INFORMATION TECHNOLOGY (IT) IN SUPPLY CHAIN MANAGEMENT:

SUPPLIER-MANUFACTURER INFORMATION COLLABORATION SYSTEM DEVELOPMENT

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ABSTRACT

Information sharing is a key issue in working with outside sources mainly suppliers. Without sharing key information especially up to date information such as inventory and forecasts, both organizations will have difficulty in managing supplier relations. Managed poorly can cause bottle necks and affect the performance of both the organization. As such a platform for information sharing and coordination is needed to reduce such cost, promote trust and improve coordination. Mainly this project will focus on the implementation of an IT system for information coordination that would benefit both organizations. The process under study is the piston and engine block supply chain where both have variations during production in terms of grade and needs a responsive supply chain to manage properly. This project proposes the development of a barcode integrated IT system that models the information flow and the processes involved in supplier-manufacturer relationship, promote information transparency between the two entities and promote collaboration between the supplier and manufacturer in a supply chain. This project mostly follows the SDLC method of system development. Several models of implementation of the proposed system is also described and the prototype system verified by potential users through acceptability study.

ABSTRAK

Perkongsian maklumat adalah isu mustahak apabila berkerjasama dengan pembekal bahan dari luar organisasi. Tanpa perkongsian maklumat penting dan terkini seperti maklumat inventori dan jangkaan produksi, kedua-dua pihak akan menghadapi masalah pengurusan hal ehwal pembekal. Jika di urus dengan dengan tidak cekap maka akan mengakibatkan "bottle-neck" dan akan memberi efek kepada prestasi kedua-dua pihak. Maka sebuah "tapak" unutk perkongsian maklumat dan koordinasi perlu dibina untuk mengurangkan kos, menjamin kepercayaan dan meningkatkan kerjasama. Pada dasar utamanya, projek ini fokus kepada implementasi sebuah sistem teknologi maklumat yang dapat memberi manfaat kepada kedua-dua pihak. Proses yang dikaji ialah pembuatan dan pembekalan piston dan blok engin dimana kedua-duanya mempunyai variasi semasa proses pembuatan dari segi gred, maka memerlukan satu rantaian pembekalan yang responsif untuk menguruskanya. Projek ini megemukakan satu sistem teknologi maklumat yang di integrasikan dengan sistem barkod, yang dimodelkan berdasarkan pengaliran maklumat dan proses yang terlibat dalam hubungan pembekal dan pemasang, mempromosi konsep perkongsian maklumat dan kerjasama antara kedua-dua pihak tersebut. Projek ini mengunakan metodologi SDLC untuk pembinaan sistem. Beberapa model implementasi di tapak kilang juga dikemukakan serta prototaip di validasi oleh bakal pengguna melalui kajian penerimaan pengguna terhadap sistem.

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CASE-Computer Aided Software Engineering

CPFR-Collaborative Planning, Forecasting, and Replenishment

CRM-Customer Relationship Management

DBMS-Database Management Systems

EDI-Electronic Data Interchange

GUI-Graphical User Interface

IDEF-Integration Definition

ID-Identification

ISCM-Internal Supply Chain Management

IT-Information Technology

JAD-Joint Application Development

OEM-Original Equipment Manufacturer

PDA-Personal Data Assistant

POS-Point-of-Sale

RAD-Rapid Application Development

SCIS-Supply Chain Information System

SCM-Supply Chain Management

SDLC-Software Development Lifecycle

SKUs-Stock-Keeping Units

SOP-Standard Operating Procedure

SRM-Supplier Relationship Management .

TMF- Transaction Management Foundation

UML-Unified Modeling Language

VICS-Voluntary Inter industry Commerce Standards

VMI-Vendor Managed Inventory

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CHAPTER 1

PROJECT OVERVIEW

1.1 Introduction

A supply chain is a logistics network, which consists of all stages involved in producing and delivering a final product or service. Supply chain management (SCM) is related to the coordination of materials, products and information flows among suppliers, manufacturers, distributors, retailers and customers. Basically a supply chain management (SCM) would consist of macro processes which is the customer relationship management (CRM), internal supply chain management (ISCM), and supplier relationship management (SRM). Each macro processes affects one another, thus integration of each aspect plays a crucial role in organization success.

Information is an important element in a supply chain as seamless information in an organization clearly affects the efficiency and responsiveness in demand and meeting needs. Information technology plays an important role in providing that efficiency and responsiveness in the aspect of information sharing between entities in macro process of a supply chain which includes organization of internal and external sources.

1.2 Background of The Research

Lack of coordination occurs when decision makers have incomplete information. Studies conducted in a supply chain model shows that sharing both supply and demand information between supply chain entities substantially reduces inventory costs and reduce order cycle time. Utilization of information collected can produce accurate forecasts analyzed by decision makers thus significantly influence the performance of the supply chain.

