DEVELOPMENT OF THE CENTRALIZED SOURCING UNIT TO IMPROVE THE ORDERING PROCESS: A CASE OF A TELECOMMUNICATION COMPANY

By

THARARAT YAMAMOTO

A Final Report of the Six-Credit Course
SCM 2202 Graduate Project

Submitted in Partial Fulfillment of the Requirements for the Degree of
MASTER OF SCIENCE IN SUPPLY CHAIN MANAGEMENT

Martin de Tours School of Management
Assumption University
Bangkok, Thailand

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I, _Thararat Yamamoto_____

declare that this thesis/project and the work presented in it are my own and has been generated by me as the result of my own original research.

Development of the Centralized Sourcing Unit to Improve the Ordering Process: A Case of a Telecommunication Company_____

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Date   _____

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Thararat Yamamoto

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November 2011

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ABSTRACT

In modern society, the telecommunication market faces various business situations which consist of new demands and new trade strategies. This is a time of transformation for service providers, enterprises and strategic industries worldwide. The ABC Company stands as a pioneer in applications and services of mobile, IP, fixed, and optic technology. It brings a matchless heritage of ideas that aim toward the recognition of the many possibilities there are in a connected world.

The ABC Company was established by the merging of the two companies. With this merger, it created many different systems and work processes that needed to be used internally in various operation processes, especially in the ordering process from selling units to the eight sourcing units of the Company. As each sourcing unit works independently, it causes excessive and redundant work in the ordering process. Huge paperwork together with work overload of the employees provokes delays in the work process.

A centralized sourcing unit is designed to solve the problem. The "as-is" ordering process is identified, based on the data gathered from the in-depth interviews, observation, and documentation reviews. Then, the "to-be" ordering process is proposed with the design of a centralized sourcing unit.

This study found that the development of centralized sourcing could help to reduce the redundancies in the work process. It also reduces the lead time in placing an order with a sourcing unit. These results can help the ABC Company to develop a centralized sourcing unit, with techniques for improving the effectiveness and efficiency of the ordering process.

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CHAPTER I

GENERALITIES OF THE STUDY

Today's telecommunication market is facing various business situations. It includes new demands, and business strategies. During a time of transformation for service providers, enterprises and strategic industries worldwide, the ABC Company stands as an innovator in applications and services for mobile, IP, fixed, and optic technology. The ABC Company owns Z Laboratory, which is one of the world's primary centers for research and novelty in communicative technology. ABC[1] brings an unmatched quantity of ideas that aim toward the realization of the many possibilities there are in a connected world.

ABC was established in 2006 by merging two companies. The first was a well known French company named A Company and the second was the largest electrical manufacturing company in the United States of America named B Technologies. It has emerged as the world's first true global supplier in communication solutions, and is one of the most successful companies in finding solutions and services in the telecommunication business. As a company it moves beyond national borders. Its worldwide accomplishes and influence is known by both its resources and revenues. It also has one of the largest and most innovative R&D departments.

ABC provides a more vivid vision of where networks are going. It becomes familiar with customer needs, and has an energetic culture of technical excellence and innovation. ABC enriches people's lives by transforming the way the world communicates. With the most skilled and talented global service organizations in the telecommunications trade and having operations spanning over one hundred countries worldwide including Thailand, ABC is a local partner that extends globally. ABC is

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[1] ABC is pseudonym

achieved revenues exceeding 10 billion EURO in 2010 and has been incorporated, with its headquarters in Paris, France.

1.1 Background of the Research

With the merging of the two companies, presently ABC has over 100 local branches in many countries worldwide including Thailand, which is called "Selling Units". ABC also has eight sourcing units in Belgium, France, Canada, Germany, Italy, Spain, The United State of America, and China. These sourcing units usually play two roles, which are performing as a manufacturer and as a sourcing unit to provide any products/materials from external suppliers to support the orders from their Selling Units. As each sourcing unit works independently, it creates many different systems and work processes that are be used internally in various operation processes, especially in the ordering process from Selling Units to their own sourcing units. Moreover, ABC has three central order management departments in three regions which are (1) Europe, Middle East, and Africa or EMEA, located in France, (2) Central America / Latin America or CALA located in Mexico, and (3) Asia Pacific or APAC located in Thailand. A central order management department is a grouping center which is responsible for creating and completing orders in a company's system for customers in the entire region, as well as managing orders and product shipments to selling units. A central order management department is the coordinator for all communications between selling units and sourcing units.

Currently, when selling units receive orders from their customers, they place the order of any hardware or software products to their sourcing units. The Processes of order creation and completion are done by the central order management departments in their region. After inputting the customer order into a company system, internal order documents need to be generated separately by product categories. For this reason, one order from a customer has to be distributed to many sourcing units with many purchase orders. It causes excessive work for selling units such as increased paper work in the process of ordering, and also increases the work process and work load for employees. All of this leads to delay in the entire working process. Any delay in

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order entry reduces the pace in the procurement and manufacturing processes, and it also reduces the company's ability to deliver on time. Increased costs are incurred to compensate for the time lost during order validation. Late deliveries and longer lead-times also have an impact on customer satisfaction and competitiveness, resulting in lost business.

Table 1.1: Key Performance Indicator (KPI) for FY2010 of Ordering Process Lead Time of Asia Pacific Region

Regional Unit	Data	FY2010 Target OPLT	FY2010 Actual OPLT				
			Q1	Q2	Q3	Q4	FY2010
APAC	OPLT (days)	10	20.88	18.03	18.50	15.63	18.26
	No of orders		535	858	940	1,554	3,887

Remarks: ABC's Fiscal Year 2010 is between July, 2010 and June, 2011.

1.2 Statement of the Problem

To avoid redundancies in the ordering process, ABC has set up a plan for a centralized sourcing unit. The first implementation will be in the Asia Pacific region. Even though there are only a few countries in this region, it is the second highest region in revenue for the Company. The new centralized sourcing unit will not be a part of any current sourcing unit. Its main function is to source materials from the current eight sourcing units while these sourcing units will be downgraded to sub-sourcing ones. The centralized sourcing unit will be the only unit that receives orders and supplies all hardware and software products to selling units in its region. The centralized sourcing unit will be linked to all manufacturing plants and CEMs (Contract Electronic Manufacturers) which are external subcontractors that assemble and test products for ABC, and also are responsible for the group's entire inventory. With this idea, when the Selling Units receive an order from their final customer, they can place the order directly to the centralized sourcing unit instead of eight sourcing units. ABC may reduce the order processing lead time and have less paper work with order processing, and it eliminates duplicated work. It will also lead to reduced operation costs, and increased order processing performance in order to provide a better service to the customers.

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However, before setting up this centralized sourcing unit, ABC would like to demonstrate this model to their management and the entire staffs. They want to show why the centralized sourcing unit is significant, what the benefits of this centralized sourcing unit will be to employees and for overall business, and also what the main changes will be needed for the new ordering process to the centralized sourcing unit instead of eight sourcing units, which leads to the research problem of **"How does the ABC Company develop a centralized sourcing unit to improve the effectiveness and efficiency of the ordering process?"**

1.3 Research Objectives

The main purpose of this research is to identify how to develop a centralized sourcing unit to improve the effectiveness and efficiency of the ordering process; three specific objectives are as follows:

1. To identify the as-is ordering process and the to-be ordering process of ABC.
2. To design the centralized sourcing unit for ABC.
3. To compare positive and negative aspects of the as-is ordering process and the to-be ordering process of ABC.

1.4 Scope of the Research

This research is a case study of a telecommunication company named The ABC Company. Its focus is on the development of a centralized sourcing unit to improve the effectiveness and efficiency of the ordering process. This research will focus on the ordering process, specifically on placing orders to a sourcing unit. The required data is significant for both the positive and negative aspects of the as-is ordering process and the to-be ordering process which ABC needs to compare before beginning to set up a centralized sourcing unit. This research will not take into account any other activities in the ordering process, operation process, and also costs and financial data.

1.5 Significance of the Research

ABC would be able to identify the as-is ordering process and the to-be ordering process by Selling Units to sourcing units, and could compare the positive and negative aspects of the as-is ordering process and the to-be ordering process. With this information, ABC would be able to develop the centralized sourcing units, improve the effectiveness and efficiency of the ordering process, and provide a better service to the customers.

1.6 Limitations of the Research

The main purpose of this research is to identify how to develop a centralized sourcing unit to improve the effectiveness and efficiency of the ordering process. This research will only concentrate on one working process which is an ordering process, specifically focusing on placing orders to a sourcing unit. It may not be representative of the other operation process problems that occur within the company. This research also concentrates on the ordering process from Selling Units to the sourcing units in the Asia Pacific region only. It may not be taking into account the other regions or countries.

1.7 Definition of Terms

Ally Web-Based Application	An application that permits order preparation and management. There are two key modules; first is the Customer Document Reference (CDR) module, which is for dispatch and storage of customer orders and the second is the Ally Order module, a key tool for order preparation and creation.
Centralized Sourcing Strategy	A strategy for procurement which aims to decrease the total cost as well as improving effectiveness in

the supply chain by combining resources and business functions. It is the authority for sourcing at one location for the larger group's demands. Centralized Sourcing can be exceedingly efficient in controlling inventory levels and improving the profits. It has the benefits of consolidated sourcing power, causing lead time reduction, and easier management on purchase orders.

SAP (Systems Applications and Products in Data Processing)

An integrated leading Enterprise Resource Planning (ERP) for a software package which uses in the company. There are two SAP applications using in ABC. The first one is called as SAP#1, which is using for dispatching the order to a sourcing unit in Belgium, Canada, Germany, Italy, Spain, and the United State of America. Another one is called as SAP#2, which is used for dispatching the order to sourcing unit in France and China.

Selling Unit

A local branch that ABC has in many countries worldwide. The Selling Unit focuses on sales, marketing, and delivering provided to its customers.

Sourcing Unit

It is ABC's provider that sources and supplies all the products to Selling Units. It performs as a manufacturer itself and is responsible for seeking external suppliers who will supply materials or products with higher quality and low cost. It is also responsible for the movement of products as they flow from its suppliers to Selling Units.

CHAPTER II

REVIEW OF RELATED LITERATURE

The review of related literature is presented in this chapter. The topics included are the explanation of sourcing, sourcing strategies, and the ordering process.

2.1 Sourcing

In industry functions, the term sourcing refers to a number of procurement practices, intended to find, evaluate and engage suppliers of finished goods and services. In a journal of reference (Novack & Simco, 1991), the sourcing process is complicated; it can contribute enormously to the competitive advantage of an organization. Approximately 70 percent of the organization's sales income or total manufacturing costs are involved in purchasing components, finished goods or services (Presutti, 2003). Chan and Chin (2007) explained that sourcing is comprised of a multilevel procedure that adds a significant advantage to the organization's competitive potential. A reduction of sourcing cost could significantly improve the return on investments by increasing profit margins as well as asset turnover rate (Dobler & Burt, 1996). Carr and Smeltzer (1997) stated that the purchasing aspect has gone from playing a supporting role to becoming a strategic activity in the last two decades, and currently makes a significant contribution to the competitive attribute of an organization.

According to Rozemeijer and Weele (2007), there are five distinct governing structures which are Centralized Sourcing, Decentralized Sourcing, Federal (or Local-led) Sourcing Structure, Coordinated Sourcing Structure, and Centre-Led Sourcing Network, that can be applied to companies when arranging for leveraged sourcing strategies. These distinct governing structures can be described in more detail, as follows:

2.1.1 Centralized Sourcing

In the structure of centralized sourcing, a corporate center is in charge of managing all major supplier contracts. A centralized procurement employee provides the corporate demand and sourcing determination. This model mainly captures a large part of the potential corporate purchasing interaction, which turns a light responsibility to local needs.

Lamoureux (2008) also describes the factors of the centralized model of procurement, where all of procurements have various advantages through a single, centralized organization. Firstly, distinct from the decentralized model, it allows a corporate expenditure which is completely leveraged against the enterprise and assisted standardized sourcing processes to operate through the organization. The intrinsic economical scale allows the organization to manipulate the full power of its expenditure, to enhance operational efficiencies, and to improve and share both knowledge and the best practical execution.

There are some disadvantages. The wide-ranging knowledge of an individual in a local supply market and utilization models of the decentralized structure are lost when the results are found in the sub-optimal purchase in the various fields or regions. Therefore, the risk of maverick purchase increases when managers in charge of geographically dispersed sites do not agree with mandatory decisions to consider local supply, quality, or response time. Forcing a centralized purchase of commodities or service categories is not suitable for centralized purchase which might increase cost or decrease the quality of service. Response time can change unexpectedly for the supply and demand. Finally, this will be very critical to the organization's profit margins which rely on the strategy of demand-driven supply.

2.1.2 Decentralized Sourcing

Decentralized sourcing is the part of a business structure in which the management of all supplier contacts and purchases are done by individual business units. Each

business unit acts independently in its contracting activities. There is no centralized cooperation or development policy exception that might appear through the company's policies in finance or other operations.

Lamoureux (2008) also describes the advantages of the decentralized model of procurement, where the responsibilities of each business, function, or geographic unit rely on its own purchase. These individual business units are empowered with independence to make their own decision to improve their overall satisfaction. It allows a fast sourcing process and fast issue resolution, which allows the organization to take advantage of proficiency in the local market.

