

LEARNING OBJECTIVES

Upon completion of this chapter the student should be able to –

- define and describe extended ERP systems
- identify various components of extended ERP
- define supply chain management (SCM) and customer relationship management (CRM)
- understand SCM and CRM integration with ERP
- understand e-business as a platform for ERP systems
- understand the role of business intelligence (BI) applications in ERP systems

2.1 Defining Extended ERP

- The latest generation of ERP solutions focuses on blending the core ERP modules with the new types of applications and web-enabled tools. This helps an organization to extend the newly-integrated applications to external entities, like suppliers and end-users. An ERP of this kind is called an extended ERP or ERP II. According to Gartner (2002):
- ERP II is an application and deployment strategy that expands from simple ERP functions to achieve the integration of an enterprise's key, domain-specific internal and external collaborative, operational, financial, and other processes.
 - ERP II sets a vision for integrating all enterprise-centric, commerce-oriented business processes without requiring a single vendor strategy.
 - ERP II does not preclude a best-of-breed approach; rather, it allows users to determine the degree of the vendor centricity required to fulfil the enterprise process requirements and integration capabilities native to ERP II.
 - ERP II not only includes capability specific to the enterprise domain but also the capability to connect the enterprise to key business partners directly, or through a private e-marketplace. Different collaborative, operational, and financial processes have the enterprise at the centre, and are included in the process structure.

Extended ERP system comprises applications such as -

- CRM
- SCM
- E-commerce applications
- BI components (e.g., data warehouse, data mining tools)
- Advanced planning and scheduling (APS) applications

Figure 2.1 gives the networked enterprise model of the extended ERP system.

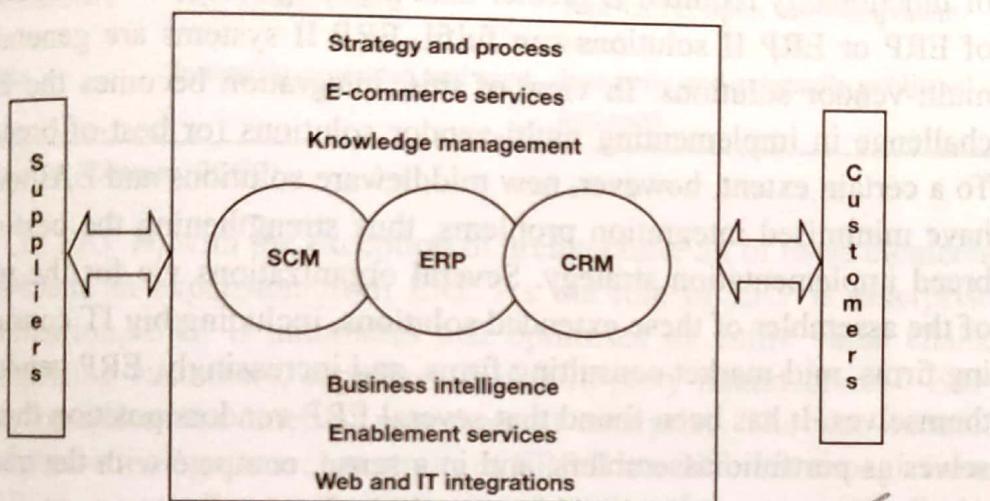


Figure 2.1
Networked enterprise model.

The process of extending ERP to external business entities is quite rapid. The primary reason for extending ERP is to capture competitive market advantage as:

- Applications such as CRM allow organizations to manage up-front opportunities.
- APS provides the tools needed to optimise resources, and keep supply and demand in sync.
- BI and analytical applications deliver access to strategic information and corporate guidance.
- SCM allows organizations to maintain optimum inventory at all levels of the organization.

New technologies such as ERP II in organizations have now led to the advent of collaborative ERP (cERP). cERP is a cohesive framework to facilitate information exchange among organizations that enables them to conduct business either with their partners or some external entities. Extended ERP and cERP are applied across enterprises conducting

their businesses through the e-business solutions mode. The mission of cERP is to increase the partnership percentage between retailers and manufacturers, and between manufacturers and their suppliers through co-managed processes and shared information. cERP is a form of electronic interaction of business entities that touches every sector of the **value chain**. This challenge has been met through the development of web-enabled ERP systems. ERP vendors are still developing or acquiring applications in the newly-developed categories, though in many cases, best-of-breed software vendors lead the segment. As the scope of functionality required is greater than any single vendor deployment of ERP or ERP II solutions can fulfil, ERP II systems are generally multi-vendor solutions. In view of this, integration becomes the key challenge in implementing multi-vendor solutions (or best-of-breed). To a certain extent, however, new middleware solutions and EAI tools have minimised integration problems, thus strengthening the best-of-breed implementation strategy. Several organizations vie for the role of the assembler of these extended solutions, including big IT consulting firms, mid-market consulting firms, and increasingly, ERP vendors themselves. It has been found that several ERP vendors position themselves as portfolio assemblers, and in a sense, compete with the traditional system integrators and big consulting firms.

Value Chain: It is a chain of activities. Products pass all processes of the chain in order, and, with each process, gain some value. Value chain is a business management concept that was first described and popularised by Michael Porter in his 1985 best-seller, 'Competitive Advantage: Creating and Sustaining Superior Performance'.

Difference between ERP and Extended ERP

According to Gartner (2000), ERP II can be differentiated from ERP on the basis of six elements that touch business, application, and technology strategy. These elements are: the role of ERP II, its business domain, the functions addressed within that domain, the processes required by those functions, the system architectures that can support those processes, and the way in which data is handled within those architectures. Table 2.1 gives a brief distinction between ERP and ERP II on the basis of these six parameters.

