
Chapter 1

Introduction to Enterprise Resource Planning Systems

LEARNING OBJECTIVES

After reading this chapter, you will be able to understand:

- Value chain framework
- The problems with disintegrated data in an organization
- Evolution of enterprise resource planning (ERP) system and what ERP systems are?
- The role of ERP systems in an organization
- Three-tier architecture and its benefits
- Stages theory and its application to the evolution of ERP
- Differences between custom-built systems and ERP systems
- Scope of ERP systems
- Different business models and support of ERP systems
- Major ERP companies

1.1 INTRODUCTION

In 1979, Information Technology Serving Society, USA defined Information Technology (IT) as a mean for the collection, storage, processing, dissemination and use of information. Information technology is not confined to hardware and software but acknowledges the importance of man and the goals they sets for this technology, the values employed in making these choices, the assessment criteria used to decide whether they are controlling the technology and is being enriched by it. [Figure 1.1](#) shows components of an information system. At the core, there is hardware that stores the data and the software that implements the standard operating procedures of the organization to reflect organizational goals. The users access the system through Intranet or Internet using one of the many technologies (shown in paranthesis in [Figure 1.1](#)).

Information technology systems have evolved in the last 50 years and an Enterprise Resource Planning (ERP) system is also an evolved IT system. The objective of an ERP system is to provide an integrated view of the business. In this chapter, we will see how a business functions, and the problems faced in the absence of an integrated view of the business. But everyone in an organization would not be interested in knowing everything about the business due to lack of time and domain knowledge. The management cannot reveal everything about the business to everyone in the organization. An ERP system has an integrated database at the backend and provides different levels of access to data to different users. It virtually supports all types of businesses and their processes. In this chapter, we will learn about a framework that describes a business and how ERP supports the business. Of course, certain characteristics of ERP systems will enhance our

understanding. ERP systems are different from a custom built software. It is important to understand the difference as it makes deployment of ERP system a challenge. By the end of this chapter, we will have a clear understanding of what ERP systems are, what they can do, and their characteristics.

FIGURE 1.1 Information System and Its Components

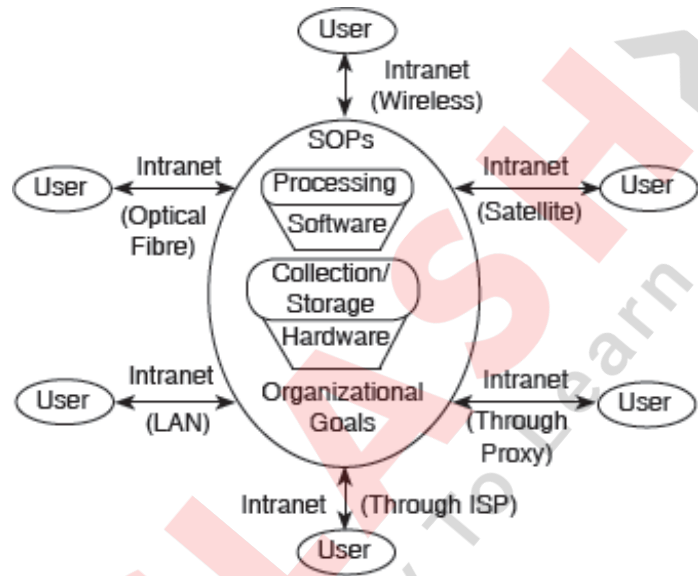
1.2 VALUE CHAIN FRAMEWORK

The Value Chain Framework (Figure 1.2) of Michael Porter explains an organization as a system that performs activities to add value to its input. The value chain consists of the following units:

- Inbound logistics that include receiving, storing, inventory control and transportation scheduling.
- Operations that include machining, packaging, assembly, equipment maintenance, testing and all other value-creating activities that transform inputs to the final product.
- Outbound logistics include activities to get the finished product to the customers such as warehouse management, order fulfillment, transportation and distribution management.
- Sales and marketing include activities that will make a customer buy the product including advertising, channel selection, promotion, selling, pricing and retail management.
- Service includes customer support, repair services, installation, training and spare parts management.

These value-adding activities are supported by the following activities:

- Procurement of raw materials, spare parts, building and machines.
- Technology development—required to improve the products and services.
- Human resource management includes recruiting, training, retention and compensation of employees and management.
- Firm infrastructure includes general management, planning, finance, accounting and quality management.



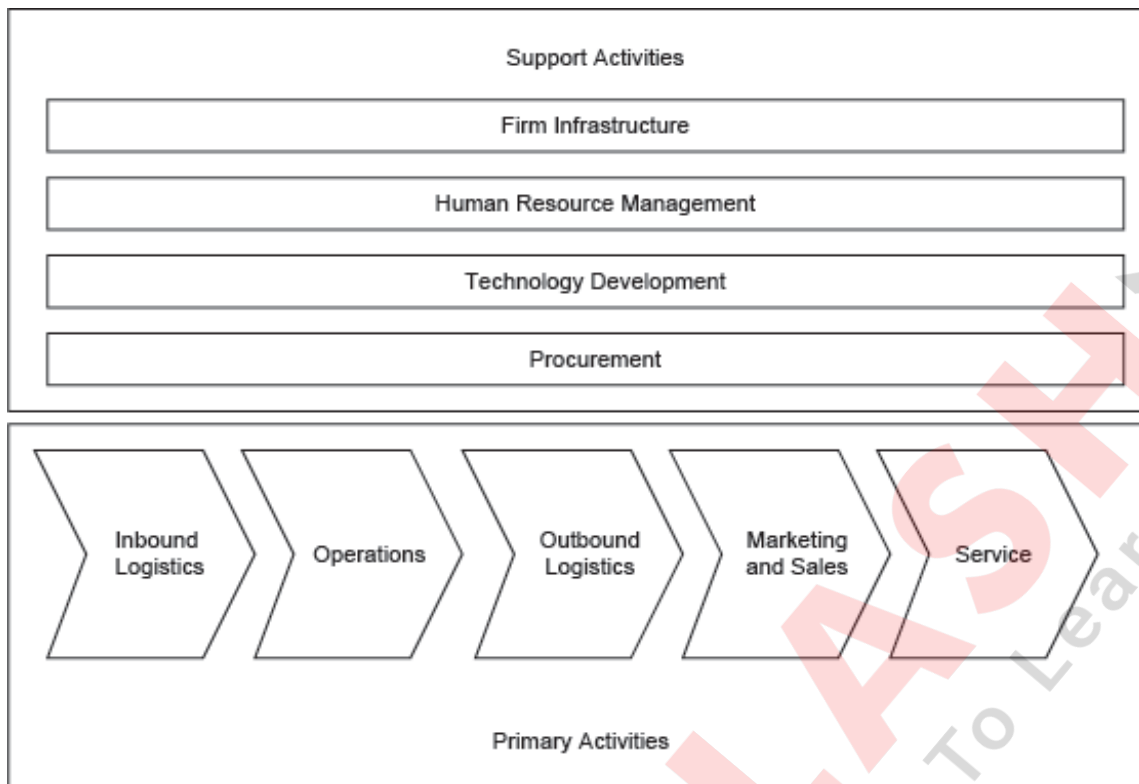


FIGURE 1.2 Michael Porter's Value Chain Framework

Organization can also be looked upon in terms of the following functional units (as shown in Figure 1.3):

- Sales and distribution
- Production planning
- Materials management
- Finance and accounting
- Human resource
- Procurement
- Infrastructure

FIGURE 1.3 Organization as a Set of Functional Units

Each of these functional units collect, generate and store vast quantities of data. In most companies, the data is not kept in a single repository. However, these functional units interact with each other in order to fulfill the objective of the organization.



