2.1. METHODOLOGY AND SOURCES

Various information sources both primary and secondary were consulted as follows:-

- IEEE
- ACM
- Panorama Consulting ERP Reports 2008-2014
- EBSCO online, 1970-2008
- GARTNER Report
- Dissertation Abstracts International, UMI
- ERIC Database, Silver Platter
- Full text journals from publishers site at www.emeraldinsight.com

Efforts have been made to identify the relevant literature on the problems by scanning, browsing, reading the original documents and abstracting sources. Appropriate notes were taken wherever the original documents are not available. Relevant information has been taken from the abstracts for preparing the review.
2.2. REVIEW OF ERP LITERATURE

Enterprise resource planning (ERP) is an information system that manages through integration all aspects of a business including production planning, purchasing, manufacturing, sales, distribution, accounting, and customer service (Scalle and Cotteleer, 19991). It streamlines data flows from the entire organization and allows manager’s direct access to real-time operations. For the past few years ERP has become a “must have” system for almost every business firms to improve their competence.

Panorama consulting group (2008 – 20142-8) provides an overview of ERP system implementation and also reviews the performance of ERP systems across the Global market.

There exists substantial literature on ERP. These literatures were grouped into:

- ICT in Textile Industries
- ERP System
- ERP Implementation
- ERP Success factors
- ERP Failure Analysis
- Case studies

2.2.1 ICT in Textile Industries

Emerging Information Technology, especially in mass communication facilitates an effective and efficient communication platform
between the Government and the Industries. Various e-governance applications, ERP applications, on-line video conferencing etc. boost up the functioning of the management to achieve efficiency in performing delivery of services. In order to utilize IT’s bloom, the Ministry of Textiles thrives new on-line applications like information dissemination through websites, fresh schemes and policies in areas such as modernization, technological upgradation, skill development, market / products expos and other trade promotional activities to compete in the global market. In order to ensure the quality of services with transparency, ubiquity, interactivity, customized support, securable supply chain management and global reach. The Ministry has also taken several new initiatives to provide high end ICT enabled platform.

2.2.2 ERP System

Substantial research in ERP has been published over the last few years. These studies covered a wide range of research issues pertaining to ERP systems. Some of these works identified technical issues with regard to architecture, data standards, configuration, hardware and software integration (e.g., Jordan and Krumwiede, 1999⁹ Markus and Tanis, 2000¹⁰ Olinger, 1998¹¹). Some researchers (Bingi et al., 1999;¹² Kumar and Hillegersberg, 2000;¹³ Griffithet al., 1999;¹⁴ Holland and Light, 1999;¹⁵ Hong and Kim, 2002;¹⁶ Verville and Halingten, 2002;¹⁷ Willcocks and Sykes, 2000¹⁸) investigated the critical factors such as top management support, adequate training, proper project management and communication for the successful implementation of ERP. Others studied the tactical issues such as process and organizational adaptation, measurement of the benefits, and resistance to change (Glass, 1998;¹⁹ Laughlin, 1999;²⁰ Motwani et al., 2002;²¹ Swan et al., 1999;²²).
Few studies were more concerned with strategic and cultural issues by involving the alignment of ERP implementation to products and processes (Bowersox et al., 1998; Davenport, 1998; Hammer and Stanton, 1999; Jacobs and Whybark, 2000; Soh et al., 2000). Hammer and Stanton (1999) related ERP with re-engineering, since ERP provided information that flows horizontally across the business. They argued that business firms should use ERP as an integrative mechanism to create a new style of management. Davenport (1998), Bowersox et al. (1998), and Jacobs and Whybark (2000) asserted that ERP was not only a software package, but also “a way of doing a smart business”.

2.2.3 ERP Implementation

Jacobs and Whybark (2000) expressed their concerns with ERP implementation. By using the furniture industry as a reference, they illustrated how ERP implementation could lead to disaster unless there were considerations for production processes and customer demands. They have suggested for the centralization of information and flexibility of production systems should be simultaneously considered as firms configure their ERP systems with multiple facilities.