Nevertheless, there are a number of significant disadvantages. Corporate expenditures cannot use leverage nor business unit objectives to be aligned in the organization as a whole. There is no coordination or information shared amongst divisions, meaning the best quality of practice is not shared. Costs of Supply and their performance are uneven against the enterprises. Moreover, operation costs are often rather high in the decentralized model.

2.1.3 Federal (or Local-led) Sourcing Structure

This Structure consists of a small central core that is moderately flat in structure. This provides a sourcing infrastructure in common to all autonomous sourcing units. These communications may consist of sourcing processes, tools, templates, IT systems in common which consist of reporting, and a joint capability of development and recruitment system. Due to the unity of purchased products, services and suppliers are somewhat limited. It is cleared that there are not many corporate sourcing projects. Aside from some coordination, most business units need their own sources. The way in which this is done, is very similar to business units. Business units are enhanced by facilities, systems, tools and services provided by corporate sourcing employees. Frequently, there is only a functional reporting relationship between the corporate procurement manager and local purchasing managers.

2.1.4 Coordinated Sourcing Structure

This model consists of decentralized sourcing units which are located in the individual business units supported by a sourcing employee at the company's headquarters. This sourcing employee deals with the strategies of overseas sourcing which are based on the entire firm, and seek the sourcing opportunities for the firm as a whole. However, the employees in charge of an individual business unit may not be able to develop this macro-view. The advantage of this model is that the firm attains the corporate scope and the authority in dealing with suppliers. It does not incur full operating costs which mostly occur with centralized groups. It is specified usually that this procurement model is found in corporations which are operated by main global brands with a high degree of consistency in their manufacturing operations and product structures.

2.1.5 Centre-Led Sourcing Network

The Centre-Led Sourcing Network model consists of a network in which corporate sourcing schemes are taking place with energetic support empowered wholly by sourcing employees as specialists from individual business units. The corporate center obliges consistency of sourcing processes, reporting, IT-systems and capability of development. The variation in coordinated sourcing is made so that the coordinated model for any sourcing activity is not conducted by specialists. This is the reason why the level of proficiency is required by the professional global sourcing which resides principally in business units. Sourcing employees may start corporate sourcing projects which are based on an analysis of specific expenditures and market study for supplies. Aside from providing that type of sourcing strategy, the main interest of corporate employee turns to facilitate networking amongst the individual business units which will stimulate exchange of knowledge and experience. The sourcing specialty in the business units report to corporate management as well as their own business managers.

Lamoureux (2008) also describes a procurement center of excellence which focuses on a corporate strategy concerning the supply chain, strategic commodities, excellent

practices, and the sharing of knowledge, which leave individual purchases and strategic execution to the individual business units which provides the best of both worlds - all of the advantages of the centralized and decentralized models with minimal disadvantages. It builds on cross-functional teams represented by the key divisions and business units; it allows the creation of a flexible supplying chain that can be adapted at the local level when it is necessary to follow local regulations or to take advantage of local markets. Corporate expenditure can be completely leveraged on strategic commodity categories which are well suited for centralized sourcing, and non-strategic categories which are not suited for the centralized sourcing can be handling by individual business units. Operational efficiencies are increased; on the other hand overall operational costs are decreased. Therefore, the ability of the organization is to react rapidly to unexpected changes in demand. Most excellent practices can be shared simply through the enterprise, maverick purchase is reduced, and performance maintained at a consistent level as well. The advantages and disadvantages of the five distinct governing structures can be summarized, and are presented in Table 2.1.

Table 2.1: Advantages and Disadvantages of the Five Governing Structures

Governing Structures	Advantages	Disadvantages
Centralized Sourcing	• The main corporate center makes all decisions for the local markets and creates a structure form format, making all the orders more organized the process. • A corporate center would play a role in making it harder in local markets to argue over proper procedure and to establish its equality.	• By a main corporate center making all the order decisions, it may not meet the supply demand for each individual local market. • In each local market it sells more or less of a certain product. A corporate office distributes each product evenly throughout each local market, which may cause more work as local markets may have to make trading and have to redistribute the products amongst each other in order to meet supply and demand.

Table 2.1: Advantages and Disadvantages of the Five Governing Structures (Con't)

Governing Structures	Advantages	Disadvantages
Decentralized Sourcing	• Local markets are not able to place orders based on demand or based on a corporate perspective. • Issues may occur in the local market, which can be fixed rapidly by the local staff as an approach to following the guidelines by a corporate office.	• Local markets are organized with small scale objectives; local markets tend to keep information to themselves and do not share good practical traits with other local markets, all of this lead to a lack of coordination, which may cause high supply costs.
Federal (or Local-led) Sourcing Structure	• Federal sourcing has a small central core which allows it to be more flexible in the market together with its demands. • Federal sourcing relies primarily on its own sources to create business units for making itself sufficient.	• Federal sourcing is a flat structure, meaning that the local market will never grow, and stay the same. • There is very little communication between corporate managers and local managers; this makes it hard for a local market to spread out of its region.
Coordinated Sourcing Structure	• Coordinated sourcing has a small sourcing staff in the corporate headquarters that foresee the market for what it is and foresee what demands are in each local market. Also they have authority to deal with suppliers. All of this allows the corporations to deal with high quality global brands and to avoid overhead costs.	• Although the small sourcing staff at headquarters foresee the market demands, this advantage is not branched off to individual business units, so this form of sourcing deprives local markets to create a business and to spread their influence beyond its own region.
Centre-Led Sourcing Network	• Center-led sourcing is run by a staff of specialists from each individual business unit. This allows local markets to communicate with corporate headquarters, and it allows local branches to exchange ideas and to share business knowledge, as each specialist brings ideas from their local market back to headquarters, which allow comparison of their success and failure with other specialists. Also on a global scale the staff can help with local issues such as regulations and taxes in local areas.	• Although specialists determine the local market, there needs at times, a global sourcing staff that make distribution based on analysis, the specialists and sourcing staff can contradict and oppose each other which may decrease production or lead NG to products not in the proper supply category.

In the view of Rozemeijer and Weele (2007), corporate management does not add value by choosing a positive approach to create corporate advantage in purchasing. They add value by generating a fit between the approaches and use that to generate corporate advantage in sourcing as their research has revealed that the level of both corporate coherence and purchasing maturity are completed.

Figure 2.1: Governing Structures for Corporate Procurement
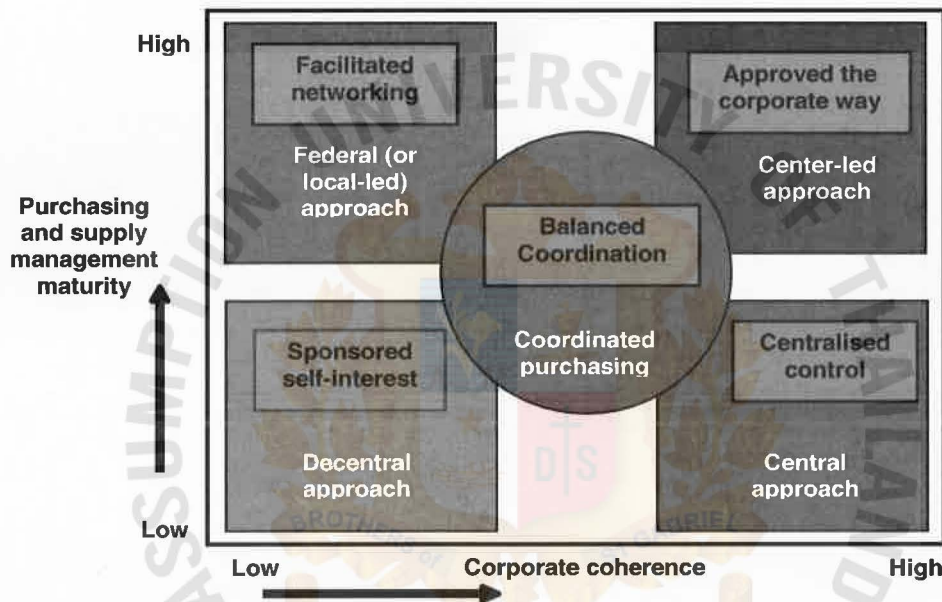
Source: Rozemeijer and Weele (2007, p.5)

Corporate coherence is related to the scope to which the dissimilar parts of the corporate function and management can be one entity (Axelsson, Rozemeijer, & Wynstra, 2005). Teece, Rumelt, Dosi, and Winter (1994) stated that the most important differences among the business units in management method, vision, strategy, and structure frequently replicate a low corporate coherence. In these situations, where a firm lacks a clear corporate strategy, and an integrated corporate structure, it is significantly changed by the integration of global sourcing activities.

Purchasing maturity concerns the level of professionalism in procurement and sourcing, and is expressed in the role and the position of procurement professionals which involve these professionals in key business decisions, with business leaders in

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strategic sourcing decision-making and cross-functional teamwork, the availability of company wide procurement information systems and competence of a procurement employee (Rozemeijer, 2003).

When the purchasing role is vastly matured, companies will use a different and more advanced approach to manage corporate purchasing synergy than the situation where one is dealing with low purchasing maturity (see Figure 2.1). In a case where both purchasing maturity and corporate coherence are low, decentralized purchasing is mostly found. In such a situation, a central coordination will hardly affect the sustainable. Therefore, we expect a little homogeneity in specifications against business units. There are opportunities to realise purchasing synergy through exchanging information of supply markets, suppliers and prices, by using voluntary working groups. When both constructs are high, a center-led structure has a good opportunity to be successful In such a structure, cross-functional teams conduct coordinated activities supported actively by business units, which are strongly managed by a corporate purchasing employee. In occasions where both parameters have medium value and a fusion structure, central purchasing and intentional purchasing coordination are mostly found in their activities. The central purchasing model appears feasible in organizations where purchasing at the operation level and corporate high coherence are strongly developed.

2.2 The Ordering Process

The ordering process is considered a key business element of order fulfillment. There are two characteristics that comprise this business method: it goes beyond organizational constraints, and includes both internal and external customers. These characteristics pertain to order processing, as it is composed of serial subsequent steps that have to be followed to accomplish pre-defined performance goals, which relate to various functional disciplines (Davenport & Short, 1990). Ould (1995) has stated that the ordering process is one of the key business operation methods because it focuses on customer satisfaction. Moreover, by way of the ordering process the customer along with the company create an agreement on product requirements, order volume

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and the delivery time frame. To describe the ordering process more accurately, it can be modeled conceptually as an input-output system (Figure 2.2).

Figure 2.2: Input-Output Model of Ordering Process
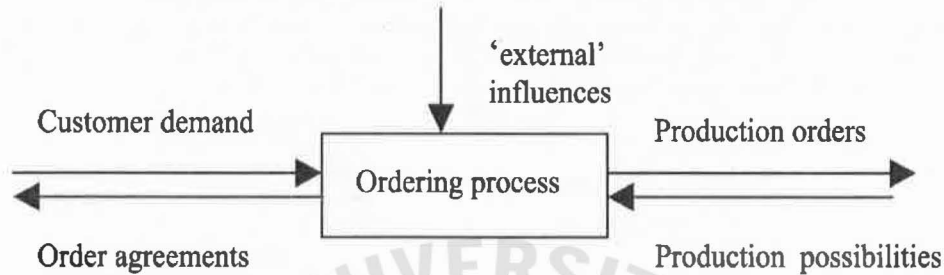
Source: Welker and Vries (2005, p.398)

The ordering process starts when the receiving customer orders, and ends after delivering the finished goods. This consists of various activities which are conducted by different business functions and are also greatly co-dependent, for instance, tasks, resources, and agents concerned in the process, which causes too much complexity in the ordering process. This process involves the harmonization of various activities such as sales commitment, financial checking, manufacturing, and logistics (Lin & Shaw, 1998).

According to Welker and Vries (2005), customer requirements need to be converted into manufacturing orders in order for the firm to deliver the right products at the right time with right quantities. To achieve order agreements, manufacturing capability and customer requirements need to be matched. Parente (1998) has stated that at least two business functions are concerned in these interactions, which are sales and manufacturing. These business functions are functionally co-dependent in an ordering process, as sales supply the customer needs with finished goods produced by manufacturing. In order to achieve feasible order agreements, decisions must be taken regarding orders acceptance, capacity and material allocation based on priority of orders, and delivery time frame commitment. For that reason, Sales and Manufacturing frequently have to share a lot of information on different levels, pertaining to the product specification, order volume, and delivery time frame.

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Welker and Vries (2005) have stated that managing customer requirements and production potentials are primarily a logistical decision-making process. Therefore, it can be concluded that three important measurements in the ordering process are decision-making structure, the processing of information and the setting of organization in the logistic side, which are discussed in the following details:

1) Logistical Control

Regarding a logistical control perspective, the ordering process can be considered after making the functional decision for the purpose of coordination in both requirement and manufacturing. This coordination might occur in different control levels. In the operational level creating order agreements are mostly related to planning decisions, including the acceptance of customer orders, frame commitment of delivery time, priority of customer orders and stock allocation. For instance, the appropriate order agreements can be made only when taking obtainable capability and materials into account. Therefore, the structural coordinated decisions must be made more often. According to Bertrand, Wortmann, and Wijngaard (1990), the structure of making coordination is related to the agreements whose production, sales in delivery condition or each type of products are described.