1.3 PROBLEMS WITH DISINTEGRATED DATA IN AN ORGANIZATION

If a company uses paper-based system, paper files move around. Every table in the organization would have many files containing all sorts of documents. The file folders and documents sometimes are colour coded. The paper-based system took days to convey data from one department to another department. In 1960s, the computer technology helped companies in automating the existing processes of each functional unit. The data

then started getting stored on electronic media, and the simple programs that fall in the general category of Transaction Processing Systems (TPS) and Management Information Systems (MIS), were used for processing and disseminating data/information. However, the functional units continued to be isolated and no integration took place. Each functional unit acquired computers and software programs to automate its existing functions as and when it felt the need and found itself ready. As a result, the data and information was spread across hundreds of separate software and computers, each housed in an individual function, business unit, region or factory.

The automation of existing business functions helped organizations in better record keeping but many problems that were there in the paper-based system continued. In fact, some new problems also surfaced due to non-compatibility of systems of different functional units and different systems of the same functional unit. Maintaining data on many different computers systems (hardware + software) lead to the following problems:

- A redundant, disorganized database structure.
- Inaccurate data.
- Difficulty in reporting and sharing information.
- Dependence on manual processes and human interventions.
- Problems in providing seamless customer service.
- Difficulty in complying with reporting requirements.
- Lack of capacity for process improvements.

Computer and information technology made an impact on every dimension of the business and its environment. The information technology has been widely accepted by the business community. Computer technology has also gone through a rapid change since its inception. The following are few of the examples.

- Computers and information technology have changed from being challenging to user friendly.
- The price tags on computers have reduced dramatically.
- From being useful to computer scientists only, computer has become an essential tool for everybody. It affects most of the people in some or the other form.

1.4 EVOLUTION OF ERP SYSTEMS

From 1960s to 1980s, the industrial economy changed to information economy. In 1960s, 60 per cent of the manpower was blue collared and 40 per cent was white collared. In 1980s, more than 50 per cent workforce was engaged in information industry. Information is treated as a resource in information economy. In the 1960s, the economy was based on manufacturing and the competitive strategy was to produce volumes at low cost (economies of scale). Companies could afford to maintain large quantities of inventories to meet production requirements and still stay competitive. In the 1970s, the companies could no longer afford to keep unlimited inventory. This led to the introduction of a system called Material Requirement Planning (MRP) followed by Manufacturing Resource Planning (MRP-II). Main objective of MRP was to automate manual procedures for planning and controlling production schedules. MRP systems were designed to work back from the sales orders to determine the requirements for raw material for production. The objective was to

integrate the functional units that had a direct impact on the competitive strategy such as sales and distribution, production, finance and accounting, and human resource. MRP is a complex system and consists of the following modules:

- Master production schedule
- Material requirements planning
- Bill of materials
- Inventory control
- Capacity requirements planning
- Rough cut capacity planning (high-level resource analysis)
- Routing/work centres
- Shop floor control
- Sales order processing
- Detailed operations scheduling
- Purchasing and receiving
- Forecasting
- Finance and accounting (MRP-II)
- Payroll/personnel (MRP-II)

MRP was a generic system that fell in general category of Commercial of the Shelf Systems (COTS). MRP represented a huge step forward in the material planning process. MRP system used sales order to work out a production schedule considering bill of materials (material needed to produce each finished product), available inventory and scheduled-to-arrive inventory. Once the requirements got calculated, it triggered events such as placing an order for procuring raw material. The system knew the time-to-procure and used this knowledge to modify the delivery dates if required or to cancel an order if it is clear that the supply date cannot be honoured. It used past sales data to forecast the demand for sales planning and customer order promising. Once the demand forecast became available, it is used to schedule procurements and production. MRP system also supported sales and operations planning to make use of the capacity of the manufacturing facility. MRP integrated main functional units of the organization through automatic data flow.

It is interesting to note that in 1970s, companies experienced difficulty in implementing MRP systems. Researchers studied the reasons for failure of MRP, and the consolidated reasons include organizational problems, technical problems and people problems. Managers did not believe in the capability of the system and did not spend enough effort to discover and use the potential of the system. MRP is an IBM mainframe system. The main objective of MRP was to manage inventory better, increase the efficiency of a manufacturing plant and hence serve the customer better by avoiding unnecessary delays. Organizations could justify purchasing MRP because they expected to reduce inventory cost and use their resources more efficiently. MRP was a generic system that IBM claimed would fit all businesses. However, not many business houses believed IBM as each of them thought their businesses to be considerably different from each others. Organizations who bought MRP also did not benefit from it as expected, because about 60 per cent of all MRP implementations failed. Failure could mean that return on investments (ROI) did not

materialize as expected or the implementation overshoot its budget or schedule or both. In the worst case, an organization had to halt its production. These failures are discussed in detail in further sections.

Let us look at the manner in which an organization evolves. Usually an organization is started by an individual or by a small group of people. The processes are all informally defined in an ad hoc manner. As the organization grows, more people are hired for performing different functions in the organization. Further growth is managed by adding more people to assist the existing staff. The data and information is shared only at the top level. Each department develops its own ad-hoc processes in isolation. There are no formal identified data flow paths. When these organizations implemented MRP to automate entry, storage, retrieval and flow of data, they did not know how it was all done. A leading consultant firm of US reports that MRP requires 95 per cent accuracy in the bill of materials, 98 per cent accuracy in inventory balances, and a feedback to the planning process. In an informal environment, which was prevalent in most of the organization prior to micro-computer era, the required level of accuracy was difficult, if not impossible to achieve. MRP calculated Economic Order Quantity (EOQ) based on its own logic that was often times far from required quantity.

MRP and MRPII taught some important lessons and another big COTS solution ERP system came into the market Evolution of the information systems is shown in [Figure 1.4](#). Gartner (claims to have) coined the term ERP in the early 1970s to describe the next generation of integrated manufacturing software. ERP is an information system that integrates data of all departments and functions across a company into one computer system. ERP runs off a single database, enabling various departments to share information with each other. It is a business management system that integrates all facets of the business including planning, manufacturing, sales and marketing. ERP automates finance and human resources departments, and helps manufacturers handle jobs such as order processing and production scheduling.

As an example, let us look at the sales process of a retailing organization. The process is shown in [Figure 1.5](#). A sales order is received by a company for product X. The availability of the product is checked and if it is available, product X is picked up, packed and shipped. The available inventory of product X is reduced appropriately. The customer is billed and the accounts receivable go up accordingly. The customer eventually pays that leads to accounts receivable to reduce and the bank account getting credited. In a simple scenario with only retailing and no manufacturing, if the product X is not available in sufficient quantity, the company would have to procure the product. Without an ERP system, individual functional units may have their own multiple applications that may not communicate with each other in a seamless manner as shown in [Figure 1.6](#). To complete an order, all functional units need to communicate and coordinate. The communication delays may add to the lead time in completing the order. ERP system changes the scenario completely as shown in [Figure 1.7](#). The communication happens in real time and seamlessly.