Skinner (1974) first suggested that the choice of competitive priorities includes cost, quality, delivery, and flexibility. Other studies (Hill, 2000; Wheelwright and Bowen, 1996) have added various dimensions of competitive priorities such as service and innovation. Table 2.1 defines various competitive priorities that have been commonly adopted in the industry (Hayes and Wheelwright, 1984; Krajewski and Ritzman, 2001).
Table 2.1 Competitive priorities

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>Production and distribution of product or service at lowest cost</td>
</tr>
<tr>
<td>Quality</td>
<td>(a) High performance design: superior features, close tolerance and sustained durability</td>
</tr>
<tr>
<td></td>
<td>(b) Quality consistency: frequency of meeting the design specifications</td>
</tr>
<tr>
<td>Delivery</td>
<td>(a) Dependability: ability to meet delivery schedules or promises</td>
</tr>
<tr>
<td></td>
<td>(b) Speed: the ability to react quickly to customer orders</td>
</tr>
<tr>
<td>Flexibility</td>
<td>(a) Customization: the ability to satisfy the unique needs of customers by changing the product or service design</td>
</tr>
<tr>
<td></td>
<td>(b) Volume: the ability to operate profitably at varying production levels</td>
</tr>
</tbody>
</table>

Other possible decisions of implementation practices include process standardization (Bingi et al., 1999), package customization (Glass, 1998; Hong and Kim, 2002), degree of information sharing and centralization (Markus et al., 2000), accessibility to ERP information (Markus et al., 2000), and the degree of centralization (Markus et al., 2000). These are the practices believed to be critical for the success of implementation (Jacobs and Bendoly, 2003).
Knowledge Management strategy is defined as “A declaration of how the organization will use KM methods, tools, processes and practices to achieve the business objectives by leveraging its content, people and process and how KM will support the organization’s overall strategy” Leknes, John and Munkvold, BjørnErik (2011\textsuperscript{37}).

Richard L Nolan in the Harvard Business Review (2005\textsuperscript{38}) attributed the non-availability of dedicated workforce as one of the reasons for CISCO ERP implementation failure. Lack of commitment from the members drawn from various departments for the purpose of ERP implementation was one of the main reasons for the failure. Amin Amid, Morteza Moalagh and Ahad Zare Ravasan (2011\textsuperscript{39}) have described that organisations primarily focus on financial and technical aspects for ERP implementation and many fail to address the social factors and ascertained it as a Critical failure factor for ERP implementation.

Soh et al. (2000\textsuperscript{27}) studied ERP implementation practices in a hospital in Singapore and cautioned about the potential cultural incongruence in implementing ERP in Asia. Potential misfits could arise from areas including data format, operational procedures (e.g., billing and collection), and output format. Resolving such incompatibilities resulted in extra implementation time and expense. Specifically, this study is interested in discussing research questions such as:-

- Which ERP implementation practices are affected by competitive priorities? How and why it is affected?

- How should business firms align an ERP system with their competitive priorities?
• Are there factors other than the competitive priorities which affect ERP implementation?

2.2.4 ERP Success Factors

In the earlier studies serious attempts were made to identify the critical success factors in ERP implementations (Bingi, Sharma, and Godla (1999); Holland and Light (1999); Stefanou (1999); Sumner (1999); Hong and Kim (2002); Rajagopal (2002)). In a study on ERP implementation in China, the authors gave strong considerations for national cultural issues, since critical success factors may vary significantly depending upon the country where an implementation is carried-out (Shanks and Parr (2000)).

ERP implementations have also been investigated through case studies with varying degrees to describe critical success factors. These include the impact of ERP on job characteristics (Perez and Rojas 1999) strategic options open to firms beyond the implementation of common business systems (Holland (1999); Upton and McAfee (1997)) mean to avoid ERP project failures (Scott (1999)) issues of business alignment (Smethurst and Kawalek (1999) and Volkoff (1999)) business process re-engineering (BPR) (Slooten and Yap (1999)) and change management (Klaus and Rosemann and Gable (2000)).

Other studies have assessed the ambiguous role of large systems as both catalysts and inhibitors analyze the special challenges of ERP implementations outside the business world and described the global supply chain (Pawlowski and Boudreau (1999), Sieber and Nah (1999), Chatfield and Andersen(1998)). Flexible and responsive global supply chain is considered as crucial for a company to satisfy the end consumer
needs in different markets and to improve the integrated performance of the company in a time-bound competitive environment.

