

Business Process Management & IT

Learning Objectives

- ◆ To understand the concepts of Business Process Management (BPM) and Business Process Reengineering (BPR) in bringing about integration and significant improvement in business processes;
- ◆ To understand the different approaches used in mapping business systems and the significance of each approach;
- ◆ To understand the impact of Information Technology (IT) on BPM and the payback achieved by implementing BPM packages; and
- ◆ To understand benefits and risks of implementation of BPM and BPR projects.

Task Statements

- ◆ To evaluate the BPM Principles and Practices to determine whether the goals of BPM exercise are achieved effectively and efficiently;
- ◆ To determine whether the implementation of BPM is done in a structured manner following the different phases of a BPM life cycle;
- ◆ To determine whether the business strategy and operational goals have been appropriately translated into organizational business processes, operational business processes and implemented business process;
- ◆ To conduct reviews to determine the appropriateness of the approach adopted in mapping systems;
- ◆ To determine whether the re-engineered business processes have succeeded to achieve significant improvements in profits, customer-satisfaction, quality, deliveries, etc;
- ◆ To evaluate the payback achieved by implementing an integrated BPM system in an enterprise in terms time and cost savings; and
- ◆ To evaluate the business risks involved in the implementation of BPM and the necessary controls to ensure success.

Knowledge Statements
◆ Knowledge of key concepts, terms, methodologies and techniques used in Business Process Management (BPM); ◆ Knowledge of the practices that are making "process thinking" a new approach to solving business problems and are relentlessly recuperating organizational performance; ◆ Knowledge of key capabilities of BPM systems; ◆ Knowledge of the different phases of BPM lifecycle – evaluation, design, configuration & enactment and the elements involved in BPM implementation; ◆ Knowledge of classification of business processes into different levels of business process management – business strategy, operational goals, organizational business processes, operational business processes and implemented business processes; ◆ Knowledge of application of BPM solution to Accounts – the study of various processing cycles involved in Accounts and integrating them using Accounts BPM solution; ◆ Knowledge of different approaches to mapping systems – entity relationship diagrams, data flow diagrams, systems flow diagrams, system outline charts, decision trees, decision tables, etc; ◆ Knowledge of the key concepts, terms, methodologies and techniques used in Business Process Reengineering (BPR); ◆ Knowledge of the impact of IT on BPM and the criteria for determining the payback achieved through implementing integrated BPM systems; and ◆ Knowledge of the numerous stumbling-blocks that organizations face while implementing BPM systems and reasons for the same.

1.1 Introduction

The chapter provides key concepts, terms, methodologies and techniques for implementing BPM. It provides details of how BPM implementation is done in a structured manner through different phases of a BPM life cycle. Further, it provides an overview of how to evaluate the BPM Principles and Practices so as to determine whether the goals of BPM exercise are achieved effectively and efficiently. Automation plays a major role in BPM. Hence, the need for automation and how business process automation can be achieved is also explained. With these objectives in mind, let us understand what is BPM and how does it work.

1.2 Business Process Management

The objective of Business Process Management (BPM) is to evaluate the efficacy and usefulness of business processes for reducing costs and ensure value creation. All enterprises must constantly analyze and streamline their business processes. BPM enables enterprises to assess the usefulness of these processes and helps them to achieve enterprise objectives at

optimum cost. BPM is primarily about the efficient and effective management of business processes. BPM is actually paper-based standard operating procedures taken to their most productive level – throughout the initiation of increasingly business-centric technological advances. People are at the center of business processes and hence it is imperative to make them part of the solution. The key to a successful BPM implementation is to consider it not just as an improvement programs but make it an integral part of business strategy. An effective BPM implementation has to result in the institutionalization of process improvement as a fundamental management practice. This can be effectively achieved through proactive and predictive management of relevant business processes.

BPM requires enterprise to align its' processes with enterprise goals, find ways to improve those processes and then establish measurements that can be used to track and monitor performance for continuous improvement and optimization. Processes are multi-functional and need to be properly integrated. Effective streamlining of process requires process management to be implemented. Process management is a functional group including (but not limited to) operations management, Supply Chain Management, Finance and Accounting, Marketing, and General management. Process management provides a sequence of analytical tools that are essential to the modern project manager, analyst, and management consultant.

At the heart of BPM is the continuous search for ways to progress proficiently. BPM is a combination of systems, methods and tools for ensuring processes that are improved on a continuous basis to achieve enterprise objectives. BPM has evolved with usage of combination of well-known organizational transformation concepts such as Business Process Reengineering, Six Sigma, and Total Quality Management (TQM); and process-supporting technologies such as workflow management, process analysis and automation suites, and service enabled systems.

- ◆ Six Sigma is a set of strategies, techniques, and tools for process improvement. It seeks to improve the quality of process outputs by identifying and removing the causes of defects and minimizing variability in manufacturing and business processes.
- ◆ Total quality management (TQM) is the organization-wide effort to install and make permanent a climate in which it continuously improves its ability to deliver high-quality products and services to customers.

The primary benefit of using technology for BPM is the effectiveness gains for enterprises through the automated coordination of activities, distribution of tasks to process participants and the amalgamation of applications. Another key benefit of BPM is the creation of basic operational value proposition – which is the ability to process more with less effort and higher quality. BPM is at the core of enterprises which aim to grow revenues quickly while controlling resource costs.

Business processes are pervasive in any organization and represent all activities that an organization undertakes. Businesses try to improve on these operations or process as a process improvement project. This requires using advanced methodologies and technologies

to deliver consistent, repeatable, and more efficient outcomes by the improvement project. BPM helps to define and manage the business processes to reach the desired goals.

1.2.1 What is a Process?

In the systems engineering arena, a process is a sequence of events that uses inputs to produce outputs. This is a broad definition and can include sequences as mechanical as reading a file and transforming the file to a desired output format; to taking a customer order, filling that order, and issuing the customer invoice.

From a business perspective, a process is a coordinated and standardized flow of activities performed by people or machines, which can traverse functional or departmental boundaries to achieve a business objective and creates value for internal or external customers.

Process orientation is at the core of BPM. Hence, it is important to get understand clearly the distinction between the traditional functional organization and process organization. The following table provides the distinction between functional versus process organization as discussed in the Table 1.2.1.

Table 1.2.1: Functional versus Process Organization

	Functional Organization	Process Organization
Work Unit	Department	Team
Key Figure	Functional Executive	Process Owner
Benefits	Focus on functional excellence. Easier to implement work balancing because workers have similar skills. Clear management direction on how work should be performed.	Responsive to market requirements. Improved communication and collaboration between different functional tasks. Performance measurements aligned with process goals.
Weaknesses	Barrier to communication between different functions. Poor handover between functions that affects customer service. Lack of end-to-end focus to optimize organizational performance.	Duplication of functional expertise. Inconsistency of functional performance between processes. Increased operational complexity.
Strategic Value	Supports cost leadership strategy.	Supports differentiation strategy.

1.2.2 Process Management

Process management is based on a view of an organization as a system of interlinked processes which involves concerted efforts to map, improve and adhere to organizational processes. Whereas traditional organizations are composed of departments and functional stages, this definition views organizations as networks or systems of processes.

To manage a process,

- ◆ The first task is to **define** it. This involves defining the steps (tasks) in the process and mapping the tasks to the roles involved in the process.
- ◆ Once the process is mapped and implemented, **performance measures** can be established. Establishing measurements creates a basis to improve the process.
- ◆ The last piece of the process management definition describes the **organizational setup** that enables the standardization of and adherence to the process throughout the organization. Assigning enterprise process owners and aligning employees' performance reviews and compensation to the value creation of the processes could accomplish this.

1.2.3 Business Process Management (BPM)

Business Process Management (BPM) refers to the closed loop, iterative management of business processes over their complete lifecycle. In simple terms, BPM is about the management of business processes with the organization being the primary focus. BPM may be defined as: "The achievement of an organization's objectives through the improvement, management and control of essential business processes". All the key terms of the definition are explained below.

- ◆ **Achievement:** Realizing the strategic objectives as outlined in the organization's strategic plan. At a project level, it is about realizing the value or business benefits as outlined in the project business case.
- ◆ **Organization:** The organization in this context refers to an enterprise or parts of an enterprise, perhaps a business unit that is discrete in its own right. It is the end-to-end business processes associated with this part of an organization. This end-to-end focus will ensure that a silo approach does not develop.
- ◆ **Objectives:** The objectives of a BPM implementation range from the strategic goals of the organization through to the individual process goals. It is about achieving the business outcomes or objectives. BPM is not an objective in itself, but rather a means to achieving an objective. It is not 'a solution looking for a problem'.
- ◆ **Improvement:** It is about making the business processes more efficient and effective.
- ◆ **Management:** It refers to the process and people - performance measurement and management. It is about organizing all the essential components and subcomponents for a processes. By this we mean arranging the people, their skills, motivation, performance

measures, rewards, the processes themselves and the structure and systems necessary to support a process.

- ◆ **Control:** BPM is about managing our end-to-end business processes and involves the full cycle of plan–do–check–act (Deming circle, Walton, 1986). An essential component of control is to have the ability to measure correctly. If we cannot measure something, we cannot control and manage it.
- ◆ **Essential:** Not every process in an organization contributes towards the achievement of the organization's strategic objectives. Essential processes are the ones that do.
- ◆ **Business:** An implementation of BPM must have an impact on the business by delivering benefits. It should focus on the core business processes that are essential to our primary business activity – those processes that contribute towards the achievement of the strategic objectives of the organization.
- ◆ **Processes:** A process comprises all the things we do to provide someone who cares with what they expect to receive'. The lifecycle of an end-to-end process is from the original trigger for the process to the ultimate stakeholder satisfaction. The final test of a process's completeness is whether the process delivers a clear product or service to an external stakeholder or another internal process.

1.2.4 BPM Principles and Practices

The primary objective of BPM is to improve products and services through structured approach to performance improvement that centers on systematic design and management of a company's business processes. Let us understand some of the key BMP principles and practices.

