HAAGA-HELIA
University of Applied Sciences

Adding value to customers by improving supply chain management performance for VuHai Company Ltd.

Chau Le Minh

Abstract

19 November 2012

International Business

Author or authors Chau Le Minh	Group or year of entry 2009
Title of report Adding value to customer by improving supply chain performance for VuHai Company Ltd.	**Number of pages and appendices** 39 + 6
Teacher(s) or supervisor(s) Sirkka Hoikkala, Tanja Vesala-Varttala	

The overall aim of this thesis was to measure and assess the current supply chain performance of one case company. The specific objective was to suggest the right actions to improve the supply chain performance in order to add value to customers. The research focused on VuHai Company Ltd, the Vietnamese commissioning company, which produces and exports its construction steel products to Asian countries, USA and Australia.

The theoretical framework was established on the key attribute of supply chain, supply chain measurement method and the KPIs for accessing the supply chain performance. This was the framework for the empirical research.

The main research method is qualitative. The data collection method included unstructured interviews and semi-structured interviews. The purpose of the research tools was to collect the opinions and information on the current supply chain performance.

It was found that there were many serious problems happening in the case company's supply chain including the information flow problems, inventory problems, a poor customer service level, and a lack of using technology in the supply chain. Based on these problems, improvement actions were suggested. The company needs to change its work method, offer training to employees in using and applying technology tools to their works, and implement the ERP software package to the supply chain.

Keywords
Supply chain management, key performance indicators, SCOR model, information flow, material flow, ERP

Table of contents

1 Introduction

Well-functioning supply chain can be a tremendous advantage in comparison to the competitors, but it is a long way to the top. The company has to decide on a supply chain strategy or design, applied supply chain management practices, control over the operations and continuously develop the whole supply chain.

Supply chain performance is one of the critical aspects which lead companies are succeeding in the market. It is why improving supply chain performance has become one of the most important issues for companies to gain competitive advantages. Good supply chain management can bring to companies both productivity advantage and value advantage (Hugos 2006, 5).

This thesis used VuHai Company Ltd. as a case example in finding ways how to improve a company's supply chain performance. The goal of supply chain performance improvement is to achieve a highest possible customer service level at minimum cost.

1.1 Key concepts

Supply chain management: The active management of supply chain activities and relationships in order to maximize customer value and achieve a sustainable competitive advantage. It represents a conscious effort by a firm or group of firms to develop and improve supply chains in the most effective ways possible. (Bozarth & Handfield 2008, 567.)

Information Flow: In supply chain, material flow from upstream to downstream. Demand information from the end-customer flows in the opposite direction. (Harrison & Hoek 2011, 32.)

Material Flow: measures the quantity of material that passes through a given network per unit of time (Harrison & Hoek 2011, 32.)

Supply Chain Opreations Reference (SCOR) model: identifies five management processes: plan, source, make, deliver and return. The plan processes can be described as the tasks of planning the demand and supply in order to have right activities to meet sourcing, long-term production and delivery requirements. The source processes are the tasks that acquire material and services to fulfill the expected demand. In the make processes, the manager will make decision to produce the finished products in a good quality to meet the demand forecast. The delivery processes include several tasks, which are demand forecast management, warehouse management, transportation management and distribution management. Return is the final process in SCOR dealing with returning products from customers for the replacement one and the recycling the materials of the returned products. (Murphy & Wood 2008.)

Key Performance Indicators (KPIs): are the key metrics that help firms to assess their supply chain performance in relation with their organizations' goal. The key metric provides the useful and trustful information for the organization to notice that their supply chain performance is on the track or not. In case of bad performance of the supply chain, organization and their stakeholders need to develop actions to achieve the problems. (Advanced Performance Institute 2012.)

Enterprise Resource Planning (ERP): is an information system for identifying and planning the enterprise-wide resources needed to take, make, ship and account for customer orders. ERP allows companies automating and integrating many of their business processes, sharing common database and business practice through the enterprise and produce information in real time. (Heizer & Render 2011.)

1.2   Background of the research

VuHai Company Ltd. is a Vietnamese based company. It produces and exports construction steel products to many Asian countries, USA and Australia. The company was established in 1992 and its manufacture is located in Haiphong city in Vietnam.

The company's mission is to bring to their customers products with high quality in a good price and in the shortest time. This is a reason why supply chain management is a very important thing that VuHai Company Ltd. pays attention to. If one mistake is made in their supply chain, the company will lose a huge amount of money to solve problems. They aim to maximize profit and pursue a business growth strategy based on expansion of market share in existing and new markets; development of new product lines to satisfy different consumer preferences and continuously enhancing supply chain management. (VuHai 2012.)

"Developing the current supply chain performance of VuHai Company Ltd." project was launched because of many reasons. Construction steel industry relies a lot on the real estate sector. However, as the result of frozen real estate market in Vietnam in 2012, domestic construction steel market has to face many difficulties of decreasing demand. The industry outlook in 2012 is also not so positive because of negative effects from monetary policy, interest rate and steel price fluctuations. On the other hand, competing with the large and strong steel producer i.e. Nippon Steel Company, Hoa Phat Group Joint Stock Company, Vietnam German Steel Pipe Joint Stock Company is a one of the most challenges for VuHai Company. Moreover, last year company lost around EUR 48,000 because mistakes were made during the product manufacturing. It did not only affect to the company's revenue but also affect to the image of the company. (Vu Hai 2012.)

The author of this thesis was responsible for planning and execution of the project. Representative of the commissioning party was Mr Vu Hai, the Director of VuHai Company Ltd. He also approved the project plan and acts as an advisor on the company's behalf.

1.3 Research problem and objectives

The objective of the project is taking a look in to the current situation of the company's current supply chain performance and recommending the actions to develop the supply chain in order to improve the customer service level.

The research problem is **"how should the supply chain management of VuHai Company Ltd. be improved in order to add value to their customers"**.

The problem will be solved by investigate the supply chain performance at the moment and base on the result the author will recommend the right actions for the company to achieve its supply chain management performance in the future. The investigative questions (IQs) of the thesis are as follows:

- IQ1: How is the current supply chain performance? (Time, cost, quality and flexibility perpective)
- IQ2: What are the company's strengths and weaknesses of the supply chain performance at the moment from customers' point of view?
- IQ3: What are employees' opinions about the company's current supply chain performance? Their opinion about improving the supply chain management?

1.4   Dermacation

There are many different aspects in supply chain management i.e. inbound logistics, operations, outbound logistics, marketing & sales and services (Figure 1). All these activities are involved in supply chain with the purpose of creating the value, cutting costs and offering the good quality product or service in order to meet the expected profit margin.

