ERP Implementation in Industries and Its Challenges

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***Abstract*— Implementing ERP (Enterprise resource planning) causes substantial change that needs to be carefully managed to get the benefits of an ERP solution. Critical issues that must be carefully considered to ensure successful implementation in an industry include commitment from top management, reengineering of the existing processes, integration of the ERP with other business information systems, selection and management of consultants and employees, and training of employees on the new system. There are many things which are to be considered for choosing and implementation of ERP.**

Keywords*— *ERP, ERP implementation, ERP challenges, Selection of ERP, IT enabled industries

I. INTRODUCTION

Enterprise resource planning (ERP) was developed to cater the need of large companies to manage their resources and operations. In the early stages of ERP only multinational companies could afford the investment in the software and the infrastructure needed to support it. It has been found that, unique risks in ERP implementation arises due to tightly linked interdependencies of business processes, relational databases, and process reengineering [1]. According to Markus et al. [2], three main factors that can be held responsible for failure of ERP system are: poor planning or poor management; change in business goals during project; and lack of business management support. In another study, it has been found that companies spent large money in developing ERP systems that are not utilized. From a software perspective ERP systems is complete. But from the business perspective it is found that software and business processes needs to be aligned, which involves a mixture of business process design and software configurations [3]. So a purely technical approach to ERP system design is insufficient.

II. OBJECTIVE

To thrive in a world of global competition and demanding customers, manufacturers must be able to sense and respond to change and adapt quickly and accurately to evolving conditions. To a large extent, adaptability depends on a company's frontline production employees – and making sure those employees are armed with the right information. To remove delays and errors from processes – and enable manufacturing to work at the speed of the business – you need to give plant managers, quality inspectors, and production and maintenance supervisors the ability to identify and resolve problems rapidly, as they arise, and to monitor, measure, and improve manufacturing performance over time.

Adaptiveness depends on being able to push decision making to the shop floor. It is very difficult. At many companies, the various systems used for enterprise resource planning, manufacturing execution, and the shop floor automation are not well integrated. Data is fragmented across systems. There is little or no real-time information about production events available on the shop floor. End users cannot easily access up-to-date reports and perform the rapid analyses needed to evaluate and improve performance. It's an environment where plant managers and production personnel are overloaded with data – but without ready access to essential information about orders, labor, machines, material, and capacity. Pulling information together from disparate systems is slow and difficult, and decision makers have to work without a clear, up-to-date view of what is actually happening in the plant. In short, production personnel are faced with a fundamental lack of visibility into their manufacturing operations, which makes it difficult to understand and respond to change, impairs their performance, and ultimately hampers the company's ability to meet customers' needs.

III. FUNCTIONAL MODULES OF ERP SOFTWARE

ERP software is made up of many software modules. Each ERP software module works on a major functional area of an organization. Common ERP modules include modules for product planning, parts and material purchasing, inventory control, product distribution, order tracking, finance, accounting, marketing, and HR. Organizations often selectively implement the ERP modules that are both economically and technically feasible.

A. Production Planning Module

In the process of evolution of manufacturing requirements planning (MRP) II into ERP, while vendors have developed more robust software for production planning, consulting firms have accumulated vast knowledge of implementing production planning module. Production planning optimizes the utilization of manufacturing capacity, parts, components and material resources using historical production data and sales forecasting.

B. Purchasing Module

Purchase module streamline procurement of required raw materials. It automates the processes of identifying potential suppliers, negotiating price, awarding purchase

order to the supplier, and billing processes. Purchase module is tightly integrated with the inventory control and production planning modules. Purchasing module is often integrated with supply chain management software.

C. Inventory Control Module

Inventory module facilitates processes of maintaining the appropriate level of stock in a warehouse. The activities of inventory control involves in identifying inventory requirements, setting targets, providing replenishment techniques and options, monitoring item usages, reconciling the inventory balances, and reporting inventory status. Integration of inventory control module with sales, purchase, finance modules allows ERP systems to generate vigilant executive level reports.

D. Sales Module

Revenues from sales are live blood for commercial organizations. Sales module implements functions of order placement, order scheduling, shipping and invoicing. Sales module is closely integrated with organizations' ecommerce websites. Many ERP vendors offer online storefront as part of the sales module.

E. Marketing Module

ERP marketing module supports lead generation, direct mailing campaign and more.

F. Financial Module

Both for-profit organizations and non-profit organizations benefit from the implementation of ERP financial module. The financial module is the core of many ERP software systems. It can gather financial data from various functional departments, and generates valuable financial reports such balance sheet, general ledger, trail balance, and quarterly financial statements.