1. BPM's first principle is **processes are assets that create value for customers**. They are to be managed and continuously improved. Because a process are assets, core processes and processes that generate the most value to customers, should be carefully managed.
2. A managed process produces **consistent value to customers** and has the foundation for the process to be improved. Management of processes entails the tasks of measuring, monitoring, controlling, and analyzing business processes. Measuring of business processes provides information regarding these business processes. Process information allows organizations to predict, recognize, and diagnose process deficiencies, and it suggests the direction of future improvements.
3. The third principle is **continuous improvement** of processes. This is a natural result of process management. Process improvement is facilitated by the availability of process information. The business environment usually dictates that organizations need to improve to stay competitive. Business processes are central to an organization's value creation. It follows that processes should be continuously improved.

The BPM principles and practices are summarised in the Table 1.2.2 given below:

Table 1.2.2: BPM Principles and Practices

Principles	▪ Business processes are organizational assets that are central to creating value for customers; ▪ by measuring, monitoring, controlling, and analyzing business processes, a company can deliver consistent value to customers; ▪ as the basis for process improvement - business processes should be continuously improved; and ▪ Information technology is an essential enabler for BPM.
Practices	▪ Strive for process-oriented organizational structure; ▪ appoint process owners; ▪ senior management needs to commit and drive BPM; ▪ execution of BPM process improvements should take a bottom-up approach; ▪ put in place information technology systems to monitor, control, analyze, and improve processes; ▪ work collaboratively with business partners on cross-organizational business processes; ▪ continuously train the workforce and continuously improve business processes; ▪ align employee bonuses and rewards to business process performance; ▪ utilize both incremental (e.g., Six Sigma) and more radical (e.g., BPR) methodologies to implement process improvement

Under the BPM framework, Business Process Re-engineering (BPR) and incremental process improvement methodologies (i.e., Six Sigma, TQM, etc.) are tools that organizations can use to implement process improvement. With a focus on continuous improvement, an organization is better prepared to face change, which is constant in our customer-oriented economy. This helps to develop a corporate culture that is process-oriented; ready to adapt to changes in management at the operational level; and is predominantly about the improvement and control of the processes essential to any business to achieve the objectives of the organization. Setting the direction and goals for business process improvement is a critical step, and one that needs to be addressed by higher management.

1.3 Overview of Business Processes and Process flow

A business process is a prescribed sequence of work steps performed in order to produce a desired result for the organisation. A business process is initiated by a particular kind of event, has a well-defined beginning and end, and is usually completed in a relatively short period.

Organisations have many different business processes such as completing a sale, purchasing raw materials, paying employees and paying vendors, etc. Each of the business processes has either a direct or indirect effect on the financial status of the organisation. For example, complete a sale directly reduces cash or increases liabilities. Purchasing new efficient equipment also directly affects assets and/or liability accounts and this transaction is also expected to indirectly sales and assets as it provides for increased productivity and an expanded customer base. The number and type of business processes and how the processes are performed would vary across enterprises. This is also impacted by automation. However, most of the common processes would flow a generic life cycle. Examples of key business process life cycle pertaining to accounting, sales and purchase are explained below.

1.3.1 Accounting

Accounting or Book keeping cycle covers the business processes involved in recording and processing accounting events of a company. It begins when a transaction or financial event occurs and ends with its inclusion in the financial statements.

A typical life cycle of an accounting transaction may include the following transactions as depicted in Fig. 1.3.1:

- (a) **Source Document:** a document the capture data from transactions and events.
- (b) **Journal:** transactions are recorded into journals from the source document.
- (c) **Ledger:** entries are posted to the ledger from the journal.
- (d) **Trial Balance:** unadjusted trial balance containing totals from all account heads is prepared.
- (e) **Adjustments:** appropriate adjustment entries are passed.
- (f) **Adjusted Trial balance:** the trial balance is finalized post adjustments.
- (g) **Closing entries:** appropriate entries are passed to transfer accounts to financial statements.
- (h) **Financial statement:** the accounts are organized into the financial statements.

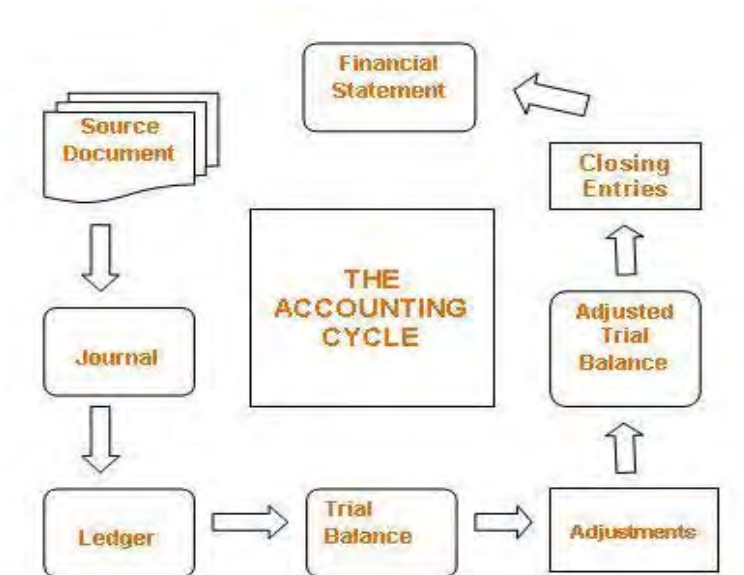


Fig. 1.3.1: Accounting process flow

1.3.2 Sales

Order to Cash (OTC or O2C) covers all the business processes relating to fulfilling customer requests for goods or services. It involves transactional flow of data from the initial point of documenting a customer order to the final point of collecting the cash.



Fig. 1.3.2: Order to cash process flow

The typical life cycle of a sales transaction which may include the following transactions are depicted in Fig. 1.3.2 given here:

- (i) **Customer Order:** a purchase order received from a customer specifying the type, quantity and agreed prices for products.
- (ii) **Recording:** availability of the items is checked and customer order is booked.
- (iii) **Pick release:** the items are moved from the warehouse to the staging area.
- (iv) **Shipping:** the items are loaded onto the carrier for transport to the customer.
- (v) **Invoice:** invoice of the transaction is generated and sent to the customer.
- (vi) **Receipt:** money is received from the customer against the invoices.
- (vii) **Reconciliation:** the bank reconciliation of all the receipts is performed.

1.3.3 Purchase

Procure to pay (purchase to pay or P2P) cycle covers all the business processes relating to obtaining raw materials required for production of a product or for providing a service. It involves the transactional flow of data from the point of placing an order with a vendor to the point of payment to the vendor.

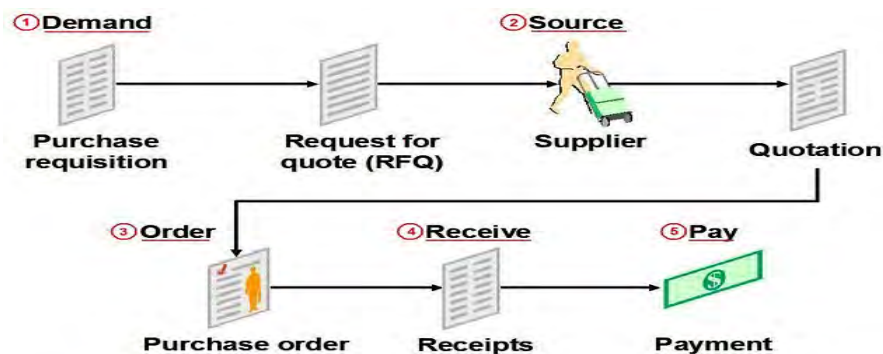


Fig. 1.3.3: Procure to pay process flow

Typical life cycles of a purchase transaction which may include the following transactions are depicted in Fig. 1.3.3.

- (a) **Purchase requisition:** a document is prepared requesting the purchase department to place an order with the vendor specifying the quantity and time frame.
- (b) **Request for quote:** an invitation is sent to the vendors to join a bidding process for specific products.
- (c) **Quotation:** the vendors provide cost quotations for the supply of products.
- (d) **Purchase order:** a commercial document is issued to the vendor specifying the type, quantity and agreed prices for products.
- (e) **Receipts:** the physical receipt of goods and invoices.
- (f) **Payments:** the payments are made against the invoices.

1.4 Classification of Business Processes

Business processes are broadly classified into two categories. These are:

1. Organizational business processes and
2. Operational business processes.

Different levels can be identified in business process management, ranging from high-level business strategies to implemented business processes. These levels are depicted in Fig. 1.4.1.



Fig. 1.4.1: Levels of Business Process Management

Each of the levels of the business processes management are explained here.

A. At the highest level, the strategy of the company is specified, which describes its long-term concepts to develop a sustainable competitive advantage in the market. An example of a business strategy is cost leadership for products in a certain domain.

B. At the second level, the business strategy is broken down to operational goals. These goals can be organized, so that each goal can be divided into a set of sub-goals. Reducing the cost for supplied materials is a sample goal that contributes to the realization of the business strategy mentioned.

C. At the third level, 'organizational' business processes can be found. Organizational business processes are high-level processes that are typically specified in textual form by their inputs, their outputs, their expected results and their dependencies on other organizational business processes. These business processes act as supplier or consumer processes. An organizational business process to manage incoming raw materials provided by a set of suppliers is an example of an organizational business process.

Informal and semiformal techniques are used at these high levels. The strategy of a company, its goals, and its organizational business processes can be described in plain text, enriched with diagrams expressed in an ad-hoc or semiformal notation.

While organizational business processes characterize coarse-grained business functionality, typically there is multiple operational business processes required that contribute to one organizational business process. In operational business processes, the activities and their relationships are specified, but implementation aspects of the business process are disregarded. Operational business processes are specified by business process models.

The structure of organization-level business process management is shown in Fig. 1.4.1. The business process management space is influenced by the business strategy of the enterprise, i.e., by the target markets, by business strategies opening new opportunities, and, in general, by the overall strategic goals of the enterprise.

