	0.2677	28.7596
Purchaser Inquire Inventory and Negotiation	7.8951	.77	4.9882	11.8150	1.1513	34.6662
Request for Payment	6.0310	1.20	2.1688	13.6365	0.5053	30.9748
Search in Related Shopping Website	5.6616	1.20	2.2187	12.8842	0.2564	32.2615
Supplier Feedback Shipping Cost	10.6504	1.07	7.0686	15.9833	1.1192	32.9924

Figure 46 Total Time per Entity of Current Purchase Process Simulation Model

Process				
Other				
Number In	Average	Half Width	Minimum Average	Maximum Average
Add to Shopping Cart	57.2692	2.46	47.0000	68.0000
Calculate Total Cost	53.9615	1.80	45.0000	61.0000
Cancel Orders	4.3077	.81	1.0000	8.0000
Change Orders	4.6154	.67	1.0000	8.0000
Confirm Payment	51.6538	1.59	45.0000	58.0000
Inquire Purchaser Shipping Cost	21.0769	1.39	15.0000	28.0000
Inquire Supplier Shipping Cost	20.5385	1.23	14.0000	27.0000
Online Payment	43.0769	1.34	36.0000	48.0000
Payment Notice	43.6538	1.37	36.0000	49.0000
Place Orders and Mark Up	50.4615	1.41	44.0000	57.0000
Preorder Feedback Requirement	9.1923	1.10	5.0000	14.0000
Preorder Staff Feedback Product Information	9.4615	1.17	6.0000	14.0000
Purchaser Feedback Product Information	9.6538	1.19	6.0000	14.0000
Purchaser Feedback Shipping Cost	19.7308	1.20	14.0000	25.0000
Purchaser Inquire Inventory and Negotiation	49.5000	1.37	43.0000	56.0000
Request for Payment	52.6923	1.62	45.0000	59.0000
Search in Related Shopping Website	57.9615	2.60	48.0000	70.0000
Supplier Feedback Shipping Cost	20.3846	1.23	14.0000	26.0000

Figure 47 Number In of per Process of Current Purchase Process Simulation Model

Process				
Other				
Number Out	Average	Half Width	Minimum Average	Maximum Average
Add to Shopping Cart	55.8077	2.06	46.0000	64.0000
Calculate Total Cost	52.6923	1.62	45.0000	59.0000
Cancel Orders	4.3077	.81	1.0000	8.0000
Change Orders	4.5769	.67	1.0000	8.0000
Confirm Payment	50.4615	1.41	44.0000	57.0000
Inquire Purchaser Shipping Cost	20.5385	1.23	14.0000	27.0000
Inquire Supplier Shipping Cost	20.3846	1.23	14.0000	26.0000
Online Payment	42.9615	1.36	36.0000	48.0000
Payment Notice	43.0769	1.34	36.0000	48.0000
Place Orders and Mark Up	49.5000	1.37	43.0000	56.0000
Preorder Feedback Requirement	8.9231	1.12	5.0000	14.0000
Preorder Staff Feedback Product Information	9.1923	1.10	5.0000	14.0000
Purchaser Feedback Product Information	9.4615	1.17	6.0000	14.0000
Purchaser Feedback Shipping Cost	19.2308	1.08	13.0000	24.0000
Purchaser Inquire Inventory and Negotiation	48.7308	1.23	43.0000	54.0000
Request for Payment	51.6538	1.59	45.0000	58.0000
Search in Related Shopping Website	57.2692	2.46	47.0000	68.0000
Supplier Feedback Shipping Cost	19.7308	1.20	14.0000	25.0000