Inbound logistics include all the activities related to materials i.e. purchasing, receiving and inventory. Operations are including all the activities in relation with manufacturing the final products. Outbound logistics are the activities that related with stock, distribution and delivery the final products to customers. Marketing & sale are one of the important parts in the supply chain because it will advertise the company's products to the target customer; attract them to buy those products. On the other hand, it will decide the products price based on the company's pricing strategy. The final part in the supply chain process is the service or we can know as the service after

sale. It is dealing with maintaining the product quality and supporting the customers with different services.
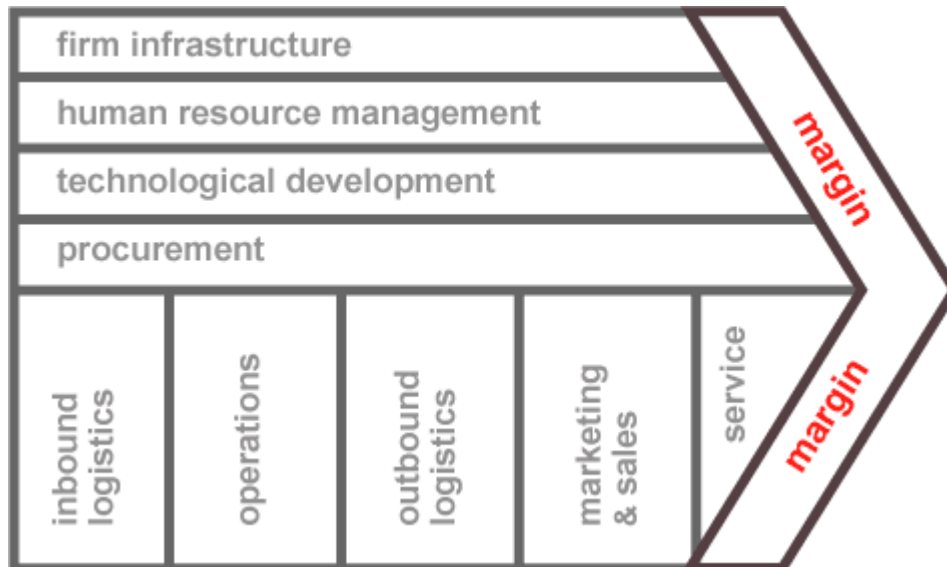
Figure 1. Value chain model by Porter (Fao 2001)

In this thesis, the author only focuses on the operation (mainly in manufacturing) and outbound logistics.

1.5 Benefits

The benefit that the case company or the supply chain department in specific received from author's study was the assessment of the current supply chain performance. Then based on the assessment, the author recommended the right actions for the case company to improve its supply chain performance. The improvement suggestions would help the case company to reduce mistakes, minimize costs, maximize profits, improve the service quality and build a strong image with their customers. VuHai Company also would gain competitive advantage through the development suggestions in order to compete with their competitors in both domestic market and international markets.

1.6 Structure of the thesis

The overlay matrix presents the structure of the thesis paper which includes six chapters (table 1). The chapter 1 introduces the thesis topic, background of the research, research problems, its objectives and the benefits to the commissioning party. The chapter 2 presents the relevant theoretical framework, which includes the importance of supply chain management, key attributes of supply chain as well as the supply chain performance measurement method. Chapter 3, which is the empirical research, represents the interviews with VuHai Company's representative, key customers, and their employees. In chapter 4, the results will be analyzed. In chapter 5, the author will apply the SCOR model and KPIs to analysis the current supply chain activities. Chapter 6 is the end of the research with the conclusion of the overall findings as well as development suggestions, suggestion for further research, and the author's personal learning after doing the thesis.

Table 1. Overlay matrix

Research problem: Adding value to customer by developing supply chain performance for VuHai Company Ltd.			
Investigative questions	Theory	Data collection	Findings
IQ 1: How is the current supply chain performance? (time, cost ,quality,flexibility perpective)	2.1	4.1	4.1, 5, 6.1
IQ 2: What are the company's strengths and weaknesses of the supply chain performance at the moment from customers' point of view	2.1, 2.3	4.2	4.2,5, 6.1
IQ 3: The employees' opinions about the company's current supply chain performance? Their opinions about improving the SCM?	2.1, 2.3	4.3	4.3, 5,6.1

2 Theory

Theory is fundamental to the research process. A theoretical framework is needed for all the researchers because it provides the conceptual clarity and capacity to connect new knowledge that is gained through the data collection method to the knowledge which is relevant. Theory framework is the conceptual direction for all researchers. (Depoy & Gitlin 1998.)

The first part of this chapter 2.1 analyzes how important the supply chain management is in the company operation and the key attributes of supply chain. The second part, chapter 2.2 presents performance measurement method. It is important to understand the purpose of supply chain performance measurement and how to measure it in order to be able to use the right method approach for the case company.

2.1 The importance of supply chain management

Supply chain management is the managing and controlling of all processes, which are involved in purchasing, production, transportation and distribution across the whole supply chain. Supply chain management also includes coordination and collaboration between the organization with their suppliers, third party service provider and customers. Material flow and information flow are the main overall task of supply chain management in order to meet end-customers' needs. (Figure 2.)
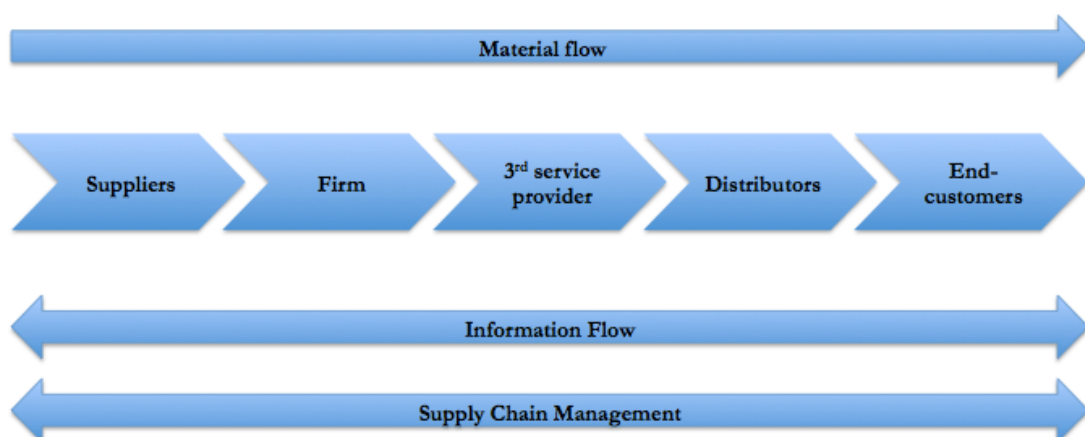

Figure 2. Supply Chain network

Supply chain management plays an important role in the company. The firm's aim is to provide a product or service that someone values in order to make profit. However, the company's operation function is not enough for company to focus on doing the right things. The business can only be succeeding when it is linked with the operation of its suppliers, distributors and customers. There are four performance factors in supply chain operations, which need be taken under closer concentration: *quality, time, cost* and *flexibility*. In order to compete with competitors in the market, company must scope their supply chain performance with these factors to be able to provide the service in a demand way.

Quality is the most visible aspect of supply chain performance. Defects, incorrect quantities and wrong items delivery are symptoms of quality problems in supply chain processes that are all too apparent to the end-customers. These problems can influence customer loyalty negatively. Quality of service in supply chain can be known as the concern of the company's operation with its supply chain i.e. good quality materials from suppliers, delivery the right quantity of the right product in the right sequence in response to customer order. Many companies failed in the market because of the poor quality in supply chain performance. Customers' buying decisions are made base on the quality of the products and services which the company offers. Thus the supply chain could be driven as a whole worst or a whole best depending on the quality. (Harrison & Hoek 2011, 17-38.)

In supply chain, *time* measures how long a customer has to wait in order to receive a given product or service. Time also is used to win orders by the company who understand that many customers do not want to wait and is willing to pay more in order to get what they want quickly. On the other hand, businesses today are looking to reduce order cycle times because longer cycle times means the company will face with the high inventory problem. (Murphy & Wood 2008, 93.) Speeding up supply chain processes is a good process to improve the good quality of the end product and reduce the risk of over-aged stock.

Cost is very important aspect in any supply chain processes. Reddy & Reddy (2001, 33)

state most of the firms spend between 50 and 70 percent of their total revenues on purchasing goods and services. There are two types of costs in supply chain: visible costs (locating product, placing order, purchase and payment approvals and receiving product or services) and invisible costs (dispute resolution, working capital, buffer inventory, indirect material, unplanned shipping costs). Visible costs in the supply chain are mainly associated with transaction-processing activities. This is why invisible costs have the biggest impact on the profitability of a firm. By understanding the costs in supply chains, firms notice that supply chains offer an obvious potential source of cost savings in order to maximize the organization's profit.

