CHAPTER 1

INTRODUCTION

1.1 PREAMBLE

The emergence of global economy and evolution of Information system has transformed the modern business into new horizons. Information is a vital resource for an organization. It is consistently playing a significant role in achieving higher growth, increased productivity and competitive benefits among the industries concerned. In an organization, information supports the existing process and operations in a business setup. The organization use information as a tool for decision making and leads for making decisions scientifically. Information also provides an edge over the competitors and allows the organization to establish conducive and competitive business environment. Moreover, so as to compete in the global market, the organization requires improved business analysis and effective communication system as well. Further, Information plays a crucial role in market forecasting and analysis; it also helps in taking cautious and calculated risks which lead for market innovation.

However, the new information era enables the organization to break the traditionally structured way of functioning with a defined frame of rules and regulations. Information driven market enables any organization to function with set of flexible rules, array of mass customizable products, informal goals, dynamic teams and customer oriented tasks.
Thus to say information has become an inevitable factor in all areas of decision making such as strategic planning, day to day activities, short term and long term goals of an organization.

1.2 THE NEED FOR AUTOMATION

In a rapid business process, every organization collects and distributes information among themselves and others. Information once gathered is compiled and regrouped as per the requirement. In this process some data may get distorted or lost due to certain intentional or unintentional reasons. Sometimes the information processed may be irrelevant, unreliable or incorrect. In order to ensure the relevance, reliable and accurate information flow, information has to be properly acquired, classified, stored, retrieved, edited and carefully verified for the quality purpose. For this arrangement, the information is stored in a digital format by capturing the information on each activity within the department in a storage device in a system. The accurate and reliable information has to be tested, analyzed, processed and placed in a presentable format. After this, information is distributed and evaluated subsequently on its effectiveness and finally used for the business analysis.

A structured organization operates with departments such as Purchase, Sales, Stores, Human Resources, Manufacturing, Finishing, Finance, Supply Chain etc. Each of these departments are backed with series of well-defined process. Each process carries a set of information from one individual to another within the department and between individuals outside the department in the organization and to an outsider or another organization.
Most of the information gathered within the department are common information and the same has to be shared by various departments within the organization, for example, the Purchase department is required to obtain clearance from the Finance department before placing an order to ensure that payment is made in time for the goods to be delivered. Similarly, the Finance department depends on Sales department to find out the fund flow inside the organization. The dependency level is more in an organization in terms of managing its day to day activities.

In a manual scenario, the process of the organization are independently carried-out by the departments. Also information is independently created, collected and processed within the department. Similarly, every department works in an independent and isolated manner which results in the creation of counterproductive and duplicate information. Sometimes it leads to conflict within the organization, when the information processed by one department does not match with the information provided by another department.

Material requirement planning is a classic example for integrating the activities of various departments. The manufacturing department plans for the scheduled production on month based on the orders received. While finalizing the requirement, the manufacturing department has to get the concurrence of the departments like Finance, purchase and stores to ascertain the material requirement. At the same time, the manufacturing department has to ascertain the availability of production line and labour.

In most cases the organization suffers with huge loss in dead stock accumulated due to poor Material Requirement Planning (MRP) and lack of information shared among the departments. Excessive work force increases the cost of production. Most of the public sector industries were closed down
due to excessive work force. Inorder to ensure smooth flow of information within the organization, the process across the departments has to be properly integrated. This integration ensures seamless flow of quality information within the organization and will certainly enhance the efficiency and productivity of the organization.

1.3 ENTERPRISE RESOURCE PLANNING SYSTEMS

Enterprise Resource Planning (ERP) provides a comprehensive technological solution to integrate and restructure the organization process and ensure a smooth flow of information. It bridges the information gap throughout the organization and facilitates to integrate the various resources of the business [93]. In addition ERP provides a competent solution to overcome the issues related to material management, productivity, customer relationship service, cash flow, financial management, quality control, inventory management and delivery systems. ERP also enables the organization to set up systems such as management information system (MIS), decision support system (DSS), data management system and data mining in place. It also provides vital alerts such as early warnings when the process deviate from the guidelines provided.

