FACTORS AFFECTING BUYER-SUPPLIER COLLABORATION IN THAI PUBLIC AND PRIVATE HOSPITALS

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ABSTRACT

Title of Dissertation	Factors Affecting Buyer-Supplier Collaboration in Thai Public and Private Hospitals
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The objectives of the study were 1) to determine the critical factors that affect the buyer-supplier collaboration in Thai public and private hospitals, and 2) to test the causal relations in a structural equation model for the buyer-supplier collaboration framework. The unit of analysis was at the organizational level. The methodology was divided into 3 steps: (1) review of the buyer-supplier collaboration phenomena and relevant literature to develop a theoretical model of buyer-supplier collaboration in Thai public and private hospitals; (2) qualitative study using in-depth interviewing with 48 hospital executives working in 23 hospitals during the period of August 2015 - February 2016 and then presenting the proposed research model; (3) quantitative study which tested the generalization of the model using a hospital survey with executives in public and private hospitals all over Thailand. The questionnaire was constructed and mailed to hospital executives from April to July 2016. The response hospital executives were 416 persons from 309 public hospital and 107 private hospitals, and the response rate was 59.43%. The path analysis technique was intentionally used to analyze these complicated data.

It was found that in the macro view of buyer-supplier collaboration the phenomena were related to 2 factor groups: the external factor group and the internal factor group. The in-depth interviews revealed that 2 factor groups were related to buyer-supplier collaboration: 1) external factors: external support, market competition, and commitment; and 2) internal factors: management support, inventory management, capability, and trust.

The causal model for buyer-supplier collaboration in Thai public and private hospitals was initially summarized and then proposed. In the next step, it was found that the buyer-supplier collaboration varied with the kind of hospital, level of care, number of beds, number of service years, and hospital accreditation.

For quantitative research, the results was practical models for Thai public hospitals and Thai private hospitals. The critical factors that directly influenced the buyer-supplier collaboration in the Thai public hospitals were composed of 3 independent variables: 1) external support; 2) management support; and 3) trust. All 3 variables accounted for buyer-supplier collaboration at 42.1 percent. The factors that indirectly influenced the buyer-supplier collaboration in the Thai public hospitals were composed of 3 independent variables: 1) commitment; 2) capability; and 3) inventory management.

The critical factors that directly influenced the buyer-supplier collaboration in the Thai private hospitals were composed of only 2 independent variables: 1) external support and 2) trust. The 2 variables accounted for buyer-supplier collaboration 28.0 percent. The factors that indirectly influenced the buyer-supplier collaboration in the Thai private hospitals were composed of 5 independent variables: 1) management support; 2) market competition; 3) commitment; 4) capability; and 5) inventory management.

The findings and results will help readers gain greater understanding of the relationships among the variables and the practical model can be applied to other services. The study can be used as guidelines to build collaboration between hospitals and suppliers. Additionally, the outcome of this research can be used as a guideline in healthcare system policy formulation and healthcare service business development. The study can help benefits healthcare-related executives and managers in terms of realizing what critical factors can be more greatly utilized and emphasized for buyer-supplier collaboration establishment.

Future research on specific groups of hospital executives is recommended in order to develop further strategies and policies. Furthermore, more in-depth interviews should be conducted with top management team members and executives working in different types of service organizations in order to obtain more useful information and deep insight in order to utilize this research model in practice.

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ABBREVIATIONS AND SYMBOLS

Abbreviations	Equivalent
AEC	ASEAN Economic Community
BSC	Buyer-supplier collaboration
CAP	Capability
CIL	Center for Innovative Logistics
COM	Commitment
CPFR	Collaborative Planning, Forecasting and Replenishment
CR	Continuous Replenishment
DF	Degree of Freedom
ECR	Efficient Consumer Response
EDI	Electronic data interchange
EXS	External support
FTI	Federation of Thai Industries
HA	Hospital Accreditation
HSA	Center for Health Systems Analytics
IFR	Inter-Firm Relationships
INM	Inventory management
IOC	Index of Item-Objective Congruence
IOR	Inter-Organizational Relations
ISO	International Organization for Standardization
JCI	Joint Commission International
KM	Knowledge management
LOGEX	Center for Logistics Excellence
MAC	Market competition
MAS	Management support
MOPH	Ministry of Public Health

NGO	Non-governmental organization
PIM	Panyapiwat Institute of Management
PSCMT	Purchasing and Supply Chain Management Association of Thailand
RBV	Resource Based View
SCC	Supply chain collaboration
SCM	Supply chain management
SD	Standard Deviation
Sig.	Significance level
SME	Small and medium-sized enterprises
TLAPS	Thai Logistics and Production Society Association
TQM	Total quality management
TRU	Trust
VMI	Vendor-managed inventory
β	Standardized coefficient
$\overline{x}$	Mean
$\chi 2$	Chi-Square
$\chi 2/df$	Relative Chi-Square
r	Correlation
Σ	Summation

CHAPTER 1

INTRODUCTION

1.1 Statement of Problem and Significance of Study

Healthcare service is a patient-centered care service that requires continuous interaction between medical staff and customers (Botta-Genoulaz & Millet, 2006). Healthcare service is the main product and service provided by public and private hospitals. Other healthcare support services such as laboratory services, biomedical engineering services, laundry services, sterile services, food services, and facility management services are also needed. The customers of healthcare service providers are the payers and patients. The aim of all healthcare service process flow is to respond regarding patient safety and to provide a high standard of care. Accurate, timely, and high-quality data flows inside and outside the organization are very important.

Nowadays, the healthcare service sector is confronting incremental cost burdens and healthcare service providers are facing a difficult time serving high-quality care at affordable and reasonable costs. The focus of the healthcare service sector has shifted from managing procurement to managing relationships. Healthcare service providers are intensively under the limitation of service costs and the pressure of high-standard quality of care. While other sectors have coped with these pressures by engaging value co-creation through purchasing and supply chain management, the healthcare service sector has slowly adopted this concept. Some researchers support the notion that this slow adoption comes from the context of healthcare's unique operation. At the same time, the general views on value co-creation are focusing more intently on collaborations attempting information and specialized competency sharing among partners working throughout the supply chain network (Chakraborty, Bhattacharya, & Dobrzykowski, 2014)

According to Kritchanchai and Suwandechochai (2010) Muangchoo and Singkarin (2012), there are four key players in the typical supply chain for healthcare services: principals, distributors, healthcare service providers, and the payers acting in the typical supply chain for healthcare services, as shown in figure 1.1. Principals include product and service owners, and primary manufacturers and secondary manufacturers. Product and service owners refer to any organizations that obtain the copyright, license or patent of those products and services. Primary manufacturer refers to any organizations that produces the active ingredients and parts used in the production of medicine, medical supplies, and medical devices. The primary manufacturers act as a supplier for secondary manufacturers. After acquiring active ingredients or parts from the primary manufacturers, the secondary manufacturers will transform these active ingredients or parts into finished goods and services such as medicine, medical supplies, and/or medical devices.

The finished goods and services are distributed to healthcare service providers by distributors, wholesalers, third-party organizations, and healthcare support service providers. Healthcare service providers included hospitals, clinics and medical centers working as both suppliers and customers. They are not only customers of their principals (or distributors) but also suppliers of their payers. The products and services are normally served for optimizing their availability rather than reducing their inventory-holding costs based on the medical preferences needed by physicians, nurses, pharmacists and other medical staff. Payers function as the customers of their healthcare service providers. Payers include any patients (and their relatives), healthcare-related government offices, employers and insurance companies.

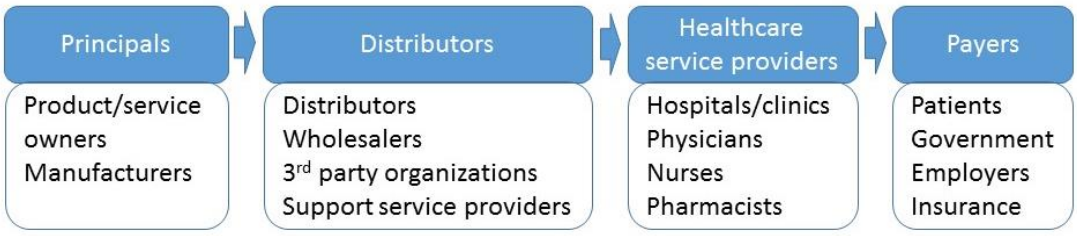

Figure 1.1 Typical Supply Chain for Healthcare Services

Changes in healthcare spending represent both opportunities and challenges for all stakeholders. They need to retain a competitive advantage in the future of healthcare by monitoring the drivers of this trend in healthcare and executing some strategic business model innovations whenever needed (The Economist Intelligence Unit Healthcare, 2014).

Referring to the Board of Investment of Thailand (2014), Thailand offers hi-end healthcare facilities and technologies, excellent clinical expertise, highly-qualified medical professionals, internationally-certified healthcare services, and a broad range of high-standard public and private hospitals. Thailand also has a huge number of internationally-accredited healthcare facilities. In these days, Thailand is well positioned to be the medical hub of Asia.

Developing Thailand into an "International Health Center for Excellence," the Ministry of Public Health, which is in charge of the implementation of the Medical Hub Policy, is progressing with its second strategic five-year plan (2012-2016), including four major areas, which are: 1) medical services, 2) integrative wellness centers, 3) development of Thai herbs, and 4) traditional and alternative Thai medicines.

Thailand is the world's largest medical tourism market, with the number of international patients increasing continuously. In 2012, there were over 2.5 million international patients, 14% up from 2011. According to Thailand's Ministry of Public Health and the Kasikorn Research Center, Thailand's 2012 revenue from medical tourism was approximately US$ 4.0-4.7 billion, an increase from US$3.2 billion in 2011.

This country also attracts many international patients with its traditional and alternative Thai medicines. Unlike modern medicine, alternative uses include natural herbs, biofeedback, and acupuncture. Several practices are used, including homeopathy, naturopathy, chiropractic, and acupuncture. The Ministry of Public Health of Thailand has officially supported this sector in an effort to promote Thai traditional and alternative medicines in public and private hospitals across the country.

As a result, Thailand has created good opportunities for continued growth in related businesses, including the healthcare services, and the medical device and

pharmaceutical sectors. Thailand provides world-class healthcare facilities. Many hospitals are among the first in Asia to be Joint Commission International (JCI) accredited. Over 1,000 public and 300 private hospitals nationwide operate in compliance with international standards and employ internationally-trained medical professionals. With Thai hospitality, patients feel comfortable. Many hospitals have specialized a multi-language speaking staff and also provide translators, including English, Arabic, Japanese, Myanmar, and Chinese, to ensure that there are no communication barriers between the doctor and patient. In addition, this country offers excellent healthcare services at highly competitive prices in Asia.

A wide range of treatments , including general examinations, dentistry, cancer treatments, hip and knee replacements, kidney transplants, cardiovascular testing, open heart surgeries, LASIK eye surgeries, cosmetic and plastic surgeries, weight loss surgeries, and transsexual operations are provided. The price of surgery services in Thailand is significantly less than the price of surgery services in Singapore, Hong Kong, the USA or Europe.

The Thai government's continued attempts to develop the country to be the medical hub of Asia have raised the demand for healthcare services, pharmaceuticals, medical supplies, and medical devices. Although several medical devices are produced domestically, Thailand still mostly depends on imported medical devices, especially sophisticated, hi-technology and hi-end medical devices from many countries such as the United States, Japan, Germany, and Singapore.

In fact, the domestic market for medical devices has steadily grown. In 2012, the market for medical devices in Thailand was US$2 billion, 24% up from 2011. The local market is forecasted to reach US$2.5 billion and US$3.0 billion in 2013 and 2014, respectively.

One of the key drivers of the healthcare services, the Thai pharmaceutical market, valued at US$4 billion in 2012, is the largest in Southeast Asia. By 2020, this value is predicted to rise to US$9 billion.

Thailand's cost-effective and high-quality manufacturing base has attracted foreign pharmaceutical companies. In recent years, the growth numbers of medical tourists, the aging population, and the higher level of health awareness amongst Thai people have promoted Thailand's pharmaceutical and medical reputations. Thailand

also currently manufactures 25 active pharmaceutical ingredients, including sodium chloride, camphor, menthol, etc.

Actually, the imported pharmaceutical market has grown firmly while exports have only arisen slightly. From January to August 2013, imports were valued at US $1.3 billion while exports were valued at US $301 million.

Thailand imports its pharmaceuticals from many sources. From January to August 2013, the US was the largest exporter of pharmaceuticals to Thailand, accounting for 13% of total imports. Switzerland, Germany, and France were the next largest importers at 10%, 10%, and 9%, respectively. Furthermore, 50% of Thailand's pharmaceutical exports were destined for the ASEAN countries, including Myanmar, Vietnam, and Cambodia at 16%, 15%, and 8%, respectively.

At the 2012 Thailand Medical Hub Expo, the potential and promptness of the country to declare itself as the world's premier medical hub, which is also affordable to both international visitors and local Thai people. The Thai government has already made a policy which will be executed from 2012 to 2016 for the purpose of upgrading the country as the top ranking medical industry center. Also, the Public Health Minister has stated that this policy will gain at least 800 billion baht in earnings in the next five years. Starting from 2012, about 2.5 million international visitors have been welcomed into Thailand for medical services, earning about 121.6 billion baht.

Moreover, Thailand also promotes retirement homes and care centers, as well as dedicated health centers, for the aging population, which are facilities that can serve healthcare or psychotherapeutic treatment through the use of sophisticated and hi-end technological medical devices, well-trained professionals, and high standard facilities.

According to Thailand Convention and Exhibition Bureau (2014), while China and India are Asia’s biggest markets for medical devices, ASEAN countries such as Indonesia, Singapore, Malaysia, and Thailand are considered the focal points for sales, marketing, investment, and business opportunities. Asia’s healthcare sector is predicted to account for one third of the world market by 2015, encouraging several large US and Japanese companies to seek business opportunities.

In addition, medical tourism is increasing at 14% per annum. In 2006, there were 1.4 million international medical tourists and Thailand is predicting 3 million by

2015. Once the ASEAN Economic Community (AEC) and its free trade provisions were implemented in 2015, healthcare industry experts also targeted the growth of Thailand's healthcare businesses. Within the AEC, international investors in the medical sector are officially allowed to hold stakes of over 70 percent.

Moreover, Thailand's specialized aftercare services are different from other medical tourism destinations. Aftercare services are often operated in resort-like settings with levels of Thai hospitality, happiness, and friendliness. There are over 1,000 public hospitals and 300 private hospitals performing nationwide. The healthcare service industry includes many services provided by hospitals, clinics, medical centers, physicians, nursing homes, diagnostic laboratories, drug stores, distributors, pharmaceutical companies, medical supply companies, and medical device manufactures.

In Thailand, population demographics and the increasing number of international patients create enormous business opportunities for investment in high technology medical devices. Suppliers and manufacturers of for example artificial blood vessels, IV sets, respiratory sets, disposable test kits, rehabilitation equipment, orthopedic surgery and implant devices, have operated well and have also been successful in their business.

Despite the rising growth in both the regional and local markets, this country mainly depends on importing products, with approximately 87 percent of medical device and accessories imported from other countries worldwide. In these days, there are many international manufacturers operating in Thailand, such as 3M, Bausch & Lomb, Baxter, Boston Scientific, Carl Zeiss, Diethelm, GE Medical Systems, Johnson & Johnson, Medtronic, Philips, Roche Diagnostics, Siemens, and many more.

The dramatic change of globalization and market competition in the world economy influence the organizations to improve themselves to gain competitiveness. As a result, the organizations consider how they run their business and step forward for establishing collaboration among partners. In the supply chain, inter-organizational relationships have become increasingly substantial to make sure that businesses will be successful and gain a competitive advantage over the competitors (Thitisomboon, Visanvetchakij, Chalermchutidet, Phongarjarn, & Jeenanunta, 2009).

In Thailand, most hospitals are officially supervised by the Ministry of Public Health (MOPH), along with many other non-ministerial government agencies. Universal healthcare is legally provided through three programs: 1) the civil service welfare system for civil servants and their families, 2) Social Security for private employees, and 3) the universal coverage scheme usually available to all Thai citizens. Some private hospitals are participants in these programs, though most are eventually financed by private health insurance companies and the patient's self-payment.

The hospital (as also known as a medical center or health center) is the place where healthcare services are delivered to the patient. Its objectives are to promote wellness, prevent disease, treat illness and rehabilitate the patient to an earlier standing, functioning, reputation or moral character. Both public and private hospitals are defined as accepting patient admissions (Ministry of Public Health, 2014).

Most public hospitals are formally operated by the MOPH. Other government units and public organizations also operate public hospitals such as universities, the military, and local governments. Provincial hospitals operated by the MOPH Office of the Permanent Secretary are officially categorized as follows.

1) Regional hospitals are located in province centers, have a capacity of at least 500 beds, and have a comprehensive set of specialists on the medical staff. These hospitals can normally provide primary care, secondary care, and tertiary care as well.

2) General hospitals are located in major districts and have a capacity of 200 to 500 beds. They can normally provide primary and secondary care.

3) Community hospitals are located at the district level and have a capacity of fewer than 200 beds. They can only provide primary care and are further classified by size:

   (1) Large community hospitals have a capacity of 90 to 120 beds.
   (2) Medium community hospitals have a capacity of 60 beds.
   (3) Small community hospitals have a capacity of 10 to 30 beds.

While all three types of community hospitals serve the local population living in nearby areas, they are normally limited to providing primary care, while patients that need more specialized or advanced care are referred to general or regional hospitals.

Private hospitals are officially regulated by the Medical Registration Division under the MOPH's Department of Health Service Support following Sanatorium Act, B.E. 2541. The general private hospitals refer to hospitals that commonly provide non-specialized care. Private hospitals with fewer than 30 beds are formally called health centers. The general private hospitals refer to hospitals that commonly provide non-specialized care.

As of 2014, there were 1,020 public hospitals and 328 private hospitals operating in Thailand (Ministry of Public Health, 2014).

In the healthcare service chain, the hospital is one of the key actors playing many roles, and one of them is the buyer role. The hospital needs to buy several products and services from the supplier in order to support its service activities. The objectives of public and private hospitals are different. The public hospital aims to provide standard healthcare services to patients with limited resources supported by the government. Some public hospitals have more objectives than others in terms of developing research and educating healthcare professionals and students, such as medical schools. Private hospitals aim to provide more privileged healthcare services to any patients that can afford the service charge. Like other businesses, the private hospital has to ensure that it will continuously improve its services to generate more income, make a profit, increase productivity, and ensure business growth.

The suppliers that provide the services and/or sell the products, such as pharmaceuticals, medical supplies or medical devices to hospitals, also are important key players in the chain. Almost of them are private companies, which also aim to generate more income, control costs, make a profit, and increase productivity and grow the business. Thus, the supplier has to ensure that he or she will closely coordinate with its customers to serve their demands by improving the products and the services continuously.

Nowadays, healthcare service costs have been gradually increasing and hospitals need to provide high-quality care without passing the cost burden to the patient. The attention has significantly shifted towards cost containment through supply networks and network relationship management. Hospitals have been facing high service cost burdens and a difficult time providing high-quality care at the same time (Chakraborty, Bhattacharya, & Dobrzykowski, 2014).

In recent years, several management concepts have been introduced to increase the competitive advantage in business; one of the most recognized one is supply chain management (SCM). Several studies have confirmed that SCM can help organizations gain a greater competitive advantage, improve performance, reduce costs, shorten lead time, and increase speed-to-market to cope with the changes in market competition and requirements. In order to achieve effective collaboration with suppliers, an organization needs to integrate the supply chain process between itself and its partners; and in order to have effective supply chain integration, collaboration among buyers and suppliers, who share information, simplify core processes, align their operations , and reduce total supply chain costs, is recommended (Lee & Whang, 2001).

Kritcharnchai (2012) indicated that SCM has become one of the most famous competitive tools in several industries in Thailand. The supply chain perspective has allowed any organization and its partners to have a clear picture of the process of integration from upstream to downstream. Although the SCM concept was introduced in Thailand many years ago, its implementation is still limited. For implementing SCM in any organization, collaboration has to be established at the beginning. The healthcare SCM concept has only just been introduced and implemented in hospitals in Thailand, and inter-organizational cooperation among buyers and suppliers is still limited. This concept of healthcare services in Thailand is at the beginning stage.

The healthcare SCM concept has just been introduced and implemented in the public and private hospitals in Thailand. Inter-organizational collaboration and cooperation among buyers and suppliers are still limited. This concept for healthcare services in Thailand is at the beginning stage. It is premise that this service still confronts under-performed processes and non-aligned information sharing. Moreover, both buyers and suppliers are inclined to implement their own data communicating system. As a result, it is difficult to enable the organization to communicate and share important business information among buyers and suppliers. Furthermore, the growing problem of product counterfeiting has to be taken into account. There is much evidence that a rising number of counterfeit pharmaceuticals and medical devices have negatively affected Thai healthcare services in terms of economic loss and patient safety. This encourages both healthcare-related policymakers and

healthcare service providers to be aware of this issue and to further study it in order to improve the national healthcare system as a whole (Kritcharnchai, 2012).

Although there have been several studies that have examined buyer-supplier collaboration (BSC) in many Thai manufacturing and service businesses, the BSC in Thai public and private hospitals has not been examined yet. High-performing BSC is critical to an organization's success in the face of rising healthcare cost pressures and more expectations for elevating the quality of healthcare. Therefore, it was considered a significant aspect of this study to determine the critical factors affecting the BSC in the context of Thai public and private hospitals and their direct and indirect causal relationships.

1.2 Research Questions

The two central research questions of this study are as follows.

1) What are the critical factors affecting buyer-supplier collaboration in Thai public and private hospitals?

2) What are the direct and indirect causal relationships between the critical factors and buyer-supplier collaboration in Thai public and private hospitals?

1.3 Research Objectives

The research objective details are as follows.

1) To determine the critical factors that affect buyer-supplier collaboration in Thai public and private hospitals

2) To test the causal relations in a structural equation model of the buyer-supplier collaboration framework

1.4 Scope of the Study

To make this study more effective and manageable, the scope of this study focuses on four main areas as follows.

1) This study focuses on the relationship between the dependent variable and the independent variables. By using path analysis, there was one dependent variable, which was buyer-supplier collaboration, and there were seven independent variables, which were inventory management, capability, commitment, market competition, external support, management support, and trust.

2) The population and samples of survey respondents target to Thai hospitals. In the qualitative research, the participants were total 48 hospital executives working in Thai hospitals that have been involved in the procurement process of the hospital, have had direct experience coordinating with suppliers and also have had responsibility for buyer-supplier collaboration. The sample size for the quantitative research included total 416 hospitals.

3) The unit of analysis was at the organizational level. And this study focuses on Thai public and private hospitals operating in Thailand only.

4) This study was conducted in the period of August 2015-July 2016.

1.5 Definition of Terms

The objective of this part was to elaborate on the definition of terms and to let readers have a better understanding of this study. The details are as follows.

1) Buyer refers to personnel, team members, committees and/or executives that are involved in the procurement or purchasing process within the hospital and also have direct experience working and/or coordinating with suppliers.

2) Supplier refers to salespersons, dealers, distributors and/or any personnel working in the company that provide services and/or sell products such as pharmaceuticals, medical supplies or medical devices to the hospital.

3) Buyer-supplier collaboration refers to working practice whereby individuals work together, with cooperation, and where there is a good relationship between the buyer and supplier in many aspects, such as information sharing, resource-sharing collaborative communication, joint activity, goal congruence, etc.

4) Thai public hospitals refer to hospitals that are located in Thailand and are formally operated by public organizations such as the Ministry of Public Health, the military, universities, local governments or the Thai Red Cross Society, etc.

5) Thai private hospitals refer to hospitals that are located in Thailand and are formally operated by non-public organizations such as listed companies, private corporations or limited companies, etc.

6) External support refers to promotions, campaigns, and support from government organizations, NGOs, and associations or private organizations.

7) Market competition refers to the force exerted by the global economy and competitors in the market. This also includes the customer's pressure on the organization to build collaboration among partners.

8) Management support refers to top management's vision and support. This also means the top management's potential to express its vision and mission of the organization and to lead others to achieve the organization's goals.

9) Inventory management refers to the process of managing a suitable inventory-holding level of medicines, medical supplies, or medical devices in order to serve the demand of hospital personnel and to support the activities in the hospital.

10) Capability refers to the understanding, awareness, experience, and competency of buyers including items such as negotiation, presentations, systematic costing, etc. It also refers to understanding SCM and awareness of the importance of BSC.

11) Commitment refers to concentration, empathy, carefulness, facilitation, service mind, and problem solving before and after the sales services of the supplier provided to the buyer.

12) Trust refers to the confidence, beliefs, credence, and reliance of the buyer presented to the supplier. It is also refers to trust and honesty, goodwill and intimate relationships between the buyer and supplier.

1.6 Benefits of the Study

There are several benefits in using the knowledge gained from the study of a causal model of the critical factors affecting buyer-supplier collaboration in Thai public and private hospitals. These benefits are as follows.

1.6.1 Academic Benefits

1) This study will help readers gain more understanding of the seven independent variables and the dependent variable, which is buyer-supplier collaboration, in Thai public and private hospitals. Therefore, it is a benefit for any personnel or organizations that are related to the same environment, such as healthcare system development organizations, healthcare support service organizations, healthcare system and policy research organizations, or business research organizations.

2) The result of this study will encourage researchers interested in the topic of buyer-supplier collaboration in Thai public and private hospitals.

3) This study will help readers understand the causal relations among the independent and dependent variables which were used in developing a conceptual framework for Thai public and private hospitals and that also can be applied in other services.

4) This study will help researchers obtain methods and tools for measuring variables, which are the critical factors and buyer-supplier collaboration.

In summary, the research findings and results will be useful in terms of their academic contribution, especially regarding the knowledge gained from the mechanisms connecting the relationship between the main factors and buyer-supplier collaboration.

1.6.2 Operation Benefits

1) The data can be used as a guideline to enhance buyer-supplier collaboration. Moreover, it can be used in healthcare system policy formulation and healthcare service business development.

2) It would benefit healthcare-related executive and managers to realize what factors can be more utilized for buyer-supplier collaboration establishment.

3) The government offices related to healthcare system spending policy and regulation can use the data, information, and findings elaborated in this study to formulate precise healthcare spending policy and support to improve Thai healthcare services as a whole.

In summary, the research findings and results will be beneficial to Thai public and private hospitals in terms of buyer-supplier collaboration enhancement.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In this chapter, a comprehensive literature review is systematically presented and includes a review of related research, studies, theories, and concepts about the study's variables consisting of the concepts, definitions, and causal relationships among the variables. Consequently, the conceptual framework of this study was proposed. The sample group was defined, which was the population directly related to this study. In this literature review, there are four parts: the introduction, buyer-supplier collaboration, the critical factors affecting buyer-supplier collaboration, and the conceptual framework. The details of each part are shown in the following.

2.2 Buyer-Supplier Collaboration

Collaboration is based on trust, honesty, risk sharing and reward sharing that provide a competitive advantage and this results in better performance (Hogarth-Scott, 1999). The review of the literature highlighted the importance of collaboration among the supply chain and determined that collaborative relationships with supply chain partners result in many advantages. Supplier collaboration significantly solves procurement problems and helps the organization attain a competitive advantage by reducing transaction costs.

Sorat (2007) mentioned that collaboration can be defined as cooperation or working together. One of the success factors of SCM is to establish the supplier cooperative relationship. This influences total effective cost reduction, real time delivery, creative value added, and efficient customer response. Collaboration management has become important for increasing the velocity of raw material,

product and information flows. Collaboration among partners is substantial for all partners to communicate, solve problems and increase performance together. This also includes human resource training and information technology development among partners.

The supply chain is the process of the product life cycle supporting the flow of physical, information, financial, knowledge, transportation, and services from raw material suppliers (or primary manufacturers) to end consumers. Cooper and Ellram (1993) explained that, in a globally-challenging environment, the concepts of a supply chain and SCM are getting more attention as a means of gaining competitiveness. SCM is to design, plan, operate, and control supply chain activities. Its objectives are to gain more value in a competitive advantage, to standardize the work process, to align the supply of suppliers with the demand of customers, and to measure performance.

SCM also involves the integration of organizational management involved in relationship activities and the collaboration affecting business processes and enhancing the value added in products and services. SCM has led to sustainable competitiveness. SCM involves the business process related to business collaboration from upstream sources to downstream customers. It includes procurement, marketing promotion, process and production, warehouse, and transportation to customers. These processes interact with each other in terms of integration. The objective of SCM is to fulfill the customer's satisfaction which emphasizes cost efficiency and financial return.

SCM has been defined by the Council of Supply Chain Management Professional (2006) as the combination of planning and managing all activities related to procurement, transformation, production, logistics, and collaboration among the players in the supply chain, which are suppliers, manufacturers, service providers, and customers. SCM is the management of procurement, supply, and demand under the relationship among the players in the supply chain.

The Council of Supply Chain Management Professional (2006) also have explained that logistics management is a part of SCM, including planning processes, presentation, production, warehousing, services, and control of the flow efficiently and effectively from sources to end consumers. Logistics management focuses on the

management of planning, and the control of material and information flow from end to end process under the objective of customer responsiveness.

Li, Ragu-Nathan, Ragu-Nathan, and Rao (2006) stated that effective SCM is a potentially valuable way to ensure a competitive advantage and to improve organizational performance. There are five dimensions of supply chain management practice, including the strategic supplier partnership, customer relationships, the level of information sharing, the quality of information sharing, and postponement. The results of the study imply that higher levels of SCM practice lead to competitive advantage enhancement and organizational performance improvement.

One of the objectives of SCM is to reduce uncertainty and risks by managing appropriate levels of inventory, cycle time, work processes, and suitable end customer services. SCM has become important for any organization these days. SCM also focuses on solving business problems and adding value to products and services.

According to Barney (2012) and Squire, Paul, Benn, and Steve (2009), the resource-based view theory (RBV) is frequently used to describe the impact of supply chain collaboration on competitiveness and organizational performance, especially regarding the aspect of utilizing resources in the process of collaboration. Priem and Butler (2001) stated that RBV is not a prescriptive theory and it can be used to describe the variation of the organizational sustained competitiveness, which depends on how organizations acquire and utilize their strategic resources. By sharing information and resources among partners in the supply chain, organizations can improve the capabilities of their resources.

Lei and Slocum (2005) stated that supply chain collaboration includes specific resource investment, which yields valuable and inadequate capabilities to the organization. Furthermore, collaborative communication can also improve social capital such as trust, commitment, and intangible assets such as knowledge, awareness, and problem-solving skills among partners in the supply chain (Cousins & Menguc, 2006). In addition, this can also decrease transaction costs between the organization and partners throughout the supply chain (Williamson, 2008).

From the related research and studies of the resource-based view, the internal factors were combined both regarding organizational resources and capabilities. They were the main factors that support the organization in establishing collaboration in the

supply chain. Moreover, based on the RBV, this study proposes that supply chain collaboration is affected by increased internal factors, e.g. top management, policy, awareness, and commitment, and also increased inter-organizational factors.

Business Performance Innovation BPI Network and the Chief Marketing Officer CMO Council (2009) reported that, based on the resource-based view, organizations can enhance their competitiveness by utilizing their strategic resources, but it is really difficult for them to gain these resources by themselves. As a result, organizations frequently have to share resources. RBV additionally explains the role of dependence between organizations and their partners in the supply chain, especially for resources (Fawcett & Matthew, 2011). Hence RBV has at it foundation the importance of resources. Sarkis, Zhu, and Lai (2011) and Pfeffer and Salancik (1978) explained that RBV focuses on how organizations become dependent on each other for obtaining the required resources, including raw materials or any types of inputs.

Ketchen and Hult (2007) explained that, for inter-organizational relationships, asymmetric interdependence is a main point for alleviating the uncertainty of the environment. Lei and Slocum (2005) stated that organizations normally become more dependent upon each other whenever they collaborate with partners in the supply chain.

