SUPPLY CHAIN MANAGEMENT INFORMATION SYSTEM (SCMIS) A CASE STUDY IN VAMCO (AXLE MANUFACTURING FACTORY)

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In preparing this thesis, I was in contact with many people, researchers, academicians, and practitioners. They have contributed towards my understanding and thoughts. In particular, I wish to express my sincere appreciation to my main thesis supervisor, Professor Dr. ASHRAF HAFIZ RADWAN, for encouragement, guidance, critics and friendship. Without his continued support and interest, this thesis would not have been the same as presented here.

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ABSTRAK

Pasaran masakini yang semakin berdaya saing memerlukan kecekapan, tindakbalas segera, pantas, mudah untuk mengikuti perkembangan proses permintaan, berkeupayaan untuk berinteraktif dalam talian selama 24 jam dan 7 hari dan sebagainya. Bagi pengkaji, model ini menyediakan pendekatan antara displin untuk memahami keupayaan SCM IS. Dengan kajian lanjutan, model dan konsep ini juga boleh diadaptasi bagi penggunaan IS yang strategik. Pengguna boleh mencapai kefahaman yang lebih mendalam terhadap penggunaan SCM IS dan juga jangkaan keupayaan yang boleh diberikan oleh SCM IS di masa hadapan. Pengurusan sistem rantaian bekalan adalah sistem maklumat di antara syarikat yang menguruskan maklumat dan teknologi komunikasi dikalangan ahlinya seperti pelanggan, penjual, pembekal dan pengedar yang terlibat di dalam penggunaan dan pembekalan barangan atau servis. Syarikat kebiasaanya menggunakan portfolio sistem pengurusan rantaian bekalan di mana secara umumnya mengandungi sistem pengesan yang menghubungkan data elektronik, pakej pertukaran maklumat atau idea berdasarkan laman layar dan sesuatu kombinasi teknologi capaian maklumat. Oleh itu, matlamat penulisan ini adalah untuk membangunkan model bersepadu SCM IS yang disokong oleh bukti empirik yang spesifik kepada penggunaan SCM IS. Model yang dibangunkan adalah menggunakan teori bersepadu seperti strategi bersaing, pengurusan rantaian bekalan dan sistem maklumat antara organisasi.

ABSTRACT

Today high competitive market needs fast, effective, high responsiveness, online interactive, 24 hours 7 days availability, easy to follow up orders processing, etc. For researchers, the model provides an interdisciplinary approach to understanding the range of Supply Chain Management Information System (SCMIS) capabilities. With further study, the model and concepts could also be adapted for other strategic IS applications. Practitioners can gain a better understanding of the capabilities of their implemented SCMIS and the expected capabilities that future SCMIS may provide. Supply chain management information systems are the information systems between companies that employ information and communication technology to arrange information inside and among the participator of a supply chain such as clients, sellers, providers, and distributors. Companies frequently use a portfolio of supply chain management information systems, which characteristically contain legacy systems linked by electronic data interchange, packaged applications employing Web-based exchange of information or ideas, or some other blend of information connection technology. Thus, the goal of this thesis is to identify the system's main elements, analyze the system's operational issues, identify the inputs and outputs for each element of the system, define the interfaces between the related activities in the system, design relation data model and develop a prototype SCMIS. It is hoped that the model that will be developed is able to integrate and enrich theories of competitive strategy, supply chain management, and interorganizational information systems.

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

The background of the present study will discuss the following areas, next we will discuss about each in turn.

- What is Supply Chain Management?
- The Importance of Information System to Supply Chain Management in Strategy
- The Importance of Information System to Supply Chain Management in Procedure Planning
- Supply Chain Management Information Systems
- Type of Information systems in supply chain operations

1.1.1 What is Supply Chain Management?

Supply chain management is an advance that has evolved out of the combination of these considerations. Supply chain management is known as the combination of key business procedures from last part user through original providers that present products, services, and information and therefore adds value for customers. Supply chain management is an increasingly useful procedures pattern for increasing overall organizational competitiveness. (A. Gunasekaran , E.W.T. Ngai,2004)

A latest study of supply chain linked executives found that 92% of those studied were scheduling to execute one or more supply chain ideas in 1999 (Bradley, 1999). Supply chain management is based on the combination of all behaviors that increase the value to customers, staring from designing the product to delivery of it. Supply chain management is a point of approaches applied to efficiently combine suppliers, manufacturers, warehouses, and stores, so that products is created and spread at the exact amounts, to the precise positions, and at the correct time, to reduce system broad cost in order to pleasing service stage conditions. (A. Gunasekaran , E.W.T. Ngai,2004)

Today's companies are in contest for civilizing their organizational competitiveness in order to participate in the latest century worldwide marketplace. This market is electronically linked and active in nature. Hence, companies are demanding to improve their nimbleness stage with the purpose of being supple and responsive to face to the changing marketplace requirements. In an attempt to reach this, many companies have spread out their value-adding actions by outsourcing and increasing virtual enterprise.