Figure 48 Number Out of per Process of Current Purchase Process Simulation Model

Queue						
Time						
Waiting Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Add to Shopping Cart Queue	5.0702	1.15	1.6371	11.7253	0.00	29.0533
Calculate Total Cost Queue	4.9976	1.17	1.4131	12.4151	0.00	31.7815
Cancel Orders Queue	6.9467	1.33	0.00	13.4051	0.00	25.2476
Change Orders Queue	5.4063	1.23	0.00	10.4299	0.00	20.0848
Confirm Payment Queue	5.3240	1.20	1.3360	12.5346	0.00	32.1621
Inquire Purchaser Shipping Cost Queue	6.2179	1.24	1.7222	12.9540	0.00	25.7092
Inquire Supplier Shipping Cost Queue	5.0590	.69	2.0522	10.7052	0.00	32.5132
Online Payment Queue	0.04935753	.01	0.01117516	0.03164663	0.00	0.6697
Payment Notice Queue	5.4661	.73	2.8362	10.1413	0.00	29.6259
Place Orders and Mark Up Queue	5.5565	1.19	2.0049	12.2865	0.00	29.5532
Preorder Feedback Requirement Queue	5.0594	1.27	1.0563	12.1332	0.00	19.0746
Preorder Staff Feedback Product Information Queue	5.2753	1.22	1.2195	11.9212	0.00	25.5987
Purchaser Feedback Product Information Queue	5.0735	.93	1.9439	10.7333	0.00	27.6559
Purchaser Feedback Shipping Cost Queue	5.1766	1.21	1.1656	12.4363	0.00	28.3551
Purchaser Inquire Inventory and Negotiation Queue	4.8699	.75	2.2555	6.3563	0.00	30.7413
Request for Payment Queue	5.0547	1.20	1.2040	12.6540	0.00	30.0735
Search in Related Shopping Website Queue	5.0626	1.20	1.6631	12.2890	0.00	31.7162
Supplier Feedback Shipping Cost Queue	5.3623	.93	1.7201	10.7543	0.00	26.5632

Figure 49 Waiting Time of Queue of Current Purchase Process Simulation Model

Queue						
Other						
Number Waiting	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Add to Shopping Cart Queue	0.6364	.17	0.1671	1.6936	0.00	7.0000
Calculate Total Cost Queue	0.5513	.15	0.1422	1.5551	0.00	7.0000
Cancel Orders Queue	0.05773791	.02	0.00	0.1955	0.00	2.0000
Change Orders Queue	0.05791545	.02	0.00	0.1426	0.00	2.0000
Confirm Payment Queue	0.5882	.14	0.1254	1.5033	0.00	7.0000
Inquire Purchaser Shipping Cost Queue	0.2395	.07	0.05649170	0.6100	0.00	4.0000
Inquire Supplier Shipping Cost Queue	0.2178	.04	0.03123396	0.4545	0.00	4.0000
Online Payment Queue	0.00447791	.00	0.00363514	0.00759462	0.00	2.0000
Payment Notice Queue	0.5016	.07	0.2129	0.9523	0.00	5.0000
Place Orders and Mark Up Queue	0.5926	.13	0.1360	1.3147	0.00	6.0000
Preorder Feedback Requirement Queue	0.03633612	.02	0.02205313	0.1832	0.00	3.0000
Preorder Staff Feedback Product Information Queue	0.0954	.02	0.02360703	0.2041	0.00	3.0000
Purchaser Feedback Product Information Queue	0.1043	.03	0.02429901	0.2569	0.00	3.0000
Purchaser Feedback Shipping Cost Queue	0.2199	.06	0.04069475	0.6026	0.00	3.0000
Purchaser Inquire Inventory and Negotiation Queue	0.5096	.03	0.2021	0.9518	0.00	5.0000
Request for Payment Queue	0.5753	.15	0.1129	1.5493	0.00	7.0000
Search in Related Shopping Website Queue	0.6474	.18	0.1757	1.7823	0.00	7.0000
Supplier Feedback Shipping Cost Queue	0.2306	.05	0.08306163	0.5352	0.00	4.0000

Figure 50 Number Waiting of Queue of Current Purchase Process Simulation Model

Resource						
Usage						
Instantaneous Utilization	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Financial officer	0.08711602	.00	0.05617835	0.07777254	0.00	1.0000
Preorder Staff 1	0.8852	.02	0.7816	0.8818	0.00	1.0000
Preorder Staff 2	0.8852	.02	0.7816	0.8818	0.00	1.0000
Preorder Staff 3	0.8852	.02	0.7816	0.8818	0.00	1.0000
Preorder Staff 4	0.8852	.02	0.7816	0.8818	0.00	1.0000
Preorder Staff 5	0.8852	.02	0.7816	0.8818	0.00	1.0000
Purchaser 1	0.7797	.03	0.6425	0.9301	0.00	1.0000
Purchaser 2	0.7797	.03	0.6425	0.9301	0.00	1.0000
Purchaser 3	0.7797	.03	0.6425	0.9301	0.00	1.0000
Purchaser 4	0.7797	.03	0.6425	0.9301	0.00	1.0000
Purchaser 5	0.7797	.03	0.6425	0.9301	0.00	1.0000