Flexibility in supply chain can be divided into two types: micro flexibility and macro flexibility. Micro flexibility means how fast the supply chain can respond to opportunities or threats in a short term i.e. the demand of the typical product suddenly increases, how fast the supply chain can adapt to this change. Macro flexibility can be know as the speed that organization can adapt to the changes in their supply chain or market changes i.e. a clothing decides to have e-store for their customers, flexibility here means how fast can this supply chain can make it exist for the customers. (Supplychaindigest 2012.)

2.2   Key attributes of supply chain

After understanding how important the supply chain performance in an organization, it is necessary to know the key attributes of supply chain well in order to have a big picture of supply chain performance. There are six key attributes of supply chain: customer power, long-term orientation, leveraging technology, enhanced communication across organization, inventory control, inter-organizational collaboration.

In recent years, the customer has gained tremendous power over buying decision, in large part because of greater access information on Internet. Through Internet,

consumer will get more knowledge about an individual organization and its products as well as the competing companies and their products. They will compare and their buying behavior will be affected based on the information, which they find out. It also means the increased power of customers has an important implication for the design and management of supply chain. Furthermore, the *customer power* suggests that traditional factory-driven, push supply chains should be replaced by customer-centric, pull-oriented ones.

Well-run supply chain can help the organization to compete with their strong competitors in the international market. *A long-term orientation* tends to be predicated on relation exchange between the company and their suppliers, customers, intermediaries and facilitators. Partnerships, which can be described as positive, lone-term relationship between supply chain participants, are part and parcel of relationship exchange. The supply chain partners are working together to share information, compatible goals, build the trust and make buying decisions based on cost and price value.

Technology plays an important role in supply chain. Supply chain has a complex former, which is consisting of multiple organizations, processes and requirements. By using computing power and Internet, company can have a great opportunity for supply chains to become more proactive and less reactive, which can translate into lower inventories and improve quality and profitability throughout the supply chain.

Enhanced Communication across Organizations is very important key that company needs to pay closer attention to. Supply chain processes depend on huge quantities of real-time information; it is essential that the information seamlessly transmitted across organization. (Murphy & Wood 2008, 36-40.)

Inventories usually present 20-60% of total assets of a company (Glen 2005). There is a cost of warehousing, which increases operating costs and decreases the company's profit. *Inventory control* in supply chain management is planning and controlling stock

from the raw material stage to the customer. It also involves a reduction in the amount of inventory in the supply chain.

Supply Chain Collaboration can be defined as cooperative, supply chain relationships-formal or informal between manufacturing companies and their suppliers, business partners or customer in order to develop and enhance the overall business performance of both sides. Because a primary objective of supply chain management is to optimize the performance of the supply chain as a whole so the inter-organizational collaboration is needed. Collaboration with suppliers has the potential for greater impact on the company's profits. (Matchette & Seikel 2004.)

2.3 Supply Chain Performance measurement

The performance of the complete supply chain and all processes are needed to measure. The performance measurement approach always base on the company's strategy, value drivers and goals. Performance measurement helps the managers to assists in revising company goals, and re-engineering business processes. Supply chain performance measurement is helpful in the continuous improvement of supply chain management. The evaluation of supply chain performance should be *effective* and *efficiency*.

The *effectiveness* of the supply chain measurement refers to the results that the company's manager can have the right decision-making in order to meet the company's previously established standard. The *efficiency* identifies the relationship between the planned and the actual practice which helps the organization to realize their previously agreed-upon goal in the supply chains. Based on the efficiency the organization can work with their vendors, partners and stakeholders in the chain to achieve the goal. (Handfield et al. 2009.)

2.3.1 Why supply chain performance measurement is needed?

The information from the supply chain performance measurement is not only needed in top management level but also in operational level.

Concerning to the top management level, through the performance measurement, the management can recognize how efficient the supply chain management is. On the other hand, performance measurement also provides information on how effective the supply chain activities have been.

Concerning about operation level, evaluating supply chain activity and performance supports better decision-making and better communication in supply chain. In addition, it provides good performance feedback, motives and directs working behavior in the supply chain. Measurement can lead to have better decisions to achieve the supply chain performance based on the results which shows the problem areas that company need to improve. The communication across the supply chain will be better after evaluating the supply chain activity i.e. purchasing department must clearly communicate with their suppliers about the performance expectations. Feedback can be collected during the performance measurement process. The identified problems in the supply chain will be corrected in order to meet the supply chain performance's objectives over time. Management can motivate and influence the working behavior by linking the result of performance objectives to the company's reward. (Handfield et al. 2009.)

When Handfield et al. (2009) explain the reasons for measuring and evaluation supply chain performance based on the top management level and operation level, Sadler (2007) state the purposes of a performance measurement system based on the value-added to customers. First of all, the performance measurement helps the organization to identify their succeeding in the market i.e. do their customers satisfy with their product or service quality, how they fulfill their customers' needs. By evaluating the supply chain performance, the organization can get deeper understanding on the current processes in order to identify bottlenecks, waste, problems and improvement opportunities to add value to their customers.

2.3.2 Designing and developing the performance measurement metrics

The performance measurement metrics should be designed and developed carefully. The measurement system should reinforce the firm's strategy as well as guide the organization to improve customer and shareholder satisfaction and competitiveness. When designing and developing the supply chain performance metrics, the strategy and goals of entire supply chain need to be understood clearly.

First of all, four important issues that researchers must pay close attention when they want to assess the supply chain performance are definitions of indicators, perspective of indicators, capturing date and confidentiality. The supply chains consist of many companies and their functions so the common definition of all the measures is compulsory. The researcher should understand and choose the suitable indicators and apply them in the same way in every aspects of the supply chain. Depending on the role in the supply chain, partners can have different perspective to the measurement. For example, a customer calculates the order fill rate based on the date of order and the delivery date. However, a supplier will calculate it based on the order receipt and the ship date. It causes the differences in results regarding to an agreed order fill rate. Thus, it is important that all the parties involve in the supply chain should agree on one perspective. All the units in the supply chain should capture the data in a consistent way throughout the supply chain in order to provide the reliable and up-to-date data for the supply chain partners. Confidentially is one of the most important issues in the supply chain when it consists more than two companies. Most of firms always want to hide their internal information with their partners. (Chopra & Meindl 2007.)

After knowing the important issues when assessing the supply chain activities, it is needed for researchers to state the steps to develop a performance measurement metrics. Figure 3 presents the nine steps to develop the performance metrics, which are established by Wisner & Fawcett (1991). Understanding the company's mission is one of the most important things that researchers need to pay attention to when assessing the supply chain performance. Based on its mission, the researcher can identify the company's current supply chain performance and notice the role of each

functional area in the supply chain and develop the suitable measurement for this area. All parts in the supply chain must be involved in evaluating the performance. Thus, communicating across the supply chain about the performance goal and objectives must be established in order to assure the compatibility of performance measurement used in all functional areas. The problems and feedbacks about the supply chain performance will be identified in details. The management should review the results and suggest the right action to achieve and improve the supply chain performance.