FIGURE 1.4 Evolution of Information Systems

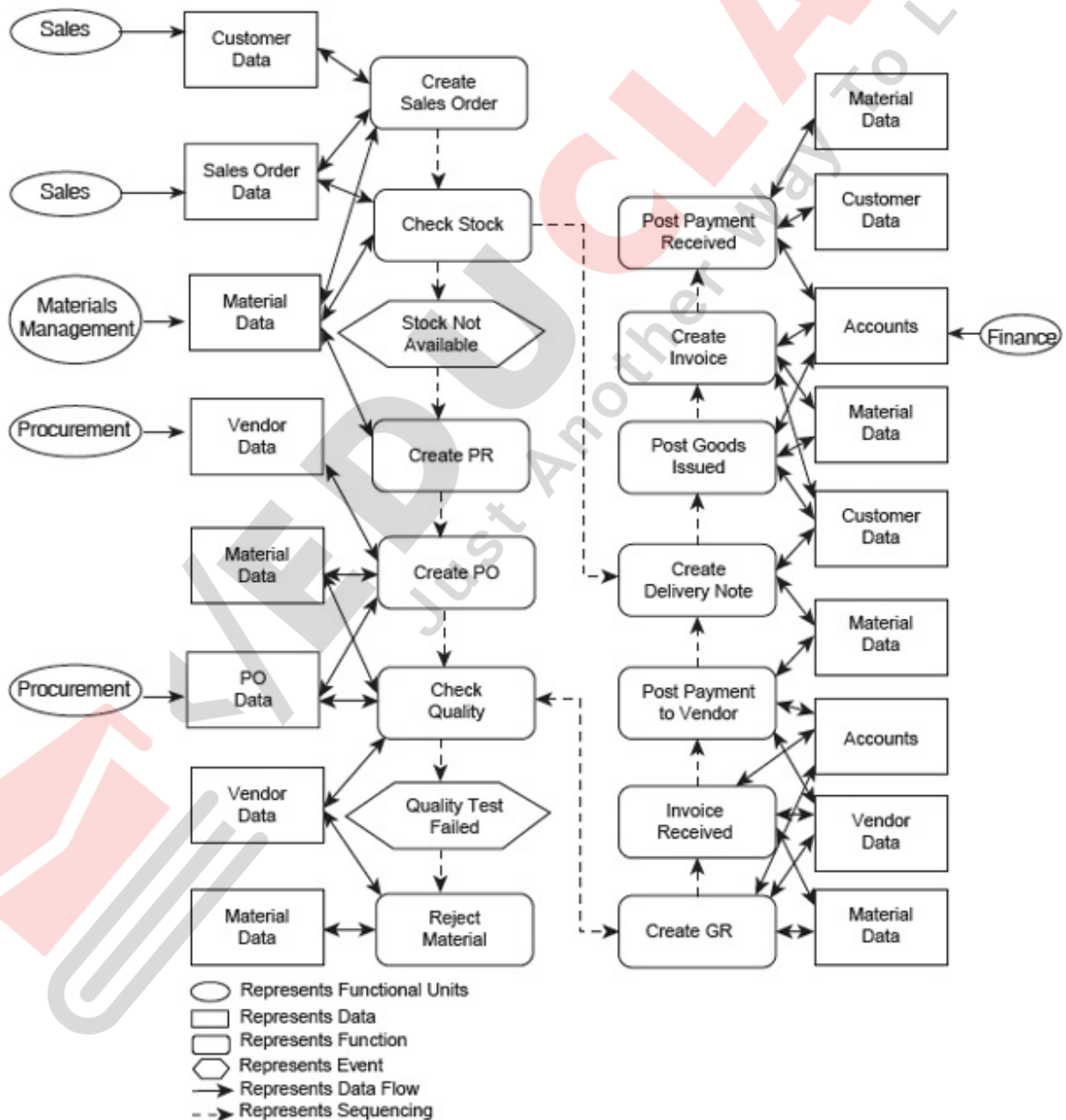
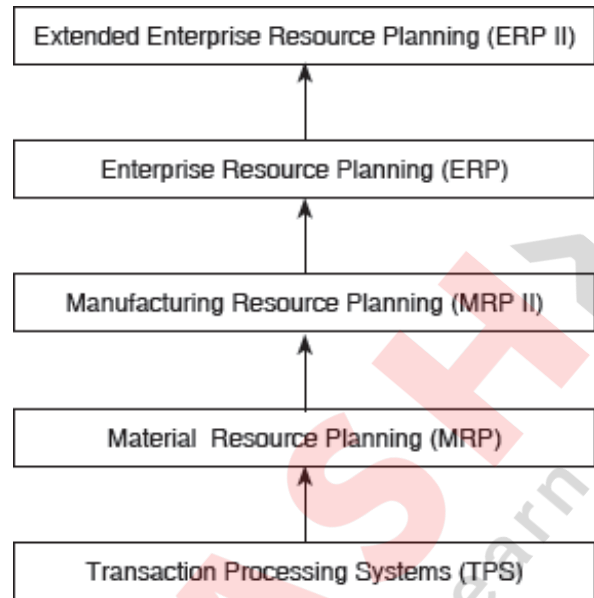


FIGURE 1.5 Sales Process of a Retailing Organization

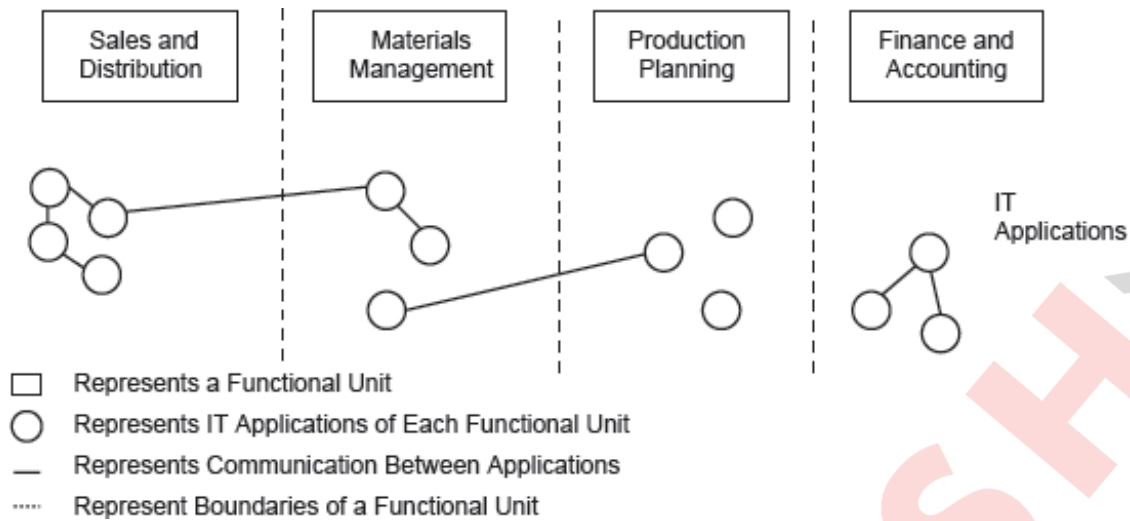


FIGURE 1.6 Independent Functional Units with Their Own IT Applications

For example, a sales representative prepares a quote for a customer. He enters the quote in ERP system and the system completes the quote with product details, price and delivery date. The quote gets converted into a sales order and the sales representative updates the status of quote to sales order. The system verifies customer's credit limit and records the order. The system schedules the shipment, identifies the best routing, and then working backward from the delivery date, reserves the necessary materials from inventory, orders necessary parts from suppliers and schedules assembly/manufacturing. The sales and production forecasts are immediately updated, and a material-requirements-planning list and bill of materials are created. The actual product cost and profitability are calculated and all accounts-receivable, payable, cost-centre and cash updated. The system performs nearly every informative transaction resulting from the sale (Figure 1.7).

