CHAPTER 1
INTRODUCTION

The evolution of the global economy has intensified competition, and organizations have been driven to offer increased levels of customer service in order to survive. A range of new competitive requirements including speed, flexibility and customization have emerged as the key competitive drivers. To maintain this competitive stance, these organizations rely on their operational functions to be dependable and efficient. Effective operations management is the key to business success that integrates other functional areas, which together enable an organization to excel in the marketplace. The successful integrated organization will meet global competition with quality outputs, outstanding customer service, and effective control of costs.

Today the competitive business environment changes much faster than it did twenty years ago, primarily because of advances in technologies. To remain competitive, companies today must be flexible and be able to respond quickly to changes in their environment and changes in customer demands. Quick response can be a competitive advantage (Stevenson, 2015). One way is quickly bringing new or improved products or services to the market. Another is being able to quickly deliver existing products or services to a customer after they are ordered, and still another is quickly handling customer complaints. Flexibility is the ability to respond to changes, which might relate to alterations in design features of a product or service, or to the volume demanded by customers or to the mix of products or services offered by an organization. High flexibility can be a competitive advantage in a changeable environment, and it has become a central capability of world-class manufacturers. Market requirements now demand manufacturing capability in terms of flexibility, and this flexibility comes from an array of possibilities under the header of flexible manufacturing. Companies must adopt new technologies for increased flexibility, and must make their technology-adoption plans part of their
operations strategies. Automation is frequently touted as a strategy necessary for competitiveness. Today, automation projects are initiated not only for labour-cost savings but also for improved quality, faster production and delivery of products and services, and increased flexibility. The earlier methods used make-to-stock that helped in reducing costs by producing items in large volume. But this has largely been replaced by flexible manufacturing system (FMS), where the manufacturing operations are fully automated, and the product lines can be changed relatively quickly and easily to meet the changing market needs (Upton, 1995). Wang et al. (2009) state that many manufacturing units are investing heavily in FMS to compete in markets that are characterized by mass customization, shortened product life cycles, stringent product specifications, and global supply and distribution.

The FMS provides several advantages in an environment, where customer requirements are changing frequently. Although the initial cost of these systems is high, but they offer several advantages, for example, per-unit production costs are low, quality of products is high, and product flexibility is high. FMS are growing in importance and many companies are now installing them. Flexibility in manufacturing system is an effective tool for surviving in the new manufacturing environment involving extreme uncertainties, keeping in mind the unpredictable behavior of the customer and the dynamic nature of market. It provides an atmosphere that is conducive for make-to-order environment by virtue of its capability to incorporate immediately the required changes that are demanded by a customer, and thus providing a formidable competitive leverage to a manufacturing unit. It often appeals to managers who hope to achieve both the flexibility of job shop processing and the productivity of repetitive processing systems.

The competitive environment encourages thinking new and challenging, which in turn, fosters innovations and new products development. To succeed in global competition in the twenty-first century, companies must quickly develop innovative products and respond quickly to customers’ needs. Innovation leads to
offer variations in a product and makes it available at highly competitive price. Hammer (2004) maintains that operational innovation can provide organizations with long-term strategic advantages over their competitors. The manufacturing competitiveness can be increased in many ways, and one such tool as suggested by Besterfield et al. (2001) is the quality that goes beyond simply meeting the designed specifications and satisfying the customer. He emphasizes on increasing its scope so that quality can be used as a business strategy to gain competitive advantage in the global market. Attaining near-perfect product quality is seen as a principal means of capturing market share in global competition. Customers are generally willing to pay more for a product or service if they perceive the product or service has a higher quality than that of a competitor. Reducing production lead time is another means to increase manufacturing competitiveness. Trott (2000) states that bringing a product in a short period will give the product early market entry advantage by setting standards for others before they can think to enter the market. In a dynamic market, where everything is uncertain and unpredictable, it becomes vital for an organization to acquire the ability to fulfill the customer’s specific demands in a very short time. Developing customized products is another strategic tool of gaining competitive edge as it leads to total customer satisfaction.

Controlling or managing inventory is one of the most important aspects of operations, and is certainly value enhancing for the organization. The inventory management in a production system is of extreme importance as the inventory absorbs a large portion of the working capital of a company and often it represents a large portion of the total assets of a business, and is directly related to the unit cost of the product. The ideal situation for a business organization is to achieve a match of supply and demand. Having excess supply or excess capacity is wasteful and costly; having too little means lost opportunity and possible customer dissatisfaction. Addressing these two extreme conditions effectively is very critical for an organization for keeping its inventory costs reasonably low. Poor inventory management can have a devastating effect on new product development.
Operating successfully today requires organizations to become much more involved with their suppliers along with customers. The supply chain network that refers to the sequence of processes right from ordering raw materials from the supplier to converting them into finished goods by the manufacturer and finally sending them to customers, plays an important role in inventory management. Brown (2000) states that techniques such as design for manufacture and modular assembly have become increasingly important, and demand close relationships with suppliers to ensure that modules and sub-assemblies are delivered to the quality and quantities needed. The success of a company depends to a great extent on how well it manages its supply chain network and supply chain relationships. Chopra and Meindl (2009) stated that the amazing growth of Dell, a leading US computer manufacturing company, was largely due to its effective supply chain management. An effective supply chain network greatly reduces the level of overall inventory and thus leading to tremendous saving in inventory-related costs. Partnerships in the supply chain are strategic issues for world-class companies in the car, computer and telecommunications industries.