Information systems, shown in the lower part of Fig. 1.4.2, are valuable assets that knowledge workers can take advantage of. An important aspect of business process reengineering is combining small granular functions conducted by several persons into functional units of larger granularity, and supporting knowledge workers in performing these tasks with dedicated information systems. Business process management is based on the resources of an enterprise, most prominently on the information systems in place. Information systems enable knowledge workers to perform business process activities in an effective manner. Information systems also have implications on business processes, since some business processes might not be possible without appropriate information system support.

D. 'Operational' Business Processes are the basis for developing implemented business processes. Implemented business processes contain information on the execution of the process activities and the technical and organizational environment in which they will be executed.

Stakeholders are among the most important influential factors of business process management. The stakeholder box in the left hand side in Fig. 1.4.2 represents the fact that stakeholders have implications on the organizational business processes. But business processes also have implications on the stakeholders, as shown in that figure, too. Stakeholders include external business partners, customers, and the personnel of the enterprise.

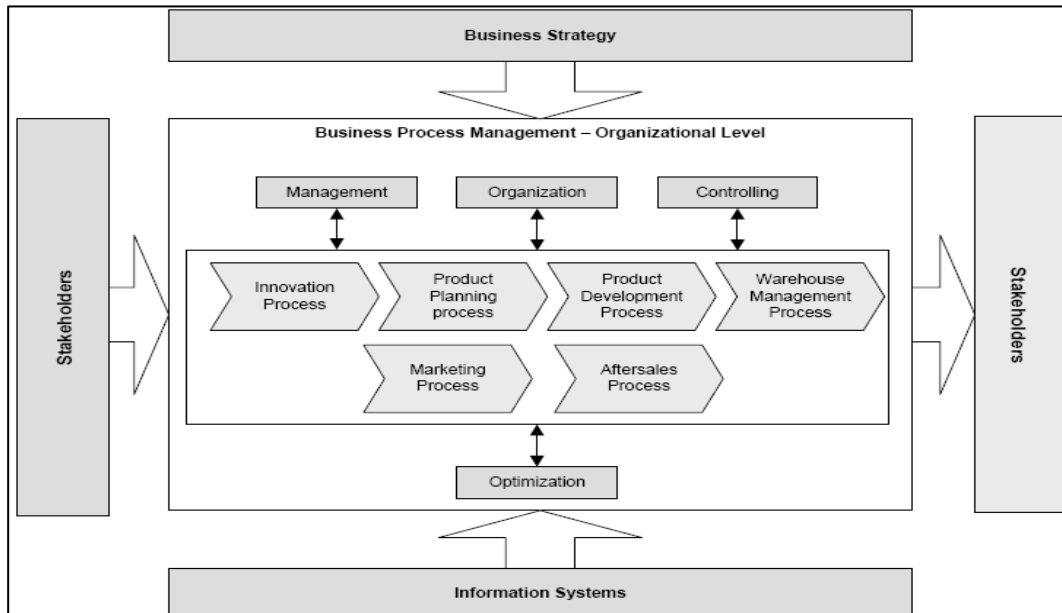


Fig. 1.4.2: Organization-level business process management

The internal structure of the business process management box in Fig. 1.4.2 contains the organizational business processes of an enterprise. At this top level, the business process is treated as a black box, so that no details on the internal structure of the process are given. As a consequence, the property that a business process consists of activities with execution constraints does not immediately apply. This definition is appropriate at a lower level of abstraction where operational business processes are at the centre of attention.

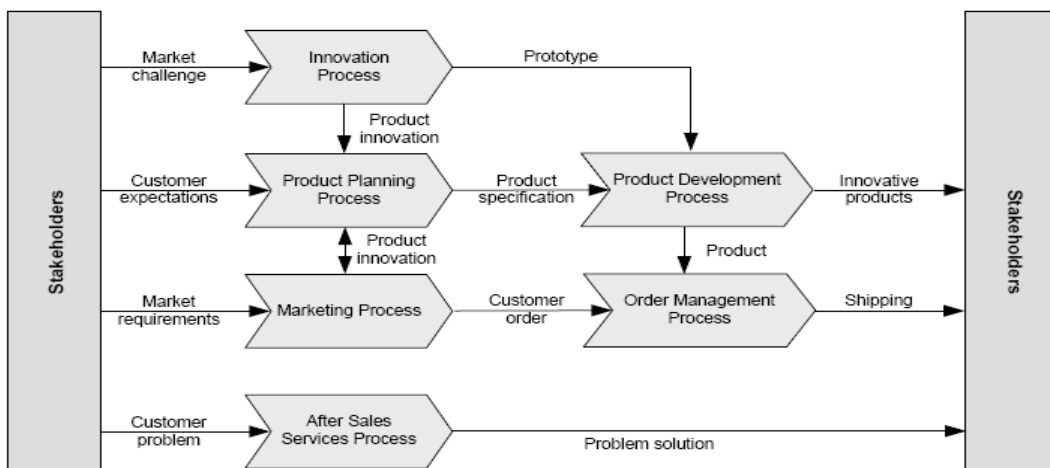


Fig. 1.4.3: Process landscape diagram

To represent the relationships between the organizational business processes, their dependencies are depicted by a process landscape diagram. It contains each organizational business process as a block; dependencies are represented by arrows. There are different forms of dependencies, including information transfer and the transfer of physical goods. The interfaces of the organizational business processes need to be designed carefully, since unclear interfaces are a source of inefficiency. These interfaces need to be broken down into interfaces of the operational business processes that actually realize the organizational business process. A process landscape is represented in Fig. 1.4.3, showing the main business processes of a manufacturing company and their dependencies. Stakeholders such as customers are also depicted as interfaces, because the external behavior of the company—which to a large extent is responsible for the commercial success of the company—is specified at exactly these interfaces.

1.5 BPM Implementation

As the business process may cover different people working in different departments, the organization should also consider allocating issues such as process owners, process managers, and the method of measuring the effectiveness and efficiency of a business process. This also implies that, with most organizations, the business and IT should be involved. In the end, the organization should develop a mindset that implementing BPM technology can contribute towards an organization becoming process-centric.

The payback of BPM implementation is enormous in any economic surroundings. But achieving business quickness in a turbulent, competitive global market is all the easier with BPM tools, as success stories of BPM-driven companies show. Spread across industry sectors, these companies stand out for their quick come back to revolutionize, proficient cost structures, enhanced revenue models and optimal growth levels. By providing an adjustable structure to make key corporate decisions, BPM helps organizations optimize both work and revenues.

1.5.1 Key factors to consider in implementing BPM

Table 1.5.1 illustrates the key factors to be considered in implementing BPM.

Table 1.5.1: Seven factors and related considerations

Factors	Key Considerations
Scope	A single process, a department, the entire company
Goals	Process understanding, improvement, automation, re-engineering, optimization
Methods to be used	Six Sigma, BPM Life Cycle Method, TQM, Informal methods
Skills Required	Consultants, Train Employees, Formal Certification, Basic Education, Existing Skill sets
Tools to be used	White-Boards, Sticky Notes, Software For Mapping,

	Documenting, Software for Simulation, Comprehensive BPMS
Investments to Make	Training, Tools, Time
Sponsorship/Buy-in Needed	Executive Level, Department Level, Process Owner Level, Employee Level

1.5.2 Need for a BPM implementation

Thus BPM will be the mechanism to:

- ◆ Create the long-term future positioning of the business and enhance its future capability;
- ◆ Create short-term cost effectiveness and improvement to current customer service;
- ◆ Initiate continuous improvement from the base of the current, but improved, processes;
- ◆ Introduce a knowledge of product and customer profitability;
- ◆ Re-engineer the business radically and provide clear future competitive differentiation;
- ◆ Address the cultural barriers that prevent effective cross-functional and hierarchical working;
- ◆ Introduce leadership and a role for managers and empowered staff.

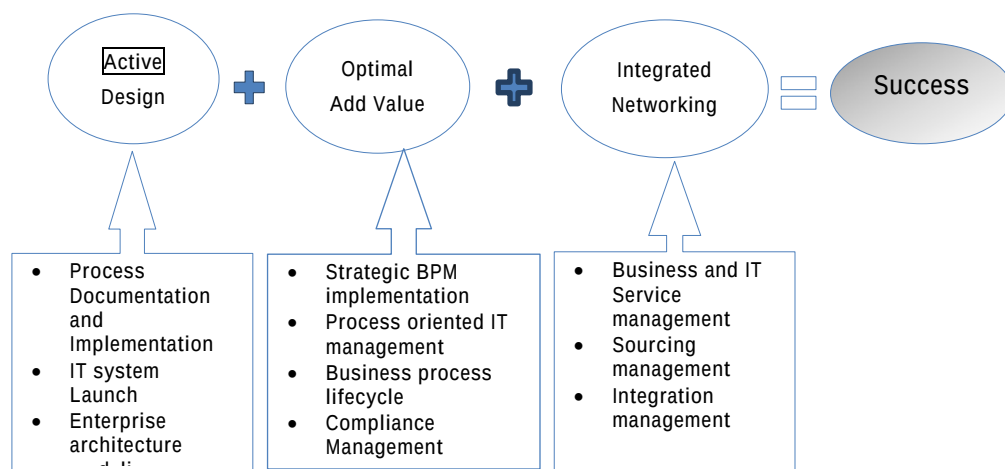


Fig. 1.5.1: BPM leads to success

Business processes are all around us, independent of the market, organization, department or function – whether a telecom operator providing an internet connection, a bank processing a loan application, an insurance company handling a claim, or a local government organization processing a request for a new passport. Any organization is the sum of its business processes and is the fundamental part of any organization's infrastructure as depicted in the Fig. 1.5.1. In all the above examples, the volume of work and the complexity of the business

process demand that organizations look for possible IT applications to support and automate their processes.

Throughout the years, many companies have invested millions in all sorts of IT solutions. The marketing department has its Enterprise Content Management (ECM) system, used to inform the consumer of the organization's products or services. The sales department has a Customer Relation Management (CRM) system to allow the company to up- and cross-sell, and finally the delivery department has an Enterprise Resource Planning (ERP) system to process the order and send an invoice. The challenge for today's organizations is that these departments operate as independent functional units.