2) Process of Information

The processing of information is a second measurement for the ordering process. Most of the customer orders contain a lot of information based on their specified requirement. These specifications are necessary to be converted into manufacturing orders and agreement of orders. With this perspective, the ordering process is a series of information operating activities which consists of order acceptance, order preparation, order entry, order confirmation and making scheduling. The ordering process also involved the corresponding information with customer requirements and the status of the manufacturing system. In order to create a reliable agreement with the customer based on their significant requirements, for instance, order volume, and delivery time frame, the information of manufacturing constraints should be

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considered for the ordering process as well as the customer requirements. In order to take an efficient capacity for production and to realize a delivery time, both sales and production frequency are needed to exchange a great deal of information in a rather early phase of the ordering process (Kingsman, Hendry, Mercer, & De Souza, 1996).

3) Setting Organization

Setting organization is a third measurement of the ordering process. In the ordering process by the different functional disciplines are implicated, for instance, sales, planning and manufacturing. In many studies on the organizational context of the ordering process, it is implicitly assumed that organizations are made in function. Consequently, these studies are focused frequently on issue coordination and to give influence a functional decoupling to the departments which has an effect on the ordering process. In this context, Shapiro, Rangan, and Sviokla (2004) argue that cooperation within the ordering process is hindered by the organizations that organize functionally, though the various departments often conflict many interests and have a poor knowledge of what goes on in the other departments. Therefore, the degree of co-operation, relationship and interdependence among the factors as described in the ordering process, tasks and responsibilities seem to be important significantly by the effects to formalize the ordering process (De Vries, 1999).

In the ordering process, it requires the diverse needs which are coordinated with different control levels as well as the other factors need to be coordinated. In the product introduction for new phases the core of operational coordination concerning the ordering process is mainly concentrated on the proper specifications; for make-to-order phases are also concentrated on the frame of delivery time, and for make-to-stock phases according the volume of agreements is the main concentration (Konijnendijk, 1992).

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2.3 Systems Applications and Products in Data Processing (SAP)

SAP or Systems, Applications, and Products in Data Processing, is an integrated leading Enterprise Resource Planning (ERP) for a software package, which it is firmly integrated global functions in a corporation into a single application firstly. Therefore, this will permit it to do an open communication (Burleson, 1999).

2.3.1 The History of SAP

According to Burleson (1999), SAP AG was created in 1972 by five former IBM programmers aiming to start a real-time business data system. The original name selected for the company was not "Systems, Applications and Products", or the acronym SAP (German is "Systeme, Anwendungen und Produkte in der Datenverarbeitung"), but was the first "Systems analysis and program development", in German, "Systemanalyse und Programmentwicklung". The SAP R/1 ("R" stands for real-time data processing) solution was launched within one year since this creation. SAP launched SAP R/2 seven years afterwards since 1979. Two years later, SAP introduced the resigned solution to the market. A change from R/2 to R/3 was made in 1992, and SAP followed the trend to grow client-server architect from the existing mainframe computing (*History of SAP*, 2009). In 1999, SAP introduced mySAP.com, its latest major upgrade of products. With emphasis on its shift to an e-business focus, mySAP.com builds on the strengths of the SAP R/3 product in a fully Internet enabled architecture. MySAP.com also incorporates SAP's latest business applications for Customer Relationship Management (SAP CRM), Supply Chain Management (SAP APO), and Data Warehousing (Business Information Warehouse or BW). Prior to mySAP.com's introduction, these applications (known as New Dimension products) had been included as add-ons to SAP R/3 (Burleson, 1999).

The design of SAP ERP is aimed to cater all demands of various departments under the organization without any need to use an additional application of software. As a result, a central database is maintained for all the departments among an enterprise. SAP ERP includes four separate solutions that support major functional sections:

- SAP ERP Financials
- SAP ERP Human Capital Management
- SAP ERP Operations
- SAP ERP Corporate Services

As a part of a centralized database, each module of SAP is interconnected with a real time reporting make it impossible for the legacy due to lack of interconnection between various applications being used. Real time reporting is not possible to delay time result in legacy systems (*SAP Stands for*, 2008).

2.3.2 Advantages and Disadvantages of SAP ERP

Monk and Wagner (2009) have stated that the advantages of SAP can be categorized to be five major parts; firstly, SAP permits easier worldwide integration (issues including language and culture barriers, currency exchange rates can be bridged automatically). Next is updates are only required once to be applied company-wide. The third one is supplied data and information in real time, reducing the likelihood of redundancy errors. Fourthly, employees may benefit from a more efficient work setting. The last is vendors can apply valuable experience and knowledge on how best to implement and build the system.

However, Monk and Wagner (2009) also stated that there are some disadvantages that need to be considered; the company in bind by a contract and manageability with vendors – a company is held to a vendor pending the expiration of the contract. If the cost of changing is too high, it can be unprofitable to change vendors. Next is inflexibility – the package offered by the vendor may not fit well into the company's business model and can lead to expensive customization. Furthermore, the return on Investment may be too slow to be cost effective.

2.4 Summary

This chapter has explained in detail the literature reviews which include the definition of sourcing, the ordering process, and SAP (Systems, Applications, and Products in Data Processing). Five distinct governing structures by leveraged sourcing strategies are described in this chapter. The advantages and disadvantages of these five distinct governing structures are explained. Three important measurements of the ordering process are explained for the study.

CHAPTER III

RESEARCH METHODOLOGY

This research focuses on the development of the centralized sourcing unit in order to reduce the complexity of the ordering process for ABC. The centralized sourcing concept will be applied to process improvement in order to reduce an ordering lead time and eliminate duplicated work. Moreover, it aims to increasing ordering process performance in order to provide a better service to the customers. The methodology of data collection and improvement are discussed in this chapter.

3.1 Required Data

The required data for mapping a structured process can be categorized into three major parts; first, the overall process flow of the as-is ordering process, which starts from the point when the selling unit receives the order from its customer to placing the order to sourcing units, and will be mapped and presented in a graphical diagram. The specific activities of placing an order to a sourcing unit which are the focus point will be included in this graphical diagram. The next part is the work flow for the as-is ordering process which will be analyzed and explained. Lastly, the lead time on each activity of the as-is ordering process, as well as Key Performance Indicator of ordering process lead time will be collected in detail. The difference between as-is ordering process and to-be ordering process are observed.

3.2 Data Collection

The data collected is through the three following techniques:

3.2.1 In-depth Interviews

The target respondents are concerned departments who engage in the ordering process, specific on the operation management level. This technique also collects work flow information, working participation, the problems of work, and other related information.

3.2.2 Observation

The Ordering activities are specified by the order place to the sourcing units' activities that are observed. The observation is done for collecting the key information such as activities of concerned resources, working lead time of each activity, and also some physical data, for instance, the as-is process work flow. All this information is collected for the measurement of process lead time of each activity. The observation results will help to identify problems of work for the as-is ordering process, and propose process improvements.

3.2.3 Documentation Review

Various internal company documents are reviewed, for instance, customer sale orders, and internal order documents. Types and amounts of products, as well as sale order volumes supplied by each sourcing unit, and other related documents are also studied.

3.3 Process Mapping

The process mapping for the ordering process of The ABC Company will start when the selling unit receives the order from its customer to placing the order to sourcing units. This is the overall process of ABC's ordering process. The process mapping is an important technique to present a better visual monitoring and led to a better understanding of the development process of the company, as well as the flow of information collaborated among related activities.

The results of this process mapping will enable the study for:

1 Understanding the direction of work for the as-is ordering process step by step as well as link relations amongst departments.
2 Identifying problems of work for the as-is ordering process.

The overview of an ordering process flow of ABC is presented in Figure 3.1.

Figure 3.1: Overview of Ordering Process Flow

Selling Units: All Local branches
Sourcing Units: Belgium, France, Canada, Germany, Italy, Spain, USA and China
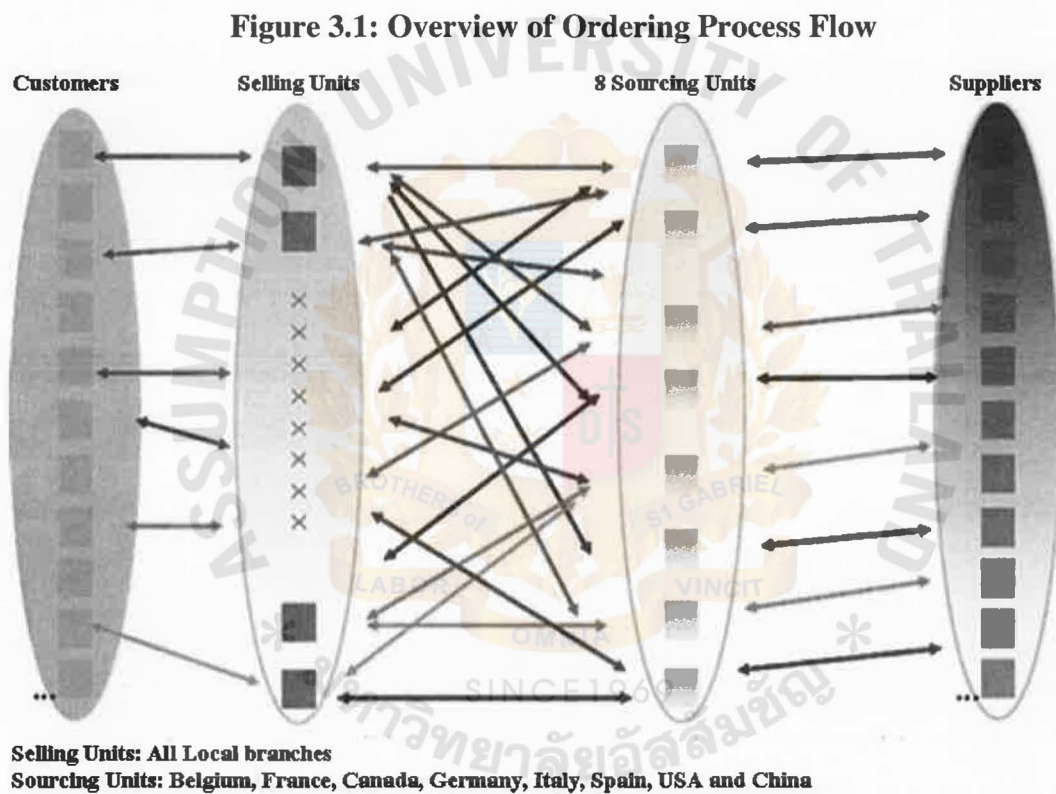
In the overall of as-is ordering process, starting from the selling unit which receives the order from its customer to placing the order to sourcing units, its required collaboration among concerned departments; Customer Service, Local Management, Engineering, Financial Controller, Asia Pacific Central Order Management, Master Data Support, and Sourcing units. Each department takes responsibility in its scope which can be described in more details as follows:

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1) Customer Service

Customer Service is a sale's supporter, who is authorized to contact a final customer. Customer Service will provide services to customers with a positive manner, including technical support. The final customer orders the products or services through Customer Service in Selling Units of ABC. This purchase order can be the firmed purchase order as well as firmed forecast. Customer Service is responsible for verifying the information required of all the receipt purchase order to ensure that the purchase order is valid from a legal perspective, for instance, customer currency, denomination and signature. In addition, the purchase order category is identified, for instance, firmed forecast, the hardware order, the software order, or the services order. After verifying the purchase order, Customer Service scans the document if not received electronically, and then dispatches the purchase order attachment to Local Management through a company's email. The original purchase order will be collected at Customer Service department only.

2) Local Management

Local Management is a department in the selling unit. It coordinates all information related to customer orders between the internal department within its Selling Unit and the Central Order Management department in its region. Local Management is responsible for verifying the missing information required aside from the purchase order, which is received from the Customer Service through a company's email. The missing information required needs to be done by involved departments, for instance, Bill of Material provided by Engineering, and cost account reference provided by Financial Controller. This is to ensure that the information required is complete before registering the purchase order and key parameters in the initiation of Customer Document Registration module. After this, Local Management dispatches this Customer Document Registration to Asia Pacific Central Order Management. Customer Document Registration is one module of Ally Web-Based application for the register and dispatch of customer documents as well as concerned documents to initiate the preparation of orders. In addition, they are responsible for managing the

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product shipment as well as the entire shipping document that needs to be provided to the final customer.

3) Engineering

Engineering is responsible for translating customer requirements into hardware, software and service items for production, procurement and delivery. It leads to a translation of customer codes into a list of configuration items which are orderable items used in the ordering process of The ABC Company. Engineering creates the Bill of Material which is complete, formally structured lists of all thing needed to produce particular-finished goods. The conversion of customer codes to configuration items is done in this step as well as sourcing determination.

4) Financial Controller

Financial Controller is responsible for generating cost account references. A cost account reference is a control point at which actual costs are accumulated and compared to budgeted costs for the work performed, especially for firmed forecast and service orders. Financial Controller will provide financial system data input, reporting and analysis to project financial records required. They are also responsible for running checks on customer data, for instance, customer credit limit details and exchange rate hedging.

