CHAPTER I
INTRODUCTION

The expanding global competition, emerging new technologies and improved communications have increased customers’ expectation of full satisfaction with the products and services that they purchase. These changes have, in recent years, brought too many manufacturing and service firms into the challenges of improving the satisfaction of their customers and the quality of their products and services. Faced with these challenges, business firms worldwide are prompted to look for ways to reduce costs, improve quality and meet the ever-escalating demands of their customers. One successful solution has been the implementation of JIT in Supply Chain Management, which involve many functional areas of a firm such as purchasing of raw materials, manufacturing, distribution, marketing and purchasing, among others. This chapter provides an introduction which includes background, objective, scope and organisation of the research works.

1.1. BACKGROUND OF THIS STUDY

The varying demand and high expectation of the customer have pulled the attention of research community to focus on the appropriate control over supply chain Management. This has also become vital due to uninterrupted expansion of business surroundings. As the size of business grows the importance of supply chain matters and hence it is necessary to get better knowledge and techniques to manage it. The present study explores applicability of Just in Time (JIT) to manage a prompt and responsive supply chain.

First successful use of Just in Time can be seen in Toyota Production System (TPS) in 1980’s where as concept is coined in 1970’s. It was developed by Tai-ichi Ohno, a former vice president at TPS. Latter on TPS was then transferred to the US and other countries, and became a powerful tool for improving the effectiveness of production systems. The philosophy of JIT was used to eliminate all sources of wastes in production activities by providing the right part at the right place at the right time (Schonberger, 1986). In same period i.e. in the late 1980’s the supply chain management also started getting importance in literature along with logistics.
management. Cooper et al. (1997) also state that supply chain management has risen to prominence over the last ten years. By this period Just in time has reached to the maturity and being used with several disciplines including supply chain to get business advantages (Fullerton, et al. 2003). Last 10 years have shown JIT as an important philosophy in improving productivity, waste elimination, house-keeping in industries, working culture, information sharing and distribution process. Azadeh, et al. (2015) and Katiyar et al.(2015) claim that JIT in supply chain has enormous potential in growth of business as time, place, services and cost have become very important.

Bechtel & Jayaram, (1997); Lee &Whang, (2000); Stank et al., (2005) have shown effective uses of just in time with various process for example JIT purchasing, JIT distribution and JIT training,

1.2 SOME DEFINITIONS

The large number of research in the Supply Chain Management area has led to a wide range of definitions, expressions and concepts (Mentzer et al., 2001) and it is therefore necessary to define some of important expressions like supply chain management and Just in Time. Further the integration of both can be defined in order to specify and describe the focus of this thesis.

1.2.1 SUPPLY CHAIN MANAGEMENT

Hall (1983), Monden (1983), Fisher (1997), Lambert (2004) give details of processes of Supply Chain as procurement, manufacturing and distribution of material. Lambert (2004) explains the various processes as supply of raw material, manufacturing of finished/semi-finished goods and distribution of finished goods. Supply chain management, as a more holistic concept, is a collaborative-based strategy to link inters organisational business operations to achieve a shared market opportunity (Cooperand Lambert, 2000). The objective setting in supply chain management is two-fold. One is to seamless flow of material another to updated information sharing among all stake holders in the chain. Christopher (1998) defines supply chain as;
“The management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole.”

The definition points out the various objectives of SC as superior customer value in terms of quality, cost, delivery and other expectations of the customers. In addition various concept of supply chain management has also been referred to as a management philosophy of material and information (Houlihan, 1985 and Mentzer et al., 2001).

Tan, (2001) defines supply chain management (SCM) as an increasing prevalent approach to purchasing and distributing goods from the suppliers to the manufacturers, wholesalers, and retailers, where the process has been increasingly integrated and electronically handled, replacing inventory with information, and planning for the long term success of a buyer-seller relationship. Lee and Billington, (1992) warns against the larger view of supply chains which are so complex that no one organization can directly control them and there are many pitfalls that companies should be aware. The effort over the last decade is in integrating a buyer’s immediate supplier into the internal production, management, and distribution, resulting in a better flow of goods (Houlihan, 1985). Therefore three important points on supply chain management can be written as

- A systems approach of viewing the supply chain as a whole and to manage the total flow of goods/inventory from the supplier to the ultimate customer.

- A strategic orientation toward co-operative efforts to synchronise convergence of intra-firm and inter-firm operational and strategic capabilities into a unified whole.