1.5.3 Automation of the functional units

The consumer is often confronted with poor customer service due to broken processes, inefficient processes and manual processes – that is, the customer is often confronted with the silos of the organization. However, the same consumer is becoming more and more demanding with respect to delivery time – where customers used to expect and accept days or weeks for delivery, same time, the consumer is demanding higher quality of the products or services. Finally, the product or service is becoming more and more personalized (and thus more complex), supported by increased customer services. Refer to the Fig. 1.5.2.

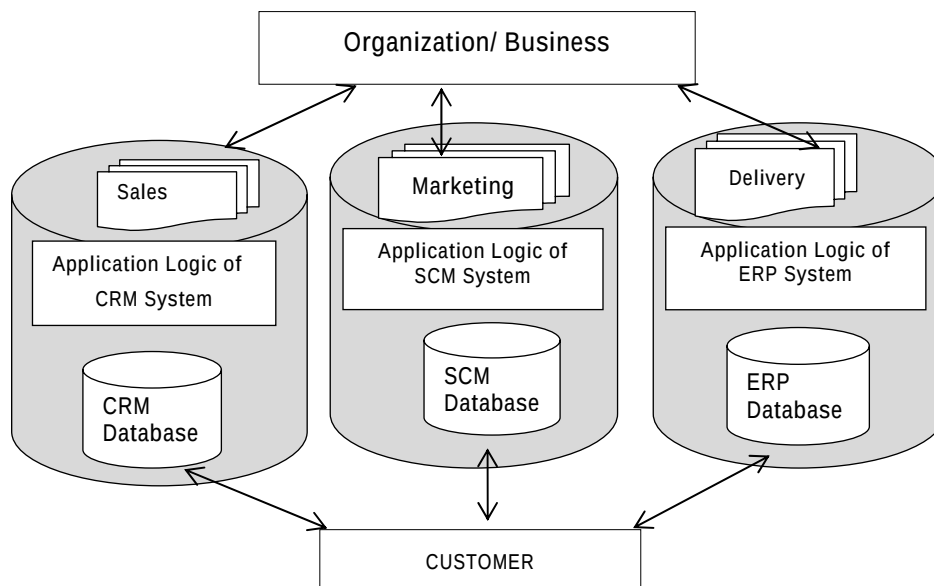


Fig. 1.5.2: Automation of the functional units

1.5.4 Challenges in implementing BPA

How can any organization cope with these increased demands in an environment where, at the same time:

- ◆ The number of interfaces with the customers is growing (e.g. phone, fax, email, sms, pda, etc.)
- ◆ The product, service and price options have increased the complexity of the business
- ◆ Most organizations have a whole suite of 'build and buy' systems and applications, often each with its own data format
- ◆ Budgets are being cut.

Organizations are realizing that all the organization's assets, systems, departments and people are interlinked. Referring to the Fig. 1.5.3, there are numerous internal processes that form an internal supply chain, which relate to the end-to-end process of the organization. Basically, one simple interface with the organization would be preferable:

- ◆ Marketing – what product or service do you have to offer?
- ◆ Sales – please treat me as one single client
- ◆ Delivery – please provide the product or service as quickly as possible.

Realizing that an organization could be seen as a sum of its business processes is the key element in selling a BPM and automation is not just about implementing technology, it is also about automating the business processes in the right circumstances. Existing applications can be linked to each other by an independent process layer. BPM automation is also about a new way of working, monitoring and managing the organization, which could result in a new organizational structure.

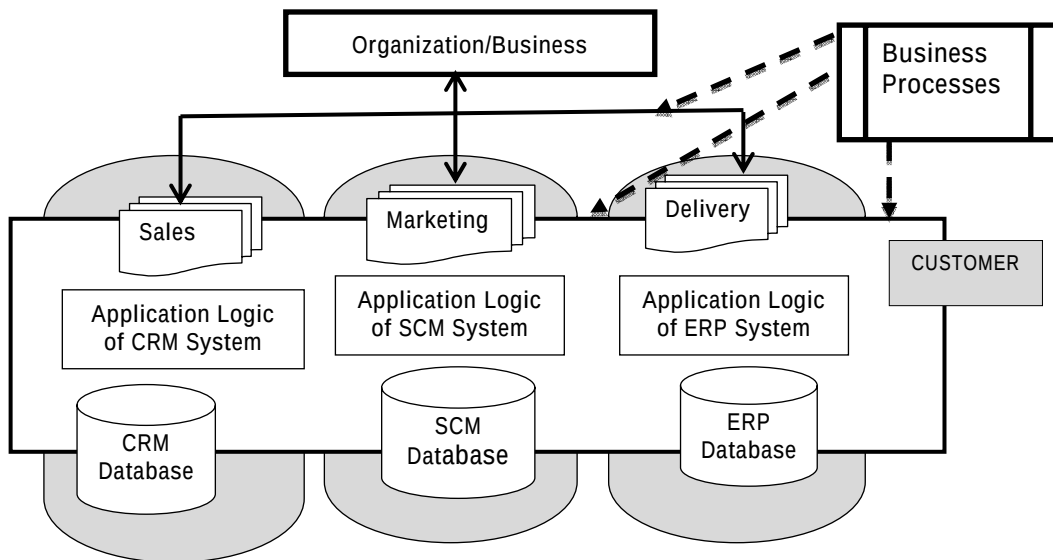


Fig. 1.5.3: Enterprise Business Systems: end-to-end customer processes.

1.5.5 BPM Technology

As in Fig. 1.5.3, BPM technology can complement existing (and future) investments in applications. BPM provides an independent process layer, linking the various independent applications needed to execute a single end-to-end business process. BPM technology can then manage the flow of activities along different applications, and the people involved and also reduce execution time. By tracking the business process, an organization can monitor its performance and at the same time audit for compliance. Analyzing information helps to improve the business processes further. All this can increasingly be completed in real time; management can make instant changes and validate if the changes are having the desired effect. Experience shows that organizations which are successful in exploiting BPM technology start by solving a specific business problem with a clear, short-term return on investment (ROI). Thus, anybody selling BPM, both internal and external to an organization, should consider both parts of the equation:

BPM = process and organization (including people) as well as technology

1.5.6 Value Chain Automation

Value chain refers to separate activities which are necessary to strengthen an organization's strategies and are linked together both inside and outside the organization. It is defined as a chain of activities that a firm operating in a specific industry performs in order to deliver a valuable product or service for the market.

The idea of the Value Chain is based on the process view of organizations, the idea of seeing a manufacturing (or service) organization as a system, made up of subsystems each with inputs, transformation processes and outputs. Value chain of a manufacturing organization comprises of Primary and Supportive activities. The primary ones are inclusive of inbound logistics, operations, outbound logistics, marketing and sales, and services. The supportive activities relate to procurement, human resource management, technology development and infrastructure.

Six business functions of the value chain:

- ◆ Research and development
- ◆ Design of products, services, or processes
- ◆ Production
- ◆ Marketing and sales
- ◆ Distribution
- ◆ Customer service

Value Chain Analysis is a useful tool for working out how we can create the greatest possible value for our customers. IT helps us identify the ways in which we create value for our customers, and then helps us think through how we can maximize this value: whether through superb products, great services, or jobs well done.

1.5.7 Business Process Automation (BPA): Benefits & Risks

BPA is a strategy to automate business processes so as to bring benefit to enterprise in terms of cost, time and effort. The core objective of BPA is achieved through integrating various business processes. The key benefits and risks of BPA are given below:

Benefits

- ◆ **Saving on costs:** Automation leads to saving in time and labour costs.
- ◆ **Staying ahead in competition:** Today, in order to survive, businesses need to adopt automation
- ◆ **Fast service to customers:** This was not the initial reason for adoption of BPA but gradually business managers realized that automation could help them to serve their customers faster and better.

Risks

- ◆ **Risk to jobs:** Jobs that were earlier performed manually by several employees would post-automation would be mechanized, thereby posing a threat to jobs.
- ◆ **False sense of security:** Automating poor processes will not gain better business practices.

For further details on BPA, students may refer to Chapter – 5 of the Study Material of Intermediate (IPC) Course.

1.6 Accounting Systems Automation

An Accounting Information System which is known as AIS is defined as a system of collection, storage and processing of financial and accounting data that is used by decision makers. An accounting information system is generally a computer-based method for tracking accounting activity in conjunction with information technology resources. The resulting statistical reports can be used internally by management or externally by other interested parties including investors, creditors and tax authorities.

1.6.1 Basic Functions of an Accounting Information System (AIS)

Accountants and auditors must study and understand AIS and related concepts so that they can accomplish the functions of accounting, general accounting reports and using accounting reports. The accounting information system is the mechanism that allows accountants to perform their accounting functions and tasks. Further, in automation of AIS, accountants and auditors need to be actively involved in evaluating which software to purchase, how to design the software or systems and implementation of the software or systems. As auditors in auditing AIS, understanding of AIS is critical for collecting and evaluating evidence to provide an opinion/report on the completeness and accuracy of accounting information which is

processed through AIS to produce the financial reports. There are three basic functions of AIS and these are explained here.

- (i) **Collect and store data:** Collect and store data about organization's business activities and transactions by capturing transaction data from source documents and posting data from journals to ledgers. Source documents are special forms used to capture transaction data such as sales order, sales invoice, order processing, purchase order, etc. Control over data collection is improved by pre-numbering each source document. Accuracy and efficiency in recording transaction data can be further improved if source documents are properly designed. The Figure 1.8 shows the system input documents through a system process flow namely source documents, product documents and turnaround documents.