Figure 51 Instantaneous Utilization of Resource of Current Purchase Process Simulation Model

Resource				
Usage				
Total Number Seized	Average	Half Width	Minimum Average	Maximum Average
Financial officer	43.0769	1.34	36.0000	46.0000
Preorder Staff 1	376.23	10.47	320.00	412.00
Preorder Staff 2	376.23	10.47	320.00	412.00
Preorder Staff 3	376.23	10.47	320.00	412.00
Preorder Staff 4	376.23	10.47	320.00	412.00
Preorder Staff 5	376.23	10.47	320.00	412.00
Purchaser 1	151.15	3.77	128.00	167.00
Purchaser 2	151.15	3.77	128.00	167.00
Purchaser 3	151.15	3.77	128.00	167.00
Purchaser 4	151.15	3.77	128.00	167.00
Purchaser 5	151.15	3.77	128.00	167.00

Figure 52 Total Number Seized of Resource of Current Purchase Process Simulation Model

**APPENDIX E CATEGORY OVERVIEW REPORT OF RE-DESIGN
PURCHASE PROCESS SIMULATION MODEL**

16:48:26

Category Overview

一月 13, 2018

Values Across All Replications

Purchase Process Work Efficiency

Replications: 26 Time Units: Minutes

Key Performance Indicators

System
Number Out

Average
30

Figure 53 System Number Out of Re-design Purchase Process Simulation Model

Entity						
Time						
	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
VA Time						
Orders	12.3220	.18	11.5680	13.2416	5.1775	25.8678
NVA Time						
Orders	0.00	.00	0.00	0.00	0.00	0.00
Wait Time						
Orders	98.05	15.51	32.9672	169.72	0.00	292.35
Transfer Time						
Orders	0.00	.00	0.00	0.00	0.00	0.00
Other Time						
Orders	0.00	.00	0.00	0.00	0.00	0.00
Total Time						
Orders	111.33	15.68	44.6880	182.75	7.0901	308.32

Figure 54 VA Time of Entity of Re-design Purchase Process Simulation Model

Process						
Time per Entity						
VA Time Per Entity	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Add to Shopping Cart Process	0.9199	.02	0.8410	1.0363	0.2627	1.9480
Calculate Total Cost Process	2.9928	.05	2.7145	3.2095	1.0580	4.9503
Cancel Orders Process	1.4988	.04	1.3366	1.7294	1.0613	1.8760
Change Orders Process	1.8464	.19	0.00	2.3293	0.00	2.9098
Check Account Balance Process	0.5756	.01	0.5321	0.6101	0.2572	0.9956
Confirm Orders Process	0.4977	.01	0.4613	0.5286	0.2656	0.7375
Confirm Payment Process	1.4772	.04	1.3113	1.6716	0.5099	2.9098
Feedback Product Information Process	5.1015	.28	4.2126	6.6035	1.2460	9.6139
Inquire Inventory and Shipping Cost Process	1.0037	.01	0.9372	1.0616	0.5121	1.4741
Negotiation Process	2.3418	.04	2.1718	2.5309	1.0970	3.9309
Online Payment Process	0.7551	.01	0.7253	0.8007	0.5129	0.9862
Payment Notice Process	0.4962	.01	0.4529	0.5478	0.2547	0.7257
Place Purchase Order Process	0.5796	.01	0.5100	0.6294	0.2704	0.9636
Search in Related Website Process	0.6667	.01	0.5311	0.6218	0.2605	0.9842