Table 2.1 ►
Differences between ERP and ERP II

Element	ERP	ERP II
Role	Internal enterprise optimisation	Whole value chain participation
Domain	Manufacturing and distribution	All sectors/segments
Function	Manufacturing, sales, finance, HR	Cross-industry, industry sectors, and specific industry processes
Process	Internal, hidden	Externally connected to other stakeholders
Architecture	Web-aware, closed	Web-based, open, and component-based
Data	Internally generated and used	Internally and externally published and used

(Source: Gartner 2000)

In ERP II, with the exception of architecture, all of these elements represent an expansion from ERP. As the role of ERP is enterprise automation, ERP II automates and optimises its entire value chain, comprising customers, suppliers, and third-party manufacturers. ERP only optimises the internal processes of enterprise. The web-centric, designed-to-integrate architectures of ERP II are different enough from ERP to eventually necessitate complete transformation. Similarly, ERP II's domain extends beyond ERP to include non-manufacturing industries as well. The data in ERP II is shared among external entities comprising the value chain of the organization, whereas in ERP, it is internally generated and consumed. Processes in ERP II are externally connected while in ERP, they are only internally defined.

2.2 5) Supply Chain Management (SCM)

Supply chain management (SCM) is the management of a network of interconnected businesses to provide product and services required by end customers. It consists of all stages involved, directly or indirectly, in fulfilling a customer request. A typical SCM spans over the:

- Movement and storage of raw materials,
- Work-in-process inventory, and
- Finished goods from point-of-origin to point-of-consumption.

So a typical supply chain includes the following entities:

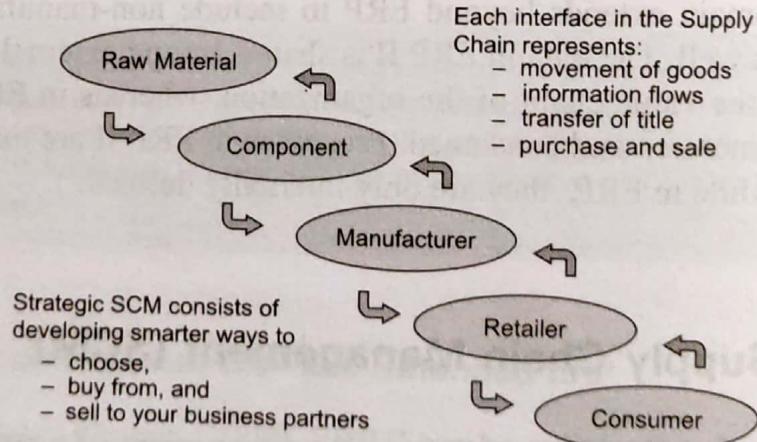
- Manufacturer
- Suppliers
- Transporters
- Warehouses
- Retailers
- Customers

If we try to give sequence to various services, then supply chain is a network of facilities and distribution options that performs the functions of:

- Procurement of materials
- Transformation of these materials into intermediate and finished products
- Distribution of these finished products to customers

In other words, SCM is a cross-functional inter-enterprise system that uses information technology to help support and manage links between some of company's key business processes and those of its suppliers, customers, and business partners.

Figure 2.2
Supply chain activities.



Today, supply chain management has generated much interest in business for a number of reasons. Some of the key reasons are:

- That actions taken by one member of the chain can influence the profitability of all others in the chain.
- That firms are increasingly thinking in terms of competing as part of a supply chain against other supply chains, rather than a single firm against other individual firms.

- To streamline their operations through better coordination with their suppliers and customers. The cost of poor coordination can be really high.

Let us try to understand the Wal-Mart's SCM: 23

- The process begins with the customer wanting to buy detergent and visiting Wal-Mart store.
- Wal-Mart store stocks its shelves with inventory which is supplied from finished-goods warehouse or distributor using trucks supplied by a third party.
- The distributor gets inventory from the manufacturer (e.g. Proctor & Gamble [P&G] or Unilever).
- The manufacturer's (P&G, Unilever, etc.) production plant receives raw material from a variety of suppliers, who may themselves have been supplied by lower-tier suppliers. For example, packaging material may come from Tenneco packaging, while Tenneco receives raw material to manufacture the packaging from other supplier.

This supply chain is illustrated in Figure 2.3.

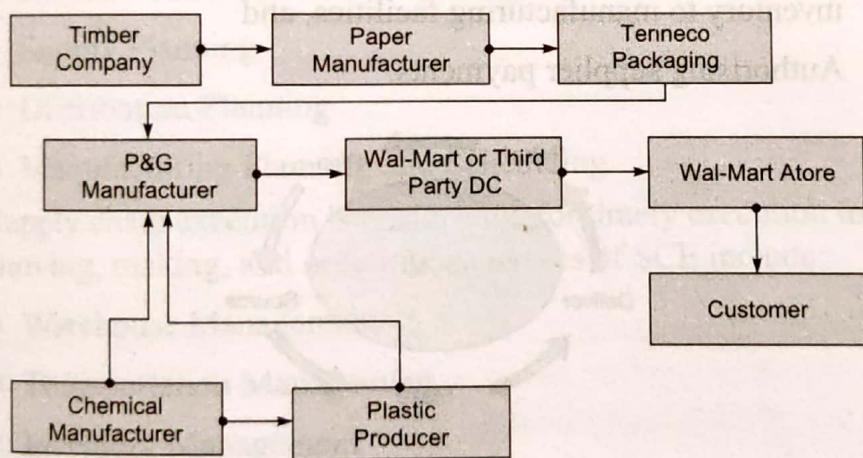


Figure 2.3
Wal-Mart SCM
process (Source:
SCM by Sunil Chopra
& Pete Meindl).