Modern business is information driven. Inorder to ensure uninterrupted flow of information and to co-ordinate the process of the departments, organizations implement ERP software. Ready to use ERP software are available in the industry; It suits for the various requirements of the industries. These applications are developed on the basis of broad outline of business process and functionalities mapped in the industry. Every organization has its own set of process, procedures and functions which are generally fall within the broad outline of the industry; but it does not include all the processes. In order to make the readymade software compatible to the
organization’s needs, either the ERP software is altered or customized as per the requirements of the organization.

Enterprise Resource Planning software is available in different scales in order to meet the requirements of the organizations.

A. Large scale Enterprise Resource Planning software caters to the needs of large business establishment which operates from large scale geographical location which runs into multiple verticals. Software such as SAP, Microsoft, IBM, Sun Guard, Fast React and Oracle are some of the major players in the huge volume business which runs across the continents. Since it is called large scale, ERP implementation requires huge investment, massive infrastructure and team of experts to successfully implement the project.

B. Medium scale Enterprise Resource Planning software caters to the requirement, which are moderate in size and has large presence in one country, yet does not have a large scale operation. Software such as SAP Business 1, SAP AFS, World Fashion Exchange, Microsoft Dynamics, TCS, EPICOR, IFS and Data Tex are some of the major players in the midsize volume business which runs all over the country. As the name suggests Medium scale, ERP implementation requires moderate investment, infrastructure and team of experts to successfully implement the project.

C. Small scale Enterprise Resource Planning software caters to the requirements of a small scale business with limited presence in a country which has moderate scale operations.
Software such as Stage, REACH ERP, Eduberry, and Tally ERP are some of the major players in the small size volume business which runs in a single vertical and across a particular territory. As the name suggests Small scale ERP implementation requires minimum investment, infrastructure and team of experts to successfully implement the project.

Some of the Enterprise Resource Planning software are industry specific such as Education, Apparel Manufacturing, Automobile, Aeronautical etc. These applications are also available in modules inorder to cater to a specific process in an organization. Exclusive software is also available for production planning and control in various manufacturing facilities throughout the country. Supply Chain Management software is extensively used in logistics based business such as Retail and Fast Moving Consumer Goods Industries (FMCG). Product Lifecycle Management products (Gerber) are exclusively used in Fashion and Apparel Manufacturing Industries.

Enterprise Resource Planning software is available in the market runs in various modules such as Marketing, Production Planning, Manufacturing, Material Management, Maintenance, Supply Chain, Finance, Human Resources and Product Lifecycle. Generally an organization takes a call on whether it wants to completely integrate all the processes of the organization or core processes or selective processes. At times it chooses different products for different processes such as separate product for Finance (Tally), Production Planning (Fast React) and Product Life Cycle (Gerber).
Products such as SAP, Microsoft, Oracle and EPICOR are some of the common Enterprise applications which can suit any type of industry, whereas Sun Guard, Eduberry, TCS Ion are Academic specific. FAST REACT, World Fashion Exchange and Data Tex are textile and apparel based industry specific Enterprise applications.

1.4 GENERAL MODEL ERP

The General Model ERP depicting various functionality, processes and features covered is shown in Fig. 1.1.

![Figure 1.1 Enterprise Resource planning General Model](Source: Adapted from Siriginidi, 2000:380)

Figure 1.1 Enterprise Resource planning General Model
(Source: Adapted from Siriginidi, 2000:380)
1.5 CHANGING TREND IN ERP

The Traditional ERP systems run on an on-premise model and standalone systems. Subsequently the multi user operating system enabled the organizations to connect various departments’ processes within the organization by using Local Area Network. The Wide Area Network enabled organizations to bring multiple location operations under one roof. The web enabled solutions provided a paradigm shift in the organization by supporting the organization to bring global operations under one roof to manage business from multiple verticals making the information available on the desk from any part of the world at any given time. Technology forces the ERP to have following changes:

- Mobile technology enables the solution providers to reach the stakeholders personally in accessing the information.
- Hand held devices and bar code scanners are used to capture the real time data in remote locations.
- Radio Frequency Identifiers are used in manufacturing plants to capture the movement of the components and end products.
- Cloud Computing is an emerging trend in the Integrated Enterprise Solution which is available on web, allowing the organization to pay for the number of actual users, reducing huge investments on IT infrastructure in terms of Hardware, Software and its maintenance and thus make it available at an affordable cost accessible from any part of the world.
- Software as Service (SaaS) model is an effort in the industry to provide a rapid, cost-effective solution to its customers who
are looking for an enterprise solution and greater value realization (ROI).

