CHAPTER 2
CHAPTER – 2
LITERATURE REVIEW

Studies on Enterprise Resource Planning have been done in last few years. Most of the papers on ERP have appeared after year 1995. While concept of ERP is very attractive for manufacturing organizations, the organizations have realized that while the potential benefits of ERP implementation are significant, there are failure stories too. This chapter attempts at critically reviewing the existing related literature. It traces the genesis of ERP concept, different surveys, selection process, implementation procedure, evaluation techniques, research work in related area, ERP in Indian context, future ERP extension followed by limitations of the existing work and need of the present study.

2.1 ERP: CONCEPTS, EVOLUTION AND STATUS

In order to understand why industries are implementing ERP systems, it is useful first to comprehend the evolution of it. The Enterprise Resource Planning applications we see today can be traced back to and have evolved from Materials Requirement Planning (MRP) and Manufacturing Resource Planning (MRPII) systems. The Gartner Group is credited for coining the term “Enterprise Resource Planning”, for a concept they developed in the 1990s for the next generation Manufacturing Resource Planning (MRPII) systems (Dahlen and Elfsson, 1999; Keller, E.L., 1999). Russell and Taylor (1995) define ERP as an updated MRPII with relational database management, graphical user interface and client server architecture. The initial definition of ERP was targeted at manufacturing companies. But being a framework of integrated application suites that unites major business processes, the use of the term ERP has expanded. Watson and Schneider (1999) describe Enterprise Resource Planning (ERP) as a generic term for an integrated enterprise computing system. They define it as an integrated, customized, packaged software-based system that handles the majority of an enterprise’s system requirements in all functional areas such as finance, human resources, manufacturing, sales and marketing. It has a software architecture that facilitates the flow of information among all functions within an enterprise. It sits on a common database and is supported by a single development environment (Joshi and Lauer, 1999; Kumar and Hillegersberg, 2000). According to Jacobs and Bendoly (2003), ERP is a strategic concept rather than simply
Information system. They represent corporate infrastructure which impacts business decisions.

Before ERP came into existence, different departments had their own software system to meet their requirements. This resulted in a fragmentation of information, as all of the information was stored separately on different systems in business units, factories etc sometimes spread across the world. This made it impossible to get accurate information on time. In 1990s, globalization led to immense competition and companies, especially in the manufacturing sector, realized the need for more customer focus and shortened product life cycles. Corporations had to move towards agile manufacturing, continuous improvement of business processes and business process reengineering. This required an integration of manufacturing with other functional areas like accounting, marketing, HR, etc. This led to the evolution of MRPII to ERP systems (Sadagopan, 1999).

The reference book of Jacobs and Whybark (2001) gave an excellent treatise on ERP. Some of the important issues highlighted by them are:

• ERP leads to information integration for the various functions of the business like accounts, Finance, Marketing, Sales, Production, Vendors, and Distribution etc. It provides the benefit of single data entry, immediate access, and common data. Data are updated in real time.
• Prevailing Business processes are replaced by best practices.
• Organizations with multi-plants located all around the globe are benefited the most.
• Resources are put to better and more efficient use.
• ‘Roles’ of some people changed significantly due to ERP. This brings in resistance to change, which needs to be handled properly.
• Do not implement everything on ERP, most critical areas where information integration is essential, could be put on ERP first.

Today an ERP system is considered as the price of entry for running a business and for being connected to other businesses, which allows for business-to-business electronic commerce (Boykin, 2001).

Theoretically the benefits of ERP in any organization according to Garg et al. (2006) are beyond doubt. Some of them are reduced Planning cycle time, reduced manufacturing cycle time, reduced inventory, reduced error in ordering, reduced
requirement of manpower, enables faster response to changing market situations, better utilization of resources, etc.