Thus, we can conclude that:

- Each stage in a supply chain is connected through the flow of products, information, and funds.
- These flows often occur in both directions and may be managed by one of the stages or an intermediary.
- The appropriate design of supply chain depends on the customer's needs and the roles played by stages involved.
- The objective of every supply chain is to maximize the overall value generated.

Basic Components of Supply Chain Management

97

Five basic components of SCM are:

1. Plan: It is the most strategic part of SCM which involves:

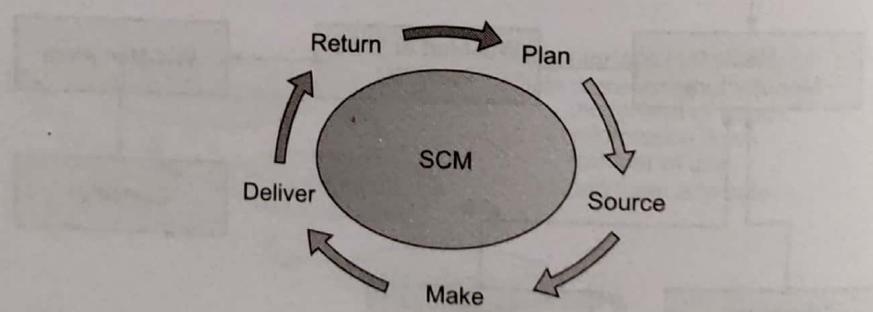
- Managing various resources to meet customer demand for product or service, and
- Developing set of metrics to monitor the supply chain so that it is efficient, costs less, and delivers high quality and value to customers.

2. Source: It involves:

- Selecting the suppliers for goods or services,
- Developing set of pricing,
- Setting delivery and payment processes,
- Developing metrics for monitoring and improving the relationships,
- Providing processes for managing the inventory, transferring inventory to manufacturing facilities, and
- Authorising supplier payments.

Figure 2.4

The five components of supply chain process.



3. Make It involves activities for manufacturing like:

- Scheduling the production activities,
- Testing, packaging, and preparing for delivery, and
- Developing metrics for measuring quality levels, production output, and worker productivity.

4. Deliver It involves logistics part including:

- Receiving of orders from customers,
- Developing of a network of warehouses,

- Picking of carriers to get products to customers, and
 - Setting up of an invoicing system to receive payments.
- 5. Return** It involves creating a network for receiving defective and excess products back from customers and supporting customers who have problems with delivered products.

The basic supply chain applications have matured enough and available at far reasonable price tags and with much faster implementation cycle. Many ERP vendors have incorporated SCM functionality in their ERP products. Similarly, even the SCM vendors are trying to adapt ERP functionality, although this process might take some time.

3) Customer Relationship

Customer relationship management (CRM) is an integrated marketing, sales, and service strategy of attracting and retaining customers, using integrated information and consistent channel processes. Some other definitions of CRM are as follows:

- Process to identify, acquire, and retain customers.
- Process of automating the front office functions of sales, marketing, and customer service.
- Process to enable companies to leverage **increased customer knowledge** for building profitable relationships through technology-enabled strategies.

Customer relationship management, as a broad term, covers the concepts used by organizations to manage their relationships with customers, including collecting, storing, and analysing customer information. It -

- requires coordinated enterprise-wide actions for managing relationships;
- combines business process and technology; and
- focuses on customer lifetime value creation and optimisation.

Figure 2.9 gives the general architecture of CRM applications. As shown in figure the overall objective is to acquire new customers, enhance services to existing customers, and ultimately retain existing customers. The core processes are: direct marketing, **cross/up selling**, proactive services, sales force automation, customer support, and call centre support.

Cross/up selling: It is a term used to describe the sale of additional products or services to a customer.

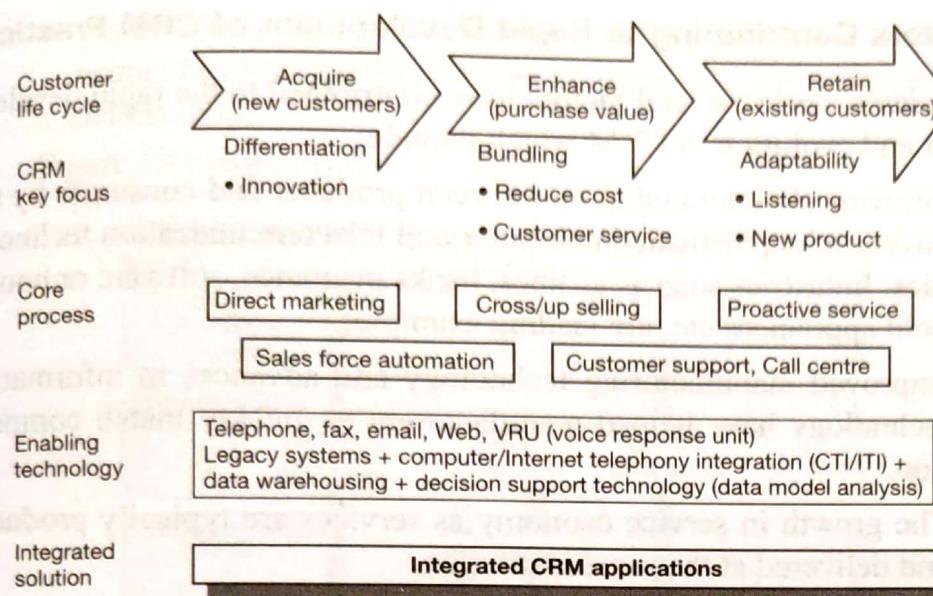


Figure 2.9
CRM architecture.
(Source: modified from
Kalakota & Robinson
2001)

