A

CASE STUDY

OF

e-SUPPLY CHAIN & BUSINESS PROCESS REENGINEERING

OF

A SEMICONDUCTOR COMPANY IN MALAYSIA

SOLAIMURUGAN A/L ANANDAYAH

Research report in partial fulfillment of requirement for degree of

MBA

2011

NO. REKOD: PPSP-B-ADK-13

GRADUATE SCHOOL OF BUSINESS (GSB)
UNIVERSITI SAINS MALAYSIA

DECLARATION

I hereby declare that the project is based on my original work except for quotations and citation which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at USM or any other institutions.

A. Solaimurugan

(Signature):

Name: SOLAIMURUGAN ANANDAYAH

Date: 16/12/11

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF SYMBOLS

3R	-	Right Quality, Right Time and Right Cost,
APS	-	Advanced Planning and Scheduling
ASICs	-	Application-Specified Integrated Circuits
B2B	-	Business-to-Business
BOM	-	Bill of material
BPR	-	Business Process Reengineering
CAGR	-	Compound Annual Growth Rate
CARS	-	Corrective Action Requests
CRD	-	Customer Request Date
e	-	Electronic
EDI	-	Electronic Data Interchange
e-SC	-	electronic-Supply Chain
e-SCM	-	electronic-Supply Chain Management
ERP	-	Enterprise Resource Planning
FTP	-	File Transfer Protocol
IC	-	Integrated Circuits
IT	-	Information Technology
JIT	-	Just-in-Time
MRO	-	Maintenance, Repair, Operations
OAD	-	Original Acknowledgement Date
OEM	-	Original Equipment Manufacturing
PIP	-	Partner Interface Process
PO	-	Purchase Order
POS	-	Point-of-Sale

UPS	-	United Parcel Service
SCM	-	Supply Chain Management
SWOT	-	Strength, Weakness, Opportunity, Threat
WIP	-	Work-in-Progress
WMS	-	Warehouse Management System

ACKNOWLEDGMENTS

This dissertation was so far the most challenging work that has come across in my entire academic life. In order to complete this task I had to go through some excruciating phases, which at several occasion was demoralizing due to my work demand and other commitments. Despite the relentless rejection and failure, I continue to strive for a better future through the completion of this project paper.

The conclusion of this dissertation would not have been possible without the support and guidance of Associate Professor Suhaiza Hanim Zailani for her dedicated guidance, advice, freedom to express my thought and the time spent through the course of doing this case study.

I would like to thank my mother, important and special individuals in my life who supported me till to date for my success in life.

ABSTRACT

e-business involvement in supply chain have created a new e-supply chain(e-SC) in firms locally and globally. Effectiveness and efficiency of e-SC post business process reengineering (BPR) depends on the approaches undertaken during the BPR implementation. Thus in this case study, the objective is to prove that there are weaknesses in the e-supply chain after going through a BPR in a semiconductor company in Malaysia. The scope is on the internal perspective of the management of this company. This exploratory research case study through semi-structured interviews using localist view on six managers, direct observation and documentary data or archival records was used. The findings of the study reveal that five gaps have been identified after BPR implementation: that there are multiple methods used in integration with trading partners; IT software solutions deployed are from different vendor, system running on different platforms created interface issues, internal resistance to change and high cost incurred in system maintenance and support. The knowledge of these five gaps is then proposed as seven components in new BPR model that have positive effect on the supply chain performance. The factors for success include adopting a strategic approach, which prioritizes business processes for BPR projects. The significant of the study is the gaps identified become a key learning for future semiconductor companies to benchmark prior any BPR initiatives.