2.2 ERP SURVEYS IN THE INDUSTRIES

Different surveys were conducted in different countries to know the status of ERP implementation and some conclusions are derived from it. In the first survey in European mid size firms conducted by Van Everdingen et al. (1998), it was found that average ERP penetration level was 33% and predicted then to be 55% by the year 2000. They also found differences in adoption between countries and industry types. The Scandinavian countries and the Netherlands were far ahead in adopting ERP compared to other EU countries. According to them, it was due to cultural differences where Scandinavia and the Netherlands are characterized by innovation and a strong desire for novelty and variety. Among industries, electronics was high, while process industry was lagging.

The survey of US manufacturing sector, done by Vincent Mabert et al. (2000), reported an adoption level of 44% in both large and small firms, being SAP as leader in the U.S. market. The key findings of their survey in small as well as large manufacturing companies were that the benefits were differing by company size. Larger companies reported improvements in financial measures whereas smaller companies reported better performance in manufacturing and logistics. They found in their subsequent case studies (Vincent Mabert et al. 2003) that ERP systems have experienced a phenomenal growth in last five years. The case firms were found benefited with quickened information response time and increased interaction across the enterprise. Their results indicated that pre-implementation planning to system configuration influence performance.

Some interesting findings of a survey done few years later by Jan Olhager and Erik Selldin (2003) on implementation of ERP systems in Swedish manufacturing firms are: a) Swedish manufacturing firms are broadly adopting ERP systems (83.6% penetration) b) The cost for implementing ERP systems range from an average of 0.5% of annual revenues for large enterprises up to an average of 3.5% for smaller companies. c) Swedish firms often choose to implement ERP systems from Swedish vendors. d) The most cited improvements related to ERP systems are concerned with information access and improved intra-organizational interaction.

ERP survey conducted in the developed country like Korea by Moon (2006) revealed that ERP penetration in their firms is growing at very high rate and nearly 85.5% of
firms have implemented ERP. The different methodologies have been adopted to implement ERP system in different firms. Mixed results on cost of ERP system and attaining predetermined goals were found among those industries. He found that decreased financial close cycle was highly rated benefit of ERP systems in Korean manufacturing companies. In this survey ‘simplify and standardize systems’ and ‘replace legacy systems’ were found as most important motivations for implementing ERP.

No such surveys were found in developing economies like India and China.

2.3 SELECTION PROCESS OF ERP SYSTEM

There are different criteria adopted by different industries for selecting the ERP software. Many companies have chosen global vendors while few went for local vendors. Few companies have developed in-house software too. There are different criteria followed by different companies while choosing the software system. Few cases have reported here.

Marlene Piturro (1999) found the strategy of deciding which enterprise resource planning software is right for the company. As the choice of Enterprise Resource Planning software can be a make or break decision for a company it must determine whether it will be more comfortable with a direct purchase from a vendor or an indirect one through a Value Added Reseller (VAR). ERP suites always need customization to fit a particular business.

According to Teltumbade (2000), the evaluation methodologies relying on financial cost benefits utterly fail to apply, as most of the factors dealing with cost as well as benefits defy attempts at quantification. Conventional methodology, which reckoned cost displacement as the only benefit, has proved inadequate for modern IT projects that have decreasing scope for cost displacement and an increasing focus on effectiveness objectives. A wrong ERP software selection would certainly have a lasting adverse impact on the business performance. Effectiveness is a multidimensional attribute and is not amenable to easy quantification. His evaluations Criteria were (i) Strategy-fit (ii) Technology (iii) Change Management (iv) Risk factors (v) Implementation ability (vi) Business functionality (vii) Vendor credentials (viii) Flexibility (ix) Cost (x) Benefits.

Glen B. Alleman (2002) showed that the selection, procurement, and deployment of an Enterprise Resource Planning system are fraught with risk in exchange for significant business and financial rewards. In many cases the packaged ERP product
does not provide the entire solution for the business process. These gaps can be closed with third party products or by customizing existing products.

R. P. Sundarraj and Srinivas (2003) investigated that Component-based systems are emerging information technologies that can help resolve the dilemma of choosing between a protracted implementation of a traditional, single-vendor enterprise system and the problems of working with an uncoordinated supply chain.

Wenhong Luo and Diane M. Strong (2004) identified that a key issue in enterprise resource planning implementation is how to find a match between the ERP system and an organization’s business processes.