Implementing ERP with or without Business Process Re-engineering (BPR) has been surveyed and analyzed (Bernroider and Koch (1999^54)). Despite this increased experience and capability, changes required by ERP have often proved to be over-whelming in many organizations by resulting in ERP project failures (Maguire et al., 2010^55). The overall implementation failures and difficulties involved in ERP projects attracted much research interest (Liu and Seddon, 2009^56). This has resulted in substantial studies conducted on Critical Success Factors (CSF’s) for ERP implementation and overall project success.

Liaquat Hossain, Jon David Patrick and M.A. Rashid et al (2002^57) described success of ERP implementation is largely depends on the best fit to the functional requirements of the organisation and configuring the product to suit the organisational structure, strategy and culture. Rosío Alvarez (2002^58) described that organisations create a Myth that ERP takes care of the integration of various process of the Organizations by ensuring collaboration between specialized units or individuals.

Success of the ERP implementation is primarily determined by the system testing which ensures the critical data captured from the legacy system and integrate with the mapped processes of the organisations for the new system. Jonathan Gross (2011^59) insisted that testing should be carried-out in three phases namely,(i).The conference room Pilot Phase, where users perform test with frequently used business scenario;(ii). Departmental Pilot Phase, where users carryout test in more realistic conditions; (iii). Integrated Pilot Phase, where users test on day-in and day-out methods by integrating with other modules.
Mary Sumner, (2007) suggested “Best of Breed” approach for ERP implementation to the organisations which had wide range of operations and could not be covered by a single ERP vendor. According to Dave Russell (2013) Modern business data is stored in a common location processed and retrieved time and again. Security of this information stored is ensured by the backup options, thus resulting in huge storage space requirement for storing the redundant and duplicate information.

The literature has outlined some of these benefits that can be realised by an organisation has below:

- Improved co-ordination(Alsene, 2007);

- Quality check in day-to-day operations and significantly lowered the operational costs(Gupta et al.,2004);

- Improved performance on a variety of financial metrics, and higher market valuation (as measured by Tobin’s q) (Hitt et al., 2002);

- Reduced inventory cost and a related reduction in the cost of capital (Rikhardsson and Krcmmergaard,2006);

- Operational performance and continuous learning leads to continuous improvements in performance (Cotteleer and Bendoly, 2006);

- Enhancement in firm competency of supply chain management through operational process integration and customer relationship interaction(Su and Yang,2010);
• Efficient use of information leading to profitability (Bendoly et al., 2006); 

• A positive effect on the accounting process through:
  
  o Increased flexibility in information generation;
  
  o Increased integration in accounting application;
  
  o Improved quality of reports; and
  
  o Improved timely decision making and reliable accounting information (Spathis and Constantinides, 2004).

• ERP application helps to improve the business process by providing better visibility which enables better co-ordination. Thus, results in minimizing the error and also identifies and highlights potential threat and helps in resolving the issues well in time (MAS Active, the sports & leisurewear on the Fast React Evolve software revealed (2013)).

Kimberling (2011) and Ram et al. (2013) have enumerated many problems and evidences of failure factors of ERP in different domains and supports the need for further research to help and reduce the failure levels. Several explanations for the continued failures have been proposed. For instance, some researchers suggest that studies which have identified critical success factors (CSFs) for the implementation have failed to provide an understanding of how these CSFs for this stage may influence subsequent performance outcomes of an organisation (El Sawah et al., 2008; Liu and
Seddon, 2009\(^6\)). Other scholars even question the usefulness of CSFs (Hakkinen and Hilmola, 2008\(^{72}\); Liu and Seddon, 2009\(^{56}\)).

CHAOS (2012\(^{73}\)) revealed that 37\% of the ERP projects were successful in terms of Delivery in time, completion in line with budget provisions and delivered all features and functions. 21\% of these projects failed to take off and abandoned prior to completion. However 42\% of Projects failed to deliver the expected results, and could not complete the project in time due to over shooting of the budget allocation.

Bent F and Alexander B\(^{74}\) stated: There were 1471 project implementations examined for comparing their budgets and estimated performance benefits with actual cost and result. Out of these, 27\% of the projects had over run the project cost even upto two times of the cost projected. Panorama’s study (2010\(^4\)) reiterates that, 57\% of ERP implementations took longer than the expected time to the unrealistic expectations regarding timeframes.

