ERP Systems For Effective Management

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INTRODUCTION

Over the past few years, integrated enterprise resource planning (ERP) applications have brought a new way of delivering operation information. The advantages of these changes have transformed many organizations, which improved financial visibility, streamlined supply chain processes, and minimized human resource (HR) processes and overhead.

The beginning of ERP concept can be traced back to 1960s. During that time, the manufacturing systems were mainly handling inventory control, based on traditional inventory concept. The next decade's (1970s) manufacturing systems shifted to material requirement planning (MRP) transactions. MRP helped in translating the master production schedule into requirements for raw material planning and procurement. The concept of MRP-II (manufacturing resource planning) came in 1980s. Manufacturing resource planning involved optimizing the production process and distribution management (Yen et al., 2001). Later, MRP-II was extended to include areas such as corporate finance, personnel management, engineering process, and business project management. The development of manufacturing systems gave birth to ERP that supported the cross-functional coordination and integration within the production process. The modern ERP includes the entire range of a company's activities. ERP system is a business management system that integrates all facets of the business, including planning, marketing and manufacturing (Yen et al., 2001). More than 20,000 firms in the world spent billions of US dollars to install the ERP systems. Around 70 percent of the Fortune 1,000 companies had deployed ERP applications by 1997 for manufacturing, finance, HRs, and other main areas.

Information is the foundation of every critical business decision. The creation of ERP systems integrates all functional areas of the organization. ERP systems are backbone systems for most organizations that integrate back-office applications such as finance, purchasing, HR, inventory management, etc. Although ERP systems can integrate all business transaction data into their master databases for organizational planning, it is not a system for data analysis and decision support process.

Decision support function is vital to any company since it helps the company to plan ahead and reduce the time on decision-making, and then improve efficiencies. Decision support capability can be a key to the success of an organization. Providing a consolidated analysis of the data and user-friendly reporting capabilities will help users make intelligent and correct decisions and gain advantages over their competitors. If an organization does not take advantage of decision support systems, it cannot take complete advantage of the data and may lose its competitive edge.

ERP is a software package developed for optimum use of resources of an enterprise in a planned manner. ERP integrates that entire enterprise starting from the supplier to the customer, covering logistics, financial and human resources. This will enable the enterprise to increase productivity by reducing costs. ERP is a package for cost saving. Once the ERP is implemented, a single solution addresses the information needs of the whole organization. Enterprise Resource Planning (ERP) is software driven business management system which integrates all facets of the business, including planning, manufacturing, sales, and marketing. The business environment has become increasingly complex and the marketplace has changed from local to global. Management is under constant pressure to improve competitiveness by lowering operating costs and improving logistics. Organizations, therefore, have to be more responsive to the customer and competition. ERP as a business solution aims to help the management by setting better business practices and equipping them with the right information to take timely decisions.

ERP software is designed to model and automate many of the basic processes of a company, from finance to the shop floor, with the goal of integrating information across the company and eliminating complex, expensive links between computer systems that were never meant to talk to each other.

ERP software is a mirror image of the major business processes of an organization, such as customer order fulfillment and manufacturing. Its success depends upon reach; a circumscribed ERP system isn't much better

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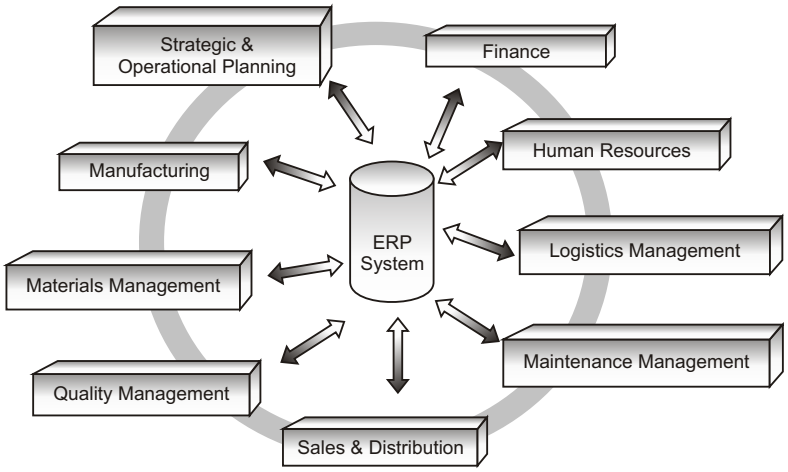
Figure 1.1 shows how information is integrated within an organization using the ERP system.