2.4 ERP IMPLEMENTATION

After ERP system selection, implementation procedures are the important tasks and some selection process to choose the ERP system and their implementation procedure was recommended by Umbale E.J., et al. (2003) among the competitive ones. The most prominent implementation success factors as identified by them were as follows: (i) Clear-cut understanding of strategic goals, (ii) Commitment by top management, (iii) Excellent project management, (iv) Organizational change management, (v) A great implementation team, (vi) Data accuracy, (vii) Extensive education and training, (viii) Focused performance measures and (ix) Multi-site issues.

The findings from the research of Toni and Klara (2003) indicated that the extent of Business Process Reengineering (BPR), competitive strategy, adequacy of end-user training, role of steering committee, package functionality, integration of IT are important determinants of managements perceptions for ERP system benefits.

Ash and Burn (2003) found that successful implementation of ERP projects requires attention to both technical and social dimensions and their interaction within an environment of change managed.

In the work of Frédéric ADAM et al. (2003), they investigated whether traditional project management techniques are, in fact, unsuitable for ERP projects and whether the problems encountered in ERP implementations could be alleviated by using more suited approaches. All nine knowledge areas of project management are required to apply for ERP project implementation to make it successful.

Joe Nandhakumar et al. (2005) in their studies argued that any approach to managing such a project should take into account: the need for customization and
improvisation to accommodate revised goals in response to affordance of the system; and the need to take advantage of emerging capabilities and opportunities.

**Malhotra and Temponi (2010)** identified the need to adopt ERP for small business to maintain control of their operations and to compete globally. The best practices for the critical decisions while implementing ERP as project team structure, implementation strategy and database conversion strategy, transition technique, risk management strategy and change management strategy.

### 2.5 EVALUATION TECHNIQUES

The companies are always adopting the newer and newer techniques to progress and stay in competitive market. There are evaluation mechanisms exist to measure the performance of these techniques. Few such evaluations techniques appeared in literature are discussed here

- **Brynjjolfsson et al. (1998)** emphasized that productivity measurement of IT investment is very difficult as it involves various factors. The intangible benefits are more than tangible benefits and the tangible benefits are also difficult to measure. Hence Return on Investment (ROI) can not be the criteria for its measurement.

- **Roseman Michael and Weise (1999)** in their ongoing work suggested the Balanced Scorecard approach for evaluating ERP systems: a framework comprised of financial, internal processes, customer, and innovation and learning criteria.

- **Andreas (2004)** has examined the process of system review during post implementation stage and realized that there exist the relation between the degree of quality of post implementation review and extent to which organization attains desirable system outcome.

- **Vale’rie and Pierre-Alain (2005)** emphasized the optimization (or efficient use) of information systems like ERP in order to reach their performance objectives as many companies have invested considerable resources in the implementation of ERP systems.

- **Albert Y.T. Sun et al. (2005)** addressed a framework for assessment of ERP system implementation and proposed structured approach to help small manufacturing enterprise identify the key requirements and measurements that determine its achievement of ERP implementation. Their study indicated that many ERP implemented firms fail to achieve their goals in terms of its utilization and overall expected improvement.
According to the survey of Donald et al. (2005), there is no analytical framework for assessing the organizational benefits of ERP systems. The existing evaluations studies have limitations in one or the other area.

2.6 EVALUATIONS OF OTHER ADVANCED MANUFACTURING TECHNIQUES

The organizations are implementing new techniques anticipating improvement in productivity, cost saving to stay in competitive market. No all such systems suit to all organizations. Once newer system is matured, its post implementation review is must which gives feedback to continue with the system or discontinue it or some research in it. Here are some cases of evaluations of systems prior to ERP implementation.

Upton (1995) stated that implementation of Computerized Integrated Manufacturing System (CIMS: another I/T Software) makes factories inflexible. New requirements come up each time and software is really not equipped to handle such requirements, thus making it inflexible. Before ERP, industries have enjoyed the benefits of MRP in inventory turnover, delivery performance, and other benefits (Roger G. Schroeder, 1981).