Ireland and Webb (2007) stated that organizations with a high level of dependence on their partners in the supply chain tend to have less power in the relationship. In contrast, Crook and Combs (2007) indicated that resource dependencies are strongly recognized as the sources of unforeseen, unexpected, and serious consequences, which can destroy collaborative parties in the occurrence of supply chain collaboration.

In addition, many manufacturers have aimed at enhancing the dependency of their suppliers by encouraging their suppliers to decrease their profit margins. However, the suppliers made a decision to directly sell their products and services to end customers, and then manufacturers finally received losses (Rossetti & Choi, 2005).

Ketchen and Hult (2007) Ireland and Webb (2007) explained that, based on aspect of supply chain collaboration, resource dependencies can be used to establish social attributes, such as trust and commitment, among partners in the supply chain

rather than being used to aggressively utilize the other partners. Despite the fact that RBV has not often been applied in SCM research, this theory can be used to explain the occurrence of supply chain collaboration, especially for resource sharing, to improve social capital across organizations and partners in the supply chain (Petersen, Handfield, Lawson, & Cousins, 2008).

In this study, RBV was applied to support the causal relationship of the information-sharing, joint activities, and resource-sharing dimensions of supply chain collaboration regarding the trust, willingness, and commitment between supply chain partners. Therefore RBV can be referred to support the proposition that information sharing and resource sharing between supply chain partners can build inter-organizational factors, e.g. trust, willingness, and commitment between organizations.

Integration management is the exchange of information, research, and development together. It will directly influence the business of an organization to grow sustainably. The development of collaboration in the supply chain includes the following activities.

1) Relationship management is to provide the system and establish the system relationship through the supply chain.

2) Conflict management is the mutual interest and benefit among the partners by using a win-win partnership approach.

3) Employee's attitude management is to convince all levels of employees of the organization and partners to have a shared vision and goals to execute the business process in increasing the competitiveness and fulfilling the end customer's satisfaction.

4) Problem solving and communication process is the easy access to all levels of management teams in order to create collaboration and trust in the supply chain.

Applying SCM in any organization, the top management has to be concerned about the importance and roles of collaboration management as a business mechanism to increase sustainable competitiveness. This is the challenge for every top manager to lead the human resources within the organization to be aligned with the partners (Sorat, 2007).

Horvath (2001) and Kumar (2001) stated that collaboration is an approach to SCM that enhances the relationships between the organization and key partners in the supply chain from normal business transactional exchanges to focus on integrated planning, joint activities, resource sharing, and process cooperation. Supply chain collaboration (SCC) that delivers operational efficiency, business visibility, and agility throughout the supply chain provides the organization with an edge by enabling it to grow the business at a low cost, in a dynamic way, and to see change as an opportunity. Establishing SCC is one of the most essential key success factors for a robust and agile core business for the organization.

Although SCM focuses on controlling the activities throughout the supply chain, SCC focuses on improving the information flow between the links of the organization and the key partners in the supply chain, and supply chain optimization focuses on synchronizing decision making that reduces information asymmetry and excess inventory holding in the supply chain. If only one organization drives the decisions of supply chain optimization, this can lead to an asymmetrical distribution of information, excess inventory, and lower bargaining power (Iacovou, Benbasat, & Dexter, 1995).

Holweg, Disney, Holmström, and Småros (2005) stated that, since the mid-1990's, SCC has been mainly supported by consultants, researchers, and scholars under concepts such as collaborative planning, forecasting and replenishment (CPFR), vendor managed inventory (VMI), and continuous replenishment (CR). It is broadly accepted that establishing a seamless and synchronized supply chain leads to increased competitiveness and responsiveness and also decreased inventory costs. Applying these concepts is simple, powerful and useful among many industry sectors, and several success stories have been reported. In some industries, the practices of collaboration were not understood well. SCC means simply holding consignment stock but, in other industries, it is focused on how to manage stock replenishment and production rates among partners or key players in the supply chain.

According to the Bureau of Logistics (2011), for small and medium-sized enterprises (SME), SCC may be known as “business dealing.” SCC is necessary for managing a business in these days. This begins with the coordination between the organization and key partners and then builds cooperation that leads to collaboration. The fundamental aspect of SCC is to share the vision, information, and risk between

the organization and the key partners. The success of SCC depends on the business philosophy and organizational culture of each member in the supply chain.

Total quality management (TQM) has been defined as a philosophy and a set of techniques used for managing a service quality, defining an organization's goal and work processes, and applying the quantitative method to measure a service quality focused on patient-centered outcomes (Chowanec, 1994). TQM also refers to a customer-driven leadership approach based on continuous process improvement connected with offering goods or a service (Counte & Meurer, 2001). It is a combination of leadership, customer focus, employee focus, supplier focus, and process focus.

Before TQM could be applied in the healthcare service sector, it was implemented and developed in manufacturing and other service industries many years ago (Chowanec, 1994). TQM practices refer to the effort to adopt healthcare lessons about improving healthcare service quality in order to fulfill the needs and expectations of customers, suppliers, and employees. Berwick (1989) stated that the ultimate goal of TQM using the continuous quality improvement technique is the acquirement of an outstanding performance level.

According to Black and Porter (1996), TQM concepts broadly depend on case studies, small evidence, and the invention of leading researchers, scholars, and practitioners, including Deming, Juran, Crosby , and Ishikawa. Hence, there has been discussion on what factors are critical success factors for TQM. At that time, there was not much effort to conceptualize frameworks for measuring TQM practices and a methodology for determining the factors has not been established yet. This implies that TQM models, such as the Baldrige model, have not been constructed or validated by empirical evidence yet. This research presents a series of measurement items extracted from the Baldrige model and recent comprehensive literature. As a result, researchers found that there were ten critical success factors for TQM: corporate quality culture, strategic quality management, quality improvement measurement systems, people and customer management, operational quality planning, external interface management, supplier partnerships, teamwork structures, customer satisfaction orientation, and communication of improvement information.

In addition, TQM practices focus on leadership, strategic planning, the customer, the supplier, the employee, the process, and informational and analysis to improve product and service quality and leadership vision. The practices determine the process role and responsibility to transform inputs into outputs and to create value throughout the process. The important contributions of TQM are their effective development and understandable approaches, which are able to apply to routine work process improvement (Blumenthal & Kilo, 1998).

Any organization that promotes long-term relationships with suppliers will be able to contribute to the quality improvement of their products and services. However, relationship development is quite challenging to prove (Wong, Tjosvold, Wong, & Liu, 1999). While the importance of quality management is widely emphasized, it needs a more focused approach for quality management issue evaluation within the internal and external supply chain context (Robinson & Malhotra, 2005).

SalmaAhmed (2012) pointed out that, in the early 1990s, there was an initiative of collaboration, called efficient consumer response (ECR), which appeared in the grocery and consumer packaged goods production and service industries in the United States. ECR encouraged all partners to share strategic information, develop inter-organizational relationships, and seek efficiency improvements that would enhance value-added for their customers (Kurt Salmon Associates, Inc., 1993; Lummus & Vokurka, 1999).

Barratt and Oliveira (2001) explained that ECR has been applied by many production and service industries for serving additional collaborative approaches, including CPFR, VMI, and CR. All of these collaborative approaches recognize the organization to enhance supply chain integration for sharing better information across partners. CPFR includes not only consideration of the main factors that are the sources of uncertainty in the supply chain, but also examines the level of cooperation within the organization and across partners in the supply chain. Lack of the consumer's demand visibility and collaborative relationships based on synchronized decision making becomes a major barrier to the goal of supply chain collaboration. CPFR is one of the most useful strategies for conquering such barriers and searching for joint planning, synchronized decision making, and greater understanding development of the uncertainty of the supply chain replenishment process to gain

more benefits of actual supply chain collaboration. ECR found an increasing number of suppliers very critical of the way in which SCC has turned out in practice (Corsten & Kumar, 2003).

Marquez, Bianchi, and Gupta (2004) stated that there are four main collaboration phases: 1) information sharing, 2) collaboration for a common forecast, 3) collaboration for common planning, and 4) automated financial transactions. There is no need to implement these four phases in the same sequence.

Holweg, Disney, Holmström and Småros (2005) specified four different basic supply chain configurations for collaboration. The configurations were carefully reviewed and categorized by the differences in the inventory control and planning collaboration. In more detail, there were further explanations for the definition of these four types of basic supply chain configurations for collaboration as follows.

Type 0 -The traditional supply chain means that each key player in the supply chain independently places any production orders and individually replenishes stock without evaluating the situation of their other upstream and downstream partners in the supply chain. It represents how most supply chains still operate and there is no official collaboration among partners in the supply chain.

Type 1 - Information exchange or information sharing means that key players and partners still place any order freely and share demand information and action plans for aligning their demand and supply forecasts and for long-term capacity planning.

Type 2 - Vendor managed replenishment means that the partner will be the one that manages the replenishment order generation and maintains the organization's inventory and service levels.

Type 3 - Synchronized supply means that the organization and partner have mutually agreed on removing any single decision point and then synchronizing the replenishment decision with the production and materials requirement planning of the partner. In this way, the partner manages the organization's inventory replenishment on the operational level and uses this visibility for planning its own supply operations.

Holweg et al. (2005) summarized that the target of SCC is to jointly establish agreement on information sharing, replenishment, and supply synchronization among

the partners in the supply chain to decrease excess inventory. This is necessary for the effective reduction of the costly bullwhip effect, which is still common in several production and service sectors.

According to Kampstra, Ashayeri, and Gattorna (2006) and Niemsakul, Singkarin, and Somboonwiwat (2014), SCC is defined as a continuance or outcome of the organization's business initiatives fulfilled by key partners in the supply chain. Healthcare SCC levels have been mainly classified for cost benefit sharing depending on co-cost and co-benefit and different sharing characteristics. The levels of SCC and the collaborative indices have been developed according to the proposed dimensions of SCC. The ladder of collaboration that shows five levels of collaboration can be described as follows.

Level 1 Arm's length: This is defined as mostly transactional business relationships without any level of SCC.

Level 2 Communication: the key partners' goals are to improve productivity and share information throughout the supply chain via information technology.

Level 3 Coordination: this involves within and across the organization's process corporation to synchronize decision making and routine business processes/workflows.

Level 4 Intensive collaboration: the organization and key partner in the supply chain mutually agree on enhancing the strategic decision making and improving the innovation across the supply chain. This varies from vertical or horizontal integration, where all key partners belong to one main stakeholder only. Moreover, this intensive collaboration is not the same as a strategic alliance or joint venture, which normally have some level of ownership sharing with key partners in the supply chain.

Level 5 Partnerships: The organization and key partner in the supply chain mutually agree on the finances, budget, investment, and/or profit sharing.

Ahmed and Ullah (2012) specified three types of collaborative relationships as follows.

Type 1: Collaborative transaction management means that the organization and partners both have a high-volume of data exchange and alignment of roles and responsibilities based on operational issues. The relationships classified as Type 1 include scorecard collaboration initiatives and VMI.

Type 2: Collaborative event management means that the organization and partners jointly have planning activities regarding events such as new product (and/or new service) research, development, and promotions.

Type 3: Collaborative process management means that the organization and partners have mutually established more strategic collaboration depending on knowledge and information sharing as well as synchronized decision making. Type III collaboration also includes synchronized problem solving, joint business planning, integrated processes, and CPFR, which is consolidated an order forecasting process.

SCC involves strategic planning, in which the organization and key partners with different complementary capabilities gain more mutual benefit and/or common interest in the competitive market environment that cannot fulfill the customer's demand by any of them alone. Then, SCC becomes a significant important strategy to gain competitiveness, to achieve greater advantage, and to develop core capabilities throughout the supply chain. In high-level market competition, fast-moving globalization and incremental demanding customers, organizations cannot compete by themselves alone in the market. So, they seek collaborative work with key partners that have complementary capabilities to eliminate business risks (Rokkan, Heidi, & Wathne, 2003; Kumar & Banerjee, 2012b; Kumar & Banerjee, 2012a).

SCC also focuses on joint planning, coordination, and integrated processes between the organization and key partners in the supply chain. Efficient business processes management is one of the characteristics of high collaborative supply chains, such as electronic data interchange (EDI), VMI, CPFR, e-procurement and e-auction. SCC has been identified as a joint effort between the organization and key partners in the supply chain to achieve common interests and to gain mutual benefit. In SCC, the terms of collaboration, coordination, integration, joint, and cooperation are frequently defined with the same meaning and they are complementary to each other among the organizations and key partners in the supply chain McLaren, Head, & Yuan, 2002; Langabeer, 2005; Kanda & Deshmukh, 2008; Niemsakul et al., 2014). The basic rationale is that the organizations cannot successfully compete by themselves alone and then they seek to establish collaboration among key partners in the supply chain (De Leeuw & Fransoo, 2009).

Soosay, Hyland, and Ferrer (2008) suggested that SCC is necessary for innovation as the organization and key partners perceive several innovation advantages such as high quality improvement, cost reduction, on-time delivery, operational efficiency and effective activities. Moreover, sophisticated SCC information systems enable organizations to increasingly collaborate with their key partners in the supply chain, reduce costs, and increase the market's demand fulfillment (McLaren, Head, & Yuan, 2004). However, there have been many reports that have stated that supply chain collaboration is difficult to implement because of a failure to understand for both the organization and its key partners and a lack of commitment and trust among the organizations and their key partners in the supply chain (Barratt, 2004).

Regarding critical information sharing, Frankel, Goldsby, and Whipple (2002) stated that a high level of trust has to be built across the organization and partners in the supply chain. Trust means the extent to which the organization and partners respect each other in terms of benevolence (or generous) and credibility. Benevolence (or being generous) means the extent to which the organization appreciates its collaborating partners' aims, goals, and purposes, which will be an advantage to the relationship between them. On the other hand, credibility means the extent to which the organization appreciates that its collaborating partners have the potential and competency to operate effectively (Ganesan, 1994; Doney & Cannon, 1997).

SCC can be defined as an inter-organizational relationship in the supply chain, where the participating players or partners agree to share resources, mutually achieve goals, share information and responsibilities , and make decisions and solve problems together. Any organization or partners in the supply chain that have higher levels of collaboration practices can achieve higher operational performance and innovation activities (Simatupang & Sridharan, 2005).

Simatupang and Sridharan (2002) explained that the important requirements for establishing effective supply chain collaboration are mutual objectives, integrated strategic policies, appropriate performance measures, synchronized decision making, information sharing, and incentive alignment. These requirements represent the necessity for the organization to create joint planning and significant communication across partners in the supply chain, and commit required resource sharing. There are

five major dimensions of SCC, which are information sharing, decision synchronization, incentive alignment, shared supply chain process, and a collaborative performance system (Simatupang & Sridharan, 2005).

Min, Roath, Daugherty, Genchev, Chen, Arndt, and Glenn (2005) categorized five groups of the key SCC activities, including information sharing, joint planning, joint problem solving, joint performance measurement, and leveraging resource and skill. Fawcett, Magnan, and McCarter (2008) stated that SCC activities include an alignment mechanism, information system and technology, human resource empowerment, cross-functional process change, alliance design, and the measurement of organizational performance.

Thitisomboon et al. (2009) studied the main factors influencing the formation of SCC, the major collaborative mechanisms, and the effect of collaboration on the supply chain performance in the automotive industry of Thailand. This research found that this industry has been directly influenced by fuel price increases and global financial and economic crises. The organizations are necessary to improve their business management in order to enhance their competitive advantage. The organizations also need to step forward for building more collaboration with their partners in the supply chain.

According to Cao and Zhang (2011), a conceptual framework has been proposed that indicates that SCC leads to a collaborative advantage and in turn to process performance and organizational performance. There are four forms of organizational coordination in the supply chain: dyadic, channel integration, 3P-hub chain, and vertical integration. There are seven interconnecting dimension: information sharing, incentive alignment, goal congruence, decision synchronization, resource sharing, as well as communication and joint knowledge creation. These seven elements define the occurrence of collaborative endeavors and describe SCC more exactly.

Regarding the successful SCC implementation by Wal-Mart, it has increasingly encouraged many organizations to establish coordination among the key partners in the supply chain. Afterwards, this cooperation between the organization and key partners becomes a normal practice in many production and service industries.

However, its benefit measurement is still a major challenge in each industry (Ramanathan et al., 2011).

Phong-arjarn and Jeenanunta (2010) studied the main factors affecting SCC in the Thai textile-apparel industry and proposed four dimensions of SCC activities: information sharing, decision synchronization, joint business process, and skill and resource sharing. Each dimension consists of various SCC activities. The dimensions of SCC and a sample of SCC activities are shown in table 2.1.

Table 2.1 Dimensions of SCC and a Sample of SCC Activities

Dimensions of SCC	Sample of SCC activities
Information sharing	Sharing of production plan, order tracking, and on-hand inventory level monitoring
Decision synchronization	Joint planning, joint decision making, and joint problem solving
Joint business process	Joint sourcing, joint performance measurement, and joint transportation
Resource and skill sharing	Skill and knowledge sharing, joint R&D, and financial support

Phong-arjarn and Jeenanunta (2013) explored the main factors affecting the occurrence of SCC in four major industries of Thailand-the electronics and computer industry, the automotive industry, the textile-apparel industry, and the construction industry-and then found that there were 52 factors affecting the establishment of collaboration among supply chain partners. These factors were classified into three groups consisting of internal factors (17 factors), inter-organizational factors (28 factors), and external factors (7 factors).

Internal factors, or organizational factors, mean the factors within an organization. These internal factors influence the organizational ability to establish collaboration with others. These factors are business processes, organization structures, information system, top management support, attitude, commitment, and understanding and awareness of supply chain management and the organization's

resources. Inter-organizational factors mean the factors between organizations in the supply chain. These inter-organizational factors influence the collaboration establishment between the organizations in the supply chain. These inter-organizational factors are trust, business benefit, good relations, intention, coordination, communication, commitment, leadership, and the partner's readiness. External factors mean the factors in the organization outside the supply chain. These external factors are customer satisfaction, global economy uncertainty and market competition, social influence, and globalization and uncertainty.

As a result of the study, 80.2% of all the surveyed organizations built SCC across their key partners and the main SCC activities are information sharing. The technology intensive industry, including the electronics and computer industry and automotive Industry, had a slightly higher level of the occurrence of SCC than labor intensive industry, including the textile-apparel industry and construction industry. Among the several types of companies, the domestic group company had the highest percentage of the establishment of SCC. The bigger organizations, with more fixed asset value and a higher number of employees, tended to have more establishment of SCC than the smaller organizations (Phong-arjarn & Jeenanunta, 2013).

Hotrawaisaya, Chandraprakaikul, and Suthikarnarunai (2014) studied the logistics collaboration in the supply chain in the orchid industry of Thailand and found that the results of implementing the logistics collaborative model in the organization reduced inventory and transport cost as a whole. This model also improved forecasting accuracy and the supply chain synchronization of the organizations.

Piboonrungroj (2012) studied SCC in the Thai tourism industry and proposed ten dimensions of SCC activities: information sharing, joint team, dedicated investment, congruence of goals, collaborative communication, alignment of incentives, risk sharing, shared resources, joint knowledge creation , and synchronized decisions. He found that SCC significantly affected firm performance through commitment, trust, transaction cost, and sustained competitive advantage. The path model for supply chain collaboration-impacts and mediation in relation to firm performance-is illustrated in figure 2.1.

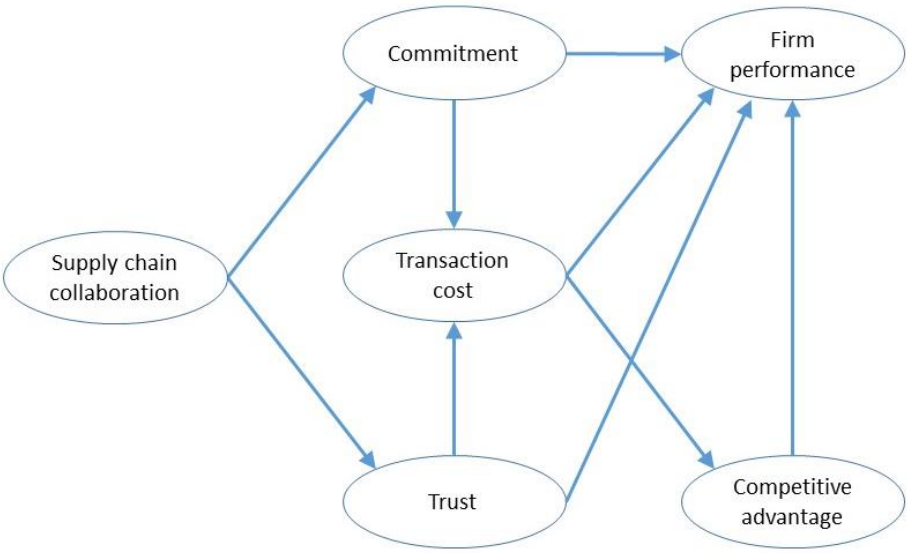

Figure 2.1 Path Model of Supply Chain Collaboration: Impacts and Mediation on Firm Performance

In the healthcare service industry, BSC is an activity that involves collaboration, cooperation, and integration within the organizations and with key partners. Compared with other service industries, BSC in the healthcare service industry has more complex and different characteristics. The healthcare service industry has less awareness of BSC than other production and service industries, and the supply chain process improvement has been a low priority in this industry. Therefore, new sophisticated and hi-end technology improvement has been mostly focused on providing the highest quality service of care and reducing service costs (Stock, Greis, & Kasarda, 1998; Smith, 2011; Piboonrungroj, 2012; Smith, Nachtmann, & Pohl, 2012).

Kritchanchai (2012) has stated that the BSC concept enables process visibility and transparency so that all key players, including buyers and suppliers, can notice what is happening throughout the chain. All key players are seeking how to gain clearer visibility of their operations in order to improve the quality of care, lower costs, gain marginal benefits, and increase total revenues. They are also trying to increase their supply chain performance by aligning business strategies with supply chain strategies. Moreover, the collaboration within an organization can lead to risk

management, performance improvement, and meaningful cost containment (Farney, 2003; Langabeer, 2005; Smith, 2011; Ebel, George, Larsen, Shah, & Ungerman, 2013; Niemsakul, Singkarin, & Somboonwiwat, 2014).

In the healthcare service industry, information sharing and collaboration are quite difficult since there is a high level of information complexity, uncertainty, and fragmentation. As a result, raw data and crucial information are not fully circulated across buyers and suppliers whereby pharmaceutical information is actually acknowledged as significant and important information to improve patient safety (Muangchoo & Singkarin, 2012).

Moreover, there are many manual activities and regulatory pressures using the raw data stored and maintained in the fragmented IT systems of each service provider. As a consequence, each service provider is facing big challenges in terms of the track and traceability of the information along the process, high standard quality of care, operational efficiency, and customer satisfaction. As a result, there is a significant need to improve the information sharing across buyers and suppliers (Muangchoo & Kritchanchai, 2011).

In summary, there are many different types of BSC approaches, such as information sharing, resource sharing, collaborative communication, and joint teams and goal congruence. BSC can be classified using different criteria such as mutual benefits, information sharing, an integrated supply chain process, resource sharing, and incentive alignment (Simatupang & Sridharan, 2005), sharing information, goal congruence, collaborative communication, and decision synchronization (Cao & Zhang, 2011), information sharing, joint teamwork, joint planning, and resource sharing (Ramanathan et al., 2011), synchronization of objectives, frequent and open dialogue, joint costs, innovation and synchronized decision (Wilding & Humphries, 2006), and resource-dedicated investment, collaborative communication, and supply chain decision making (Sheu, Rebecca, Yen, & Chae, 2006). The definitions of the dimensions of BSC are shown as follows.

1) Information sharing refers to the mechanism of capturing and disseminating information for monitoring, planning, and controlling supply chain operations, sharing of production schedules, ordering tracking, stock-out and on-hand inventory level monitoring, etc. This also refers to the scope whereby an organization

and key partners exhibit a willingness to share and utilize the information together. Its expectation is to share and visualize all data and information to buyers and suppliers in the supply chain (Kritchanchai, 2012).

2) Resource sharing refers to the sharing and mutually leveraging of collaborative partners' resources such as skill and knowledge sharing, joint research and development, and financial support. This also refers to the scope that buyers and suppliers exhibit a willingness to share and utilize the resource together. Its expectation is to share any materials and resources with buyers and suppliers in the supply chain (Kritchanchai, 2012).

3) Joint activities refer to the scope that buyers and suppliers are willing to give and take in the relationship and to work together (Ellinger, Daugherty, & Keller, 2000). This includes the joint business operations among supply chain partners, e.g., planning, forecasting, sourcing, production, inventing, delivering, selling, and performance measuring, etc.

4) Collaborative communication refers to the extent to which buyers and suppliers are willing to communicate collaboratively and efficiently. This also refers to the scope that buyers and suppliers are willing to communicate collaboratively and efficiently.

5) Goal congruence refers to the scope that both buyers and suppliers realize that their business objectives and goals are satisfied and fulfilled together by following the whole supply chain's overall goals and that the goals of the organization are not a disadvantage for themselves. This includes the extent to which buyers and suppliers realize that their business objectives and goals are satisfied and fulfilled together by following the whole supply chain's overall goals and that the goals of the organization are not a disadvantage for them.

Based on the comprehensive literature review of previous-published articles, researches and studies related to buyer-supplier collaboration, a summary of the different dimensions of buyer-supplier collaboration is shown in table 2.2.

Table 2.2 Summary of Dimension of Buyer-supplier Collaboration

Authors	Dimensions of buyer-supplier collaboration				
	Information sharing	**Resource sharing**	**Collaborative communication**	**Joint activities**	**Goal congruence**
Dourish and Bellotti (1992)	X	X		X	
Simatupang and Sridharan (2002)	X			X	X
Simatupang and Sridharan (2005)	X	X		X	X
Li et al. (2006)	X		X	X	X
Wilding and Humphries (2006)	X		X	X	X
Sheu, Yen and Chae (2006)	X		X	X	
Thitisomboon et al. (2009)	X	X		X	
Cao and Zhang (2011)	X		X	X	X
Muangchoo and Kritchanchai (2011)	X		X	X	
Ramanathan, Gunasekaran and Subramanian (2011)	X	X		X	X
Kumar and Banerjee (2012a)		X	X	X	
Muangchoo and Singkarin (2012)	X		X	X	
Piboonrungroj (2012)	X	X	X	X	X
Phong-arjarn and Jeenanunta (2012)	X	X		X	
Phong-arjarn, Jeenanunta (2013)	X	X		X	
Chakraborty et al. (2014)	X	X	X		X

The relationship between SCM. SCC, BSC and firm performance is illustrated in figure 2.2.

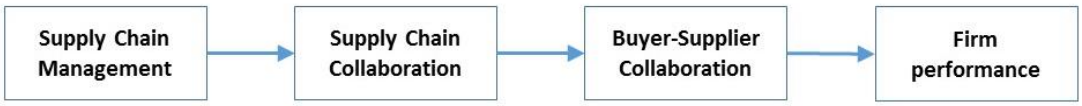

Figure 2.2 The Relationship between SCM. SCC, BSC and Firm Performance

In summary, buyer-supplier collaboration refers to the working practice whereby individuals work together, cooperate and where there is a good relationship between the buyer and supplier in many aspects, such as information sharing, resource sharing, collaborative communication, joint activity, goal congruence, etc. (Simatupang & Sridharan, 2005; Cao & Zhang, 2011; Ramanathan, Gunasekaran, & Subramanian, 2011; Wilding & Humphries, 2006; Sheu et al., 2006).

2.3 Critical Factors Affecting Buyer-Supplier Collaboration

According to the comprehensive literature review and concepts in the previous section, this study mainly focuses on buyer-supplier collaboration establishment in Thai public and private hospitals. There are two critical factors affecting buyer-supplier collaboration establishment-external and internal factors. The details of each factor and the causal relations are shown as follows.

2.3.1 External Factors

1) External support refers to promotion, campaigns, and support from government organizations, non-governmental organizations (NGO), and associations or private organizations.

According to the Bureau of Logistics (2011), one of the major problems found in BSC establishment once the members, who have more bargaining power than others, take the benefit over the others is that someone wins while others lose. This can lead to an unsustainable supply chain relationship whereby the government and/or regulatory agencies can help promote equity in BSC. For this reason, BSC needs to be established and supported continuously.

According to the results of exploring BSC in Thai major industries, external support was significantly related to BSC. Phong-arjarn and Jeenanunta (2013) suggested that an organization should move proactively forward to establish BSC with its partners rather than waiting for external support only.

In Thailand, there are many government organizations that promote and support the leveraging of the knowledge of SCM and awareness of the importance of BSC, such as the Office of Service Trade and Trade Logistics under the supervision

of the Department of International Trade Promotion (Ministry of Commerce), the Thailand Productivity Institute (Ministry of Industry), the Department of Industry Promotion (Ministry of Industry), the Bureau of Logistics under the supervision of Department of Primary Industries and Mines (Ministry of Industry), the Department of Skill Development (Ministry of Labor), the Healthcare Supply Chain Excellence Center under the supervision of Mahidol University, the Center for Health Systems Analytics (HSA) under the supervision of Chulalongkorn University, the Center for Logistics Excellence (LOGEX) under the supervision of King Mongkut's University of Technology Thonburi, and GS1 Thailand (this is an international not-for-profit association dedicated to the design and implementation of world-class standards and solutions to improve the efficiency and visibility throughout the supply chain globally). Most organizations initially come to GS1 to obtain a barcode number attached to their product's packages, under the supervision of the Federation of Thai industries (FTI) and the Ministry of Industry.

Moreover, knowledge of the SCM concept and the importance of BSC has also been promoted and supported by non-government organizations, associations and other private organizations such as the Private Hospital Association, the Association of Hospital Pharmacy (Thailand), the Thai Medical Device Technology Industry, the Thai Chamber of Commerce, the Thai Federation on Logistics, Efficient Consumer Response (ECR-Thailand), the Thai Logistics and Production Society Association (TLAPS), the Purchasing and Supply Chain Management Association of Thailand (PSCMT), the Asian Institute of Logistics Foundation, and the SCM Executive Education Institute and Center for Innovative Logistics (CIL) under the supervision of the Panyapiwat Institute of Management (PIM). These public and private organizations help emphasize the top management of the organization to have greater understanding and knowledge of SCM and more awareness of the importance of BSC in many manufacturing and service industries in Thailand.

Saad, Jones, and James (2002) studied the early progress towards the awareness and adoption of SCM relationships in the construction industry. This research is based on a comprehensive literature review and survey of the opinions of practitioners working in that industry. This study suggested that although almost of the practitioners in this industry have some knowledge of SCM, they still require a

better conceptual understanding of SCM and new and more systematic approaches to the implementation supported by others public or private organizations. Moreover, the majority of the practitioners believe that the external actors are very ineffective. There was a lack of awareness about the need for external support required for the development of such complicated knowledge and innovation and insufficiency of external support available in this industry.

Somboonwiwat, Kritchanchai, Wasusri, and Ruktanonchai (2006) explained that the Thai government has broadly supported SCM knowledge as one of the key competitive management tools for all production and service industries. BSC awareness can also help the organization and key partners reduce lead time and inventory holding costs throughout the supply chain and maximize customer satisfaction. Many training courses and seminars have been introduced and promoted by government agencies, universities, training centers, and consulting companies.

Arora and Gambardella (1990) studied the complementarity and external linkages among large organizations in the biotechnology industry and found that large organizations utilize many kinds of inter-firm relationships, so-called linkages, supported and promoted by other public and private organizations such as universities and small/medium-sized research-based organizations. If any two strategies are complementary, then they have a positive correlation.

For this study, the researcher mainly focused on external support from any government organization, non-governmental organization (NGO), association or private organization influenced the hospital to build collaboration between buyers and suppliers in Thai public and private hospitals.

2) Market competition refers to the force exerted by the global economy and competitors in the market. This also includes the customer’s force, push, or pressure on the organization to build collaboration among partners.

From the results of exploring SCC in Thai major industries, market competition was seen to be significantly related to SCC (Phong-arjarn & Jeenanunta, 2013).