### 2.2.5 Case Studies

Case studies conducted at Triburg (2008\(^{75}\)) revealed that Extended Enterprise solution, working on processes within the Triburg intranet and connecting with suppliers over the web sales order, the merchandiser sends the order and T&A to its vendor online which is received at the vendors factory on real time basis eliminating the time delay and to provide holistic view of the organisation by integrating the process of the vendors.
Similarly, Fast React Evolve software revealed (2013\textsuperscript{77}) (sports & leisurewear) that, the software besides providing better visibility, it enables better co-ordination by resulting in minimizing error and also identifies and highlights the potential threat and helps in resolving the issues well in time. Fast react software also improved the efficiency, reduced lead time and Work in Progress (WIP).

The study at Gokaldas Exports (GE) (2001\textsuperscript{77}) indicated that India is a single largest exporter with headquarters at Bangalore (India) and employs over 30,000 people across 38 factories of apparel and manufacturing products ranging from, men’s, ladies, and children’s wear. GE had a problem of ineffective control over its multi-location operations with lack of integrated IT systems.

BMW (SAP Case Study \textsuperscript{29}) needed an application that seamlessly integrated with the current SAP system without requiring any extra hardware or software. Newmerix Automate Change, which is built on the SAP platform, delivered on BMW’s SAP transport management requirements. It has successfully completed the implementation phase, four times faster than for a new payroll/time management project for a 200 transport effort, while at the same time reducing the number of resources required. The team has been able to standardize and automate the SAP transport management process and able to double the number of landscapes we manage without adding any additional resources.

2.2.6 ERP Failure Analysis

The top three reasons for the failure of IT-related projects, as cited by IT managers surveyed by Information Week, were poor planning or poor management (cited by 77%), change in business goals during the project
(75%), and lack of business management support (73%). As a result, most IT-related projects fall far short of their potential payback, and 26% are cancelled before the completion. Moreover many of the completed projects, the technology is deployed in a vacuum and users resisting to it (Ptak, Schragenheim 2000). Langenwalter claims that the percentage of ERP implementations that can be classified as, “failures” ranges from 40% to 60% or higher (Oden, Langenwalter, Lucier 1993). Ptak defines failure as an implementation which does not achieve the ROI identified in the project approval phase and finds that failure rates are in the range of 60–90% (Macharis et al 2004). Complexity in ERP implementation increased the curiosity among the researchers to conduct study on ERP failure. According to Davenport (1998), Langenwalter (2000), Ptak, Schragenheim (2000), McCaskey and Okrent, (1999), Minahan (1998), Oden, Langenwalter, Lucier, (1993), Volkoff, Sterling, Nelson, (1999), Macharis et al (2004) the reasons for ERP implementation is broadly classified into 10 categories:

1. Strategic goals are not clearly defined.
2. Top management is not committed to the system.
3. Implementation of project management is poor.
4. The organization is not committed to change.
5. A good implementing team is not selected.
6. Inadequate education and training results in users that are unable to run the system satisfactorily.
7. Data accuracy is not ensured.
8. Performance measures are not adopted to ensure for organizational changes.
9. Multi-site issues are not properly resolved.
10. Technical difficulties can lead to implementation failures.

Dependency on consultants, poor product and vendor selection led to a disaster which paved to bankruptcy in Fox Meyer Judy E. Scott (1997\textsuperscript{85}). Jonathan Gross, (2011\textsuperscript{59}) described 68% of companies implemented were destined to fail even before the ERP implementation has started, primarily owing poor Product selection.

Amin Amida et al. (2004\textsuperscript{39}) gave a new dimension as Critical Failure factors for ERP implementation strategy. ERP implementation results in Successful implementation, Partial Failure in implementation and complete failure and abandonment. Poor architectural design forced CISCO to close its doors as the legacy database crashed says Richard L Nolan (2005\textsuperscript{38}) .Owing poor product selection, Jonathan Gross, (2011\textsuperscript{59}) in his studies stated that 68% of the companies implemented were destined to fail even before the ERP implementation has started. Liaquat Hossain, Jon David Patrick and Rashidet al (2002\textsuperscript{57}) described the success of ERP implementation largely depends upon the best fit to the functional requirements of the organization.