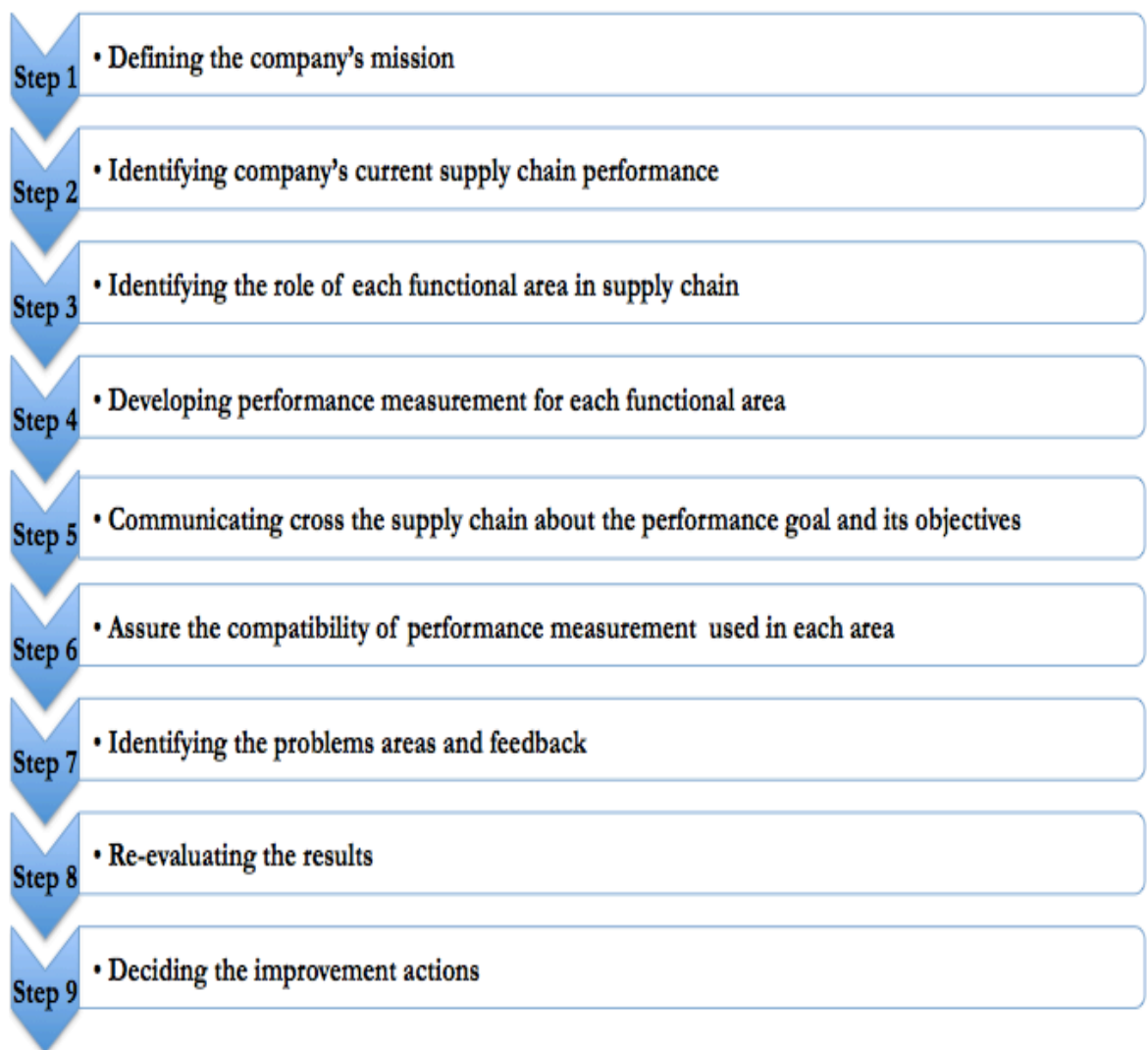| Step 1 | • Defining the company's mission |
Step 2	• Identifying company's current supply chain performance
Step 3	• Identifying the role of each functional area in supply chain
Step 4	• Developing performance measurement for each functional area
Step 5	• Communicating cross the supply chain about the performance goal and its objectives
Step 6	• Assure the compatibility of performance measurement used in each area
Step 7	• Identifying the problems areas and feedback
Step 8	• Re-evaluating the results
Step 9	• Deciding the improvement actions

Figure 3. Nine steps to develop a performance measurement metrics (Wisner & Fawcett 1991)

2.3.3 Supply chain performance measurement method

There are various methods to measure the supply chain performance depending on the purpose of the measurement. There are three key questions, which are suggested by Harrison and Hoek (2011) are needed to answer in measuring the supply chain performance. All the questions must be answered on the focused time. The first question is how the company meets the customers' target. This question helps the organization to get deeper understand their on-time delivery and order lead time processes. These processes are involved several stages and the co-operation between partners in the supply chain. The information in these processes is gathered hence the management can see which functional area is having problems. The second question is about benchmarking of the firm with their competitors in order to have an overall picture of how the supply chain performance differ with their competitors. The good things will be enhanced and the bad things will be achieved to compete with the competitors in the market. The supply chain performance needs to be measured often to enhance well-run supply chain to meet its goals and objectives. The final question relates to the improvement decisions of the management. After the implementing the decision, how the company's supply chain performance gets better or worst. Thus, it is required to have regular measurement in order to determine the performance is getting better or not. (Sadler 2007, 213-215.)

 Another method that can be used in assessing the supply chain performance is the Supply chain operations reference (SCOR). The SCOR approach, which is a famous method for evaluating the supply chain performance, and can lead the management to have best practice and make the supply chain performance to work the most effectively. Five different processes (plan, source, make, delivery and return), which represent the SCOR model, were explained in the chapter 1.1 (key concepts). The metrics used in SCOR method are categorized under five core supply chain performance attributes: reliability, responsiveness, agility, costs and assets. When reliability, responsiveness and agility attribute are the customer-focused attributes, costs and assets attribute are the internally focused attributes. Reliability represents how the tasks are performed to meet the supply chain's objectives. It predicts the outcome of

the supply chain performance processes. Thus, 4Rs (right time, right quality, right product and right quantity) are used as the main metrics to evaluate the reliability of the supply chain performance. The responsiveness attribute of the supply chain can be defined as the time duration that needs to be completed a task in the chain. The main metric used to assess the responsiveness is the order fulfillment cycle-time. In order to describe how fast the supply chain responds to the changes in operation or market changes, the agility attribute is used. Flexibility and adaptability are the main KPIs to use in this phase. There are many different costs in the operating process in the supply chain i.e. labor costs, raw material costs and transportation costs and supply chain management cost. All these costs present the cost attribute in the supply chain. In order to measure the cost attribute, the cost of good sold and supply chain management cost metrics are used. The final attribute is the assets. Assets can be known as the stock. As the author described in chapter 2.2 (key attribute of supply chain), inventory played an important role in the supply chain. Thus, the assets attribute is needed to measure carefully. Cash-to-cash cycle time and return on fixed assets metrics are used in this case. (Supply-Chain Council 2010.)

2.3.4 Typical KPIs to evaluate supply chain performance

Key Performance Indicators (KPIs) can be known as Key Success Indicators (KSIs) are often used to measure the supply chain performance. KPIs are the main metrics that track the performance of supply chain in terms of facilities, inventory, information, transportation, sourcing and pricing.

There is large amount performance indicators suggested for the supply chains in the literature. One of the most famous performance indicators, which are proposed by Handfield et al. (2009), can apply to measure the supply chain performance of different firms in different fields. Those authors stated them as the key performance indicators (KPIs). The KPIs was categorized in four groups that are delivery performance, supply chain responsiveness, assets and inventories, and costs. The delivery performance group includes service level, on-time delivery, forecast accuracy and order lead time

indicator. The supply chain responsiveness group consists the planning cycle time indicator. Asset turn, inventory turns and inventory age indicator are in the assets and inventories group. Finally the costs group includes the cost of good sold, value-added employee productivity and warranty cost indicator.

