

ERP APPLICATION IN INDIA: AN OVERVIEW

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ABSTRACT

Enterprise resource planning (ERP) systems are among the most important enablers for business intelligence and planning functionality in supply chains. This paper provides an overview of ERP research and its development and implementation in India. The paper describes the current market, challenges and future trends for ERP software in India. Cases are provided where ERP implementations have been used to enhance supply chain management of major companies. One of the (not unexpected) findings is that not only analytical data concepts play an important role in successful ERP implementations in India but also cultural and language aspects.

Keywords - Enterprise Resource Planning, Information Systems, MRP, Supply Chain Management

INTRODUCTION

An enterprise resource planning (ERP) system is a highly integrated enterprise information system to manage all aspects of the business operations of an enterprise (especially regarding transactional data) including production, purchasing, engineering design, manufacturing, sales, marketing, distribution, accounting and customer service, etc. Once ERP systems are successfully implemented, significant benefits such as improved customer service, better production scheduling, and reduced manufacturing costs can be gained. However, the successful implementation rate can be accounted for as still quite low and many firms that have gained some benefits from ERP systems have yet to exploit the full potential benefits in their organizations.

Comprehensive studies related to the economical evaluation of information systems in general and those of ERP systems in particular still seem to be in their infancy to date. More specifically, if one cares about specific cultural and language barriers (including not even language differences but also considerations regarding character sets different from those used in most of the countries as they can be found related studies need to investigate additional aspects not yet included in general ERP adoption and innovation diffusion models.

One of the major concerns in today's globalization is the transformation of countries like India or China. 'More than any other country, India is being transformed by its application of IT, from a poor and isolated society to a major force in the global economy.' What makes India a somewhat special case is the great variety of ownership structures including state-owned, foreign invested and privately-held companies? That is, the role of ownership can be studied in relatively greater depth there than elsewhere.

In this paper we focus on ERP system applications in India. While some studies exist in this respect, they seem to be completely isolated and even expressing contradictory results at places. Therefore, we provide an expository survey on existing literatures and studies related to ERP applications in India. That is, specific studies with India focus related to various systems including MRP based and ERP systems from the literature are put into perspective. Moreover, this is moderately interleaved with some reasoning based on an empirical analysis conducted by the researcher based on an online survey investigating some 25 enterprises which are currently or were implementing ERP systems in India. The outcomes of this paper may provide a more comprehensive picture of current ERP implementations in India especially regarding the provided references and facilitate organizations to respective literatures and to avoid obstacles for future adoption.

II. ERP SYSTEM ADOPTIONS: GENERAL ISSUES

ERP systems are rated among the most important information systems towards achieving competitive advantage especially for manufacturing firms. As IT and supply chain management continue to improve and modeling applications expand, it is expected that more and more companies implement various systems including those that interest us here. ERP systems may be regarded as those information systems enabling to manage a company's transactional data on a continuous, real-time basis, i.e., standardizing data and information systems for order entry, financial accounting,

purchasing, and many other functions, not only within a single location of a firm but also across multiple facilities and business units.

The most prominent basics of ERP utilize ideas from materials requirements planning (MRP) and its successor, manufacturing resource planning (MRP II). Here net requirements of raw materials and intermediate products to be manufactured or ordered from vendors to meet demand for finished products are calculated (MRP). Moreover, capacity considerations are taken into account (MRP II). Supply chain management (SCM) became a major management issue in recent decades. The ability to instantaneously exchange information together with increased computational power has enabled the use of sophisticated optimization software, although one has to admit that appropriate planning functionality has not yet come to its full extent despite the mouthwatering advertisements of most SCM software vendors. Nevertheless, ERP systems and the availability of transactional data are at the core of enabling SCM while supply chain planning and integration remain a critical issue

Introducing information systems and especially ERP systems is closely related to organizational change. Taking the view of a company, say, a manufacturing firm, introducing an ERP system refers to innovation, change (management) and reshaping through the use of IT. That is, an interesting topic related to innovation management is the question how to justify ERP system adoption and related investments.

Besides some general discussion, specific surveys and case studies are provided in many references including those mentioned and beyond. For instance, the importance of proper project management is based on a study of about 70 ERP system implementations. Most importantly, one may conclude that critical success factors (CSF) for implementing ERP systems are somewhat in line with those of other types of information systems.