The average ERP implementation duration is 19.8 months, with some difference based on the specific ERP software being implemented. Large companies take 25.2 months, and the average time taken for Implementation in Aerospace and Airlines industry is 28 months. The Average total cost of implementation is $8.5M. The average implementation cost for large organizations is $24.1M and in Aerospace and Airlines industry, the average implementation cost is even higher at $31.5M (Eric Kimberling, Panorama Consulting (ERP Report 2009\textsuperscript{3}).
ERP Report (2010\(^4\)) Panorama consulting says the average time taken for ERP implementation is 12.3 months; 35% of the implementation took longer than the expected period; 43% of implementation completed on time and 21.5% completed well in advance. 51.4% of projects implemented exceeded the budget projected and 40% of projects were completed as per the proposed budget. Interestingly 8.6% of projects were completed well with in the budget allocation. Key findings in ERP Report (2010\(^4\)) published by Panorama consulting stated barely 22.4% of customers were satisfied with ERP implementation, 49.8% were fairly satisfied. Many of the top companies realised less than 50% benefits in ERP implementation. 55% of the clients realised only 30% of the expected business results.

ERP Report (2010\(^4\)) of Panorama consulting revealed that significant number of implementations surveyed did not deliver anywhere near the anticipated benefit or value. 41% of companies surveyed failed to realize at least half of the business benefits they expected from their ERP systems, and 22% of implementations failed to deliver at least some measurable business benefits from their ERP solutions. In addition, over one in three companies (40%) realized the major operational disruptions after implementation go-live, such as the inability to ship products or to close the books. Finally, only 68% of executives and 61% of employees are somewhat satisfied with their ERP solutions.

Many of the projects over shot the budget provision and implementation time primarily due to the unrealistic expectations from ERP implementation and configuring the product to suit the organisational structure, strategy and culture (Eric Kimberling\(^7\)). The Web enabled Enterprise solutions extend its wings across various horizons such as supply chain management, customer relationship management, sales force automation (SFA), advanced planning and scheduling (APS), Business
intelligence (BI), and e-business capabilities. In fact ERP solutions are becoming the backbone for organizations for their online business operations. Rosío Alvarez (2002\textsuperscript{58}) described that the Myth making process drive organisations to experiment unproven, new, and expensive system as a tool to achieve integration. An organisation has the right to choose from a wide range of features available with various vendors and integrate the same to suit the organisations requirement Sumner. M, (2007\textsuperscript{60}).

2.3 PROJECTED TIME LINE AND BUDGET

Success factor is determined by project cost or time result of achieving implementation goals like integrating organizational information, better decision making, improving inter-organizational communications and decreasing operational bottlenecks according to Amin Amid et al. (2004\textsuperscript{39}). Eric Kimberling (2013\textsuperscript{7}) stated that the state of Massachusetts announced that the system integrator and internal project team could not deliver the expected business benefits defined and could not complete the implementation on time. Many of the projects over shot the budget provision and implementation time primarily due to the unrealistic expectations from ERP implementation.

2.4 HUMAN FACTORS

Change management, communication and stakeholder involvement are equally important to overcome the complex processes of ERP implementation. Effectiveness of the ERP implementation is measured by the effective knowledge transfer between the end users and the ERP implementation agency (client, vendor and Implementation partner) so as to support the business processes effectively. Kimberling in his organizational change management report (2013\textsuperscript{7}) stated that process of Knowledge
management including creating, organizing, storing and transferring knowledge related to core organizational processes. Knowledge transfer is the key element in successful ERP implementation. Knowledge management between Clients, Vendors, and Implementation partners has to be clearly drawn for favour of reduce the dependency levels of the client.

Further, Kimberling indicated the success of ERP Implementation is less of technology and more of people and processes. Change Management focuses on the employee transition to the new system which includes new processes, related training and Communication. Change Management primarily focuses on improving business processes for enhancing productivity and profitability to increase the business performance. According to Laknes J. Bjorn Eric (2011) activities involved in Change management are periodical status update to employee groups, customised training based on business processes and communication redesign the roles and responsibilities to review the impact analysis. Some of the potential challenges in implementation, according to Laknes J (2011) are unproven knowledge, a barren organizational context, acceptance to change, resistance to new systems and accountability. Lack of training, recipient motivation, absorption, and retentive capacity, Lack of vision, goals, inadequate resources, unrealistic time frames, unclear requirement definition and top management’s commitment could be the potential challenges in successful implementation with regard to change management.