5) Asia Pacific Central Order Management (APAC COM)

Asia Pacific Central Order Management (APAC COM) is a grouping center for coordinating all activities required between selling units and sourcing units for the entire customer in the Asia Pacific region. APAC COM takes responsibility for creating and completing orders into a company's system. APAC COM's responsibility starts when it receives a Customer Document Registration notification through a company's mail, which is automatically dispatched by the system. All information required is reviewed to ensure that the receipt purchase order information

is completely correct, as well as checking where the sourcing unit that needs to be ordered for this purchase order is. After that, APAC COM starts to generate the sale order into the company system. For the sale order creation, there are two ways to generate the sale order which can be described in more detail as follows:

- Sale Order Creation through SAP#1

SAP#1 is the system to be used in the case that the purchase order needs to be distributed to these six sourcing units: Belgium, Canada, Germany, Italy, Spain, and the United State of America. In any order which is generated through SAP#1, all the information needs to be inputted manually into the system by using the Bill of Material file which is provided by Engineering for reference. If there is any issue occurs during sale order creation, Master Data Support will be the consultant who helps APAC COM for a problem resolution. Once the sale order creation is done, APAC COM must carry out two preliminary phases. Firstly, order booking which submits the revenue to the financial record. Secondly, order releases which releases and the transfer order requirement to automatically generate the purchase requisition in the system. Purchase requisition is a precise document generated by the company's SAP-ERP to trigger what items need to be ordered, what quantities, and the time frame that will be given in the future. It also contains the authorization to proceed with the ordering process. After generating the purchase requisition, next is to generate the internal purchase order, with one purchase order for one sourcing unit. Once the internal purchase order is generated, APAC COM generates the internal sale order which is the document used to communicate with the entire sourcing unit and follow up the order status. The internal sale order information is extracted from the system into excel file, and dispatched to the sourcing unit by mail. One email is dispatched for one sourcing unit.

- Sale Order Creation through Ally Order Module and SAP#2

Any product that needs to be sourced from France or China, the sale order creation needs to be done through Ally order module and SAP#2. APAC COM prepares the

order structuring file by using the Bill of Material file which is provided by Engineering. The order is structured by a category of order, which refers to a company's structure platform. Next, APAC COM uploads the completed order structuring file to the Ally order module and validates the order. If there is any error during the validating sale order, which causes the order block and unable to export the order to SAP#2, Master Data Support will be concerned to help APAC COM for a problem resolution. The issue ticket will be generated by APAC COM through Ally Web-Based and dispatches to Master Data support automatically by the system. If there is no error, APAC COM exports the sale order from Ally order module to SAP#2 for order completion. The steps of order completion are the same as order completion in SAP#1. Purchase requisition will be generated automatically once the order release is done. This is followed by the internal purchase order creation, as well as the internal sale order creation. Next is to extract the internal sale order information from the system into an excel file, and then dispatch it to the sourcing unit by email.

6) Master Data Support

Master Data Support is a department who responsible for managing all the data in ABC's system. They are also responsible for consulting and resolving any errors that occur in the company's system, especially in an ordering process.

7) Sourcing unit

The sourcing unit is ABC's provider who sources and supplies all the products to Selling Units. It performs as a manufacturer itself and is responsible for seeking external suppliers who will be supply materials or products to ABC. Finished goods are to be delivered and assigned to a sourcing unit belonging to the company's sourcing list. The master data team manages this information on the company's global system. There are eight sourcing units worldwide to supply products for ABC, which can be described in more details, are as follows:

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7.1 The Belgium sourcing unit is responsible for products of Broadband Access & Server, Internet Protocol Division Intelligent Service Server Access Manager, and some products of Optics Terrestrial Optical Multi-Service Node.

7.2 The French sourcing unit is responsible for products of Optics Terrestrial Wireless Transmission, Worldwide interoperability for Microwave Access, Wireless Network Global System for Mobile communications (2G/ 3G), Wireless Network Long-Term Evolution, Radio Frequency System, Interactive Media and Communication Division, Network and System Integration , and some products of Wireline Network.

7.3 The Canadian sourcing unit is responsible for products of Internet Protocol Division.

7.4 The German sourcing unit is responsible for some products of Optical Multi- Service Node, and a second source of Broadband Access.

7.5 The Italian sourcing unit is responsible for products of Optics Terrestrial Switched Wavelength Division Multiplexing, Optic Wireless Transmission, Optics Terrestrial Network Management System, Optical Multi-Service Node, Intelligent Optical Network Core, and Submarine.

7.6 The Spanish sourcing unit is responsible for some products of Wireline Networks Extended Life Product.

7.7 The United States of America's sourcing unit is responsible for products of Optics Terrestrial Switched Wavelength Division Multiplexing Reconfigurable Optical Add Drop Multiplexer, some of Optical Multi-Service Node products Deployment Management Service, and Wireless Network Mobile Next Generation Network.

7.8 The Chinese sourcing unit is responsible for products of Wireless Network Code Division Multiple Access, Wireline Network IP Multimedia Subsystem. It is also a second sourced for Optics Terrestrial Switched Wavelength Division Multiplexing, Optic Wireless Transmission, Optics Terrestrial Network Management System, Optical Multi-Service Node products, and Intelligent Optical Network Core.

With the result mention above, the diagram indicating an overall process flow chart of the ordering process of the ABC Company is shown briefly in Figure 3.2.

Figure 3.2: Summary of Overall Process Flow of Ordering Process

Final Customer	Customer Service	Local Management	Engineering	Financial Controller	Asia Pacific Central Order Management (APAC COM)	Master Data Support	Sourcing Units

Order sent to ABC → Check data required, scan PO, dispatch email to Local Management → Received PO data through email

Missing datas:
- Bill of Material
- Cost account reference

missing data? — YES → Customer code conversion, and souring determination → Cost account reference creation

NO → PO registration in CDR through Ally

APAC COM received order data through CDR

Completed data? — NO → APAC COM rejected CDR and return to Local Management.

YES

France or China sourcing? — NO → SO creation in SAP#1 (manually create) → Order completion, and PR generation → IPO creation → ISO creation

Master data is consulted if any issue(s) occur during SO creation in SAP#1

YES → Order struture preparation & upload to Ally

Order validation — FAIL → Ticket created on Ally web-based by APAC COM → Master data solve the issue(S)

PASS → SO Exportation to SAP#2 → Order completion, and PR generation → IPO creation → ISO creation

Sourcing Units: Belgium, Canada, Germany, Italy, Spain, USA, France, China

Remark: Following are definitions of acronym in Figure 3.2.
PO means Purchase Order, CDR means Customer Document Registration, SO means Sale Order, PR means Purchase Requisition, IPO means Internal Purchase Order, and ISO means Internal Sale Order.

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Table 3.1: Ordering Process Lead Time by Activities

#	Activities' details	Responsible By	Related to item no#	Process Lead Time	Remarks
1	Purchase order verification. Scan and dispatch email to Local Management.	Customer Service	-	1 hour	
2	Purchase order received and review all key data required.	Local Management	-	1 hour	
3	Email dispatching for missing data request.	Local Management	2	15 min	
4	Bill of Material creation (customer code conversion, and sourcing determination).	Engineering	2	2 - 4 days	Small order ~ 2 day. Large order < 4 days.
5	Cost account reference creation.	Financial Controller	2	½ – 1 day	Process time is based on order assortment.
6	Missing data verification. Purchase order registration into Ally Web-Based and dispatch.	Local Management	4, 5	1 hour	
7	Customer Document Registration verification.	APAC COM	-	1 hour	
8	Customer Document Registration rejection or submission.	APAC COM	7	15 min	
9	Sourcing unit verification (in Bill of Material document).	APAC COM	-	15 min - 1 hour	Process time is based on number of file.
10	Order creation in SAP#1.	APAC COM	9	1 ½ – 3 days	Small order < 1 ½ days, Large order < 3 days.
11	Order completion in SAP#1.	APAC COM	10	2 hours	
12	Internal Purchase Order creation in SAP#1 (One document for one sourcing unit).	APAC COM	11	1 – 2 days	System will automatically release the document with management approval every 4 hours; schedule is 00.00, 04.00, 08.00, 12.00, 16.00 & 20.00).
13	Internal Sale Order creation in SAP#1.	APAC COM	12	1 – 2 days	System will automatically release the document with management approval every 4 hours; schedule is 00.00, 04.00, 08.00, 12.00, 16.00 & 20.00).
14	Internal Sale Order extraction(s) and email dispatching to sourcing unit(s).	APAC COM	13	10 min - 1 hour	Process time is based on number of file extraction.
15	Order structuring file(s) preparation, order upload and validation in Ally order module.	APAC COM	9	½ – 1 ½ day	Small order < ½ day, Large order < 1 ½ day.
16	Ally ticket creation in Ally Web-Based (in case that there is any error during validating the order and it needs to be solved by Master Data Support).	APAC COM	15	15 min	
17	Issue resolution in Ally Web-Based.	Master Data Support	16	½ – 1 day	Process time is based on complexity of issue.
18	Order validation in Ally order module (second time). Order exportation to SAP#2.	APAC COM	16, 17	30 min	
19	Order completion in SAP#2.	APAC COM	18	2 hours	
20	Internal Purchase Order creation in SAP#2 (One document for one sourcing unit).	APAC COM	19	1 – 2 days	System will automatically release the document with management approval every 4 hours; schedule is 00.00, 04.00, 08.00, 12.00, 16.00 & 20.00).
21	Internal Sale Order creation in SAP#2.	APAC COM	20	1 – 2 days	System will automatically release the document with management approval every 4 hours; schedule is 00.00, 04.00, 08.00, 12.00, 16.00 & 20.00).
22	Internal Sale Order extraction(s) and email dispatching to sourcing unit(s).	APAC COM	21	10 min - 1 hour	Process time is based on number of file extraction.

Remark: ABC has five working days from Monday to Friday. One working day has eight hours, and working time of APAC COM is between 9.00 A.M. and 6.00 P.M. GMT+7.

Figure 3.2 and Table 3.1 have shown the whole picture of the as-is ordering process of ABC as well as the lead time of each activity. Therefore, the specific activities which will be focused on this study are presented, which are placing order to sourcing units. These specific activities are starting from when APAC COM which receives the purchase order through Customer Document Registration to dispatching an internal sale order to each sourcing unit.

3.4 Evaluation Process and Problem Analysis

After mapping the process, the problem in the as-is ordering process of ABC can be summarized into two major parts:

3.4.1 Various steps are used to complete an ordering process from Selling Units to Sourcing Units, which leads to longer operation time.

3.4.2 Various systems as well as documents are used for the entire ordering process. This leads to excessive work inside the company, and increases work processing as well as the work load of employees.

Figure 3.3: Document Flow of Ordering Process

Figure 3.3 has shown that after receiving the purchase order from the final customer, the purchase order needs to be inputted into the company's system as a sale order. After that, purchase requisitions are generated, and then followed with an internal purchase order, and an internal sale order. There are four documents that need to be used in the current ordering process.

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3.5 Development of the Centralized Sourcing

The Centralized sourcing is applied in this study. The concept of the development can be described more in the following:

3.5.1   Concept, Definition, and Structure of the Centralized Sourcing Unit

The Centralized Sourcing Unit is a new regional model that aims at improving ABC's operational efficiency through simplification and harmonization of inter-unit relationships during all phases from the order to the cash collection. It will be a centralization of order activities, communication and transmit all the ordering functions from selling units to all the sourcing units which will be downgraded to sub-sourcing units, in order to streamline a complex inter-company transfers, selling and sourcing processes.

The centralized sourcing unit will be the only sourcing to supply all hardware and software products to selling units in its region. The centralized sourcing unit will be linked to all manufacturing plants as well as contract with electronic manufacturers, and also responsible for all inventories for its region.

3.5.2   Development Process of the Centralized Sourcing Unit

ABC will set up one centralized sourcing unit. This unit will not be a new plant but ABC will select one of their current eight sourcing units and upgrade it to be a centralized sourcing unit. After setting up this centralized sourcing unit, the authority of the current eight sourcing units will be downgraded. All eight sourcing units' role will be reduced to be sub-sourcing units. Next is data management, for instance, the creation of the plant code of the centralized sourcing unit, and data duplication from the current eight sourcing units to this centralized sourcing unit. Furthermore, ABC will utilize their systems to be more useful. For instance, they will utilize one SAP application to be one common global ERP backbone, which will be used for all selling units as well as this centralized sourcing unit instead of various SAP

applications. With this result, the document for using a whole process will be reduced instead of having various documents.

After setting up the centralized sourcing unit, human resource management is required. In order to cutoff the employees, ABC's resources will be relocated to work amongst the centralized sourcing unit and the rest of seven sourcing units which will be downgraded to sub-sourcing units.

3.5.3   Expected Benefits of the Centralized Sourcing Unit

The centralized sourcing unit will strongly contribute to the company's strategy to increase customer satisfaction, improve efficiency and ABC's agility on the market. In addition, it will accelerate the company's ability to serve customers by simplifying and automating internal processes. As a result, it will provide one common global ERP backbone relying on an optimized SAP application. It will be uses for all selling units as well as this centralized sourcing unit instead of various SAP applications. Furthermore, the necessary document for using a whole process will be reduced instead of having various documents.

The change in the sourcing unit will reduce the workload and the complexity linked to the management of customer contracts and Inter-Unit flows. It will ease the day-to-day job. As needed, the various functions will be able to connect directly to the company's harmonized information systems.

