Chapter 2
Literature Review

2.1 Concept of Supply Chain Management

About 50 years ago, Forrester (1958) introduced a new theory of production management that recognized the importance of the integrated nature of organizational relationships among the distribution channels. The new theory viewed organizations as being intertwined. The theory argued that system dynamics could influence the performance of functions such as research, engineering, sales, and promotion.

The theory had not been given much attention until in the last 10 years when supply chain management became an important area in production operation management. The term Supply Chain Management became a “hot topic” that is it difficult to pick up a periodical on manufacturing, distribution, marketing, customer management, or transportation.

The Supply Chain Management becomes an important study in the current business environment due to several factors that are:

a) The increasing globalization of the material sourcing. These activities have been carried out to look for more effective ways to coordinate the flow of materials into and out of the company.

b) In the current era, the distribution channel of the companies is competing on the basis of the time and quality. Now days, customers’ expectation is high and dynamic. The defect free product with high-speed distribution is no longer a competitive advantage, but more of a reliability. The customers’ are expecting the products to be consistently delivered faster, punctual, and defect free. This high and dynamic demand requires a closer coordination from the supplier until the distribution.
c) Due to the increase of the globalization activities and rapid technology change, the customer demand also changed very dynamically and with uncertainty. The dynamic change and uncertainty of the demand from customers require the companies to be more flexible in their operation, which in return causes the total demand operation to be more flexible.

All the points mentioned above clearly identify the importance of the Supply Chain Management study in the current business environment.

As the concept of the Supply Chain Management gained popularity over the past several years, there were various definitions of the Supply Chain Management. The APICS Dictionary (Cox, 1995) describes the supply chain as:

a) The processes from the initial raw materials to the ultimate consumption of the finished product linking across supplier user companies: and

b) The functions within and outides a company that enable the value chain to make products and provide services to the customers.

The Supply Chain Council (1997) has used the definition:

"The Supply Chain term increasingly used by logistics professionals – encompasses every effort involved in producing and delivering a final product, from supplier’s supplier to the customer’s customer. Four basic processes – plan, source, make, deliver – broadly define these efforts, which include managing supply and demands, sourcing raw materials and parts, manufacturing and assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, and delivery to the customer.”

Quinn (1997) defines the Supply Chain as:

"All of those activities associated with moving goods from the raw materials stage through to the end user. This included sourcing and procurement, production scheduling, order processing, inventory
management, transportation, warehousing, and customer service. Importantly, it also embodies the information systems so necessary to monitor all of those activities."

Mentzer (2001) defines the Supply Chain Management as:

"The systemic, strategic coordination of the traditional business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as whole."

In summary the definition of supply chain can be stated as: all the activities involved in delivering a product from raw material through to the customer including sourcing raw materials and parts, manufacturing, distribution across all channels, delivery to the customer, and the channels delivery to the customer, and the information system necessary to monitor all of these activities. The Supply Chain Management is the activity that coordinates and integrates all of these activities into a seamless process. It links all of the partners in the chain including departments within an organization and the external partners including suppliers, carriers, third party companies, and information systems providers. Managers in companies across the supply chain take an interest in the success of other companies. They work together to make the whole supply chain competitive. They have the facts about the market, they know a lot about competition, and they coordinate their activities with those of their trading partners. It encompasses the processes necessary to create, source, make to, and to deliver to demand.

Different people working in the different industry having a different definition of the Supply Chain, but basically we can distinguish the supply chain into 3 type; "Basic supply chain", "extended supply chain" and "ultimate supply chain"
From the figure 2.1: Types of Channel Relationships, Mentzer (2001) clearly shown that:

A) Basic Supply Chain

*Consists of a company, an immediate supplier, and an immediate customer directly linked by one or more of the upstream and downstream flows of products, services, finances, and information.*

B) Extended Supply Chain

*Includes suppliers of the immediate supplier and customers of the immediate customer, all linked by one or more of the upstream and downstream flows of products, services, finances, and information.*

C) Ultimate Supply Chain

*Includes all the companies involved in all the upstream and downstream flows of products, services, finance, and information from the initial supplier to the ultimate customer.*

2.2 Previous Research on Supply Chain Management

After an initial model from Forrester over 30 years ago, only recently the researchers have paid more attention on the Supply Chain Management research. The change of the business environment and the need for high velocity reaction cause the research in Supply Chain Management become more important.

In the manufacturing industry, the key factor that determines the survival of the company is QCD (quality, cost and delivery). In line with this key factor, the research on the Supply Chain Management was surrounding on the QCD issue. Improvement in the QCD will increase the company competitiveness or competitive advantages. From the Porter 5 model, we know that there are 2 types of competitive advantages: cost leadership and differentiation. By implementing the Supply Chain Management, the companies are looking forward on both competitive advantages.
Cooper & Ellram, 1993; Jones & Riley, 1985 has define that the key objective of Supply Chain Management is to lower the costs required to provide the necessary level of customer service to a specific segment. Same as the Porter 5 model, the Supply Chain Management help build competitive advantages through low cost and differentiated services.