Kedia (1997) explained the effect of market competition on the design of an organization’s governance structure. In an oligopoly market, profits are not only a function of the top management's own actions but also of the actions influenced by

market competitors. Top management then strategically acts and commits itself to actions which seize the benefits and most preferable responses from market competitors. It has been represented that top management strategically utilizes the incentive features of compensation contracts to adjust behavior in markets.

According to Hambrick (1981), understanding and awareness are considered in two ways: the extent to which one top management's perception of the organization's strategy aligns with the organization's realized strategy and with higher top management's perception. Being influenced by competitors in the market, and understanding and awareness, are greater in organizations that have just adjusted their policies and strategies than in organizations that have not.

Powell, Koput, and Smith-Doerr (1996) examined the critical factors promoting inter-firm relationships in the biotechnology industry, influenced by current market competition whereby the research breakthroughs are widely distributed so that no individual organization alone has all of the necessary resources and capabilities. There are quite limitations to market competition and transaction in this industry.

For this study, the researcher mainly focused on the idea of market competition influencing the hospital to build collaboration between buyers and suppliers in Thai public and private hospitals.

3) Commitment refers to concentration, empathy, carefulness, facilitation, service mind, problem solving, and before and after sale services of supplier providing to buyer. It also refers to a desire of the supplier to continuously build a relationship because of the positive affect on the good partnerships between itself and the buyer (Nyaga, Whipple, & Lynch, 2010; Gundlach, Achrol, & Mentzer, 1995, Piboonrungroj, 2012).

For this study, the researcher mainly focused on the idea of commitment influencing the hospital to build collaboration between buyers and suppliers in Thai public and private hospitals.

2.3.2 Internal Factors

1) Management support refers to top management's vision and support. It also means the top management representative's potential to express the vision and mission of the organization and to lead others to achieve the organization's goals. This support also includes the policy and strategy of the organization to ensure that the needs and requirements of each customer will be continuously fulfilled over time, and be committed to establishing collaboration with partners and budget for building collaboration (McKone-Sweet, Hamilton, & Willis, 2005; Bhakoo & Chan, 2011).

There are many factors that affect BSC, and management support could be positive in establishing collaboration between buyers and suppliers in the supply chain. Among the main obstacles and major factors affecting BSC establishment in healthcare services are the limitations of support from top management, conflicts of priorities, and the lack of SCM knowledge and awareness among top management and healthcare professionals (McKone-Sweet et al., 2005; Bhakoo & Chan, 2011). In a study of senior members' opinions of the Council of SCM Professionals, top management was seen to be the most important facilitator (Larson et al., 2007).

From the result of exploring SCC in Thai major industries, management support was seen to be significantly related to buyer-supplier collaboration. The most important factor regarding the occurrence of BSC was top management's vision, support, and commitment. Management support (including vision and commitment) was a critical factor that influenced the building up of the dimension of BSC. Top management representatives or executives of an organization play an important role in establishing BSC, as they are the main persons that create policy, provide the budget, and control the direction of an organization. For building successful BSC with partners, it are necessary to have a clear supportive vision, an understanding of the importance of BSC, and commitment to continuously execute the BSC plan. Moreover, the business's benefit is also the main factor that forces top managers (or business owners) to establish collaboration between buyers and suppliers in the supply chain (Phong-arjarn & Jeenanunta, 2013).

For this study, the researcher mainly focused on the idea of management support influencing the hospital to build collaboration between buyers and suppliers in Thai public and private hospitals.

2) Inventory management refers to a management process in the hospital to have a suitable inventory holding level of products such as pharmaceuticals, medical supplies, or medical devices in order to serve the demand of the hospital personnel and the support activities that take place in the hospital. For increasing the effectiveness throughout the supply chain, the buyer and supplier jointly administer both logistics and inventory management in the supply chain (Min & Mentzer, 2004).

For this study, the researcher mainly focused on the idea of inventory management influencing the hospital to build collaboration between buyers and suppliers in Thai public and private hospitals.

3) Capability refers to the understanding, awareness, experience, skill and/or competency of the buyer, such as negotiation, presentation, systematic costing, knowledge management (KM), etc. It also refers to having knowledge of SCM and being aware of the importance of BSC.

For this study, the researcher mainly focused on the idea of capability influencing the hospital to build collaboration between buyers and suppliers in Thai public and private hospitals.

4) Trust refers to the confidence, belief, credence, and/or reliance of the buyer presenting to supplier. It is also refers to the trust and honesty, and goodwill and intimate relationship between the buyer and supplier, regular and intimate coordination, the partners' intention and willingness to build collaboration, and communication efficiency. Buyers perceive suppliers as beneficent and credible (Nyaga, Whipple, & Lynch, 2010).

Doney and Cannon (1997) determined the cognitive processes through which buyers can build trust with suppliers. These processes provide a theoretical framework used to identify the antecedents of trust. They also examined the impact of trust on a buyer's current approved supplier list and future procurement intentions. Buyer trust presented to suppliers influences a buyer's anticipated future coordination with the supplier.

Based on many examples of other industries in the global economy, a small but rising number of organizations in the construction industry are beginning to adopt supply chain management and to be aware of the importance of BSC in terms of improving their performance and addressing their opponent inter-organizational relationship and trust (Saad et al., 2002).

For this study, the researcher mainly focused on the idea of trust influencing the hospital to build collaboration between buyers and suppliers in Thai public and private hospitals.

2.3.3 Causal Relations

1) Causal Relation between Commitment and Buyer-supplier Collaboration

Based on the above review, the commitment of the supplier plays a significant role in collaboration. An increase in the commitment of the supplier can result in many outcomes, such as more joint activities, collaborative communication, cost reduction, enhanced competitive advantages, and improved performance (Piboonrungroj, 2012). In the past, commitment has frequently been the subject of several researches and studies. The key success and main failure factors in commitment were determined in many articles and papers. Partnership development normally begins with excellent collaborative communications between the organization and key partners in the supply chain. Few studies have specified important steps to establish BSC (Ellram, 1995; Corbett, Blackburn, & Wassenhove, 1999; Boddy, Macbeth, & Wagner, 2000; Cassivi, 2006).

Kumar and Dissel (1996) stated that a recent comprehensive literature review regarding inter-organizational relationships and commitments focuses on explaining the role of information technology in enabling the transformation from inter-firm competition to inter-firm collaboration and coordination.

Stank, Keller, and Daugherty (2001) indicated that the SCM philosophy that focuses on maximizing the customer's demand fulfillment at the lowest service cost requires a commitment to build relationships between the organization and key partners in the supply chain. This is to enhance the relationships from short-term interactions toward long-term partnerships. Increasing BSC establishment can lead to

lower service costs and improve service performance. Therefore, the collaboration requires the commitments of both intra-organizationally and inter-organizationally.

Love, Irani, Cheng, and Li (2002) explored the factors affecting inter-organization relationships and commitment in the construction industry and found that this industry was very conflicted and fragmented. For improving performance, especially regarding inter-firm relationships and commitment, organizations have to consider the formation of collaboration with partners in the supply chain. Leveraging supply chain management strategy, some organizations are beginning to establish short-term collaborations with their suppliers and customers. However, these short-term collaborations limit feedback, which promotes learning and the development of mutual benefits, trust, and coordination. It is suggested that organizations focus on establishing long-term collaborations to enable partners to form learning collaborations. Bordonaba-Juste and Cambra-Fierro (2009) stated that the buyer obtains benefits from building long-term relationships with the supplier, based on the commitment of the supplier and collaboration, which are beneficial to the supplier as well.

According to the Bureau of Logistics (2011), for building inter-organizational relationships, three dimensions need to be considered: trust, commitment, and bargaining power. As a result, supply chain efficiency will be improved in three aspects: cost, time, and quality.

Corsten, Gruen, and Peyinghaus (2011) explained that, so far, conceptual and empirical research in operations and SCM gradually have gradually adopted the new concept that collaborative inter-organizational relationships are source of competitiveness and benefits for the organization. The finding suggested that supplier-to-buyer identification has a direct positive impact on information exchange and supplier relationship-specific investments, which are mostly mediated by commitment.

In general, inter-organizational system implementation within the healthcare supply chain is difficult because it requires the participation of all key players , including principals, manufacturers, distributors, wholesalers, healthcare service providers, patients, payers, regulatory agencies, insurance company and information service providers (Kritchanchai & Suwandechochai, 2010; Muangchoo & Singkarin, 2012). One of the main obstacles and major factors affecting BSC

establishment in the healthcare service industry is a lack of good relationships and the commitment of the supplier and trust among the buyers and suppliers in the supply chain (McKone-Sweet et al., 2005; Bhakoo & Chan, 2011).

From the results of exploring SCC in Thai major industries, the commitment of the supplier was seen to be significantly related to BSC. The commitment of the supplier was the most driving force that governed decision synchronization. Commitment, trust, and intention have also been viewed as the main factors in establishing BSC (Phong-arjarn & Jeenanunta, 2013).

2) Causal Relation between Commitment and External Support

Saad et al. (2002) suggested that although buyers have trust in the supplier and suppliers have commitment to buyers, for increasing commitment, they still require the support given by others public or private organizations. Moreover, buyers believe that external actors are not very effective. There was a lack of awareness about the need for external support required not only enhancement of commitment but also insufficiency of external support available.

According to the Bureau of Logistics (2011), one of the major problems related to the commitment issue once the members, who have more bargaining power than others, take the benefit over the others. This can lead to unsustainable commitment and trust whereby the government and/or regulatory agencies can intervene in the situation to promote the commitment of the supplier and trust throughout the chain. Moreover, the external support obtained from other private, government and/or non-government organizations is necessary and needs to be maintained continuously.

In Thailand, there are many private, government, and non-government organizations that promote and provide many types of support for organizations such as providing useful information and benchmarking, providing consultancy service, etc. These useful supporting activities and promotions help buyers working in both manufacturing and service industries have more trust between the buyer and supplier and in terms of the commitment of the supplier. Somboonwiwat et al. (2006) explained that the Thailand government has broadly provided useful information about suppliers as one of the key competitive management tools for the manufacturing and service industries. This information and support can also help the buyer and

supplier reduce the conflicts throughout the supply chain and increase their commitment.

3) Causal Relation between Inventory Management and Buyer-supplier Collaboration

Any organization that has well-managed its inventory in terms of having acceptable inventory holding costs and suitable on-hand inventory levels tends to continuously improve the process to increase more efficiency over time. This also tends to lead such organizations to establish, maintain, or develop collaboration with their suppliers to a greater extent. In addition, once any organization faces an inventory management issue and cannot solve it, such an organization tends to ask for help and/or collaboration from its suppliers, in terms for example of information sharing, resource sharing, and/or joint activities as well.

4) Causal Relation between Inventory Management and Market Competition

Phong-arjarn and Jeenanunta (2010) discussed the idea that high market competition in the market has strongly affected to the Thai textile-apparel industry. Thitisomboon et al. (2009) also indicated that the automotive manufacturing industry has been mainly affected by the global financial crises, market competition, and fuel price increases. As a result, organizations have to improve their business in many management aspects, including inventory management, in order to increase their competitive advantage and reduce total costs; and they also have to proactively move forward for establishing more collaboration with their suppliers in the supply chain to ensure that organizations will have a suitable inventory level to serve their customer's demand on time.

5) Causal Relation between Inventory Management and Management Support

Normally, top management and/or the executives of the organization should provide a clear direction to support the business activities for both short-term and long-term business plans. Like other activities that take place in the hospital, a suitable inventory level held by the organization should be directed and targeted by top management and/or executives. Apart from setting inventory-level targets, top management and/or executives should also support buyers that manage the inventory

by allocating the required resources, giving suggestions, solving problems, providing guidelines and/or approving the budget in order to empower buyers to have more flexibility or efficiency in managing the inventory for achieving proper inventory levels and controllable shortages.

Moreover, Lenny Koh, Demirbag, Bayraktar, Tatoglu, and Zaim (2007) explained that the buyer and supplier should have a clear vision of benchmarking and organizational performance objectives in order to jointly enhance continuous improvement , which should be implemented throughout the supply chain with a predefined budget and management support (Chen & Paulraj, 2004).

6) Causal Relation between Capability and Buyer-supplier Collaboration

One of the main obstacles and major factors affecting BSC establishment is the lack of buyer capability concerning SCM knowledge and buyer-supplier collaboration awareness among top management and healthcare professionals (McKone-Sweet et al., 2005; Bhakoo & Chan, 2011).

Phong-arjarn and Jeenanunta (2013) explained that understanding the SCM knowledge and awareness of the importance of BSC on the part of top management and employees, who work as buyers, affect the implementation of new management concepts and information systems.

According to the results of exploring BSC in Thai major industries, awareness of the importance of BSC was significantly related to BSC. Understanding the SCM concept and its importance was also a major important factor in information sharing, which was one of the BSC dimensions (Phong-arjarn & Jeenanunta, 2013).

Dourish and Bellotti (1992) explained that the capability of the executives, committees and individuals that work as buyers is critical for successful collaboration and normally supports the dimensions of BSC , which are information sharing, joint activities , and resource sharing.

For building successful BSC, it is necessary for the buyer of the organization to have enough capability and experience developed over the past years, a clear understanding of SCM, and awareness of the importance of BSC (Phong-arjarn & Jeenanunta, 2013).

7) Causal Relationship between Capability and Inventory Management

Phong-arjarn and Jeenanunta (2010) stated that one of the key factors affecting the inventory management of the organization is the sufficient capability, skills or competency of the buyers. Buyers have to be well-trained and continuously develop their understanding, knowledge, and technique in order to run the day-to-day operation, improve efficiency, optimize the inventory holding costs, and minimize any loss or waste that occurs from inventory management failure.

8) Causal Relation between Capability and External Support

Saad et al. (2002) studied the early progress towards the awareness and adoption of SCM relationships. Their study suggested that although buyers in this industry have capability and knowledge of SCM, but they still require a better conceptual understanding of SCM and more systematic approaches to the implementation supported by other public or private organizations. Moreover, buyers believe that external actors are very ineffective. There was a lack of awareness concerning the need for external support required not only the development of such complicated knowledge but also insufficiency of external support available in this industry.

According to the Bureau of Logistics (2011), one of the major problems related to the external support issue once the member, who have more bargaining power than others, take the benefit over the others. This can lead to an unsustainable supply chain relationship whereby the government and/or regulatory agencies can intervene in the situation to promote equity in the chain. Moreover, external support gained from other private, government and/or non-government organizations is necessary and needs to be established and maintained continuously.

In Thailand, there are many private, government, and non-government organizations that promote and provide many types of support for organizations such as arranging training courses, publishing knowledge, allocating the approved budget, providing the consultancy services, etc. These useful supporting activities and promotions help buyers to develop their capability.

9) Causal Relation between Capability and Management Support

Sanders (2007) explained that, based on the foundation of SCM, inter-organizational collaboration has been enabled by the development and use of e-

business technology. Inter-organizational collaboration and information sharing are expected to improve the performance of the organization. The findings represent the complication of the inter-organizational trust supported by top management and the executives of the organization, emphasizing the importance for any organizations to promote collaboration.

Management support was the main factor that influenced the building up of inter-organizational relationships and trust between the buyer and supplier. Any top management representatives or executives of an organization play an important role in establishing BSC. For building successful inter-organizational relationships with suppliers, they are necessary to have a clear supportive vision, and contribution to continuously execute BSC plan. Moreover, mutual business benefit is also the main factor that forces buyers to establish collaboration with their suppliers in the supply chain (Phong-arjarn & Jeenanunta, 2013).

It is the accountability of any top management and/or executive to ensure that employees working in the organization have a suitable level of capability to proactively plan the tasks, well manage routine work, and solve problems effectively. Since buyer capability needs to be maintained and continuously developed over time within the organization, top management and/or executives have to have a clear direction to continuously support the human resource development.

10) Causal Relation between Capability and Commitment

Whenever buyers notice behavioral uncertainty on the part of their suppliers, they may closely monitor the supplier's performance and behavior in order to prevent business disruption leading to incremental costs. This is one of many lessons learned from dealing with suppliers' uncertainty. Therefore, supplier commitment can reduce unexpected costs, develop buyer capability to handle the uncertainty, and manage their suppliers at the same time (Williamson, 2008, Piboonrungroj, 2012).

Regarding the commitment of supplier, one of the major factors is buyer capability concerning SCM knowledge and BSC awareness (McKone-Sweet et al., 2005; Bhakoo & Chan, 2011). Phong-arjarn and Jeenanunta (2013) explained that the knowledge of SCM and awareness of the importance of BSC on the part of top management and employees, who work as buyer, affects the commitment of the supplier.

The capability of the buyer was seen to be significantly related to the commitment of the supplier. For the buyer, understanding the SCM concept and its importance was also a major important factor for increasing the commitment of the supplier and creating long-term relationships (Phong-arjarn & Jeenanunta, 2013).

11) Causal Relation between Trust and Commitment

Although many organizations have gained many benefits from collaboration with their suppliers, some other organizations have found difficulty or have failed to collaborate with their suppliers. The cause of this problem may be the lack of enough commitment, which reduces the level of trust between the buyer and supplier (Barratt, 2004; Holweg et al., 2005; Sheu et al., 2006).

In BSC, the collaborative communication and joint activities between the buyer and supplier were stated to be the core importance of collaboration. When suppliers closely coordinate with buyers, they are inclined to be committed to each other more and this creates trust among themselves (Piboonrungroj, 2012). Finally, the buyer and supplier should establish trust together and share the mutual benefits gained from BSC (Min & Mentzer, 2004; Li, Ragu-Nathan, Ragu-Nathan, & Rao, 2005).

Based on the above comprehensive literature review of the previously-published articles, research, and studies related to the occurrence of buyer-supplier collaboration, a summary of the critical factors affecting buyer-supplier collaboration is shown in table 2.3.

Table 2.3 Summary of Critical Factors Affecting Buyer-supplier Collaboration

Authors	Critical factors affecting buyer-supplier collaboration	
	External factors	**Internal factors**
Hambrick (1981)	X	X
Arora and Gambardella (1990)	X	X
Powell et al. (1996)	X	X
Kumar and Dissel (1996)		X
Kasouf and Celuch (1997)	X	X
Kedia (1997)	X	X
Maloni and Benton (1997)		X
Spekman, Jr. and Myhr (1998)	X	X
Boddy et al. (2000)		X
Anthony (2000)		X
Szeto (2000)	X	X
Handfield and Bechtel (2002)		X
Love (2002)		X
Saad et al. (2002)	X	X
McKone-Sweet et al. (2005)		X
Angerhofer and Angelides (2006)	X	X
Somboonwiwat, Kritchanchai, Wasusri, and Ruktanonchai (2006)	X	X
Attaran and Attaran (2007)	X	X
Fawcett et al. (2008)		X
Leat and Revoredo-Giha (2008)	X	X
Madlberger (2008)		X
Thitisomboon et al. (2009)	X	X
Phong-arjarn and Jeenanunta (2010)	X	X
Bhakoo and Chan (2011)		X
Bureau of Logistics (2011)	X	X
Corsten et al. (2011)		X
Phong-arjarn and Jeenanunta (2013)	X	X

2.4 Conceptual Framework

The results of the literature review could be used as a causal model of the main factors affecting buyer-supplier collaboration within the context of Thai public and private hospitals. A list of one dependent variable and two groups of independent variables is shown as follows.

1) Dependent Variable:

(1) Buyer-supplier collaboration

2) Groups of Independent Variables:

(1) External factors consisting of external support, market competition, and commitment

(2) Internal factors consisting of management support, inventory management, capability, and trust

The Conceptual Framework of this Study is Illustrated in Figure 2.3.

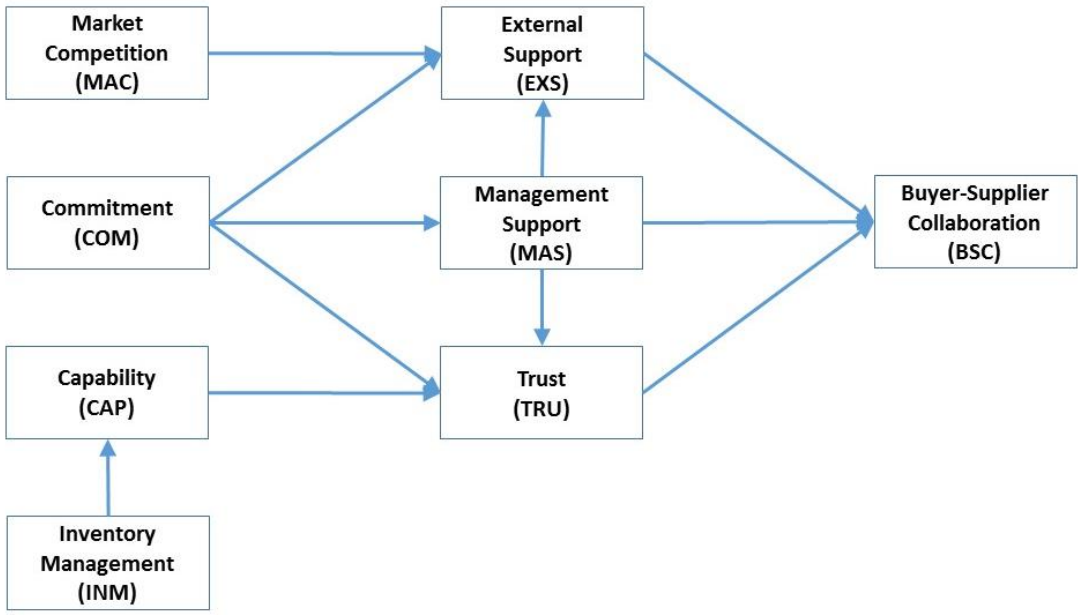

Figure 2.3 Conceptual Framework

CHAPTER 3

QUALITATIVE RESEARCH: METHODOLOGY AND RESULTS

3.1 Introduction

The main objectives of this study were to find out the typical characteristic of buyer-supplier collaboration and its factors in Thai public and private hospitals. This chapter presents an overview of the methodological perspective of the research. It describes the research design based on the research questions and the conceptual framework shown in the previous chapter and presents the strategy of the research methodology.

This chapter describes the methodology and results of the qualitative research based on the in-depth interviews with hospital executives involved in the procurement process of public and private hospitals operating in Thailand. The overall results showed that inventory management, capability, commitment, market competition, management support, external support, and trust significantly affected buyer-supplier collaboration. Finally, the summary of finding is presented in this chapter and linked to the next chapter (chapter 4 quantitative research: methodology and results).

3.2 Research Design

In this study, the researcher employed the exploratory sequential method for the research design, beginning with the qualitative research technique and then followed by the quantitative research technique (see next chapter) in order to gather the necessary information that would be used to answer the research questions. This study was carefully conducted by collecting the quantitative and qualitative data sequentially, which means that both qualitative and quantitative data collection techniques and analysis procedures were used in a sequential period of time.

For this study, the qualitative research methodology was very important. Only quantitative data could provide the pattern and level of relationship among the variables, and the results might due to particular circumstances. The results of the qualitative data analysis helped to explain the phenomena of the results and enhanced the concepts and conclusion of the results. The qualitative methodology consisted of the data collection by using a semi-structured interview technique with hospital executives (as a role of buyer) of Thai public and private hospitals in order to study the phenomenon and to apply the collected data to describing and confirming the quantitative results. The principles and concepts were used to study the empirical phenomena according to the qualitative research approach for strengthening the research findings, results, conclusion, and discussion. Using the in-depth interview technique, the data were collected from a sample of hospitals by face-to-face and telephone interview.

3.3 Population and Sample Selection

The purposive sampling method was used in this study. The key informants in the qualitative research were hospital executives that were involved in the procurement process such as director, head of division, department manager, supervisor, or other management team members, etc.

The criteria used for selecting the key informants were that they were one of the hospital executives or top management team members or employees that were willing to answer the questions, willing to share their opinions, were involved in the hospital procurement process and had direct experience coordinating or working with suppliers. Moreover, for obtaining more important information, the snowball sampling technique was also used in this study where existing study subjects recruit further subjects from among their supervisors, peers, and subordinates. Eventually, the researcher interviewed twenty-four executives from twelve public hospitals and twenty-four executives from eleven private hospitals. In total there were forty-eight key informants that participated in this study. A list of hospitals and key informants from the twenty-three public and private hospitals is provided in appendix A.

3.4 Data Collection

In the time period of August 2015 to February 2016, the researcher collected the data from the key informants working in different hospital areas, such as kind of hospital, level of care, size of hospital, service year and hospital accreditation. For the in-depth interviews, both face-to-face interviews and telephone interviews were conducted in order to collect the data by using the semi-structured interview technique aligned with the conceptual framework in the context of Thai public and private hospitals. Before any interview session, an appointment was made by sending an in-depth interview requisition letter to the hospital director or hospital management team members.

The semi-structured interview was also adopted to collect the data. The structure of the questions was adapted from the quantitative research according to the level of BSC and its variables. The interview objectives were to find out the in-depth meaning of the buyer's opinions related to policy planning, implementation, application, human resource, and the organization's development. There were eight main topics for the interview, which were buyer-supplier collaboration, external support, market competition, commitment, management support, inventory management, capability, and trust.

The collected data would help describe the relations and the direct and indirect effects of these seven main factors on BSC in Thai public and private hospitals. The interviews took place according to the time constraints of each key informant. The face-to-face interviews were mainly conducted at hospitals located in Bangkok and nearby provinces where the researcher had a good relationship with the hospital management team members and/or key informants and as able to get very good cooperation at each hospital. In addition, telephone interviews were mainly conducted for hospitals located outside Bangkok. Most key informants were available for a telephone interview and the rest were available for face-to-face interview, which took approximately 40 to 60 minutes. The conversations were recorded by digital voice recorder and/or mobile phone, if the key informant allowed it. Very good support given by the hospital director and hospital management team members and very good cooperation given by every key informant helped the interview sessions go well.

3.5 Research Instrument

Regarding the in-depth interviewing tool used in this study, the semi-structured interview technique was used as per the following questions:

1) Has the hospital collaborated with suppliers so far? How? Please explain.

2) What factor do you think affects buyer-supplier collaboration? How? Please explain.

3) What factor do you think affects external support? How? Please explain.

4) What factor do you think affects management support? How? Please explain.

5) What factor do you think affects trust? How? Please explain.

6) What factor do you think affects capability? How? Please explain.

7) What factor do you think affects commitment? How? Please explain.

8) What factor do you think affects market competition? How? Please explain.

9) What factor do you think affects inventory management? How? Please explain.

3.6 Data Analysis

There were 3 main processes for the qualitative data analysis, which were: 1) data organizing, 2) data display, and 3) data conclusion, interpretation, and verification (Miles & Huberman, 1994). Once the interviews with each key informant were completed, the recorded conversation was written down and organized into categories. The translation of the conversations was then completed and inductive reasoning was concluded. The detail of each main process is shown as follows.

1) Data organizing: This was a process of organizing the collected data into two aspects: 1) the physical aspect: most of them happened during the data collection period such as data recording, data editing, data conclusion and data

storage; and 2) the content aspect: this was to find out the meaning of each sentence in the collected data in order to make the data categorization and data coding easier.

2) Data display: This was a process of presenting the collected data. Most of them were presented in narrative form linked from the categorized data and regrouped according to coded data. The key informants' original words, sentences, or their own quotations were mentioned and referred to in order to confirm the source of the raw data, to highlight the raw data's importance and interest, and to express the key informants' feelings and opinions (Creswell, 2009).

3) Conclusion, interpretation, and verification: This was a process to find out the conclusion, and the interpretation and then to test whether such conclusions and interpretations were valid or not.

The researcher used the triangulation technique to examine the validation and reliability of the raw data (Supang Chantavanich, 2003). Triangulation was conducted to collect the raw data and to gather the information by using two methods, in-depth interviews and focus group discussion. Data triangulation was also used by considering the different sources of raw data, including places which are public and private hospitals, and the key informants that were hospital executives, and these were compared as to whether the collected data were the same or different. From the in-depth interviews, the raw data collected with senior management, who were directors, were compared to the raw data collected from the head of the department, managers, and supervisors. This was to indicate the consistency and linkage between the evidence and the data responding to the research questions collected from the data analysis concerning whether they were reasonable and acceptable or not.

3.7 Findings and Results

3.7.1 Buyer-supplier Collaboration

The preliminary results showed that the BSC was quite important for both the hospital and supplier in working together. They were gathered from several interview sessions. The details are shown as follows.

3.7.1.1 Information Sharing

When the key informants explained their collaboration, they often focused on the useful information shared between their team and suppliers in day-to-day operations. This can be captured from the interview data at Lerdsin Hospital in the following passage:

> In these days, it is not only our suppliers share their useful information, knowledge and experience with our team, but our team also provide them the advice and recommendation gained from our team's experience such as best practices in operating room, hospital infection control, and sterilization process etc. I think that these advice and recommendation will be useful for them to apply with other hospitals as well. (Head of Operating Room Department, Lerdsin Hospital, personal communication, September 21, 2015).

In addition, the head of the rehabilitation department of Udonthani Hospital also described information sharing in the same way as in following passage:

> Information sharing between suppliers and our hospital team is quite important for our hospital management. In these day, it is very necessary to use lots of information coming back and forth. Many time we requested our suppliers to provide the useful and update information. On the other hand, we also provided their required information. (Head of Rehabilitation Department, Udonthani Hospital, personal communication, September 26, 2015).

This can also be noted from the interview data of and senior pharmacist at Ramathibodi Hospital as in the following passage:

> Whenever there is a new medicine introduced, acquired or purchased into the hospital, pharmacy department team will contact to the sale representatives of the particular supplier to provide the useful information in advance. Moreover, we also request them to arrange the product knowledge training session in the hospital for all concerned person including doctors, nurses, and pharmacists.

> On the other hand, the hospital provides the information to the suppliers when they request as well. (Senior Pharmacist, Ramathibodi Hospital, personal communication, September 30, 2015).

In the same way, this can be gathered from the telephone interview data of the supervisor of procurement and senior officer of procurement at Ban Paew Hospital as in the following passage;

> It is quite sure that the hospital procurement team have to coordinate with their suppliers in order to give and take all useful information related to each particular product and service, especially for their attribute, cost, quality and warranty. (Supervisor of Procurement, Ban Paew Hospital, personal communication, October 19, 2015)
>
> As a hospital buyer, I have to cooperate and work together with every suppliers for getting all related information about the hospital's required product and service including cost, benefit and application. Moreover, I have to negotiate with the suppliers to get the better deal and share the supplier's requested information as well. (Senior Officer of Procurement, Ban Paew Hospital, personal communication, October 19, 2015).

3.7.1.2 Resource Sharing

In the interview session about BSC, resource sharing was one of the most frequent topics mentioned by the key informants, as some key informants stated in the following:

> Many times so far, we faced with our serious equipment breakdown issues and we cannot fix them by ourselves on time, then we urgently asked help from our suppliers. They intentionally coordinated and tried to help us installing their spare equipment at our hospital in the shorten period of time which it could very much reduce the negative impact to our patient's treatment. (Radiology and Medical Device Department Manager, Praram 9 Hospital, personal communication, October 3, 2015).

The assistant director of procurement of the World Medical Center Hospital also stated about resource sharing the following:

> Many times, our suppliers shared their owned manpower and equipment with the hospital in order to ensure that we will always have enough capacity to handle unexpected peak load of work. For example, before the hospital will be able to issue the purchase order of new unit of high capacity sterilizer, one of the suppliers noticed and realized that the hospital has not enough capacity to handle a huge workload in certain period of time, so they quickly installed one new unit at the hospital. During the pre-installation, they also supported the hospital by sharing their capacity and using the sterilizers installed at their service providers. (Assistant Director of Procurement, World Medical Center Hospital, personal communication, September 27, 2015).

3.7.1.3 Collaborative Communication

Moreover, collaborative communication was often noticed from the discussions with several key informants. According to the interview data, the deputy director of Lerdsin Hospital stated the following:

> Apart of good product and service quality provided by supplier, the good coordination and open communication between our procurement team and sale representatives are quite important to work together. We could realize these from their greeting, conversation, presentation and body language. (Deputy Director for Hospital Administration, Lerdsin Hospital, personal communication, September 21, 2015).