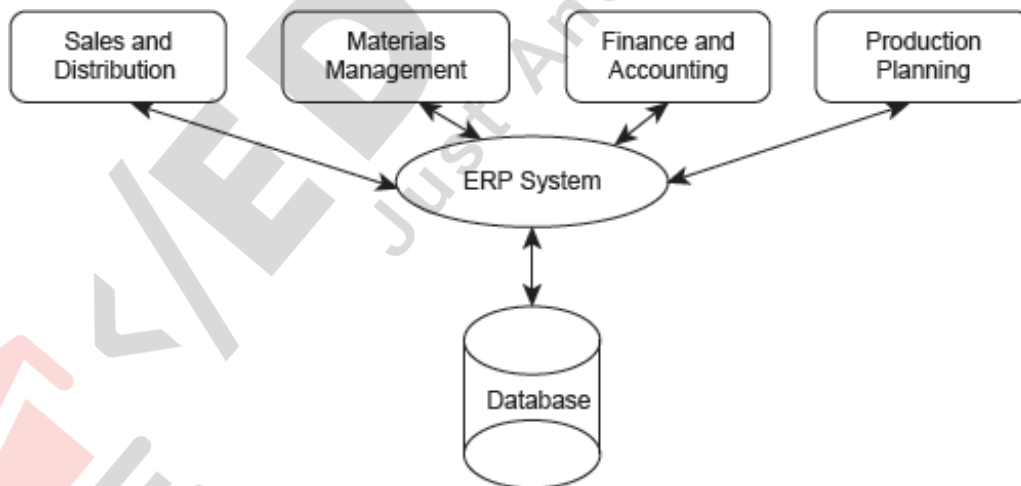


FIGURE 1.7 All Functional Units Access Same Database and Integrate Seamlessly Within and Across Functional Units.

ERP began as a term to describe a sophisticated and integrated software system used for manufacturing. In its simplest sense, ERP systems create interactive environments designed to help companies manage and analyse the data associated with manufacturing, such as inventory, orders, accounting and so on. Although this basic definition still holds true for ERP systems, and is expanding. IT savvy users, increasing customer expectations, changes in manufacturing requirements and technology's relentless pursuit for innovation are just some of the forces reshaping the definition of ERP. In today's dynamic and

turbulent business environment, there is a strong need for organizations to become globally competitive. The survival guide for competitiveness is to be closer to the customer and deliver value-added product and services in the shortest possible time. This, in turn, demands integration of the business processes of an enterprise, which is the stronghold of ERP. Economy has shifted from being based on manufacturing to service, and information has become the competitive advantage providing asset. ERP helps an organization obtain accurate and timely information. ERP has been defined in many different ways. The following is the functional definition of ERP software.

An ERP is a software-driven business management system which integrates all facets of the business, including planning, manufacturing, sales and marketing.

Put in simple words, *ERP systems comprise function-specific modules designed to interact with the other modules. ERP from an IT perspective is 'a comprehensive software package that stores, retrieves, modifies and processes the transactions of all the functions of an enterprise in an integrated fashion'.*

For an ERP project team, *ERP is a semi-finished product with tables and parameters that an organization and its implementation partner configure according to the business needs.*

1.5 ROLE OF ERP SYSTEMS IN AN ORGANIZATION

The Strategy, Technology, Organization-enterprise, People and Environment (STOPE) model shown in [Figure 1.8](#) helps in visualizing the role of ERP in an organization. This figure shows that the organization environment is the foundation on which company, technology and people rest. A company has internal business processes which are performed by functional units such as sales and distribution, production, finance and accounting, materials and human resource management. There are also some business processes to handle customers and vendors. The common thread that integrates the functional units is the information. If an organization uses information technology to run its business, then internal business processes are realized through an ERP system. An organization may use a Customer Relation Management (CRM) system for managing its customers and a Supply Chain Management (SCM) system to manage its vendors and suppliers. ERP, SCM and CRM together are termed as ERP-II. ERM, SCM and CRM together are termed as ERP-II (refer to [Figure 1.9](#)). We will learn about CRM and SCM in [Chapter 10](#).

1.6 THREE-TIER ARCHITECTURE FOR ERP SYSTEMS

Major ERP systems run on three-tier client-server architecture. Components of three-tier architecture are a central database server, an application server and a presentation server. Three-tier architecture is shown in [Figure 1.10](#). The database is generally a relational database management system and the organization data is stored in a relational database. Relational Database Management System (RDBMS) helps an organization in consolidating data and enforcing standards across the organization. Also, the data can be distributed across many geographical locations as well as on many servers. The distribution remains transparent to the user. All major RDBMS such as IBM DB2, Oracle, Informix and Microsoft SQL Server can support most of ERP systems today. The ERP system is loaded onto the application server. All ERP packages provide Graphical User Interface (GUI) for its configuration and for its end users. The hardware requirements are modest from today's

standards. A machine with couple of gigabytes of RAM and RAID-3 disks with a capacity of roughly 100 GB is sufficient. RAID architecture will ensure disk availability in spite of some disk failures. A server with two CPUs will help in 24 × 7 availability of the system. Most of the ERP systems require no special operating system. UNIX (its versions and cousins) and MS Windows operating systems are two major operating systems used by ERP software. Finally, presentation logic is loaded on user's desktop or laptop.