1.1.2 The Importance of Information System to Supply Chain Management in Strategy

Raising an information system for supply chain management involves with a cooperative work with business associates for the restore and clearing up of a pure infrastructure for the supply chain and the plan and execution of the information system. A supply chain as mentioned earlier is a group of providers, producers, stores, distributors and sellers who, during synchronized strategies and behaviors, develop products by changing raw substances to completed products. The supply chain covers all organizations and actions related with the flow and alteration of goods from raw resources to the end product user and the data flows related with it.

Supply chain management engage different approaches used to combine suppliers, producers and distributors in performing their purposes: materials obtain materials transformation in middle and finished goods, the sharing of these products to clients in the proper amounts, to the exact place and at the correct time to meet the essential service level with minimum cost. During cooperation and information distribution firms create high presenting value systems, supplying part organizations a significant competitive advantage. The value system is a joined chain of organizations, resources and understanding channels included in the producing and delivery of value to the end client. (Figure 1.1) shows the production of higher value for customers, decrease cycle times for improving new products at inexpensive price in a company. (Handfield and Nichols, 2002).

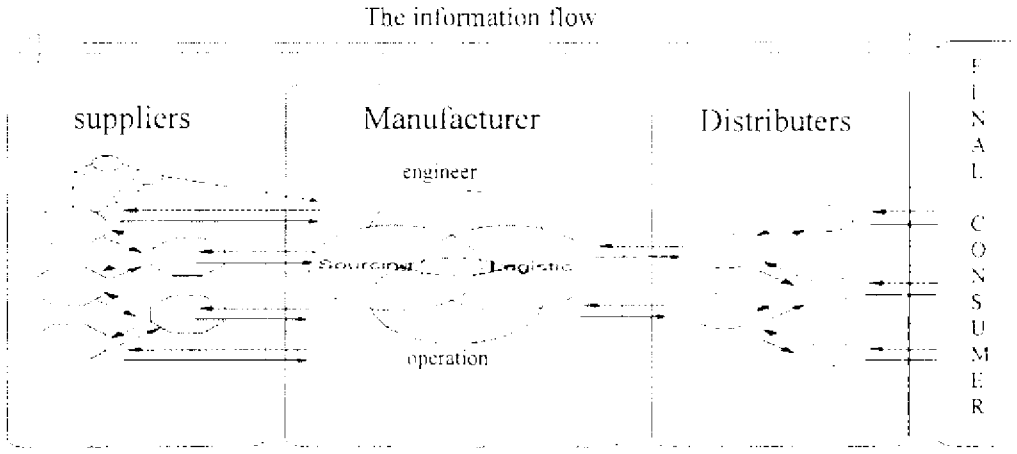

Figure 1.1 production of higher value for customers, decrease cycle times (Handfield and Nichols, 2002).

Clients demand new products on the function that the most current technologies and suitable to various market niches. By analyzing the picture of events as they are now in the market, we can understand that administers have to make determinations in a short period of time, with fewer information and with higher fine expenses. So that by administering these appearances, firms raise their responsiveness and elasticity in their performance, giving high concentration to time.

Information systems help to decrease delivery lead time admit stock costs, fewer re work, higher quality, and fewer operating expenses across the supply chain. It could be made by the execution of an information system which can raise the rate of all the activities from the supply chain. There are outdoor profits caused from concentration to time: higher quality, faster client reaction, higher products. Interior profits are: more effective procedures, shorter scheduling times, and enhanced reactiveness, exchange of information or ideas, harmony, working together among acts.

Substances and data flows upon supply chain are potential founded upon organizational connections between supply chain components. To make these connections better, exchange of information or ideas and solving the problems actions like enterprise or venture undertaken in collaboration, distributed drilling schedules, staff gathering are required. Firms have to distribute much information: production data, predicting data or expense information for distinguishing non-value added parameters as illustrated in Figure 1.1. (Handfield and Nichols, 2002).

The development of information systems is an element that allowed the combination of supply chains within value systems. Electronic business technologies uphold current's client centric situation which providers use the web to connect their business information systems and to raise the productivity of the decision making procedures for their providers and clients.

Discerning supply chains information systems allow quality enlargement of products, and services, information services and electronic business connects, stock decrease, client service enhancement. Earlier than executing a multifaceted information system for supply chain management, firms have to make a new preliminary sketch for their supply chain, produce an infrastructure to enable the utilizing of these up to date technologies. In order that make an incorporated value system, it is essential to execute a chain of activities that we mentioned in following.