According to the interview data, the head of pharmacy of Lerdsin Hospital also stated the following:

> With our good relationship built with suppliers, normally they will sincerely communicate and notice us in advance in any changes or difficult situation like product shortage, product quality and delivery problems. This will help us

> well manage the changes and prepare the solutions in advance to reduce the impact of those problems. (Head of Pharmacy Department, Lerdsin Hospital, personal communication, September 21, 2015).

3.7.1.4 Joint Activity

Joint activity was also one of the key categories mentioned by many key informants. As per the interview data, the deputy director of Lerdsin Hospital stated the following:

> There were many joint activities coordinated with supplier so far, for example, new medical device demonstration, free sample of medicine and medical supply testing, product knowledge training and seminar etc. Driven by supplier's sale representatives, such a good relationship built from these joint activities. (Deputy Director for Hospital Administration, Lerdsin Hospital, personal communication, September 21, 2015).

This can also be noted from the interview data from the head of the medicine storage room at Bhumibol Hospital in the following passage:

> We used to jointly arrange several in-hospital training courses related to pharmaceutical management issues and product knowledge with our good-relation suppliers. Moreover, they sometimes sponsored our team and other hospitals to attend both Thailand and international academic conference, symposium, seminar and workshop as well. There were lots of useful activities we worked together. (Head of Medicine Storage Room, Bhumibol Hospital, personal communication, September 24, 2015).

Assistant director of procurement of World Medical Center Hospital also discussed the joint activities with suppliers as follows:

> If any supplier has not enough potentiality to develop or improve together with the hospital, it will be difficult to prolong the business with the hospital. In the near future, the hospital will has many projects to be jointly planned

> and developed with potential suppliers, such as purchase order submission via Electronic Data Interchange system, E-Auction system, E-payment system, customized medical supply product, etc. (Assistant Director of Procurement, World Medical Center Hospital, personal communication, September 27, 2015).

This was also noted from the interview data from the deputy director of operations and assistant director of operations at Theptarin Hospital as in the following passage:

> Theptarin Hospital team have jointly worked together with our key suppliers, such as Diethelm and Zuellig Pharma, to develop and implement the system called “E-procurement” in order to not only reduce work process and human error but also increase our operations efficiency in medicine and medical supply procurement process. (Deputy Director of Operations, Theptarin Hospital, personal communication, October 5, 2015).
>
> So far, Theptarin Hospital team have jointly arranged the on-site seminar with many pharmaceutical suppliers in the topic of the new technology and new knowledge in medicine and medical related products. They helped to invite the guest speaker and also provided the well-trained instructors to answer the questions from our medical staffs about how to properly use the medicine in the hospital. (Assistant Director of Operations, Theptarin Hospital, personal communication, October 13, 2015).

3.7.1.5 Goal Congruence

Last, goal congruence is an important point of BSC. According to the hospital interview session data, the hospital department manager of Chulalongkorn Hospital mentioned goal congruence as follows:

> Now in these days, multidisciplinary cooperation between suppliers and the hospital is more and more significant. If we want to achieve the target, we cannot set it alone without the collaboration with our good-relation suppliers anymore. The congruent goals and mutual benefits are the key topics that we need to align, commit and establish them together. (Central Logistics

> Department Manager, Chulalongkorn Hospital, personal communication, September 26, 2015).

The radiology and medical device department manager of Praram 9 Hospital discussed goal congruence with suppliers as follows:

> Trading agreement has been changed a lot over the period of time. One of the key reasons is the goal congruence between supplier and the hospital. For example, Intravenous infusion set procurement, the hospital had to purchase both of the infusion pump (as an asset of the hospital) and the intravenous infusion set (as an operation expense of the hospital) in the past. Once the hospital discussed, negotiated and aligned the goals together with key suppliers, then both of them could finalized and agreed on the better trading agreement and more mutual benefits. (Radiology and Medical Device Department Manager, Praram 9 Hospital, personal communication, October 3, 2015).

The face-to-face interview data gathered from the medical supply procurement department manager of Bangkok General Hospital also emphasized the same point as in the following passage:

> The hospital procurement team definitely had the collaboration with the supplier in many aspects, especially for setting the goal together. Both of us agreed on providing high standard quality of product and service at reasonable cost, delivering on time and complete quantity in good condition, committing in the purchasing volume, fulfilling any requirement in urgent situation and reducing the delivery lead time. (Medical Supply Procurement Department Manager, Bangkok General Hospital, personal communication, October 5, 2015).

3.7.2 Inventory Management

The preliminary results showed that inventory management was quite an important factor for both the hospital and supplier. This was noticed in much of the

interview data. In the interview session with the assistant director for procurement of World Medical Center Hospital, she intentionally mentioned inventory management as follows:

> In recent years, the hospital implemented electronic data interchange (EDI) technology with our key suppliers which is very useful tools for both procurement operations and inventory management process. Using EDI technology help us reduces the product ordering lead time, ensure the purchase order submission, increase the accuracy of product delivery and then reduce the hospital's inventory day on hand eventually. (Assistant Director for Procurement, World Medical Center Hospital, personal communication, September 27, 2015).

3.7.3 Capability

The preliminary results showed that capability was quite an important factor for the hospital. This was noticed in much of the interview data. In the face-to-face interview session at Lerdsin Hospital, the deputy director talked about capability as follows:

> Our team's capability does not developed by reading text books only, but also by attending the useful training course, practicing the day-to-day work and solving the immediate problem together. As a buyer, it is very necessary that our procurement team have to quite understand the user's requirement and also have well-trained product knowledge to make a best deal with the supplier. (Deputy Director for Hospital Administration, Lerdsin Hospital, personal communication, September 21, 2015).

In addition, the central logistics department manager of Chulalongkorn Hospital also mentioned capability in the interview session as follows:

> When we are thinking about the capability of the hospital procurement team, it is not only to know the detail of the quotation, purchase requisition, after-sale

> service, warranty period or product specification stated on the document but it also is to know the detail of user's requirement, and product's utilization. In addition, the total cost of ownership evaluation and the supplier selection are also significant for the procurement process. (Central Logistics Department Manager, Chulalongkorn Hospital, personal communication, September 26, 2015).

The assistant director for procurement of World Medical Center Hospital also discussed the capability of the procurement team as follows:

> If buyers have only experiences in general product or service procurement, I think they have not enough capability to manage medicine or medical supply procurement yet. They need to be trained for product knowledge intensively. This kind of procurement has to be handled by specialists who had specific product knowledge or experiences using these groups of product in the past. In our procurement team, we had both of well-trained pharmacists and experienced registered nurses who currently manage medicine and medical supply procurement processes. (Assistant Director of Procurement, World Medical Center Hospital, personal communication, September 27, 2015).

According to the telephone interview data, the procurement team's capability was mentioned by the head of the rehabilitation department of Udonthani Hospital as follows:

> The capability and experience of our team have been continuously built and developed over the time. Knowing the foreseen problem, possible root cause, designed solutions and expected deliverables are basic competencies we needed. (Head of Rehabilitation Department, Udonthani Hospital, personal communication, September 26, 2015).

This was also noted from the interview data from the head of the medicine storage room at Bhumibol Hospital as in the following passage:

> As a buyer role of the hospital, our pharmacy team are not only have enough clinical pharmacy knowledge and capability for running our daily operations but we also had lots of experience and elaboration working with pharmacy management work for many years. (Head of Medicine Storage Room, Bhumibol Hospital, personal communication, September 24, 2015).

In addition, the head of the OPD medicine department, Kumphawapi Hospital also mentioned capability in the interview session as follows:

> Nowadays, Kumphawapi hospital needs to purchase more and more volumes of new medicine, medical supply and medical device in order to provide better healthcare services to our patients. It is very necessary that our buying team has to have enough capability in understanding such new product knowledge as well as its application. That is why our team capability has to be continuously developed over the time. (Head of OPD Medicine Department, Kumphawapi Hospital, personal communication, October 3, 2015).

3.7.4 Commitment

The preliminary results gathered from many interview sessions showed that commitment had a significant impact on BSC. Some of the key informants mentioned about commitment during many interview sessions as follows:

> Any suppliers who worked with our hospital for some time. Some of them will start to understand our working style and try to help anything as per our requests. Then commitment between each other will be gradually increased. (Head of Rehabilitation Department, Udonthani Hospital, personal communication, September 26, 2015).

In addition, the head of the OPD medicine department, Kumphawapi Hospital also mentioned commitment in the interview session as in the following:

> Most of our suppliers have frequently visited us in order to not only help us manage the pharmaceutical and medical supply stock level but also help us solve the out of stock situation. They always pay attention on our requirements. This is the way they presented their commitment to their customers, like us. (Head of the OPD Medicine Department, Kumphawapi Hospital, personal communication, October 3, 2015).

The commitment between the buyer and supplier according to the interview data from the assistant director of operations at Theptarin Hospital can be seen in the following passage:

> The commitment and integrity for both of buyer and supplier are very important in these days. They have to be sincere and commit to each other. Importantly, they should not exploit or take too much advantage of the mutual benefits from other party. (Assistant Director of Operations, Theptarin Hospital, personal communication, October 5, 2015).

3.7.5 Market Competition

The preliminary results gathered from many of the interview sessions showed that market competition had a significant impact on BSC. Some of the key informants mentioned market competition during many interview sessions as follows:

> The change in economic situations has quite less influenced or pressured to the public hospital. For our hospital located in Udonthani province, most of the influence and pressure frequently occurred from government organizations, nearby communities and patients. (Head of Rehabilitation Department, Udonthani Hospital, personal communication, September 26, 2015).

In addition, this can be noted from the interview data from the central logistics department manager at Chulalongkorn Hospital as in the following passage:

> In the hospital policy and strategic plan review, I thought that the hospital has to periodically analyze and evaluate any change, influence or pressure impacted to the hospital management and operations. Moreover, the hospital management also have to make a decision on how to cope with the situation in order to minimize the negative results impacted to both hospital employees and other stakeholders. (Central Logistics Department Manager, Chulalongkorn Hospital, personal communication, September 26, 2015).

This can also be gathered from the interview data with the senior pharmacist at Ramathibodi Hospital as in the following passage:

> I think that whenever the market competition is on high level, the hospital will get more benefits, for example; the hospital will have more alternative supplier choices to negotiate, select and validate in order to maximize the advantages. Moreover, the hospital will also have more alternative product and service choices to compare and select in order to getting the better solutions. (Senior Pharmacist, Ramathibodi Hospital, personal communication, September 30, 2015).

3.7.6 Management Support

Management support is normally presented to the employee in many ways that are different approach depended on different situation. Some of the key informants addressed this point as follows:

> Whenever we fall into trouble, our top management team always help and support us by seeking for the solution and making the useful suggestion. (Head of Procurement Department, Lerdsin Hospital, personal communication, September 21, 2015).

This was noticed from the interview data from the central logistics department manager at Chulalongkorn Hospital as in the following passage:

> If the leader or the management team members of the hospital have a clear direction, give a constructive advice and make a decision on time, these will help us solving the problem and managing the operations more productively and effectively. (Central Logistics Department Manager, Chulalongkorn Hospital, personal communication, September 26, 2015).

In addition, this can be gathered from the interview data with the senior pharmacist at Ramathibodi Hospital as in the following passage:

> I think that the hospital management support is very crucial for our daily operations. Hospital management team members are the ones who formulate the working policies, set the action plans, monitor the key performance indicator targets and make the decisions for all departments including our pharmacy department as well. (Senior Pharmacist, Ramathibodi Hospital, personal communication, September 30, 2015).

3.7.7 External Support

Normally, external support occurred in several ways subject to both non-financial and financial matters. Some of the key informants mentioned non-financial support as follows:

> We do need to have the supports from other organizations to educate our hospital employee to have up-to-date knowledge and information in the market. The support may occur in many different approaches, such as new product knowledge training courses, new technology demonstration, academic research sharing and site visiting activity, including in-hospital CSR activities. (Head of Pharmacy Department, Udonthani Hospital, personal communication, September 26, 2015).

This can also be noted from the interview data from the head of the rehabilitation department at Udonthani Hospital as in the following passage:

> Regarding regulations of the Office of the Prime Minister on Procurement B.E.2535, our hospital received the supports given by Udonthani Provincial Health Office and nearby Medical Center to educate and train our procurement personnel in order to have clear understanding and more knowledge on budgeting, sourcing, purchasing, inventory management, controlling and write-off processes. (Head of Rehabilitation Department, Udonthani Hospital, personal communication, September 26, 2015).

In addition, the central logistics department manager of Chulalongkorn Hospital also mentioned external support in the interview session as follows:

> I would like to mention about one of community hospital located in Chumphon province, called Sawee Hospital. This is one of very good example for the external supports given by two public organization which are The Healthcare Accreditation Institute (public organization) and Healthcare Supply Chain Excellence Centre of Mahidol University. With the intention and dedication of hospital management team members and employees in two years period of time, this small public hospital has improved a lot in term of procurement process, pharmaceutical traceability, in-hospital logistics and supply chain management. Recently, this hospital was just recognized the honorable mention award in 17th Hospital Accreditation National Forum. (Central Logistics Department Manager, Chulalongkorn Hospital, personal communication, September 26, 2015).

This can also be noticed from the interview data from the head of the medicine storage room at Bhumibol Hospital as in the following passage:

> Like management consultancy and quality assessment activities, if those external supports are not prohibit to any regulation or our hospital's policy and procedure, we are willing to admit them. In the past, there were many activities supported by both public and private organizations, such as The Healthcare Accreditation Institute (Public Organization), Department of

> Medical Science-Ministry of Public Health, Healthcare Supply Chain Excellence Centre of Mahidol University and other private hospitals. Our daily operations and in-hospital activities have been observed and assessed periodically. After that, they always provided many useful suggestions for improvement. (Head of Medicine Storage Room, Bhumibol Hospital, personal communication, September 24, 2015).

In addition, this can be gathered from the interview data with the senior pharmacist at Ramathibodi Hospital as per the following passage:

> I think that the hospital have significantly gained lots of supports and benefits given by external organizations such as NGOs, Universities, other hospitals, public and private organizations. So far, these external supports provided in many types such as product knowledge, opinions, experiences, useful information, reference sites and other resources sharing. The benefits will then occurred to the hospital whenever we utilize them to negotiate with suppliers to get the better deal and whenever we apply them into our day-to-day operations to achieve the better results and productivity. (Senior Pharmacist, Ramathibodi Hospital, personal communication, September 30, 2015).

External support also occurred in many ways subject to financial matters. Some of the key informants mentioned this as follows:

> Many years ago, our department used to submit the hospital pharmacy management improvement project proposal and receive allocated budget given by The Government Pharmaceutical Organization (GPO). With our team's efforts, this improvement project was completely accomplished on time. (Head of Pharmacy Department, Lerdsin Hospital, personal communication, September 21, 2015).

This was also gathered from the interview data from the head of the rehabilitation department at Namsom Hospital as in the following passage:

> So far Namsom Hospital received the supported budget allocated by National Health Security Office (NHSO) for sourcing and purchasing the necessary resources such as medicine, medical supplies and medical devices in order to raise healthcare service level to our patients and nearby community. Moreover, our hospital also got help given by nearby public and private hospitals in borrowing the out-of-stock medicine and medical supplies. Without this kind of support, our patients may not be treated on tine. (Head of Rehabilitation Department, Namsom Hospital, personal communication, September 27, 2015).

The external support given by the nearby hospitals was noted in the interview data from the assistant director of operations at Theptarin Hospital as in the following passage:

> Theptarin Hospital had built good relationship with the nearby hospitals. We also had informal agreement to borrow some stock of high value and low usage medicine and medical between each other. Without these supports given by them, we have to acquire the stock and keep it at our storage room. Sometime we keep it until it expired or damaged eventually. This kind of external support help both of us significantly reduces the cost of expired and damaged stock. (Assistant Director of Operations, Theptarin Hospital, personal communication, October 13, 2015).

3.7.8 Trust

Trust does not just happen and is not just built in a short period of time, and many key informants mentioned this point as follows:

> Basically, any supplier which would like to have a business with our hospital has to pass the supplier selection criteria. It does not mean that we will trust them since the first day. It took them quite some time to prove themselves until we trust them. (Head of Procurement Department, Lerdsin Hospital, personal communication, September 21, 2015).

The radiology and medical device department manager of Praram 9 hospital also stated the following:

> It is definitely sure that our commitment is presented to our trusted suppliers only. They had to have good historical relationship, good after sale services, good quality product delivery, getting to know each other, willing to solve the problem, sincerely frequent visit our team and so on. (Radiology and Medical Device Department Manager, Praram 9 Hospital, personal communication, October 3, 2015).

In addition, the head of the OPD medicine department at Kumphawapi Hospital also mentioned trust in the interview session as follows:

> When I think of trust building between supplier and our hospital, there were many factors and reasons why we trust them. Firstly, it is a good product quality at reasonable cost. Secondly, it is a great after-sale service with always on time delivery. Finally, it is a knowledge and update information sharing constantly. All of them have to be continuously provided over the time. (Head of OPD Medicine Department, Kumphawapi Hospital, personal communication, October 3, 2015)

This was noted from the interview data from the head of the pharmacy department at Lerdsin Hospital as in the following passage:

> Trust between supplier and our team could slowly be increased step by step over the time. Suppliers who we trusted had to continuously deliver the good quality products and service on time. (Head of Pharmacy Department, Lerdsin Hospital, personal communication, September 21, 2015)

In addition, the head of the operating room department of Lerdsin Hospital also mentioned the same as follows:

> It is quite important that we actually trust the suppliers who have dedicated sale representative to always deliver the good before and after sale services. In the other hand, we will gradually reduce our trust level to any suppliers who often change their sale representative. (Head of Operating Room Department, Lerdsin Hospital, personal communication, September 21, 2015)

The assistant director of procurement of the World Medical Center Hospital also discussed trust as follows:

> When we consider whether we will trust any new supplier or not, we actually start to review its company's profile, salesperson and then product and service quality. (Assistant Director of Procurement, World Medical Center Hospital, personal communication, September 27, 2015).

Moreover, the head of the rehabilitation department of Udonthani Hospital also explained trust in the same way as follows:

> Regarding the trust built with our suppliers, the good personality of their sale representatives is quite significant. Polite, diligence, honest, caring, well-trained, experienced and informative salesperson and coordinators are those ones who we trusted. (Head of Rehabilitation Department, Udonthani Hospital, personal communication, September 26, 2015).

This was also noted from the interview data from the assistant director of operations at Theptarin Hospital as in the following passage:

> For supplier's trust, firstly I will focus on the product quality. If suppliers sell inconsistent or low quality products to us, we will immediately stop to purchase them. Secondly I will then focus on the after-sale service and finally I will focus on the willingness on problem solving. If we can find any other alternative suppliers, we may switch to place the order to the better ones. (Assistant Director of Operations, Theptarin Hospital, personal communication, October 13, 2015).

The face-to-face interview data gathered from the medical supply procurement department manager and laboratory department manager of Bangkok General Hospital also emphasized the same point as in the following passage:

> If buyer and supplier do not have any trust between each other, the relationship among them will occasionally be existed for short period of time and be able to fulfill some specific requirement in sometime or some situation only. (Medical Supply Procurement Department Manager, Bangkok General Hospital, personal communication, October 5, 2015).
>
> If suppliers do not improve their services or do not develop their products to be efficient, modern and up-to-date, these factors may create a negative impact to the trust which also impacts to the purchasing contract renewal. Because the hospital team always look for the new feature, attribute and technology which can help us work more productively and effectively. (Laboratory Department Manager, Bangkok General Hospital, personal communication, October 4, 2015).

3.7.9 Relationships between Variables

3.7.9.1 Relationship between Inventory Management and Buyer-supplier Collaboration

The preliminary results gathered from many of the interview sessions showed that inventory management had a significant impact on BSC. Some of the key informants mentioned this relationship during many interview sessions as follows:

> Information sharing between hospital procurement and inventory management team and key suppliers helped hospital a lot in term of inventory day on-hand reduction, for example, the ordering lead time was significantly reduced once hospital started to utilize Electronic Data Interchange technology provided by key suppliers many years ago, as a result, the inventory level and its holding cost were obviously decreased so far. (Inventory Management Department Manager, Samitivej Sriracha Hospital, personal communication, September 15, 2015).

In addition, the head of pharmacy at Lerdsin Hospital also described this relationship in the same way as in following passage:

> Regarding good collaboration with our suppliers, we could receive an urgent medicine, like life-saving and vital drugs, in shorten period of time. This can help us reduce the percentage of stock out to patience as well. Sometime, we faced with medicine's out of stock problem, our supplier helped us to coordinate for borrowing such shortage medicine from other nearby hospitals and delivering it to our hospital on time which we are very appreciated it. (Head of Pharmacy Department, Lerdsin Hospital, personal communication, September 21, 2015).

This was also noted in the interview data from the assistant director of operations at Theptarin Hospital as in the following passage:

> Even through Theptarin Hospital has well prepared the suitable stock level of both medicine and medical supply to treat our patients, if our suppliers did not share the update information about their supply limitations or out of stock possibility, the hospital still faces with running out of stock to patient problem. This will definitely create a negative impact to patient treatment efficiency. Sometime, our suppliers had to borrow such stock from other nearby hospitals for us. (Assistant Director for Operations, Theptarin Hospital, personal communication, October 13, 2015).

In the same way, the telephone interview data summarized from the senior manager of operating room, senior manager of business process improvement and innovation, manager of procurement and capital expenditure, and supervisor of medical supply store at Bumrungrad International Hospital also emphasized the same point as in the following passage:

> The collaboration between the hospital team and the supplier team is very important. So far, the hospital team had to consider whether the hospital

should directly purchase the medical devices from the supplier to keep in the hospital stock or make the consignment contract with the supplier to keep in the supplier stock. However, we still have to closely monitor and work together in order to ensure that the hospital will always have enough stock to provide healthcare services to our patients. (Senior Manager of Operating Room, Bumrungrad International Hospital, personal communication, October 28, 2015).

If hospital inventory management process is not enough effective and efficient, the hospital will actually confront with the over stock or shortage stock situation. And then both of the hospital and the supplier will also be impacted negatively. Thus buyer-supplier collaboration will help both of them minimize these negative impacts and then improve the inventory management productivity and efficiency as well. (Senior Manager of Business Process Improvement and Innovation, Bumrungrad International Hospital, personal communication, October 27, 2015).

Hospital inventory management will not be well enough if there is no the good relationship built and collaboration established by both of the hospital buyers and suppliers, especially in the short product supply situation. (Manager of Procurement, Capital Expenditure and Service, Bumrungrad International Hospital, personal communication, October 16, 2015).

If the hospital inventory is not well managed, the hospital may not have adequate stock to consume as planned which caused of out-of-stock problem. On the other hand, the hospital may have over stock to consume as planned which caused of expired and damage stock problem. This will also impact to the supplier. So buyer and supplier have to find the way to collaboratively plan and cooperate in order to prevent these kinds of problems in advance. (Supervisor of Medical Supply Store, Bumrungrad International Hospital, personal communication, October 29, 2015).

3.7.9.2 Relationship between Capability and Buyer-supplier Collaboration

The preliminary results gathered from many of the interview sessions showed that capability had a significant impact on BSC. The radiology and medical device department manager of Praram 9 Hospital also characterized this relationship as follows:

> I think that this relationship is quite interested. If our procurement team had enough capability, negotiation skill, interpersonal skill, working experience, product knowledge, supplier information, and so on, BSC will be eventually established and enhanced together in the shorten period of time. (Radiology and Medical Device Department Manager, Praram 9 Hospital, personal communication, October 3, 2015).

In addition, the head of the OPD medicine department, Kumphawapi Hospital also mentioned this relationship in the interview session as in the following:

> I think that buyer's capability is quite significant to Buyer-Supplier Collaboration. If buyer has no capability to work, coordinate and negotiate with suppliers, the collaboration will definitely be difficult to build in the shorten period of time. On the opposite side, if buyer had enough capability, the collaboration will be quickly established and enhanced. (Head of OPD Medicine Department, Kumphawapi Hospital, personal communication, October 3, 2015).

This was also noted from the interview data from the deputy director of operations and assistant director of operations at Theptarin Hospital as in the following passage:

> I think that our buying team's capability sometime impacts to Buyer-Supplier Collaboration. If buyer does not have enough capability or ignore daily work improvement, the collaboration among buyer and supplier will not be occurred and developed. (Deputy Director of Operations, Theptarin Hospital, personal communication, October 5, 2015).
>
> I think buyer's capability definitely impacts to the level of collaboration. Buyers who have high level of procurement capability will normally have well providence and negotiation skill. So they mostly obtained the supports and gained the collaboration from suppliers more than the ones who have low level of procurement capability, especially in the short supply period of high demanded medicine and medical supply. (Assistant Director of Operations, Theptarin Hospital, personal communication, October 13, 2015).

3.7.9.3 Relationship between Capability and Inventory Management

The preliminary results gathered from many of the interview sessions showed that capability had a significant impact on inventory management. Some of the key informants mentioned this relationship during many interview sessions as follows:

> In order to comply with regulations of the office of the Prime Minister on Procurement B.E.2535, our department had to have the clear knowledge and understating about the procurement and inventory management processes. They are the good framework and useful guidelines for us to follow in our operations, and then achieve better medicine inventory management's KPI eventually. (Head of Pharmacy Department, Udonthani Hospital, personal communication, September 26, 2015).

In addition, the central logistics department manager of Chulalongkorn Hospital also mentioned this relationship in the interview session as in the following:

> For improving procurement and inventory management process in the hospital, team capability is the heart of this matter. It will be very difficult to develop or enhance anything if such team have not enough capability. On the other hand, the experienced, knowledgeable and capable team will continuously improve their day-to-day operations by themselves. (Central Logistics Department Manager, Chulalongkorn Hospital, personal communication, September 26, 2015).

3.7.9.4 Relationship between Commitment and Buyer-supplier Collaboration

The preliminary results gathered from many of the interview sessions showed that commitment has a significant impact on BSC. Some of the key informants mentioned this relationship during many of the interview sessions as follows:

> I agreed on this relationship. Supplier's after sale service and commitment presented to the hospital over the past are very important factors for our team in considering whether we should collaboratively working together with this particular supplier or not. (Radiology and Medical Device Department manager, Praram 9 Hospital, personal communication, October 3, 2015).

3.7.9.5 Relationship between Commitment and Capability

The preliminary results gathered from many of the interview sessions demonstrated that commitment had a significant impact on capability. Some of the key informants mentioned this relationship during many of the interview sessions as follows:

> Nowadays, multidisciplinary cooperation between supplier and us is more and more important. Even through our procurement team will have enough capability to do our daily tasks, we still need to have commitment with our suppliers. Because they normally have more up-to-date data, more evidence-based information and sophisticated technology in the market that help us a lot to have more efficiency and effectiveness in managing our operations and benchmarking the best practices with other hospitals. (Central Logistics Department Manager, Chulalongkorn Hospital, personal communication, September 26, 2015).

3.7.9.6 Relationship between Market Competition and Inventory Management

The preliminary results gathered from many of the interview sessions showed that market competition had a significant impact on inventory management. Some of the key informants mentioned this relationship during many interview sessions as follows:

> In the situation of high level of market competition, its influence will be beneficial factors for hospital's procurement and inventory management. Whenever the economic situation change, suppliers will feel uncomfortable

> and then try to approach the hospital representatives in many ways and more frequent. They will surely come with the useful information and then purpose us the better deal and services in order to compete with their competitors. At least we will receive a lower price with more secured volume of product combining with better after sale service. (Assistant Director of procurement, World Medical Center Hospital, personal communication, September 27, 2015).

In addition, the head of the OPD medicine department at Kumphawapi Hospital also mentioned about this relationship in the interview session as the following;

> Once there were high levels of market competition, normally, many supplier will come to approach us more frequent. This will make us more benefits in getting not only more product comparison information but also getting more attractive product cost because each of them put a lot of effort to win the market. This will also help us more productive and effective in managing our inventory level. (Head of OPD Medicine Department, Kumphawapi Hospital, personal communication, October 3, 2015).

The face-to-face interview data gathered from the director of operations support, manager of medical supply procurement department, and manager of laboratory department of Bangkok General Hospital also emphasize the same point as the following passage;

> Whenever there is high level of market competition, each supplier will try to offer the better promotion to the hospital in order to compete with their competitors, so the hospital will then gain the advantage and obtain more benefit on this situation but it is quite short period of time only. (Director of Operations Support, Bangkok General Hospital, personal communication, September 28, 2015).

In different situation of market competition, both of hospital and supplier will also have different direction and decision depended on their owned limitations and expectations. For example, when any suppliers confront with high market competition situation, they may change the product and service cost setting direction, this will surely impact to the hospital's purchasing volume, ordering cost and inventory holding cost. Moreover, each supplier also has to seek for the opportunity and take the advantage over its competitors to secure its owned market share by improving its services, increasing speed to market and fulfilling the hospital's needs. (Manager of Medical Supply Procurement Department, Bangkok General Hospital, personal communication, October 5, 2015).

If any new suppliers can introduce the better product quality at attractive cost rather than other existing suppliers, the hospital will definitely consider switching and admitting new ones. Whenever the hospital purchasing team switches to purchase any product or service from the existing suppliers to the new ones, the inventory management will also be impacted. So, this is the key topic which we needs to be aware and informed in advance for proper preparation. (Manager of Laboratory Department, Bangkok General Hospital, personal communication, October 4, 2015).

3.7.9.7 Relationship between Management Support and Inventory Management

The preliminary results gathered from many interview sessions showed that management support had a significant impact on inventory management. Some of the key informants mentioned this relationship during many interview sessions as follows:

Even though there was not clear direction stated on hospital's vision and mission, hospital director and management team always supported the team by providing their useful opinion and constructive suggestion. Apart of KPI setting, they also emphasized on how well we manage the inventory as important part to reduce the overall service cost reduction. (Inventory Management Department Manager, Samitivej Sriracha Hospital, personal communication, September 15, 2015).

In addition, the deputy director of hospital administration at Lerdsin Hospital also mentioned this relationship in the interview session as in the following:

> Our hospital director did not hesitate to support us on information technology development. He always drive us to utilize IT system on procurement and inventory management. (Deputy Director of Hospital Administration, Lerdsin Hospital, personal communication, September 21, 2015).

This relationship can be obtained from the interview data from the head of the medicine storage room at Bhumibol Hospital as in the following passage:

> Hospital director and other hospital management team members always supported our in-hospital pharmacy management activities. They provide us the clear direction on how we should manage the inventory by formulating the policy and setting the key performance indicators for our department including Inventory Day on hand, % Stock availability, % Damage stock and % Stock out to patient. As operation guidelines, these can help us manage our medicine inventory well. (Head of Medicine Storage Room, Bhumibol Hospital, personal communication, September 24, 2015).

In addition, the Head of the OPD medicine department, Kumphawapi Hospital, also mentioned this relationship in the interview session as in the following:

> Our hospital management team always supported and placed importance on our inventory management in order to make sure that our hospital will have suitable stock availability for both medicines and medical supplies to provide the healthcare service to our patients all the time. (Head of OPD Medicine Department, Kumphawapi Hospital, personal communication, October 3, 2015).

The relationship between the support given by the hospital management team and inventory management was noted in the interview data from the deputy director of operations and assistant director of operations at Theptarin Hospital as in the following passage:

> If we got the flexible inventory management policy given by the hospital director and management team, it will be the key positive factor for us to negotiate both of the cost and purchase volume with the key suppliers. This will help us improve a lot in term of inventory holding and purchase order cost reduction, including better storage room management as well. (Deputy Director of Operations, Theptarin Hospital, personal communication, October 5, 2015).
>
> If there is not clear inventory management policy given by hospital management team members, too low level of stock kept in the hospital may lead to out of stock problem and then we do not have enough medicine and medical supply to treat our patients. On the other hand, too high level of stock kept in the hospital may create over stock problem and then cause of high expired and damaged stock. (Assistant Director of operations, Theptarin Hospital, personal communication, October 13, 2015).