- A customer focuses to create unique and individualised sources of customer value, leading to customer satisfaction.
1.2.2 JUST IN TIME

JIT concept started in Japan in 1980’s in a production system of Toyota. It was also called a Toyota production system (TPS). The concept was coined in relevance of waste elimination and quality practices in the production system. Mehra and Inman (1992), Garg et al. (1999) remained pioneer of JIT in India. Following definitions of JIT are given.

1. Schonberger (1986) has defined JIT as a system to produce and deliver finished goods just in time to be sold, purchased materials just in time to be transformed into finished goods.

2. Miltenbergm (1993) sates that JIT is an approach wherein waste in the production process is systematically identified and removed to reduce cost and lead times and improve quality.

3. Alternburg et al.(1999) defines JIT is a programme consisting of material management and control in terms of waste elimination from all sources including unnecessary inventory and scrap in production

4. Lau (2000) defines JIT as philosophy that concentrates more on improving manufacturing efficiency by eliminating non-value added activities and minimizing inventory.

1.2.3 JIT IN SUPPLY CHAIN MANAGEMNT

A JIT initiative in supply chains are something very positive and is expected to be beneficial for all parties involved. Traditionally suppliers, manufacturers and distributors are in practice of keeping some inventories at their ends. These inventories are termed as waste or dead asset in the literatures (Schonberger, 1986; Ohno, 1988). Therefore, it is an urgent need to remove/ reduce the unused inventories at each ends, i.e., suppliers, manufacturers and distributors. The proper planning, forecasting, dedication, teamwork, timeliness and information sharing can reduce/eliminate the dead inventory and other non adding activities at large. Also in
recent years the term supply chain management was confronted with some criticism that the notion does not describe its customer-oriented focus well enough. Christopher, (1998) and Volman et al. (1997); Vokura and Lumunas (2000) have pointed out that at many instances sub-optimisation exists in Supply chain management due to some non value added activities in the whole production process and subsequently the desired outcome of business is not achieved. To overcome these problems they suggested implementing Just in time concept in supply chain.

Indian Economy is a fast growing economy in the world. Due to large demand and supply gaps in indigenous production, large number of MNCs is in trend to set up the manufacturing units in India. It is also seen that large chunk of investment in India is from Japan, USA, Korea and European Unions. These countries invest lot of funds on improving the supply chain. Balakrishnan et al. (1996) and Kumar et al. (2002) have recognised JIT as a catalyst in improving supply chain of their country. This prompted the researcher to investigate impacts of JIT in improving the supply chain of Indian industries. The implementation of JIT supply chain would help the manufacturing firms substantially to improve lags in flow of information, trend of low inventories, zero defect, minimum wastes and a harmonious working culture which is needed in growing India.

In above context JIT supply chain can be defined as “Integrated processes of procurement, manufacturing and distribution by using Just in time inventory”.

1.3 OBJECTIVES OF THIS RESEARCH

The objective of this study is to highlight JIT applicability in various activities of Supply chain in context of Indian Industries. This study has been chosen because of increasing popularity of just in time supply chain in western and other developed countries. The study would explore actual trends of implementation of JIT in supply chain. This will lead to identify and understand different perspectives of JIT, attributes applicable in supply chains and performance of Supply chain due to it. Especially, more focus has been concentrated on discovering the trends of JIT application in managing the suppliers, distributors, human resources, information sharing and role of top management in Indian industries. Besides these broad agendas following objectives of this study have been undertaken.
i. Identification of related research works from literature.

ii. Classifications of research works as per requirement of this study.

iii. Identifying relevant attributes /factors/ elements of JIT supply chain

iv. Identifying factors affecting performance of supply chain due to JIT.

v. Exploring trends of application of JIT Supply Chain in India.

vi. Finding Performance of JIT supply chain in context of Indian firms.

vii. Exploring Supplier selection in a JIT supply chain.

viii. Identifying suitable distributor in JIT supply chain

ix. To carry out performance based comparative study of various supply chains

x. Acknowledging benefits of JIT supply chain

xi. Identifying difficulties in implementation of JIT supply chain.

xii. Discussion of important challenges against JIT supplies chain in India.

1.4 OBJECTIVES OF THIS RESEARCH

The overall Scope of this research is to develop a better understanding of JIT Supply Chain and to make existing supply chain more rewarding, competitive advantageous and effective. This research carries out studies of four major features of JIT applicability in Supply Chain. The detailed features of scope and focus of the study is shown in figure 1.1. The model is depicting of proposed study undertaken to explore various features of JIT supply chain.