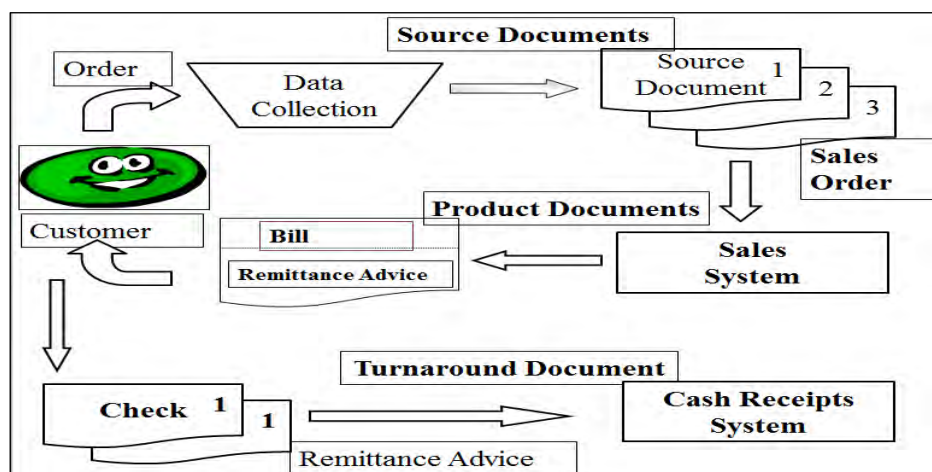


Fig. 1.6.1: System input documents for an accounts BPM

- (ii). **Record transaction:** Record transactions data into journals. These journals present a chronological record of what occurred and provide management with information useful for decision making. These documents are in the form of reports like financial statements, managerial reports, etc.
- (iii) **Safeguarding organisational assets:** Provide adequate controls to ensure that data are recorded and processed accurately by safeguarding organizational assets (data and systems). The two important methods for accomplishing this objective is by providing adequate documentation of all business activities and an effective segregation of duties. Documentation allows management to verify that assigned responsibilities were completed correctly. Segregation of duties refers to dividing responsibility for different portions of a transaction among several people. The functions to be performed by different people are authorizing (approval) transactions, recording (capture) transactions and maintaining custody (protect) of assets. Thereby ensure that business activities are performed efficiently and in accordance with management's objectives.

1.6.2 Processing Cycles of an Accounts BPM

The processing cycles of an Accounts BPM are identified in the Fig. 1.6.2 namely financing cycle, revenue cycle, expenditure cycle, human resource and the general ledger & reporting systems and the flow of data between them. These systems are discussed as follows:

- (i) **Financing Cycles:** A transaction processing cycle combines one or more types of transactions having related features or similar objectives. The cycle consists of a set of transactions leading to the recognition of a major economic event on the financial statements. It is through the study of transaction cycles that we gain a clear view of a firm's processing framework.

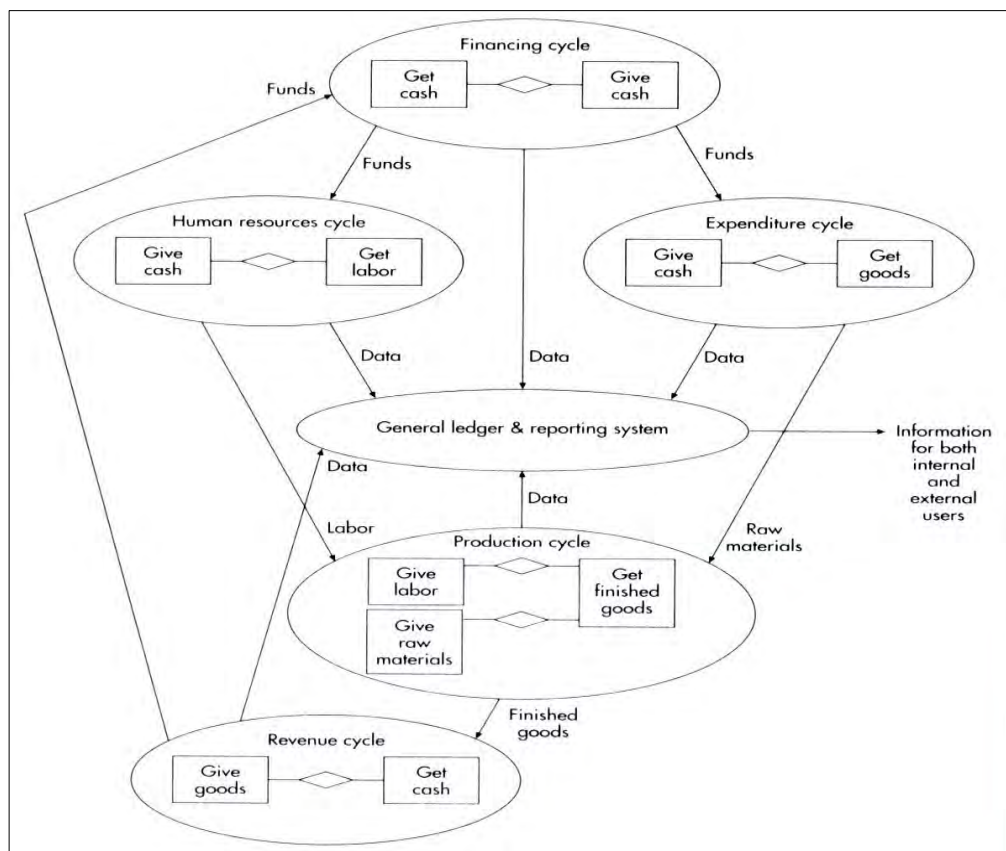


Fig. 1.6.2: Accounting Information Systems and its subsystems

- (ii) **Revenue Cycle:** It includes transactions surrounding the recognition of revenue involving accounts like Sales, Accounts Receivable, Inventory and General Ledger. It involves capturing and recording of customer orders; shipment of the goods; and recording of the cost of goods sold. The billing process and the recording of sales and accounts receivable; the capturing and recording of cash receipts.

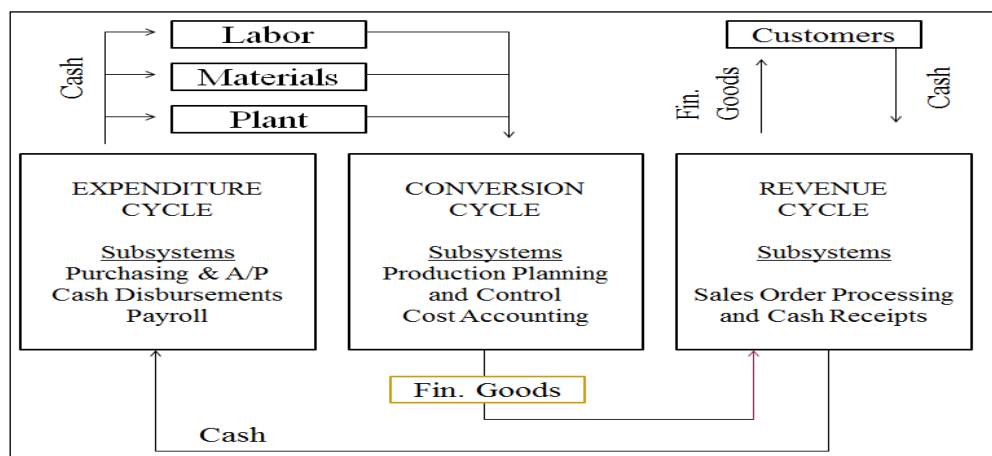


Fig. 1.6.3: Subsystems of the main processing cycles

Source Document	Function
Sales Order	Record Customer Order
Delivery Ticket	Record Delivery to Customer
Remittance Advice	Receive Cash
Deposit Slip	Record Amounts Deposited
Credit Memo	Support Adjustments to Customer Accounts

Revenue Cycle - Common Source Documents & Functions

- (iii) **Expenditure Cycle:** It includes transactions surrounding the recognition of expenditures involving accounts like Purchases, Accounts Payable, Cash Disbursements, Inventory and General Ledger. It includes preparation and recording of purchase orders; receipt of goods and the recording of the cost of inventory; receipt of vendor invoices; recording of accounts payable and preparation and recording of cash disbursements. The cycle also includes the preparation of employee paychecks and the recording of payroll activities.

Source Document	Function
Purchase Requisition	Request that purchasing department order goods.
Purchase Order	Request goods from vendors.
Receiving Report	Record receipt of merchandise.
Check	Pay for items.

Expéditeur Cycle - Common Source Documents & Functions

(iv) Human Resource Cycle

Source Document	Function
W4 forms	Collect employee withholding data.
Time cards	Record time worked by employees.
Job time tickets	Record time spent on specific jobs.

Human Resource Cycle - Common Source Documents & Functions

(v) General Ledger & Reporting System

General Ledger and Reporting System	
Journal Voucher	Record entry posted to general ledger.

General Ledger & Reporting System - Common Source Documents & Functions

- (vi) **Data Processing Cycle:** It may be noted, that all the above cycles of processing involves data processing activities which has been updated and stored. The stored information has details about the resources affected by the event and agents who participated in the activity. If the process of updating of the data stored is periodic, it is referred to as batch processing and if involves immediate updating as each transaction occurs, it is referred to as on-line, real-time processing.

In the data processing cycle, the processes of business activities about which data must be collected and processed are identified. Further, the activities, resources affected by that event, the agents who participate in that event and the event of Interest could be the input, output, processing, storage, alerts, controls and feedback.

The control on these data are maintained using Audit Trails. This is done by capturing snapshots or by tracing the flow of data. This provide a means to check the accuracy and validity of ledger postings. Storage of these data is in files named General Ledger, Accounts Payable ledger and Accounts Receivable ledger. The data files stored in the system typically include the following:

- Transaction file which is a collection of transaction input data - normally temporary in nature.
- Master file which is a collection of data that are of a more permanent or continuing interest.
- Reference (table) file contains data that are necessary to support data processing.