2.3.5   Difficulties in measuring supply chain performance

Supply chain management is a huge concept and it consists of many aspects. Thus, the supply chain performance is very complicated to measure. Handfiled et al. (2009, 708-710) stated four fundamental challenges in measuring supply chains: too much data or wrong data, short-term focused measurement, lacking of detail and driving the wrong performance. The first challenge is quite common in many organizations. The supply chain includes many process and many data. It is very difficult for management to decide which data can be use to measure the supply chain performance. It is not an easy work to do. If the management use the wrong data, it leads to the wrong evaluation and affect to the development decisions dramatically. The second problem that many small- and medium-sized companies face is a problem of relying on measures and data that are short-term focused i.e. they measure the supply chain performance based on the financial and operating data. The third challenge for the management in assessing the supply chain performance is receiving the bad reports (lacking of detailed). Thus, it is very important for the management to choose the best person involving in the measurement team. Driving the wrong performance is the last problem that companies may face during the measurement. Based on the wrong data and bad report, the management can make the wrong decision. The management can avoid this problem by re-evaluating the supply chain performance before deciding the improvement actions.

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3 Research methodology

This chapter represents the researcher's choice of the method approach for the case company and the reasons why she decided to choose this method. The main research method is qualitative. All the data collected through the interviews with the company representatives, company's business customers and its employees. The author chose unstructured and semi-structured question types for the interviews. They helped her to get deeper understanding on the company's supply chain activities and collect the value data to measure the supply chain performance.

3.1 Qualitative research

The purpose of qualitative approach is to capture data on "the perception of respondents in the context of their setting, through a process of attentiveness and empathetic understanding" (Miles & Huberman 1994, 6). The detailed data is general gathered from small group of people through the interaction between the researcher and respondents.

For this case study, quality approach is chosen as the main research method. The researcher's aim is to concern the views and opinions of customers and employees about the current supply chain activities and the performance of the case company's supply chain. Hence, a qualitative approach is suited for this research in order to help the researcher to have a big picture the current supply chain performance.

The research methodology of this study consisted two parts: the desktop research and the interviews. The desktop research was done to acquire the theoretical background on the subject of supply chain performance measurement. The followed interviews were the main tool to collect the data about the current supply chain activities of the case company. The reason that the author decided to use only interviews to collect the data this study were the company really wanted to improve their supply chain performance in order to add value to their customers. Thus, the researchers believed the company would provide her all the needed and trustful information to evaluate its supply chain activity.

The interviews consisted of 3 separated interviews: interview with the company representatives, group interview with business customers and group interview with employees. The first interview with the company answered the IQ 1, the second interview with customers answered the IQ 2 and the last interview with employees answered the IQ3. (Figure 4.)
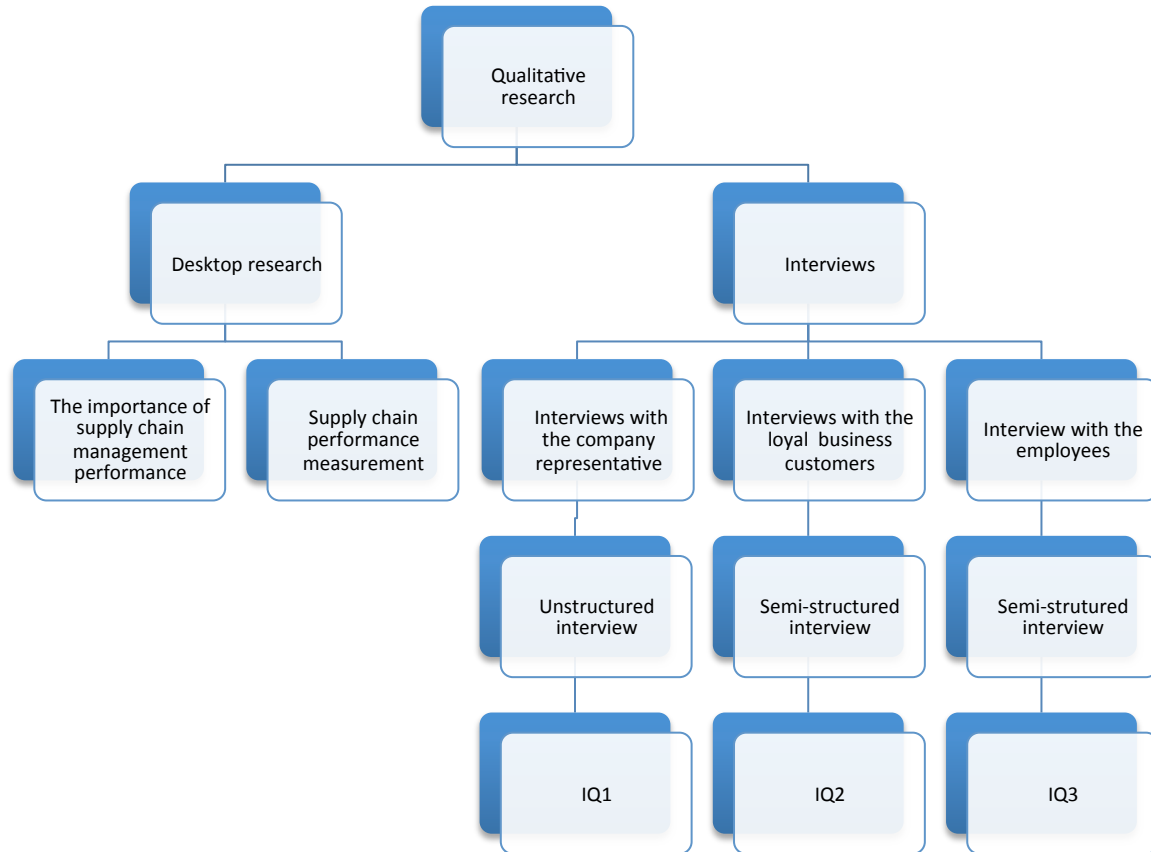
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                          Qualitative
                           research
              ┌───────────────┴───────────────┐
        Desktop research                  Interviews
         ┌──────┴──────┐          ┌──────────┼──────────┐
  The importance of  Supply chain   Interviews with  Interviews with the  Interview with the
   supply chain      performance    the company      loyal business      employees
   management        measurement    representative   customers
   performance                           │                 │                 │
                                    Unstructured     Semi-structured   Semi-strutured
                                     interview         interview         interview
                                         │                 │                 │
                                        IQ1               IQ2               IQ3
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Figure 4. Research methodology

3.2 Data collection methods

Kajornboon (2005) stated that "there are four main types of interviews: structured interviews, semi-structured interviews, unstructured interviews and non-directive interviews". For this study, unstructured interviews and semi-structured interviews and were chosen because the researcher is uncertain about what and how much information she could get from the interview (King 1994).

Unstructured interviews were conducted for the interviews with the company representatives. The use of unstructured interview means the detailed interview guide is

not needed and the interviewees are encouraged to express their opinions, knowledge and experiences openly, frankly and give as much detail as possible. The author used this method to interview the company representatives because she did not know how the case company's supply chains operation and its role in their business. By using the data collection method, the researcher can collect the background information about the supply chain activities of the case company.

Semi-structured interviews were conducted for the interviews with customers and the interview with employees. Using semi- structure interviews meant that the researcher had a list of questions to be covered. During the interviews, the researcher could also ask questions that were not listed and the order of the questions could be changed according to the flow of the discussion. (Kajornboon 2005.) In this study, semi-structured interviews were used to collect qualitative data, which was used for studying supply chain characteristics and identifying the supply chain performance of the case company.