ABSTRAK

Penglibatan e-perniagaan dalam rantaian bekalan telah mewujudkan e-rantaian bekalan yang baru (e-SC) di firma-firma tempatan dan global. Keberkesanan dan kecekapan e-SC selepas proses kejuruteraan semula perniagaan (BPR) bergantung kepada pendekatan yang diambil semasa pelaksanaan BPR. Oleh itu dalam kajian kes ini, objektifnya adalah untuk membuktikan bahawa terdapat kelemahan dalam e-rantaian bekalan selepas melalui BPR dalam syarikat semikonduktor di Malaysia. Skop yang diambil adalaah perspektif dalaman pengurusan syarikat ini. Kajian dalam penyelidikan kes diteroka melalui temu bual separa berstruktur yang menggunakan pandangan localist daripada enam pengurus, pemerhatian secara langsung dan data dokumentari atau rekod arkib telah digunakan. Dapatan kajian menunjukkan bahawa lima jurang telah dikenal pasti selepas pelaksanaan BPR: bahawa terdapat pelbagai kaedah yang digunakan dalam integrasi dengan rakan perdagangan; penyelesaian perisian IT dikerahkan daripada vendor yang berbeza, sistem yang dijalankan pada platform yang berbeza mencipta isu-isu antara muka, rintangan dalaman untuk menukar dan kos tinggi yang ditanggung dalam penyelenggaraan sistem dan sokongan. Pengetahuan tentang kelima-lima jurang kemudian dicadangkan sebagai tujuh komponen dalam model BPR baru yang mempunyai kesan positif ke atas prestasi rantaian bekalan. Faktor-faktor kejayaan termasuk mengguna pakai pendekatan yang strategik, yang mengutamakan proses perniagaan untuk projek-projek BPR. Kepentingan kajian jurang yang dikenal pasti menjadi pembelajaran bagi syarikat-syarikat semikonduktor masa depan untuk penanda aras sebelum apa-apa inisiatif BPR.

CHAPTER 1

INTRODUCTION

Due to globalization and advancement in information technology (IT), companies adopt best practices in e-business and supply chain management to be globally competitive as both are realities and prospects in 21st century. Internet has connected the global market players such as suppliers of services with buyers. Consequently, internet transaction and traffic is increasing daily and e-business is expanding at an exponential growth (Ahmed, Qadri, Shahzad, & Khilji, 2011). In this respect, suppliers, distributors and customer will need to have their logistics requirements, integrated into one cohesive process. The impact of one entity in the supply chain weakening, e.g. financially can end up with a number of entities closing down and in some occasions the whole supply chain shuts down (Yi, Ngai, & Moon, 2011). Supply Chain Management (SCM) stresses on the co-ordination and collaboration within the firm and between the firms to achieve a win-win situation for all the companies involved. This is a well-known agreement, especially among companies, that there is a necessity for co-ordination and collaboration within the firm and between the firms (Rajagopal, Zailani, & Sulaiman, 2009). Firms overlooking this challenge are meant to fall behind their competitors. This integration of companies within a network has led to put more stress on supply chain management (SCM) (Gime´nez & Lourenco, 2008). Current technological developments in information systems and information technologies have the potential to assist this coordination, and this, in turn, allows the virtual integration of the whole supply chain. The emphasis of

this integration in the context of internet-enabled activities is generally referred to as e-Supply Chain Management (e-SCM). Unification these two fields (SCM and the internet) is a key area of concern for contemporary managers and scholars. Managers have realized that the internet can enhance SCM decision making by providing real-time information and enabling collaboration between trading partners (Gime´nez & Lourenco, 2008). Web based applications have changed the way companies do business along their supply chain hence despite the economic downturn, companies continue to invest and implement electronic business application to streamline their business processes through integration and coordination of their supply chain processes (Wiengarten, Fynes, Humphreys, Chavez, & McKittrick, 2011). The integration and coordination is done to manage with various uncertain issues, various firms are now restructuring their operational processes to better manage their environmental dynamics and to achieve competitive advantage (Yi, Ngai, & Moon, 2011). Due to this pressure of adapting to change, a group of process innovation techniques called as business process reengineering (BPR) has emerged to overcome this challenge (Doomun & Jungum, 2008; Eierman & Schultz, 1995).

The purpose of reengineering is to make processes the best-in-class (Weicher, Chu, Lin, Le, & Yu, 2003), whereas, business process reengineering (BPR) is aimed to discover the best process for performing a certain piece of work and to optimize productivity. BPR is the fundamental rethinking and radical redesign of business processes to achieve vivid improvements in critical, current measures of performance, such as cost, quality, service and speed in as per cited by Hanafizadeh & Osouli, 2011 (Hammer & Champy, 1993). Reengineering assumes a philosophy of redesigning current business processes and activities to increase product quality, value added, and customer satisfaction (Abdolvand, Albadvi, & Ferdowsi, 2008). The straightforward