This relationship can be gathered from the telephone interview data from the supervisor of costing, supervisor of procurement and senior officer of procurement at Ban Paew Hospital as in the following passage:

> If the hospital management team members do not emphasize and focus on the inventory management of both medicine and medical supply or do not support and provide enough budget, equipment, tool and technology enabling the inventory process control, the hospital may run out-of-stock or face with over-stock problems. (Supervisor of Costing, Ban Paew Hospital, personal communication, October 17, 2015).
>
> The key supports given by hospital director and other hospital management team are to formulate the policy, manage the overall hospital operations, make decision on each situation on time and prepare enough budget for capital and operating expenditures including procurement and inventory management of medicine, medical supply and medical devices. (Supervisor of Procurement, Ban Paew Hospital, personal communication, October 19, 2015).

> If our procurement department receives enough annual budget and supports provided by the hospital management team members, we will be able to plan to purchase enough stock of medicine and medical supply. On the other hand, if our department does not receive enough annual budget, so we cannot purchase enough stock surely. (Senior Officer of Procurement, Ban Paew Hospital, personal communication, October 19, 2015).

3.7.9.8 Relationship between Management Support and Capability

The preliminary results gathered from the interview sessions showed that management support had a significant impact on capability. Some of the key informants mentioned this relationship during many interview sessions as follows:

> It is very crucial that top management team have to understand and realize the importance of the team's capability development, so they will fully support throughout the whole process. (Inventory Management Department Manager, Samitivej Sriracha Hospital, personal communication, September 15, 2015).

The face-to-face interview data gathered from the director of operations support, manager of medical supply procurement department, and manager of laboratory department of Bangkok General Hospital also emphasized the same point as in the following passage:

> Investing in human capital and developing their capabilities are main roles and responsibilities of the hospital director and all management team members. It is very necessary that they will have to provide the full support to continuously increase the hospital employee's skill and competency over the time. (Director of Operations Support, Bangkok General Hospital, personal communication, September 28, 2015).
>
> I think that if the hospital director and management team members do not have clear direction in developing hospital personnel or human resource management policy is not stable and keep changing in every years, these will then impact to hospital employee's capability and performance eventually.

(Manager of Medical Supply Procurement Department, Bangkok General Hospital, personal communication, October 5, 2015).

Hospital management supports definitely have a positive impact to our laboratory team capability, especially for formulating the human resource development policy, preparing enough training budget and allowing us to attend the training courses as planned. (Manager of Laboratory Department, Bangkok General Hospital, personal communication, October 4, 2015).

3.7.9.9 Relationship between External Support and Capability

The results gathered from many interview sessions showed that external support had a significant impact on capability. Some of the key informants mentioned this relationship during many interview sessions as follows:

For enhancing our knowledge, understanding and capability, we have attended many useful training courses and public seminars organized by The Association of Hospital Pharmacy (Thailand), The Pharmacy Council of Thailand, and Healthcare Supply Chain Excellence Centre of Mahidol University. As a membership privilege, some of them were free of charge. (Inventory Management Department Manager, Samitivej Sriracha Hospital, personal communication, September 15, 2015).

This was noted from the interview data from the central logistics department manager at Chulalongkorn Hospital as in the following passage:

It is a good thing that we always had the external parties or independent consultants came to the hospital to assess, evaluate, comment and recommend us to improve our procurement process and in-hospital logistics operations included team’s capability development. These groups of people are the scholars, lecturers, instructors, specialists or consultants who have a freedom to provide the useful suggestions without any organizational culture obstacle, conflict of interest or beneficial barrier. (Central Logistics Department Manager, Chulalongkorn Hospital, personal communication, September 26, 2015).

In addition, the deputy director of hospital administration at Lerdsin Hospital also mentioned the same as follows:

> Our team used to have experiences visiting the facilities of some public hospitals and private companies as well. Apart of site seeing experience, we also gained a lot of procurement management knowledge and technique shared by their professional teams. (Deputy Director of Hospital Administration, Lerdsin Hospital, personal communication, September 21, 2015).

This was also noticed from the interview data from the head of the operating room department at Lerdsin Hospital as in the following passage:

> Apart of capability development by ourselves, so far we always had a good support from other public hospitals such as Siriraj Hospital, Rajavithi Hospital, Central Chest Institute of Thailand, etc. for providing many specialty training courses and sharing their experiences. Without their supports, our team's capability cannot come this far. (Head of Operating Room Department, Lerdsin Hospital, personal communication, September 21, 2015).

Moreover, the head of the procurement department of Lerdsin Hospital also explained this relationship in the same content as follows:

> We normally attended the annual seminar organized by The Commodity Management Association of Thailand (CMAT). There were a lot of new procurement information and knowledge gained from this useful seminar such as product liability law, product sourcing process, contract management and etc. (Head of Procurement Department, Lerdsin Hospital, personal communication, September 21, 2015.

This can also be gathered from the interview data from the head of the medicine storage room at Bhumibol Hospital as in the following passage:

> Most of conference, symposium, workshop and seminar we used to attend so far were mainly focused on medical and academic subjects organized by other public and private organizations. We have got a lot of idea, knowledge and information to improve ourselves and apply into our day-to-day work. (Head of Medicine Storage Room, Bhumibol Hospital, personal communication, September 24, 2015).

In addition, the head of the OPD medicine department, Kumphawapi Hospital, also mentioned this relationship in the interview session as in the following:

> Apart of borrowing the normal saline stock from Udonthani Hospital whenever we faced with the out of stock situation, Udonthani Hospital always supported our team in sharing their knowledge and experiences which are very useful in developing our team's capability. (Head of OPD Medicine Department, Kumphawapi Hospital, personal communication, October 3, 2015).

This can be gathered from the telephone interview data from the supervisor of costing at Ban Paew Hospital as in the following passage:

> If our department team obtain any types of support provided by external organizations such as knowledge sharing, experience sharing, seminar arrangement and other hospital activities, these supports will keep us, as a buyer, having more knowledge and clear understanding on hospital procurement process, applying them on daily inventory management operations and developing our team's capability eventually. (Supervisor of Costing, Ban Paew Hospital, personal communication, October 17, 2015).

3.7.9.10 Relationship between External Support and Commitment

The results gathered from many of the interview sessions showed that external support had a significant impact on commitment. Some of the key informants mentioned this relationship during many interview sessions as follows:

> Some pharmaceutical principals and their distributors allowed our team to visit their distribution center and also observe their operations in order to show their good intention and high commitment in providing the good product and service to us. (Inventory Management Department Manager, Samitivej Sriracha Hospital, personal communication, September 15, 2015).

This was noted from the interview data from the deputy director of hospital administration at Lerdsin Hospital as in the following passage:

> The Department of Medical Service – Ministry of Public Health, helped us in gathering and sharing the useful information for pharmaceutical, medical supply and medical device procurement. This made us having more confidence and commitment to coordinate with such suppliers. (Deputy Director of Hospital Administration, Lerdsin Hospital, personal communication, September 21, 2015).

In addition, the head of the operating room department of Lerdsin Hospital also mentioned the same as follows;

> For price comparison of medical device, we frequently asked help from head of operating room department working at our good-relationship hospitals which used to purchase and use such medical device, like Taksin Hospital, Nopparat Rajathanee Hospital and other hospitals under the supervision of Department of Medical Service, Ministry of Public Health. They did not only provide the useful procurement information but also their valuable opinions related to price negotiation, product warranty period and feedback on the particular supplier's after sale services. As an endorsement, these made us having more commitment to work with the suppliers recommended by our good-relationship hospitals. (Head of Operating Room Department, Lerdsin Hospital, personal communication, September 21, 2015).

3.7.9.11 Relationship between Trust and Commitment

The preliminary results gathered from many of the interview sessions showed that trust had a significant impact on commitment. Some of the key informants mentioned this relationship during many interview sessions as follows:

> Importantly, trust among our procurement team and suppliers has to be built over the time. Once we realized they are our trusted suppliers, so we are comfortable to commit with them. (Deputy Director of Hospital Administration, Lerdsin Hospital, personal communication, September 21, 2015).

This can also be noticed from the interview data from the head of the medicine storage room at Bhumibol Hospital in the following passage:

> It depends on whether this particular supplier is a monopoly supplier, only supplier who provides specific or special products served in the market without any product substitution, or not. If yes, we still have to work and coordinate with them, no matter how we trust them. If no, we surely selected to work, cooperate and commit with the ones we trusted. (Head of Medicine Storage Room, Bhumibol Hospital, personal communication, September 24, 2015).

The interview data from the head of the rehabilitation department of Namsom Hospital also emphasized the same as in the following passage:

> In general, we feel hesitant to commit anything with the new or unknown suppliers who are not trusted yet. At first, we normally asked for the reference, opinion, recommendation or endorsement on these suppliers from our good-relationship hospitals, nearby hospitals or network hospitals whether such new supplier should be trusted or not. Eventually, we still make a decision ourselves whether we will trust them or not. Whenever we trust them, we feel more comfortable to commit anything with them. (Head of Rehabilitation Department, Namsom Hospital, personal communication, September 27, 2015).

In summary, based on the data and information obtained from the in-depth interviews, the summary of qualitative findings and results separated in the context of Thai public and private hospitals can be initially summarized in table 3.1.

Table 3.1 The Summary of Qualitative Findings and Results

Variable	Public hospitals focus on	Private hospitals focus on
BSC	1) Information sharing 2) Collaborative communication 3) Joint activity	1) Information sharing 2) Resource sharing 3) Collaborative communication 4) Joint activity 5) Goal congruence
EXS	1) Training and knowledge sharing 2) Site visit 3) Necessary information support 4) Tools, devices and instruments support 5) Finance and budget support	1) Training and knowledge sharing 2) Site visit, workshop and conference 3) Necessary information support 4) Consultation, advice and suggestion 5) Manpower, tools, devices and instruments support 6) Finance and budget support
MAS	1) Clear vision and mission 2) Policies and goals 3) Budget support 4) Information technology support	1) Clear vision and mission 2) Policies, objectives and goals 3) Top management's commitment 4) Budget support and investment 5) Information technology support 6) Joint activities support
TRU	1) Well understanding and mutual interest 2) Commitment to each other 3) Long term relationship	1) Well understanding and mutual interest 2) Success of each other 3) Commitment to each other 4) Long term relationship 5) Significant effort 6) Relationship building investment

Table 3.1 (Continued)

Variable	Public hospitals focus on	Private hospitals focus on
MAC	1) Nearby community pressure 2) Government organization pressure 3) Patients and patient's relative pressure	1) Economic situation pressure 2) Nearby community pressure 3) Competitors pressure 4) Government organization pressure 5) Non-government organization pressure 6) Private organization pressure 7) Patients and patient's relative pressure
COM	1) Service commitment 2) Service facilitation and service mind 3) Joint problem solving 4) After sale services	1) Service commitment 2) Empathy to provide a good service 3) Dedication to provide a good service 4) Service facilitation and service mind 5) Joint problem solving 6) Before and after sale services
CAP	1) Knowledge management 2) Knowledge application 3) Well-trained skills 4) Continuous developed competency	1) SCM knowledge and BSC awareness 2) Knowledge management 3) Knowledge application 4) Working experience with suppliers 5) Well-trained skills 6) Continuous developed competencies
INM	1) Inventory holding 2) Out of stock 3) Expired and damage stock	1) Inventory management system 2) Inventory holding 3) Inventory turnover and out of stock 4) Goods return, expired and damage stock 5) Inventory storage condition

CHAPTER 4

QUANTITATIVE RESEARCH: METHODOLOGY AND RESULTS

4.1 Introduction

This chapter describes the methodology and results of the quantitative research based on the questionnaire survey with hospital executives involved in the procurement process of public and private hospitals operating in Thailand such as the director, the head of the division, the department manager, the supervisor or other management team members, etc. The overall results showed that inventory management, capability, commitment, market competition, management support, external support, and trust significantly affected buyer-supplier collaboration. The details of the quantitative research are described and demonstrated as follows.

4.2 Variables, Items and Measurements

Variables, items and a list of measurements were presented in table 4.1.

Table 4.1 Variables, Items and Measurements

Variable	Item	Measurement
Buyer-supplier collaboration	1) Information sharing 2) Resource sharing 3) Collaborative communication 4) Joint activity 5) Goal congruence	10-point rating scale

Table 4.1 (Continued)

Variable	Item	Measurement
Inventory management	1) Inventory management system 2) Inventory holding 3) Inventory turnover 4) Out of stock 5) Goods return 6) Expired and damaged stock 7) Inventory storage condition	10-point rating scale
Capability	1) Supply chain management knowledge 2) Buyer-supplier collaboration awareness 3) Knowledge management and application in general management 4) Knowledge application in daily operation 5) Working experience with suppliers 6) Well-trained skills 7) Continuous developed competency	10-point rating scale
Commitment	1) Service commitment 2) Empathy to provide a good service 3) Dedication to provide a good service 4) Service facilitation 5) Service mind 6) Joint problem solving 7) Before and after sale services	10-point rating scale
Market competition	1) Economic situation pressure 2) Nearby community pressure 3) Competitors' pressure 4) Government organization pressure 5) Non-government organization pressure 6) Private organization pressure 7) Patients and patient's relative pressure	10-point rating scale

Table 4.1 (Continued)

Variable	Item	Measurement
External support	1) Training and knowledge sharing 2) Site visit 3) Necessary information support 4) Consultation, advice, and suggestions 5) Manpower support 6) Tools, devices, and instruments support 7) Finance and budget support	10-point rating scale
Management support	1) Clear vision 2) Missions and policies 3) Top management's commitment 4) Budget support 5) Investment 6) Information technology support 7) Joint activities support	10-point rating scale
Trust	1) Well understanding 2) Mutual interest 3) Success of each other 4) Long term relationship 5) Commitment to each other 6) Significant effort 7) Relationship building investment	10-point rating scale

4.3 Summary of Hypotheses

The proposed research model of this study is illustrated in figure 4.1.

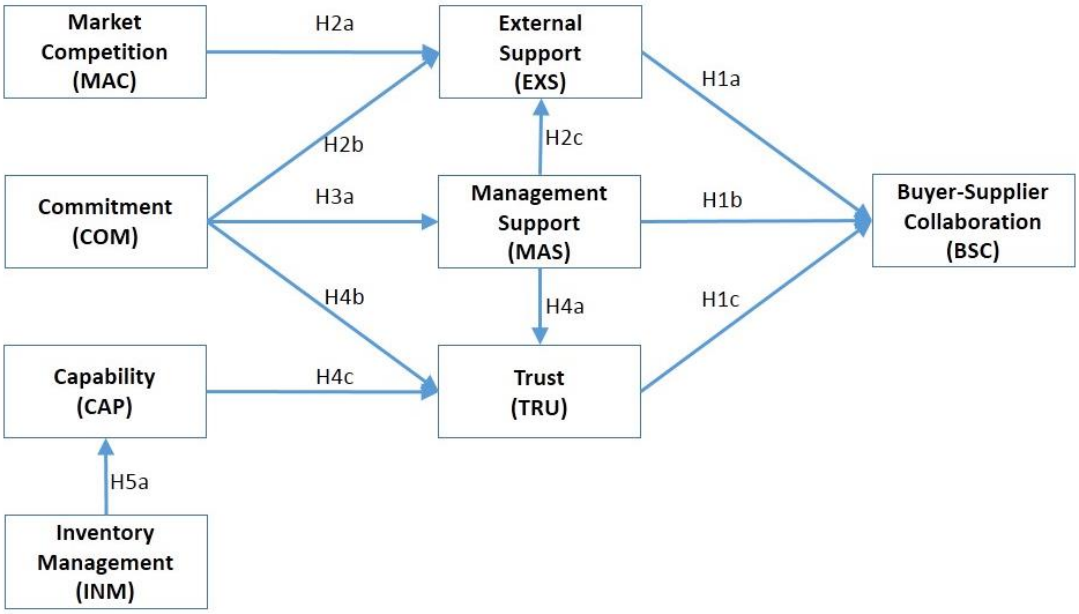

Figure 4.1 Proposed Research Model

The five structural equations of this study are shown below.

1) (BSC) $= \beta_1$ (EXS) + β_2 (MAS) + β_3 (TRU)
2) (EXS) $= \beta_4$ (MAC) + β_5 (COM) + β_6 (MAS)
3) (MAS) $= \beta_7$ (COM)
4) (TRU) $= \beta_8$ (MAS) + β_9 (COM) + β_{10} (CAP)
5) (CAP) $= \beta_{11}$ (INM)

The research hypotheses of this study are summarized as follows:

1) H1a: External support has a positive impact on buyer-supplier collaboration.

H1b: Management support has a positive impact on buyer-supplier collaboration.

H1c: Trust has a positive impact on buyer-supplier collaboration.

2) H2a: Market Competition has a positive impact on external support.

H2b: Commitment has a positive impact on external support.

H2c: Management support has a positive impact on external support.

3) H3a: Commitment has a positive impact on management support.

4) H4a: Management support has a positive impact on trust.
   H4b: Commitment has a positive impact on trust.
   H4c: Capability has a positive impact on trust.
5) H5a: Inventory management has a positive impact on capability.

4.4 Research Design

The main objective of the quantitative research was to demonstrate the impact of the critical factors, including inventory management, capability, commitment, market competition, management support, external support, and trust on the buyer-supplier collaboration in Thai public and private hospitals. For collecting the data from the large sample, a survey questionnaire was developed from the related concepts, theories, and studies in order to gather reliable and valid evidence of the relationships that could be generalized to Thai public and private hospitals.

For this study, the unit of analysis was at the organizational level, which was the hospital. As neither public nor private hospitals could answer the survey questionnaire themselves, the researcher selected multiple participants in order to avoid biases in responding to the survey questionnaires. Top management representatives and hospital executives were selected from among the director, the head of the division, the department manager, the supervisor or other management team members, including the executives in charge of hospital administration, procurement, operations, and services. Thus, these hospital executives were considered good participants for the data collection, which could be generalized at the organizational level.

All of the obtained data were processed, analyzed, and synthesized to describe and examine the relationships between the dependent variable and independent variables. According to the results, a final research model of the relationship between the main factors affecting buyer-supplier collaboration in Thai public hospitals and a final research model of the relationship between the main factors affecting buyer-supplier collaboration in Thai private hospitals were separately developed.

4.5 Population and Sample Selection

The population size (N) consisted of a total of 1,348 organizations including 1,020 organizations of public hospitals operated by the Ministry of Public Health, other government units, and public organizations (such as the military, the police, universities, local governments, and the Thai Red Cross Society) and 328 organizations of private hospitals legally registered by the Medical Registration Division under the Ministry of Public Health's Department of Health Service Support following the Sanatorium Act, B.E. 2541 (Ministry of Public Health, 2014).

The studied sample was collected by stratified random sampling method and the unit of analysis was at the organization level (the hospital). There were 5 steps as follows:

Step 1: Checking conditions. The number of samples was important, as a sufficient number of sample units would let the results be more reliable. There was a minimum number of sample units used in the analysis by using the structural equation model.

Step 2: The sample size calculation formula of Yamane (1970). The Taro Yamane formula was applied to calculate the sample size (n), when acceptable error (E) is 0.05, as shown below.

$$\text{Formula} \quad n = \frac{N}{(1+NE^2)}$$

When n = The sample size

N = The population size

E = Acceptance error

$$\text{Hence} \quad n = \frac{1{,}348}{1+ (1{,}348(0.05)^2)}$$

$$= 309 \text{ hospitals}$$

From above calculation, sample size of 309 hospitals calculated using the Taro Yamane formula conformed to the recommendation on determining the number of sample units to be used in analyzing data with the structural equation model. In order to avoid the issue of a low response rate, which often occurs in data collection through a mailed survey questionnaire, the survey questionnaires were distributed to Thai public and private hospitals by using stratified random sampling. These hospitals were stratified random sampling according to the kind of hospital so that the sample could be a good representative of the target population in Thai public and private hospitals.

Step 3: Select the sample. This study selected public and private hospitals that were located and legally operating in Thailand.

Step 4: Stratified random sampling. The random selection of hospitals was done by dividing the hospitals into their own categories (public and private hospitals) and then randomly picking the samples following the proportion of the population number. The population size, the minimum sample size required, and the number of questionnaire returned are shown in table 4.2.

Table 4.2 Population Size, Minimum Sample Size Required, and Number of Questionnaire Returned

Kind of hospital	**Population size**	**Minimum sample size required**	**Number of questionnaire returned**
Public	1,020	234	309
Private	328	75	107
Total	1,348	309	416

Step 5: Selection of an organizational representative. Since the unit of analysis of this study was at the organization level, the data had to be collected from top management representatives or hospital executives that had direct experience coordinating with suppliers and also were responsible for buyer-supplier collaboration. The reasons were that the hospital executives were strategically involved in formulating the organization’s policies. They managed the hospital’s

limited resources and also were involved in decision-making. They also played an important role in the organization and ensured that all of the people, processes, and technology worked efficiently. Most organizations would let top management representatives or the hospital executives answer the questionnaires.

4.6 Data Collection

For this study, a cross sectional survey was used for the data collection. The data were collected via mail survey questionnaire in the time period of April - July 2016. The details of the data collection are shown as follows:

Step 1: Sending questionnaires by mail. First, it was necessary to find out the hospital information, such as addresses and policies concerning the research collaboration at each particular hospital, by contacting the secretary of the top management representative or hospital executive, so the pre-notifications would be sent to the hospitals. The pre-notification described the importance, value, and benefit of this study to each of top management representative or hospital executive, and would also explain that all of the details obtained in the filled questionnaires would be kept confidential. Then, the survey questionnaire requisition letter issued by the Graduate School of Public Administration of the National Institution of Development Administration (NIDA) was sent to the targeted hospitals. The context of this letter described that the data would be kept confidential. The cover letter, which included the personal details of the researcher, was attached with the questionnaires. The due date to return the survey questionnaire was also be identified in the cover letter. Enclosed with the survey questionnaires, an envelope and a return stamp were also provided for each of the targeted hospitals.

Step 2: Follow up. First follow up occurred when there was no response from the top management representative or executive of the hospitals after one month. The researcher would call their secretary to request a response. Second follow up was done when there was no response from the top management representative or executive of the hospitals two weeks after the first follow up. They would be offered some information, such as information about a comparison with their competitors. The researcher would call them to request a response.

Step 3: Re-selecting more samples and sending more questionnaires by mail. After completing step 1, and 2, if there was still no any response from the top management representative or executive of the hospitals, more questionnaires would be sent by mail to top management representative or executive of other hospitals in order to increase the response rate.

4.7 Research Instrument

The quantitative research methodology consisted of the data collection by using a questionnaire in order to study the relations among the variables within Thai public and private hospitals. In the questionnaire, there were eight measurement instruments used to measure buyer-supplier collaboration, inventory management, capability, commitment, external support, market competition, management support, and trust. Each instrument had some measurement scales. Before testing the proposed research model, it was necessary to first evaluate the reliability and validity of the instruments; it is only on the basis of reliable and valid measurement scales that hypothesis testing can be conducted. Reliable and valid instruments of these constructs were developed and tested through empirical analysis. Data were collected through the questionnaire survey of executives working in Thai public and private hospitals. The statistical methods used included confirmatory factor analysis, path analysis, and structural equation modeling.

This study adopted quantitative research methodology as the main data-collection method. A research questionnaire was developed and used to gather empirical data from both public and private hospitals in Thailand in order to test the proposed research model mentioned in the previous chapter. The quantitative research methodology was suitable for this study because the bigger the number of samples, the more reliable is the study. The results of the study can be generally applied to Thai public and private hospitals. The data were analyzed using causal relationships in order to understand the relations between the direct and indirect effects of each independent variable on BSC in Thai public and private hospitals.

This study used questionnaires as a tool to obtain the empirical data. The details are shown as follows:

1) Details of questionnaire; there were nine parts in the survey questionnaire that needed to be filled in (see the details of the English version of the questionnaire in appendix B and of the Thai version of the questionnaire in appendix C). These parts are described below.

Part 1: Hospital details. These consisted of five check lists which included the kind of hospital, the level of care, the number of beds service years and hospital accreditation. Close-ended questions were used and only one answer needed to be selected.

Part 2: Buyer-supplier collaboration. This was measured using a set of five questions using a 10-point rating scale (from rating scale no.1 = least to rating scale no.10 = most) adapted from the studies of Hardy, Phillips, and Lawrence (2003); Simatupang and Sridharan (2005); Malhotra, Gosain, and Sawy (2005); Li et al. (2006); Paulraj, Lado, and Chen (2008); Thitisomboon et al. (2009); Flynn, Huo, and Zhao (2010); Nyaga, Whipple, and Lynch (2010); Cao and Zhang (2011); Muangchoo and Kritchanchai (2011); Muangchoo and Singkarin (2012); Piboonrungroj (2012); and Phong-arjarn and Jeenanunta (2013).

Part 3: Inventory management. This was measured using a set of seven questions using a 10-point rating scale adapted from the studies of Closs and Mollenkopf (2004); Min and Mentzer (2004); Olhager and Selldin (2004): Petrovic-Lazarevic, Sohal, and Baihaqi (2007); and Yardpaga (2014).

Part 4: Capability. This was measured using a set of seven questions using a 10-point rating scale adapted from the studies of Boddy, Macbeth, and Wagner (2000); Handfield and Bechtel (2002); Saad et al. (2002); McKone-Sweet et al., 2005; Simatupang and Sridharan (2005); Fawcett et al. (2008); Thitisomboon et al. (2009); Bhakoo and Chan, 2011.

Part 5: Commitment. This was measured using a set of seven questions using a 10-point rating scale adapted from the studies of Morgan and Hunt (1994); Thitisomboon et al. (2009); Piboonrungroj (2012); Phong-arjarn and Jeenanunta (2013); Yardpaga (2014).

Part 6: Market competition. This was measured using a set of seven questions using a 10-point rating scale adapted from the studies of Angerhofer and Angelides (2006); Attaran and Attaran (2007); Leat and Revoredo-Giha (2008);

Thitisomboon et al. (2009); Phong-arjarn and Jeenanunta (2010); and Phong-arjarn and Jeenanunta (2013).

Part 7: External support. This was measured using a set of seven questions using a 10-point rating scale adapted from the studies of Saad et al. (2002); Leat and Revoredo-Giha (2008); Thitisomboon et al. (2009); Phong-arjarn and Jeenanunta (2010); Piboonrungroj (2012); and Phong-arjarn and Jeenanunta (2013).

Part 8: Management support. This was measured using a set of seven questions using a 10-point rating scale adapted from the studies of Anthony (2000); Chen and Paulraj, 2004; McKone-Sweet et al., 2005; Attaran and Attaran (2007); Leat and Revoredo-Giha (2008); Madlberger (2008); and Bhakoo and Chan (2011).

Part 9: Trust. This was measured using a set of seven questions using a 10-point rating scale adapted from the studies of Morgan and Hunt (1994); Phong-arjarn and Jeenanunta (2010); Piboonrungroj (2012); and Phong-arjarn and Jeenanunta (2013).

From part 2 to part 9, the interpretations of the measurement items of each variable were as follows:

8.71 - 10.00 means that variable matches the reality at the highest level.

7.41 - 8.70 means that variable matches the reality at a high level.

6.11 - 7.40 means that variable matches the reality at a somewhat high level.

4.81 - 6.10 means that variable matches the reality at a medium level.

3.51 - 4.80 means that variable matches the reality at a somewhat low level.

2.21 - 3.50 means that variable matches the reality at a low level.

1.00 - 2.20 means that variable matches the reality at the lowest level.

In this study, the comprehensive literature review was systematically conducted to form the foundation for developing the measurement items of each variable.

2) Development of questionnaires. There were six steps as follows:

Step 1: Studying of concepts. Studies and research related to buyer-supplier collaboration, inventory management, capability, commitment, market competition, external support, management support, and trust were reviewed in order to understand the meaning of the variables and the relationships among the variables, then establishing the conceptual framework.

Step 2: Defining each variable. Based on the previous literature review, all of the variables were set the common understanding and then create questions. Each top management representative or hospital executive would have a common understanding of the question.

Step 3: Creating questions. Based on each operational definition of the variables, there was much research that has already examined the areas related to this study. This study adopted some of the questions from those researches.

Step 4: Checking the quality of questionnaires-content validity test. A content validity evaluation normally involves a systematic literature review of the survey's content in order to ensure that it includes everything it should, and does not include anything it should not. In this study, it was a premise that the instruments for measuring the variables had content validity since the development of these measurement items was actually based on an organized literature review and detailed evaluations by cited researchers and scholars. A reference list of the literature reviewed by the researcher during the period of conducting this study, and the research methodology design, addressed the detailed process of developing the questionnaire.

Step 5: Checking quality of questionnaires-reliability test. The questions that had been improved were then sent to 30 hospitals. The results of this survey were analyzed for reliability by determining Cronbach's alpha coefficient. The reliability of the questions would have a coefficient of more than 0.70.

Step 6: Checking the quality of the questionnaires - construct validity test. A construct validity test was conducted by analyzing the data from the collected samples, which were Thai public and private hospitals.

4.8 Validity and Reliability

The triangulation technique was used to test the validity of this research. This tests the validity of the collected data gathered from different sources by comparing them with each other (Supang Chantavanich, 2003). In this study, there were many different techniques used for the validity test such as the in-depth interview technique, the snowball technique, participant observation, non-participant observation, and a quantitative research examination.

The survey questionnaire was examined in order to determine its validity and reliability. For the index of item-objective congruence (IOC), the questionnaire was then examined by five content experts, taking account of language accuracy and content validity. This was to ensure that the elements within the measurement tool were adequately representative of the construct that they would be used to measure and that they were related to the objectives and content of the research. The results of the index of the item-objective congruence for each item are shown in appendix D. The overall results of the index of the IOC for each item were accepted. After that, the survey questionnaire was revised according to the suggestions of the content experts, and the survey questionnaire was pre-tested with a sample of 30 hospitals in order to examine the reliability by using Cronbach's alpha coefficient calculation. The overall results were also accepted. All of them were higher than the acceptable score, which was 0.700 or above. Cronbach's alpha coefficient for all variables is shown in table 4.3.

Table 4.3 Cronbach's Alpha Coefficient for all Variables

Variables	Cronbach's alpha coefficient
Buyer-supplier collaboration	0.740
Inventory management	0.878
Capability	0.916
Commitment	0.940
Market competition	0.856
External support	0.892
Management support	0.923
Trust	0.885

4.9 Data Analysis

The concepts of the data analysis from the empirical data and statistical data are outlined in three sections below.

Section 1: The basic statistical analysis of the variables in this study.

The samples were analyzed in order to understand the characteristics of the hospitals. The statistical values involved frequency and percentages. In addition, the basic statistical values of all the variables were analyzed in order to understand the distribution and variation of each variable.

Section 2: The analysis of the data to satisfy the study's objectives.

The basic statistical value of the variables was analyzed in order to understand the distribution and variation of the independent and dependent variables. The statistical values consisted of mean and standard deviation. The statistical values consisted of mean, standard deviation, and the coefficient of variation. In addition, Pearson's product moment correlation coefficient was used in order to understand the relationship among the variables, which was a linear or a nonlinear relationship, and the portion and trend of the relationships among the variables. The relationship number should not be greater than 0.80. If it exceeds 0.80, the researcher should consider cutting or merging some of the duplicated variables.

Section 3: Path analysis.

The researcher tested the path analysis to study the relationship among the variables. The validation and reliability of the independent variables in relation to the dependent variables were examined. The analysis of the relationship between the variables was in the structural equation model. This was to investigate the direct and indirect impact of the variables, whether they were consistent with the empirical data or not. The empirical data on Thai public hospitals and Thai private hospitals were separately analyzed. The structural model denoted the relationship of the variables in the form of a regression equation among the independent and dependent variables. The regression coefficient of the structural equation should be higher than 0.50.