2.7 EVALUATIONS OF ERP SYSTEMS

As ERP is widely used in the organizations and every year investment in it is increasing tremendously. Small and medium enterprises are also attracted towards it. There are mixed results of ERP implementation. The literature on ERP evaluation is discussed here.

The case studies are longitudinal in nature and detailed discussions on one attribute are possible from different key persons of the same company. Palaniswamy and Frank (2000) used case analysis in five manufacturing firms to investigate the enhanced manufacturing performance of ERP systems. They found that these companies all benefit from the better cross-functional integration. Even though the systems of these five companies chosen were different, they all enhanced the manufacturing performance. The significant performance improvements were in ‘reduction in inventory’, ‘coordination amount various functions’, and ‘information diffusion’.

There is also evidence indicating the numerous tangible and intangible benefits of ERPs. They reduce costs by improving efficiencies through computerization; enhance
decision-making by providing accurate and timely enterprise-wide information (Robin Poston, 2001).

A study of Siew Kien Sia et al. (2002), explored ERP as technology of power. It tightens management control by bringing a new level of visibility to organizational activities.

A study in a large aircraft manufacturing organization in the Midwest, USA done by Sue Abdinnour et al. (2003), has found that the job tenure and job type of an employee influences the attitudes towards ERP system. Newer employees and managers have a more favorable attitude towards ERP system.

Kumar S. (2003) in his doctoral study found that with ERP implementation, managers became more ‘task oriented’ than ‘human relation oriented’. The job of the manager is improved. It was found that average percentage of the time, managers spend in implementation work (chasing people, data acquisition etc.) has reduced for all management levels. It was found that average percentage of time spent on planning activities or strategy formulation, giving guidance to sub-ordinates has increased for all management levels.

Henk A. Akkermans et al. (2003) identified that the successful ERP implementations lead to further integration of activities between suppliers and customers across the entire supply chain and hence needs more flexibility in the system.

Mandal and Gunasekaran (2003) also concluded that ERP system can provide significant improvements in efficiency across the company, but only when implemented correctly. Otherwise, an ERP system could be a curse and drag the whole enterprise into spiraling inefficiency. The planning for ERP systems and their implementation requires an integrated approach to meet the requirements of various functional areas. They conducted case study regarding ERP Implementation in Water Corporation and revealed that some of the intricacies during planning and implementation stages may result in poor utilization of ERP systems.

Majed Al-Mashari et al. (2003) have presented that ERP benefits are realized when a tight link is established between implementation approach and business-wide performance measures. They confirmed that ERP systems can yield a wide array of benefits that are of tangible and intangible nature.
According to Daniel (2004) ERP is benefited to most of the organizations in reducing inventory, reducing manpower, improving productivity, increase in revenue/profit, on time delivery and many more intangible benefits.

Claire Berchet and Georges Habchi (2005) proposed that even if it is not very easy to measure the return on investment (ROI) of such a project, the implementation and deployment of ERP was considered a huge success and a major advance for the company in the area of information management.

Eric Wang et al. (2005) emphasized the importance of leadership style and team cohesiveness as key factors to the success of ERP compared to other factors such as top management commitment, change management, etc.

Kelvin et al. (2007) found evidence of improvements in profitability but not in stock returns of ERP implementation. The results for improvements in profitability were stronger in the case of early adopters of ERP systems. Adopters of Supply Chain Management (SCM) system experienced positive stock returns as well as improvements in profitability. There was no evidence of improvements in stock returns or profitability for firms that have invested in Customer Relation Management (CRM).

Despite the wide spread popularity of ERP, not all organizations are aggressively adopting ERP systems. Some have adopted certain stand alone or partially integrated functional modules, while some organizations have even discontinued implementing or using ERP systems after adoption (Bingi, 1999).

According to Cliffe (1999), 65% of executives believe that ERP systems could be harmful, this perception being buttressed by specific examples of how poorly implemented ERP systems have contributed to the bankruptcy of companies (Appleton, 1997).