Figure 55 VA Time per Entity of Re-design Purchase Process Simulation Model

Process						
Time per Entity						
Total Time Per Entity	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Add to Shopping Cart Process	15.3005	2.05	4.0450	24.7622	0.3356	56.2768
Calculate Total Cost Process	17.3221	2.12	6.0681	27.5302	1.4129	55.5637
Cancel Orders Process	16.0842	2.42	5.9548	25.4057	1.2806	47.7186
Change Orders Process	15.3407	3.26	0.00	37.6837	0.00	54.0858
Check Account Balance Process	14.9282	2.17	4.6204	26.9651	0.2735	52.8591
Confirm Orders Process	15.0181	2.06	4.1391	24.6292	0.2973	56.3877
Confirm Payment Process	16.6582	2.25	4.3519	27.2620	0.5099	55.3495
Feedback Product Information Process	19.1056	2.34	9.5842	27.7355	1.2460	56.6378
Inquire Inventory and Shipping Cost Process	16.2381	2.02	4.1917	23.6971	0.5121	55.3644
Negotiation Process	16.0736	2.28	6.5342	26.4634	1.1743	56.3223
Online Payment Process	0.7650	.01	0.7289	0.8127	0.5129	1.2934
Payment Notice Process	14.7289	2.25	3.8143	23.3617	0.2643	52.2195
Place Purchase Order Process	15.2199	2.39	4.3282	27.9188	0.3079	55.4873
Search in Related Website Process	14.9774	2.03	4.3222	24.1067	0.2741	54.3905

Figure 56 Total Time per Entity of Re-design Purchase Process Simulation Model

Process				
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Other				
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Number In	Average	Half Width	Minimum Average	Maximum Average
Add to Shopping Cart Process	52.2692	2.26	41.0000	67.0000
Calculate Total Cost Process	40.4231	1.30	33.0000	47.0000
Cancel Orders Process	4.4231	.78	1.0000	8.0000
Change Orders Process	4.0385	.76	0.00	9.0000
Check Account Balance Process	37.8462	1.01	33.0000	43.0000
Confirm Orders Process	35.2692	.78	32.0000	38.0000
Confirm Payment Process	32.7692	.87	28.0000	36.0000
Feedback Product Information Process	9.0000	1.03	4.0000	15.0000
Inquire Inventory and Shipping Cost Process	49.0769	1.77	40.0000	61.0000
Negotiation Process	28.9231	1.27	22.0000	35.0000
Online Payment Process	25.6923	1.48	17.0000	33.0000
Payment Notice Process	26.8846	1.48	18.0000	34.0000
Place Purchase Order Process	30.8462	1.11	24.0000	36.0000
Search in Related Website Process	55.6154	2.91	41.0000	71.0000

**Figure 57 Number In of per Process of Re-design Purchase Process
Simulation Model**

Process				
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Other				
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Number Out	Average	Half Width	Minimum Average	Maximum Average
Add to Shopping Cart Process	49.0769	1.77	40.0000	61.0000
Calculate Total Cost Process	37.8462	1.01	33.0000	43.0000
Cancel Orders Process	4.0769	.74	1.0000	8.0000
Change Orders Process	3.8077	.73	0.00	8.0000
Check Account Balance Process	35.2692	.78	32.0000	38.0000
Confirm Orders Process	32.7692	.87	28.0000	36.0000
Confirm Payment Process	30.8462	1.11	24.0000	36.0000
Feedback Product Information Process	8.4615	.96	4.0000	14.0000
Inquire Inventory and Shipping Cost Process	45.6154	1.28	40.0000	53.0000
Negotiation Process	26.8846	1.48	18.0000	34.0000
Online Payment Process	25.6538	1.47	17.0000	33.0000
Payment Notice Process	25.6923	1.48	17.0000	33.0000
Place Purchase Order Process	28.9231	1.27	22.0000	35.0000
Search in Related Website Process	52.2692	2.26	41.0000	67.0000

**Figure 58 Number Out of per Process of Re-design Purchase Process
Simulation Model**

Queue						
Time						
Waiting Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Add to Shopping Cart Process.Queue	14.4049	2.05	3.2340	23.9029	0.00	55.3117
Calculate Total Cost Process.Queue	14.4098	2.15	2.8755	24.3207	0.00	52.5591
Cancel Orders Process.Queue	13.5667	2.41	4.4871	23.3684	0.00	46.0047
Change Orders Process.Queue	13.4943	3.18	0.00	35.6430	0.00	52.3008
Check Account Balance Process.Queue	14.3638	2.18	4.0544	26.4089	0.00	52.2432
Confirm Orders Process.Queue	14.5372	2.06	3.6552	24.1223	0.00	55.9629
Confirm Payment Process.Queue	14.1868	2.25	2.8647	25.8157	0.00	54.4715
Feedback Product Information Process.Queue	14.2558	2.26	4.5072	23.3428	0.00	53.5703
Inquire Inventory and Shipping Cost Process.Queue	14.2601	2.03	3.1655	23.4087	0.00	54.3622
Negotiation Process.Queue	13.8504	2.30	4.3132	25.5083	0.00	53.2852
Online Payment Process.Queue	0.01025871	.00	0.00	0.02626791	0.00	0.5451
Payment Notice Process.Queue	14.2443	2.24	3.3386	22.8542	0.00	51.7536
Place Purchase Order Process.Queue	14.6523	2.39	3.7334	27.3633	0.00	54.9411
Search in Related Website Process.Queue	14.4320	2.03	3.7739	23.5075	0.00	53.7687