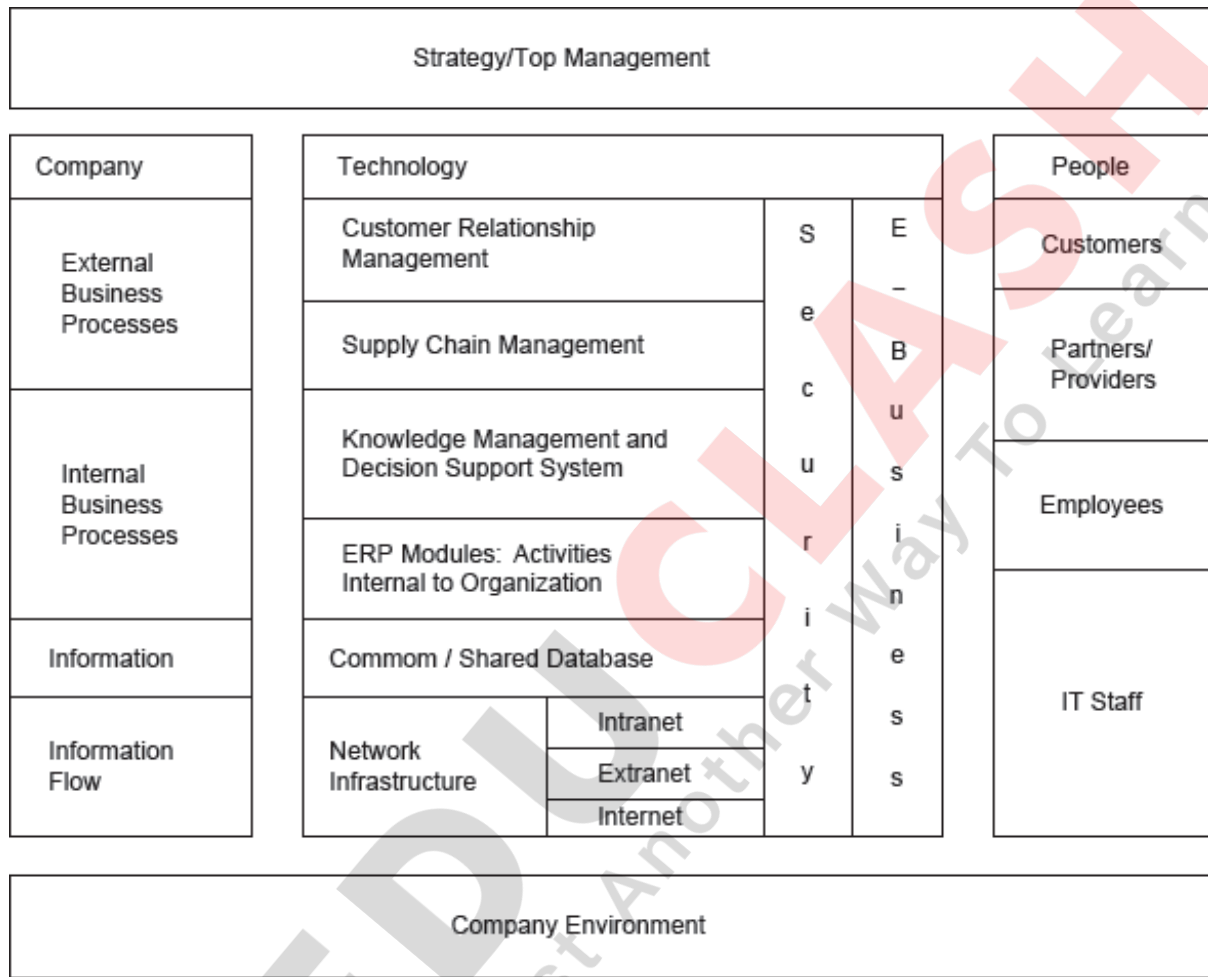


FIGURE 1.8 A STOPE Integrated View of ERP System

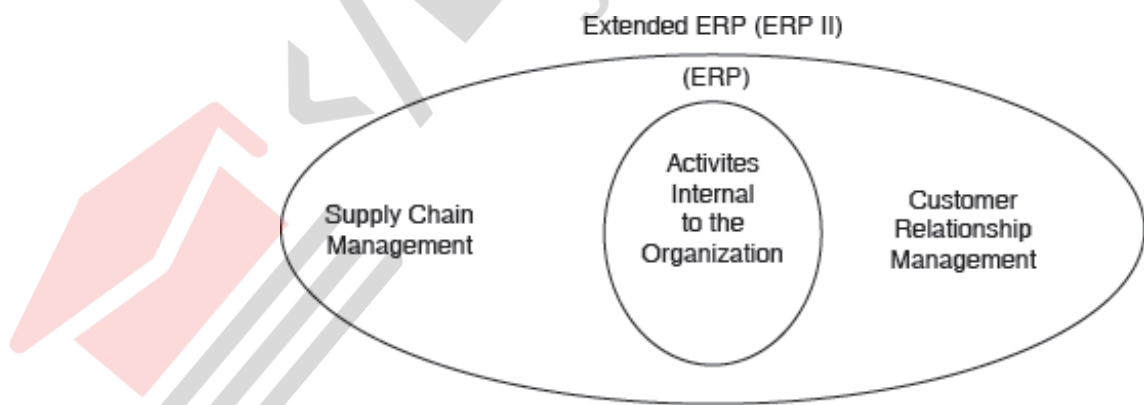


FIGURE 1.9 ERP-II or Extended ERP

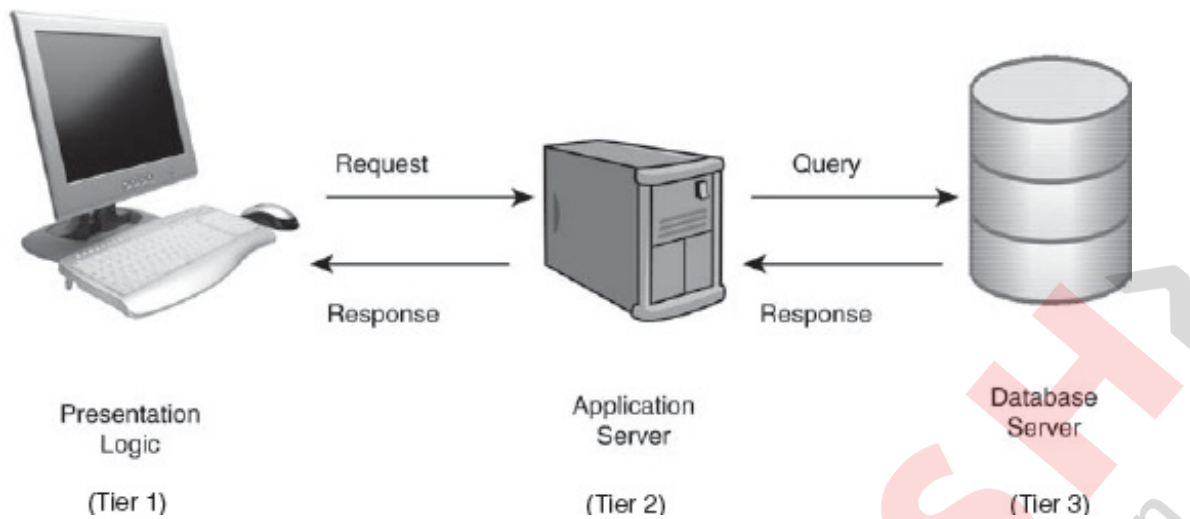


FIGURE 1.10 Three-tier Architecture of an ERP System

A small organization may use one server for database and application both. A large organization may have multiple application and database servers.

An ERP system supports many multi. For instance, it supports multi-currencies and multi-languages. It also supports multi-calendars, multi-time zones, multi-tax laws and multi-business rules (multi-environment). ERP supports multi-facility, multiple decisions and multi-companies under a corporate banner. It supports a multi-environment where business rules/tax rules may be different.

It supports multi-mode manufacturing which includes discrete process, continuous process, make-to-stock, highly repetitive, assemble to order (the final product is specified in terms of standard components), designed to order, and so on. Each of these manufacturing environments require different decision-making mechanism and all of these may be required under one single corporate banner. A mix of manufacturing modes help an organization fight severe market competition. The current business environment requires an organization to reduce total costs, maximize return on investment, shorten lead times and to be more responsive to customer demands, all at the same time. Highly dynamic markets call for effective enterprise information systems to enhance competitive advantage. An ERP is increasingly important in modern business because of its ability to integrate the flow of material, finance and information, and to support organizational strategies.

1.7 STAGES THEORY AND ITS APPLICATION TO EVOLUTION OF ERP

The stages theory proposed in 1973 explains organizational learning of the effective management of IT within the organization. An organization adopts information technology in four stages. The stages are initiation, contagion, control and integration. In the initiation stage, organization automates its well-understood processes that fall into general category of Transaction Processing Systems (TPS). The objective is to reduce functional cost. The organization would need only some knowledge of IT to achieve the objective. Only a handful of people will be involved and most of the employees would be unaffected. The management would need no justification for the IT spending as the expenditure is not much and the benefits start materializing quickly. In the second stage (contagion), more standard processes at operational level are automated that affect employees in general. The

management continues to pump in money hoping to see better results. The employees in this relaxed environment become innovative. The users of information systems and information technology are no more only the IT people. People from other functional areas also start using IT.

This relaxed environment does not continue forever. The management puts control mechanism in place to start the third stage which is control stage. The objective of the management is to achieve the better return on investments (ROI). By this time, however, the middle management realizes the potential of IT and starts using IT for decision-making activities. Employees either assume or are assigned responsibility for IT applications.