distinction between automation and reengineering is that reengineering increase a step to the process of translating information into action. Prior a process can be reengineered it must be analyzed and redesigned prior to automation. (Paper & Nicol, 1995). Furthermore, the concept of business process reengineering (BPR) encouraged businesses to contemplate company-wide processes rather than concentration on production processes only, which for an average product accounts for less than 10 per cent of the product value as per cited by Tennant & Wu, 2005 (Harrington, 1991). There are some limitations in introducing BPR at any company; various companies that have undertaken BPR suffered major implementation barriers that cause them to abandon their preliminary efforts with little or no results at all. The causes for them to discard BPR includes difficulties to support reengineering efforts through concentrating on the technology side and arriving at a redesigned process that becomes obsolete in the extended business process as cited by Tennant & Wu, 2005 (Guimaraes & Bond, 1996). High cost of new information systems that includes IT systems e.g. enterprise resource planning (ERP), IT outsourcing, internet, e-business and electornic data interchange (EDI) is reported as a major barrier to achieving immediate benefits (Tennant & Wu, 2005).

In addition, many firms seeks solutions without comprehending future performance goals. This is further aggravated when firms struggle to create an environment for successful reengineering that adequately addresses the people issues, which leads to anxiety and conflict as employees find it hard to accept completely new processes. Therefore, top management need to be aware of and develop strategies for dealing with the following issues as cited by Tennant & Wu, 2005 (Motwani et al., 1998):

1. BPR should be a deliberately planned effort;
2. The customer should be the focus of BPR efforts;
3. Recognise the targets of reengineering;
4. Use a proper approach to manage change; and
5. Integrate leadership, the reengineering team, technology and methodology.

1.1 Research Problem

As IT flood the global markets, customers has become fully informed of the product, and they are the one who determines what is to be made, when, where and at what cost of the desired product. In short, the customers demand complete care throughout the product and service's life cycle (Larivie`re, Aksoy, Cooil, & Keiningham, 2011). David Rucker, director of business development at TBM Institute, fully supported this view and also mentioned that companies that are able to develop a lean manufacturing process and couple it to the Internet will be the eventual winners, as people are looking at the entire value chain and want to see the entire chain works (Reynolds, 2001).

Utilization of IT system in the implementation of collaborative initiative with business partners in supply chain allows the company to improve customer services, reduce demand latency and inventory throughout supply chain (Zhao, Huang, & Zhu, 2008). An efficient e-supply chain will also allow customers to get real time orders status, which will then enable them to provide better information to their customers. It also mean faster rate of order fulfillment (Simatupang, Wright, & Sridharan, 2002). When members along the supply chain get access to IT systems to check on production schedule, it will enable them to better response to dynamic customer demand.

This was highlighted by Managing Director for Yokowo stated that:

> ...by having the suppliers to provide information to the planning module accurately, it will enable the customers; on the other hand, to have visibility into the company's extended supply chain.

With the establishment of web based integration, the customer can then communicate to the company as well as the supplier in a quick and proactive fashion (Simatupang, Wright, & Sridharan, 2002). Managing Director proceeded to state that:

> .....The disruption of information flow is our major concerns. We need timely data feed through to us for prompt planning and deliver within our committed lead time. We are able to compete with our competitor Z who has 100% customer expectation and delivery date.

Apart from that Managing Director added that:

> .....We are noticing symptom of data dropout which impacting ISO compliance requirement on documentation apart from creating inconvenience to customers.

1.2 Problem Statement

This case study mainly to identify the system infrastructure gaps which will impact the process of the whole supply chain. Subsequently, analyze any improvement after BPR in perspective of company in this study. The company chosen for this study is Yokowo Corporation Limited, Japanese high-tech products manufacturers worldwide in the rapidly advancing electronics, electrical machinery and automotive industries.

1.3 Research Objectives

The objective of this case study is to study:

1. The system disruptions that creates system gaps which impacts process of supply chain Yokowo Corporation Limited e-supply chain.
2. The impact of BPR to close e-supply chain gaps at Yokowo Corporation Limited.

1.4 Research Questions

From the scenario discussed above, the purpose of this case study is to define:

1. What are gaps in Yokowo Corporation Limited e-supply chain system that disrupts its process?
2. Does BPR initiatives at Yokowo Corporation Limited closed the system gaps or amplify it?