- The Adaptive ERP enables the organization to configure the system, simulate the models, test it and implement the business technology changes with minimal intervention on the development part.

- Dynamic reporting systems will pave way for predictive analysis; Logical thinking will be made more valuable than the syntax.

- Big Data is a new evolution, to manage and utilize both structured and unstructured information stored in the database.

- A Hybrid ERP provides an opportunity for greater innovation, rapid deployment, or isolating batch intensive process from the self-service applications which will provide additional flexibility to the customers and supports the business process.

- Big Data Analytics enables to gain more insight to explore additional market segments to enhance abilities of cross selling and up-selling, improve customer loyalty, retention and have a stronger product positioning with improved brand value.

- Data mining and warehousing techniques, has helped the organizations to predict the eventualities with the support of complex modeling and forecasting techniques along with Business Intelligence (BI) models.
1.6 AN OVERVIEW OF THE APPAREL INDUSTRY

Textile and Clothing (T&C) industry in India plays a vital role in Indian economy as it plays a crucial role in terms of end product, foreign exchange earnings and employment generation. The textile and apparel trade was estimated to be USD 662 billion in 2011 in which Indian textile and apparel exports has a 3% share on the global market (USD 19.86 Billion). The value chain of Indian Textile and Clothing industry comprises of spinning, weaving, knitting and garmenting. The size of the Indian textile and apparel domestic market was estimated to be ₹ 2,73,000 crores (USD 58 billion) in 2011 and is projected to grow at 9% Compound Average Growth Rate (CAGR) to ₹ 6,64,000 crores (USD 141 billion) by 2021. The Indian textile and apparel sector provide direct employment to 45 million and with an additional employment for 60 million in allied sectors. According to the Techno Pack Advisors domestic apparel market is ₹ 2, 07,400 crores in 2012 and it is expected to grow at the rate of 9% over the next decade.

1.7 PROBLEMS IN THE APPAREL INDUSTRY

In the Global Market Economy, Clothing and textiles industries make a significant contribution to generate employment opportunities in both developing and developed nations. However, manufacturing in most developed countries has shifted its focus to outsourcing. Currently, most of the developed countries like United States, the EU and Japan are the largest consumers of textiles and clothing, yet the majority of clothing and textiles in these countries are imported. India faces a tough competition from China and Bangladesh and lost significant portion of its share in the international market due to market globalization.
Higher manufacturing cost; raise in the cost of raw materials; serious fluctuation in the yarn price, non-availability of skilled labour, irregular power supply and dependency on self-generated power for electricity requirements, change in lead time for delivery, stringent margins, tough competition and unstable currency value against US$ were the serious threats to the manufacturing industry.

Types of information required for the apparel industry led to large scale ERP implementation in the industry. Apparel manufacturing process is as good as any other manufacturing processes such as automobile, pharmaceutical, steel manufacturing etc. Apparel manufacturing has a set of processes which are inter-related and share the vital source of information with one another.

Flow of information is such that it starts from design and product development. Marketing and merchandising department in an apparel industry focuses on getting orders, thus sample designs are sent to the buyers and changes are made as per to the requirements of the buyers. Then the buyers place an order for a particular product or a style on a price agreed upon for a defined quantity through a purchase order. On receipt of the order the planning department derives time and action plan based on the delivery date and schedules production plan based on the availability and the capacity of the concerned unit. Processes are identified for in-house operations and out sourced processes.

Production planning department prepares a material requirement plan and generates Bill of material (BOM) and activates the process program based on the Time and action plan (TNA). Purchase department in consultation with the materials management department releases the purchase orders based on the material requirement plan and work orders are
released for purchase of materials. These goods are primarily the raw materials such as fabrics, trims and accessories which are received by the materials management department, checked for quality and updated in the inventory.

**Manufacturing Departments** allocates lines for the production based on the plans evolved and the Fabric is issued from the stores to the cutting department. From the cutting department, the cut pieces are bundled and sent to the production lines. Trims and accessories are issued to the production lines from the stores department based on the material request note forwarded by the manufacturing department against BOM. The product undergoes the defined number of processes and on completion of quality control parameter, the products are packed and stored in the warehouse where the supply chain department takes care of logistics and dispatch of goods to the stores department or to the buyers.