In the final stage, the organization starts integrating its IT applications that commences the integration stage. The organization develops a database that sits at the back end of all applications. Users start taking active interest in IT. The management starts treating IT investments like other investments which go through cost-benefit analysis. Each phase according to stages theory lasts about six to seven years. The stages and their evolution is shown in [Figure 1.11](#).

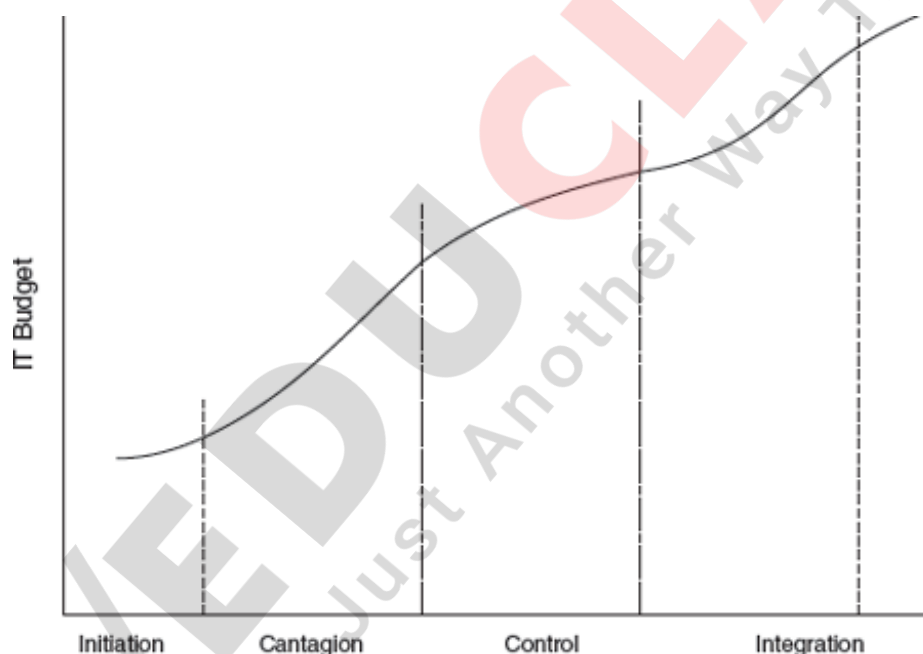


FIGURE 1.11 Stages of IT Evolution

The stages theory has been used to explain ERP strategies across organizations. There are three sequential stages that are associated with ERP system use. In the first stage, an organization continues to use the legacy system to run the business and in parallel becomes aware of ERP system. It prepares itself for ERP implementation (we will learn the details in subsequent chapters). Stage one culminates with ERP implementation. ERP system aims at the automation of all processes with the goal of integrating information across the enterprise. ERP system replaces most of the legacy systems built over a period of time with a single-integrated information system. The integration process presents an opportunity to the organizations to uncover redundancies and inefficiencies. Second stage commences when ERP usage spreads throughout the organization, employees start exploring and exploiting the system. The management becomes interested in measuring

the impact of the ERP system upon the business. The third stage commences when the organization starts feeling very comfortable with ERP and looks at it as a potential strategic tool.

An organization will have to start somewhere, learn and mature to the level where it will be able to use an ERP system as a strategic tool.

1.8 ARE ERP SYSTEMS DIFFERENT FROM TRADITIONAL INFORMATION SYSTEMS?

If an organization decides to implement an information system solution in the organization, they will first decide the scope of the project. Within the decided scope of the project, the support expected from the information system is decided. Usually a model of the information system is created and then either an off-the-shelf solution is purchased if it is available, or a custom made system is developed. In either case, the organization does not change its business processes according to the software specifications.

An ERP system is a generic system that supposedly implements best business practices. These best practices, the vendors claim, are the results of extensive research and reflect the practices followed by the successful business across the globe.¹⁰ An organization that implements ERP system is expected to adapt/change its business processes according to an ERP system.

Consider a multi-site organization that is spread geographically. If the organization does not have an ERP system, each site can follow its own naming convention for various components and products. If an ERP system is installed and all sites are integrated, everyone would have to follow the same convention. 'Nestle' USA was paying 29 different prices for vanilla to the same vendor because each factory used different name for it, and every factory was responsible for its own purchases. Then they implemented an ERP system, every factory had to use the same name for vanilla. The purchases were then consolidated impacting everybody in each factory including purchase, finance, materials management and production. Earlier each factory planned procurements according to their requirements. But now, the procurements happened according to the suggestions made by the ERP system. The people who had been running the factory saw many changes in business processes and roles. To quote:¹¹

1.9 SCOPE OF ERP SYSTEMS

ERP has been successfully implemented by automobile industry, consumer goods, chemical sector, pharmaceutical sector, banking, insurance, healthcare, telecommunication, and so on. All functional areas of an organization are supported by an ERP system. For a manufacturing organization, these include the following:

- Finance and accounting
 - Financial accounting
 - Treasury management
 - Enterprise control
 - Asset management

- Logistics
 - Production planning
 - Materials management
 - Plant maintenance
 - Quality management
 - Project systems
 - Sales and distribution
- Human resources
 - Personnel management
 - Training and development
 - Skills inventory
- Workflow
 - Integrate an employee in the value chain

For an academic institute, the ERP functionality would include the following:

- Academics
- Training and placement
- Hostel management
- Library management
- Admissions
- Human resource management
- Accounts
- Alumni relationships
- Research projects
- Seminar and events
- Purchases

There are ERP systems for various business verticals such as banks, oil industry and telephone service providers [Figure 1.12](#) shows the functionality offered by ERP system for a bank and its operations.

1.10 GENERAL MODEL OF BUSINESS AND ROLE OF ERP

ERP systems are installed in big organizations to replace the legacy system. These legacy systems worked as standalone systems and were not integrated with other systems. One of the reasons is that these systems were added to the organization as and when required by each of the functional units of the organization. The organizations themselves evolve over years. An enterprise starts as a small business with small investment and few people. As the business grows, the organization also starts growing, more people are hired and the responsibilities that were earlier shared are divided among people. In other words, functional units get created. Each functional unit installs IT systems as per their requirements. The business processes also evolve along with the business and

organization. The business processes that evolve over a period of time are not always efficient. Information systems are often used to automate or support the existing processes. ERP vendors claim that they implement the best business practices in their ERP systems. When an organization implements an ERP system, its business processes also improve. ERP also affects the organization structure as it makes information to flow horizontally through the organization as opposed to vertically in traditional organization.¹² This calls for a relatively flat organization. An ERP is a software that affects all aspects of an organization. People have to be ready to accept ERP and the changes it brings about. A training program is required to prepare people technically and psychologically.