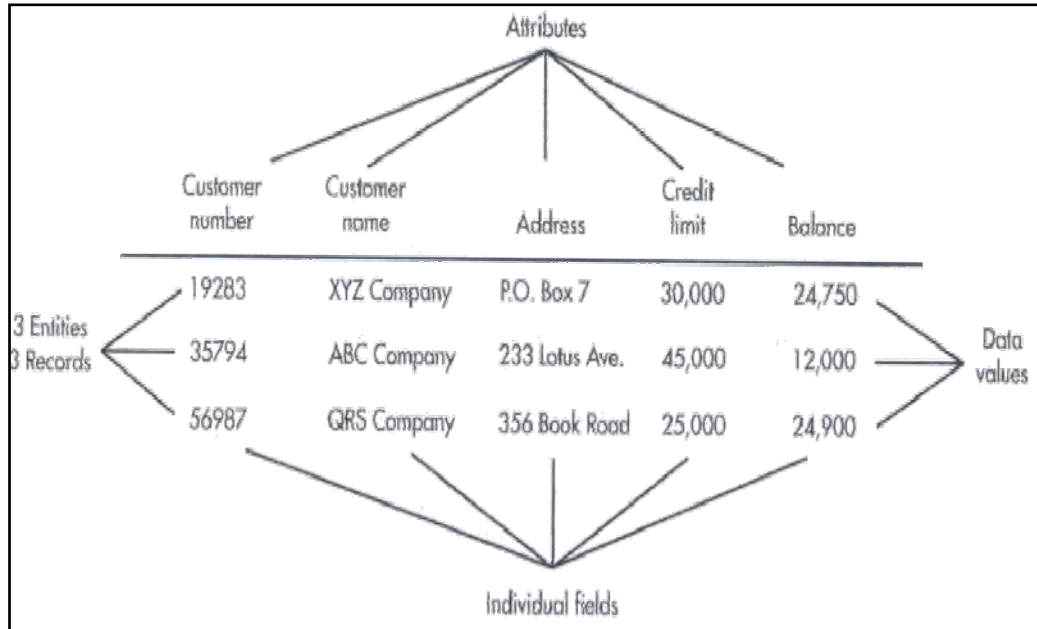


Fig. 1.6.4: Data elements in an Accounts Receivable File

1.7 Impact of IT on BPM and Risks of failure of IT

BPM Systems or suites (BPMS) are a new class of software that allows enterprises to devise process centric IT solutions. 'Process-centric' means BPM solutions are able to integrate people, systems and data (see figure given below). Organizations that utilize BPM systems to accomplish IT enabled business process change, gain from the following capabilities:

- ◆ Closer business involvement in designing IT enabled business processes,
- ◆ Ability to integrate people and systems that participate in business processes,
- ◆ Ability to simulate business processes to design the most optimal processes for implementation,
- ◆ Ability to monitor, control, and improve business processes in real time, and
- ◆ Ability to effect change on existing business processes in real time without an elaborate process conversion effort.

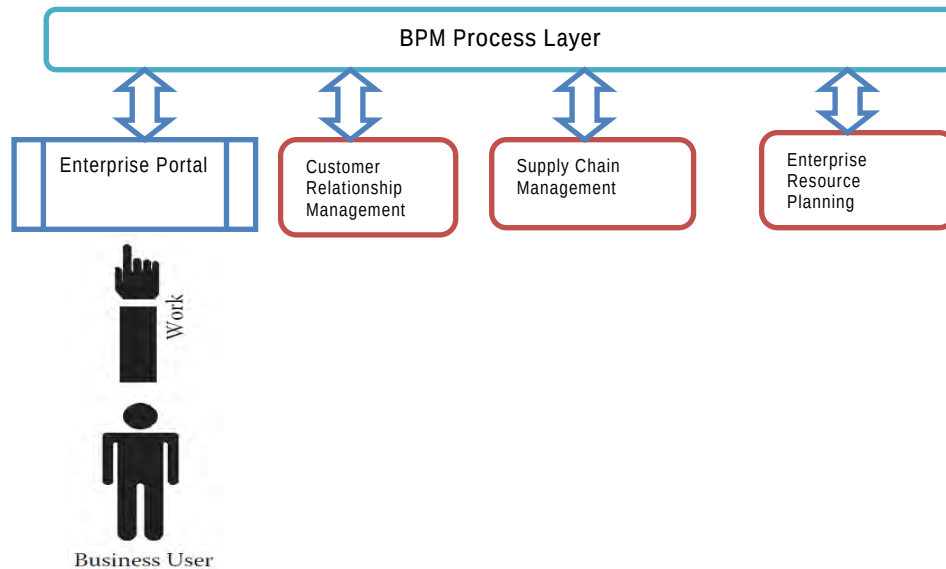


Fig. 1.7.1: Integration of People and Systems by BPM

1.7.1 Benefits of BPMS

BPMS, as a technology, can deliver endless benefits to any sized organization but more importantly these benefits are unique to a company:

- (a) **Automating repetitive business processes:** Processes such as report creation and distribution or the monitoring of or reporting on company's Key Performance Indicators (KPI) reduces the manual operational costs and helps employees to concentrate on activities that are important to the success of business.
- (b) **BPMS works by 'loosely coupling' with a company's existing applications:** This enables it to monitor, extract, format and distribute information to systems and people; in line with business events or rules.
- (c) **Operational Savings:** BPM focuses on optimization of processes. The processes that are repetitive are optimized and lead to reduced expenses which translate to immediate cost savings. By automating a task, ROI of BPM that requires six hours of manual intervention, one can expect to cut that time to half. Thus, three hours multiplied by the number of times the process is completed in a cycle will yield significant cost saving.
- (d) **Reduction in the administration involved in Compliance and ISO Activities:** Be it a quality assurance initiative such as the ISO standards, a financial audit law, or an IT systems best-practice implementation, companies worldwide are seeing the need to manage compliance as part of their everyday business activities. The BPM is ideally suited to help support companies in their quest for process improvement and compliance/governance certification. It gives full control over process and document

change, clarity of inherent risks, and ease with which process knowledge is communicated across the company.

- (e) **Freeing-up of employee time:** While the euphuism “time is money” is often over-used, it is very relevant to this topic, because in business, for each additional hour it takes to complete a manual business process, there is a hard cost associated with employee time as well as soft costs associated with losing business or lowered productivity. Another area where time comes into play is in opportunity costs.

BPM or BPR software is a fast-growing segment of the enterprise software market, due to its support for re-engineering. Using BPM software tools, enterprises can document workflow and processes, to identify bottlenecks and other impediments to effectiveness, and recommend alternative and improved business processes. The purpose of BPM software is to update the documentation, analysis, monitor and re-design business processes in an enterprise.

1.7.2 Business Risks of failure of IT

The numerous stumbling-blocks that organizations face with BPMS are primarily due to inadequate investment in ongoing training for involved personnel, as well as, lack of corporate policy protecting the integrity of the data in the BPM systems. Some of the other reasons for failure of BPMS include:

- ◆ Superficial or deficient executive involvement
- ◆ Deficient project management
- ◆ Breakdown in gap analysis
- ◆ Limited options for customization of the BPM software is required
- ◆ Not flexible enough or too complicated to be customized to meet the precise workflow and business process.
- ◆ Failure to identify future business needs
- ◆ Inadequate assessment of the need for change management
- ◆ Persistent compatibility problems with the diverse legacy systems of the partners.
- ◆ Resources not available when desirable
- ◆ Software fails to meet business needs
- ◆ System may be over-engineered when compared to the actual requirements.
- ◆ Technological obsolescence.

1.7.3 Information as a Business Asset

For information to be used effectively - and therefore to maximize its strategic value - it must be available as a shared, easily accessible service within an organization by continuous updating the old database system. Information becomes an asset for an organization if it is

useful, digital, accessible, relevant, accurate, trust-worthy, searchable, understandable, spatially enabled and shareable at the time when required. Information can be treated as a valuable commodity if it can be used effectively.

Information that is accurate and encompassing will allow decision-makers to better an organization's performance. Without reliable information, the decision-making process can be badly hampered and an informed decision impossible to make. Where a business is geographically dispersed, with servers hosted in different locations, or a business has a network of applications, there can also be the obstacle of replicating data across the network.

In short, without effectively management of information the result can be information chaos.

To achieve operational performance, it is important to ensure that Information Technology infrastructure is tailored to an organization that is able to meet an organization's needs for Customer Relationship Management (CRM), Enterprise Resource Planning (ERP), Business Intelligence (BI), Data Warehousing, Data Migration and Replication.

1.8 Business Process Reengineering

Business processes need to be re-engineered so as enhance efficiencies or due to change in the processing systems or mechanism. The discipline which provides a systematic approach to manage and bring in transformational change is called Business Process Reengineering (BPR). Although, there are many definitions of BPR, the most accepted and formal definition for Business Process Reengineering (BPR) is: "BPR is the fundamental rethinking and radical redesign of processes to achieve dramatic improvement, in critical, contemporary measures of performance such as cost, quality, service and speed".

This has a few important key words, which need clear understanding:

- ◆ **Dramatic achievement** means to achieve 80% or 90% reduction (in say, delivery time, work in progress or rejection rate) and not just 5%, 10% reduction. This is possible only by making major improvements and breakthroughs, and not small incremental changes like in Total Quality Management (TQM).
- ◆ **Radical redesign** means BPR is reinventing and not enhancing or improving. In a nutshell, a "clean slate approach" of BPR says that "Whatever you were doing in the past is all wrong", do not get biased by it or reassemble, the new system is to be redesigned afresh.
- ◆ **Fundamental rethinking** means asking the question "why do you do what you do", thereby eliminating business processes altogether if it does not add any value to the customer. There is no point in simplifying or automating a business process which does not add any value to the customer. An example is that of asking for an invoice from the supplier for payment when the company has already received and accepted a particular quantity of materials physically and at an agreed price. Receiving, processing, and filing of invoices add no value to customer and make only the supplier unhappy for delayed payments.

Thus, BPR aims at major transformation of the business processes to achieve dramatic improvement. Here, the business objectives of the enterprise (e.g., profits, customer-satisfaction through optimal cost, quality, deliveries, etc.) are achieved by “transformation” of the business processes which may, or may not, require the use of Information Technology (IT). A radical rethinking on the way the business is run would bring the finest out of the organization. BPR is the main method by which organizations become more efficient and modern. It transforms an organization in ways that directly affect its performance.