1.1.3 The Importance of Information System to Supply Chain Management in Procedure Planning

Advantageous supply chain policies must stay considerate to the active interaction of malleability and effectiveness in order to equilibrium product-centricity against the focus on purchaser's demand for choices with attention paid to unpredictable such as cost, quality, service and sequence time. An important policy district is the creation of a sturdy supply network plan which includes the following items, suppliers, producers, distributers, stores. Other region includes origins, sinks, centralized in comparison to decentralized, straight delivery, pull in comparison to push and convey (Shoumen Palit Austin Datta, 2006).

The measurable decision field includes definition of amount and position of stock involving raw substances, products that are still being manufactured (WIP) and products that have been produced and are ready for sale. Supply chain management information systems usually rotate around these decision fields. Productivity and advantageousness may conditional upon the range to which systems and procedures of the supply chain are capable to distribute real time information about claim, predicted, stock and conveyance (Shoumen Palit Austin Datta, 2006).

The "Bullwhip effect" as we know demands fickleness has influence on supply chain fields. For instance, little alters in client order at retailers might bring about bulky changes in the stock at distributors or producers. Therefore, near real time information regarding little alters together with the chain have to be accounted in supply chain models. Science of engineering, like radio frequency identification, may be helpful for acquisition of stock information at the point stage if there is adequate business worth for like granularity of information (Shoumen Palit Austin Datta, 2006).

Information models explain the problems from an information processing viewpoint. Information modeling can be mentioned as illustrative modeling and had the function of an interface for information systems progress. Information modeling of supply chains is under the influence of business procedure reengineering models, information systems driven models and the application of up to date information systems methods and techniques for the combination of supply chain decision making models (Shoumen Palit Austin Datta, 2006).

1.1.4 Supply Chain Management Information Systems

The acronym SCMIS will be used throughout the study to refer to Supply Chain Management Information Systems. Supply chain management information systems are progressively important to the prosperity of many companies (Chopra and Meindl 2001; Kumar 2001), but have received inadequate consideration in experiential information system study (Subramani 2004). Few researches have investigated the profits and abilities of various kinds of supply chain management information systems such as EDI (Lee et al. 1999; Mukhopadhyay et al. 1995), electronic market (Dagenais and Gautschi 2002; Kaplan and Sawhney 2000), or extended enterprise resource scheduling (Green 2001) systems.

Nevertheless, there are few experimentally extracted models appropriate for examining the scope of supply chain management information systems options. Similarly, companies face complicated and dangerous determination analyzing and choosing a suitable supply chain management information systems solution or guaranteeing that their executed systems are organized with their competitive policies (Reddy and Reddy 2001). While the improved policies suitable model is operationalized

particularly for supply chain management information systems, the fundamental hypothesis and methodology could be accept in coming studies for analyzing other kinds of information systems.

Supply Chain Management Information Systems have an extremely vital role in the ability of companies to decrease expenses and increase the accessibility of their supply chain. Supply Chain Management Information Systems are information systems used to organize information between indoor and outdoor customers, providers, distributors, and other members in a supply chain. Few researches have explored the benefits and potential of dissimilar Supply Chain Management Information Systems like Electronic Data Interchange, Electronic Marketplace, or Enterprise Resource Planning systems.

However, there are some experimentally form fit for evaluating the organizational skill held up by the ambit of Supply Chain Management Information Systems alternatives. Due to that, companies face complicated and perilous determinations appraising and picking up a suitable Supply Chain Management Information Systems solution or guaranteeing that their executed systems are organized with their business policies (Reddy and Reddy 2001). An organizational skill is the aptitude of an organization to attain its objectives by leveraging its different resources (Ulrich and Lake 1990).

Information system abilities are organizational abilities which are capable by information system. Correspondingly, supply chain management information systems abilities are organizational abilities capable by supply chain management information system. Through the years, study on the estimation of information system has improved in abstraction from matching information system abilities with practical necessities

(Lucas 1981), to desired formation (Allen and Boynton 1991), to competitive policies (Henderson et al. 1996).

Despite politic alignment has received important Concentration in current researches of generally information systems policies (Kearns and Lederer 2001; Reich and Benbasat 2000; Sabherwal and Chan 2001), models have not yet been advanced to an adequately itemized stage to interrogate the organizational abilities allowed by peculiar kinds of information system, like supply chain management information systems.

1.1.5 Type of Information systems in supply chain operations

Stephen Hays Russel (n.d) lists four types of information systems in sustaining supply chain operations:

• Enterprise Resource Planning (ERP) software.