Information Integration Through ERP Systems

than the legacy system it replaces. In many cases, it is worse, because the old code at least was written specifically for the company and the task. *(ERP systems' set of generic processes produce the dramatic improvements that they are capable of only when used to connect parts of an organization and integrate its various processes seamlessly.* When a warehouse in Noida enters a customer order, for example, the data flows automatically to others in the company who need to see it to the finance department at the company headquarters in Mumbai and to the manufacturing plant in Chennai. The lure of information integration struck a chord with CEOs and CFOs-ERP vendors' primary targets and sales of ERP took off in the early 1990s.

SOME OF THE SALIENT FEATURES OF ERP

1. Accommodating Variety:

The ERP software solution provides both multi- lingual and multi-currency capabilities. Also, multi- mode manufacturing and multi-facility provide the capability required to compete and succeed globally.

2. Integrated Management Information:

a) Today's business managers use ERP for Flexible reporting tools to extract the information as and when needed without depending on an information system department (MIS department).

b) Electronic data interchange (EDI) is used to electronically accept customer information like purchase orders, schedule amendments, or cash payment and electronically send order acknowledgement and invoices to customers.

c) Imaging to provide the ability to display drawings or specifications, ability to- store original sale orders, purchase orders, quotations, and contracts.

d) Data base creation: Starting with time and attendance reporting, monitoring and control of machines and post-sales statistics.

SUPPLY CHAIN MANAGEMENT

End-to-end supply chain management is crucial for enterprises having multiple manufacturing units and distribution networks. Intelligent resource Planning (IRP) is used to optimize the overall flow of demand and supply data and to build relationship between various activities to optimally identify the demand supply chain.

RESOURCE MANAGEMENT

The resources such as equipment and human resources should be effectively managed. To facilitate effective management of equipment resources, on line records of equipment location and status need to be kept and proper accounting methods need to be followed in respect of operating costs and maintenance costs.

To manage human resources effectively, functions such as employee database job descriptions and evaluations, applicant tracking, requisition management, performance review, cost benefits, career and succession planning, creating alternate organization structures, taking care of training needs etc are provided by the ERP software package.

To facilitate total quality management (TQM), the ERP provides for quality planning required for ISO 9000 certification.

ENTERPRISE RESOURCE PLANNING SYSTEMS

Implications of ERP systems

ERP is a software-driven business management system that integrates all facets of the business, including planning, manufacturing, sales, and marketing. ERP systems can be used to manage operational business information for corporate resource planning. ERP can be applied to areas such as finance, HRs, manufacturing and logistics, supply chain management, and data analysis. ERP can provide the following business functions:

Finance*:* General ledger, accounts receivable, accounts payable, fixed assets, treasury management, cost control.

• ***HR-*** HR administration, payroll, self-service HR.

• ***Manufacturing and logistics-*** Production planning, order entering, warehouse management, transportation management, project management, plant maintenance, customer service management.

ERP systems usually have the following key components: client server system, enterprise database, and application modules (Yen *et al.*, 2001). According to Yen *et al.* (2001), an ERP system is supported by client/server technology and its applications are commonly deployed in a distributed and dispersed manner. Some ERP systems provide web-based interface. ERP system is always implemented via a core database system. All applications in the ERP system interact with the database, which ensures the integrity of the enterprise data. ERP vendors provide diverse modules for corporation's units, such as finance/accounting, HR, sales, manufacturing and logistics, etc. Most application modules can be integrated for ERP processes.