Identify and eliminate the barriers in Knowledge transfer such as use of technical jargon, language, motivation etc. Knowledge Management is antecedent to the Enterprise system’s success. Role of KM include methods for creating, organizing, storing and transferring knowledge related to core processes of the organisation. The key element for successful implementation is Knowledge transfer between the Knowledge owners. ERP
implementation requires certain amount of hand holding. But the end user has to operate the system beyond go live. Knowledge management between Vendor / Implementation partner and the End user has to be clearly drawn inorder to reduce the dependency levels of the client.

2.5 ERP IN THE APPAREL INDUSTRY

Major departments in the apparel industry are as follows:

- Design Development
- Marketing and Merchandising
- Production (Production Planning - Manufacturing)
- Finishing (Quality Assurance)
- Logistics – Purchase – Stores (Supply Chain)
- Maintenance
- Human Resources
- Finance
- Customer Relations

Garment manufacturing process is broadly classified into three processes as follows:-

1. Garment manufacturing process
2. Cutting room process
3. Garment finishing process
2.5.1 Garment Manufacturing Process

Garment manufacturing process commences with receipt of order confirmation from the buyer. Number of activities takes place prior to the commencement of production which includes sample fit approval, material requirement planning and raw material sourcing. Once the sample fit is approved, pre-production planning meeting is organised for the stakeholders to finalise the production schedule. Raw materials such as fabrics, trims and accessories are checked for quality, compliance, and specifications. As per the production schedule fabric is moved into the cutting department. In order to optimise the fabric consumption, the fabric is spread on the table and cut into pieces by using the lay marker prepared. These cut pieces are moved into an assembly line in the manufacturing facility and are assembled to make the garment. These assembled pieces are then checked for quality and specifications provided by the buyer and packed in the boxes in the ratios specified. These boxes are moved into the warehouse and then shipped to the customers.

The chart depicting the work flow in garment manufacturing is shown in Fig. 2.1.
2.5.2 Cutting Room Process

Approved patterns for each style is provided to the cutting department which maintains these patterns as manual patterns are stored in the computers by using one of the Computer Aided Design (CAD) software available in the market such as Lectra, Gerber, REACH CAD, Tuka CAD etc. These CAD software’s enable to create new styles, analyse the fit, grade
the patterns for various sizes and finally to create lay marker to optimise the fabric consumption. Automatic marker planning option is a key tool in the fabric optimisation which helps to optimise fabric upto 95%. As Fabric is the primary raw material, every centimetre saved increases the profit margin and each garment manufacturing unit focus on this. In an automated process the fabric automatically spread on the table in layers and the cutting machine automatically cuts the patterns as per the lay marker created by using CAD software. Then these cut patterns are checked and marked with stickers sorted and bundled before the assembling process. Work flow in the cutting room process is depicted in Fig. 2.2.

![Cutting Room Process Flow Chart](source: onlineclothingstudy.com)

**Figure 2.2 Cutting Room Process Flow Chart**

*Source : onlineclothingstudy.com*

### 2.5.3 Garment Finishing Process

Garment finishing process is a crucial process as it determines the fate of the manufacturing process. Removing threads, pressing the garment, checking the garment, rectifying the mistakes repairing, placing various tags,
ironing, folding, packing and placing them in cartons after final inspection are the list of activities carried-out in the finishing department. Any deviation in the specifications results in cancellation of the entire order; Thus function of garment finishing process is critical for the success of the organisation. The workflow in Garment Finishing Process is shown in Fig. 2.3.

Figure 2.3 Garment Finishing Process

*Source : onlineclothingsudy.com*
2.5.4 Software in the Apparel Industry Sector

Today, numerous ERP packages are available in the commercial market. Some of these ERP packages are domain specific. List of ERP packages which are used in the Apparel industries are listed in table 2.1 along with the trade mark.