The assumptions for the path analysis are shown as follows:

1) Multicollinearity. This may be a major issue in data analysis when using the regression technique because in general, some independent variables may be

correlated among each other. If those correlated independent variables are used to predict the dependent variable in the research model, then the results may not be clear enough to reveal which independent variable is eventually useful. Moreover, a sample correlation coefficient value over than +.70 or less than -.70 for two independent variables is a warning of a potential issue caused by high multicollinearity. When the independent variables are highly correlated, it is not possible to determine the separate effect of any particular independent variable on the dependent variable. Nevertheless, there is the guideline that if the R (correlation) value between the independent variables is less than +.80, it does not have potential issue caused by high multicollinearity.

2) Linearity. This is determined as the quality of the research model having the properties of homogeneity and additivity whereby the predicted values fall in a straight line. Linearity is related to the degree of change in the dependent variable or the constancy in the slope over a range of values for the independent variables. Linearity was systematically assessed by examining the scatter plots for each independent variable plotted against each predicted criterion, and there was no evidence of a consistent nonlinear pattern on the partial regression plots. These results supported the fact that the assumption of linearity was not violated for the regression models in this study.

4.10 Findings and Results

This part discusses the general information, the basic statistics of the observed variables, and the results of the confirmatory factor analysis. The research results for each variable will be described. Then the results for the structural equation model analysis will also be presented in order to respond to the research hypotheses. The details are as follows:

4.10.1 General Information About the Sampled Hospitals

The respondents in each hospital included top management representatives or hospital executives, such as the director, the head of the division, the department manager, the supervisor or any other top management team members involved in the

procurement process of the hospital, that had direct experience coordinating with suppliers and also was responsible for buyer-supplier collaboration. Only 416 sampled hospitals returned the questionnaires, which accounted for a 59.43% return rate.

It can be seen that the majority were public hospitals (74.28%). As for the level of care, the most sampled hospitals were secondary care (50.96%), followed by tertiary care (25.00%), primary care (18.27%), and excellence center (5.77%). Regarding the number of beds, the most sampled hospitals had fewer than 90 beds (47.36%), followed by 251-500 beds (17.31%) and 121-250 beds (14.42%), and over than 500 beds (6.97%).

With regard to the number of service years, the most sampled hospitals had service for over than 40 years (31.97%), followed by 31-40 years (27.64%), 21-30 years (22.36%), 11-20 years (13.46%) and only 4.57% of the sampled hospitals had service of fewer than 10 years. Regarding the hospital accreditation, the most sampled hospitals were already certified (87.74%), followed by had not begun (9.38%), and only 2.88% of the sampled hospitals were in the certification process. The details of the general information about the sampled hospitals are shown in table 4.4.

Table 4.4 General Information About the Sampled Hospitals (n = 416)

	General information	**Frequency**	**Percentage**
Kind of hospital	Public	309	74.28
	Private	107	25.72
Level of care	Primary	76	18.27
	Secondary	212	50.96
	Tertiary	104	25.00
	Excellence center	24	5.77
Number of beds	Fewer than 90 beds	197	47.36
	90 – 120 beds	58	13.94
	121 – 250 beds	60	14.42
	251 – 500 beds	72	17.31

Table 4.4 (Continued)

	General information	Frequency	Percentage
	Over than 500 beds	29	6.97
Number of Service years	Fewer than 10 years	19	4.57
	11 - 20 years	56	13.46
	21 - 30 years	93	22.36
	31 - 40 years	115	27.64
	Over than 40 years	133	31.97
Hospital Accreditation (HA)	Already certified	365	87.74
	In certification process	12	2.88
	Has not begun	39	9.38

4.10.2 Descriptive Statistics and Correlation Matrix

This part of the dissertation describes the mean, standard deviation, skewness, kurtosis, and the interpretation of the measurement items of each variable. The results of the descriptive statistics of the measurement items (n = 416) are presented in appendix E.

The correlation coefficients analysis among the variables were investigated. Especially the independent variable aimed to verify whether any multicollinearity issue existed. Appendix F illustrates the correlation matrix between the independent and dependent variables at the moderate level. The lowest was at .039, which was the correlation between capability and market competition. The highest correlation was in the relationship between trust and capability, which was at .660. All of the correlation coefficients were very highly significant, an indication of the strong convergent validity of the subscales in assessing each construct. In addition, a sample correlation coefficient value over +.70 or less than -.70 for the two independent variables was a warning of a potential issue caused by high multicollinearity. All of the sampled correlation coefficient values among the independent variables were within the limit (-.70 to +.70), so there was no high multicollinearity. It can be claimed then that these values in the matrix were recognized at an acceptable value, and therefore the

multicollinearity issue did not exist. Consequently, these values did not harm further path analysis.

4.10.3 Path Analysis

This section explains the coefficient of determination (R^2) of the independent variables in relation to the dependent variable in each structural equation. The details of each path analysis are shown as follows:

1) Path analysis of the independent variables in relation to buyer-supplier collaboration in Thai public hospitals.

(1) Buyer-supply collaboration: it was found that all 3 independent variables - 1) external support; 2) management support; and 3) trust - had a positive impact on buyer-supplier collaboration. These variables could describe the variability of buyer-supply collaboration in Thai public hospitals at 42.1 percent ($R^2 = .421$). The standardized coefficients of these variables were .175 at 0.2% level of significance, .120 at 3.4% level of significance and .465 at less than 0.1% level of significance, respectively. In this structural equation, there was no independent variable that was at over than 5.0% level of significance.

$$BSC_{\text{Public hospitals}} = .175(EXS) + .120(MAS) + .465(TRU)$$

(2) External support: it was found that there were only 2 independent variables- 1) commitment; and 2) management support - that had a positive impact on external support. These variables could describe the variability of external support in Thai public hospitals at 39.8 percent ($R^2 = .398$). The standardized coefficients of these variables were .248 at less than 0.1% level of significance and .484 at less than 0.1% level of significance, respectively. In this structural equation, there was an independent variable which is market competition that was at 10.1% level of significance.

$$EXS_{\text{Public hospitals}} = .248(COM) + .484(MAS)$$

(3) Management support: it was found that there was an independent variable which is commitment that had a positive impact on management support. This variable could describe the variability of management support in Thai public hospitals at 15.4 percent (R^2 = .154). The standardized coefficient of this variable was .393 at less than 0.1% level of significance.

$$MAS_{Public\ hospitals} = .393(COM)$$

(4) Trust: it was found that all 3 independent variables - 1) management support; 2) commitment; and 3) capability - had a positive impact on trust. These variables could describe the variability of trust in Thai public hospitals at 59.4 percent (R^2 = .594). The standardized coefficients of these variables were .224 at less than 0.1% level of significance, .365 at less than 0.1% level of significance, and .391 at less than 0.1% level of significance, respectively. In this structural equation, there was no independent variable that was at over than 5.0% level of significance.

$$TRU_{Public\ hospitals} = .224(MAS) + .365(COM) + .391(CAP)$$

(5) Capability: it was found that there was an independent variable, inventory management that had a positive impact on capability. This variable could describe the variability of capability in Thai public hospitals at 27.1 percent (R^2 = .271). The standardized coefficient of this variable was .521 at less than 0.1% level of significance.

$$CAP_{Public\ hospitals} = .521(INM)$$

The final model for buyer-supply collaboration in Thai public hospitals is illustrated in figure 4.2.

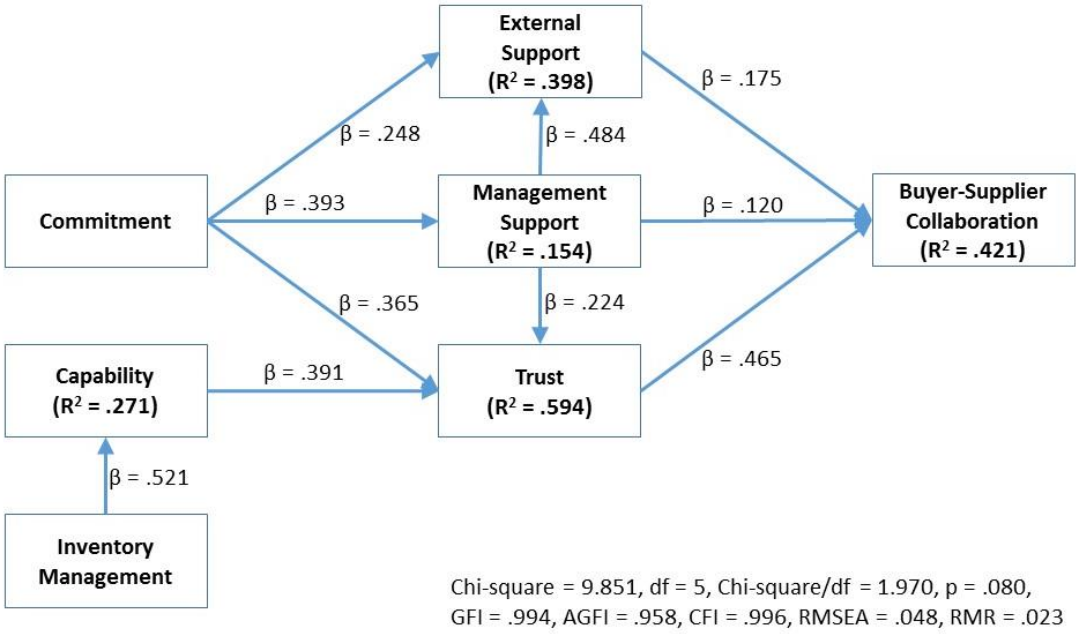

Figure 4.2 Final Model for Buyer-supply Collaboration in Thai Public Hospitals

Note: ——— Relationship Pathway at Less than 5.0% Level of Significance

Finally, this final model for buyer-supply collaboration in Thai public hospitals was tested and indicated a quite good fit between the data and the model. The detail of goodness-of-fit statistics is shown in table H.1 (see appendix H).

2) Path analysis of the independent variables in relation to buyer-supplier collaboration in Thai private hospitals.

(1) Buyer-supply collaboration: it was found that there were only 2 independent variable- 1) external support; and 2) trust - that had a positive impact on buyer-supplier collaboration. These variables could describe the variability of buyer-supply collaboration in Thai private hospitals at 28.0 percent (R^2 = .280). The standardized coefficients of these variables were .127 at 4.2% level of significance and .436 at less than 0.1% level of significance, respectively. In this structural equation, there was an independent variable which is management support that was at 95.9% level of significance.

$$BSC_{\text{Private hospitals}} = .127(EXS) + .436(TRU)$$

(2) External support: it was found that all 3 independent variables -1) market competition; 2) commitment; and 3) management support - had a positive impact on external support. These variables could describe the variability of external support in Thai private hospitals at 46.7 percent (R^2 = .467). The standardized coefficients of these variables were .151 at 4.2% level of significance, .349 at less than 0.1% level of significance, and .368 at less than 0.1% level of significance, respectively. In this structural equation, there was no independent variable that was at over than 5.0% level of significance.

$$EXS_{\text{Private hospitals}} = .151(MAC) + .349(COM) + .368(MAS)$$

(3) Management support in Thai private hospitals: it was found that there was an independent variable which is commitment that had a positive impact on management support. This variable could describe the variability of management support in Thai private hospitals at 37.8 percent (R^2 = .378). The standardized coefficient of this variable was .614 at less than 0.1% level of significance.

$$MAS_{\text{Private hospitals}} = .614(COM)$$

(4) Trust: it was found that all 3 independent variables - 1) management support; 2) commitment; and 3) capability - had a positive impact on trust. These variables could describe the variability of trust in Thai private hospitals at 66.9 percent (R^2 = .669). The standardized coefficients of these variables were .251 at 0.1% level of significance, .195 at 1.2% level of significance, and .562 at less than 0.1% level of significance, respectively. In this structural equation, there was no independent variable that was at over than 5.0% level of significance.

$$TRU_{\text{Private hospitals}} = .251(MAS) + .195(COM) + .562(CAP)$$

(5) Capability: it was found that there was an independent variable which is inventory management that had a positive impact on capability. This variable could describe the variability of capability in Thai private hospitals at 21.2

percent (R^2 = .212). The standardized coefficient of this variable was .460 at less than 0.1% level of significance.

$$CAP_{\text{Private hospitals}} = .460(INM)$$

The final model for buyer-supply collaboration in Thai private hospitals is illustrated in figure 4.3.

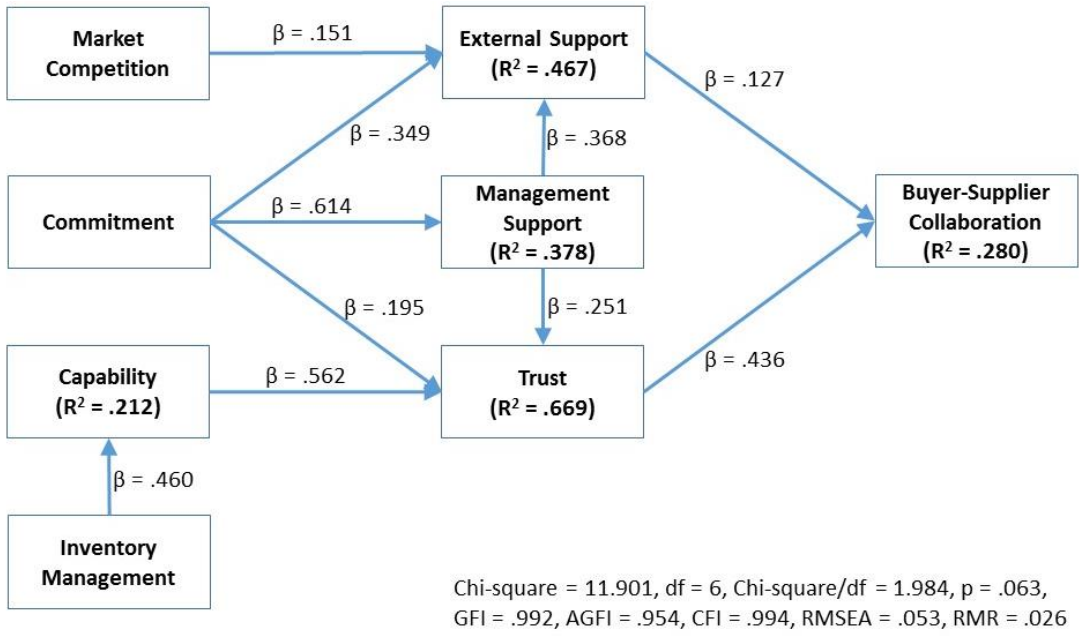

Figure 4.3 Final Model for Buyer-supply Collaboration in Thai Private Hospitals

Note: ——— Relationship Pathway at Less than 5.0% Level of Significance

Finally, this final model for buyer-supply collaboration in Thai private hospitals was tested and indicated a quite good fit between the data and the model. The detail of goodness-of-fit statistics is shown in table H.2 (see appendix H).

4.10.4 Direct, Indirect, and Total Effects

This section explains the direct, indirect, and total effects among variables in Thai public and private hospitals. The details are shown as follows:

1) Direct, indirect, and total effects of the independent variables on buyer-supplier collaboration in Thai public hospitals.

Buyer-supplier collaboration had a causal relation with 6 independent variables: 1) EXS - direct effect .175; 2) MAS - direct effect .120, indirect effect .189 and total effect .309 3) TRU-direct effect .465; 4) COM - indirect effect .335; 5) CAP -indirect effect .182 and 6) INM-indirect effect .095.

External support had a causal relation with 2 independent variables: 1) COM-direct effect .248, indirect effect .190 and total effect .438; and 2) MAS-direct effect .365.

Management support had a causal relation with 1 independent variable, which was COM-direct effect .393.

Trust had a causal relation with 4 independent variables: 1) MAS-direct effect .154; 2) COM-direct effect .365, indirect effect .088 and total effect .453; 3) CAP-direct effect .391; and 4) INM-indirect effect .204.

And capability had a causal relation with 1 independent variable, which was INM-direct effect .521 (see detail in table 4.5).

Table 4.5 Direct, Indirect, and Total Effects of Variables on BSC in Thai Public Hospitals

Causal relation between variables	**Direct effect (β)**	**Indirect effect**		**Total effect**
		□(β1)(β2)(β3)...(βn)	**Sub total**	
1) BSC and				
(1) EXS	.175	-	-	.175
(2) MAS	.120	(.484)(.175) + (.224)(.465)	.189	.309
(3) TRU	.465	-	-	.465
(4) COM	-	(.248)(.175) + (.393)(.484)(.175) + (.393)(.120) + (.393)(.224)(.465) + (.365)(.465)	.335	.335

Table 4.5 (Continued)

Causal relation between variables	Direct effect (β)	Indirect effect □(β1)(β2)(β3)...(βn)	Indirect effect Sub total	Total effect
(5) CAP	-	(.391)(.465)	.182	.182
(6) INM	-	(.521)(.391)(.465)	.095	.095
2) EXS and				
(1) COM	.248	(.393)(.484)	.190	.438
(2) MAS	.365	-	-	.365
3) MAS and				
(1) COM	.393	-	-	.393
4) TRU and				
(1) MAS	.154	-	-	.154
(2) COM	.365	(.393)(.224)	.088	.453
(3) CAP	.391	-	-	.391
(4) INM	-	(.521)(.391)	.204	.204
5) CAP and				
(1) INM	.521	-	-	.521

2) Direct, indirect, and total effects of the independent variables on buyer-supplier collaboration in Thai private hospitals.

Buyer-supplier collaboration had a causal relation with 7 independent variables: 1) EXS-direct effect .127; 2) MAS-indirect effect .156; 3) TRU-direct effect .436; 4) MAC-indirect effect .019; 5) COM-indirect effect .225; 6) CAP-indirect effect .245 and 7) INM-indirect effect .113.

External support had a causal relation with 3 independent variables: 1) MAC-direct effect .151; 2) COM-direct effect .349, indirect effect .226 and total effect .575; and 3) MAS-direct effect .368.

Management support had a causal relation with 1 independent variable, which was COM-direct effect .614.

Trust had a causal relation with 4 independent variables: 1) MAS-direct effect .251; 2) COM-direct effect .195, indirect effect .154 and total effect .349; 3) CAP-direct effect .562; and 4) INM-indirect effect .259.

And capability had a causal relation with 1 independent variable, which was INM-direct effect .460 (see detail in table 4.6).

Table 4.6 Direct, Indirect, and Total Effects of Variables on BSC in Thai Private Hospitals

Causal relation between variables	**Direct effect (β)**	**Indirect effect**		**Total effect**
		∑(β1)(β2)(β3)…(βn)	**Sub total**	
1) BSC and				
(1) EXS	.127	-	-	.127
(2) MAS	-	(.368)(.127) + (.251)(.436)	.156	.156
(3) TRU	.436	-	-	.436
(4) MAC	-	(.151)(.127)	.019	.019
(5) COM	-	(.349)(.127) + (.614)(.368)(.127) + (.614)(.251)(.436) + (.195)(.436)	.225	.225
(6) CAP	-	(.562)(.436)	.245	.245
(7) INM	-	(.460)(.562)(.436)	.113	.113
2) EXS and				
(1) MAC	.151	-	-	.151
(2) COM	.349	(.614)(.368)	.226	.575
(3) MAS	.368	-	-	.368
3) MAS and				
(1) COM	.614	-	-	.614

Table 4.6 (Continued)

Causal relation between variables	Direct effect (β)	Indirect effect		Total effect
		∑(β1)(β2)(β3)…(βn)	Sub total	
4) TRU and				
(1) MAS	.251	-	-	.251
(2) COM	.195	(.614)(.251)	.154	.349
(3) CAP	.562	-	-	.562
(4) INM	-	(.460)(.562)	.259	.259
5) CAP and				
(1) INM	.460	-	-	.460

CHAPTER 5

CONCLUSION, DISCUSSION, AND RECOMMENDATIONS

5.1 Introduction

In the previous two chapters, the qualitative and quantitative methodology and results were demonstrated and summarized. This last chapter presents the conclusion of the research, a discussion of the research, the contribution of the findings and results, and recommendations. The details are shown as follows.

5.2 Research Conclusion

The research was completed by employing the exploratory sequential method, beginning with qualitative research and then followed by quantitative research. Qualitative research was applied to collect data from 12 public hospitals and 11 private hospitals in Thailand using the in-depth interview technique. Quantitative research was applied to obtain data from 309 public hospitals and 107 private hospitals in Thailand. The descriptive statistics were presented to describe general information about the sampled hospitals. Inferential statistics were used in the path analysis to test the total eleven research hypotheses showing the influences of the variables.

For investigating the causal relationships, path analysis was statistically used to analyze the variance exhibited among the variables when input into the regression model using a sequence derived from the research hypotheses. Eleven research hypotheses with fifty-four measurement items were tested and analyzed to investigate the influence of each independent variable on BSC. The results were synthesized in order to fulfill the research objectives.

The research's concluding details regarding the buyer-supply collaboration in Thai public and private hospitals are shown as follow.

5.2.1 Practical Model for Buyer-supply Collaboration in Thai Public Hospitals

The sample data were used to analyze the quantitative techniques. The relationship among the independent and dependent variables was investigated and eleven research hypotheses were tested. Once all of the hypotheses were statistically proved, it was found that there were ten relationships that showed a significant effect: 1) external support was significantly correlated with buyer-supplier collaboration; 2) management support was significantly correlated with buyer-supplier collaboration; 3) trust was significantly correlated with buyer-supplier collaboration; 4) commitment was significantly correlated with external support; 5) management support was significantly correlated with external support; 6) commitment was significantly correlated with management support; 7) management support was significantly correlated with trust; 8) commitment was significantly correlated with trust; 9) capability was significantly correlated with trust; and 10) inventory management was significantly correlated with capability.

In summary, there were three independent variables that had a direct effect on BSC and three other independent variables that had an indirect effect on BSC. All of the causal variables could describe BSC in the Thai public hospitals at $R^2 = 0.421$. A practical model for buyer-supply collaboration in Thai public hospitals is shown in figure 5.1.

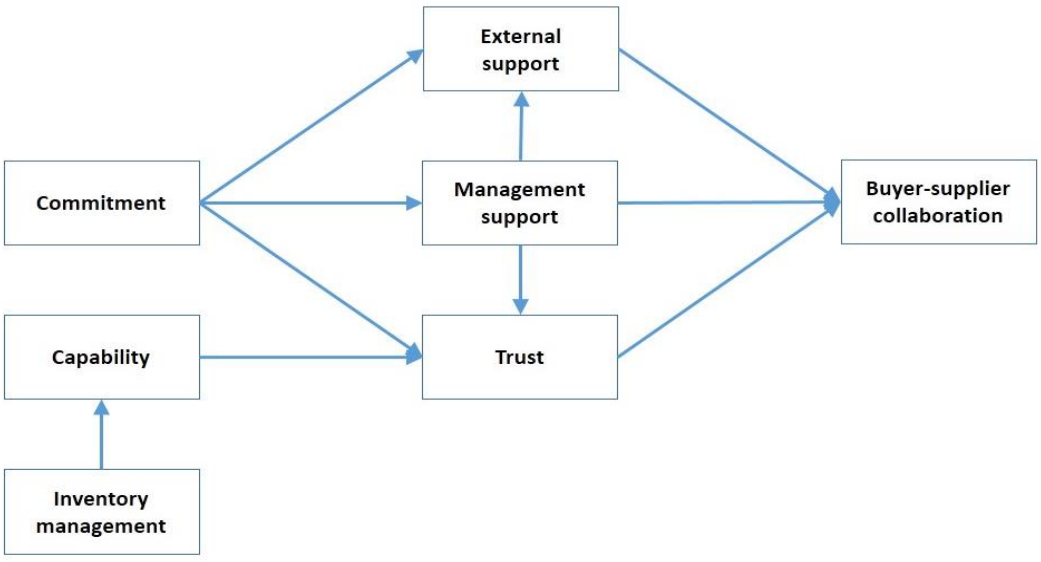

Figure 5.1 Practical Model for Buyer-supply Collaboration in Thai Public Hospitals

5.2.2 Practical Model for Buyer-supply Collaboration in Thai Private Hospitals

The sample data were used to analyze the quantitative techniques. The relationship among the independent and dependent variables was investigated and eleven research hypotheses were tested. Once all of the hypotheses were statistically proved, it was found that there were ten relationships that showed a significant effect: 1) external support was significantly correlated with buyer-supplier collaboration; 2) trust was significantly correlated with buyer-supplier collaboration; 3) market competition was significantly correlated with external support; 4) commitment was significantly correlated with external support; 5) management support was significantly correlated with external support; 6) commitment was significantly correlated with management support; 7) management support was significantly correlated with trust; 8) commitment was significantly correlated with trust; 9) capability was significantly correlated with trust; and 10) inventory management was significantly correlated with capability.

In summary, there were only two independent variables that had direct effect on BSC and five independent variables that had an indirect effect on BSC. All of the causal variables could describe BSC in Thai private hospitals at $R^2 = 0.280$. A practical model for buyer-supply collaboration in Thai private hospitals is shown in figure 5.2.

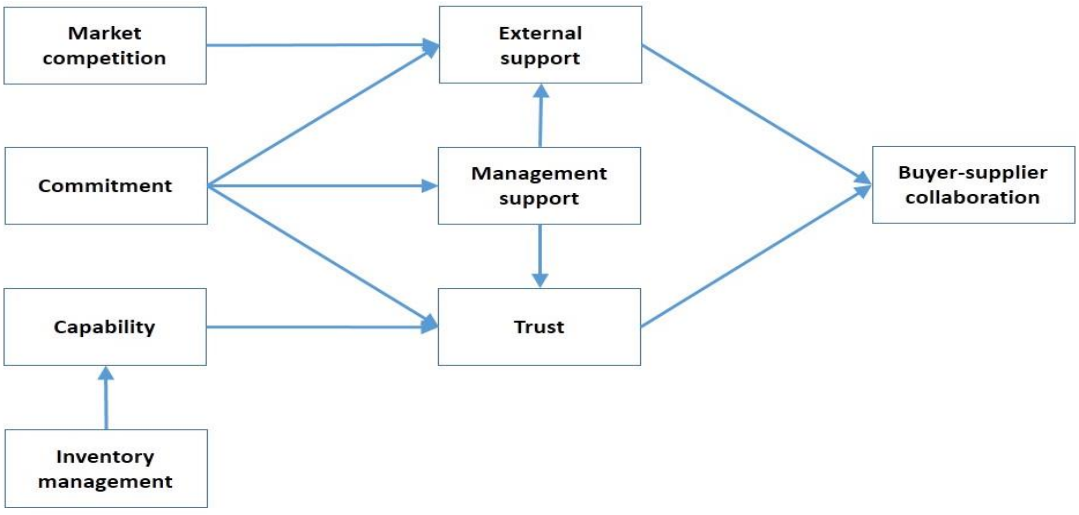

Figure 5.2 Practical Model for Buyer-supply Collaboration in Thai Private Hospitals

5.3 Research Discussion

The data and information of this research were collected from public and private hospitals in Thailand oters rich internal validity, but the generalizability of the findings and results may be significantly limited (Bryman & Bell, 2011). However, the sample size of this research was comparatively larger than most of the survey research on buyer-supplier collaboration in general, which is usually conducted with a small amount of sample data.

Even though this research employed the exploratory sequential method in the design, beginning with the qualitative research technique and then followed by the quantitative research technique to capture depth and details of the phenomenon of BSC in Thai public and private hospitals, it could only capture the truth during a short period of time. Therefore the uncertainty of the impacts of each critical factor on those proposed outcomes are limited in the results of this research.

The summary and discussion of the findings from the data collected concerning the two research questions of this study are as follows.

5.3.1 Research Question #1:

What are critical factors affecting buyer-supplier collaboration in Thai public and private hospitals?

The data collected from the questionnaires were used to analyze the quantitative techniques. It was employed to determine the critical factors and to find the causal relationships between the independent and dependent variables and to test the research hypotheses. In addition, path analysis was used in chapter 4 to find both the direct and indirect relationships among the variables. The proposed research model used for testing is shown in figure 4.1. The final model for buyer-supplier collaboration in Thai public hospitals with significant paths is illustrated in figure 4.2; and the final model for buyer-supplier collaboration in Thai private hospitals with significant paths is illustrated in figure 4.3.

When proving hypothesis H1a, the research results suggested that external support has a positive impact on buyer-supplier collaboration for both Thai public and private hospitals.

In summary, external support can generally influence the buyer-supplier collaboration model for both Thai public and private hospitals.

For hypothesis H1b, the research results suggested that management support has a positive impact on buyer-supplier collaboration for Thai public hospitals only.

McKone-Sweet et al. (2005) stated that management support could be positive in establishing the collaboration between buyers and suppliers in the supply chain, and Phong-arjarn and Jeenanunta (2013) also mentioned that management support was significantly related to buyer-supplier collaboration in several Thai major industries. However, Bhakoo and Chan (2011) argued that management support might not be directly provided to the organization to build BSC, but it might indirectly be provided to the organization to build BSC through other critical factors. Thus, no significant effect of management support on buyer-supplier collaboration can be seen in the practical model of Thai private hospitals.

This point also aligns with the qualitative result captured that many key informants working in public hospitals stated that management support is very crucial for their daily works. On the other hand, some key informants working in private hospitals stated that management support may be not much necessary to their daily works since hospital executives normally set the organization's objectives and goals and then cascade down and assign to their departments. So, they can manage their daily operations by themselves and ask for management support once they needed only.

In the researcher's opinion, most executives of Thai private hospitals would rather focus on making more of a profit by expanding greater scope of healthcare services and reducing operating costs than building buyer-supplier collaboration, so they may not directly support the hospital's purchasing team in building buyer-supplier collaboration. However, they may directly support the hospital's purchasing team through gaining external support and building trust.

In summary, management support can generally influence the buyer-supplier collaboration model for Thai public hospitals only.

For hypothesis H2c, the research results suggested that management support has a positive impact on external support for both Thai public and private hospitals.

For hypothesis H4a, the research results suggested that management support has a positive impact on trust for both Thai public and private hospitals.

In summary, management support can also generally influence the buyer-supplier collaboration model through external support and trust for both Thai public and private hospitals. This finding and results can also be interpreted in the sense that hospital executives are more concerned about emphasizing management support than emphasizing other critical factors, but still less than building trust and enhancing commitment.

For hypothesis H1c, the research results suggested that trust has highest positive total impact on buyer-supplier collaboration for both Thai public and private hospitals.

In the researcher's opinion, trust can generally influence the buyer-supplier collaboration model for both Thai public and private hospitals. This finding and results suggest that hospital executives are more concerned about building trust than emphasizing other critical factors.

For hypothesis H2a, the research results suggested that market competition has a positive impact on external support for Thai private hospitals only.

Powell et al. (1996) stated that market competition is one of the main factors promoting inter-firm collaboration in many industries, and Phong-arjarn and Jeenanunta (2013) also stated that market competition was significantly related to supply chain collaboration in several Thai major industries. However, Levitin and Redman (1995) argued that most public sectors often have imprecise goals that are difficult to determine and measure. As a result, public hospitals might tend to have several goals and focuses that are not easy to quantify. Thus, no significant effect of market competition on buyer-supplier collaboration through external support can be seen in the practical model of Thai public hospitals.

This point also aligns with the qualitative result captured that many key informants working in private hospitals stated that market competition is very crucial for their hospitals since they had lots of pressure from law and regulation changes, economics fluctuations, market and customers' changes, increase of new direct and indirect competitors, emerging market growth, etc. Moreover, they continuously focused on developing themselves and their operations to cope with any changes and business disruptions in order to survive in the current situation and ensure their business growth. On the other hand, some key informants working in public hospitals

stated that market competition may be not much critical to their hospitals since they perceived that the market and customer's changes has quite less influenced to their hospitals. Moreover, they also perceived that their hospitals can always get the support from government organizations in any market situation.

In the researcher's opinion, most executives of Thai public hospitals will probably not focus on market competition because they do not think that it is necessary for public hospitals to compete with other hospitals and they can ask for external support from many parties, such as government organizations, non-government organizations, and private organizations as well. Moreover, most hospital executives of Thai public hospitals would rather focus on raising the quality of healthcare services and expanding healthcare service coverage than increasing competition with any public or private hospitals. Therefore market competition would be less of an effect on Thai public hospitals.