The result of implementing ERP in an organization does not, however always prove successful. Many large organizations have installed an ERP system but had to abandon their implementation (soh et al. 2000).

There are many failures even for large firms that have the resources needed to perform a careful planning and implementation (Bingi et al. 1999; Hayes et al. 2001; Mandal and Gunasekaran, 2003).

Joseph and Sunderraj (2003) found that at a time when many companies are embarking on ERP implementations, despite the belief among CEOs that though 80% of the larger industries implemented ERP, approximately one-third of such systems
are said to be failures, there was also evidence indicating the numerous tangible and intangible benefits of ERPs. The ERP implementation is a complex and huge cost involvement.

**Yahaya Yusuf et al. (2004)** in their research work have stated that principal reason for unsuccessful implementation of ERP was due to poor management of the implementation process. They examined the key dimension of implementation of ERP system with a large manufacturing organization and identified the core issues to confront in successful implementation of enterprise information system.

**Eric T.G.Wang et al. (2006)** in their study assessed that the Enterprise Resource Planning systems possesses unique difficulty in implementation. In the system, one has to typically involve changes to the entire organization and is a novel application for the organization. These characteristics add to the importance of making groups more cohesive in their goals, commitment and ability to work toward completion of the new system project. Such cohesiveness is built partly through the willingness of the team members to participate and commitment to learning the new system.

**Jen-Her Wu et al. (2006)** in another paper on ERP evaluation emphasized the ultimate users view. Many large organizations have installed an ERP system but had to abandon their implementation. In spite of the problems, small and medium size companies are now also starting to embrace ERP. However, because of the complexity of system implementation, the effort may be expensive. Therefore, top managers are likely to require an evaluation of the success of the resulting system. They used User Satisfaction as the criteria to measure ERP success.

Difficulties and high failure rate in implementing ERP systems have been widely cited in the literature. Before 2000, about 90% of the ERP implementations were late or over budget and the ERP implementation success rate was only about 33% (Liping, 2009).

**Thomas Davenport (1998)** made the industries alert that there are benefits as well as failure stories of ERP system. When ERP systems are fully realized in a business organization, they can yield many benefits like reduced cycle time, enable faster information transactions, facilitate better financial management, and lay groundwork for e-commerce. When considering and implementing an enterprise system, managers need to be careful that their enthusiasm about the benefits does not blind them to the hazards.
Kennerley and Neely (1998) found in their case company that in the beginning of implementation, users were frustrated with their system. With 8 months later, these users began to see the improvement on sales performance. They suggested that more and more learning could improve the system performance.

Christopher P. Holland and Ben Light (1999) reported mixed results concerning the outcome of the ERP projects. Successful ERP projects are publicized but less successful many projects have led to bankruptcy proceedings and litigation against IT suppliers. They reported approximately 90% of ERP implementations are late or over budgeted.

Jen-her Wu et al. (2002) has tried to analyze the different questions that arose from ERP implementation. They emphasized that there should be a mechanism for determining whether the ERP is needed, and once implemented, whether it is successful. They have studied ‘user satisfaction’ as one of the evaluation mechanism for determining system success. Their results showed several areas of low ERP satisfaction among key users and end users.

Vincent A. Mabert et al. (2003) studied both the companies who have successfully implementations while others who have struggled. They have empirically investigated and identified key differences in the approaches used by companies that managed their implementations on time and/or on/under-budget versus the ones that did not, using data collected through a survey of US manufacturing companies that have implemented ERP systems. Their results indicate that many different factors ranging from pre-implementation planning to system configuration influence performance, which managers should be sensitive about when implementing ERP.

Qing Hu and Derrick Huang (2005) stated that high levels of investment in IT and related products and services over the last two decades have produced only mixed results. They argued that traditional financial accounting measures, such as return on investments, can only give limited or even misleading signals for competitive business activities, because they are lagging indicators of business health.