G. HR Module

HR (Human Resources) is another widely implemented ERP module. HR module streamlines the management of human resources and human capitals. HR modules routinely maintain a complete employee database including contact information, salary details, attendance, performance evaluation and promotion of all employees. Advanced HR module is integrated with knowledge management systems to optimally utilize the expertise of all employees.

ERP is not the same for companies of all sizes. This fact reflects an important reality of the manufacturing sector: medium and large companies face challenges that are very different from those of small enterprises.

IV. IMPLEMENTATION CHALLENGES:

According to Cooper and Zmud [4], the implementation process consists of six phases: initiation, adoption, adaptation, acceptance, routinization, and infusion. A number of factors that may affect the ERP implementation process and the probability of conversion success have been identified in the IT implementation, IT failures, and business process reengineering literatures[5]. Among the more important factors are top management support and involvement [6], the need for a project champion [7], user training [8], technological competence, process delineation, project planning, change management, and project management [9].

A. ERP's for different sizes of companies

There are several conventions on how to determine the size of a company, which can vary by continent, industry, and even institution. The size of the company can be categorized as Large, medium, Small or even lower midsize and upper-midsize companies.

B. Size and Complications

One think that a large manufacturing company just produces many more finished products than a small company in the same industry, and the challenges both companies face are proportional to their size. The truth is that the complexity of a company's operations increases exponentially relative to its size. Larger companies need to manage not only more inventory, sales transactions, people, etc., but also different software solutions, business entities and multiple levels of management, national and international laws and regulations, local cultures and unwritten rules, etc.

To add to the complexity, customer behavior and needs are constantly changing, technology is advancing at a very fast pace, and companies keep accumulating amounts of data that, if not managed properly, verge on overwhelming.

C. Facing the Challenges

To accommodate change without jeopardizing their activities, medium and large companies need to address the following challenges:

1) ***Inheritance systems****:* Many medium and large companies existed when there were no or very few software solutions available. So they used several products, not always integrated, which wasn't very cost-effective or user friendly, and which generated large amounts of unstructured data. Meanwhile, there are not enough specialists in obsolete technologies available to help address these issues.

2) ***Conformity with laws and regulations****:* The more a company expands, the more complicated it is to achieve local and international conformity. In manufacturing this is particularly important, since it can affect all major activities, from procurement and production to distribution and retail, asset management, and human resources.

3) ***Business process (re)engineering****:* The ever-changing business environment forces medium and large companies to adapt, but they can only do it by defining new workflows and procedures and restructuring existing ones. The larger the company, the more people, assets, and partners will be involved in any change dictated by the market, which makes the process of change very expensive and resource-consuming—which only exacerbates the basic logistical complexity of defining, testing, and implementing new business processes across multiple business units.

4) ***Mergers and acquisitions****:* Besides expanding their activities, companies can grow through mergers and acquisitions. Depending on the size of the companies involved, the process can be complicated by the need to

integrate the operations of different departments, plants, or sites that often operate in different languages and regions and use different business processes and software solutions. Thus, any unresolved issues during a merger or acquisition can have a negative impact on all entities involved.

5) ***Off-shoring and re-shoring****:* Globalization and the need to reduce costs have forced some companies to move some or all of their production facilities from one country to another. When headquarters and subsidiaries or plants are on different continents, activities like quality control and short delivery time can be hard to manage.

6) ***IT infrstructure****:* Despite the potential advantages of software-as-a-service (SaaS) solutions, which require neither hardware nor IT personnel, medium and large manufacturers oftentimes use a combination of SaaS and on-premise solutions (if not on-premise only). Cloud computing for large businesses has several limitations that are not yet resolved.

7) ***Human factor & Collaboration****:* Social tools can be an amazing source of feedback (internal and external) for customer service and product development. Collaboration with business partners can increase efficiency, but privacy issues may present important concerns.

Everywhere change is constant, but medium and large manufacturing companies simply do not have the flexibility to adapt quickly, and they may suffer great losses if they take too long to respond. The above-mentioned challenges only compound the usual difficulties in creating strategies to remain relevant, efficient, and profitable.

V. CRITICAL IMPLEMENTATION CONCERNS

An ERP package is so complex and vast that it takes several years and millions of rupees to roll it out. In fact, implementing any integrated ERP solution is not as much a technological exercise but an "organizational revolution." Extensive preparation before implementation is the key to success. Implementations carried out without patience and careful planning will turn out to be corporate root canals, not competitive advantage.