3.6 Summary

The research methodology of this study is presented in this chapter. It begins with required data, for instance, the overall process flow of the as-is ordering process. This begins when the selling unit receives the order from its customer to placing order to sourcing units, work flow, and process lead time on each activity. Subsequently, data collection will be collected using three techniques, which are in-depth interview, observation, and documentation review. Focus on process mapping and problem

analysis is next. Lastly, an expected consequence is the comparison between the "as-is" and "to-be" process has been explained.

CHAPTER IV

PRESENTATION AND CRITICAL DISCUSSION OF RESULTS

This chapter explains the data collection process, data analyses, and the results. The data was collected through three techniques, in-depth interview, observation and documentation review. This data is used to specify the process mapping, as well as the problem of work in the process. In addition, the directions of specific activities concerning the ordering process flow and operation lead time are analyzed step by step. There are four parts in this chapter. First, it explains the data collection with three techniques. Second, an analysis of the as-is ordering process flow, especially in the activities of placing orders to the current eight sourcing units. Third, it designs the centralized sourcing unit which makes a development plan to move from the "as-is" ordering process to the phase of the "to-be" ordering process. Lastly, it presents the "to-be" ordering process and its possible outcomes.

4.1 Data Collection

Regarding the data collection via interviews, observations, and documentation reviews, the as-is procedure could be drawn. The details are discussed in the next section. In addition, there are some critical points that make order processing complicated and time consuming. As the orders were transmitted internationally to eight sourcing units, three software programs, SAP#1, SAP#2 and Ally Web-Based were usually used in order creation and completion. SAP#1 is used for order creation and completion for any order that is distributed to a sourcing unit in Belgium, Canada, Germany, Italy, Spain, and the United State of America. SAP#2 is used for order completion for any order that is distributed to a sourcing unit in France and China. Ally Web-Based is used for order creation, and the order is exported to SAP#2.

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4.2 Analysis of "As-is" Ordering Process

According to the process mapping (as seen in Figure 3.2), the overall process flow of the as-is ordering process shows a redundancy in ordering activities which leads to excessive work, as well as a long lead time of operation in some activities. After collecting data from concerned departments and analyzing flow chart specifics of the as-is ordering process on activities concerning placing orders to the current eight sourcing units, they show that the centralized sourcing unit can improve the effectiveness and efficiency of the ordering process.

To focus on the development of the centralized sourcing unit, the diagram which indicates key activities flow in the as-is ordering process is reduced in scope and shown graphically in Figure 4.1:

Figure 4.1: Key Activities Flow of "As-is" Ordering Process
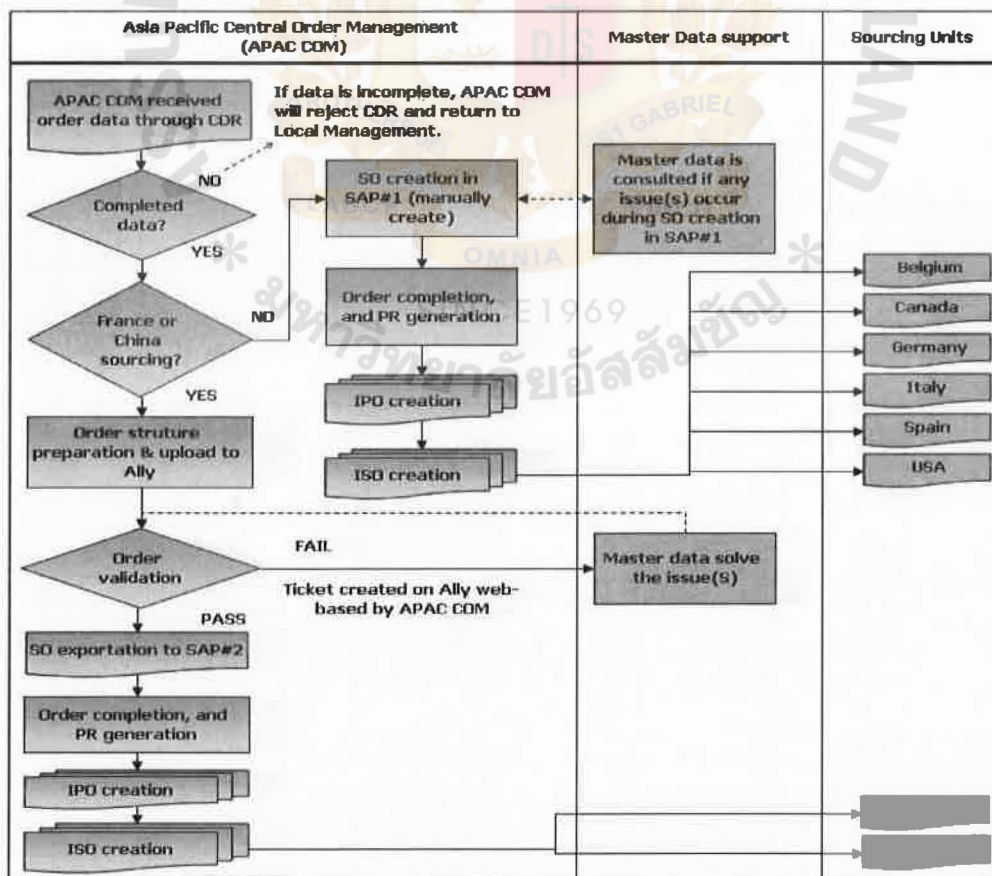
Remark: Following are definitions of acronym in Figure 4.1.
PO means Purchase Order, CDR means Customer Document Registration, SO means Sale Order,
PR means Purchase Requisition, IPO means Internal Purchase Order, and ISO means Internal Sale Order.

Figure 4.1 shows that after APAC COM receive the order through Customer Document Registration and checks the completion of data, APAC COM has to identify what sourcing units need to place the order. This identification is affected by what system needs to be used for creating order and management. Presently, there are two SAP applications that need to be used for creating order and management in ABC, which are SAP#1 and SAP#2. The first one; SAP#1, is used for placing orders to six sourcing units which are Belgium, Canada, Germany, Italy, Spain, and the United State of America. Any orders which need to be sourced from these six sourcing units needs being generated in SAP#1 directly. After that, APAC COM processes to complete the order to generate the purchase requisition; it generates the internal purchase order and also an internal sale order. Lastly, an email is dispatched to sourcing units attached with a file of an internal sale order. Another SAP application which is SAP#2 is used for placing orders to the last two sourcing units which are France and China. Any orders which need to be sourced from France and China needed to generate through Ally system and need to export to SAP#2 for order completion in order to generate the purchase requisition. After that, the internal purchase order is generated, and it is followed by the internal sale order. Lastly, an email is also dispatched to sourcing units attached with the file of an internal sale order.

As such various systems are needed to be used for order creation against the one order from the customer. Moreover, various documents need to be generated in the entire ordering process until receiving the document concerning an internal sale order which ABC uses for communication with the entire group of sourcing units. All of this takes too long in operation time to complete an ordering process from the beginning to placing the documents of an internal sale order to sourcing units. It also leads to a delay in the entire working process because any delay to entry reduces the pace of the procurement and manufacturing processes. This also may hinder the company's ability to deliver on time. In order to understand an operation concerning the lead time activities of the as-is ordering process more clearly, it can be explained in more detail by a system that is needed for order creation and management, in the following Tables.

Table 4.1: Ordering Process Lead Time by Activities of Order Creation through SAP#1

Item	Activities' details	Responsible By	Process Lead Time			Remarks
			Over all Lead Time	Minimum Lead Time	Maximum Lead Time	
1	Customer Document Registration verification.	APAC COM	1 hour	1 hour	1 hour	
2	Customer Document Registration rejection or submission.	APAC COM	15 min	15 min	15 min	
3	Sourcing unit verification (in Bill of Material document).	APAC COM	15 min - 1 hour	15 min	1 hour	Time to verify is depending on number of Bill of Material file.
4	Order creation in SAP#1.	APAC COM	1 ½ – 3 days	1 ½ days	3 days	Small order is about 1 ½ days. Large order is not over than 3 days.
5	Order completion in SAP#1.	APAC COM	2 hours	2 hours	2 hours	
6	Internal Purchase Order creation in SAP#1 (One document for one sourcing unit).	APAC COM	1 – 2 days	1 day	2 days	System will automatically release the document with management approval every 4 hours, schedule are 00.00, 04.00, 08.00, 12.00, 16.00 & 20.00)
7	Internal Sale Order creation in SAP#1.	APAC COM	1 – 2 days	1 day	2 days	System will automatically release the document with management approval every 4 hours, schedule are 00.00, 04.00, 08.00, 12.00, 16.00 & 20.00)
8	Internal Sale Order extraction(s) and email dispatching to sourcing unit(s).	APAC COM	10 min - 1 hour	10 min	1 hour	One document takes time about 5 min to extract from SAP to excel file.
			Total time	4.0 days	7.7 days	

Remark: ABC has five working days from Monday to Friday. One working day has eight hours of working time.
The working time of APAC COM is between 9.00 A.M. and 6.00 P.M. GMT+7.

4.2.1 Ordering Process of Activities of Order Creation through SAP#1

The ordering process in activities of order creation through SAP#1 in Table 4.1 shows that the longest operation lead time is an activity of order creation in SAP#1. The maximum lead time takes about three days to finish order creation in a system. This activity takes a long time to operate the data used for order creation, and is operated manually by APAC COM's employees. In case the customer's purchase order is large with many order lines or various shipment destinations, splitting shipment per site must be done. APAC COM has to generate every line into SAP#1 line by line manually. This leads to a long operation time to complete the order creation process.

The second longest operation lead time is the activities of an internal purchase order and an internal sale order creation. The maximum lead time is about two days for each activity. The reason why these two activities take a long operation lead time is that APAC COM has to generate the internal purchase order and the internal sale order manually into SAP. One of each document generates one sourcing unit. One document takes approximately thirty minutes to two hours. The time it creates to generate these documents is dependant on quantities of the line item and numbers of sourcing units which need to place the order. In addition, ABC's ERP-SAP application has a time schedule to release the internal purchase order and internal sale order documents automatically, with management approval every four hours. The schedule times are 00.00, 04.00, 08.00, 12.00, 16.00 & 20.00 every day. For this reason, when the internal purchase order and the internal sale order have been generated into SAP#1, the system groups make the entire document automatically and trigger to management its time schedule.

Table 4.1 also shows that some activities have the same operation lead time in both minimum lead time and maximum lead time. Those activities are Customer Document Registration verification, Customer Document Registration rejection or submission, and Order completion in SAP#1. The reason is that each activity has the same procedure to finish.

To understand the concept of time taken to release the internal purchase order and internal sale order documents, the input-output of documents by SAP ERP schedule are presented in Table 4.2 below:

Table 4.2: Input-Output of Documents by SAP ERP Schedule

Time	Input		Output	
	IPO	ISO	IPO	ISO
08.00	IPO#1			
09.00				
10.00	IPO#2			
11.00	IPO#3	ISO#1		
11.59		ISO#2		
12.00	IPO#4	ISO#3		
12.01	IPO#5			
13.00		ISO#4		
14.00				
15.00	IPO#6	ISO#5		
16.00	IPO#7	ISO#6	IPO#1, IPO#2, IPO#3	ISO#1, ISO#2
17.00	IPO#8			
18.00	IPO#9	ISO#7		
19.00				
20.00			IPO#4, IPO#5, IPO#6	ISO#3, ISO#4, ISO#5
21.00				
22.00				
23.00				
00.00			IPO#7, IPO#8, IPO#9	ISO#6, ISO#7

According to Table 4.2, if any documents are generated before the time scheduled, the system will trigger them to management for approval. After that, the system will release those documents approved by management into the system in the next frame of time scheduled. For example, five documents generated between 08.00 and 11.59, which are IPO#1, IPO#2, IPO#3, ISO#1, and ISO#2, are the input of ERP SAP schedule time at 12.00. These five documents become the output of the next ERP SAP schedule time at 16.00.

Table 4.3: Ordering Process Lead Time by Activities of Order Creation through Ally Web-Based and SAP#2

Item	Activities' details	Responsible By	Process Lead Time			Remarks
			Over all Lead Time	Minimum Lead Time	Maximum Lead Time	
1	Customer Document Registration verification.	APAC COM	1 hour	1 hour	1 hour	
2	Customer Document Registration rejection or submission.	APAC COM	15 min	15 min	15 min	
3	Sourcing unit verification (in Bill of Material document).	APAC COM	15 min - 1 hour	15 min	1 hour	Time to verify is depending on number of Bill of Material file.
4	Order structuring file(s) preparation, order upload and validation in Ally order module.	APAC COM	½ – 1 ½ day	½ day	1 ½ days	Small order is about ½ day, Large order is not over than 1 ½ days.
5	Ally ticket creation in Ally Web-Based (in case that there is any error during validating the order and it needs to be solved by Master Data Support).	APAC COM	15 min	15 min	15 min	
6	Issue resolution in Ally Web-Based.	Master Data Support	½ – 1 day	½ day	1 day	Time to resolve is depending on complexity of issue.
7	Order validation in Ally order module (2nd time). Order exportation to SAP#2.	APAC COM	30 min	30 min	30 min	
8	Order completion in SAP#2.	APAC COM	2 hours	2 hours	2 hours	
9	Internal Purchase Order creation in SAP#2 (One document for one sourcing unit).	APAC COM	1 – 2 days	1 day	2 days	System will automatically release the document with management approval every 4 hours, schedule is 00.00, 04.00, 08.00, 12.00, 16.00 & 20.00)
10	Internal Sale Order creation in SAP#2.	APAC COM	1 – 2 days	1 day	2 days	System will automatically release the document with management approval every 4 hours, schedule is 00.00, 04.00, 08.00, 12.00, 16.00 & 20.00)
11	Internal Sale Order extraction(s) and email dispatching to sourcing unit(s).	APAC COM	10 min - 1 hour	10 min	1 hour	One document takes time about 5 min to extract from SAP to excel file.
			Total time	**3.6 days**	**7.3 days**	

Remark: ABC has five working days from Monday to Friday. One working day has eight hours of working time.
The working time of APAC COM is between 9.00 A.M. and 6.00 P.M. GMT+7.