A special interest in ERP system adoption accounts for certain cultural backgrounds, language specifics, and alike, especially when it comes to supply chain integration. That is, especially language barriers and certain historical paths in shaping companies may greatly influence the way of ERP system adoption.

Firstly this paved way for more prospects in ERP market. The demand and supply gradually transformed from general to enterprise resource market. Once this got stabilized there was no looking back. It was well evident that ERP market could boom and give the necessary impetus to stakeholders. However this did not mean that mediocre could survive in the market. There was demand only for top notch services and professionals.

This naturally led to improvement in the quality of services offered. Such an improvement increased the competition among various players. The end user was getting assured that he would be receiving the best services for the money invested. Case ERP in India got more and more competitive. The ERP implementation in India demanded more than the custom ERP India module.

III. CURRENT STUDIES WITH INDIA FOCUS

Most empirical studies in the literature conduct a survey on a limited sample with a specific focus, e.g., a certain industry or a specific region/country. As mentioned above, India takes a somewhat special role as different ownership structures can be found side-by-side. This includes state-owned enterprises (SOE), foreign-invested enterprises, and privately-held companies. Moreover, larger companies as well as major internationally operating companies may be distinguished from small and medium sized companies (SME). That is, the role of size and ownership can be studied in relatively greater depth there than elsewhere. Another topic which makes India an interesting source is the rapid change also with respect to modern forms of corporate governance

ERP Implementation and Development in India

ERP system application can be followed back for more than two decades with many national programs in India supporting IT developments. Earlier research and development programs like, e.g., more than 750 Program on computer integrated manufacturing (CIM) systems, was launched in March 1995. It strongly supported research, development and application of MRP/MRP II based systems, ERP and other systems for many years, and allowed to accumulate comprehensive practical experiences. On a high level one may classify the development of ERP implementations into three phases.

- Phase I: MRP adoption (with limited effects of application)
- Phase II: Developing MRP II/ERP
- Phase III: Maturity of the ERP market

From the late 1990s, MRP II, ERP and SCM became more and more popular; many industrial enterprises have upgraded their ERP solutions or have directly applied new ERP systems of that time, such as SAP/R3, Oracle, and BAAN IV/V. Meanwhile, Chinese ERP software companies were active in extending their MRP II software products to ERP systems, the functionality of their ERP software became more and more powerful, and they started to replace some of the foreign dominators of the market.

Government also continues to support the ERP system's development. Since 2001, the policy of using IT technologies to speed up industrialization has been widely implemented in India. At the same time, several large scale national projects on IT applications in industrial enterprises also have been launched. Up to 2003, more than 3000 industrial enterprises, have applied ERP systems. Moreover, SME as emerging market entities rise quickly, and request new ERP solutions to meet their demands. All of these demonstrate the maturity of the ERP market in India.

Table 1 provides a snapshot of the as yet not stabilized percent market share of new license revenues for ERP software in India for the years 2008 and 2009. (100% in these cases refer to 74.7 and 95.4 millions of dollars for 2008 and 2009, respectively.) Earlier numbers can be found.

Vendor	2008 (%)	2009 (%)
SAP	18.0	22.5
Oracle	4.5	8.0
PeopleSoft	25.1	22.5
JD Edwards	2.0	1.8
BaaN	14.8	12.7
QAD	3.2	2.0
SSA	4.3	3.7
Ramco	4.1	4.7
Others	24.0	22.1

Table 1: Market share of ERP software in India

While common understanding is that mathematics and respective models are universal, many other things like culture or language are not. A thought provoking question for software vendors refers to the markets and the possible use of ERP systems. As supply chains become global we continue to encounter boundaries that are literally beyond planning in our sense, i.e., a more quantitative one. Interesting entries into some literature, e.g., considering questions of the use of MRP, MRP II, and ERP systems in this respect in, say, India.

Before 2003, about 90% of the ERP implementations were late or over budget and the ERP implementation success rate was only about 33%. While these numbers may hold in general, the success rate of the implementation of ERP systems in India was just 10%, much lower than that in Western countries.

The main reasons, among others, include the following challenges faced by Indian enterprises:

- Data maintenance and integration problems
- Involvement of consultants in respective projects
- Vendor selection
- Little implementation experience
- Weak IT infrastructure
- Access knowledge and human resource etc.