Key CRM Principles

Some of the key principals of CRM are:

- 1. Customers segmentation:** The objective is to recognise and reward best customers and also to differentiate between a high value customer and a low value customer. Hence, a CRM system is configured according to the following customer differentiating factors:
 - Sensitivities, tastes, preferences and personalities
 - Lifestyle and age
 - Culture background and education
 - Physical and psychological characteristics
- 2. Customers retention:** CRM helps in evaluating customer satisfaction and thus enables organization to improve customer satisfaction by concentrating on weak areas of customer support. Customer retention increases with improved satisfaction level for each customer.
- 3. Maximizing selling potential using up-selling and cross-selling by understanding customer's tendency.**
- 4. Increase loyalty:** Loyal customers are more profitable. Any company will like its mindshare status to improve from being a suspect to being an advocate.

Case: CRM at ICICI

ICICI is active since last 4 decades, was established as bank in 1994. Some other retail initiatives of ICICI are Prudential ICICI AMC, ICICI Personal Financial Services, ICICI Capital Services, and ICICI web trade, Prudential ICICI Life Insurance, ICICI Lombard General insurance. Some other web based initiatives of ICICI includes city portals and various other utility sites such as billjunction.com, icicimoneymanager.com, and magiccart.com, among others.

ICICI implemented CRM practices for integrated view of its customers to everyone in the organization, increased communication between the virtual universal bank and its customers. With an objective of immediate contact to customer and customer centric relationship, they put in place a technology enabled CRM solution.

The objective of CRM at ICICI was to automate and improve the business processes associated with the customer, call centre, ATM, web, telephone, kiosk, bank branch, sales associates, etc. The solution was supposed to integrate non-transactional customer information in front-office with the transactional information housed in the back office. The overall objective was:

- to carry out customer management more efficiently.
- to engage in one-to-one marketing by tracking complete customer life-cycle history.

- to automate process-flow tracking in the product sales process, and be able to generate customized reports and promote cross-selling.
- to enable efficient campaign management by providing a software interface for definition, tracking, execution, and analysis of campaigns.

A very detailed and comprehensive CRM action plan was developed based on the understanding that CRM will require enterprise wide transformation. ICICI knew that the CRM success is highly dependent on the use of technology. So, ICICI decided to purchase an off-the-shelf CRM solution and customize it to suit its requirements. They formulated a criteria for its selection based on functionality, flexibility, scalability, fit with existing architecture, etc.

For vendor selection, the criterion followed was based on vendor's CRM expertise, Retail Finance Experience, Credentials including financials, client list, life history, etc. A detailed Request for Information (RFI) was sent to shortlisted CRM vendors and thereafter evaluation was done. After shortlisting two product vendors and system integrators, reference calls were made to several of the past clients of all short-listed companies.

Various processes were mapped on to product by understanding the details. During the course of the process mapping, several opportunities for improvement were identified and implemented.

Some of the key lessons learnt by ICICI were:

- CRM is a process related initiative, not a technology initiative.
- CRM is not exclusively a marketing, sales, or service initiative.

Relationship of CRM

1. Knowledge Management System (KMS): Knowledge Management (KM) is about using a diversity of knowledge resources like legacy systems, existing data warehouses, portals, websites, external marketing research agencies to cultivate knowledge with respect to customers, suppliers, partners, etc.

Effective CRM gives real knowledge about various customer segmentations like:

- Most valued customers,
- Most growable customers,
- Below zero customers, etc.

by analyzing internal and external data, surveys, figures, etc. So in a typical situation, marketing, sales and after-sales people are knowledge workers whereas metrics, ROI, Balance Scorecard method, and benchmarking are some of the common techniques of KM system evaluation.

Front office of any organization could be more productive if they could utilize customer knowledge. One method for this is to create a data warehouse, thereafter information which is required to effectively implement principles of CRM could be mined out of this data warehouse.

2. Enterprise Resource Planning (ERP) System: An ERP system is primarily meant for automating and improving business processes. Similarly, CRM is also automating and improving the business processes albeit in front-office areas such as marketing, sales, customer service, and customer support. Also, if ERP system can result in improved organizational efficiency, CRM aims to provide organizational effectiveness by reducing sales cycle and selling cost, identifying markets and channels for expansion, and improving customer value, satisfaction, profitability, and retention.

Further, if ERP provides the backbone, resources and operational applications to make organizations more efficient in achieving these goals, then the CRM applications provide the framework for embodying, promoting and executing best practices in customer facing activities.

ERP, CRM, and SCM integration

The integration of ERP, CRM, and SCM can help in deriving substantial leverage as ERP applications can help both by sharing data across whole value chain members and providing broader information, which can help managers in making better decisions. At the same time, however, the integration of ERP with CRM and SCM is a very tough task as each member in the value chain may have different hardware and software, and it is very difficult to insist that the company's supply-chain partners maintain the same systems. It would, therefore, be ideal if all the parties involved could agree up-front to abide by open standards. Otherwise, sophisticated middleware interface software can be used, which enables the sharing of data and processes between ERP, SCM, and CRM (Figure 2.11).

Thus, by integrating ERP with data warehousing, the company obtained the following business benefits:

- Ability to rapidly change and adopt new business structures.
- Increased profitability due to improved customer profiling and reporting.
- Time and cost saving due to minimal training.