4.2.2 Ordering Process of Activities of Order Creation through Ally Web-Based and SAP#2

The ordering process for activities of order creation through Ally Web-Based and SAP#2 in Table 4.3, shows that the longest lead time of operation is activities of internal purchase order and internal sale order creation. The maximum lead time is about two days for each activity. The reason is that APAC COM has to generate each document manually into SAP. One of each document generates one sourcing unit. The time it creates is the same as document creation in SAP#1. SAP#2 also has a time schedule to release the internal purchase order and internal sale order documents, the same as SAP#1.

The second longest operation lead time is activities of order structuring file preparation, order upload and validation in the Ally order module. This activity takes a maximum lead time of approximately one and a half days to complete. The reason is that APAC COM has to prepare the order structuring file in Excel sheet before uploading into the Ally order module. Time to finish the Excel sheet depends on the quantity of line items that need to place the order. In case the customer's purchase order is large with many order lines or various shipment destinations, splitting shipment per site must be done in this order structuring file.

The third longest operation lead time is an activity of issue resolution in Ally Web-Based. This activity takes a maximum lead time of approximately one day. The minimum lead time takes approximately four hours which is quite a long operation time to resolve the issue. The reason is that Master Data Support who is responsible for resolving the issue works in Romania. The time zone difference between Thailand and Romania is four hours. Also, Master Data Support in Romania starts work from 08.00 A.M. to 05.00 P.M GMT+3 (GMT stands for Greenwich Mean Time).

Table 4.3 also shows that some activities have the same operation lead time in both minimum lead time and maximum lead time. Those activities are Customer Document Registration verification, Customer Document Registration rejection or submission,

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Ally ticket creation in Ally Web-Based, the second time of order validation in Ally order module and order exportation to SAP#2, and the order completion in SAP#2. The reason is that each activity has the same procedure to finish.

4.2.3 Ordering Process Lead Time of Ordering Process

Figure 4.2: Ordering Process Lead Time

(Example)

Final Customer — The ABC Company → Sourcing Units

CPO receipt on Fri, 1st Oct   Ordering process with maximum lead time which is about 13 days.   ABC issue ISO to Sourcing units on Tue, 19th Oct
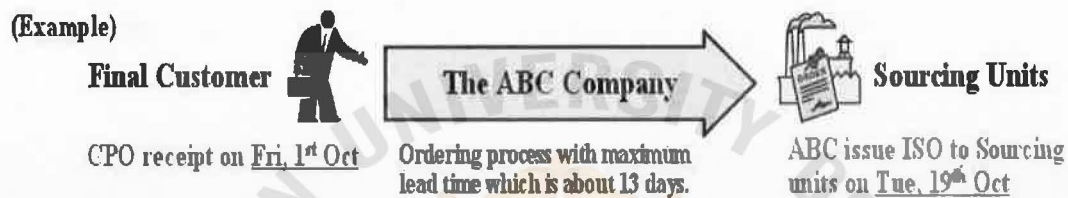
Ordering Process Lead Time (OPLT) is ABC's Key Performance Indicator (KPI) of the ordering process, to measure how fast ABC processes the customer purchase order. The ordering process lead time is calculated from the receipt date of the purchase order to the issued date of the internal sale order including the duration of days in public calendars. In order to understand the lead time calculation of ordering process more clearly, an example of the ordering process lead time calculation is presented in Table 4.4 below.

Table 4.4: Example of Ordering Process Lead Time Calculation with the Maximum Lead Time of the Ordering Process Creating through SAP#1

No	Activities' details	Process Lead Time (hour)	October																		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
			F	S	Su	M	Tu	W	Th	F	S	Su	M	Tu	W	Th	F	S	Su	M	Tu
1	Purchase order verification. Scans and dispatch email to Local Management.	1	1																		
2	Purchase order received and review all key data required.	1	1																		
3	Email dispatching for missing data request.	0.25	0.25																		
4	Bill of Material creation (customer code conversion, and sourcing determination).	32	5.75			8	8	8	2.25												
5	Cost account reference creation.	8	5.75			2.25															
6	Missing data verification. Purchase order registration into Ally Web-Based and dispatch.	1							1												
7	Customer Document Registration verification.	1							1												
8	Customer Document Registration rejection or submission.	0.25							0.25												
9	Sourcing unit verification (in Bill of Material document).	1							1												
10	Order creation in SAP#1.	24							2.5	8			8	5.5							
11	Order completion in SAP#1.	2												2							
12	Internal Purchase Order creation in SAP#1 (One document for one sourcing unit).	16												0.5	8	7.5					
13	Internal Sale Order creation in SAP#1.	16														0.5	8			7.5	
14	Internal Sale Order extraction(s) and email dispatching to sourcing unit(s).	1																		0.5	0.5
	Working time per day (hour) :		8			8	8	8	8	8			8	8	8	8	8			8	0.5

Remarks: Activity no. 4 and 5 can process in parallel.

According to this example, Table 4.4 presents the worse case scenario where ABC has received the purchase order from the final customer on Friday. ABC also has to process the ordering with the maximum lead time of the ordering process creating through SAP#1. In this case, the ordering process lead time for this order is approximately nineteen days. This means ABC spends almost three weeks to process the purchase order from the final customer before they place the internal sale order to their sourcing units. This is later than the company's target of ten days.

4.3 Design of the Centralized Sourcing Unit

After analyzing the "as-is" ordering process, the next step is to design a centralized sourcing unit by making a development plan to move from the "as-is" ordering process to the "to-be" ordering process. This step helps the company to plan what else needs to be done and considered. The development process of the Centralized Sourcing Unit can be categorized into four major steps which can be explained in the following section.

4.3.1 Setup the Location

The first step to design the centralized sourcing unit is to set up the location of the centralized sourcing unit. As explained in the previous chapter, ABC would like to select one of their current eight sourcing units and upgrade it to be the centralized sourcing unit instead of building a new plant.

Table 4.5: Summary of Sale Order Volumes Supplied by Each Sourcing

No of orders		Sourcing Unit							
		Belgium	Canada	China	France	Germany	Italy	Spain	USA
Q1	535	17	78	77	102	4	177	15	65
Q2	858	7	48	121	193	5	365	21	98
Q3	940	7	143	92	257	2	291	25	123
Q4	1,554	8	68	73	1100	16	97	3	189
YTD	3,887	39	337	363	1652	27	930	64	475
% of order volume		1.0%	8.7%	9.3%	42.5%	0.7%	23.9%	1.7%	12.2%

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Table 4.5 shows that France is the best location for making an upgrade to a centralized sourcing unit. The first reason is that approximately 42.50 percent of all customer orders are distributed to the sourcing unit in France. It is the biggest sourcing for ABC, and has a high manufacturing capacity, large facility as well as a larger plant. Moreover, the headquarters is located in France as the main corporate center. It leads to making more efficient decisions by management, as well as to organize more order processing. In addition, almost all hardware products are supplied from European countries.

After setting up France as a centralized sourcing unit, the authority of seven remaining sourcing units is downgraded. Those sourcing units' role is reduced to being sub-sourcing units.

4.3.2 Data Management

After setting up the location of the centralized sourcing unit, the next step is to set up the system and data of management concerning this centralized sourcing unit. This step is to prepare all information needed for communication in the company, especially in the ordering process. The plant code of the centralized sourcing unit is created into a company system. The plant code is a code used for identify a sourcing unit in the company system. It is used to identify what product is needed to order to what sourcing unit when the Selling Unit generates the sale order into the company system. This is managed by Central Order Management within its region. Next, it is to duplicate all the information of configuration items that exist in the current eight sourcing units to the centralized sourcing unit. All the activities involved to set up of the company system are managed by the Global Master Data team.

4.3.3 System Utilization

As explained in the previous chapter, ABC would like to utilize their system to be more useful. The first one is that SAP application. SAP#2 becomes the one common global ERP backbone which is used for all selling units as well as this centralized

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sourcing unit instead of various SAP applications. Furthermore, the Ally Web-Based application is used for all activities related to the order preparation and management for the entire company's communication. With this result, when Asia Pacific Central Order Management receives the purchase order information from the Selling Unit, they can input a sale order into the system without verifying what sourcing unit is needed to distribute. In addition, the documentation used for the entire process is reduced to be one document only, which is the sale order. The purchase requisition, the internal purchase order, and the internal sale order are no longer used in the order process.
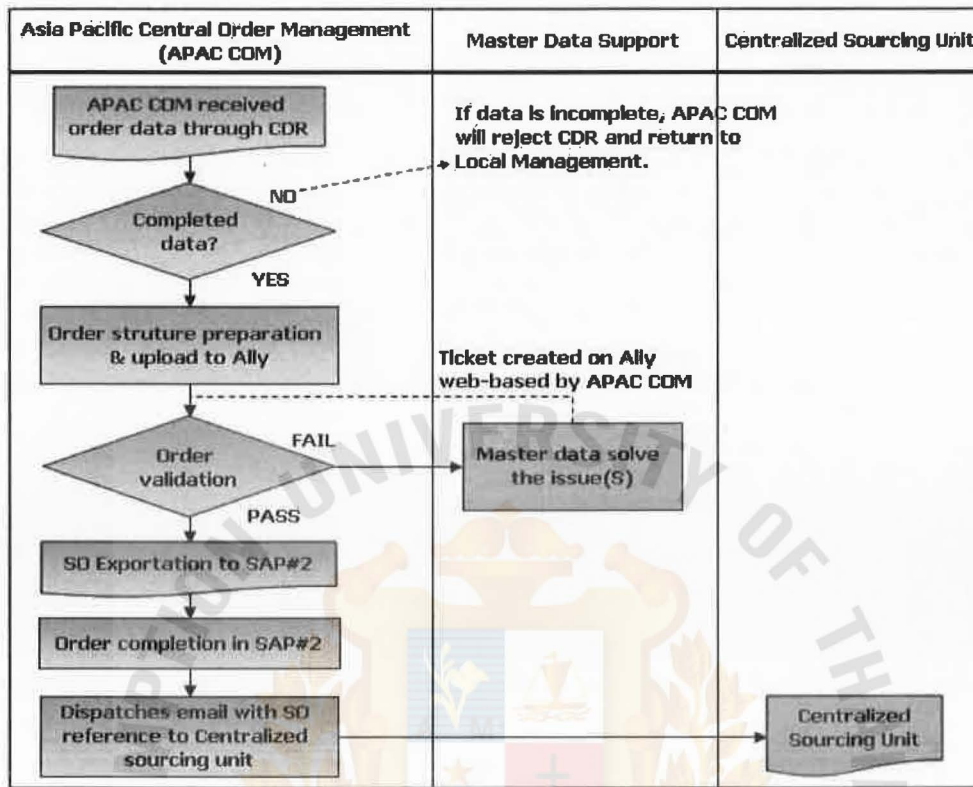
4.3.4 Human Resources Management

The last important aspect which ABC has to consider is resources management. As a consequence of setting up the centralized sourcing unit, the authority of the remaining seven sourcing units is downgraded to be sub-sourcing units. As a result, some resources from the current eight sourcing units including the sourcing unit in France need to be relocated to work in this centralized sourcing unit. This relocation helps the company have lower costs, for instance, training costs. Instead of hiring new staff that has no working experience in the company, a better solution is to transfer some resources from the existing sourcing units. For the remaining resources that are not relocated to work for the centralized sourcing unit, they are still positioned in the rest of the seven sourcing units being downgraded.

4.4 Identify "To-be" Ordering Process

After analyzing the "As-is" ordering process, as well as designing the centralized sourcing unit, the new potential work flow of the ordering process can be shown graphically in the following diagram:

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Figure 4.3: New Potential Key Activities Flow of "To-be" Ordering Process

Asia Pacific Central Order Management (APAC COM)	Master Data Support	Centralized Sourcing Unit
APAC COM received order data through CDR	If data is incomplete, APAC COM will reject CDR and return to Local Management.	
Completed data? NO →		
YES		
Order struture preparation & upload to Ally	Ticket created on Ally web-based by APAC COM	
Order validation — FAIL →	Master data solve the issue(S)	
PASS		
SO Exportation to SAP#2		
Order completion in SAP#2		
Dispatches email with SO reference to Centralized sourcing unit →		Centralized Sourcing Unit

Remark: Following are definitions of acronym in Figure 4.3.
PO means Purchase Order, CDR means Customer Document Registration, SO means Sale Order.