Just-in-time (JIT) is a highly coordinated processing system in which goods move through the system, and services are performed, just as they are needed (Stevenson, 2015). It is dependent upon both the excellence of internal manufacturing capabilities and the development and management of strategic relationships with suppliers. It encompasses every aspect of the process, from design to after the sale of a product. It thruts upon minimum levels of inventories, minimal waste, minimal space, and minimal transactions. It is a substantial portion of the Toyota system, a Japanese production system named after the famous company Toyota, which is known for its minimal use of resources and elimination of all forms of waste, including time. Kalpakjian and Schmid (2000) concluded that the JIT production concept was implemented in Japan to eliminate waste of materials, machines, capital, manpower and inventory throughout the manufacturing system. Behind JIT is the continuous drive to improve production processes and methods. Japanese manufacturers have long practiced what they called Kaizen, the goal of
continuous improvement in every phase of manufacturing. Simultaneously they have used SMED (Single Minute Exchange of Dies) to ensure that all setups take less than a minute. At the core of JIT manufacturing at Toyota is Kanban, an amazingly simple system of planning and controlling production.

Information is an important part of business transactions for an organization. The use of information through the effective applications of tools of information technology (IT) has provided global markets for a company by expanding its area of business activities, making its products dominate over a larger area. Information technology facilitates and provides smooth flow of information in the supply chain. The IT tools like Internet, Intranet, Extranet, EDI, email etc. have resulted in reduced lead time, making on-time delivery more reliable and predictable, and thus paving the way for effective implementation of JIT. Corporations are increasingly connecting their intranets to other firms via extranets to implement strategic decisions. Richards (1996) stated that Chicago-based Navistar does not maintain a tyre and rim inventory at Springfield, Ohio, where its truck assembly plant is located. This responsibility is handled electronically by Goodyear Tyre & Rubber, one of Navistar’s suppliers. A Goodyear office in New York receives Navistar’s manufacturing schedule and tyre and rim requirements by electronic data interchange (EDI). The information is then sent to a Goodyear plant in Ohio, where tyres are mounted on rims. The complete assemblies are shipped to Navistar’s Springfield plant and arrive just 8 hours ahead of, when they are needed.

Manufacturing organizations do not just offer products and service organizations do not just offer services. Both types of organizations normally provide a package of goods and services. Hence, the approach of JIT implementation in manufacturing and service sectors may not be the same because of different kinds of inventory involved. Manufacturing sectors involve tangible products, whereas service sectors involve services that are intangible. But service sectors contribute significantly in a country’s economy.
In the changing global environment, Indian companies are also required to be competitive. Hence, it necessitates developing the strategies that would provide competitive advantage to a business unit in the ever-changing dynamic environment, both at the national and international level. Some companies are particularly vulnerable in today’s global competition because of product quality, customer service and production costs. Creating competitive advantage is the need of hour, and developing strategies to create this advantage is must for any organization. Increased customer awareness has forced the companies to continuously change their business strategy to remain competitive in the market. Gaither and Frazier (2004) reported that the old bureaucratic organizational setups that were designed to provide stability are incompatible with the ever-changing nature of today’s global business.

The Indian industries are not very serious about changing the old setups of manufacturing and adopting new methods and processes. This approach makes them lag behind which ultimately leads to their failure of not meeting global standards of products. The result is that they do not contribute significantly to global economy and Indian economy in particular.

The idea behind conducting the research on JIT was derived from the Japanese industries which were immensely benefitted by JIT implementation. JIT changed the face of the industries completely by setting benchmarked standards for processes and methods, and motivated others to follow. This resulted in drastic reduction in the level of inventory besides reducing production costs, and made those industries able to produce high quality products that can meet global standards. Today Japan is the world leader of many products.

Keeping the above discussion in mind, an extensive study has been carried out about JIT implementation in Indian industries. A well-designed questionnaire (appears in Appendix II) listing all the relevant parameters relating to JIT and its implementation, holding discussions with the senior representatives of the
companies, visiting the plants for on the spot analysis of the organizational and manufacturing environments are used for finding the concluding results.

1.1 CHAPTER LAYOUT

The present dissertation work is divided into eleven chapters. Chapter 1 starts with the introduction of the work, whereas inventory system and JIT manufacturing is described in Chapter 2. A literature review is provided in chapter 3. Chapter 4 describes important elements of JIT and prerequisites for JIT manufacturing. The research methodology is provided in Chapter 5. The results and discussion part is covered in Chapter 6. Chapter 7 describes the conclusion of the work. Chapter 8 details the scope for the future work. References appear after Chapter 8. Appendix I contains case studies of JIT implementation in five Indian industries. The questionnaire used in the JIT analysis is provided in Appendix II. Appendix III contains the list of industries used in the JIT analysis. List of publications follows after Appendices. Curriculum vitae appears at the end of the thesis.