3.3   Data validity and reliability

Validity meant the measurement process and assessment meet the criteria that researcher intend to measure. There are two essential parts which validity has in a research: internal and external. Internal validity "encompasses whether the results of the study are legitimate because of the way the groups were selected, data was recorded or analysis performed". External validity, often called "generalizability", is the possibility of the results' generalization. (Handley 2005.) In this study, the internal validity of the conducted interviews is automatically established because the group interviews as its own point of reference. The use of qualitative approach causes the external cannot be established in the "generalizability" way because it was not trying to reach a general conclusion about the population. However, external validity of the conducted interviews could be described as rigorous, credible and trustworthy. (Lowhorn 2007.) During the interview, leading questions were often avoided and the interviewees' biased opinions also were eliminated by asking about the experience of the current supply chain performance in relation to the case company. The interview

questions were conducted based on the studied theory.

Reliability refers to the consistency of a measure. It also means a research considered reliable if researcher gets the same result or data repeatedly. The results' reliability in the present study was guaranteed. Firstly, the information of the respondents who participate in the interviews (interview with customers and interview with employees) was confidential and the atmosphere of the interviews were friendly and openly. Hence, it let the interviewees feel confident about sharing their thoughts and opinions about the current supply chain performance of the case company. On the other hand, in case of interviewing with customers, due to the absences of the international customers, the researcher decided to interview in their mother-tongue langue. By doing this way, she enhanced and encouraged the interviewees to give deeper feedback to the current supply chain performance. The collected data was trustful because it brought good side and bad side on the current supply chain activities. In addition, the interview questions were conducted by using very simple words and simple way to ask question in order to make sure the collected data were valuable. Moreover, the use of the audio recording in all interviews helped researcher minimizing the loss of data and having all needed data to analysis.

4 Data analysis and findings

In this chapter, the researcher described the procedures of the interviews. She also presented all the data, which were collected during the interview. The data would help her to understand the current supply chain activities of the case company and assess its performance.

4.1 Interviews with the company representative

The interviews were conducted from the beginning of May to the beginning of June via emails and face-to-face meetings. The interviewee was the director of the company. The aim of these interviews was to collect all the background information of the company business and its supply chain activities (attachment 1).

Attachment 2 presents the case company supply chain where all the departments are indicated and how they are involved in different stages of VuHai Company Ltd.'s manufacturing and delivery to the customers. At the moment, the company has three main suppliers who offer raw material for the company's production. Most of them have relationship with the company more than 8 years. The case company always gets the cheaper raw material price hence their product price is lower than their competitors. The company outsources the service delivery.

The company's supply chain processes are assisted by IT system, which the company applies. However, the IT system has been using for more than 10 years and there has been not much investment to the new technology. On the other hand, many employees of the company do not have good skills in using technology during their work. It meant the processes of the tasks often took a longer time than what it was expected.

There is no integration of data available from different departments. The data cannot be used as real-time since it is sometimes collected and transferred in the end of the day. Neither this data can be considered as reliable because in many cases it is not

inserted at all or application of certain formulas complicates this procedure and process of data interpretation. Also paper forms are used surprisingly often in the organization instead of application electronic forms which could be safely and time-efficiently transferred to a target person. Additionally, sales history data is obviously not utilized appropriately for sales forecasting.

Moreover, product flow is customer-driven. It means the products are produced based on customer demand forecasts and customers' orders. Sometimes, the sale persons can place the urgent orders when they come to visit customers. They will notice that with the planning production department by filling the company's paper form. The inventory planning is also based on the demand forecast. The visibility of the company's inventory is poor. The planning cycles time is twice a year.

4.2 Interview with the business customers

The expected number of participants for this interview was five business customers who are the company's main customers: 3 domestic customers and 2 two international customers. The invitations to the interviewees were sent via emails and by post (attachment 3). The interviews were conducted in a month from 20th July to 20th August in 2012 (attachment 4). Due to travelling problem, there were three domestic customers attending the interview on 25th July at the company's premises. At the planning stage, the interview was conducted in English. However, in practice, the author decided to interview in Vietnamese due to the absences of 2 international business customers. It made the face-to-face interview with the domestic customers more openly and friendly. The other 2 international customers were interviewed via emails. The face-to-face interview lasted around one hour and it was audio recorded.

First of all, discussing about the order lead-time of VuHai Company's supply chain, customer 1, 3 and 4 said the company's order lead-time was quite long comparing with their competitors. With the same amount of ordering steel pipes at the same size, company's competitors can offer the customers with the total order lead time less than

VuHai Company one week. Thus, when there is an urgent need, customer 1 and 4 will not purchase products from VuHai Company.

On the other hand, most of customers experienced with the late delivery. The main reasons of the late delivery were explained due to the missing data and the transportation service provider. VuHai Company is using the transportation service which is offered by Glotrans Co. Ltd. By using only one transportation service company, the case company faces so many troubles in on-time delivery. (Customer 1, 2 & 5.)

Moreover, the quality of company's products is good. They meet the product requirement standard. (Customer 3, 4.) However, customer 5 stated last year they had returned larger amount of steel pipes because they were not in the right size that the company ordered.

In contrast, the company's product price is a bit lower comparing with their competitors. This can be the competitive advantage of the company in the steel product market. (Customer 1, 2 & 5.)

4.3   Interview with the employees

Eight employees who are working as different role in the company's supply chain were invited to the group interview through invitation letters (attachment 5). The interviews took place on 30th June in 2012 (attachment 6). Half of them have been working for the company more than five years and the rest have been working in the company less than 5 years. The purpose of having this group is to get the deeper understanding of the employees' point of views about the current supply chain performance due to their different knowledge and working experience. The interview was held at the company's premises and it lasted around two hours. The group interview was audio recorded.

Firstly, when discussing about how the information flow in the company supply chain, most interviewees stated it was not good organized. The reason for this problem is the

using of paper document as the data transferring from one department to another. Sometimes, the paper form is being lost or destroyed. Thus it is very hard to have the decision-making without the data. On the other hand, the IT system of the company is outdated system. There is no available integration data between the company's departments. The data cannot be used as the real-time because it is often collected and transferred in the end of the day. (Employee 1, 3, 4, 5, 7 & 8.)

Secondly, sales and operations planning have been performed twice a year in the company. The long planning cycle time leads the low responsiveness of the company's supply chain. There were many urgent orders in these recent years and they caused many troubles for the company. The un-planed orders made many bad changes to the company's production schedule because they required more human working hours and resources. In the beginning of February 2012, the company had to face the big problem, which arise from USA customer's urgent order. The employees had to work 12hours/day during that time. The company's main suppliers could not provide enough extra raw materials for this case so the company had to purchase raw material from other suppliers and it cost much more than what the main suppliers offered. (Employee 2, 5, 6 & 7.)

Thirdly, company produces products based on the customer order forecast. Due to misleading information flow, the company often does not have the accuracy forecast. Thus, the inventory is often not in a good level. Sometimes, it is in very high level. The company has to pay extra cost for renting the place to keep the products. Sometimes, the products are all of out of stocks. (Employee 1, 4, 6 & 8.)

Fourthly, when discussing about the impacts that cause by the employees' performance in the company's supply chain. Employee 3 and employee 7 stated that even the IT system in the company is the old fashion system but many employees do not know how to use it. It takes more time to complete the tasks than it is expected. On the other hand, if there is an urgent order, company needs more resource to delivery products on time. The company will hire part-time workers to fulfill the lack of human resource. This may cause many troubles for the company's supply chain. They do not

have good skills in doing the job, they do not understand their role in the supply chain hence they make many mistake during their work. It also takes time to explain the company working processes and let them know what their jobs are. (Employees 2, 4, 5 & 7.)

Finally, in the end of the interview, the researcher asked the employees to give their idea how to improve the supply chain performance of the case company. Most of the employees noticed the information flow is the most critical issue that the company needs to improve. The investment on new technology and training sections of using technology in working process for employees were also suggested.