Specific Studies

An explanatory study of R/3 users in India had been conducted in Winter 2008. A very comprehensive questionnaire had been distributed among the users of R/3 using the customer list of SAP Indian clients culminating in some 80 usable questionnaires, corresponding with a response rate of about 74%. The researcher identifies crucial implementation process and context variables related to general issues of IT-enabled organizational change. It was found that project governance, specifically the role and decision making style of the steering committee, can be associated with a broad set of outcome variables after controlling for ownership and other important context factors. While it turns out that ownership is strongly associated with implementation process characteristics, the association of ownership structures with implementation results is much less pronounced.

In a broader context the study reveals that an overall motive for ERP adoption is to improve management control and to standardize business processes. This may help management to obtain basic transactional data on company operations. ERP implementations are often used to reduce the degree of managerial discretion and process variability. One may argue whether in the era of SCM the underlying rationale of an ERP system is to enable more decentralized or more centralized decision making.

Only the most advanced companies are beginning to build inter-organizational systems on the back of successful ERP implementations. In this study and its conclusions are extended into devising business oriented electronic commerce development strategies.

In 2009, the researcher conducted a survey on a group of executives from 150 enterprises over 20 provinces in India. The researcher received some 79 usable returns. Ten were from large SOE while the remaining were from SME. The major findings are related to CSF, ERP benefits and ERP obstacles. The major ERP benefits are related to SCM issues and constitute related benefits as cost reduction, business strategies' support and alike. Among the CSF he concludes that executive support is the key success factor for ERP, followed by SCM as an important component and BPR as another CSF. Moreover ERP is more of a concept than software. ERP obstacles are found around common challenges such as 'ERP is too expensive' or 'ERP is too complicated' as well as some firm specific challenges. In that respect main obstacles seem to be IT infrastructure in India, lack of well-trained workers, lack of incentives at SOE, and differing corporate culture.

Additional studies with independent results can be found as follows. For instance reports about a questionnaire which was published in an ERP professional website and mailed to the listed companies in the Bombay stock exchange. Depending on the questions between 90 and 118 responses were accounted for as useful, i.e., according to the source 90 enterprises have completely finished or partly finished their ERP implementation project.

Among those companies about 81% used external consultants during the ERP adoption. Among the possible consultants the vendor's consultants were mostly selected and they were involved in at least 50% of the work. Among the purpose for involving consultants we mostly found (multiple answers possible) as reasons to obtain support regarding project design and advice as well as the provision of knowledge transfer and appropriate training. Arguing in favor of the consultant selection we mainly found as reasons the expertise with the product to be implemented, a strong experience in higher education and the availability of specific personnel. While we do not assume to be comprehensive with respect to our study, we still like to emphasize the aspect of higher education. It may deserve further investigation as it seems to be a factor which is not yet fully studied.

IV. IMPLEMENTATION IMPLICATIONS IN INDIA

So far, we have provided a brief overview of the history of ERP implementations in India, and analyzed some of the currently available main references. As can easily be deduced, ERP system success still depends on the knowledge, personnel, infrastructure, etc. At the same time we accumulated some useful pointers for successful ERP implementations, such as paying attention to top management involvement, teamwork, customization, communication etc.

Based on the observations in the previous subsections the study deduces a number of CSF for domestic vendors of ERP software on the Indian market as follows:

- **Low price** : An SAP application easily costs more than more than 10 lakhs, while some domestic systems cost as little as several thousands. Even with their 'high quality' image in India, SAP vendors have difficulties to customize the product especially in the emerging SME Indian market.

- **Customer service:** Domestic vendors can reflect the market quite quickly while foreign vendors may find it difficult to provide adequate and comprehensive customer support on time due to the shortage of on-time communication and technical personnel.
- **Reporting format and content:** India's accounting standards are different from international accounting standards. This requires foreign vendors to modify their financial accounting modules to generate the correct formats to meet local requirements. Many foreign vendors might encounter difficulties to do this appropriately while their Indian competitors took this advantage.

V. PRESSURES MOUNT ON THE INDIAN INDUSTRY

As discussed earlier ERP was initially restricted to back office functions and later spread its wings to all the operations in the enterprise. This naturally meant that the ERP manufacturers and vendors had to increase the functionalities and scope of the application. There are practical difficulties when it comes to this issue.