1.5 Research Scopes

The scope of this research will cover the following:

1. Internal perspective of the management
2. e-SC system of a semiconductor industry.
3. Business process reengineering (BPR) on a semiconductor company's e-SC

1.6 Organization of Dissertation

This dissertation comprises of eight chapters. Introduction in Chapter 1, chapter 2 is the history of semiconductor industry. Chapter 3 will cover literature review of research material collected from various information sources. Methodology will be covered in chapter 4. Chapter 5 will introduce in details Yokowo Corporation Limited. Chapter 6 is the case analysis where examine the underlying issues and problems in Yokowo current e-supply chain model, BPR approaches are studied and the underlying problems or issues in e-supply chain context are highlighted. In Chapter 7, implementation of proposed model in the company is detailed. Benefits gained from the new model implementation are highlighted. Final chapter detailed the conclusion drawn from this research and recommendation for future work.

CHAPTER 2

BACKGROUND OF STUDY

2.1 Introduction to Semiconductor Devices

Semiconductor devices are electronic that exploit the electronic properties of semiconductor materials, principally silicon, germanium, and gallium arsenide, as well as organic semiconductors. Semiconductor devices have replaced thermionic devices (vacuum tubes) in most applications. They use electronic conduction in the solid state as opposed to the gaseous state or thermionic emission in a high vacuum. Semiconductor devices are manufactured both as single discrete devices and as integrated circuits (ICs), which consist of a number from a few (as low as two) to billions of devices manufactured and interconnected on a single semiconductor substrate (Muller, Kamins, & Chan , 2003). Small amounts of impurities which are supplied to pure semiconductors produces large changes in the material's conductivity in a process called doping. This produces conductivity between conductors (general metals) and nonconductors or insulators (such as ceramics) (Semiconductor Industry Association, 2011).

There are six major types of semiconductors, each with different patterns of demand namely:

1. Standard devices: they are standardized and can be used in a wide variety of ways.

2. Exclusive devices: these are basically the same as standardized devices with the difference that these devices can only be produced by a couple of producers only, as they have technological monopoly on the particular semiconductors.
3. Specific devices: these are also mass produced, but unlike the previous two, can only be used in a certain way.
4. Custom devices: these are manufactured for a certain user and according to the user requirements.
5. Microprocessors: they can be mass produced, but can be programmed for specific purposes.
6. Semicustom devices: certain parts of these semiconductors can be mass produced, and later the final connections will be arranged according to the requirements of the user. These are a little like microprocessors. These devices are also known as "application-specific integrated circuits (ASICs), and the demand for these semiconductors are expanding exceptionally rapidly (Muller, Kamins, & Chan , 2003).

2.2 History of Semiconductor Industry

The electronics industry developed in a number of steps. First the very basics of the industry started in 1901, with the introduction of the radio. The next step was when in 1948 the Bell Telephone Laboratories invented the transistor. A transistor is "a semiconductor device, usually having three terminals and two junctions, in which the load current can be made to be proportional to a small input current, so that it is functionally equivalent to a valve but is much smaller and more robust, operates at lower voltages, and consumes less power, and produces less heat." In other words

transistors transfer certain kinds of electric impulses into other type or electric currents (Muller, Kamins, & Chan , 2003).

The semiconductor device manufacturing is a global industry, with China, U.S., Japan, Korea and Europe as the leading manufacturers. The top three U.S. manufacturers in 2002 were Intel Corporation, Motorola, Inc., and Texas Instruments, Inc. (Encyclopedia of American Industries, 2003). Semiconductor device manufacturing has spread from Texas and California in the 1960s to the rest of the world. According to the Semiconductor Industry Association (SIA) (2003), their member companies had approximately 70 fabrication facilities in the U.S., 68 in foreign countries and a handful in China. It is a global business today (Semiconductor Industry Association, 2005).

2.3 Features of Semiconductor Industry

This industry features a number of distinct characteristics that position it uniquely in the economy and in the global competitive arena. These include: The role of the industry as technology enabler. The semiconductor industry is widely recognized as a key driver for economic growth in its role as a multiple lever and technology enabler for the whole electronics value chain. In other words, from a worldwide base semiconductor market of $213 billion in 2004, the industry enables the generation of some $1,200 billion in electronic systems business and $5,000 billion in services, representing close to 10% of world GDP. (European Semiconductor Industry Association, 2005)

Semiconductor industry continuous growth but in a cyclical pattern with high volatility while the current 20 year annual average growth of the semiconductor industry is on the order of 13%, this has been accompanied by equally above-average market

volatility, which can lead to significant if not dramatic cyclical swings. (Deloitte Consulting LLP, 2010)

High degree of flexibility and innovation are the key factor that catalyzes the constant adjustment to the rapidly changing market in the industry. The use of semiconductors devices in various products often have very short life cycle. Many products embedding semiconductor devices often have a very short life cycle. Simultaneously, in the semiconductor industry, the rate of constant price-performance improvement is overwhelming. Therefore, fluctuations in the semiconductor market not only occur extremely quickly but also expect changes in industries developing at a slower pace. Yet another magnitude of this rapid pace is that established market strongholds can be moved very quickly (ALGO-MATRIX ConsultingLtd., 2011).