5   Discussion

Through the interviews, the researcher notices that VuHai Company Ltd. does not have any formal method of monitoring their supply chain performance. The use of performance metrics is needed in this case in order to have the overall visibility picture of the company's supply chain. Moreover, KPIs help to access the accuracy of demand plan and the execution performance hence they offer the opportunities to identify and correct potential problems. (Chae 2009.)

According to the SCOR model and KPIs theory (chapter 2.3.3 & 2.3.4), the author assessed the case company's supply chain performance. The performance metrics that were gathered under five core supply chain performance attributes: reliability, responsiveness, agility, costs, adaptability and assets.

The reliability attribute of VuHai Company's supply chain did not address the ability to perform tasks as expected. Order lead-time and on time delivery were the typical metrics for this aspect. Through the interviews with customers, the researcher noticed that the order lead-time of the company's supply chain were long. Most of the customers complained about the late delivery, which often happened in the current supply chain. Thus, company's service level was poor and customers did not satisfy with it.

In order to access the responsiveness of the case company's supply chain, the KPI planning cycle time were used. The company's sales and operations planning have been performed twice a year. It leads to the low responsiveness of the supply chain. Bongsug (2009) stated that high-performance companies were conducting sale and operations planning on a weekly basis or even more often. Short planning cycle time enhances the responsiveness and adaptability of supply chain.

The forecast accuracy and urgent order metrics represented for the agility attribute of VuHai Company Ltd. The company's demand forecast were often not accuracy because of the missing or lost data during the information flow. On the other hand,

the urgent orders sometimes could take place that might causes many dramatic problems for the whole supply chain.

Regarding to the long order lead time and long information flow process in the supply chain, VuHai Company could not minimize their production cost and supply chain management cost. When the urgent orders took place in the supply chain, the company also needed to pay extra labor costs, material costs, and transportation costs. Inventory levels metric was used to measure the assets attribution of the current supply chain. Though the interviews, the inventory problems in the current supply chain were defined. The inventory control level is always unstable. Sometimes, most of the products are out of stock, which lead to the loss of customers. Sometimes, inventory level is too high that make the company to pay extra money to rent the warehouse. It leads VuHai Company cannot meet its revenue goal.

6 Conclusion

This last chapter presents the summarized problems which were found in the supply chain performance of the case company. The researcher based on her knowledge and studying different sources to give the valuable suggestions for the improvements. In addition, she also suggested the further researches that the company may benefit for improving its whole supply chain.

6.1 Overall outcomes

One of the big troubles in the case company's supply chain is the information flow problem. The use of paper copies to transfer the information lead to the lost and missing data throughout the supply chain. All the data cannot be use as the real-time data.

The company's inventory management is not organized well. It seems that currently it is rather common that sometimes the goods are out of stock and sometimes the stock is over full. Because the company wants to provide the high service level for customers so there should be no lack of inventory to make sure that lead times stay short. The company should optimize their resources by calculating the economic order quantity and the optimal order quantity. By calculating these figures VuHai Company will have the needed inventory in stock and save in the backorder costs, the cost of lost customers caused by the out-of-stock items or the extra cost if the inventory is over full.

Using the old IT system and the lack of technology skills of employees also causes many troubles for VuHai Company. The speed of the tasks is low; number of errors and mistakes is high. They affects to the company's product and service quality dramatically. On the other hand, their planning cycles and customer response times also lagged. It took VuHai Company more time to plan re-plan so there was less time for managing and making proactive decisions. Customers were dissatisfied with the service level and the company could not meet its revenue goals.

31

6.2 Development suggestions

In this chapter, the author suggested the improvement actions to VuHai Company's supply chain in order to help them to achieve the supply chain activities. The first suggestion was implementing the ERP software package. The author studied different ERP software packages and suggest the best and the most suitable one for the case company. On the other hand, the research suggested the company should have more training sections for their employees in using and applying the new technology tools in their working processes. The use of high technology in supply chain would help company to reduce and eliminate the human mistakes and errors that may cause due to the old traditional working method.

6.2.1 Improving information flow process

Regarding to many problems in VuHai Company's supply chain i.e. missing or lost information data during information flow, system not flexible enough under processes' exceptional circumstances and special needs of a company not defined; it is very needed for the company to implement an ERP software package.

ERP software package help to link all functions of an organization including order management, manufacturing, human resources, financial systems, and distribution with external suppliers and customers into a tight integrated system with shared data and visibility after implementing successfully. Thus, the suggestion of implementing ERP software package in VuHai Company's supply chain is to help them to create a well-organized business process management, evaluating their supply chain activity, controlling the inventory and letting all departments work more efficiency. ERP software leads VuHai Company manage their production capacity planning and control, so that the scheduling and resource allocation for different orders can be planned in detail before the products are shipped. Furthermore, the new ERP software is also included the warehouse and stock management functions. Thus the company's current inventory problems will be reduced and controlled.

In order to choose the right ERP software package for VuHai Company, the author have studied through different ERP software options for medium sized manufacturing companies. There are three options which can be the most suitable for VuHai Company: Epicor manufacturing ERP software (Express Edition), Fishbowl manufacturing ERP software (Inventory) or Intuitive manufacturing ERP software.

All of these systems help mid-sized enterprises manage the manufacturing process from quote to final shipment. They all offer a complete package to automate the core functions of make-to-order, make-to-stock, and repetitive manufacturing firms. They are all fairly easy to implement and have good feedback from customers.

In the following table, the functions that each ERP software package offers were presented:

Table 2. The functionality of different ERP software packages (Barcoding, 2012)

Features	Epicor Express	Fishbowl Inventory	Intuitive ERP
Financing/Accounting	X		X
Assess Management			
Material Planning	X	X	X
Manufacturing Excution System	X	X	X
Supply Chain Management	X	X	X
Supplier Management	X	X	X
Product Life Cycle Management	X	X	X
Customer Relationship Management	X		
Human resources	X		

Epicor might be the best option for VuHai Company due to the system's popularity, functional depth and breadth. It is a fully integrated ERP solution with extensive functionality for accounting, inventory control, pre-production materials planning and manufacturing execution – covering all the current problem areas within the VuHai Company's supply chain. (Softwareadvice 2012.)

6.2.2 Improving the working method

With the purpose of emphasizing on cutting cost and streamlining expenses, the researcher suggest the company to improve their method of working in order to have a more effective supply chain. According to the interviews, many employees involved in the company's supply chain do not have good skills in using electronic tools or software tools during their jobs and the company's IT systems are not up-to-date.

The lack of using high technology skills and knowledge of employees in VuHai Company affects to the quality of supply chain. Using the high technology through the use of web-based software and communication leads the supply chain performance reaching its full potential, i.e. the use of electronic mail makes the exchange of data and the running of the supply chain faster.

The company should encourage and have training sections for their employees to use high technology tools instead of using paper documents in order to speed up the working processes, save costs and minimize human mistakes.

6.3 Suggestion for further research

This research was mainly focus on the outbound logistics of the company's supply chain. Thus, the further research could be the assessment of suppliers' performance, how to enhance the relationship and work well together to have efficiency supply chain.

Implementing the ERP system was suggested to improve the company's supply chain performance. Even the ERP systems help to link all functions of an organization including order management, manufacturing, human resources, financial systems, and distribution with external suppliers and customers into a tight integrated system with shared data and visibility after implementing successfully. However, the facts about many companies purchase ERP package but not all of them succeed in implementing the system. This is why the author suggests the further research for VuHai Company on the choosing of the right vendor and how to implement the ERP successfully in the

company supply chain.