**Table 2.2 List of major ERP packages used in Apparel Industries**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>ERP Software</th>
<th>Logo</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Buyer Ease</td>
<td><img src="image" alt="BuyerEase Logo" /></td>
</tr>
<tr>
<td>2</td>
<td>Data tex</td>
<td><img src="image" alt="DataTex Logo" /></td>
</tr>
<tr>
<td>3</td>
<td>Fast React</td>
<td><img src="image" alt="FastReact Logo" /></td>
</tr>
<tr>
<td>4</td>
<td>Microsoft Navision / Dynamics from Microsoft</td>
<td><img src="image" alt="Microsoft Dynamics Logo" /></td>
</tr>
<tr>
<td>5</td>
<td>REACH ERP</td>
<td><img src="image" alt="REACH Technologies Logo" /></td>
</tr>
<tr>
<td>6</td>
<td>SAP Apparel Footwear and Solution</td>
<td><img src="image" alt="SAP Logo" /></td>
</tr>
<tr>
<td>7</td>
<td>Simparel</td>
<td><img src="image" alt="Simparel Logo" /></td>
</tr>
<tr>
<td>8</td>
<td>Stage</td>
<td><img src="image" alt="Stage Logo" /></td>
</tr>
<tr>
<td>9</td>
<td>Visual Gems</td>
<td><img src="image" alt="VisualGems Logo" /></td>
</tr>
<tr>
<td>10</td>
<td>World Fashion Exchange</td>
<td><img src="image" alt="WFX Logo" /></td>
</tr>
</tbody>
</table>
2.6 PROCESS MAPPING IN ERP SOFTWARE

➢ Reach ERP Process Map

REACH ERP\(^96\) software integrates various processes such as merchandising, purchase, stores, production, logistics, and customer management. Other features include supplier manager, profile of the company, customers and users.

➢ Reach Planner and Schedule process

Processes covered in REACH planner\(^96\) and scheduler are company information processes related to order management, scheduling and configuring the manufacturing in addition to various reports and analytics on the manufacturing processes.

➢ REACH design management

REACH design management\(^96\) provides edge to an organisation in design research which is vital for the retail industries. Features include market / consumer research, all design processes including moodboard development, colour story, collection management, order details tech pack, costing surface ornamentation, sewing, size specification, vendor management and Time and Action (TNA) tracking which is critical for product life cycle management.

➢ Stage ERP – System Flow

Stage ERP\(^97\) is one of the widely used ERP software in Indian Apparel Industry primarily due to its product features, easy adaptability and pricing. Modules which are available in Stage ERP are order management, costing, production planning, purchase, inventory, documentation, Time and Action
plan, accounts, payroll, sampling and analytics in addition to module for retail industries.

➢ **Stage ERP - PROMAN system flow**

PROMAN\(^97\) is production management software from Stage which monitors various activities of manufacturing include production planning to Garment Finishing by integrating various departments in the garment industries. This software ensures profitability, enhances productivity, reduces production overheads and improves better deliverables and quality.

➢ **World Fashion Exchange (WFX) – Solution**

World Fashion Exchange\(^98\) is also known as WFX in the apparel industry focuses purely on the fashion industry. WFX has a comprehensive solution for the apparel industry which include Specifications such as Bank, sampling, order management, Bill of Materials (BOM), Purchase Order Repository with electronic monitoring, Inventory and Warehouse Management, Procurement Monitoring, Production Planning, Production and Import Management, Collaborative Time & Action (TNA) Calendars, Flexible Reporting, Integrates with WFX Financial Accounting and so on. WFX provides a comprehensive cloud solution.

➢ **World fashion exchange – product data management**

Product data management\(^98\) software manages all products related data such as all style information, fabric &trim library, style versioning, change, Bill of Material (BOM), costing, online product in a centralized location. product data management covers Tech Packs, approvals, sample requests, Time and Action (TNA), messaging and documentation.
➢ Data Tex Now Structure

Datatex⁹⁹ product footprint covers the entire textile industry stating from fibre, spinning, warping, weaving, knitting, tufting, dyeing and finishing, printing and garment manufacturing. In the garment manufacturing part Data tex has features for style management, material management, sales and distribution, production planning, production management, costing, quality, finance and controlling, HR and Payroll. In the some of the clients Data Tex ruins with SAP accounting for financial and Indian textile payroll module for Payroll as bolt on model.