1.8.1 BPR Success factors

BPR implies not just change but dramatic change in the way a business functions. It would potentially impact every aspect of the business and the changes would be of a scale that could result in either drastic improvement or massive failures. Research has identified some key factors for BPR projects to succeed. These factors are:

- (i) **Organization wide commitment:** Changes to business processes would have a direct impact on processes, organisational structures, work culture, information flows, infrastructure & technologies and job competencies. This requires strong leadership, support and sponsorship from the top management. Top management not only has to recognise the need for change but also has to convince every affected group about the potential benefits of the change to the organisation as a whole and secure their commitment.
- (ii) **BPR team composition:** A BPR team is formed which would be responsible to take the BPR project forward and make key decisions and recommendations. The BPR team would include active representatives from top management, business process owners, technical experts and users. It is important that the teams must be kept of manageable size (say 10 members) to ensure well-coordinated, effective and efficient completion of the entire BPR process.
- (iii) **Business needs analysis:** It is important to identify exactly what current processes need reengineering. This would help determine the strategy and goals for BPR. A series of sessions are held with the process owners and stakeholders and all the ideas would be evaluated to outline and conceptualize the desired business process. The outcome of this analysis would be BPR project plan – identifying specific problem areas, setting goals and relating them to key business objectives. This alignment of the BPR strategy with the enterprise strategy is one of the most important aspect.
- (iv) **Adequate IT infrastructure:** Adequate investment in IT infrastructure in line is of vital importance to successful BPR implementation. An IT infrastructure is a set of hardware, software, networks, facilities, etc. (including all of the information technology), in order to develop, test, deliver, monitor, control or support IT services. Effective alignment of IT infrastructure to BPR strategy would determine the success of BPR efforts.
- (v) **Effective change management:** BPR involves changes in people behaviour and culture, processes and technologies. Hence, resistance would be a natural consequence which

needs to be dealt with effectively. An effective change management process would consider the current culture to foster a change in the prevailing beliefs, attitudes and behaviours effectively. The success of BPR depends on how effectively management conveys the need for change to the people.

- (vi) **Ongoing continuous improvement:** BPR is an ongoing process, hence innovation and continuous improvement are key to the successful implementation of BPR.

1.9 Approaches to Mapping Systems

Process mapping is a visual description of the flow of activities in a process. It describes the sequence of activities that make up a process, from its starting point to its end point. Accountants and auditors must understand the documentation and charts that describe various types of systems. Such documentation allows the accountant to analyse and understand the procedures and processes of a business process and the systems that capture and record the transaction flow. The old adage that a picture is worth a thousand words is true for users documenting processes and systems. A picture, or chart, of the system is a concise, complete, easy-to-understand way to analyse a process or system. Some of the popular pictorial representation or techniques which may be adopted for mapping business processes used are explained below. These are:

1. Entity Relationship Diagrams;
2. Data Flow Diagrams;
3. Systems Flow diagrams;
4. System outline charts; and
5. Decision Trees/Tables, etc.

1.9.1 Entity Relationship Diagrams

An Entity-Relationship (ER) diagram is a data modeling technique that creates a graphical representation of the entities, and the relationships between entities, within an information system. ER diagrams repeatedly bring into play symbols to symbolize three dissimilar types of information.

 Boxes are commonly used to represent entities. An entity may be a 'physical object' such as a house or a car, an 'event' such as a house sale or a car service, or a 'concept' such as a customer transaction or order. The entity is represented by a rectangle and labeled with a singular noun.

 Diamonds are normally used to represent relationships. A relationship is an association that exists between two entities. For example, Instructor teaches Class or Student attends Class. Most relationships can also be stated inversely. For example, Class is taught by Instructor. The relationships on an ER Diagram are represented by lines drawn between

the entities involved in the association. There are three types of relationships between entities – one-to-one, one-to-many and many-to-many.

 Ovals are used to represent attributes.

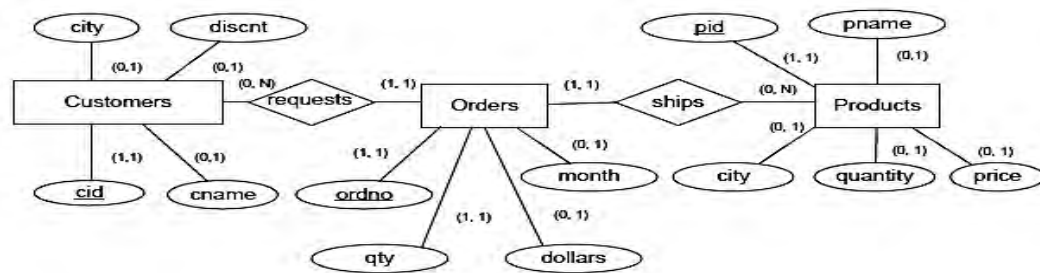


Fig. 1.9.1: Entity relationship diagram involving customers, orders and products

Fig. 1.9.1 depicts an example of Customer, Order and Products relationship using Entity Relationship Diagram.

1.9.2 Data Flow Diagrams

Data flow diagram (DFD) is a graphical representation of the flow of data through an information system. DFDs may be partitioned into levels that represent increasing information flow and functional detail. Therefore, the DFD provides a mechanism for functional modelling as well as information flow modelling.

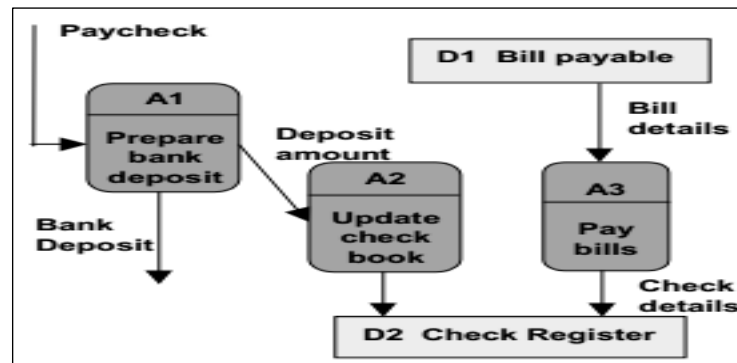


Fig. 1.9.2: An Example of a Data Flow Diagram

The four major DFD components are as follows:

- (i) **Entity:** An entity is the source or destination of data. The source in a DFD represents these entities that are outside the context of the system. Entities either provide data to the system (referred to as a source) or receive data from it (referred to as a sink). Entities

are often represented as rectangles (a diagonal line across the right-hand corner means that this entity is represented somewhere else in the DFD). Entities are also referred to as agents, terminators, or source/sink.

- (ii) **Process:** The process is the manipulation or work that transforms data, performing computations, making decisions (logic flow), or directing data flows based on business rules. In other words, a process receives input and generates some output. Process names (simple verbs and dataflow names, such as "Submit Payment" or "Get Invoice") usually describe the transformation, which can be performed by people or machines. Processes can be drawn as circles or a segmented rectangle on a DFD, and include a process name and process number.
- (iii) **Data Store:** A data store is where a process stores data between processes for later retrieval by that same process or another one. Files and tables are considered data stores. Data store names (plural) are simple but meaningful, such as "customers", "orders" and "products." Data stores are usually drawn as a rectangle with the right hand side missing and labeled by the name of the data storage area it represents, though different notations do exist.
- (iv) **Data Flow:** Data flow is the movement of data between the entity, the process and the data store. Data flow portrays the interface between the components of the DFD. The flow of data in a DFD is named to reflect the nature of the data used (these names should also be unique within a specific DFD). Data flow is represented by an arrow, where the arrow is annotated with the data name.

1.9.3 Systems Flow Diagrams

A system flowchart is a concrete, physical model that documents, in an easily visualized, graphical form, the system's discrete physical components (its programs, procedures, files, reports, screens, etc.). On a system flowchart, each component is represented by a symbol that visually suggests its function. The symbols are linked by flow lines. A given flow line might represent a data flow, a control flow and/or a hardware interface. By convention, the direction of flow is from the top left to the bottom right, and arrowheads must be used when that convention is not followed. Arrowheads are recommended even when the convention is followed because they help to clarify the documentation.

A system flowchart's symbols represent physical components and the mere act of drawing one implies a physical decision. Consequently, system flowcharts are poor analysis tools because the appropriate time for making physical decisions is after analysis has been completed. A flowchart is a diagram constructed from connected shapes representing a process or a plan.

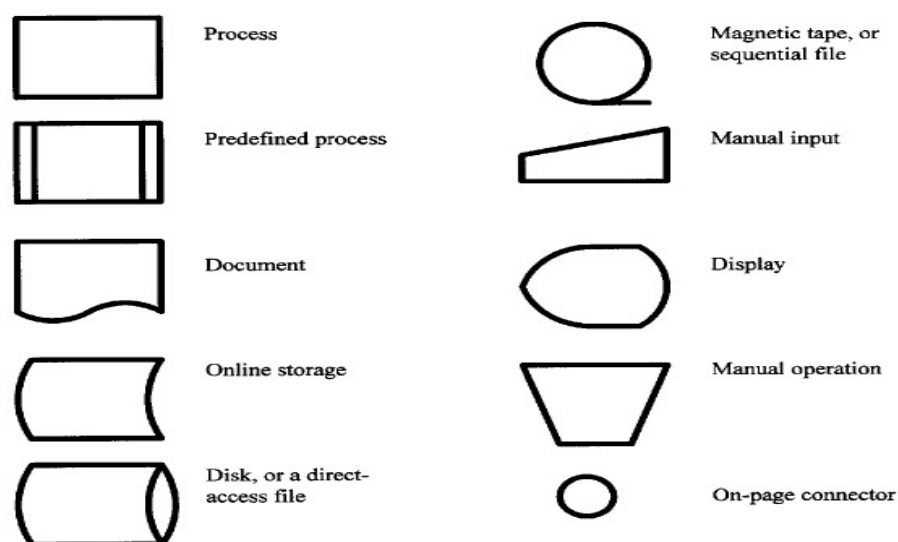


Fig. 1.9.3: System flowcharting symbols

Table 1.9.1: Difference between Flowchart and Data Flow Diagram

Flowchart	Data Flow Diagram
Flow chart presents steps to complete a process.	DFD presents the flow of data.
Flow charts do not have any input from or output to an external source.	DFD describes the path of data from an external source to internal source or vice versa.
The timing and sequence of the process is aptly shown by a flowchart.	Whether processing of data is taking place in a particular order or several processes are taking place simultaneously is described by a DFD.
Flow chart shows how to make a system function.	DFD define the functionality of a system.
Flow chart are used in designing a process.	DFD are used to describe the path of data that will complete that process.
Types of Flow charts – System, Data, Document and Program.	Types of DFD – physical data flow and logical data flow.