Figure 59 Waiting Time of Queue of Re-design Purchase Process
Simulation Model

Number Waiting	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Add to Shopping Cart Process.Queue	1.6161	.28	0.2762	3.4692	0.00	11.0000
Calculate Total Cost Process.Queue	1.2517	.22	0.1977	2.4221	0.00	8.0000
Cancel Orders Process.Queue	0.1192	.03	0.02693857	0.2491	0.00	2.0000
Change Orders Process.Queue	0.1282	.04	0.00	0.2970	0.00	2.0000
Check Account Balance Process.Queue	1.1588	.19	0.2787	2.1176	0.00	7.0000
Confirm Orders Process.Queue	1.0759	.16	0.2513	1.6398	0.00	7.0000
Confirm Payment Process.Queue	0.9589	.15	0.1970	1.7748	0.00	7.0000
Feedback Product Information Process.Queue	0.2744	.06	0.05008600	0.6202	0.00	3.0000
Inquire Inventory and Shipping Cost Process.Queue	1.4926	.24	0.2638	2.8309	0.00	9.0000
Negotiation Process.Queue	0.8331	.14	0.2965	1.4153	0.00	6.0000
Online Payment Process.Queue	0.00356348	.00	0.00	0.00142393	0.00	1.0000
Payment Notice Process.Queue	0.7866	.13	0.2295	1.3981	0.00	6.0000
Place Purchase Order Process.Queue	0.9352	.16	0.2567	1.6393	0.00	7.0000
Search in Related Website Process.Queue	1.7411	.31	0.3224	3.4693	0.00	11.0000

Figure 60 Number Waiting of Queue of Re-design Purchase Process
Simulation Model

Resource						
Usage						
Instantaneous Utilization	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
	Financial Officer	0.04035445	.00	0.02835961	0.05267256	0.00
Purchaser 1	0.9719	.01	0.9004	1.0000	0.00	1.0000
Purchaser 10	0.9719	.01	0.9004	1.0000	0.00	1.0000
Purchaser 2	0.9719	.01	0.9004	1.0000	0.00	1.0000
Purchaser 3	0.9719	.01	0.9004	1.0000	0.00	1.0000
Purchaser 4	0.9719	.01	0.9004	1.0000	0.00	1.0000
Purchaser 5	0.9719	.01	0.9004	1.0000	0.00	1.0000
Purchaser 6	0.9719	.01	0.9004	1.0000	0.00	1.0000
Purchaser 7	0.9719	.01	0.9004	1.0000	0.00	1.0000
Purchaser 8	0.9719	.01	0.9004	1.0000	0.00	1.0000
Purchaser 9	0.9719	.01	0.9004	1.0000	0.00	1.0000

Figure 61 Instantaneous Utilization of Resource of Re-design Purchase Process Simulation Model

Resource				
Usage				
Total Number Seized	Average	Half Width	Minimum Average	Maximum Average
	Financial Officer	25.6923	1.48	17.0000
Purchaser 1	382.54	5.89	352.00	403.00
Purchaser 10	382.54	5.89	352.00	403.00
Purchaser 2	382.54	5.89	352.00	403.00
Purchaser 3	382.54	5.89	352.00	403.00
Purchaser 4	382.54	5.89	352.00	403.00
Purchaser 5	382.54	5.89	352.00	403.00
Purchaser 6	382.54	5.89	352.00	403.00
Purchaser 7	382.54	5.89	352.00	403.00
Purchaser 8	382.54	5.89	352.00	403.00
Purchaser 9	382.54	5.89	352.00	403.00

Figure 62 Total Number Seized of Resource of Re-design Purchase Process Simulation Model



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