So, integration in this case was realized by updating ERP functions and integrating them into one of the big data warehousing vendors, namely, Cognos.

2.4 ERP and E-commerce

The latest trend in ERP revolves around integrating various extended ERP components, such as SCM, CRM, and BI over the e-commerce or e-business platform. To fully explore the potential of ERP, most organizations today have integrated SCM and CRM with ERP over the Internet, Intranet, and Extranet. The entire idea behind this is to cut costs by eliminating wasted and redundant data, while simultaneously providing added value to the customer. E-commerce is of great help in this because it allows instantaneous information flow throughout the different organizations. Most ERP vendors are also developing software that is Internet friendly, and looking for more web-based networks. With the advent of e-business platforms, the structure of ERP has also changed to inter-enterprise cooperation, and then to e-community collaboration. E-business based ERP solutions today support:

- Integration with existing processes and applications
- Web-enabling applications
- Advanced personalization
- Advanced mobile enterprise
- Built-to-order supply chain
- Collaborative business solutions
- XML-based industry-specific process models
- Customer self-service

Extensible Mark-up Language (XML): It is a general-purpose mark-up language, which is classified as an extensible language because it allows its users to define their own elements.

Organizations must design ways to make sure that the information on the back end of the enterprise programs feeds their e-commerce applications, and vice versa. E-business brings the advantage of integration; however, it also adds another world of challenges because many organizations have software written in different languages and designed to be a part of different models. In addition to these difficulties, ERP and e-commerce were designed with two different focuses. ERP is designed to focus on internal enterprise data, information, and knowledge, whereas the focus of e-business is primarily on the communications with external stakeholders. These issues are depicted in Figure 2.17.

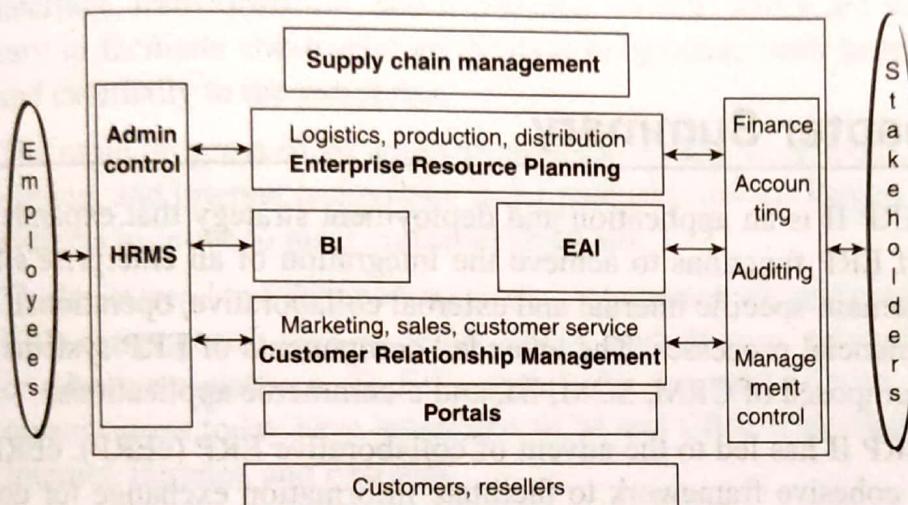


Figure 2.17
E-commerce back office enterprise integration.

Although, ERP is essential in controlling and managing all the information contained in the enterprise, it falls short in the area of providing customers and suppliers with self-service in their transaction. This is the major concern and motivation for the push to integrate ERP with the Internet. This diagram illustrates the application components, inter-relationships, and interfaces with -

- Customers (multi-channel integration)
- Employees (employee channel integration)
- Business partners (supply chain integration)
- Other stakeholders in the e-business enterprise (financial channel integration)

Figure 2.17 represents an ideal set-up, wherein all users of the system are able to access the needed information while using an easy to navigate GUI. This type of integration allows businesses to streamline their processes.

LEARNING OBJECTIVES

Upon completion of this chapter the student should be able to –

- describe business process re-engineering (BPR) and process modelling
- identify various enterprise design principles
- differentiate between BPR and TQM
- understand the role of change management in BPR implementation
- differentiate between technology-enabled and clean-slate re-engineering
- identify the methodology of BPR implementation
- understand the role of IT in BPR
- identify the factors involved in BPR's success and failure
- understand the relationship between ERP systems and BPR

5.1 Defining Business Process Re-engineering

In the present industrial scenario, business environment is changing at a very rapid pace. This is mainly due to increasing market forces such as customer, competition, and change. Enterprises, around the world, are seeking to undergo business process re-engineering (BPR), which comprises revitalizing, reinventing, and resizing themselves in an effort to become more competitive. It is a process of transition from an old system to a new one, and enterprises adopt this approach to be in sync with the ever-changing global needs. To implement BPR, enterprises have to introduce dramatic changes in organizational structures, management systems, employee responsibilities, performance measurements, incentive systems, skill developments, and the use of information technology.

By definition, BPR is the re-thinking tank of business processes to improve the speed, quality, and output of materials or services. It revolves around the IT system and focuses on the continuous change and refinement of an enterprise's changing needs. According to Hammer and Champy (1993), 'Business process re-engineering represents the radical transition that companies must make to keep pace with today's ever-changing global markets'.

Successful BPR implementation yields enormous reduction in costs and cycle time. It also has the potential to create substantial improvements in quality, customer service, or other business objectives. BPR makes enterprises more customer-focused and responsive to changes in the market. It achieves these results by reshaping corporate structures around business processes, and implementing change, not by the complete automation of a business, but by the redefinition of enterprise tasks in holistic or process-oriented terms. As shown in Figure 5.1, the key advantage of applying BPR is that organizational processes become integrated, process-oriented, standardized, customer-focused, and efficient in terms of speed and cost.