2.4 History of Semiconductor Industry in Malaysia

Malaysia has been setting a role in the semiconductor industry which traces back to the early 1970s when foreign based chipmakers such as Intel, National Semiconductor, Advanced Micro Devices, Texas Instruments, ChipPac, Western Digital and Motorola launched their off-shore Integrated Circuit (IC) assembly and test operations in Malaysia, taking gain of the then cheap labor available during the period of time. (Santhapparaj, Sreenivasan, & Chong, 2006)

For the past 30 years, Malaysia has been attaining experience in assembly, test, and packaging in the semiconductor industry. The semiconductor industry has been the driving forces behind the gross domestic product (GDP) growth for these past three decades. This is all due to the outsourcing strategy executed by many multinational

corporations (MNCs) which transmitted the capital and technology to multiple subcontractors locally. (Subramaniam & Khew, 2009)

2.5 Challenges of Semiconductor Industry in Malaysia

As cited by Santhapparaj, Sreenivasan and Chong (2006) (Abeysinghe, Siregar and Keng, 2001), emphasize that productivity in Malaysia must proliferate to equal those of more developed nations apart from the gaps in innovation, human resource, trade and global investments. They further stress that design, innovation, and new product development in Malaysia should be centered by progressing and focusing in these area. A shortage of automation and visibility is restraining companies with longer lead times, bigger inventory buffers, budget overruns, and continued demand-supply disparities have a direct bearing on the competitiveness of manufacturing potential. On average, large companies report that their global supply chains are only 50% as automated as their domestic supply chains. (Aberdeen Group, Inc, 2006). Adding to that, semiconductor manufacturers said that the recent recession has taken its toll on the semiconductor industry. The inventory of global chip suppliers and a low book-to-bill ratio have reached a distressing level that will have severe worldwide repercussions and impact on chip producers and semiconductor equipment manufacturers in Malaysia. (Tan, 2011). In the same report by Tan (2011), Mini-Circuits Technologies (Malaysia) Sdn Bhd chairman and president Datuk Seri Kelvin Kiew said, "In realistic terms, the global semiconductor industry has entered a recession period, and the impact on the chip makers and semiconductor manufacturers in Malaysia will last till mid-2012,".

2.6 Company Profile

2.6.1 Yokowo Corporation Limited: Background

Yokowo was founded by Chitaro Yokoo in Sumida, Tokyo in year 1922. Currently, the company has one plant in Malaysia, three in China and a mass production plant in the United States. Meanwhile, a new plant in Vietnam will commence operation in 2012. Overseas production now accounts for 80% of Yokowo's total production. It has a total of 3901 employee worldwide (Mar 2011) and annual turnover of ¥27,100 million yen (RM1,120 million).

Every plant emphasizes local procurement of components and it is committed to slashing product delivery lead time and establishing a stable supply operation. To ensure an uninterrupted supply of products of the highest quality, Yokowo plants demonstrate a consistent dedication improving quality.

In terms of sales, Yokowo has a total of seventeen overseas offices- in Chicago and four others U.S cities, in three European countries and nine offices in six Asian countries in order to provide sales services closely matched to global market needs. These offices focus on providing technical service systems and also to provide quick technical support for customers and to develop products geared to local market needs.

2.6.2 Yokowo's Products

Yokowo offers innovative high-tech products to manufacturers worldwide in the rapidly advancing electronics, electrical machinery and automotive industries, calling on its unique, cutting-edge technology and the production engineering capabilities of its global network of plants and services offices.

Basically, there are four categories of products:

1. Antennas- Yokowo supplies a full array of antennas from low frequency to high frequency models for portable terminals to on-vehicle models.
2. Advanced Devices – Yokowo offers advanced devices that can be used for wide range of purposes including medical devices and extension board for semiconductor testing.
3. Fine Connector – Yokowo supplies fine connectors used in small mobile equipment such as Cellular Phone, Audio Visual Equipment, Picture and Video Recorder and Data Communication Devices (Ex-PDA, Notebook, LCD monitor and GPS unit)
4. Microwave Communication Equipment – Yokowo provide Signal Processing in RF unit and its software for microwave communication systems. This equipment has earned an excellent reputation in global markets with its distinctive, ultra miniature size and high performance.