ERP systems make large enterprises rely on information technology more than ever. Automate routine process in areas such as accounting, inventory control, and procurement that accomplishes organizational accessing through automatic updating of the transaction data. ERP connects various functions of the organization in an integrated fashion. It improves the responsiveness to customer needs and delivers products to be marketed swiftly through compressed cycle times. ERP system makes data available in real time and hence allows for a more comprehensive and unified data management. ERP applications are good at capturing and storing data, but their reporting capabilities are a major concern to ERP users.

CHALLENGES FACING ERP SYSTEMS

The main objective of utilizing ERP systems is to merge corporate-wide data from various sources so that corporate employees, external partners, suppliers, and distributors can make good use of the data. Nowadays, the need of data distribution across the company boundary is extensively increasing and analytical functions are no longer the province of certain users within the organization. Therefore, organizations need to distribute the analytic capability to various operational levels, targeted at specific business needs via key performance indicators (KPIs), dynamic reporting and real-time analytics. However, ERP systems do not seem to provide all of the required functionality. The challenges to be faced by ERP systems are discussed below:

• ***Reporting capability****:* Usually, ERP systems do not offer reporting service on product line revenue analysis. Also, ERP systems are not capable of providing *ad hoc* reporting service. Online views of business operations are not available. ERP systems do not support cost allocation and profit and loss reporting. Any complex analytic solution often require*s* external software or systems (Agostino, 2004).

• ***Budgeting capability****:* Corporate budgets can be identified and controlled in various ways. Budgetary changes, however, need to be handled outside the ERP system, which means that the budget data within the ERP system will soon become obsolete (Agostino, 2004).

• ***Systems integration capability****:* Another weakness of ERP systems is its limited integration capability with other systems. For example, CRM and sales force automation systems' forecasting capability could be used to empower business decision if they can be integrated with ERP systems. Also, the budgeting tools are often not well integrated with ERP systems, which cause concerns on financial data consistency (Agostino, 2004).

• ***Practical problem:*** Since ERPs are complex systems, implementing such systems can be difficult, time consuming, and expensive. Because ERP are complex in nature, user training becomes a burden to each ERP-adopted organization. Another practical concern to the top management is that most ERP implementations do not offer corporate decision-making functions.

BENEFITS OF ERP

Benefits derived from ERP system implementation varies from one company to another. However, there are some common benefits that all companies can receive from the system. It is important that these benefits outweigh the costs of the system and they should as long as the correct system for the organization is chosen and the system is implemented properly. These systems can, in the long run, save millions of dollars, an enormous amount of paperwork, and considerable hours of work.

Many organizations have several different legacy systems that have developed over the years to meet their information needs for planning and decision making. Often, there is little or no integration among departments and application programs used by separate departments do not communicate with each other. This means that data has to be entered into each separate department of the organization resulting in data redundancy and at times, inaccuracy. The same data is available but in a different format making it difficult and time consuming to collect information and present a coherent picture of what is happening in the business. ERP systems can virtually eliminate the redundancies that occur from these outdated and separate systems. ERP systems integrate various systems into one and data is entered into the system only once. Because data is entered once, there are greater chances that it is accurate. If inaccurate data is discovered, it can be corrected once instead of going through each department for every change. Different employees can access data simultaneously in ERP systems, whereas in separate legacy systems, this is much less likely.

Process improvements are another important benefit of ERP. The common denominator in every business is the processes performed to produce a product or service. ERP systems require firms to examine their internal processes in order to increase business efficiency and profitability. Firms manufacture their products or provide their services by performing a set of processes that create value. These processes form a value chain. A firm is profitable if the outcome of the value chain provides a service or product that can be sold for more than the producer spent in product creation and delivery. By improving or reengineering business processes, poor quality and the most costly areas of the operation can be identified and improved or eliminated, thus increasing the value of the processes in the value chain. ERP/ERP II implementation enables the organization to analyze the value chain as a system, from supplier to firm to customer.