2.8 ERP IN SMEs

ERP is now not restricted to big giants only, but attracted towards Small and Medium enterprises. The big giants are forcing their SME suppliers to have ERP in their place. Many report successful implementation (Markus and Tanis, 2000).
Levy et al. (2000) discussed the role of information system in SMEs. They argued that IS role in enabling competitive advantage is to lower cost, build barriers to entry and tie in customers and suppliers.

Shehab et al. (2004) found that many multinationals restrict their business to only those companies that use the same ERP as them. As SMEs have MNCs as their clients, they have to consider ERP systems as a requirement to allow for tighter integration with their larger counterparts.

In spite of ERP failures, Small and Medium Enterprises are witnessing increased pressure to improve efficiency, productivity, and competitiveness. Moreover, since some of the SMEs are working closely with large global enterprises, they are forced to adopt streamlined automated operations. The automation of the processes would enable them best to conduct business as part of an extended enterprise of large companies (Jacobson, 2007).

In the study of ERP implementations specific to Belgian SMEs (Claude Doom et al., 2010), they examined the critical success factors of ERP implementations through survey and multiple case studies. Their result showed that there is no distinct difference between the factors applicable to SMEs and large companies found in literature. They however found that SMEs tend to rely relatively heavily on the input of consultants, who they use as a source of knowledge and experience. They concluded that SMEs need to be able to adjust their businesses quickly to be able to exploit their niche to the fullest extent.

Therefore, the assessment of ERP performance or benefits in ERP adopted companies is always an important challenge for decision makers and practitioners.

2.9 CRITICAL FACTORS STUDIES

The various studies on critical factors, which decide the success and failure of the ERP system, are also reviewed.

Christopher Holland (1999), T. R. Bhatti (2005) and Jiang Yingjie (2005) identified numerous Critical Factors (CF) which contribute to the ERP success or failure. Top management support and a clear business vision have critical influence on the implementation process and outcome.

In terms of problems encountered in ERP implementations, researchers report technical factors, substantial cost and time overruns, organizational problems including employee resistance to change etc (Nah et al. 2001). The unrealistic
expectations and Return On Investment (ROI) too leads to ERP implementation failure. Inadequate training and education too plays a significant role in the success or failure of ERP implementation (Toni Somers and Nelson, 2003). Sometimes companies skip important implementation steps like documentation, redefining and integrating processes before the final go live which too is damaging for the success of the ERP implementation (Kumar, 2000).

E.W.T. Ngai et al. (2008) in their work investigated the Critical Success Factors (CSFs) in the implementation of ERP across ten different countries/regions. The eighteen CSFs were identified. In these eighteen CSFs, ‘top management support’ and ‘training and education’ were the most frequently cited critical factors to the successful implementation of ERP system.

2.10 EXTENDED ERP
After 2005, new strategies for ERP have evolved leading to ERP-II which is called as extended ERP. Gartner group defines ERP-II as a transformation of ERP into next generation enterprise systems. It is essentially componentized ERP, e-business and collaboration in the supply chain. Möller (2005) defined four layers of generic application architecture for extended ERPII: the core components: the foundation layer; the central component: the process layer; the corporate components: the analytical layer; and the collaborative components: the e-business layer.

The second wave of ERP, ERPII or extended ERP, offers new functions and new ways of configuring systems, as well as web-based technology to establish the integrated, extended business enterprise (Shanks et al. 2003). Mabert et al. (2000) and Olhager and Selldin (2003) identified several areas for extending the ERP system. These include tying your customers to your ERP system, tying your suppliers to your ERP system, e-business or e-commerce, supply chain management, advanced planning and scheduling, customer relationship management and business intelligence capabilities, as well as data warehousing.

2.11 ERP IN INDIAN CONTEXT
 Though ERP became more popular in developed countries, ERP vendors turned late to developing economies like China and India. The studies on ERP in India are very rare. The studies, based on implementation of some other systems and ERP system, are reviewed in this section.
Pawan Sikka (1999) visualized the need to adopt new technologies by SMEs. With increasing globalization and due to various provisions of WTO regime, SMEs will face severe competition from domestic and foreign firms. He stressed on the possibilities of greater ancillarization/subcontracting by bigger companies from India and abroad. If SMEs develop specialized technological capabilities and continue to innovate, such companies would have a competitive edge over others.