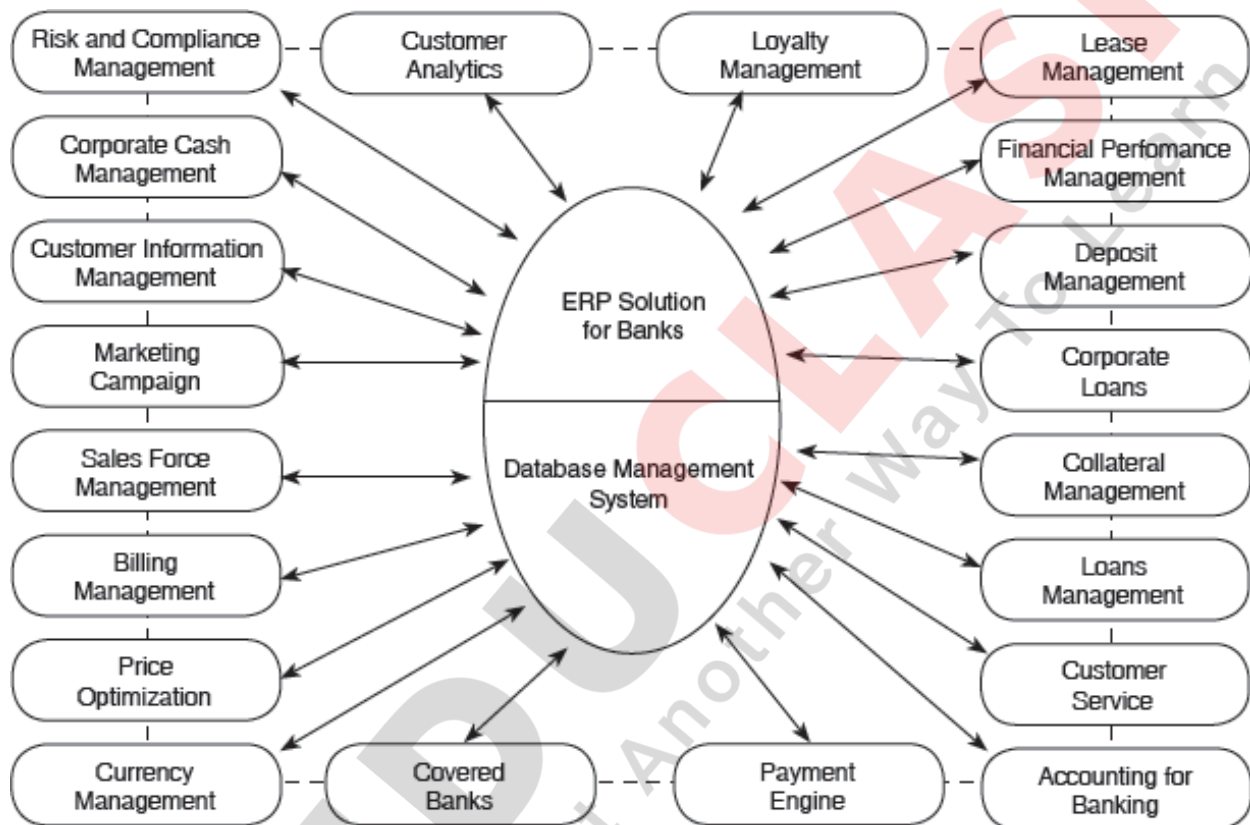


FIGURE 1.12 Functionality Offered by an ERP System for a Bank

ERP system has to support competitive strategy of the organization. Competitive strategy of an organization refers to the basis on which it achieves competitive advantage. An organization's competitive strategy may be based on one or more of the following criteria:

- Price
- Quality
- Delivery (on time)
- Flexibility (deliver-customized product)

An organization may use price as a criteria and try to provide essential qualities in its services and products at a cost lower than its competitors.¹³ For instance, Air Deccan, an Indian domestic airline clearly mentions on its Web site that it is a low-cost carrier. The company was formed in 1995 and since then it has successfully carved a niche for itself. Air Deccan has adopted a lean and mean approach to management and staffing stating, that it aims at maintaining a low aircraft-to-employee ratio. The airlines recently (December 2005) made a collaboration with Cafe Coffee Day (CCD) to serve its customers in the sky for which customers pay. CCD has the same criteria as Air Deccan for achieving competitive

advantage.

Competitive advantage can also be obtained by providing better quality where quality could be defined in terms of design. The features provided could distinguish the product or service in the market. Quality can also be defined in terms of conformance to the design specification. Tata Motors, the largest automobile company of India with revenues of ₹ 20,483 crores, use quality for achieving competitive advantage. When Tata Motors invested in IT, its one of the objective was to improve operational efficiency and to provide a better customer experience.

Ever since the market has become buyers market instead of being sellers market, sellers have to work extra hard to deliver the services on the schedule which is often tight. There is also emphasis on providing flexibility to the customer so that the services or products can be customized according to their needs. For example, Horiaki India Private Ltd., a subsidiary of Horiaki Company Ltd of Osaka (Japan), is engaged in the business of manufacturing and exporting custom-moulded rubber products.

Hulasi Metals Private Limited, India, is one of the largest manufacturers of precision sheet metal products—enclosures/cabinets, racks, sub-racks, chassis and related parts—for telecom, power electronics and IT industries in India. Hulasi specializes in customized products manufacturing and contract fabrication of high-precision sheet metal parts. Customized products include electronic, electrical and telecommunication enclosures.

When such a company invests in an IT, its objective is to improve organizational and process flexibility as well its capability to respond to changes. The company would like to achieve customer satisfaction through improved planning, forecasting and control and also through improved decision making. However, if an IT system (for example an ERP system) imposes rigidity, it is best not to install it.

IT alone will not help the organization to stay competitive. The structure of the organization should be able to take the advantage of its IT infrastructure.

1.11 MAJOR ERP PLAYERS

SAP is by far the largest company, and has been in business since 1972. SAP has 26,150 customers, 88,700 installations across 120 countries with 12 million users. SAP has a market share of 56 per cent, Oracle/People Soft 23 per cent, Microsoft 12 per cent and Siebel 9 per cent. SAP has a total revenue of 7,514 million Euro, out of which 2,361 million Euro is the contribution of license fee. Their 50 per cent revenue comes from Germany and US, with equal contribution from each country and the remaining comes from the rest of the world. SAP has more than 32,000 employees. Some other ERP vendors are Baan, Marshal, Protean, Prism, Advantis, J. D. Edwards, MFG\PRO, Rhythm, Avalon, BPCS, Mamis and RAMCO. The Sage Group is a leading provider of business management software for mid-sized companies worldwide, with annual sales of nearly \$900 million and 3.6 million customers. Siebel Systems is a recent (about five-year old) company based in San Mateo, California, employs 1,200 people and with about \$410 million in revenues.

There are companies that specialize in banking sector such as Nucleus Software, TCS and Infosys. There are companies that specialize in education sector such as Dimensions Innovations.

1.12 IMPLEMENTATIONS IN INDIA

In India, many major corporate houses as well as small and medium enterprises have implemented ERP system and many more are in the process of implementing or considering an ERP implementation. A small list of ERP implementations in India are listed in [Appendix A](#). The source is mainly the Web sites of the companies and ERP implementations partners/vendors. Once a company installs an ERP system, it will serve the company for at least three years but it may serve for as many as 10 years. Only about four per cent of the companies would retire an ERP system in less than three years. Most of the companies continue to use their ERP systems for longer than three years (refer to [Table 1.1](#)).

TABLE 1.1 ERP System Life Span and the Percentage of Organizations That Could Use ERP System for the Specified Duration

ERP System Life (Years)	Per cent of Companies
<3	3.4
3–5	21.5
5–7	27.5
7–10	22.8
>10	24.8

CONCLUSION

ERP systems are semi-finished software products that integrate all departments and functional units of an organization. An ERP system uses a centralized database to store the data and provide graphical user interface for performing business transactions.

Information technology systems have evolved from Transaction Processing Systems (TPS) to Management Information Systems (MIS) to Decision Support Systems and Executive Support Systems (DSS and ESS).