ERP systems generally come with standard applications centralizing the information of separate departments into a common database. The use of a common database and standardization of business applications provide companies with a similar appearance and use of software programs. These programs become more universal throughout the company. Standardizing the appearance and applications of various programs that are used in individual departments can create greater ease of use and improve efficiency. Whether a company is local or global, ERP systems can be used to install consistent operating practices throughout the enterprise. Most ERP systems have a customized browser that allows managers and employees to configure their own view of the program. Managers can set-up access control preventing unauthorized access by employees, customers, and business partners to sensitive information. Companies with multiple locations can alter their ERP applications to suit the needs of each location while sharing a core of common information.

ERP brings together people who work on shared tasks within the same enterprise or in their dealings with suppliers and customers and ensures the smooth flow of information at all levels and accessibility to up-to-date information.

Some of the tangible benefits of ERP are:

1. Reduction of lead time by 60 percent.
2. 99 percent on-time shipments.
3. Doubled business.
4. Increase of inventory turnover to over 30 percent.
5. Reduction of cycle time to 80 percent.
6. Reduction of work in process inventory to 70 percent.

Some of the intangible benefits are:

1. Better customer satisfaction.
2. Improved vendor performance.
3. Reduced quality costs.

4. Improved resource utilization.
5. Improved information accuracy.
6. Improved decision making capability.

EVOLUTION OF ERP

The history of ERP can be traced back to the 1960's, when the focus of systems was mainly towards inventory control. Most of the systems software were designed to handle inventory based in traditional inventory concepts. The 1970's witnessed a shift of focus towards MRP (Material Requirement Planning). This system helped in translating the master production schedule into requirements for individual units like sub- assemblies, components and other raw material planning and procurement. This system was involved mainly in planning the raw material requirements.

Then, in 1980's, came the concept of MRP-II i.e. the Manufacturing Resource Planning which involved optimizing the entire plant production process. Though MRP-II in the beginning was an extension of MRP to include shop floor and distribution management activities, during later years, MRP-II was further extended to include areas like Finance, Human Resource, Engineering, Project Management etc. This gave birth to ERP (Enterprise Resource Planning) which covered the cross-functional coordination and integration in support of the production process. The ERP, as compared to its ancestors, included the entire range of a company's activities.

ERP addresses both system requirements and technology aspects including client/server distributed architecture, RDBMS, object oriented programming etc.

EVALUATION CRITERIA

Some important points to be kept in mind while evaluating an ERP software include

Functional fit with the company's business processes.

Degree of integration between the various components of the ERP system.

Flexibility and scalability.

User friendliness.

Ease of implementation.

Ability to support multi-site planning and control.

Technology - client/server capabilities, database independence, security.

Availability of regular upgrades.

Amount of customization required.

Local support infrastructure.

Reputation and sustainability of the ERP vendor.

Total costs, including cost of license, training, implementation, maintenance, customization and hardware requirements.

IMPLEMENTATION

No ERP software can benefit an organization unless it is implemented well. Implementation costs are typically twice or even thrice the cost of the product.

ERP implementation costs can be segregated as under:

Technical costs

• Hardware, software and communication.

• Technical and functional personnel deputed for implementation.

Data creation costs

• Creation of master files.

• Conversion of data from legacy systems & building interfaces.

Training costs

• Education and training of personnel in use of the ERP system.

• Consultancy fees given to outside professionals.

Apart from the vendor itself, several consultants also provide implementation support. Implementation involves customization of the ERP package to suit the user requirements. This requires a thorough understanding of the technical aspects of the ERP package as well as the functional aspects of the business.

Under the traditional approach, organizations used to construct a '*to-be*' model which defined how the business processes are to be structured and implementation was preceded by a Business Process Re-engineering exercise. Many a times, this caused incompatibility between the '*to-be*' model and the ERP functionality. This led to more customizations, longer implementation time frames, higher costs and loss of user confidence.

The current approach is to have a concurrent Business Process Re-engineering exercise during the ERP implementation. The focus has shifted from business process improvement to technical improvement and vice-versa depending on the situation. Cases where focus would be more on business process improvement are:

• Organization is in a state where improvements to business processes are required.
• Large customizations are necessary without improvement to business process.
• High level of integration with other systems is required.
• Multiple sites have to be implemented.