Figure 4.3 shows that the redundancy in the ordering process can be reduced by developing a centralized sourcing unit. The new key activities flow of placing an order to a sourcing unit is shortened to complete the process. It starts from APAC COM receiving the order through Customer Document Registration and checking the completion of data. After that, APAC COM prepares the order structuring file by using the Bill of Material document which is provided by Engineering. Next it uploads the completed order structuring file to the Ally order module and validates the order. If there is any error during the validating sale order, which causes an order block and inability to export the order to SAP#2, Master Data Support is involved to help APAC COM towards problem resolution. The issue ticket is generated by APAC COM through Ally Web-Based and dispatched to Master Data support automatically by the system. If there is no error, APAC COM exports the sale order from Ally order module to SAP#2 for order completion. There are two preliminary phases for order completion in SAP#2; first is order booking which submits the revenue to the

financial record. Second is an order release which releases the order to generate the customer's demand into the system directly. After that, APAC COM triggers the centralized sourcing unit by dispatching an email with sale order reference information.

In addition, after receiving the sale order reference information from APAC COM by email, the centralized sourcing unit verifies what source needs to be supported for what product. As explained in chapter III, ABC's sourcing unit performs as a manufacturer itself and is responsible for seeking external suppliers who supply products to ABC. After getting finished goods from each source, a centralized sourcing unit combines all finished goods and delivers to the Selling Unit.

As a result, some unnecessary activities can be eliminated which therefore produce less complexity in the work process. In order to get a greater understanding what the main changes are for the new ordering process to the centralized sourcing unit, the comparison of the key activities flow of "As-is" ordering process and "To-be" ordering process is presented in more detail in Figure 4.4:

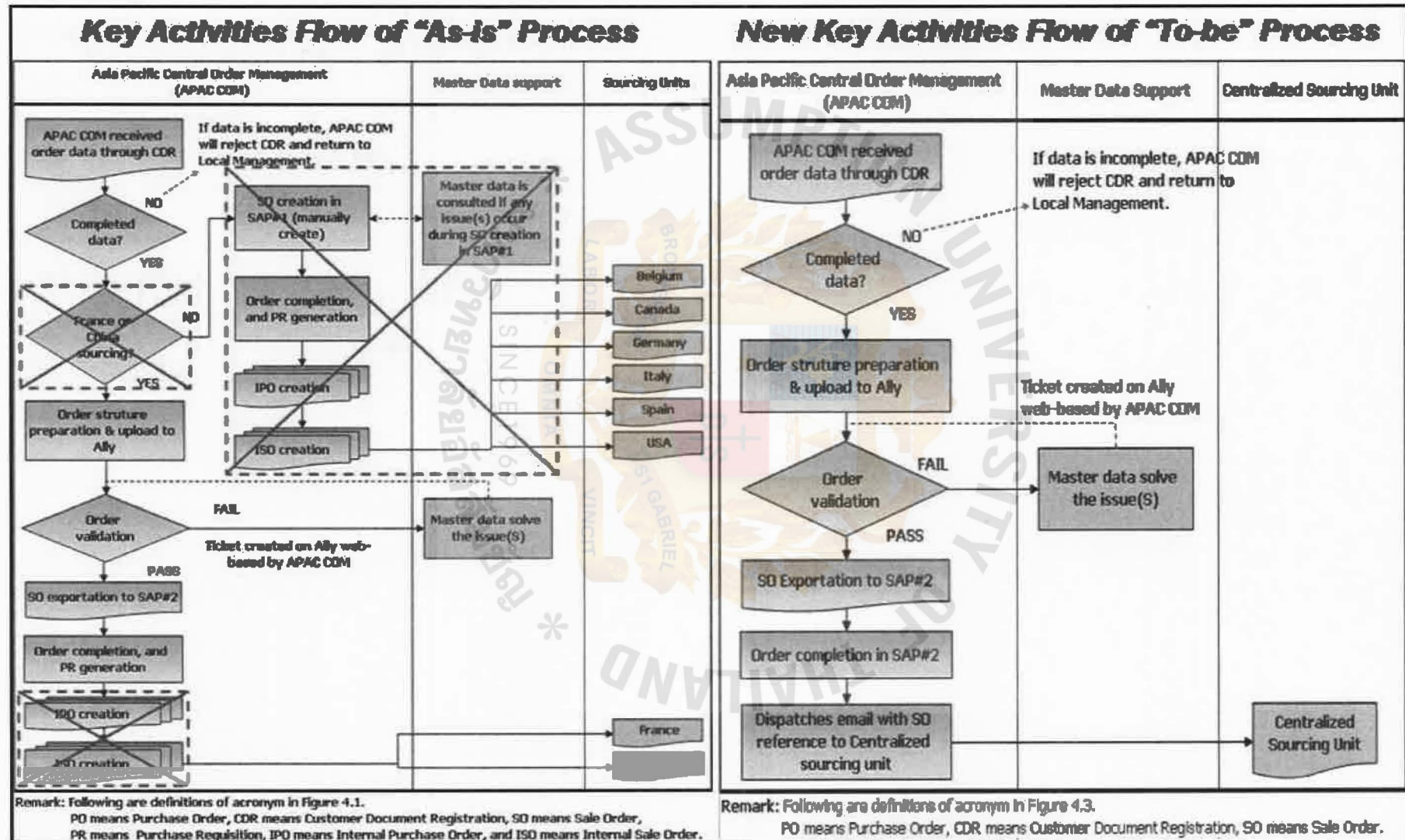**Figure 4.4: Comparison of Key Activities Flow of "As-is" Ordering Process and "To-be" Ordering Process**

Figure 4.4 shows that after developing the centralized sourcing unit, there are some working activities to be modified regarding the change of the sourcing unit. These working activities are order creation and order completion in SAP application. The order creation is done through Ally Web-Based and exported to SAP#2. SAP#1 is no longer used for an order creation in the ordering process. Another is an order completion in SAP application. In this new process the order is no longer released for generating a purchase requisition but it releases the order to generate the customer's demand directly into the system.

Moreover, some working activities can be eliminated from the work flow. The first one is sourcing unit verification. As a consequence of system utilization, there is one direction to generate the order, which is an order creation through Ally Web-Based and SAP#2. It is unnecessary to verify what system is needed to use by what sourcing unit. Next are the internal purchase order creation and an internal sale order creation. As a consequence of system utilization, SAP#2 becomes one common global ERP backbone which is used for all selling units as well as the centralized sourcing unit. The sale order document can be used for the entire process. Therefore, an internal purchase order as well as an internal sale order is unnecessary in the ordering process. By this development of a centralized sourcing unit, after receiving the order from a final customer, all the Selling Units can place the purchase order to one place which is the centralized sourcing unit. There is no need for multiple systems to generate the order, or various documents to use in the entire ordering process. This means that there is no more redundancy in the Selling Unit's work of placing orders to various sourcing units.

This study shows that the development of the centralized sourcing unit can improve the effectiveness and efficiency of ABC's ordering process. After developing the centralized sourcing unit as well as developing work processing of key activities of placing orders to sourcing units, the new working process flow is shortened. In order to get a greater understanding, the comparison of ordering process lead time by the activities of "As-is" ordering process and "To-be" ordering process can be described in more detail in Table 4.6.

Table 4.6: Comparison of Ordering Process Lead Time by Activity of "As-is" Ordering Process and "To-be" Ordering Process

"As-is" Process Lead Time								"To-be" Process Lead Time			
"As-is" activities' details of order creation through SAP#1	PIC	Min L/T	Max L/T	"As-is" activities' details of order creation through Ally Web-Based and SAP#2	PIC	Min L/T	Max L/T	"To-be" Activities' details	PIC	Min L/T	Max L/T
Customer Document Registration verification.	APAC COM	1 hour	1 hour	Customer Document Registration verification.	APAC COM	1 hour	1 hour	Customer Document Registration verification.	APAC COM	1 hour	1 hour
Customer Document Registration rejection or submission.	APAC COM	15 min	15 min	Customer Document Registration rejection or submission.	APAC COM	15 min	15 min	Customer Document Registration rejection or submission.	APAC COM	15 min	15 min
Sourcing unit verification (in Bill of Material document).	APAC COM	15 min	1 hour	Sourcing unit verification (in Bill of Material document).	APAC COM	15 min	1 hour	-	-	-	-
Order creation in SAP#1.	APAC COM	1 ½ days	3 days	-	-	-	-	-	-	-	-
-	-	-	-	Order structuring file preparation, order upload and validation in Ally order module.	APAC COM	½ day	1 ½ days	Order structuring file preparation, order upload and validation in Ally order module	APAC COM	½ day	1 ½ days
-	-	-	-	Ally ticket creation in Ally Web-Based.	APAC COM	15 min	15 min	Ally ticket creation in Ally Web-Based.	APAC COM	15 min	15 min
-	-	-	-	Issue resolution in Ally Web-Based.	Master Data Support	½ day	1 day	Issue resolution in Ally Web-Based.	Master Data Support	½ day	1 day
-	-	-	-	Order validation in Ally order module (2nd time), and Order exportation to SAP#2.	APAC COM	30 min	30 min	Order validation in Ally order module (2nd time), and Order exportation to SAP#2.	APAC COM	30 min	30 min
Order completion in SAP#1.	APAC COM	2 hours	2 hours	Order completion in SAP#2.	APAC COM	2 hours	2 hours	Order completion in SAP#2.	APAC COM	1 hour	1 hour
Internal Purchase Order creation in SAP#1 (One document for one sourcing unit).	APAC COM	1 day	2 days	Internal Purchase Order creation in SAP#2 (One document for one sourcing unit).	APAC COM	1 day	2 days	-	-	-	-
Internal Sale Order creation in SAP#1.	APAC COM	1 day	2 days	Internal Sale Order creation in SAP#2.	APAC COM	1 day	2 days	-	-	-	-
Internal Sale Order extraction(s) and email dispatching to sourcing unit(s).	APAC COM	10 min	1 hour	Internal Sale Order extraction(s) and email dispatching to sourcing unit(s).	APAC COM	10 min	1 hour	Dispatches email to centralized sourcing unit with SO reference.	APAC COM	5 min	5 min
Total time:		4.0 days	7.7 days	Total time:		3.6 days	7.3 days	Total time:		1.4 days	2.9 days

Remarks: PIC stands for Person In Charge, Min L/T stands for Minimum Lead Time, and Max L/T stands for Maximum Lead Time.

Table 4.6 shows that the operation lead time of placing an order to the sourcing unit is reduced. The reasons are:

1) The activity of sourcing verification is eliminated. As a consequence of setting up the centralized sourcing unit, it is unnecessary to verify what sourcing unit needs to distribute the order. This elimination can reduce operation time by about fifteen minutes in order processing minimum lead time. It reduces operation time to about one hour in the case of order processing by maximum lead time.

2) The activity of order creation in SAP#1 is eliminated. As a consequence of system utilization, the order creation is done through Ally Web-Based and SAP#2. There is no more manual creation for orders in SAP#1. This elimination can reduce operation time about one and a half days in case of order processing minimum lead time. It reduces operation time about three days in the case of order processing by maximum lead time.

3) The activity of order completion in SAP is modified. As a consequence of system utilization, SAP#2 becomes one common global ERP for all selling units as well as the centralized sourcing unit. Moreover, a sale order document becomes one document to be used for the entire process. It is unnecessary to generate the purchase requisition for creating the internal purchase and the internal sale order document. As a result, the order is no longer released for generating a purchase requisition but it releases the order to generate the customer's demand into the system directly. This modification can reduces operation time about one hour in both case of order processing for minimum lead time and maximum lead time.

4) The activities of the internal purchase order and the internal sale order creation are eliminated. As a consequence of the modification of order completion, the order is no longer released for generating a purchase requisition. Therefore, the internal purchase order as well as the internal sale order is unnecessary to generate in the ordering process. The elimination of these activities can reduce operation time about one day in case of order processing by minimum lead time in each activity. It is reduces operation time about two days in the case of order processing for maximum lead time in each activity.

With the minimum operation lead time, the "As-is" process of order creation through SAP#1 takes time approximately four days. The "As-is" process of order creation through Ally Web-Based and SAP#2 takes time approximately three and a half days. After developing the centralized sourcing unit, the "To-be" process takes approximately one and a half days. It is reduces operation lead time approximately two days to two and a half days respectively.

With the maximum operation lead time, the "As-is" process of order creation through SAP#1 takes time approximately eight days. The "As-is" process of order creation through Ally Web-Based and SAP#2 takes time approximately seven and a half days. After developing the centralized sourcing unit, the "To-be" process takes approximately three days. It is reduces operation lead time approximately four and a half days to five days respectively.

As a result, developing a centralized sourcing unit gradually helps ABC reduce the operation time of placing an order to a sourcing unit. This reduction helps ABC to improve the overall process lead time of the ordering process. It also helps ABC to improve the Key Performance Indicator (KPI) of the ordering process in order to provide a better service to customers.

4.5 Summary

Discussions of results are presented in this chapter. The first is the result of data collection with in-depth interview, observation and documentation review. After collecting data from these techniques, an analysis of the as-is ordering process flow are presented. These analyses are focused on the activities of the orders placed by the current eight sourcing units which develop the key activities. The centralized sourcing unit is created to develop the ordering process. As a result, it presents the design of the centralized sourcing unit. This takes a step in the development plan to move from the "as-is" ordering process to the "to-be" ordering process. Lastly, it presents the "to-be" ordering process. This study has shown that after developing the centralized sourcing unit, the new working process flow is shortened from the maximum lead time of approximately eight days to three days, and the minimum lead time of approximately four days to one and a half days. This allows ABC to reduce the ordering process lead time of placing an order to sourcing units as well as the entire ordering process.