Beside the emphasis on the cost, the researchers also notice that Supply Chain Management also contributed to the improvement on the delivery in the supply channel. Customer service objectives are also accomplished through a customer-enriching supply system focused on developing innovative solutions and synchronizing the flow of products, services, and information to create unique, individualized sources of customer service value (Ross, 1998)

As delivery is concern, we shall relate it to time compression programmers as instanced by Stalk and Hout (1990), Thomas (1990), and Dewar (1994). Cycle time compression as a supply chain paradigm is based on the assumption that collapsing lead time not only improves the supply chain performance but, also indirectly influences the other 3 component that are cost, quality and customer satisfaction for better, hence achieving fourfold benefit in competitiveness

For this research purpose, the writer will analyze the Supply Chain Management in the time compression paradigm, this will include on how the XYZ Technology (M) Sdn. Bhd. able to reduce the downstream echelon and bring the suppliers close to factory in upstream flow.
2.3 Measurement of Supply Chain Management

Every company that is operating in the 21st century business environment knows and realizes the importance and the potential of the Supply Chain Management. However, they are still lacking of tools or mechanism that can effectively measure performance and metrics which is needed to achieve a fully integrated supply chain. The measurement and metrics are needed to test and reveal the viability of strategies. Without it, it is very difficult to achieve the improvement and realization of the goal. Supply Chain will not lead to an improved productivity if each is to pursue its goals independently.

The need to study the measures and metrics of the Supply Chain Management performance can be put into 2 contexts: (Gunasekaran, Patel & Tirtiroglu 2001)

a) Lack of balance approach

Many companies realized the importance of the financial and non-financial performance measurement. However, they fail to come out with a balance framework of both measurements. In the normal condition, the manager or the research always will side on either financial performance or operational performance. It is very rare situation for the researchers or the managers to will look into both performances at the same time. Such in balance of the performance measurement cannot lead to a clear picture of the overall companies' performance. The researchers and companies' manager should make a balance approach of the performance measurement. They should always bear in mind that the financial performance measurements are important for strategic decisions and external reporting, but the day to day control of manufacturing and distribution operations is better handled with non-financial measurement.

b) Lack of clear distinction between metrics at strategic, tactical and operational levels
No doubt the performance measurements play a major influence in the decisions making at the strategic, tactical, and operational levels. Unfortunately, the companies fail to classify the measurement clearly in the Supply Chain Management for each level. We should able to distinguish which metrics is referring to which level of the business strategy decision-making. For instance, the inventory metrics is appropriate to be assigned to the operational level of strategy decision-making. It is easier to assess from day-to-day operational monitoring on the inventory level.

Therefore, to achieve an effective management in the supply chain there is a need to perform a balancing framework of the financial and non-financial performance measurement. Beside that, the performance measurement should able to consider the overall supply chain goals and the need to classified the performance metrics at strategic, tactical and operation levels.

The performance measurement focuses on analyzing performance measurement that are already in use, categorizing performance measures and then studying the measures within a category, and building rules of thumb or frameworks by which performance measurement systems can be develop for various types of systems (Beamon, 1999)

In order to get an effective measurement, there are a few characteristics that should be included: inclusiveness (measurement of all pertinent aspects), universality (allow for comparison under various operating conditions), measurability (data required are measurable), and consistency (measures consistent with organization goals) (Beamon, 1996). In this research, the writer found difficult to develop of measurement systems. What to measure? In order to over come this issue, writer has used the Stewart (1995) research method to measure the performance measurement. This is because the Stewart measurement method considers the overall supply chain goals and balance up
the strategic, tactical and operational level approach. Besides that, it also considers both financial and non-financial measures. The writer will try to discuss and identify the metrics and measurement along the link in the supply chain management, namely:

a) Plan;
b) Source;
c) Assemble;
d) Delivery.

2.3.a) Plan
Ordering is the first process for any firm. In this section, we understand that orders are generated and scheduled to determine the performance of downstream activities and inventory level. For this purpose, the writer will look into the order lead-time for measurement purpose.

Order lead-time is referred to the time which elapses between the receipt of the customer's order and the delivery of the goods. A reduction in the order lead-time leads to the reduction in the supply chain response time, and directly influences the customer satisfaction level.

2.3 b) Source
Due to the shortening of the product life cycle, the faster introduction of the product plays an important role. The speed of the product introduction time is dependent on the reliability and quick response of suppliers. A strong partnership emphasizes direct, long-term association, encouraging mutual planning and problem solving efforts.
To measure the partnership, financial method cannot be utilized. For this research purpose, the writer will use a few partnership evaluation criteria; level and degree of information sharing, the entity and stages at which supplier is involved and extent of mutual assistance in problem solving efforts.

2.3 c) Assemble

In the manufacturing industries, the assembly process is the key factor to determine the success of Supply Chain Management. As mentioned earlier, we cannot talk about Supply Chain Management in manufacturing industries if we are not discussing about production innovation.

For this evaluation purpose, the writer will look into the model change lead-time and total lead-time to produce a complete set of the product.

2.3 d) Delivery

The performance of the delivery directly link with the customer satisfaction. The establishment of the Supply Chain Management is to overcome the issue of market rapid velocity change. In order to meet this change, there is a need to improve the distribution channel that involve the delivery lead-time and inventory holding reduction.

In line with the focusing issue from the Supply Chain Management, this research project paper will look into the delivery lead-time and total inventory holding as performance measurement metrics.