CASES WHERE FOCUS WOULD BE MORE ON TECHNICAL IMPROVEMENTS ARE

• Change-minded organizations with firm decision making process.
• Company operates according to the common business practices.
• Single site has to be implemented.
• Improvements in business processes are not required immediately.

THE ADVANTAGES OF ERP

Installing an ERP system has many advantages-both direct and indirect. The **direct advantages** include improved efficiency, information integration for better decision making, faster response time to customer queries, etc. The **indirect benefits** include better corporate image, improved customer goodwill, customer satisfaction, and so on. The following are some of the **direct benefits** of an ERP system:

• Business Integration
• Flexibility
•Better Analysis and Planning Capabilities
• Use of Latest Technology

BUSINESS INTEGRATION

The first and most important advantage lies in the promotion of integration. The reason why ERP packages are considered to be integrated is the automatic data upgradation (automatic data exchange among applications) that is possible among the related business components.Since conventional company information systems were aimed at the optimization of independent business functions in business units, almost all were weak in terms of the communication and integration of information that transcended the different business functions. In the case of large companies in particular, the timing of system construction and directives differs for each product and department/function and sometimes, they are disconnected. For this reason, it has become an obstacle in the shift to new product and business classification. In the case of ERP packages, the data of related business functions is also automatically updated at the time a transaction occurs. For this reason, one is able to grasp business details in real time, and carry out various types of management decisions in a timely manner, based on that information.

FLEXIBILITY

The second advantage of ERP packages is their flexibility. Different languages, currencies, accounting standards and so on can be covered in one system, and functions that comprehensively manage multiple locations of a company can be packaged and implemented automatically. To cope with company globalization and system unification, this flexibility is essential, and one can say that it has major advantages, not simply for development and maintenance, but also in terms of management.

BETTER ANALYSIS AND PLANNING CAPABILITIES

Yet another advantage is the boost to the planning functions. By enabling the comprehensive and unified management of related business and its data, it becomes possible to fully utilize many types of decision support systems and simulation functions. Furthermore, since it becomes possible to carry out flexibly and in real time, the filing and analysis of data from a- variety of dimensions, one is able to give the decision makers the information they want; thus enabling them to make better and informed decisions.

USE OF LATEST TECHNOLOGY

The fourth advantage is the utilization of the latest developments in Information Technology (IT). The ERP vendors were very quick to realize that in order to grow and to sustain that growth; they had to embrace the latest developments in the field of Information Technology. Therefore, they quickly adapted their systems to take advantage of the latest technologies like open systems, client/server technology, Internet intranet, CALS (Computer-Aided Acquisition and Logistics Support), electronic-commerce, etc. It is this quick adaptation to the latest changes in Information Technology that makes the flexible adaptation to changes in future business environments possible. It is this flexibility that makes the incorporation of the latest technology possible during system customization, maintenance and expansion phases.

As has been stated above, ERP includes many of the functions that will be necessary for future systems. However, undertaking reforms to company structures and business processes, so as to enable the full use of these major features, is the greatest task for companies that will use them. It is necessary to take note that casually proceeding with the implementation of ERP is likely to result in turning the above mentioned advantages into disadvantages.

CONCLUSIONS

ERP system has been recognized as a powerful system for handling corporate resource planning and supply chain processing. An eminent contribution made by ERP system is its capability of integrating and managing enterprise-wide transactional data. Most ERP systems in the market can perform this feature well, however, the data reporting and analytics capabilities are absent in them. It is a truism that investments in IT in general and ERP systems in particular have been substantial. The strength of ERP systems lies in integrating modules by coupling them. The close coupling of modules means less responsiveness to the local requirements in particular functional areas. In addition, ERP systems' complexity makes them hard to control and expensive to manage. To reduce the complexity and thereby to increase the manageability, managers should carefully consider when to couple IT systems and when to better de-couple them in the light of competitive advantage in the marketplace. Strategic considerations should be explicitly taken into account when purchasing and implementing software.

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