ERP systems fall in the category of TPS and MIS. The data that ERP system stores can be consolidated and analysed using various DSS and ESS. It is critical that the data is accurate since it is seen throughout the organization and an error/omission by one functional unit. For instance, if inventory is not updated in timely manner, the production and sales may suffer.

ERP systems are available for all types of organizations—manufacturing such as auto, oil and gas exploration companies, refineries; service such as banking, telecommunication, legal agencies, distribution; and academic etc. There are more than 200 ERP products that

are available in the market. One needs to carefully choose an appropriate ERP system.

CASE STUDY

There is retail company in Delhi, India registered with the name RetailS. The company was formed in 1995. The company primarily deals in metallic packaging material. It also deals in some food products. The turnover of company is about 10 million USD and the company has less than 30 employees. RetailS has three managing directors, a sales department, a purchase department and an accounting department.

The organization structure (shown in [Figure 1.13](#)) use organizational model convention used by SAP. The conventions used in the organizational chart are quite self-explanatory. The data that is shared between these functional units is shown in [Figure 1.14](#).

The data that is shared between a customer who is outside organization unit and sales is the following:

- Customer data
- Items details
- Order data
- Accounting data

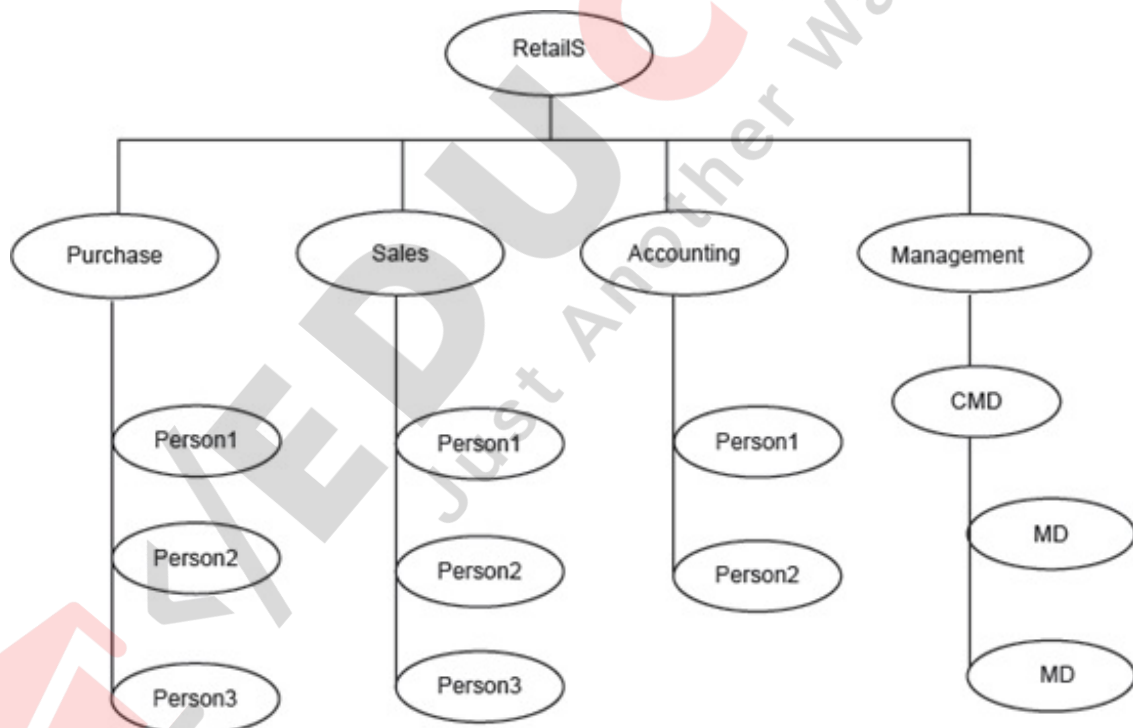


FIGURE 1.13 Organizational Structure of RetailS

The data that is shared between sales and accounts is the following:

- Customer data
- Order data
- Accounting data

The data that is shared between sales and management is the following:

- Order data

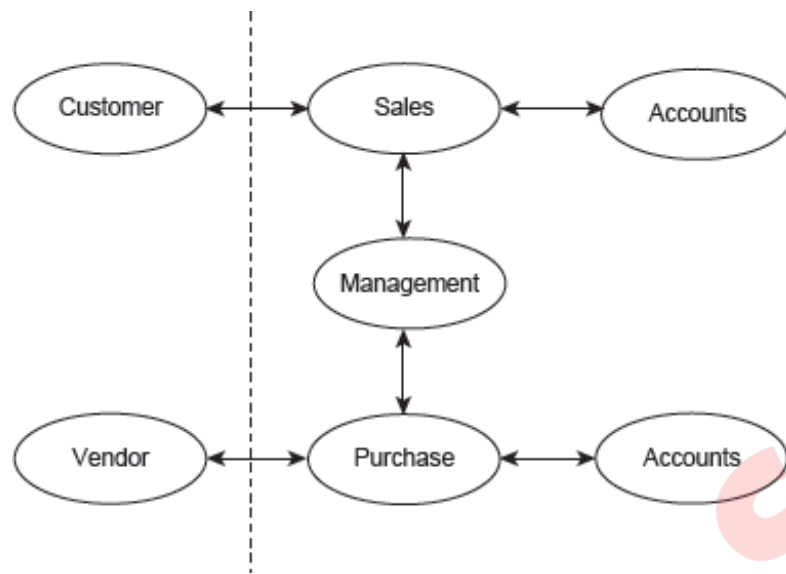


FIGURE 1.14 Interaction Between Various Organizational Units of RetailS and Outside Units—Customers and Vendors

You can enumerate the data that is shared between a vendor and the purchase, between the purchase and the accounts, and between the purchase and the management.

EXERCISES

Test Your Understanding

1. What is the value chain framework? How does each unit in this framework interact with others?
2. What are the problems that an organization faces if each functional unit maintains its own data?
3. Define and explain an ERP system. List major ERP players.
4. Explain evolution of ERP system using stages theory.
5. Explain three-tier architecture of an ERP system.
6. What makes an ERP system different from custom-made software products?
7. Compare and contrast MIS and an ERP system.
8. Describe your own IT usage pattern. Does it support stages theory?
9. What is the scope of an ERP system for a manufacturing system? Describe it with the help of Michael Porter's value chain network as well as functional view of the organization.
10. The scope of ERP system is industry specific. Justify this statement with the help of an example.
11. Who are the major ERP vendors?
12. What is the life span of ERP systems in organizations?
13. What are the different models of businesses? Do ERP support all business models?

Apply Your Understanding

1. Most likely, you are part of an organization. Identify some of the problems that you or your colleagues faced due to information being not available. Suggest some solutions.
2. Identify an organization that you can visit and study. For example, a retailing

organization or a chain, a manufacturing organization, a bank, an academic institute or a law firm. You should be able to visit and talk to the managers and employees in the organization that you identify. It is not necessary for the organization to have information systems or an ERP system. Choose the organization carefully as you will work with the same organization throughout the book.

1. Your task is to study information flow in the chosen organization. If the organization is big, restrict yourself to one functional unit but include its interface with other functional units. The objective is to identify the role that information plays in the organization and accessibility of the information.
2. If the organization has information systems, study if they the systems are fragmented and isolated or integrated. Also, learn when were the information systems installed and how long they have been in use? Write down your learnings in a document.
3. Identify the functional units of your organization and draw an organizational graph similar to the one shown in [Figure 1.13](#).
4. Identify the interactions among functional units of your organization and draw an interaction graph similar to the one shown in [Figure 1.14](#).

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