Yokowo remains identifying next generation needs for electronics solutions and advanced devices and developing products that meet those needs. Yokowo still continue focusing upgrading pre and post sales services to enhance the success to their customers.

2.6.3 Yokowo Company Mission

Yokowo operate in rapidly advancing world of information, communication and electronic components. As a specialist in antennas, fine connectors and microwave technology, Yokowo rely on core competencies and advance engineering capabilities to offer revolutionary products, principally to automotive, cellular phone, and semiconductor testing markets. The emergence of an advanced information society is gathering pace, while business processes and products alike increasingly need to be environmentally friendly and safe. Yokowo is taking step to remove environmentally harmful substances from all business processes and is expanding these initiatives to a wider range of business domains, including different sensors that help improve automotive safety and develop minimally invasive medical devices that enhance quality of life. Yokowo base these initiatives on three key policies for offering world-class products to customers.

1. Yokowo are dedicated to quality. Seeking the highest quality and eliminating the use of environmentally harmful substances to establish its brand.
2. As a technology-based enterprise, Yokowo continually upgrade and refine its products and actively introduce new technologies that unable company to offer higher value added products to customers.
3. Take care of the business by pursuing three innovations; product innovation (to enhance business and product structures), process innovation (to enhance business processes and systems) and personnel innovation (to enhance the personnel structure).

As a part of its policies in corporate social responsibility, Yokowo aim to consistently improve the corporate value and to fulfill its responsibility to shareholders and other stakeholders.

2.6.4 Yokowo Financial Status

Yokowo consolidated sales for the financial year ended 31st March 2011 was recorded 27,129,374 million yen compared to previous financial which was recorded at 26,025,697 million yen. However net income shown major decreased from 820,426 million yen for financial year ended 2009 to 586,822 million yen. The main cause effect the decreased in net income was due to loss on foreign exchange rate. Details of the financial report for financial year ended 31st March 2010.

2.6.5 Yokowo Industrial Analyses

Yokowo brand are a world market leader in Advanced Devices for wireless communication and information transmission. For other three products, Yokowo is a market challenger. Due to increase demand for cellular phone, PDA and notebook for the past 10 years, fine connector products showed the highest market growth (Growth Stage). For antenna products, the rate of sales growth are getting slow and the product will enter a stage relative to maturity. For microwave communication equipment the sales still at introduction stage because Yokowo is the pioneer for this product.

Yokowo marketing strategy is through product innovation and improvement and revision of existing products, value added and product quality to penetrate world market. Because the nature of business is through product innovation and improvement, Yokowo has positioned itself as a market leader for Microwave Communication Equipment and a market challenger for other products. Yokowo is a customer–centered company focuses more on customer development in formulating its strategies. Yokowo is not spending most its time focusing on competitors.

2.6.6 Competition for Fine Connector Products

Competitors still exist especially for Fine Connector Products. Increased entry of established cell phone and computer companies has invited new competitor producing fine connector products with reduced price. Those companies have pressured industry participants to continually cut prices. This was pointed out by the Managing Director, who claimed:

> .....There are three key competitors for Yokowo:
>
> 1. Company X – Japanese base company opened its plant in China with the marketing strategy to offer lower price at the same quality as competitor. This company is aggressively study its competitor strength and weaknesses in order to overtake the market share. However this company has utilized 90% of its production capacity and need plant expansion in order to fulfill extra sales volume.
> 2. Company Y- A joint venture Company with one famous brand Cellular Phone Brand. The company shares the same market share in global market with the cellular phone brand due to 100 percent of the parts supplied by this company. The company has excess 50% production capacity to produce others brand demand. This company slowly penetrates new market by promoting its quality products.
> 3. Company Z- A German base company and most of its customer are from Europe Cellular Phone Brand. This company has a good reputation to meet customer expectation and delivery. The advantage of this company is due to their location near to Europe country which can provide a fast delivery and superior customer service. Despite strong competition, Yokowo can carve out a definite image and gain recognition among targeted segments.