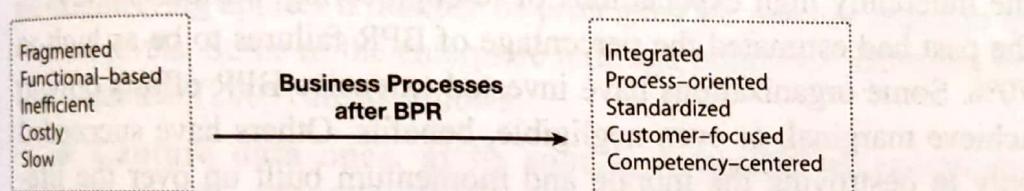


Figure 5.1
Transformations
through BPR.

The basic characteristics of BPR are as follows:

- Process innovation and reinvention
- Enterprise process
- Performance improvement
- Increased economic growth
- Higher 'competitive bar'
- IT as central enabler
- 50–75% failure rate
- High risk, high-return venture
- Significant reduction in cycle time across processes

However, different enterprises may have different primary objectives in implementing BPR. These objectives would probably fall in one of the following categories:

- Standardization of business objectives
- Elimination of organizational and technical bottlenecks
- Improvement in quality of information
- Replacement of out-of-date procedures and systems
- Integration of business processes
- Reduction in stand-alone systems and interfaces
- Covering areas previously neglected

In a nutshell, then, BPR is a method of improving the operations of the organization. It, thereby, increases the levels of productivity and output of an organization. BPR involves operating various processes of an organization in a methodical way to eliminate any wasted or redundant effort of the employees, to improve their efficiency, and to implement process changes to gain competitiveness.

The purpose of BPR is to find new methods to organize tasks and people, and redesign information technology systems to help the organization achieve its goals. It implies analysing and altering the business processes of the organization as a whole.

However, it has been found that BPR projects sometimes fail to meet the inherently high expectations of re-engineering. Various surveys in the past had estimated the percentage of BPR failures to be as high as 70%. Some organizations have invested extensive BPR efforts only to achieve marginal, or even negligible, benefits. Others have succeeded only in destroying the morale and momentum built up over the lifetime of the organization. One primary reason behind the failure of BPR projects is related to the misconceptions and ignorance surrounding the whole concept. Some common myths about BPR are given below.

6) Myths about BPR

The concept of BPR is not new. However, it is widely misunderstood as a downsizing tool. Some of the common re-engineering myths identified by various researchers are as follows:

- **Downsizing tool:** It is seen as the management's approach to reduce the number of employees. However, the primary focus of BPR is restructuring and redesigning.
- **Clean slate:** The clean-slate change is rarely found in practice. A more affordable approach is to use the clean-slate design, which involves a detailed vision for a process.
- **High failure rate:** The BPR projects, generally, have a high failure rate, but projects aiming for cycle-time reduction or cost reduction succeed in their efforts.
- **Re-engineering and transformation:** BPR is not the same as transformation, but it contributes to organizational transformation. The transformation process involves broad changes in other organizational dimensions besides the work processes.

- **BPR and TQM:** Re-engineering is not an improvement program like TQM and benchmarking. It is fundamentally different from TQM, which focuses on marginal but continuous improvements.

Total Quality Management (TQM): *It is a management strategy aimed at embedding the awareness of quality in all organizational processes.*

5.3 Business Process Re-engineering (Process Innovation) versus Total Quality Management (Process Improvement)

Management techniques related to the principle of quality, such as TQM, are often confused with BPR. However, BPR and TQM share some features, such as -

- Principle of process
- Need for organizational and cultural change
- Focus on customer needs
- Importance of process measurement
- Aim of improving business performance for competitive gain

They are, however, different in several aspects. According to Davenport (1993), quality management is often referred to as TQM or continuous improvement, and comprises programs and initiatives that emphasize incremental improvement in work processes and outputs over an open-ended period of time. In contrast, re-engineering, also known as business process redesign or process innovation, comprises discrete initiatives that are intended to achieve radically redesigned and improved work processes in a specified time frame. The differences between the two are provided by Davenport (1993), and enlisted in Table 5.1.

Table 5.1 ►
Differences between BPR and TQM

	Improvement (TQM)	Innovation (BPR)
Level of change	Incremental	Radical, breakthrough
Starting point	Existing process	Start from scratch
Frequency of change	Continuous	One-time
Implementation time required	Moderate	Long
Risk involved	Moderate	High
Primary enabler	Statistical control	IT
Type of change	Cultural	Cultural/structural
Expected improvement	Moderate	Significant
Top management	Moderate	Very high
Role of IT	Low	very high
Focus on Investment	Process improvement	Profit maximization
	Low initially, high to sustain	High initially, less later
Training	Universal	Significant

(Source: Davenport 1993, p. 11)

Thus, TQM addresses narrow processes within a department, whereas BPR is wider in scope and addresses one or more processes that span multiple functions. Finally, IT plays a major role in BPR and understanding its potential, whereas its role is less important in TQM.