➢ SAP Apparel and Footwear Solution

SAP Apparel⁹⁵ and Footwear Solution is known as AFS in the industry. AFS has its presence in retail and buying house sector of the garment manufacturing known for its strength in finance, human resources, supply chain and customer relationship modules. Customer centric marketing, merchandising, sourcing, and buying take care of the entire life cycle.

➢ Microsoft Dynamics – Solution Architecture

Microsoft Dynamics¹⁰⁰ too has a primary focus in the retail industry. Features include retail channel integration, Flexible Point of Sale (POS), merchandising, store management, supply chain management, order management, replenishment and e-commerce management.
FAST REACT

FAST REACT has 3 products for the apparel industries namely, Vision to cater the retail industry, Evolve to cater the fashion manufacturers and Aligh to cater the textile manufacturers. Evolve has a futuristic visual capacity planning and management tool. This tool was developed specifically to enable the manufacturers of garments, footwear and accessories to achieve a complete visibility at a new level, efficiency and control. The easy to use drag and drop approach allows fast and accurate planning of manufacturing lines, machines, and supporting processes including subcontractors. Features include multiple factory, multiple lines definition, defining efficiency profiles and start-up allowances at product changeover dynamic scheduling etc. Evolve brings together the essential elements of capacity, critical path (time and action) and materials into a single solution, which can also be linked to other business systems.

Buyer Ease

Buyer Ease is a web based software; it provides comprehensive solution to buying houses, sourcing agencies, liaison offices, retailers and exporters. The software covers features such as product catalogue [Library]; product development and sampling; pre-production approvals; production tracking & monitoring; shipment, traffic, and logistics. In-addition to the above the software has features such as Customer Relationship Management (CRM), quality inspection and compliance audit in addition to automated Time and action (TNA) activity calendar and critical path management.
Simparel Unified Global ERP Solution

Simparel’s Unified Global ERP Solution is built for the specific needs of the industry, with all processes under one combined platform. Simparel is designed to accommodate both small and large size fashion, apparel, footwear, accessories and textile companies with a special focus on wholesalers, manufacturers, and self-sourcing retailers. Combining the next-generation enterprise resource planning (ERP) with real-time business process management competences from design through development, sourcing, manufacturing, distribution and sales, Simparel further supports to simplify design and product development, streamline sourcing and sample management and automate sales, which helps in reducing cycle times and get the products to market more quickly.

Simparel is an industry-specific apparel ERP solution, which is said to be a unified model that comprehends all the business processes that go into the apparel manufacturing process, which include Product Lifecycle Management (PLM), Supply Chain Management (SCM), Warehouse Management (WMS), Enterprise Resource Planning (ERP), Electronic Data Interchange (EDI), Manufacturing and Material Resources Planning (MRP), Financial Management (FIN) and Business to Business Collaboration (B2B).

Visual Gems

Visual GEMS is end-to-end integrated Enterprise Resource Planning software, which is specially designed for the garment manufacturing and export industries. Visual gems has standard modules that integrates the various processes of the apparel industries which include Export order management, purchase management, inventory management, production management, shipment management, sampling management, advanced production planning, factory management system, HR and payroll
are also provided as additional modules. Early warning TNA, visual reports and alerts are the key features added in the recent times.

2.7 ISSUES IN EXISTING ERP SYSTEMS IN APPAREL INDUSTRY

Based on the review it was found that the Apparel industry faces lot of issues relating to ERP implementation. ERP implementation involves huge financial investment, participation from various departments, use of various resources and quality time. Some of the major problems encountered by apparel industry are

a. Project cost overrun
b. Project Delays
c. Conflict with business strategy
d. Employee resistance
e. Conflict with Vendors and consultants
f. Product and Vendor selection
g. Internal technical expertise.

2.8 SUMMARY

In this chapter, an extensive review of literature under various heads related to ERP system, ERP implementation, ERP success factors and implementation related case studies, ERP failure analysis, human factors in ERP implementation, garment manufacturing processes and change management. In order to fulfill the primary objective of this research, it has been further reviewed various ERP applications and the modules used in the apparel industries. Further, the collected literatures were reviewed on the basis of best practices used in the industry so as to provide appropriate guidelines for ERP implementation in the apparel industries. Based on the review, the main objective of the research and the sub-objectives as well are perfected and presented in Chapter 3.