Thus the information pertaining to the order flows from marketing and merchandising department to line of departments such as production planning, purchase, finance, stores, manufacturing, quality control and human resources. Seamless flow of information across the departments plays a vital role in the successful execution of orders. Most organizations invested on Enterprise Resource Planning Software inorder to ensure the seamless flow of information across the organizations.

### 1.8 STATUS OF ERP IMPLEMENTATION IN THE APPAREL INDUSTRY

Apparel Industry in India operates in major production centers such as New Delhi, Mumbai, Chennai, Bangalore, Tirupur and Ludhiana. Nearly 3000 apparel manufacturing units are registered under Apparel Export
Promotion Council (AEPC) in Bangalore, Chennai and Tirupur. These companies produce products of international standard with state-of-the-art technology and produced high quality garments. Majority of these organizations are unorganized.

Yet many of the established companies adhere to the best production practices and places state of art processes in place. Companies which believe in transparency use software to monitor the manufacturing processes. Many companies use automation processes for selective operations such as Marketing and Merchandising, Pattern Making, Production Planning, Finance, Supply chain, Human Resources etc. Some selective companies use Enterprise Resource Planning software for integrated enterprise solution. Some of the Enterprise Resource Planning software used in the Apparel Industry are :-

a. REACH ERP  
b. Microsoft Dynamics  
c. SAP – AFS  
d. Fast React  
e. Stage  
f. World Fashion Exchange  
g. Now (Data tex)  
h. Gems lite  

Some of these industries have developed in-house software to cater to the requirements of its automation process.
1.9 CHAPTERISATION

The thesis is presented in 7 different Chapters.

Chapter 1 Discusses the automation in the apparel industry, ERP in the apparel industry, the general ERP model, changing trends in ERP and need for the study.

Chapter 2 Review of related literature, which include ERP system, success factors, case studies and failure analysis. This chapter also speaks about the garment manufacturing process and various ERP software used in the apparel industry.

Chapter 3 Discusses about the problem definition, main objective, the sub-objectives of the research and the hypotheses.

Chapter 4 Explains the methodology and framework followed for the research.

Chapters 5 Provides a framework for sustainable ERP implementation in the apparel industry based on the results and findings from the data analyzed. This chapter also provides a Road Map for sustainable ERP implementation in apparel industry based on the results and findings of the study. Further, the chapter show cases the design of an add-on solution to ERP implemented in the apparel industry. An Add-on solution model is provided to overcome the crux identified in ERP implementation on cost analysis and warehouse management.
**Chapter 6** Speaks about the performance evaluation for the classical cost analysis model proposed and space utilization in the warehouse management system model.

**Chapter 7** Throws light on conclusion and scope for future research.

1.10 **NEED FOR THE STUDY ON ERP IMPLEMENTATION IN THE APPAREL INDUSTRY**

As Enterprise solution of an organization, it generally takes lot of time and involves large human resource and obviously requires huge financial resources to execute. Integrating the processes of various departments within the organization, ensuring the flow of information across various stakeholders, customizing the software to suit the requirements for the business needs, Co-ordinating between vendors, Implementing Partners (IP) and people within the organization. Many of the organizations which opted for ERP implementation, miserably failed to achieve the expected results. Some of these organizations have not even realized that they have failed and continue to work on implementing the application. Some of the root causes for the failures are:-

a. Implementation cost exceeds the budget proposed.

b. Overshooting of the implementation schedule.

c. Failed to deliver results as defined in the objectives.

d. Created imbalance within the organization in resistance to change.

e. Resulted in duplication of work by maintaining manual and automated process.
f. Identifying the right product or support from the vendors.

g. Inability to grow with the organization.

In order to overcome these issues, this research work focused on IT Strategic framework for sustainable ERP implementation in the apparel industry by providing a road map for sustainable ERP implementation by using Garment cost analysis model and warehouse management model.

1.11 SUMMARY

This research is envisaged to provide a comprehensive solution for successful ERP implementation in the Apparel industry. In order to fulfill this objective, effective use of various ERP applications used in the industry and to understand the barriers in ERP implementation, literature available on ERP implementation were reviewed and analyzed. Various case studies and research publications are available on ERP implementation, ERP failure, and automation processes are also reviewed in chapter 2.