A. Implementation Time

ERP *systems* come in modular fashion and do not have to be implemented entirely at once. Several companies follow a phase-in approach in which one module is implemented at a time. For example, SAP R/3 is composed of several "complete" modules that could be chosen and implemented, depending on an organization's needs. Some of the most commonly installed modules are sales and distribution (SD), materials management (MM), production and planning, (PP), and finance and controlling (FI) modules.

The problem with ERP packages is that they are very general and need to be configured to a specific type of business. This customization takes a long time, depending on the specific requirements of the business. For example, A well known ERP is so complex and general that there are nearly 8000 switches that need to be set properly to make it handle the business processes in a way a company needs. The extent of customization determines the length of the implementation.

B. Implementation Costs

Even though the price of prewritten software is cheap compared with in-house development, the total cost of implementation could be three to five times the purchase price of the software. The implementation costs would increase as the degree of customization increases. The cost of hiring consultants and all that goes with it can consume up to 30 percent of the overall budget for the implementation. Once the selected employees are trained after investing a huge sum of money, it is a challenge to retain them. Employees could double or triple their salaries by accepting other positions. Retention strategies such as bonus programs, company perks, salary increases, continual training and education, and appeals to company loyalty could work.

Training and updating employees on ERP is a major challenge. People are one of the hidden costs of ERP implementation. Without proper training, about 30 percent to 40 percent of front-line workers will not be able to handle the demands of the new system. The people at the keyboard are now making important decisions about buying and selling -- important commitments of the company. They need to understand how their data affects the rest of company. Some of the decisions front-line people make with an ERP system were the responsibility of a manager earlier. It is important for managers to understand this change in their job and encourage the front-line people to be able to make those decisions themselves. Training employees on ERP is not as simple as Excel training in which you give them a few weeks of training, put them on the job, and they blunder their way through. ERP systems are extremely complex and demand rigorous training. It is difficult for trainers or consultants to pass on the knowledge to the employees in a short period of time. This "knowledge transfer" gets hard if the employees lack computer literacy or have computer phobia. In addition to being taught ERP technology, the employees now have to be taught their new responsibilities.

C. Things to think over when planning for ERP

- Which processes are most important now and why?
- Does this system meet our needs or go beyond them?
- Who will be the change champion(s)?
- Who are the stakeholders?
- What is the business culture at our company and what are its strengths?
- What subcultures do we have and what are their strengths?
- How can we apply those strengths to business change?
- What cultural attributes are weak or will interfere with the change?

- What will be the toughest changes, and how will we address them?
- Who will be responsible for change management?

VI. SELECTION OF ERP

Questions to be asked when committing to an ERP solution when researching vendors and their products. *[11]*

1. Do you know and understand the business problems your organization's business leaders plan to solve with ERP?
2. Does your organization have a business-application vendor already?
3. Does your organization have any legacy ERP systems to contend with?
4. Is a vertical ERP solution suitable for your organization?
5. What functionality will your organization actually use?
6. Does the ERP solution align with your organization's business processes?
7. Does your organization have the IT resources necessary to support an on-premise installation?
8. What kind of services will your organization require from the ERP vendor?
9. What is the true cost of the ERP solution?
10. Does the vendor have a clear long-term product strategy?

CONCLUSION

ERP systems are very large and complex and warrant a careful planning and execution of their implementation. They are not mere software systems; they affect how a business conducts itself. How a company implements an ERP system determines whether it creates a competitive advantage or becomes a corporate headache. The top contributor for a successful ERP implementation is strong commitment from upper management, as an implementation involves significant alterations to existing business practices as well as an outlay of huge capital investments. The other important factors are the issues related to reengineering the business processes and integrating the other business applications to the ERP backbone. Upper management plays a key role in managing the change an ERP brings into an organization. Organizational commitment is paramount due to possible lengthy implementation and huge costs involved. Once implemented, an ERP system is difficult and expensive to undo. Since no single ERP solution can satisfy all the business needs, organizations may have to implement custom applications in addition to the ERP software. Integrating different software packages poses a serious challenge, and the integration patchwork is expensive and difficult to maintain.

Organizations could reduce the total cost of implementation if they reduce customization by adapting to the ERP's built in best practices as much as possible. Selecting the right employees to participate in the implementation process and motivating them is critical for the implementation's success. Finally, it is important to train the employees to use the system to ensure the proper working of the system.

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