Enterprise resource planning software procedures all the deals in every useful area and suppliers provide real time approach to an enterprise wide data base. Enterprise resource planning substitute for the inheritance information systems which after passing the years have been matched together by performance, finance, selling, engineering, purchase, and so forth. Inheritance systems are ability repressed, hard to connect to other Operational stages, and cannot support supply chain activities.

• Electronic Data Interchange (EDI).

Electronic data interchange and the Internet make easy a connected to each other business environment that enables members to distribute decision pertinent information all over the supply chain.

• Electronic Product Code Technologies.

Electronic product code technologies contain optical scanners, radio frequency identification and bar codes technologies. Electronic product code enables for situation, item, pallet, and vehicle tagging for a track and trace ability in a supply chain.

• Supply Chain Analytics.

Supply chain analytics is any software planed to estimate and progress supply chain execution. Supply chain analytics can do that things as appraise capacity, substances, and client order instabilities; or recognize which carriers and allotment centers are more responsive.

1.2 Problem Statement

Supply Chain Management Information System acting an increasingly vital role in the skill of factories to decrease costs and raise the responsiveness of their supply chain. Supply chain management information systems used to organize the data between interior and outdoor customers, producers, distributors, and other associates in a supply chain.

Nevertheless, there is a very few study articles that show the influence of information system in supply chain management. However, it is impossible to reach to a successful supply chain without information system. While providers are placed all over the global, it is necessary to combine the behaviors both in and out part of an organization. This needs a general-purpose information system for sharing data on sundries value adding behaviors participant to supply chain. Information system is like a chord system for supply chain management. In this research we try to develop a system that shows the vital role of information system in supply chain Management.

1.3 Objective of Study

The objective of the study is as follows:

1. To identify the system's main elements
2. To analyze the system's operational issues
3. To identify the inputs and outputs for each element of system
4. To define the interfaces between the related activities in the system
5. To design relation data model
6. To develop a prototype SCMIS.

The primary objective of the study is to design and develop a Supply Chain Management Information System (SCMIS). It is hoped that the model that will be developed is able to integrate and enrich theories of competitive strategy, supply chain management, and interorganizational information systems.

1.4 Significance of Study

Today high competitive market needs fast, effective, high responsiveness, online interactive, 24 hours 7 days availability, easy to follow up orders processing, etc. For researchers, the model provides an interdisciplinary approach to understanding the range of SCM IS capabilities. With further study, the model and concepts could also be adapted for other strategic IS applications. Practitioners can gain a better understanding of the capabilities of their implemented SCM IS and the expected capabilities that future SCM IS may provide.

The next section describes the initial SCM IS capabilities model and its theoretical foundations. The third section describes the research methodology and the fourth presents the findings and the emergent SCM IS capabilities model. The final section discusses the implications of the findings for research and practice.

Supply chain management information systems are the information systems between companies that employ information and communication technology to arrange information inside and among the participator of a supply chain like the clients, sellers, providers, and distributors included in the utilization and supply of a special product or service. Companies frequently use a portfolio of supply chain management information systems, which characteristically contain legacy systems linked by electronic data interchange, packaged applications employing Web-based exchange of information or ideas, or some other blend of information connection technology.

1.5 Scope of the Study

While strategic coalition has received substantial consideration in latest researches of generally information systems policies (Kearns and Lederer 2001; Reich and Benbasat 2000; Sabherwal and Chan 2001), models have not so far been advanced to a adequately itemized stage to tested the organizational ability, capable by particular kinds of information system, such as supply chain management information system.

Find out that how well supply chain management information systems facilitate different organizational potential in a company can decrease the complexity of estimating different supply chain management information system. Earlier studies models of the organizational powers, accomplished by dissimilar types of information system (Bensaou 1997; Sabherwal and Chan 2001; Venkatraman and Ramanujam 1987; Zviran 1990).

Nevertheless, there isn't any single model that is appropriate for investigative and evaluating the potential facilitated by supply chain management information system specifically. Tim S. McLaren et.al. (2004) found existing generic IS capabilities constructs such as "analysis" (Sabherwal and Chan 2001; Venkatraman 1989) did not sufficiently discriminate between internal and external analysis, which subsequent interviews showed to be an important distinction in SCM IS.

In addition, current researches of information systems abilities have various shortages when used to model the abilities allowed by supply chain management information systems particularly. For instance, vagueness in the current hypothesis makes it indistinct whether or how a model of supply chain management information

systems abilities should differentiate among complicated concepts like functional competence, functional elasticity, and interior or exterior business procedure harmony.

Thus, the goal of this paper is to develop an integrated model of SCM IS capabilities that is supported by empirical evidence specific to SCM IS implementations. The model developed integrates and enriches theories of competitive strategy, supply chain management, and interorganizational information systems.