2.6.7 The Future Prospects

Although there are opportunity and threat in this business, Yokowo still have the ability to forecast the future market demand and situation with balancing for any technology changes. Research and Development (R & D) unit in Yokowo Head Office found a strategy by collaborate with customers in developing their future design. This

section has monitored closely the new invention or requirement by customers in terms of any technological changes.

In terms of sales forecasting, Yokowo has a secure sales volume from customer. The collaboration with customer in R&D stage has developed trust to Yokowo in supplying the component for customer products. The ability to understand customer needs is the main ingredient of securing sales and orders from customers.

In terms of pricing strategy, Yokowo not emphasize on price reduction to penetrate new market. Yokowo offers highly quality product with constant product supply and a good after sales services for their product offering. However, the prices are elastic and can be stretching up or down according to variations in geographical demand and order levels.

Mr.Takayuki Tokuma, the president of Yokowo group of companies have gave company direction to make a revolutionary products with advance technology especially for automotive (antenna products), cellular phone (fine connector products) and Semiconductor Testing (Advance Device products). This statement will guide the company to advance it technologies that ensure company still competitive in the market and also for company's survival.

CHAPTER 3

LITERATURE REVIEW

3.1 e-Supply Chain (e-SC)

The Council of Logistics Management defines a supply chain as the material and information interchanges in the logical process, stretching from acquisition of raw materials to delivery of finished products' to the end user. The importance of supply chain management for competitiveness of industrial and services enterprises has been demonstrated by several authors as per cited by Caputo, Cucchiella, Fratocchi, Pelagagge, & Scacchia (2004). Gunasekaran & Ngai (2004) classified e-SC as most essential components of IT-enabled SCM: strategic planning for IT in SCM, virtual enterprise and SCM, e-commerce and SCM, infrastructure for IT in SCM, knowledge and IT management in SCM, and implementation of IT in SCM.

It is critical and relevant for enterprises to adopt e-supply chain (e-SCs). e-SC is the utilization of electronic means and information technology to improve coordination between buyers and suppliers, to enhance upstream and downstream channels management; and to improve cash flows as per cited by Caputo, Cucchiella, Fratocchi, Pelagagge, & Scacchia (2004) in (Fliedner, 2003; Lightfoot and Harris, 2003; William, Esper & Ozment, 2002). Another way of defining e-SC is the impact that the internet has on the integration of key business processes from end-user through original suppliers that provides products, services and information that add value for customers and other stakeholders (Gime´nez & Lourenco, 2008). Sammon & Hanley (2007)

defines e-SC as a network of organizations taking up the coordination and integration of internal and external key functions and processes associated with the added value delivery of products, information flows, and services from supplier to end customer. In fact the Managing Director commented that:

> .....It is important for the survival of the company as market leader. Although we have niche products, we need a comprehensive e-supply chain model.

e-SC allows companies to move toward real time operation by sharing information with trading partners, which allows buyers to consolidate orders from multiple vendors and subsequently provide for the effective integration of the final logistical activities (Gime´nez & Lourenco, 2008). Effective information and material flow throughout a network of customers and suppliers ensure an effective e-supply chain (Gime´nez & Lourenco, 2008). The effectiveness can be achieved by employing the right processes and supporting information technology. In addition, it also requires companies to integrate backend applications such as Enterprise Resource Planning (ERP) and Advanced Planning and Scheduling (APS) systems to customer touch points such as corporate web portal, indeed, providing the right amount of relevant information to those who need to know it, at the right time, is very critical. It is imperative that electronic commerce techniques have become a next step in supply chain management and given hot word that is electronic supply chain management (e-SCM), the important role of this technique is clearer when we see it from a process where demand plan at downstream is changed or modified, and the companies can communicate the changes to business partners automatically via internet email, EDI, fax and etc. as per cited by Bakker, Zheng, Knight, & Harland, 2008 (Levy et al., 2001; Power & Simon, 2004). As a result, the companies are trying their best to look for a method using IT that can best achieve as the end results. Caputo, Cucchiella, Fratocchi, Pelagagge, & Scacchia (2004) stated that the effectiveness and efficiency of an e-SC depends on the consistency

between the characteristics of the environment in which the fixed players operate and the ways in which relationship among the fixed player are managed. The management of such connections in turn, is based on the following three factors as cited by Caputo, Cucchiella, Fratocchi, Pelagagge, & Scacchia (2004) (Cucchiella et al., 2002):

1. The structure adopted to reorgeanize the relationships among the players of the network structure (organizational structures):
2. The criteria adopted to manage suchrelationships (managerial criteria); and
3. The activities to be carried out for coordinating the relationships (critical activities).