CHAPTER V

SUMMARY FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the findings, as well as the conclusions that have been found in this study. Theoretical implications and managerial implications are presented. Moreover, recommendations for further study will be explained in this chapter.

5.1 Summary of the Findings

It is found that the ordering process is the most significant operation related to the supply chain management. Any delay in the order entry portion can decrease effectiveness in the procurement and manufacturing processes. Also, it leads to a delay in the company's ability to deliver finished goods on time to the customer. Late deliveries and longer operation lead time may have an impact on the customer's satisfaction, and on competitiveness, which result in lost business.

In the as-is ordering process of ABC, it was found that various activities need to be completed for the ordering process. It also found that various systems as well as various documents are needed for the ordering process. All this leads to long operation lead time and a delay in the order entry into the system.

Regarding the Ordering Process Lead Time (OPLT), which is the ABC's Key Performance Indicator (KPI) of the ordering process, it showed that the ordering process lead time of the as-is process did not achieve the company's target of ten days. The worse case scenario in the ordering process with the minimum lead time creating through Ally Web-Base and SAP#2 was about eleven days. IT was another worse case in the ordering process; with maximum lead time created through SAP#1 being about nineteen days.

5.2 Conclusions

The aim of this study was to identify how to develop a centralized sourcing unit to improve the effectiveness and efficiency of the ordering process. The current ordering process of ABC starts from the selling unit which receives the order from its customer, to placing the order to sourcing units. To focus on the development of the centralized sourcing unit, only key activities of placing order to current sourcing units were considered. The key activities start from APAC COM which receives the order through Customer Document Registration, to dispatching an internal sale order to each sourcing unit. These activities contain redundancies of work in completing the process and placing the order to sourcing units, as well as long operation lead time. The redundancies in the work process create the use of various systems as well as various documents in the entire ordering process. All of this can be changed by the establishment of a centralized sourcing development. By this development, ABC would upgrade one of its current sourcing units to be a centralized sourcing unit instead of building a new plant. The other seven sourcing units would be downgraded to be sub-sourcing units.

As a result, there are four major steps for developing the centralized sourcing, which are 1) set up the location; 2) data management; 3) system utilization; and 4) human resources management. To set up the location, it is required to analyze the summary of data and sale order volumes supplied by each sourcing, plant facility, and organization management concerned with the sourcing unit. France is the best location for upgrading to the centralized sourcing unit. The data management step is required to set up the system of this centralized sourcing unit, for instance, plant code, and information of configuration items that exist in all current sourcing units. Next is the system utilization. ABC utilizes SAP#2 application to be one common global ERP backbone to use for all selling units as well as a centralized sourcing unit. Moreover, Ally Web-Based application is used for all activities related to order preparation and management. In the research result, the document for using a whole process is reduced to be only one document, which is a sale order. Resources management is the last step to be considered. As a consequence of developing a centralized sourcing unit,

some resources from each sourcing unit are relocated to work for this centralized sourcing unit. The remaining resources are still positioned in the rest of sourcing units which are downgraded to be sub-sourcing units.

Process mapping is very helpful as it shows the overall process flow chart and makes it easier to monitor redundancy of work and a long operation process lead time. After analyzing the as-is process and developing the centralized sourcing unit, the redundancies of the ordering process have been reduced. Some working activities can be eliminated because of the change of sourcing unit, for instance, no more manual creation for orders in SAP#1 but do that through Ally Web-Based and SAP#2. It also reduced the necessary documentation to be one document, which is a sale order document instead of various documents.

Furthermore, the lead time of placing an order to sourcing units is reduced. With the minimum operation lead time, the "As-is" process of order creation through SAP#1 takes approximately four days. The "As-is" process of order creation through Ally Web-Based and SAP#2 takes approximately three and a half days. After developing the centralized sourcing unit, the "To-be" process takes approximately one and a half days. It can be reduced by approximately two days to two and a half days. With the maximum operation lead time, the "As-is" process of order creation through SAP#1 takes approximately eight days. The "As-is" process of order creation through Ally Web-Based and SAP#2 takes approximately seven and a half days. After developing the centralized sourcing unit, the "To-be" process takes approximately three days. It can be reduced by approximately four and a half days to five days. This lead time reduction helps ABC to improve its overall lead time of the ordering process. Key Performance Indicator (KPI) of the ordering process can be improved by this development which may help ABC achieve the company target of ten days.

5.3 Theoretical Implications

According to the centralized sourcing governing structure presented in chapter II, it can be applied in a business that wants to streamline its sourcing process. A company can manages all major operation in a corporate center. It helps a corporation to manipulate the full power of its expenditure, to enhance operational efficiencies, and to improve and share both knowledge and the best practical execution. It also assists standardized sourcing processes to be instituted throughout the organization.

With the same theories, centralization can be applied in other department of the business, for instance Human Resource Management and global procurement.

5.4 Managerial Implications

This study aims to develop a centralized sourcing unit to improve the effectiveness and efficiency of the ordering process by the application of the centralized sourcing concept. It greatly helps to reduce redundancy of work, as well as overall operation lead time of the ordering process of the ABC Company.

Regarding the development of the centralized sourcing unit, the overall operation lead time of the ordering process is apparently reduced. The redundancies in the ordering process are reduced. Moreover, the system and document used in the entire ordering process are minimized. This development helps The ABC Company to standardize the ordering process with faster operation lead time and no redundancy in the work process.

The proposed implication can result in various benefits to the company. First, the reduction of redundant order processing helps ABC eliminate unnecessary tasks. The overall work flow is shortened and made less complex. Therefore, the overall operation lead time is reduced. Moreover, centralization of placing order to one place can minimize excessive work in the faster operation. All this helps the company save any extra costs which might be incurred to compensate for the time lost during

making order entries which will affect delivery on time. In addition, it also brings many benefits to ABC in order to provide a better service to its customers. A faster operation helps ABC improve effectiveness and efficiency in the ordering process. This leads to increased capability of work in the order entry process and amongst manufacturing processes. Increasing working capability helps the company to better manage its manpower and workload. It can reduce management costs and operation costs. In addition, a faster operation helps ABC deliver product on time to the customers. This leads to increasing customer satisfaction, resulting in more orders from customers.

To implement the centralized sourcing unit, some major steps are needed. First, ABC's management needs to brainstorm to identify positive and negative aspects of the centralized sourcing unit set-up. This is to identify the expected outcomes in terms of cost, and how much benefit the company can expect. After getting the result, an implementation plan is required. This is to set up the timeframe and the department in charge of this implementation. After that, the implementation of the centralized sourcing unit starts by following the four steps of the development plan.

5.5 Limitations and Recommendations for Future Research

For future research, studies should focus more on developing the activities of receiving customer purchase order to dispatching the order to the Central Order Management. These activities also take a long operation lead time. Developing these activities can improve the entire ordering process lead time. Moreover, future research should focus more on utilizing the company's system for communicating. There is some work aside from the company system in these activities; for instance, Local Management needs to follow up on the departments concerning missing data. The utilization of this system may help the company to communicate between departments through a company system. It would help the company to protect against a lack of operation tracking without losing information.

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APPENDICES

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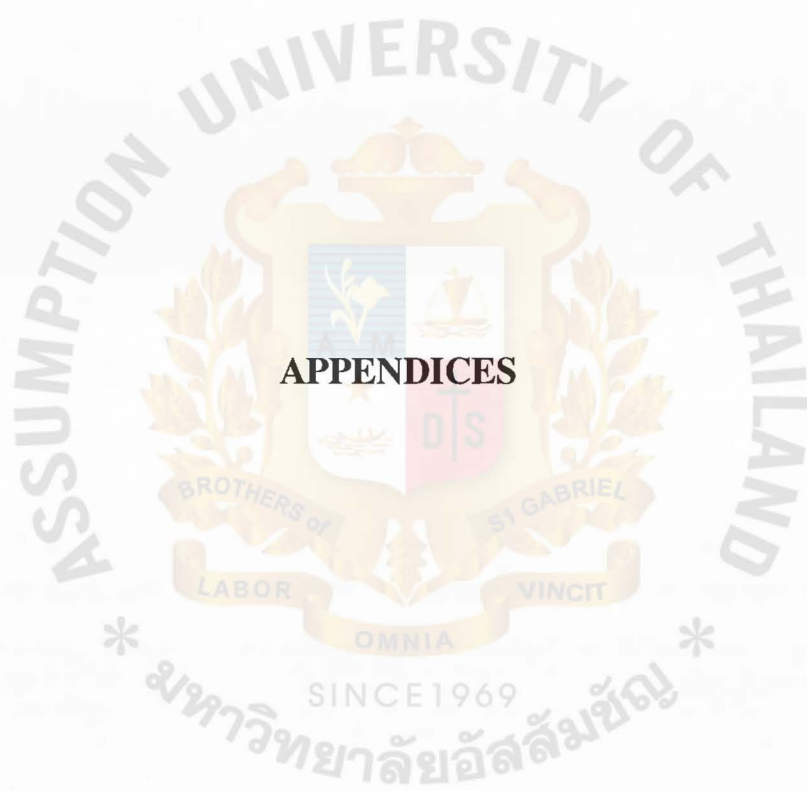
APPENDIX A

Results of Data Collection

In-depth Interview Results

In order to collect data of the as-is ordering process flow, in-depth interviews are conducted. All departments concerned which engage in the ordering process and specific level of operation management have subjects to interview. The questions and answers are as follows:

1) *What is the Centralized Sourcing Unit?*

The Centralized Sourcing Unit supplies products of hardware and software. It takes responsibility for all sales concerning products of hardware and software and of inventories for the group. Centralized Sourcing Unit bears risks and rewards for products of hardware and software (credit, warranty, inventory, currency). It is linked to all Manufacturing Plants and CEMs (Contract Electronic Manufacturers).

2) *Why is ABC developing this Centralized Sourcing Unit?*

ABC has chosen the development of this structure in order to streamline the company's complex inter-company concerning transfers, selling and sourcing processes. The Centralized Sourcing Unit will become the reference of the legal entity for ABC's sales products of hardware and software to customers and will have a primary responsibility for contracts involving products.

3) *How will the Centralized Sourcing Unit be developed?*

The Centralized Sourcing Unit is derived from eight sourcing units which are transferred to the Centralized Sourcing Unit. Internal Controls are set up at Centralized Sourcing Unit level. When the first step is completed, the source of all products from the Centralized Sourcing Unit is linked to each Selling Unit.

4) What are the benefits of the Centralized Sourcing Unit?

It will strongly contribute to the company's strategy to increase customers' satisfaction, to improve efficiency and company agility in the market. Furthermore, it will speed up the ability to take a service to customers by simplification and automation of the company's inter-house processes. Also, it will give the company an end-to-end view of the company's key financial data and in doing so will allow ABC to be more customer-centric. This will provide one common global ERP backbone relying on an optimized SAP#2.

5) Is this a reorganization of the company?

No, this is not a reorganization of the company. In the current structure, which is based on Regions, Central and Corporate functions will remain unchanged. This will however lead to a reorganization and rationalization of ABC's support functions and Selling Units.

6) How will this change employees day-to-day job?

The change to a Centralized Sourcing Unit will reduce the load of work and the complexity of links in the management of customer contracts and Inter-Unit flows. It will ease the day-to day job. As needed, the various functions will be able to connect directly to the company's harmonized Information systems.

The in-depth interview technique is useful for portraying and integrating details of the overall process flow and leads to a better understanding of process details and their consequences. The result of the in-depth interviews is applied to creating an idea and for the development of the centralized sourcing unit, and it will be interpreted in the phase of the "to-be" ordering process design.

Observation Results

Observation of process work flow was done in specific ordering activities, starting when the selling unit receives the order from its customer to placing in sourcing units. These activities can be observed in the branch office, Bangkok which is helping to visualize the realistic process and lead time of its activities process. After observing all work flows, it shows that various activities need to be done in order to complete the whole process of ordering. Also, there is some work aside from the company system. For instance, Local Management needs to follow up the departments concerning missing data. All this causes a lack of operation tracking by a loss of information. Furthermore, various systems need to be used for entering the order, for instance, SAP#1, Ally Web-Based, and SAP#2. As a consequence of various systems being used in the ordering process, too much documentation is being used in the whole process.

Observation technique is useful for collecting key information to identify the problems of work. It leads to a better understanding of the practice of ordering procedures, and proposes a development process.

Results of Documentation Review

Various internal documents of the company are reviewed for details concerning the process collection. These documents are used in the "as-is" ordering process, for instance, purchase orders from the final customer, sale orders, internal purchase orders, and internal sale orders. In order to foresee the best location to develop the centralized sourcing unit, order volumes of overall customer sales supplied by each sourcing unit. After reviewing the concerned documents, they show that various documents are used in the entire ordering process. Some documents take a long operation time to generate, for instance, internal purchase orders, and internal sale orders. This led to a long lead time of operation in the overall process of ordering.

Documentation review technique leads to a better understanding in detail of what is required in each process and lead time preparation. Moreover, it helps to identify what documents can be reduced in the ordering process.