In summary, market competition can also generally influence the buyer-supplier collaboration model through external support for Thai private hospitals only.

For hypothesis H2b, the research results suggested that commitment has a positive impact on external support for both Thai public and private hospitals.

For hypothesis H3a, the research results suggested that commitment has a positive impact on management support for both Thai public and private hospitals.

For hypothesis H4b, the research results suggested that commitment has a positive impact on trust for both Thai public and private hospitals.

In the researcher's opinion, commitment can also generally influence the buyer-supplier collaboration model through external support, management support, and trust for both Thai public and private hospitals. This finding and results suggest that hospital executives are more concerned about enhancing commitment than emphasizing other critical factors, but still less than building trust.

For hypothesis H4c, the research results suggested that capability has a positive impact on trust for both Thai public and private hospitals.

In the researcher's opinion, capability can also generally influence the buyer-supplier collaboration model through trust for both Thai public and private hospitals.

Finally, for hypothesis H5a, the research results suggested that inventory management has a positive impact on capability for both Thai public and private hospitals.

In the researcher's opinion, inventory management can also generally influence the buyer-supplier collaboration model through capability and trust for both Thai public and private hospitals.

For comparing between the practical model for BSC in Thai public hospitals and the practical model for BSC in Thai private hospitals, it is obviously that there are 2 different points: 1) MAS has a statistical significant path to BSC in the practical model for BSC in Thai public hospitals only; and 2) MAC has a statistical significant path to EXS in the practical model for BSC in Thai private hospitals only. For other paths, they have the same in statistical significant path in both practical models.

Moreover, it is obviously that the qualitative results are very much aligned and supported with the quantitative results for both Thai public and private hospitals.

In the researcher's opinion, the practical model for BSC in Thai private hospitals would rather be more suitable to apply for both Thai public and private hospitals in the near future than the practical model for BSC in Thai public hospitals. As an impact of rapid market and economics changes, both public and private hospitals are necessary to survive by themselves while the external support tends to be decreased over time.

5.3.2 Research Question #2:

What are the direct and indirect causal relationships between the critical factors and buyer-supplier collaboration in Thai public and private hospitals?

External support and trust had direct effect on buyer-supplier collaboration in both the Thai public and private hospitals. Management support however had a direct effect on buyer-supplier collaboration in Thai public hospitals only, but management support also had an indirect effect on buyer-supplier collaboration in Thai private hospitals through external support and trust.

Market competition had indirect effect on buyer-supplier collaboration in Thai private hospitals only through external support. However, market competition had no indirect effect on buyer-supplier collaboration in Thai public hospitals.

Commitment had an indirect effect on the buyer-supplier collaboration in both Thai public and private hospitals through external support, management support, and trust.

Capability had an indirect effect on buyer-supplier collaboration in both Thai public and private hospitals through trust.

Further, inventory management had an indirect effect on buyer-supplier collaboration in both Thai public and private hospitals through capability and trust.

Based on the results of direct and indirect effects of independent variables on BSC in both Thai public and private hospitals, it is obviously that total indirect effects are more than total direct effects. This can be implied that market competition, commitment, capability, and inventory management are also very important to establish buyer-supplier collaboration in both Thai public and private hospitals. This point quite aligns with the qualitative result captured that many key informants working in both public and private hospitals stated that commitment, capability, and inventory management are very crucial for both public and private hospitals.

In the researcher's opinion, regarding the effects of the critical factors affecting buyer-supplier collaboration, all independent variables were seen to have direct or indirect effects on buyer-supplier collaboration in Thai public and private hospitals except market competition, which had an indirect effect on buyer-supplier collaboration in Thai private hospitals only.

Finally, as mentioned by Piboonrungroj (2012), the collaboration throughout the supply chain will significantly affect firm performance. In the researcher's opinion, these seven critical factors should be set up, monitored, and emphasized by top management team members and hospital executives in order to increase the level of buyer-supplier collaboration in Thai public and private hospitals. Once the level of buyer-supplier collaboration is intentionally increased, the firm performance of both Thai public and private hospitals will eventually increase as well.

5.4 Research Contributions

The research contributions of this study are divided into three parts: academic, policy, and practical contributions. The details are as follows.

5.4.1 Academic Contributions

This research applied both qualitative and quantitative methods in order to obtain insightful data and to support the results of each other, resulting in more integrated valuable information. The research model proposed in this research created valuable contributions to this research topic. Moreover, the findings and results are expected to yield greater understanding of external and internal factors that will be critical for building more knowledge of this research topic. Even though this research mainly focused on Thai public and private hospitals, other types of service organizations can gain benefit from the findings and results.

The academic contribution of this research was comprised of testing the measurement tools used in the data collection according to the principles of good measurement, which consisted of reliability and validity. For the measurement items of each variable, this research presented evidence of reliability and validity that provided a foundation for further study in this research area. Fifty-four measurement items measured each variable in the survey questionnaire. The researcher examined the data and tested the reliability and validity of the measurement tools. The results presented evidence of all variables' internal consistency and construct reliability and validity. Cronbach's alpha test was run during the stage of the confirmatory factor analysis. The results showed that the Cronbach's alpha values of all measurement tools were quite high and the overall results met acceptable standards at 0.700 or above.

Both the independent and dependent variables developed can be a useful tool for any researcher to investigate the typical characteristics of BSC and its critical factors. Therefore, this research can be of benefit to any reader or organization that is related to the healthcare business environment. Path analysis was seen to be a suitable method for investigating the causal relationships among the critical factors and BSC in Thai public and private hospitals. The research findings and results provide useful contributions, especially in terms of the knowledge gained from the mechanisms connecting the causal relationships between the critical factors and BSC.

The contribution of the findings and results to theory is associated with the causal relationship between critical factors and BSC. The research findings and results suggested that each critical factor had an impact on BSC in Thai public and private

hospitals. The findings and results help to confirm and indicate the importance of each critical factor as a valuable factor that can respond to the needs of hospital executives and stakeholders. It is an approach that scholars or researchers have had an interest in for a long time.

5.4.2 Policy Contributions

The outcome of this research can be used as a guideline in healthcare system policy formulation and healthcare service business development. It will benefit healthcare-related executives and top management team members to realize what critical factors can be more greatly utilized for buyer-supplier collaboration establishment. Government offices related to healthcare system policy and regulations can use the information and findings elaborated from this research to formulate precise healthcare spending policies and support to improve Thai healthcare services as a whole, which will be good for Thai citizens and the Thai economy, not to mention the global healthcare marketplace.

In summary, the research findings and results will be beneficial to Thai public hospitals, private hospitals, healthcare-related executives, and healthcare-related government offices in terms of buyer-supplier collaboration policy formulation.

5.4.3 Practical Contributions

Regarding the practical contributions of this research, the researcher presented a BSC establishment model based on the critical factors derived from a synthesis of the qualitative and quantitative research findings and results. This aimed to fulfill the research objective, which was to test the causal relations in a structural equation model of the BSC framework. The research findings and results suggested that trust, management support, commitment, and capability should be continuously monitored and emphasized for Thai public and private hospitals. This support not only comes from hospital executives, but also from external organizations. Moreover, this supports not only regard financial matters, but also non-financial matters such as consultancy, knowledge, and experience sharing. Nowadays, this is an area of research that has been neglected. As a result, this research makes a contribution by formulating and testing the proposed research model that explains the direct and

indirect causal relationships of the independent variables with BSC. The results demonstrated that the proposed research model had statistical validity, and provided empirical evidence for the importance of BSC.

Further, this research provided a survey questionnaire as the research instrument, which could be of benefit to any reader or scholar. The findings and results also will help readers gain greater understanding of the causal relationships among the variables, and the practical model can be applied to other service organizations. The research findings and results can be used as a guideline to build collaboration between the hospitals and suppliers. It also will benefit any hospital executive in terms of realizing the critical factors that can be greatly utilized and emphasized for building BSC.

5.5 Research Recommendations

This part if the present study aims to propose recommendations gathered and summarized from the research, which include recommendations for building trust, for enhancing commitment, for emphasizing management support, for developing capability, and recommendations for future research. The details are as follows.

5.5.1 Recommendations for Building Trust

Trust was the variable that had the highest total influence on BSC. Therefore, in order to establish BSC, it is recommended that trust between buyer and supplier in both of Thai public and private hospitals be intentionally built.

As Afonso Vieira, Monteiro, and Teixeira (2011) stated that trust plays an important role in collaboration and trust also significantly attests collaboration, the building of inter-firm trust between buyer and supplier can result in many positive outcomes. Therefore, top management team members and hospital executives should take account of the concept that building more trust leads to greater BSC. Building trust may be different in each hospital, therefore, upon implementing it, hospital executives have to support employees in order to make them understand the benefits of building trust and how to build it effectively.

The researcher would like to recommend that the goals of building trust be periodically evaluated as well; for example, hospital executives can monitor and investigate if the quality of the procurement process between buyer and supplier is significantly improved, if the internal customer needs are well responded to, and if other related goals are achieved. Process-based evaluation and mission-based assessment will enable the hospital executives to receive certain achievements from the comprehensive implementation of building trust.

5.5.2 Recommendations for Enhancing Commitment

Commitment was the variable that had the second highest total influence on BSC. Therefore, in order to establish BSC, it is recommended that commitment between buyer and supplier in both of Thai public and private hospitals be increasingly enhanced.

In building BSC, joint activities are determined to be the core basis of collaboration (Simatupang & Sridharan, 2005). Like BSC in Thai public and private hospitals, when buyer and supplier work closely together, they tend to understand and admire each other more and this creates commitment among the parties. The researcher would like to recommend that hospital executives arrange more joint activities and then empower the employees that work as buyers in order to have greater opportunity to work closely with suppliers to enhance their commitment together.

5.5.3 Recommendations for Emphasizing Management Support

Management support was the variable that had third highest total influence on BSC. Therefore, in order to establish BSC, it is recommended that management support in both of Thai public and private hospitals be seriously emphasized.

Hospital executives should express the clear vision and mission of the organization and lead employees to achieve the organization’s goals. Management support also includes the policies and strategies of the organization to ensure that the needs and requirements of both internal and external customers will be continuously fulfilled over time, and to commit to establishing collaboration with supply chain partners and preparing enough budget for building BSC (McKone-Sweet et al., 2005; Bhakoo & Chan, 2011).

Moreover, hospital executives should indicate the current status quo of the hospital, clarify the ultimate goals of the hospital, and identify the gaps between the present status and the ultimate goals of the hospital. This is considered as a beginning point in creating organizational change. After that, the hospital executives need to clearly communicate relevant information to the employees. Two-way communication will lead to better employee understanding, engagement, and collaboration.

In the researcher's opinion, the hospital executives play an important role in establishing BSC, as they are the main group of persons that formulate policy, provide the budget, and determine the direction of the organization. In order to build successful BSC with supply chain partners, it is necessary to have a clear supportive vision, an understanding of the importance of BSC, and to be committed to continuously executing the BSC plan given by the hospital executives.

5.5.4 Recommendations for Developing Capability

Capability was the variable that had the fourth highest total influence on BSC. Therefore, in order to establish BSC, it is recommended that the capability in both of Thai public and private hospitals be continuously developed.

For developing capability, internal and external training should be conducted in parallel (Phong-arjarn & Jeenanunta, 2013). The researcher would like to recommend that the hospital executives arrange employee studies with experts at other organizations and to participate in training programs that suit the required competency. However, the hospital executives should also select training programs that utilize several training techniques, including classes, workshops, knowledge-sharing forums, brainstorming sessions, panel discussions, academic seminars, international conferences, site visits, etc. In addition, on-the-job training should be more intentionally applied through coaching and feedback, mentoring systems, and job enhancement and job rotation. Both of these off-the-job and on-the-job training approaches will develop the capability of the employees, especially those that work as buyers.

Capability can also be developed through several training approaches. Most of the hospital executives send employees to get trained for general managerial skills at educational institutions, and public and private training centers. Even though this can

successfully develop the managerial capability of employees, the researcher would like to recommend that more specific capability development training programs customized to the context of each hospital be employed in order to develop the capability of the employees in a more effective way. The researcher would also like to suggest that capability development training programs be especially developed for medical personnel and other multidisciplinary professionals that work as buyers on the purchasing team of each particular hospital.

The training programs should be arranged step by step. First, the training program should begin with encouraging employees to recognize the importance of capability development and set the objectives of their own capability development plan. They should be trained in theoretical knowledge along with using examples of case studies, the sharing of experiences, and the application of routine work situations in order to make it easy for them to understand and apply this information to their day-to-day operations once they return to work in the hospital. Moreover, coaching and feedback should be additionally conducted in the training program so that the employees can understand how to implement their own capability development plan.

Second, a variety of training methods should be applied in the training program, such as delegation, practice, discussion, and project-based assignment, in order to develop the capability of the employees in each expected aspect accordingly.

Third, a proper learning and practicing time period in the routine work situations should be carefully set, and the researcher would like to recommend a proper time period of about 3 to 6 months so that the employees can learn and practice applying the gained knowledge and implementing their own capability development plan. This will enable the employees to understand and adapt what they have learned to the context of their hospital for greater productivity and efficiency of work.

Last, the researcher would like to recommend that there be follow-up and monitoring plans 6 to 12 months after each employee’s learning and practicing time period. The coaching and feedback given by the immediate supervisor, and comment, provided by each employee, should be systematically collected in order to measure the success as per the objectives of the capability development plan.

In conclusion, even though several previous studies have found significant benefits from BSC, hospital executives still struggle to achieve them. Employing the

exploratory sequential method in the research design, beginning with the qualitative research technique and then followed by the quantitative research technique, the issue of BSC in Thai public and private hospitals was explored here in order to gain greater understanding of how the critical factors impact BSC. It was found that hospital executives can enhance the benefits from BSC if their buyers work together with their suppliers more closely. Using structural equation models, the survey of Thai public and private hospitals confirmed these findings and results. This research also suggests that critical factors mainly increase BSC by building trust, enhancing commitment, emphasizing management support, and developing capability.

5.5.5 Recommendations for Future Research

Although this research revealed many interesting findings and results, there were still limitations in some aspects, and these can be further explored in order to expand the knowledge of this research topic and to bring about more comprehensive and practical benefits. The findings and results of this research lead to several future research topics that could be explored in order to gain greater insight into the mechanisms of buyer-suppler collaboration work. They also emphasize the need for conducting more research on this topic.

Even though evidence of the reliability and validity of the instrument was presented, the instrument still needs to be further developed in the future. Further research will be necessary to explore the measurement scale with other types of service organizations. In order to prove and affirm the reliability and validity of the instrument, it needs to be cross-validated with more studies by comparing different types of service organizations. Additionally, future research needs to be developed regarding more reliable and valid operational definitions for the newly-proposed constructs. Moreover, more complicated interactions between new constructs need to be tested and proven. The hypotheses should be tested in organizations from various types of service industries and the results compared to those in order to determine if BSC and critical factors react differently.

This research aimed to develop an instrument measuring the construct of the critical factors and buyer-supplier collaboration with a suitable statistical technique. This contributes to the literature by determining the independent and dependent

variables, measuring all of them, providing evidence of their construct validity, and investigating the causal relationships among the variables in the research model. Thus, it is expected that this research will encourage readers, researchers, and scholars to focus on conducting more research related to the construction of critical factors and buyer-supplier collaboration.

Future research on specific groups of hospital executives in Thai public and private hospitals is recommended in order to develop further strategies and policies in Thai public and private hospitals. Furthermore, more in-depth interviews should be conducted with executives working in different types of service organizations in order to obtain more useful information and deeper insight so that this research model can be utilized in practice. Lastly, the influence of internal and external factors and environments should be carefully investigated in order to explore whether they statistically affect BSC in the organization or not. This research may be a benchmark for future research in BSC-related topics in terms of both methodology, findings, and results.

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APPENDICES

APPENDIX A

LIST OF HOSPITALS AND KEY INFORMANTS FOR THE IN-DEPTH INTERVIEW

Table A.1 List of Hospitals and Key Informants for the In-depth Interview

Kind of hospital	Province	Name of hospital	Position of key informant
1. Public	Bangkok	Lerdsin	1. Deputy Director of Hospital Administration 2. Head of Pharmacy 3. Head of Procurement 4. Head of Operating room
		Bhumibol	1. Head of Medicine Storage Room
		Chulalongkorn	1. Central Logistics Manager
		Chakri Naruebodindra Medical Institute, Ramathibodi	1. Deputy Executive Director of Logistics and Supply Chain 2. Senior Pharmacist
		Siriraj	1. Head of Orthopedics Procurement 2. Head of Orthopedics Operating Room
	Nonthaburi	Central Chest Institute of Thailand	1. Head of OPD Service
		Sirindhorn National Medical Rehabilitation	1. Deputy Director of Academic 2. Deputy Director of Nursing 3. Head of OPD Service 4. Supervisor of IPD Service
	Udonthani	Udonthani	1. Head of Pharmacy 2. Head of Rehabilitation
		Namsom	1. Head of Rehabilitation
		Kumphawapi	1. Head of OPD Medicine
	Uttaradit	Uttaradit	1. Head of Pathology Laboratory 2. Head of Pharmacy
	Samutsakhon	Ban Paew	1. Supervisor of Costing 2. Supervisor of Procurement 3. Senior officer of Procurement
Sub total - Public	5 provinces	12 hospitals	24 key informants
2. Private	Bangkok	Bangkok General	1. Director of Operations Support 2. Medical Supply Procurement Manager 3. Laboratory Department Manager
		Praram 9	1. Radiology and Medical Device Manager
		Samitivej Sukhumvit	1. Branch Manager 2. Procurement Supervisor

Kind of hospital	Province	Name of hospital	Position of key informant
		Phyathai 2	1. Central Supply and Operating Room Manager 2. Hemodialysis center manager
		Theptarin	1. Deputy Director of Operations 2. Assistant Director of Operations
		Navamin 9	1. Assistant Director of Medical
		Bumrungrad International	1. Senior Manager of Operating Room 2. Supervisor of Medical Supply Store 3. Senior Manager of Business Process Improvement and Innovation 4. Manager of Procurement, Capital Expenditure and Service
	Nonthaburi	World Medical Center	1. Assistant Director of Procurement 2. Procurement Manager
	Chonburi	Samitivej Sriracha	1. Inventory Management Manager 2. Branch Manager
		Samitivej Chonburi	1. Branch Manager 2. Procurement Supervisor
		Bangkok Pattaya	1. Operations Support Director 2. Medicine and Medical Supply Storage Room Supervisor 3. Branch Manager
Sub total - Private	3 provinces	11 hospitals	24 key informants
Grand total	**6 provinces**	**23 hospitals**	**48 key informants**

APPENDIX B

QUESTIONNAIRE
(ENGLISH VERSION)

QUESTIONNAIRE

"Factors Affecting Buyer-supplier Collaboration in Thai Public and Private Hospitals"

In answer this questionnaire, please note that your answers are strictly confidential and intended for academic research only. There is no right or wrong answer, so please help answer according to your opinion. There were nine sections which were 1) Hospital details; 2) Buyer-supplier collaboration; 3) Inventory management; 4) Capability of buyer; 5) Commitment of supplier; 6) Market competition; 7) External support; 8) Management support; and 9) Trust.

Section 1: Hospital Details

(Please mark X in the appropriate box □ or fill data in the blank**)**

1. Kind of hospital 1) Public 2) Private

2. Level of care 1) Primary 2) Secondary
   3) Tertiary 4) Excellence center

3. Number of beds _____ beds

4. Service years _____ years

5. Hospital accreditation □ 1) Already certified
   2) In certification process
   3) Has not started

Section 2: Buyer-supplier collaboration is referred to good relationship built between buyer (hospital) and supplier which are information sharing, resource sharing, collaborative communication, joint activity, and goal congruence.

Please mark X in the appropriate box □ which is represented the level of Inventory Management according to your opinion		**Low** →				**Medium** →				**High**
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1.	Buyer and supplier had an **information sharing** among each other										
2.	Buyer and supplier had a **resource sharing** among each other										
3.	Buyer and supplier had a **collaborative communication** together										
4.	Buyer and supplier have arranged **joint activity** together										
5.	Buyer and supplier have set a **goal congruence** together										

Section 3: Inventory management is referred to level of inventory holding, inventory turnover, out of stock, goods return, expired and damage stock, and proper storage condition as per hospital's key performance indicator (KPI) or standard.

Please mark X in the appropriate box □ which is represented the level of Inventory Management according to your opinion		**Low** →				**Medium** →				**High**
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1.	Hospital has **managed inventory** well as per standard										
2.	Hospital had **suitable inventory holding** level as per KPI										
3.	Hospital had **inventory turnover** level as per KPI										
4.	Hospital had **out of stock** level as per KPI										
5.	Hospital had **goods return** level as per KPI										
6.	Hospital had **expired and damage stock** level as per KPI										
7.	Hospital has **kept inventory in proper storage condition** as per standard										

Section 4: Capability of buyer is referred to understanding, awareness, knowledge, experience, skill and competency of buyer in the subject of supply chain management, procurement and inventory management.											
Please mark X in the appropriate box □ which is represented the level of Inventory Management according to your opinion		**Low**			→ **Medium**				→		**High**
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1.	Buyer has **understood the knowledge of supply chain management (SCM), procurement and inventory management**										
2.	Buyer has **aware of the importance of buyer-supplier collaboration (BSC)**										
3.	Buyer has normally **applied knowledge of SCM and BSC in general management**										
4.	Buyer has normally **applied knowledge of SCM and BSC in daily operation**										
5.	Buyer had **well experience working with suppliers**										
6.	Buyer had **well-trained procurement and inventory management skills**										
7.	Buyer has continuously **developed the competency**										
Section 5: Commitment of supplier is referred to concentration, empathy, carefulness, facilitation, service mind, problem solving, and before and after sale services of supplier.											
Please mark X in the appropriate box □ which is represented the level of Commitment of Supplier according to your opinion		**Low**			→ **Medium**				→		**High**
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1.	Supplier had **a good service commitment** to buyer										
2.	Supplier had **empathy to provide a good service** to buyer										
3.	Supplier has **dedicated to provide a good** service to buyer										
4.	Supplier has **facilitated very well** to buyer										
5.	Supplier had a **good service mind** to buyer										
6.	Supplier had **joint problem solving** to buyer										
7.	Supplier has **provided a good before and after sale services** to buyer										

Section 6: Market competition is referred to External pressure, influence and current situation from commercial competition affecting procurement and/or competition of hospital and working process of buyer											
Please mark X in the appropriate box □ which is represented the level of Market Competition according to your opinion		**Low**			→ **Medium**				→		**High**
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1.	Hospital has been influenced or pressured from **economic situations**										
2.	Hospital has been influenced or pressured from **nearby communities**										
3.	Hospital has been influenced or pressured from **nearby hospitals**										
4.	Hospital has been influenced or pressured from **government organizations**										
5.	Hospital has been influenced or pressured from **NGO**										
6.	Hospital has been influenced or pressured from **private organizations**										
7.	Hospital has been influenced or pressured from **patients and their relatives**										
Section 7: External support is referred to training, knowledge publishing, site visiting, information sharing, budget support, consultancy and sponsorship provided by other organizations and related to procurement and inventory management											
Please mark X in the appropriate box □ which is represented the level of External Support according to your opinion		**Low**			→ **Medium**				→		**High**
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1.	Buyer has been **provided the training and knowledge sharing**										
2.	Buyer has been **provided the site visit**										
3.	Buyer has been **shared the necessary information** as per hospital's request										
4.	Buyer has been **consulted, advised and suggested**										
5.	Buyer has been **supported in term of human resource and manpower**										
6.	Buyer has been **supported in term of tools, devices and instruments**										

Please mark X in the appropriate box □ which is represented the level of External Support according to your opinion		**Low** →				**Medium** →					**High**
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
7.	Buyer has been **supported in term of finance and budget**										
Section 8: Management support is referred to policy implementation, key performance indicator (KPI) setting, working guideline, performance monitoring, suggestion, problem solving, and budget allocation supported to Buyer-Supplier Collaboration (BSC).											
Please mark X in the appropriate box □ which is represented the level of External Support according to your opinion		**Low** →				**Medium** →					**High**
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1.	Top management had **a clear vision** for building Buyer-Supplier Collaboration										
2.	Top management has **directed any missions and policies** for building Buyer-Supplier Collaboration										
3.	Top management has **committed** for building Buyer-Supplier Collaboration										
4.	Top management has **allocated budget** for building Buyer-Supplier Collaboration										
5.	Top management has **invested in any joint activities** for building Buyer-Supplier Collaboration										
6.	Top management has **provided IT to support any joint activities** for building Buyer-Supplier Collaboration										
7.	Top management has **supported buyer in any joint activities** for building Buyer-Supplier Collaboration										
Section 9: Trust is referred to confidence, belief, credence and reliance which were built between buyer and supplier											
Please mark X in the appropriate box □ which is represented the level of Trust according to your opinion		**Low** →				**Medium** →					**High**
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1.	Buyer and supplier have **understood each other well**										

Please mark X in the appropriate box □ which is represented the level of Trust according to your opinion		**Low** → **Medium** → **High**									
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
2.	Buyer and supplier have **trusted each other** to keep the best interests in mind										
3.	Buyer and supplier have **genuinely concerned** about the success of each other										
4.	Buyer and supplier have **expected good relationship** to continue for long time										
5.	Buyer and supplier have **committed to each other**										
6.	Buyer and supplier have **taken significant e**ffort in building relationship										
7.	Buyer and supplier have **budgeted or invested** in building relationship										

Additional Comment or Suggestion for This Research

_____

_____

_____

_____

APPENDIX C

QUESTIONNAIRE
(THAI VERSION)

แบบสอบถาม

“ปัจจัยที่มีผลกระทบต่อความร่วมมือระหว่างผู้ซื้อและผู้จัดจำหน่าย ในโรงพยาบาลรัฐและเอกชนของไทย”

คำชี้แจง: แบบสอบถามฉบับนี้ แบ่งออกเป็น 9 ส่วน ดังนี้ (1) ข้อมูลทั่วไปของโรงพยาบาล (2) ความร่วมมือระหว่างผู้ซื้อและผู้จัดจำหน่าย (3) การจัดการสินค้าคงคลัง (4) ความสามารถของผู้ซื้อ (5) ความมุ่งมั่นของผู้จัดจำหน่าย (6) สภาวะกดดันจากการแข่งขันในตลาด (7) การสนับสนุนจากองค์การภายนอก (8) การสนับสนุนจากผู้บริหาร และ (9) ความเชื่อมั่นระหว่างผู้ซื้อและผู้จัดจำหน่าย

ส่วนที่ 1: ข้อมูลทั่วไปของโรงพยาบาล

(โปรดทำเครื่องหมาย X ลงในช่อง □ หรือเติมข้อมูลลงในช่องว่าง)

1. สังกัด 1) ภาครัฐ 2) ภาคเอกชน
2. ระดับของการรักษา 1) ปฐมภูมิ 2) ทุติยภูมิ
   3) ตติยภูมิ 4) ศูนย์ความเป็นเลิศ
3. จำนวนเตียงทั้งหมด _____ เตียง
4. จำนวนปีที่ให้บริการ _____ ปี
5. การรับรองมาตรฐาน HA 1) ได้รับการรับรองมาตราฐานแล้ว
   2) อยู่ระหว่างดำเนินการ
   3) ยังไม่ได้เริ่มดำเนินการ

ส่วนที่ 2: ความร่วมมือระหว่างผู้ซื้อและผู้จัดจำหน่าย คือ การทำงานร่วมกัน การประสานงานกัน และความร่วมมืออันดีที่เกิดขึ้นระหว่าง ผู้ซื้อ (บุคลากรของโรงพยาบาล) และผู้จัดจำหน่าย

โปรดทำเครื่องหมาย X ลงในช่อง ☐ ที่แสดงถึงระดับความร่วมมือระหว่างผู้ซื้อและผู้จัดจำหน่าย ตามความคิดเห็นของท่าน		ต่ำ →			ปานกลาง			→ สูง		
		1	2	3	4	5	6	7	8	9	10
1.	ผู้ซื้อและผู้จัดจำหน่าย **แบ่งปันข้อมูลสารสนเทศ**ที่เป็นประโยชน์ซึ่งกันและกัน										
2.	ผู้ซื้อและผู้จัดจำหน่าย **แบ่งปันทรัพยากร** ที่จำเป็นในการทำงานซึ่งกันและกัน										
3.	ผู้ซื้อและผู้จัดจำหน่าย **ติดต่อสื่อสารร่วมกัน** อย่างเปิดเผยและตรงไปตรงมา										
4.	ผู้ซื้อและผู้จัดจำหน่าย **จัดทำกิจกรรม** ต่างๆ ร่วมกัน										
5.	ผู้ซื้อและผู้จัดจำหน่าย **กำหนดเป้าหมาย** ในทำงานร่วมกัน										

ส่วนที่ 3: การจัดการสินค้าคงคลัง คือ การจัดการกระบวนงานต่างๆ ของผู้ซื้อ (บุคลากรของโรงพยาบาล) เพื่อให้มีปริมาณสินค้าคงคลัง (โดยเฉพาะ ยา เวชภัณฑ์และเครื่องมือแพทย์) อยู่ในระดับที่เหมาะสม เป็นตาม KPI และมาตราฐานที่กำหนด

โปรดทำเครื่องหมาย X ลงในช่อง ☐ ที่แสดงถึงระดับการจัดการสินค้าคงคลัง ตามความคิดเห็นของท่าน		ต่ำ →			ปานกลาง			→ สูง		
		1	2	3	4	5	6	7	8	9	10
1.	โรงพยาบาล **จัดการสินค้าคงคลัง** เป็นไปตามมาตรฐานที่กำหนด										
2.	โรงพยาบาล **มีปริมาณสินค้าคงคลัง** เป็นไปตาม KPI ที่กำหนด										
3.	โรงพยาบาล **มีอัตราการหมุนเวียนของสินค้าคงคลัง**เป็นไปตาม KPI ที่กำหนด										
4.	โรงพยาบาล **มีปริมาณสินค้าขาดคราว** เป็นไปตาม KPI ที่กำหนด										
5.	โรงพยาบาล **มีปริมาณสินค้าส่งคืน** เป็นไปตาม KPI ที่กำหนด										
6.	โรงพยาบาล **มีปริมาณสินค้าหมดอายุและเสียหาย** เป็นไปตาม KPI กำหนด										
7.	โรงพยาบาล **จัดเก็บสินค้าคงคลัง** เป็นไปตามมาตรฐานที่กำหนด										

ส่วนที่ 4: ความสามารถของผู้ซื้อ คือ การมีความรู้ความเข้าใจ ประสบการณ์และทักษะความสามารถ ของผู้ซื้อ (บุคลากรของโรงพยาบาล) ที่เกี่ยวข้องกับการจัดการโซ่อุปทาน การจัดซื้อจัดจ้าง และการจัดการสินค้าคงคลัง

โปรดทำเครื่องหมาย X ลงในช่อง ☐ ที่แสดงถึงระดับความสามารถของผู้ซื้อ ตามความคิดเห็นของท่าน		ต่ำ → ปานกลาง → สูง									
		1	2	3	4	5	6	7	8	9	10
1.	ผู้ซื้อ **มีความรู้และความเข้าใจ**ในเรื่องที่เกี่ยวข้องการจัดการโซ่อุปทาน การจัดซื้อจัดจ้าง และการจัดการสินค้าคงคลัง เป็นอย่างดี										
2.	ผู้ซื้อ **มีความตระหนักถึงความสำคัญ** ของความร่วมมือระหว่างผู้ซื้อและผู้จัดจำหน่ายเป็นอย่างดี										
3.	ผู้ซื้อ **ได้ประยุกต์ใช้ความรู้และความเข้าใจ** เรื่องการจัดการโซ่อุปทาน การจัดซื้อจัดจ้าง และการจัดการสินค้าคงคลัง ในการบริหารจัดการทั่วไป										
4.	ผู้ซื้อ **ได้ประยุกต์ใช้ความรู้และความเข้าใจ** เรื่องการจัดการโซ่อุปทาน การจัดซื้อจัดจ้าง และการจัดการสินค้าคงคลัง ในการปฏิบัติงานประจำวัน										
5.	ผู้ซื้อ **มีประสบการณ์** ในการทำงานร่วมกับผู้จัดจำหน่ายเป็นอย่างดี										
6.	ผู้ซื้อ **มีทักษะในการทำงานจัดซื้อจัดจ้าง** ที่ผ่านการอบรมมาเป็นอย่างดี										
7.	ผู้ซื้อ **ได้รับการพัฒนาความสามารถ** ที่เกี่ยวข้องกับการจัดการโซ่อุปทาน การจัดซื้อจัดจ้าง และการจัดการสินค้าคงคลัง อย่างต่อเนื่อง										