As per cited by Bakker, Zheng, Knight, & Harland, 2008 (Cullne & Webster, 2007), Table 3.1 shows the recent taxonomy of e-commerce business-to-business (B2B) transactions has been developed suggested that transactions vary between nine scenarios depending on the "connectivity" (number of buyers and sellers) and "purpose" of the transaction. They do not look at contextual factors other than the supply market situation (i.e. number of buyers and sellers) and do not clearly focus on the influence these appropriate factors can have on the real e-adoption.

Technology	Function
E-procurement	Automating the purchasing processes:
e-MRO/web-based ERP	To create and approve requisitions (e.g. e-requisitioning) and place and receive orders (e.g. e-ordering), often within framework agreements;
e-sourcing	Identifying new suppliers for specific purchasing categories;
e-tendering	Sending and receiving RFI's and RFP's to and from suppliers;
e-reverse auctioning/e-auctioning	Enables real-time bidding comparison;
e-informing	Gathering and distributing information from internal (internal clients or users) and external parties (suppliers);
E-marketplaces	Virtual intermediaries for trading products/services. E-marketplaces involve both a number of sellers and buyers; e-auctioning involves only one buyer
Electronic data interchange (EDI)	Integration of business systems, only available to a limited number of organizations who agree on its use
Enterprise resource planning (ERP)/ e-collaboration	Facilitates information flow within organizations based on a Web-integrated ERP system. E-collaboration is the expansion of an ERP system, linking firms.

Table 3.1: Different e-commerce technologies and their function (Source: As cited by Bakker, Zheng, Knight, & Harland, 2008 in (Adapted from Easton and Araujo (2001); de Boer et al. (2002))

3.1.1 Goals of e-Supply Chain (e-SC)

In order to improve efficiency in e-supply chain, the ultimate goals have been set by the organization as a clear driving force to achieve the desired end results. One of the e-supply chain goals is to increase organizational efficiency by coordinating the processes among suppliers, production facilities, distribution centers and customers in order to achieve Right Quality, Right Time and Right Cost (3Rs) . The next goal is to reduce total operating cost from sourcing of raw material to the find product shipment. Thirdly, in a competitive market an organization wishes have an e-supply chain that can help to increase customer satisfaction and subsequently retain customers' loyalty.

3.1.2 e-Supply Chain Measurement

The manufacturing world is embracing an e-business model; executives realize that running an extended supply chain without performance visibility is like trying to fly an airplane by looking at the fuel gauge (Reynolds, 2001). Key decision-makers need a transparent, real time view of the supply chain so that they can proactively take advantage of changing conditions and turn away disasters before they happen. In competitive environment, business managers cannot afford to wait for weeks or months to obtain information needed. They want to see how their manufacturing initiative are performing real time faster, better decisions across the global supply chain.

The facts imply that appropriate measurement has to be put in place and it is important to the management in terms of providing performance visibility. The toughest part of establishing measures is making them meaningful in the right way. There is a need to check if the cost of the measurement is balance with the value or bend it of measuring. Thus, the measurement for e-supply chain needs to take into consideration

of meeting customer expectations as well as the cost incurred. As the company move into an assessment of the measures, it is advisable to bear in mind the point made by J. Thomas Mentzer of the University of Tennessee: "What gets measured gets rewarded, what gets rewarded gets done" (Reynolds, 2001) Hence, to have a sharp measurement of the efficiency, IT tools can be adopted to carry out the measurement tasks. The following sections will explain the measurement of e-supply chain efficiency and the role of IT in that context.

3.1.3 Inventory Turnover

Inventory turnover measures a company's success in managing working capital. In fact, lowering inventories is one of the quickest ways to decrease working capital needs. Empirical evidence suggests that the use of e-business processes such as e-procurement can reduce transaction costs by aggregating demand, improving operational efficiencies, enabling an organization to gain access to a wider supplier base and facilitating the analyses of procurement patterns across different functional departments (Bhakoo & Chan, 2011) . If the company is capable have more inventory turns, it will not only drive to efficient capital use, but also can respond more quickly to changes in customer demands by reducing inventories the capital saved could be used to finance new product development, expanded marketing and sales, modernization, business process redesign expansion, acquisitions and debt reduction (Reynolds, 2001). Hence, inventory turnover is one of the measurement factors in e-supply chain in terms of efficiency.