6.4   Methodological review of the research

The aim of the thesis is to develop VuHai Company's supply chain performance in order to add value to the customers. The major concern of this thesis was investigated by three investigate questions which helped the researcher to have a clear picture of the current supply chain and access the supply chain performance.

The theoretical framework was established by studying various literatures i.e. books, journals and Internet sources. The theoretical part was the guideline, which helped the author to conduct the survey questions and measure the supply chain performance.

The actual research was done by 3 main group interviews, which were the interview with the company's representatives, the interview with business customers and the interview with the employees. The types of interviews were chosen differently and suitably for each interview in order to get the best valuable data for the analysis.

In general, the outcome of the thesis is quite beneficial for improving the company's supply chain performance. Many problems in the company's supply chain were stated as the outcomes of the thesis. The researcher also based on the theory and the useful sources to suggest the suitable improvement actions for those problems.

6.5   Personal learning

Working on this thesis topic helped the author to get a deeper understand of the supply chain management role in organizations. It was a good chance for the author to apply what she had learnt in university to practical work. It also enables the researcher to formulate business processes, helps her to develop practical project management skills and enhances her ability to analyze business problems and find viable solutions.

On the other hand, during the thesis process, the author had read a lot of and a variety of books and articles for her theoretical framework study. The literature helped her to gain more knowledge about supply chain management. In addition, through the interviews, the researcher also developed her communication skills and problem-solving skills. Even at the beginning of the preparation, she thought it was very hard for her to handle all the interviews by herself. However, when the time went by, she could handle it very well.

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Attachments

Attachment 1. Interview topic guide with the company representative

1. Company information
2. Supplier relationship
3. Inventory
4. Transportation
5. Information flow
6. Customer relationship
7. Demand forecasting
8. Sale and operation planning
9. IT system
10. Delivery
11. Product quality

Attachment 2. VuHai Company's supply chain
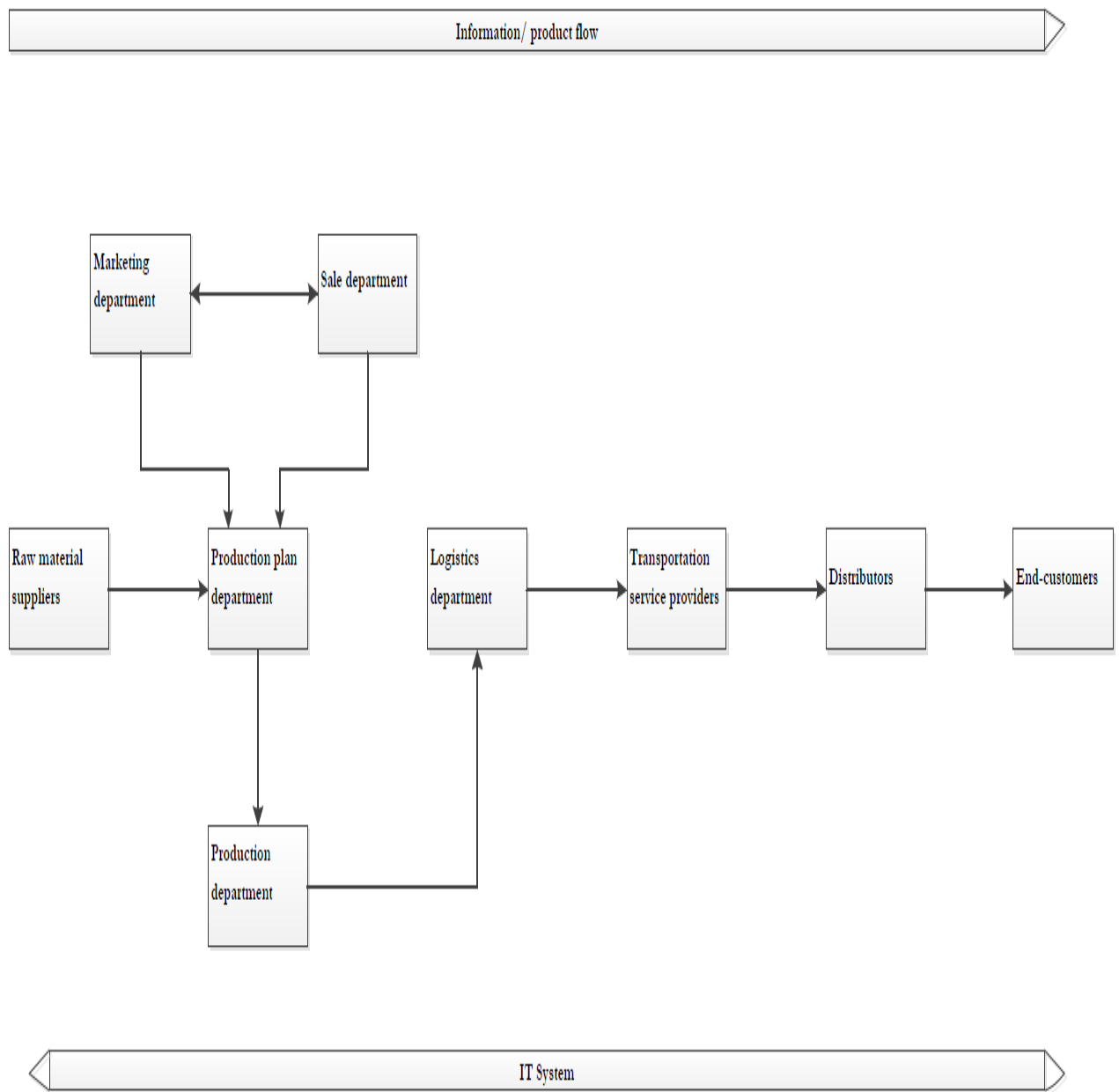
Attachment 3. Invitation letter to the business customers

Dear Mr/Ms,

VuHai Company Ltd is conducting a research on how to improve its supply chain performance. The outcomes of the research will help the company to improve our service level and reach the expectation of our customers.

This is why we hope you can attend and contribute your great idea and experiences to our research. Ms Chau Le will conduct the group interview on 30th June 2012 at 15.00 at our company's conference room. The interview will be conducted in English.

Your participation is highly appreciated. VuHai Company Ltd will offer 2% discount on the next order with the company who are willing to attend our interview.

Kindest Regards,
Chau Le

Attachment 4. Interview questions with the business customers

1. What is your current position in your company?
2. How often do your companies order VuHai Company's products?
3. What do you think about our company's order lead-time?
4. Do you satisfy with our delivery and products quality?
   (Please clarify the reasons)
5. Have you ever ordered the urgent orders? How was the product quality and delivery time at that time?
6. What do you think about the company product's price comparing with other steel producers?

Attachment 5. Invitation letter to the employees (translated from Vietnamese)

Dear Mr/Ms,

Our company is conducting a research on how to improve its supply chain performance. The outcomes of the research will help the company to improve our service level and reach the expectation of our customers.

As employees play an important role in the company supply chain. We hope you can attend and contribute your great idea and experiences to our research. Ms Chau Le will conduct the group interview on 25th July 2012 at 14.00 at our conference room at XXX address.

Your participation is highly appreciated and all the provided data in the interview will be treated confidentially.

Kindest Regards,
Chau Le

Attachment 6. Interview with employees (translated from Vietnamese)

1. Please describe what do you do in your job?
2. How many years have you involved in company?
3. What role of supply chain initiatives has your company involved in?
4. Do you have any responsibilities in supply chain activities?
5. What do you think about the information flow in the company?
6. How good are your technology skills? Do you often apply it to your jobs?
7. How is the planning cycle time of the company?
8. What do you think about inventory level in the company?
9. How does your job contribute to the company's supply chain?
10. What are your opinions about developing the current supply chain performance?