Upon comparison of both the approaches, each approach has its advantages as well as related disadvantages. Depending upon the organization's requirement, either of the approaches can be selected. Given below are some of the key advantages of the clean-slate re-engineering approach:

- It is independent of any particular tools or ERP package. The organization can employ a range of best practices, and can implement value-creating processes as per needs. Moreover, BPR implementation will be free of the accompanying limitations of an ERP package or tool.
- The design of re-engineered processes is hidden from others. Only the developing firm will have knowledge of the design.
- The system is not affected by any change in technology, as implementation is process-driven, not tool-driven.
- It removes confusion in ERP implementation as re-engineering is treated independent of technology implementation. It helps in identifying problems in the re-engineering or the technology-implementation phase. Ultimately, the overall implementation takes less time and cost.

However, there are number of disadvantages of the clean-slate approach. Some of the key disadvantages are given below:

- Difficulty in designing the processes that need to be re-engineered since no prior structure is available. The overall process is very complex as an organization starts developing process design right from scratch.

- The chosen design may be unviable or sub-optimal.
- The chosen design may not match either ERP packages available.
- The development and implementation of a new design may be costly and time consuming.
- Needs a number of highly efficient functional consultants.
- Overall risk increases as the design selected may not be a pre-tested one.

On an average, the clean-slate re-engineering approach is adopted by large firms with significant implementation time and budget. The organizations who want to implement ERP to create strategic advantages and build a unique solution, also choose the clean-slate approach.

However, there are a number of advantages of the technology-enabled re-engineering approach as one can exploit the capabilities of technology used to facilitate re-engineering. Some of the key advantages of the technology-enabled re-engineering approach are given below:

- The ERP package chosen gives clear directions for re-engineering as it includes inbuilt best practices. It helps in structuring a complex re-engineering effort in terms of process design and development.
- The ERP package is tested from many parameters, which results in building better solutions. So any design implemented from a set of designs available in a package is highly feasible.
- The ERP package helps in implementing cost effective re-engineering as packages are designed to be cost effective.
- The ERP package helps in the timely implementation of BPR, and generally in overall ERP implementation.

However, the technology-enabled re-engineering approach is limited to a particular technology or tool. Consequently, whatever process design is available, the implementation will be limited to that only. In addition to this, any change in the chosen technology will also affect the system. Generally, it has been found that small firms with limited implementation budgets choose the technology-enabled approach.

5.6 Methodology for BPR Implementation

Various experts have identified the different activities necessary for success in implementing BPR. These optimal activities are proposed by various management consulting firms and experts who have been

successful in assisting their clients with BPR. These methods, procedures, and tasks are identified to help organizations decide how they should perform BPR to meet the unique needs of their industry, people, and culture. Given below is the five-stage approach to implementing BPR, compiled from various existing theories.

Phase 1: Plan BPR implementation

Phase 2: Identify opportunities for BPR in the existing system

Phase 3: Develop a blueprint of the existing processes

Phase 4: Develop an improvement plan

Phase 5: Implementation

Phase 1: Plan BPR Implementation

The primary activities in this phase include:

- Providing access to the current state of the organization in terms of efficiency.
- Identifying the need for the change.
- Developing a vision and identifying success strategies.
- Constituting a re-engineering team and giving them clearly defined goals.

In this phase, the first step is to critically analyse the overall operation of the organization, in terms of operating procedures and bottom-line results, with the purpose of determining whether BPR will actually bring dramatic changes. In case of marginal change, a TQM program can be initiated instead. Certain aspects of business that need to be evaluated at this point are:

- Existing processes and their data flow
- New challenges for the organization
- Manner in which the existing processes are impeding the business
- Cause for the organization's concern related to the market's demand and competitors
- Computation of results of inaction

Finally, based on all such observations, the future direction of the organization should be decided, and a business strategy designed. This strategy will serve as a clear and concise guide with measurable goals for employees to focus on. So, if an organization is considering a change, the very first step is to develop a business plan and supporting strategies. Since BPR requires significant change at various levels, it

must begin with a communication campaign to educate all those who will be impacted by this change. For BPR to succeed, everyone must understand where the organization is today, why the organization needs to change, and where the organization needs to be in order to survive.

The next step is to constitute a re-engineering team with clearly defined roles and responsibilities. In case of technology-driven re-engineering, the ERP implementation team should itself perform this task. In larger or multiple re-engineering projects, a steering committee can control the situation by developing an overall re-engineering strategy, and monitoring its progress. One of the most important members of the re-engineering process is the executive leader, who must have the power and authority to make people listen and follow him. Similarly, without the assured commitment of substantial time and effort from the top management, most BPR projects cannot overcome the internal forces that work against them and, as a result, never attain success.

The entire re-engineering effort must be divided among several process owners, who will be responsible for the re-engineering related to a particular process. The process owner must be a senior functional consultant. He or she is responsible for convening the re-engineering team dedicated to a specific process. The team must be a mix of people from within the organization and external consultants.

Phase 2: Identify Opportunities for BPR in Existing Processes

Some of the key activities of this phase are:

- Analysis of core/high-level processes.
- Identification of change enablers and process performance matrices.
- Evaluation of existing business strategy, and establishment of new process performance objectives and key characteristics.
- Identification of potential barriers to implementation.

In this phase, the re-engineering team usually starts dividing the entire organization into high-level processes rather than the usual vertical business areas such as marketing, production, etc. These processes are numerous, and are considered the core process of the organization. For example, in a typical manufacturing organization, some of these processes can be product development, order fulfilment, manufacturing capability development, and customer support activities.

Once all the major processes are defined, all the high-level processes that need to be re-engineered are identified. This can be done by identifying the performance of such processes with respect to different standards of organizations outside the industry. The objective of this phase is to establish the bottom-line performance metrics for the processes that need to be re-engineered. Typically, processes that are highly ineffective, but highly important and have high feasibility (most suitable to successful redesign) shall be given higher priority than others.