The ERP experts will definitely be able to restructure the ERP systems with the help of resources and expertise available with them. However doing it all on sudden is a difficult task. They must have been working with different requirements till then. Compelling them to suddenly change will land things in a mess because there will be lot of confusions for the vendors, manufacturers and end-users. The unrealistic deadlines and time pressures further add agony to this menace.

Finance

This is another important determinant of ERP market in India. Some bigger companies still hesitate to invest in ERP due to the exorbitant costs. It is indeed encouraging to find that a vast majority of them have realized its benefits and have determined to go for it. However some of them are keeping quiet due to the risks involved besides the unforeseen expenses and losses.

Technical factors

Thirdly ERP in the nation calls for a restructuring in the technical aspects. This is definitely appreciable. The fate of the businesses that have already implemented and deployed ERP remains a big question mark. No doubt change is inevitable and an element for growth. However it would be next only to impossible to change even before the current change has stabilized in the market.

VI. FUTURE TRENDS

Future developments in ERP software need to be analyzed in the light of two contexts.

The first relates to the enhancement of technical and functional capabilities of the ERP software. ERP packages now provide Web-enabled functionalities and e-business suites for use in B2B and B2C transactions. In this context, SAP has launched mySap.com, Baan has a product called iBaan, and Oracle has incorporated e-business functionalities into their new ERP software called Oracle. Moreover, many ERP vendors have positioned themselves as one-stop vendors for different integration requirements, and are adding CRM and SCM functionalities into their software. This is in response to integration problems that organizations have had when they have tried to interface different best of breed solutions. Therefore, basic ERP packages are expected to serve as the back-end transaction-processing database, to which e-business modules incorporating functions relating to e-procurement, CRM and SCM would be added.

Future research efforts would therefore need to be directed at analyzing ERP adoption as part of an overall framework for adoption of e-business, along with the implementation of other packaged software such as CRM and SCM. The study of ERP adoption by SMEs and the accompanying specific problems and issues is another area of potential investigation

Future research is still in dire need for more comprehensive empirical data. For instance, one might add a few issues that have not been widely addressed, especially when comparing the ERP application in different countries. It would be useful to investigate the significance of the interaction between firm size and financial health for ERP adopters compared to non-adopters with respect to measures such as return on investment, return on assets and return on sales.

VII. CONCLUSION

Over the last few years, many organizations in India have benefited from improved processes and better information availability as a consequence of the implementation of ERP solutions. For many others, the adoption of ERP has resulted in a very painful transition and adaptation period, while the benefits have not been immediate or tangible.

This model presents a general conceptual framework and serves as a useful starting point from where the ERP experience of Indian companies can be analyzed. It also presents some practical implications for managers for managing and controlling relevant aspects of different stages of the implementation process. The generality of the framework has been further enhanced because of the number of industries covered in the study. The framework can be used for organizations in other developing societies, as well as in SMEs.

During implementation most companies are looking for consulting assistance with ERP system vendors themselves becoming the most popular consultants during the implementation. Nevertheless, some consulting companies with special experience have a considerable growth share. For the selection of appropriate consulting companies, price seems not the main influencing factor, but reputation and practical experience. Despite all the advances, there is still a considerable way to go for India regarding ERP implementation, and for improving their operational as well as their management level.

VIII. RESEARCH HIGHLIGHTS

The main objective of this paper focuses on ERP system applications in India. While some studies exist in this respect, they seem to be completely isolated and even expressing contradictory results at places. Therefore, we provide an expository survey on existing literatures and studies related to ERP applications in India. That is, specific studies with India focus related to various systems including MRP based and ERP systems from the literature are put into perspective. Moreover, this is moderately interleaved with some reasoning based on an empirical analysis conducted by the researcher based on an online survey investigating some 25 enterprises which are currently or were implementing ERP systems in India. The outcomes of this paper may provide a more comprehensive picture of current ERP implementations in India especially regarding the provided references and facilitate organizations to respective literatures and to avoid obstacles for future adoption.

The major research highlights of this paper focus on:

- General adoption issues before considering the specific case of India
- ERP implementation Implications in Indian Market
- Future trends of ERP adoption.

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