1.3 Problem Statement

Integrating information between internal processes of an organization in a supply chain can be difficult depending on the variability of the business process. The processes involved and the information conveyed must be modeled and analyzed. Different types or formats of information can be confusing between the two organizations. Different business practices can lead to miss coordination. Inter-organizational policy can also promote or hinder information collaboration.

1.4 Justification of Research

More and more companies are relying on outsourcing from other suppliers. Lead time and ordering cost can influence the total supply chain cost and efficiency. Information sharing is also a key issue in working with outside sources that is not an entity of the organization - instead form a symbiotic relationship with one another – seller and buyer. As stated, an organization may rely on more than one supplier to manufacture products. Without sharing key information especially up to date information such as inventory and forecasts, both organizations will have difficulty in managing their businesses respectively. Thus one affects the other and vice versa in the supply chain. Relying on external resources is not a bad management decision, further more it can be beneficial if managed correctly, but if managed poorly can cause bottle necks and affect the performance of both the organization.

As such a platform for information sharing and coordination is needed to reduce such cost, promote trust and improve coordination. This project will focus on the implementation of an IT system for information coordination that would benefit both organizations.

1.5 Methodology

Software development lifecycle (SDLC) method is used mostly for the project. The methodology consists of:-

i. Planning:-

Study and collect data from both the supplier and manufacturer in terms of existing IT systems, user requirements, information conveyed, business processes and inter-organization policy regarding information sharing. The data collection method would mostly consist of interviews and system inspection, factory visits, observations and document reviews.

ii. Analysis:-

The feasibility of a collaborative IT system frameworks is determined based on the data collected and the requirements are structured into appropriate IT system functions. Determination of the system features which is required for inter-organization information collaboration.

iii. Design:-

Model the process and information into an IT framework / model to determine which information is useful in promoting collaboration. The modeling method used would be unified modeling language (UML) which is common amongst IT developers. Choosing an IT system model or a combination of models to best fit the design of the system being developed considering the capabilities of such models.

iv. Implementation:-

Creation and coding of the proposed IT system. Development will only be limited to a working prototype with consideration of the system requirements as stated in the analysis phase. Software testing and proposed IT system implementation is also applied.

v. Maintenance :-

Software iteration required to match the user requirements if necessary.

1.6 Objectives

To develop a system that:-

i. models the information flow and the processes involved in supplier-manufacturer relationship.

ii. promote information transparency between the two entities.

iii. promote collaboration between the supplier and manufacturer in a supply chain.

1.7 Scope

The research will only focus on the supplier-manufacturer relationship, its processes and the information that is shared or conveyed between the two supply chain entities. The project will be conducted in the processes that would only involve both parties in collaborating in a supply chain – inventory replenishment.

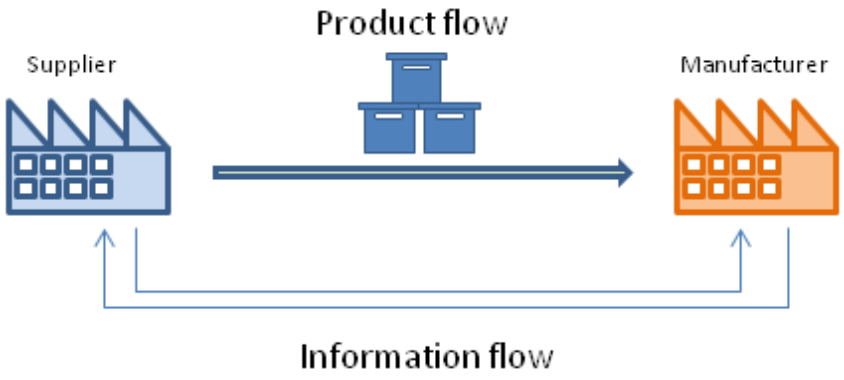

Figure 1.1: Research scope – Supplier relationship management

1.8 Research Contributions

Develop a system development methodology to derive inter-organization information collaboration feasibility and an IT framework including a working prototype based on off-the shelf customizable systems that will fulfill the objectives as stated above. System documentation, proposed design implementations and graphical model deliverables will be included in the project to allow better understanding of the project and recreation of the proposed system for future study in information collaboration between different entities of a supply chain. The summary of the system validation via user acceptability study of the prototype system will also be conducted to obtain potential user opinions and feedback of the proposed system.

1.9 Outline of The Report

This report contains Chapter 1 which covers the project overview, Chapter which covers the literature review of the project and other related topics. Chapter 3 covers the methodology of the project. Chapter 4 covers the data collection and analysis to develop the system. Chapter 5 explains the methods proposed to the

problem statement or project objectives and Chapter 6 explains the conclusion of the project and potential future works.

1.10 Conclusion

The proposal outlines the importance of information in a supply chain, further more the importance of information collaboration between supply chain entities in achieving a mutual goal and benefit as well as the challenges in achieving inter-organization information collaboration. SDLC is used to conduct the research as the objective is more towards IT implementation methods. The research will only be confined to the manufacturer and supplier entity in terms of inter-organization processes and information conveyed. Various deliverables are also mentioned to support the validity of the project.

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