The next step is to identify potential change enablers, such as the use of information and information technology, and human factors. The use of new information technologies to enable customers and suppliers to interact with organizational business, structuring cross-functional work teams, compensation systems, etc. are some of the key enablers for BPR.

After identifying the high priority processes and key enablers for re-engineering, the next step is to define new process strategy that would reflect the new strategic goals for the process. Process goals and objectives can be determined by combining customer needs with the competitor's benchmarks and the best industry practices. Similarly, there is a need to identify key performance measures, process characteristics, critical success factors, and potential barriers to implementation.

Phase 3: Develop Blueprint of Existing Processes

The key activities of this phase include:

- Modelling the existing processes in terms of process and data flow.
- Understanding how technology and information are currently used.
- Understanding the existing organization structure.
- Comparing the existing processes with new objectives.

In this phase, the implementation team is required to study the existing processes to create a related process model and activity diagrams. It is important to identify the impulse behind existing processes, and then compare the existing processes with the new process objectives identified in the previous phase. Only then can one assess the extent to which BPR needs to be applied. Modelling the current processes will help in understanding the existing processes, and planning the migration to the new system.

Similarly, the use of information, the effort required in generating the information, and the effort wasted in creating duplicate information, need to be underlined. In addition, the use of technology in existing processes, the effectiveness of user interfaces, and the artificial restrictions imposed by the technology, need to be analysed as well. Finally, the adopting organization needs to summarize the cost and value of each management information system in use.

Phase 4: Develop an improvement plan

The key activities of this phase include:

- Developing a complete model for the new processes.
- Establishing a new organization structure.
- Describing new information requirements and technology specifications.

Create detailed plans and model new processes to understand the details of the newly re-engineered business system. This activity includes modelling of new process flow, information flow, and the data model required, that is, to create a 'to be' model to explain the difference in the new workflow. This will also help in redesigning the organization structure. Similarly, detailed technology specifications required to support the new processes should also be defined.

The new model should explain the new management system, management strategies, organization structure, and compensation system.

Phase 5: Implementation

The key activities of this phase include:

- Developing a migration strategy to the new model.
 - Assessing the current skills and capabilities of the organization's employees.
 - Mapping new tasks and skill requirements to the employees.
 - Reallocating the work among various people and departments.
 - Training the people at all managerial levels for the new system.
- The first step in this phase is to develop a plan for migration to the new process. The migration strategies may include -
- Complete transformation to the new system

- Phased transformation approach to the new system
- Undergoing a pilot process for the transformation

In case of applying re-engineering on multiple processes, the new process needs to integrate itself with the existing process as well as with the newly re-engineered processes. Transforming an information system to support the new process may involve retooling the hardware, software, and information needs for the new process. The type of information available should be likewise transformed to avoid problems like data integrity, incorrect data, and insufficient data.

The success of BPR depends on the efficient reorganization, retraining, and retooling of the business system. In the new system, it is important to map the tasks in the process to functional skill levels, and ultimately, to the workers. So, it begins with an assessment of the current operational and technical skills available, and identifying the gap between the actual and the desired. On the basis of these gaps, the educational material needs to be designed for training the employees, so as to map them with the new process in place. The training should include system training, which can facilitate the understanding of the new information system and how to take advantage of its capabilities. Similarly, process training is required to understand the interdependence and relationship of various processes.

Table 5.3 ►
Various BPR success/failure factors

	Failure factors	Success factors
Change of management system and cultural factors	<ul style="list-style-type: none"> 1. Communication gap 2. Organizational resistance to change 3. Lack of organizational readiness 4. Cultural issues 5. Inefficacy 	<ul style="list-style-type: none"> 1. Establishing motivation and reward system 2. Effective communication 3. Employee empowerment 4. People's involvement in BPR implementation 5. Training and education about new system 6. Creating effective culture for organizational change
Management support factors	<ul style="list-style-type: none"> 1. Problems related to commitment, support, and leadership 2. Problems related to championship and sponsorship 	<ul style="list-style-type: none"> 1. Committed and strong leadership 2. Championship and sponsorship 3. Management of risk
Organizational structure	<ul style="list-style-type: none"> 1. Ineffective BPR teams 2. Problems related to integration mechanism, job definition, and responsibility allocation 	<ul style="list-style-type: none"> 1. Adequate job integration approach 2. Effective BPR teams 3. Appropriate jobs, definitions, and responsibility allocation
BPR project management factors	<ul style="list-style-type: none"> 1. Problems related to planning and project management 2. Problems related to goals and measures 3. Inadequate focus and objectives 4. Ineffective process redesign 5. Problems related to BPR resources 6. Unrealistic expectations 7. Ineffective use of consultants 	<ul style="list-style-type: none"> 1. Alignment of BPR and corporate strategies 2. Effective planning and use of project management techniques 3. Setting performance goals and measures 4. Adequate resources 5. Appropriate use of methodology 6. External orientation and learning 7. Effective use of consultants 8. Building BPR vision 9. Effective process redesign 10. Integrating BPR with other improvement approaches
IT infrastructure factors	<ul style="list-style-type: none"> 1. Problems related to IT investment and sourcing decisions 2. Improper IT integration 3. Inadequate IT development 4. Ineffective re-engineering of legacy system 	<ul style="list-style-type: none"> 1. Adequate alignment of IT infrastructure and BPR strategy 2. Building an effective IT infrastructure 3. Adequate IT investment and sourcing decisions 4. Adequate measurement of IT infrastructure effectiveness on BPR 5. Proper IT integration 6. Effective re-engineering of legacy system 7. Increasing IT function competency 8. Effective use of software tools