Saxena and Sahay (2000) surveyed Indian manufacturing companies and identified the important issues that need to be addressed in order to be a world-class manufacturer. The findings showed most of the companies had fragmented (rather than integrated) information system which might not enable to deliver superior value to their customers and lead them to world-class status. They must therefore align their IT initiatives towards facilitating agile manufacturing rather than introducing IT to merely automate their conventional operations.

Siriginidi Rao (2000) in his study in Indian context, concluded that only 3.6% of companies in India had successfully implemented ERP by 2002. They have yet to tap the power of IT and an integrated information system to stay in competitive market and customer oriented. He claimed that one third of ERP implementations worldwide fail owing to various factors. One major factor for failure is considering ERP implementation to be a mere automation project instead of a project involving change management. It is a business solution rather than an IT solution, as is perceived by most organizations. Yet another reason for failure is over customization of the ERP system. Therefore, organizations need to very carefully go about their ERP implementations, if they are to be successful.

In the initial phase, companies adopting ERP were Indian operations of MNCs and large companies. But more importantly these companies were not ready for the business process re-engineering and associated organizational changes at that time. Vendors also did not fully understand the user needs and Indian business processes at that time. This resulted in failure of some of the implementations, which hampered the growth of the market. Only 42% of the ERP users were satisfied with the implementation of their ERP package. Indian market suffered a negative growth of 12% and total revenues came down in 2001. The break up of the industry segment which has implemented ERP, are Manufacturing 45%, Telecom 15%, Financial 18% and others 22% (Dinesh Jindal et al. 2002).
Up to mid-1990s, SMEs sector in India had operated under a much-protected economic regime characterized by limited competition and a highly regulated business environment. This business atmosphere had resulted in limited focus on process efficiencies, centralized control structures, highly formalized business settings and lack of professional business practices (Ranganathan and Kannabiran, 2004). However, following the economic liberalization and opening up of the economy to foreign Multi-National Companies (MNCs), Indian SMEs have been forced to adopt modern business practices and strategies, which in turn can provide SMEs a cutting edge over its competitors.

G. S. Dangayach and S.G. Deshmukh (2005) surveyed some Small and Medium Enterprises in India. The conclusion of their work was that the main barriers to growth in the SME sector are niche players, management resources, market intelligence and long term strategy. Indian companies are giving highest priorities to the quality and the least priority to flexibility which is the competitive priority for adopting Advanced Manufacturing Technology (AMT). Their work also confirmed that Indian SMEs are least attentive towards the “post implementation evaluation” and “requirement analysis”. The Indian SMEs are investing more in administrative AMT like ERP, Office Automation and Activity Based Costing. They concluded that Indian automobile, electronics, machinery and process companies are not emphasizing adequately on Advance Manufacturing Technologies (AMT). The Adoption of AMT makes the companies flexible which is a competitive priority.

R. K. Sharma and Rajesh (2005) has undertaken case study in one of the Indian companies which had implemented ERP and found changes in manager’s job for the organization chosen. They found, use of power increased significantly with ERP implementation. This facilitated the change process and was consistent with all management levels. They also found that flexibility of the organization had increased with ERP. Executives were spending less time in implementation and the free time is employed more in planning activities. They found that standardization, specialization, and formalization had increased due to ERP implementation.

Rajesh K. Singh et al. (2006) demonstrated in their work that even medium scale organization can sustain its competitiveness in global market by using its limited resources effectively and updating existing facilities. Indian industries are facing new challenges in terms of cost, quality, flexibility and human resource development for their survival and growth.
Sharma and Bhagwat (2006) in their work concluded that Indian industries have shifted from protection towards competitiveness. They have substantially increased their Information system investment but their success in exploiting these technologies for bettering their business performance squarely lies in devising an effective Information System management processes and deploying its sound strategy.