The first feature of this model is integration of various JIT elements with important processes of supply chain (Procurement, Manufacturing and Distribution) thus forming JIT Supply Chain. The applicability of JIT Supply Chain has five aspects. The first aspect is to know the level of JIT application in supply chain in process of procurement, manufacturing, distribution, information sharing and human involvement. The second aspect is to investigate expected benefits from implementation of various JIT attributes in managing the supply chain. This has been expedited in terms of no benefits to very high benefits due to its application. The various benefits of JIT are cost, lead time, flexibility, responsiveness and low inventory. Third aspect is to explore the degree of difficulties in JIT implementation in terms of very easy to highly difficult. Fourth aspect is to explore the Degree of importance of each JIT elements in terms of no importance to high importance. The
fifth aspect is to highlight the important problems of JIT application in scale (1-5) of no problem to very high problem.

The second feature of this model is to investigate the performance of Supply chain due to implementation of Just in time. It has also been investigated in reference of five aspects. The first aspect is to expedite the performance of supplier of the raw material to the manufacturer. The performance of supplier depends on various factors like; increased flexibility, increased involvement and better quality of raw materials. The second aspect is to explore performance of manufacturer in terms of reduced cycle time, reduced man power and quality products given out by the firm. The third aspect is to explore the performance of distributors in terms of improved warehousing, increased responsiveness and improved delivery. Fourth aspect is to investigate the performance of information sharing in terms of increased accuracy and increased frequency of information sharing. The fifth aspect is to find out business performance in terms of improved return on investment, improved market share and high Assets Turn Over (ATO).

The third feature is to investigate various circumstances of selecting a suitable supplier and distributor in JIT supply chain, because the task is very challenging. As the priority of various features of JIT practices vary as per requirement and circumstances of the industry. Interpretative Structural Model (ISM) has been used in selection of supplier. Similarly, Graph theory application (GTA) has been used to find out JIT distributor selection Index (JDSI).

Finally, literature indicates that some of JIT attributes like; zero inventory, nil wastage, pull production, low cost and high responsiveness are very difficult to meet in reality. These attributes are neither neglected nor fully practiced by the industries. In this case partial implementation of JIT can be seen in literature to improve the overall results of the business. Therefore a Hybrid Supply Chain has been proposed here which possess the characteristics of JIT and traditional supply chains. The comparison of performance of the three types of supply chain has been proposed using Analytic Network Process (ANP).
Fig 1.1: Proposed Research Model
1.5 ORGANIZATION OF THE RESEARCH

The study of applicability of JIT supply chain in Indian context is overall depiction of present trends in industries. The study includes seven chapters and explains various features starting from introduction to conclusion of the research. The following paragraph describes the organization of the thesis contents.

Chapter 1 is an introduction to JIT supply chain, mentioning background, objectives, focus & scope, and various definitions. Chapter 2 is literature reviews mentioning the past studies in this field. For this, a comprehensive study of literature pertaining to JIT and supply chain has been carried using Systematic Literature Review (SLR). The literature gaps have been taken as base to formulate the research questions and setting up research directions. Chapter 3 is about features of JIT supply chain which include the definitions and explanations of recognized attributes of JIT supply chain. The chapter also includes the advantages and disadvantages of the JIT Supply Chain in context of India. Chapter 4 presents the Survey of Indian industries with an objective to find out applicability of JSC in real sense. The survey has been split into two parts. Part one will explore the applicability of JIT in Supply Chain and second will find out performance of Supply Chain due to JIT implementation. Chapter 5 presents two modelling works, one is mentioning the selection of Supplier using ISM and second model is identification of Distributor using GTA model for the purpose of JIT supply chain. Chapter 6 presents other possibility of JIT supply chains on performance based analysis. A comparative study of three supply chains has been proposed. By use of ANP an effort has been carried out to explore most desirable supply chain in Indian context.

Chapter 7 concludes this thesis with important findings, implications, limitations, specific contribution and futuristic scope.

1.6 SUMMARY

The increasing interest of researchers in the topic has increased the scope of this thesis. The introduction to this thesis highlighted the background of this study with a brief definition of JIT supply chain. The scope and focus of this study have highlighted the important aspects touched in this thesis. The clear cut objectivity of the study sets up right research directions. The organization of the various chapters with brief ideas of each one has been laid down.