ส่วนที่ 5: ความมุ่งมั่นของผู้จัดจำหน่าย คือ การให้คำมั่นสัญญา การเอาใจใส่ทุ่มเท อำนวยความสะดวก มีจิตใจบริการที่ดี ช่วยแก้ปัญหาเฉพาะหน้า และการบริการทั้งก่อนและหลังการขายของผู้จัดจำหน่ายที่มีให้กับผู้ซื้อ (บุคลากรของโรงพยาบาล)

โปรดทำเครื่องหมาย X ลงในช่อง ☐ ที่แสดงถึงระดับความมุ่งมั่นของผู้จัดจำหน่าย ตามความคิดเห็นของท่าน		ต่ำ → ปานกลาง → สูง									
		1	2	3	4	5	6	7	8	9	10
1.	ผู้จัดจำหน่าย **ให้คำมั่นสัญญา** ในการให้บริการที่ดีแก่ผู้ซื้อ										
2.	ผู้จัดจำหน่าย **เอาใจใส่** ในการให้บริการที่ดีแก่ผู้ซื้อ										
3.	ผู้จัดจำหน่าย **มีความทุ่มเท** ในการให้บริการที่ดีแก่ผู้ซื้อ										
4.	ผู้จัดจำหน่าย **ช่วยเหลือและอำนวยความสะดวก** แก่ผู้ซื้อ										
5.	ผู้จัดจำหน่าย **มีจิตใจบริการที่ดี** แก่ผู้ซื้อ										
6.	ผู้จัดจำหน่าย **ให้ความร่วมมือในการแก้ปัญหาเฉพาะหน้า** แก่ผู้ซื้อ										
7.	ผู้จัดจำหน่าย **ให้บริการที่ดีทั้งก่อนและหลังการขาย** แก่ผู้ซื้อ										

ส่วนที่ 6: สภาวะกดดันจากการแข่งขันในตลาด คือ อิทธิพล แรงกดดัน หรือสถานการณ์ต่างๆ ที่มีผลกระทบต่อการจัดซื้อจัดจ้าง และหรือการแข่งขันในเชิงการค้าและการตลาดของโรงพยาบาล ซึ่งมีผลกระทบต่อการทำงานของผู้ซื้อ (บุคลากรของโรงพยาบาล)

โปรดทำเครื่องหมาย X ลงในช่อง ☐ ที่แสดงถึงระดับการแข่งขันในตลาด ตามความคิดเห็นของท่าน		ต่ำ → ปานกลาง → สูง									
		1	2	3	4	5	6	7	8	9	10
1.	โรงพยาบาล ได้รับอิทธิพล หรือแรงกดดันจาก **สภาวะทางเศรษฐกิจ**										
2.	โรงพยาบาล ได้รับอิทธิพล หรือแรงกดดันจาก **ชุมชนที่อาศัยอยู่ใกล้เคียง**										
3.	โรงพยาบาล ได้รับอิทธิพล หรือแรงกดดันจาก **โรงพยาบาลที่ตั้งอยู่ใกล้เคียง**										
4.	โรงพยาบาล ได้รับอิทธิพล หรือแรงกดดันจาก **หน่วยงานของภาครัฐ**										
5.	โรงพยาบาล ได้รับอิทธิพล หรือแรงกดดันจาก **หน่วยงานอิสระ (NGO)**										
6.	โรงพยาบาล ได้รับอิทธิพล หรือแรงกดดันจาก **หน่วยงานของภาคเอกชน**										
7.	โรงพยาบาล ได้รับอิทธิพล หรือแรงกดดันจาก **ผู้ป่วย หรือญาติของผู้ป่วย**										

ส่วนที่ 7: การสนับสนุนจากองค์การภายนอก คือ การสนับสนุนจากองค์การหรือหน่วยงานอื่นๆ เช่น หน่วยงานของภาครัฐ หน่วยงานที่ไม่ใช่ของภาครัฐหรือหน่วยงานอิสระ หน่วยงานภาคเอกชน สถาบันการศึกษา โรงพยาบาล ชมรมและสมาคม เป็นต้น ซึ่งให้การสนับสนุนในรูปแบบต่างๆ ที่เกี่ยวข้องกับการทำงานของผู้ซื้อ (บุคลากรของโรงพยาบาล)

โปรดทำเครื่องหมาย X ลงในช่อง ☐ ที่แสดงถึงระดับการสนับสนุนจากองค์การภายนอก ตามความคิดเห็นของท่าน		ต่ำ → ปานกลาง → สูง									
		1	2	3	4	5	6	7	8	9	10
1.	ผู้ซื้อ **ได้รับการอบรม เพื่อให้มีความรู้ความเข้าใจ** ที่เกี่ยวกับการจัดซื้อจัดจ้าง หรือการจัดการสินค้าคงคลัง										
2.	ผู้ซื้อ **ได้รับการเอื้อเฟื้อสถานที่ เพื่อให้เข้าไปศึกษาดูงาน** ที่เกี่ยวกับการจัดซื้อจัดจ้าง หรือการจัดการสินค้าคงคลัง										
3.	ผู้ซื้อ **ได้รับการแบ่งปันข้อมูลที่จำเป็น (ตามที่โรงพยาบาลร้องขอ)** ที่เกี่ยวกับการจัดซื้อจัดจ้าง หรือการจัดการสินค้าคงคลัง										
4.	ผู้ซื้อ **ได้รับการให้คำปรึกษา คำแนะนำ หรือข้อเสนอแนะ** ที่เกี่ยวกับการจัดซื้อจัดจ้าง หรือการจัดการสินค้าคงคลัง										

โปรดทำเครื่องหมาย X ลงในช่อง □ ที่แสดงถึงระดับการสนับสนุนจากองค์การภายนอก ตามความคิดเห็นของท่าน		ต่ำ → ปานกลาง → สูง									
		1	2	3	4	5	6	7	8	9	10
5.	ผู้ซื้อ **<u>ได้รับการสนับสนุนด้านบุคลากร หรือทีมงาน</u>** ที่เข้ามาช่วยเหลือในการปฏิบัติงานที่เกี่ยวกับการจัดซื้อจัดจ้างและการจัดการสินค้าคงคลัง										
6.	ผู้ซื้อ **<u>ได้รับการสนับสนุนด้านเครื่องมือ วัสดุหรืออุปกรณ์</u>** ที่ใช้ในการปฏิบัติงานที่เกี่ยวกับการจัดซื้อจัดจ้างและการจัดการสินค้าคงคลัง										
7.	ผู้ซื้อ **<u>ได้รับการสนับสนุนด้านการเงินหรืองบประมาณ</u>** เพื่อช่วยเหลือในการดำเนินโครงการที่เกี่ยวกับการจัดซื้อจัดจ้างและการจัดการสินค้าคงคลัง										

ส่วนที่ 8: การสนับสนุนจากผู้บริหารของโรงพยาบาล คือ การสนับสนุนจากผู้บริหาร หรือคณะกรรมการบริหารของโรงพยาบาล ในรูปแบบต่างๆ เช่น กำหนดนโยบาย ให้แนวทางในการปฏิบัติงาน ตรวจสอบผลการดำเนินงาน เป็นต้น

โปรดทำเครื่องหมาย X ลงในช่อง □ ที่แสดงถึงระดับการสนับสนุนจากผู้บริหารของโรงพยาบาล ตามความคิดเห็นของท่าน		ต่ำ → ปานกลาง → สูง									
		1	2	3	4	5	6	7	8	9	10
1.	ผู้บริหารของโรงพยาบาล **<u>มีการกำหนดวิสัยทัศน์อย่างชัดเจน</u>** ที่เกี่ยวข้องและเอื้อต่อการสร้างความร่วมมือกับผู้จัดจำหน่าย										
2.	ผู้บริหารของโรงพยาบาล **<u>มีการกำหนดพันธกิจและนโยบาย</u>** ที่เกี่ยวข้องและเอื้อต่อการสร้างความร่วมมือกับผู้จัดจำหน่าย										
3.	ผู้บริหารของโรงพยาบาล **<u>ให้คำมั่นสัญญา</u>** ที่เอื้อต่อการสร้างความร่วมมือกับผู้จัดจำหน่าย										
4.	ผู้บริหารของโรงพยาบาล **<u>จัดสรรงบประมาณ</u>** ที่เอื้อต่อการสร้างความร่วมมือกับผู้จัดจำหน่าย										
5.	ผู้บริหารของโรงพยาบาล **<u>ได้ลงทุนในกิจกรรมต่างๆ</u>** ร่วมกับผู้จัดจำหน่ายที่เอื้อต่อการสร้างความร่วมมือกับผู้จัดจำหน่าย										
6.	ผู้บริหารของโรงพยาบาล **<u>จัดเตรียมระบบเทคโนโลยีสารสนเทศ</u>** ในกิจกรรมต่างๆ ที่เอื้อต่อการสร้างความร่วมมือกับผู้จัดจำหน่าย										
7.	ผู้บริหารของโรงพยาบาล **<u>สนับสนุนบุคลากร</u>** ให้มีความรู้ความเข้าใจ และมีส่วนร่วมในกิจกรรมต่างๆ ที่เอื้อต่อการสร้างความร่วมมือกับผู้จัดจำหน่าย										

ส่วนที่ 9: ความเชื่อมั่นระหว่างผู้ซื้อและผู้จัดจำหน่าย คือ ความเชื่อมั่น ความเชื่อใจและความไว้วางใจ ที่ผู้ซื้อ (บุคลากรของโรงพยาบาล) และผู้จัดจำหน่ายมีให้ต่อกัน											
โปรดทำเครื่องหมาย X ลงในช่อง □ ที่แสดงถึงระดับความเชื่อมั่นระหว่างผู้ซื้อและผู้จัดจำหน่าย ตามความคิดเห็นของท่าน		**ต่ำ**		→	**ปานกลาง**			→	**สูง**		
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1.	ผู้ซื้อและผู้จัดจำหน่าย **มีความเข้าใจ** ซึ่งกันและกันเป็นอย่างดี										
2.	ผู้ซื้อและผู้จัดจำหน่าย **มีความเชื่อมั่น** ที่จะช่วยกันสร้างประโยชน์ที่ดีต่อกัน										
3.	ผู้ซื้อและผู้จัดจำหน่าย **มีความสนใจอย่างจริงใจ** ในความสำเร็จของกันและกัน										
4.	ผู้ซื้อและผู้จัดจำหน่าย **คาดหวังที่จะสานสัมพันธ์ที่ดี** ไปอย่างต่อเนื่อง										
5.	ผู้ซื้อและผู้จัดจำหน่าย **มีการให้คำมั่นสัญญา** ซึ่งกันและกันเป็นอย่างดี										
6.	ผู้ซื้อและผู้จัดจำหน่าย **มีความพยายาม** เพื่อสร้างความสัมพันธ์ที่ดีต่อกัน										
7.	ผู้ซื้อและผู้จัดจำหน่าย **มีการลงทุน** เพื่อสร้างความสัมพันธ์ที่ดีต่อกัน										

ข้อคิดเห็นเพิ่มเติมต่อแบบสอบถามหรือหัวข้อการวิจัย

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APPENDIX D

INDEX OF ITEM-OBJECTIVE CONGRUENCE

Table D.1 Name List of Content Experts

No.	Name	Position	Office
1.	Group Captain Dr. Pranee Mooklai	Senior Pharmacist, and Head of Division	Medical Supply Division, Directorate of Medical Services, Royal Thai Air Force
2.	Dr. Tuangyot Supeekit	Assistant Professor, Lecturer, and Healthcare Supply Chain Researcher	Department of Industrial Engineering, Faculty of Engineering, Mahidol University
3.	Dr. Sophon Muangchoo	Industrial Consultant, and Healthcare Supply Chain Researcher	Healthcare Supply Chain Excellence Centre, Mahidol University
4.	Mr. Kanok Juthamanee	Deputy Executive Director for Logistics and Supply Chain	Chakri Naruebodindra Medical Institute, Ramathibodi Hospital
5.	Mr. Sirirak Sombat	Instructor and Consultant for Hospital Logistics and Supply Chain	Department of Skill Development, Ministry of Labour

Table D.2 The Result of the Index of Item-objective Congruence of Each Item

Objective Variable	Item	Opinion of content expert					Total	IOC	Result
		#1	#2	#3	#4	#5			
1. Hospital details	1	+1	+1	+1	+1	+1	5	1.00	Accepted
	4	+1	+1	+1	+1	+1	5	1.00	Accepted
	3	+1	+1	+1	+1	+1	5	1.00	Accepted
	4	+1	+1	+1	+1	+1	5	1.00	Accepted
	5	+1	+1	+1	+1	+1	5	1.00	Accepted

Objective Variable	Item	Opinion of content expert					Total	IOC	Result
		#1	#2	#3	#4	#5			
2. Buyer-supplier collaboration	1	+1	0	+1	+1	+1	4	0.80	Accepted
	4	+1	0	+1	+1	+1	4	0.80	Accepted
	3	+1	0	+1	+1	+1	4	0.80	Accepted
	4	+1	0	+1	+1	+1	4	0.80	Accepted
	5	+1	0	+1	+1	+1	4	0.80	Accepted
3. Inventory management	1	+1	+1	0	+1	+1	4	0.80	Accepted
	4	+1	+1	0	+1	+1	4	0.80	Accepted
	3	+1	+1	0	+1	+1	4	0.80	Accepted
	4	+1	+1	0	+1	+1	4	0.80	Accepted
	5	+1	+1	0	+1	+1	4	0.80	Accepted
	6	+1	+1	0	+1	+1	4	0.80	Accepted
	7	+1	+1	0	+1	+1	4	0.80	Accepted
4. Capability	1	+1	+1	+1	+1	+1	5	1.00	Accepted
	4	+1	+1	+1	+1	+1	5	1.00	Accepted
	3	+1	+1	+1	+1	+1	5	1.00	Accepted
	4	+1	+1	+1	+1	+1	5	1.00	Accepted
	5	+1	+1	+1	+1	+1	5	1.00	Accepted
	6	+1	+1	+1	+1	+1	5	1.00	Accepted
	7	+1	+1	+1	+1	+1	5	1.00	Accepted
5. Commitment	1	+1	+1	+1	+1	+1	5	1.00	Accepted
	4	+1	+1	+1	+1	+1	5	1.00	Accepted
	3	+1	+1	+1	+1	+1	5	1.00	Accepted
	4	+1	+1	+1	+1	+1	5	1.00	Accepted
	5	+1	+1	+1	+1	+1	5	1.00	Accepted
	6	+1	+1	+1	+1	+1	5	1.00	Accepted
	7	+1	+1	+1	+1	+1	5	1.00	Accepted

Objective Variable	Item	Opinion of content expert					Total	IOC	Result
		#1	#2	#3	#4	#5			
6. Market competition	1	+1	+1	+1	+1	+1	5	1.00	Accepted
	4	+1	+1	+1	+1	+1	5	1.00	Accepted
	3	+1	+1	+1	+1	+1	5	1.00	Accepted
	4	+1	+1	+1	+1	+1	5	1.00	Accepted
	5	+1	+1	+1	+1	+1	5	1.00	Accepted
	6	+1	+1	+1	+1	+1	5	1.00	Accepted
	7	+1	+1	+1	+1	+1	5	1.00	Accepted
7. External support	1	+1	+1	+1	+1	+1	5	1.00	Accepted
	4	+1	+1	+1	+1	+1	5	1.00	Accepted
	3	+1	+1	+1	+1	+1	5	1.00	Accepted
	4	+1	0	+1	+1	+1	4	0.80	Accepted
	5	+1	+1	+1	+1	+1	5	1.00	Accepted
	6	+1	+1	+1	+1	+1	5	1.00	Accepted
	7	+1	+1	+1	+1	+1	5	1.00	Accepted
8. Management support	1	+1	+1	+1	+1	+1	5	1.00	Accepted
	4	+1	+1	+1	+1	+1	5	1.00	Accepted
	3	+1	+1	+1	+1	+1	5	1.00	Accepted
	4	+1	+1	+1	+1	+1	5	1.00	Accepted
	5	+1	+1	+1	+1	+1	5	1.00	Accepted
	6	+1	+1	+1	+1	+1	5	1.00	Accepted
	7	+1	+1	+1	+1	+1	5	1.00	Accepted
9. Trust	1	+1	+1	+1	+1	+1	5	1.00	Accepted
	4	+1	+1	+1	+1	+1	5	1.00	Accepted
	3	+1	+1	+1	+1	+1	5	1.00	Accepted
	4	+1	+1	+1	+1	+1	5	1.00	Accepted
	5	+1	+1	+1	+1	+1	5	1.00	Accepted

Objective Variable	Item	Opinion of content expert					Total	IOC	Result
		#1	#2	#3	#4	#5			
	6	+1	+1	+1	+1	+1	5	1.00	Accepted
	7	+1	+1	+1	+1	+1	5	1.00	Accepted

APPENDIX E

DESCRIPTIVE STATISTICS

Table E.1 Result of Descriptive Statistics of Measurement Items (n = 416)

Variables	Measurement item no.	Code	Mean	Standard deviation	Skewness	Kurtosis	Interpretation
Buyer-supplier collaboration	**1**	BSC_1	8.95	.866	-.534	-.131	Highest
	2	BSC_2	7.78	1.156	-.167	-.801	High
	3	BSC_3	9.13	.796	-.784	.656	Highest
	4	BSC_4	7.76	1.217	-.058	-1.021	High
	5	BSC_5	8.08	1.158	-.305	-.737	High
Inventory management	**1**	INM_1	8.89	.858	-.769	.622	Highest
	2	INM_2	8.82	.894	-.737	.485	Highest
	3	INM_3	8.73	.900	-.701	.483	Highest
	4	INM_4	8.32	1.072	-.693	-.175	High
	5	INM_5	8.35	1.154	-.800	-.075	High
	6	INM_6	8.44	1.235	-.856	-.026	High
	7	INM_7	8.91	.883	-.964	1.406	Highest

Table E.1 (Continued)

Variables	Measurement item no.	Code	Mean	Standard deviation	Skewness	Kurtosis	Interpretation
Capability	**1**	CAP_1	8.31	.961	-.644	.480	High
	2	CAP_2	8.48	.967	-.720	.643	High
	3	CAP_3	8.33	.960	-.722	.587	High
	4	CAP_4	8.29	.972	-.647	.346	High
	5	CAP_5	8.36	.923	-.622	.081	High
	6	CAP_6	8.34	.988	-.706	-.043	High
	7	CAP_7	8.30	1.020	-.601	-.099	High
Commitment	**1**	COM_1	8.14	1.017	-.429	-.392	High
	2	COM_2	8.26	.868	-.540	-.119	High
	3	COM_3	8.10	.930	-.360	-.299	High
	4	COM_4	8.32	.850	-.492	-.034	High
	5	COM_5	8.31	.856	-.352	-.070	High
	6	COM_6	8.23	.859	-.514	-.037	High
	7	COM_7	8.24	.858	-.455	-.256	High

Table E.1 (Continued)

Variables	Measurement item no.	Code	Mean	Standard deviation	Skewness	Kurtosis	Interpretation
Market competition	**1**	MAC_1	8.09	1.188	-.269	-.628	High
	2	MAC_2	7.33	1.197	.288	-.794	Somewhat high
	3	MAC_3	7.19	1.312	.309	-.815	Somewhat high
	4	MAC_4	7.60	1.357	-.007	-.970	High
	5	MAC_5	7.01	1.181	.330	-.660	Somewhat high
	6	MAC_6	7.36	1.224	.150	-.763	Somewhat high
	7	MAC_7	7.97	1.276	-.203	-.807	High
External support	**1**	EXS_1	8.09	1.106	-.488	-.480	High
	2	EXS_2	7.67	1.149	-.113	-1,016	High
	3	EXS_3	8.00	.995	-.231	-.624	High
	4	EXS_4	8.11	1.027	-.456	-.574	High
	5	EXS_5	7.63	1.068	-.084	-.891	High
	6	EXS_6	7.69	1.094	-.204	-.830	High
	7	EXS_7	7.65	1.190	-.089	-.900	High

Table E.1 (Continued)

Variables	Measurement item no.	Code	Mean	Standard deviation	Skewness	Kurtosis	Interpretation
Management support	**1**	MAS_1	8.23	1.133	-.493	-.374	High
	2	MAS_2	8.15	1.128	-.427	-.349	High
	3	MAS_3	7.89	1.137	-.321	-.720	High
	4	MAS_4	7.91	1.168	-.301	-.822	High
	5	MAS_5	7.50	1.194	-.105	-.947	High
	6	MAS_6	7.90	1.132	-.301	-.655	High
	7	MAS_7	7.95	1.122	-.219	-.777	High
Trust	**1**	TRU_1	8.32	.841	-.549	.260	High
	2	TRU_2	8.39	.885	-.385	.003	High
	3	TRU_3	8.35	.917	-.563	.230	High
	4	TRU_4	8.54	.910	-.520	.234	High
	5	TRU_5	8.09	.998	-.306	-.453	High
	6	TRU_6	8.12	.998	-.370	-.270	High
	7	TRU_7	7.61	1.214	-.100	-.886	High

APPENDIX F

CORRELATION MATRIX

Table F.1 Correlation Matrix, Eigenvalue, Mean, and Standard Deviation of All Variables

Variable	EXS	MAS	TRU	CAP	MAC	COM	INM	BSC
EXS	1.000							
MAS	.588	1.000						
TRU	.522	.534	1.000					
CAP	.491	.356	.660	1.000				
MAC	.149	.086	.093	.039	1.000			
COM	.484	.449	.641	.478	.080	1.000		
INM	.265	.222	.374	.516	.042	.363	1.000	
BSC	.467	.463	.614	.400	.142	.455	.251	1.000
Eigenvalue	3.807	1.043	.903	.614	.521	.494	.395	.223
Mean	7.835	7.934	8.203	8.344	7.507	8.229	8.638	8.339
Standard Deviation	.850	.950	.748	.791	.911	.765	.767	.736
n	416	416	416	416	416	416	416	416

Note: 1) All variables are significance at .000 (2-tailed)

2) No high multicollinearity

APPENDIX G

PATH ANALYSIS RESULTS

1. Path Analysis Results for Buyer-supplier Collaboration in Thai Public Hospitals

1.1 Buyer-supplier Collaboration

Table G.1 Model Summary

Model	R H_Kind = Public (Selected)	R Square	Adjusted R Square	Std. Error of the Estimate
1	.649[a]	.421	.416	.58874

Note: a. Predictors: (Constant), TRU, EXS, MAS

Table G.2 ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	76.970	3	25.657	74.022	.000[c]
	Residual	105.716	305	.347		
	Total	182.687	308			

Note: a. Dependent variable: BSC
b. Selecting only cases for which H_Kind = Public
c. Predictors: (Constant), TRU, EXS, MAS

Table G.3 Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.583	.386		6.700	.000
	EXS	.161	.051	.175	3.134	.002
	MAS	.093	.044	.120	2.129	.034
	TRU	.455	.051	.465	8.879	.000

Note: a. Dependent variable: BSC
b. Selecting only cases for which H_Kind = Public

1.2 External Support

Table G.4 Model Summary

Model	R H_Kind = Public (Selected)	R Square	Adjusted R Square	Std. Error of the Estimate
1	.631[a]	.398	.392	.65197

Note: a. Predictors: (Constant), COM, MAC, MAS

Table G.5 ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	85.667	3	28.556	67.180	.000[c]
	Residual	129.644	305	.425		
	Total	215.311	308			

Note: a. Dependent variable: EXS
b. Selecting only cases for which H_Kind = Public
c. Predictors: (Constant), COM, MAC, MAS

Table G.6 Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.930	.507		3.805	.000
	MAS	.410	.041	.484	10.020	.000
	MAC	.068	.041	.073	1.646	.101
	COM	.263	.051	.248	5.128	.000

Note: a. Dependent variable: EXS
b. Selecting only cases for which H_Kind = Public

1.3 Management Support

Table G.7 Model Summary

Model	R H_Kind = Public (Selected)	R Square	Adjusted R Square	Std. Error of the Estimate
1	.393[a]	.154	.152	.90964

Note: a. Predictors: (Constant), COM

Table G.8 ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	46.406	1	46.406	56.083	.000[c]
	Residual	254.027	307	.827		
	Total	300.433	308			

Note: a. Dependent variable: MAS
b. Selecting only cases for which H_Kind = Public
c. Predictors: (Constant), COM

Table G.9 Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.763	.540		6.973	.000
	COM	.493	.066	.393	7.489	.000

Note: a. Dependent variable: MAS
b. Selecting only cases for which H_Kind = Public

1.4 Trust

Table G.10 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	H_Kind = Public (Selected)			
1	.771[a]	.594	.590	.50416

Note: a. Predictors: (Constant), CAP, MAS, COM

Table G.11 ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	113.419	3	37.806	148.743	.000[c]
	Residual	77.523	305	.254		
	Total	190.942	308			

Note: a. Dependent variable: TRU
b. Selecting only cases for which H_Kind = Public
c. Predictors: (Constant), CAP, MAS, COM

Table G.12 Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.683	.353		1.934	.054
	COM	.365	.043	.365	8.461	.000
	MAS	.179	.032	.224	5.543	.000
	CAP	.369	.040	.391	9.280	.000

Note: a. Dependent variable: TRU

b. Selecting only cases for which H_Kind = Public

1.5 Capability

Table G.13 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	H_Kind = Public (Selected)			
1	.521[a]	.271	.269	.71268

Note: a. Predictors: (Constant), INM

Table G.14 ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	57.987	1	57.987	114.165	.000[c]
	Residual	155.931	307	.508		
	Total	213.918	308			

Note: a. Dependent variable: CAP

b. Selecting only cases for which H_Kind = Public

c. Predictors: (Constant), INM

Table G.15 Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.704	.431		8.601	.000
	INM	.533	.050	.521	10.685	.000

Note: a. Dependent variable: CAP

b. Selecting only cases for which H_Kind = Public

2. Path Analysis Results for Buyer-supplier Collaboration in Thai Private Hospitals

2.1 Buyer-supplier Collaboration

Table G.16 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	H_Kind = Private (Selected)			
1	.529[a]	.280	.259	.48417

Note: a. Predictors: (Constant), TRU, MAS, EXS

Table G.17 ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9.385	3	3.128	13.345	.000[c]
	Residual	24.145	103	.234		
	Total	33.530	106			

Note: a. Dependent variable: BSC

b. Selecting only cases for which H_Kind = Private

c. Predictors: (Constant), TRU, MAS, EXS

Table G.18 Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.039	.780		5.175	.000
	EXS	.082	.076	.127	2.077	.042
	MAS	.005	.092	.006	.052	.959
	TRU	.454	.117	.436	3.878	.000

Note: a. Dependent variable: BSC
b. Selecting only cases for which H_Kind = Private

2.2 External Support

Table G.19 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	H_Kind = Private (Selected)			
1	.683[a]	.467	.451	.64266

Note: a. Predictors: (Constant), COM, MAC, MAS

Table G.20 ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	37.244	3	12.415	30.059	.000[c]
	Residual	42.540	103	.413		
	Total	79.784	106			

Note: a. Dependent variable: EXS
b. Selecting only cases for which H_Kind = Private
c. Predictors: (Constant), COM, MAC, MAS

Table G.21 Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.006	.982		-1.024	.308
	MAS	.476	.119	.368	3.997	.000
	MAC	.150	.073	.151	2.062	.042
	COM	.459	.120	.349	3.824	.000

Note: a. Dependent variable: EXS
b. Selecting only cases for which H_Kind = Private

2.3 Management Support

Table G.22 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	H_Kind = Private (Selected)			
1	.614[a]	.378	.372	.53145

Note: a. Predictors: (Constant), COM

Table G.23 ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.990	1	17.990	63.695	.000[c]
	Residual	29.657	105	.282		
	Total	47.647	106			

Note: a. Dependent variable: MAS
b. Selecting only cases for which H_Kind = Private
c. Predictors: (Constant), COM

Table G.24 Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.085	.663		4.654	.000
	COM	.626	.078	.614	7.981	.000

Note: a. Dependent variable: MAS

b. Selecting only cases for which H_Kind = Private

2.4 Trust

Table G.25 Model Summary

Model	R H_Kind = Private (Selected)	R Square	Adjusted R Square	Std. Error of the Estimate
1	.818[a]	.669	.660	.31524

Note: a. Predictors: (Constant), CAP, MAS, COM

Table G.26 ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.712	3	6.904	69.472	.000[c]
	Residual	10.236	103	.099		
	Total	30.948	106			

Note: a. Dependent variable: TRU

b. Selecting only cases for which H_Kind = Private

c. Predictors: (Constant), CAP, MAS, COM

Table G.27 Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.316	.501		2.626	.010
	COM	.160	.063	.195	2.554	.012
	MAS	.202	.058	.251	3.481	.001
	CAP	.484	.055	.562	8.818	.000

Note: a. Dependent variable: TRU
b. Selecting only cases for which H_Kind = Private

2.5 Capability

Table G.28 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	H_Kind = Private (Selected)			
1	.460[a]	.212	.204	.56009

Note: a. Predictors: (Constant), INM

Table G.29 ANOVA[a,b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.843	1	8.843	28.189	.000[c]
	Residual	32.938	105	.314		
	Total	41.781	106			

Note: a. Dependent variable: CAP
b. Selecting only cases for which H_Kind = Private
c. Predictors: (Constant), INM

Table G.30 Coefficients[a,b]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.302	.796		5.406	.000
	INM	.481	.091	.460	5.309	.000

Note: a. Dependent variable: CAP

b. Selecting only cases for which H_Kind = Private

APPENDIX H

GOODNESS-OF-FIT STATISTICS

Table H.1 Goodness-of-fit Statistics: Final Model for BSC in Thai Public Hospitals (n = 309)

Measurement	Abbreviation	Value
Chi-square	CMIN	9.851
p-value	P	.080
Degree of freedom	DF	5
Chi-square/df	CMIN/DF	1.970
Root Mean Square Residual	RMR	.023
Root Mean Square Error of Approx.	RMSEA	.048
Goodness-of-fit Index	GFI	.994
Adjusted Goodness-of-fit	AGFI	.958
Normed Fit Index	NFI	.992
Comparative Fit Index	CFI	.996
Tucker-Lewis Index	TLI	.978
Relative Fit Index	RFI	.956

Table H.2 Goodness-of-fit Statistics: Final Model for BSC in Thai Private Hospitals (n = 107)

Measurement	Abbreviation	Value
Chi-square	CMIN	11.901
p-value	P	.063
Degree of freedom	DF	6
Chi-square/df	CMIN/DF	1.984
Root Mean Square Residual	RMR	.026
Root Mean Square Error of Approx.	RMSEA	.053
Goodness-of-fit Index	GFI	.992
Adjusted Goodness-of-fit	AGFI	.954
Normed Fit Index	NFI	.990
Comparative Fit Index	CFI	.994
Tucker-Lewis Index	TLI	.973
Relative Fit Index	RFI	.951

BIOGRAPHY

NAME	Mr. Nattawut Charumekin
ACADEMIC BACKGROUND	2010: Master of Public and Private Management Graduate School of Public Administration, NIDA 2007: Master of Business Administration, Finance Graduate School of Business Administration, NIDA 1998: Bachelor of Engineering, Chemical Engineering Faculty of Engineering, Mahidol University
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