Mahadeo Jaiswal (2007) studied the case studies of two Indian SME sector auto component manufacturing ERP implemented industries. He provided insights into adoption of ERP and best business practices to achieve competitiveness. These companies adopted the ERP processes along with Business Process Reengineering and best business practices into their organizations. He referred survey done by Confederation of Indian Industries which also showed that adoption of ERP in India is prevalent mostly in the large companies and the SME sector has not yet achieved the desired level of ERP adoption.

Ashim Raj Singla (2008) observed through two case studies in public sector undertakings of northern India that there is positive impact of ERP system on Small and mid sized public sector undertakings. He found that ERP adopters are consistently higher in performance across a wide variety of measures than non-adopters. Overall this suggested that indeed ERP systems yield substantial benefits to the firms that adopt them and that the adoption risks do not exceed the expected value, although there are some evidences that suggested that firms do indeed perceive ERP projects to be risky. The findings suggested strategy so as to mitigate and manage successful ERP implementation.

In spite of the varied results of ERP implementation, the use of ERP system in the Indian market is increasing every year. According to AMR research, world wide ERP software sales grew by 14% in 2006 to $28.8 billion in 2007 and expected to grow @ $ 47.7 billion by 2011. (AMR Research-2007) Small and Medium Scale industries are also adopting ERP packages to stay in competitive market.

2.12 STATE OF RESEARCH

ERP is not a recent phenomenon now. Its implementation started in 1990s in European and United States industries. Formidable body of literature exists on the ERP selection, its implementation and critical success factors mostly concerned with large scale organizations. Indian organizations are attracted towards ERP in late 2000. Indian Small and Medium Enterprises are also adopting these systems widely. Most
of the studies on ERP are found after 1990 in European and United States industries. Comparatively, very little effort has been made in the fast developing countries like India and China. The empirical analysis on the performance of the ERP is rarely found in the literature.

ERP implementation is not always beneficial as can be expected theoretically. The reasons are many. The organizations have to be careful while implementing expensive systems like ERP. The measurement of ERP performance is complex construct.

2.13 CONCLUDING REMARKS

ERP came into existence in industries in western countries first in late 1990s. Conceptually, it was the extension of MRP and MRPII but became more popular in its revised form. It mainly integrates the information in a server which was earlier scattered in isolated stand alone system. It is beneficial in reducing inventory, reducing planning cycle and manufacturing cycle and many other areas. The intangible benefits are more than tangible benefits. It is beneficial to all types of industries though there are some failure stories or some industries are not successful in their implementation for achieving the desired objectives.

The various surveys of industries to know status about ERP penetration showed that developed countries are reaping the benefits more from its implementation than developing economies like India. The reason of failure in some cases is due to the selection of software itself. The business process reengineering and software customization plays important roles to arrive at a solution. The value added consultant played important role in some selection procedures. ERP system projects are not like other IT projects rather the problems starts in implementing the software. There are some critical factors which handled properly makes implementation successful.

The different evaluation methods of ERP have given mixed results and showed that it is useful if implemented properly. The cost benefit analysis, user satisfaction, balanced scorecard approach are some of the factors for evaluating the performance of the ERP system.

Indian industries are also adopting ERP on large scale. Most of the research done is on how to implement the ERP and its success factors. The research in Indian industries is very scant and is mainly focused on the effect on managerial job and organization structure. The SMEs are also attracted towards ERP adoption for staying in a global competitive market. The evaluation of advanced manufacturing technology
in Indian SMEs has been studied but not the ERP evaluation. Researches in the field of IT introduction and advance technologies adoption in organizations are available which shows ample evidences of benefits. As ERP systems are not just IT project, it effects the whole organization by changing the way the company is organized and often acting against company culture. It has got the impact on organizational working. But there is no considerable research on how ERP systems benefited these organizations. There are no standard techniques/strategies to evaluate the performance of ERP system from user’s perspective.

Hence an appropriate research study is needed to know the ERP penetration in Indian SMEs and to explore how ERP is enabling to improve the performance of SMEs. It is also necessary to compare the performance of ERP among industries to find out the best practices followed.