Example: Draw the program flowchart for finding the sum of first 100 odd numbers.

Solution. The flowchart is drawn as Fig. 1.9.4 and is explained step by step below. The step numbers are shown in the flowchart in circles and as such are not a part of the flowchart but only a referencing device.

Our purpose is to find the sum of the series 1, 3, 5, 7, 9.....(100 terms.) The student can verify that the 100th term would be 199. We propose to set $A = 1$ and then go on incrementing it by 2 so that it holds the various terms of the series in turn. B is an accumulator in the sense that A is added to B whenever A is incremented. Thus B will hold

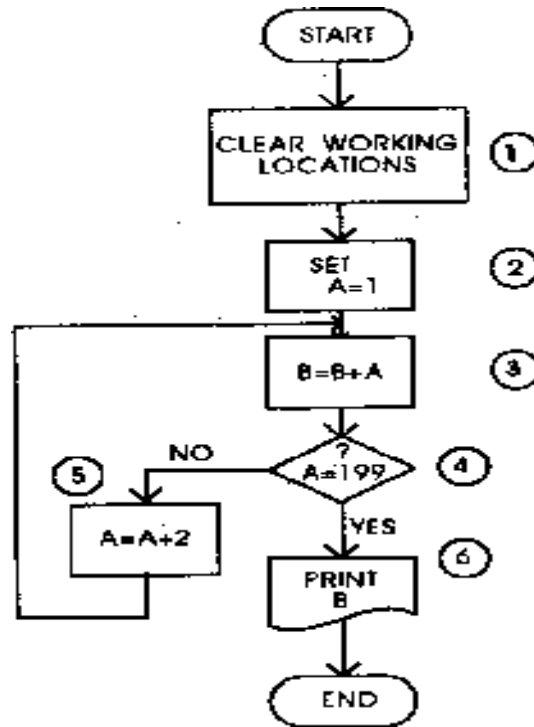


Fig. 1.9.4 Flowchart for addition of first 100 odd numbers

1

$1 + 3 = 4$

$4 + 5 = 9$,

$9 + 7 = 16$, etc. in turn.

Step 1 - All working locations are set at zero. This is necessary because if they are holding some data of the previous program, that data is liable to corrupt the result of the flowchart.

Step 2 - A is set at 1 so that subsequently by incrementing it successively by 2, we get the wanted odd terms : 1,3,5,7 etc.

Step 3 - A is poured into B i.e., added to B. B being 0 at the moment and A being 1, B becomes $0 + 1 = 1$.

Step 4 - In step 5, we shall increment A by 2. So that although at the moment A is 1, it will be made 3 in step 5, and so on. Since we have to stop at the 100th terms which is equal to 199, step 4 poses a question. "Has A become 199 ?" If not, go back to step 3 by forming loop.

Thus, A is repeatedly incremented in step 5 and added to B in step 3. In other words, B holds the cumulative sum upto the latest terms held in A.

When A has become 199 that means the necessary computations have been carried out so that in step 6 the result is printed.

Perhaps more suggestive symbols for A and B could be ODD and SUM respectively.

1.9.4 System Outline Charts

These charts merely list the inputs, files processed and outputs without regard to any sequence whatever. An example of this chart of sales order Processing is given below in Fig. 1.9.4.

Title	System	Document	Sheet
Sale Order Processing (SOP)	S	3.1	1
Inputs Customer Order Details		Processes Order entry (clerical) Order acknowledgement (computer) <u>Despatch</u> (clerical) <u>Despatch</u> update (computer)	
Files Product Catalogue Customer Index Cards Doubtful Cost List Delivery Cost List Factory Stock List Customer N/A Card Product Card file Outstanding Order File Product Order Book Order Ledger		→ Outputs Error reports Balance Order Set Advice Notes Set Invoice Details Tape	
Notes, Cross references			
Issue			
Date			

Fig. 1.9.4: System Outline Charts

1.9.5 Decision Trees/Tables

A Decision Table also termed as an inference or logical tree or decision tree is a collection of a basis (condition) and a conclusion (action). In its tree-like representation, the premises and conclusions are shown as nodes, and the branches of the tree connect the premises and the conclusions. The logical operators "AND" and "OR" are used to replicate the structure of the if-then rules. As such, decision tables (DTs) do not seem to differ much from a decision tree.

Instead of specifying a table, the preference maker constructs a graph of the decision alternatives emanating as branches from a root node over a number leafs. A decision is the assortment between achievable actions. A choice is the range between two or more objects. Decision Trees are measured to be one of the most accepted approaches for representing classifier. Researchers from a variety of disciplines such as statistics, machine learning, pattern identification and data mining have dealt with the issue of growing a decision tree from available data. Decision trees are a simple, but powerful form of multiple variable analyses.

Thus Decision tree builds categorization or regression models in the shape of a tree structure. It breaks down a dataset into slighter and slighter subsets while at the same time an allied decision tree is incrementally developed. The concluding consequence is a tree with decision nodes and leaf nodes. As shown in Fig. 1.9.5, the decision node (e.g., Outlook) has two or more branches (e.g., Sunny, Overcast and Rainy). Leaf node (e.g., Play) represents a categorization or decision. The uppermost decision node in a tree which corresponds to the greatest predictor called root node. Decision trees can grip both clear-cut and numerical data.

They provide unique capabilities to supplement, complement, and substitute for

- ◆ traditional statistical forms of analysis (such as multiple linear regression)
- ◆ a variety of data mining tools and techniques (such as neural networks)
- ◆ recently developed multidimensional forms of reporting and analysis found in the field of business intelligence



Fig. 1.9.5: Decision Tree Conceptual View

A decision tree is a decision support tool that uses a tree-like graph or model of decisions and their possible consequences, including chance event outcomes, resource costs, and utility. It is one way to display an algorithm. Decision trees are commonly used in operations research, specifically in decision analysis, to help identify a strategy most likely to reach a goal. Refer to the Fig. 1.9.6.

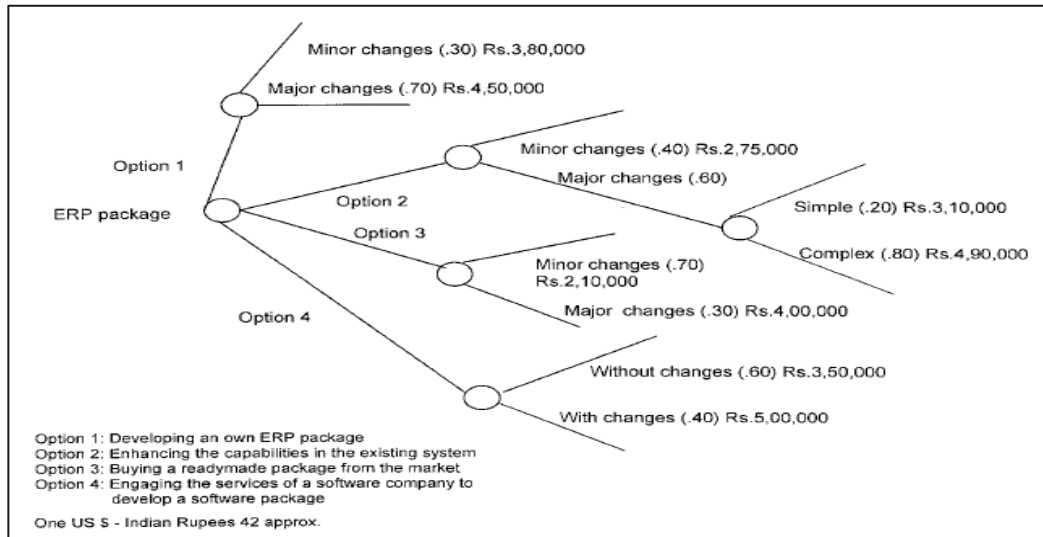


Fig. 1.9.6: Decision tree model for selection of an ERP software package

1.10 Summary

"Process thinking" is the new approach to solving business problems. In this chapter we have learned how viewing an organization as a system of set of interlinked processes rather than functional silos could bring about significant improvements in the overall performance of the business and help in achievement of organizational objectives. Businesses are a collection of connected processes and that to be agile, those processes must frequently be realigned or reconnected so they can address changing business environments, redefined business objectives and newly imposed regulations.

Business Process Management (BPM) is a holistic approach for aligning business processes with the needs of the customers. The idea is to view processes as assets that provide value to customers. Hence a systematic approach to continuously improve the business processes through innovation, integration and use of technology is essential to ensure survival of the business as well as improvement in business effectiveness and efficiency.

BPM systems allow organizations to devise process centric information technology solutions. Process-centric means BPM solutions are able to integrate people, systems, and data. BPM solutions enable business users, analysts, managers and other stakeholders to collaborate with developers in implementation process through the - Business Process Management Lifecycle. Different levels can be identified in business process management, ranging from high-level business strategies to implemented business processes.

BPM can be applied in many disparate ways, depending on the sector in which it is being used. Several approaches to mapping business processes may be adopted including entity relationship diagrams, data flow diagrams, systems flow diagrams, system outline charts,

decision trees, decision tables, etc. The purpose of mapping is to define clearly the activities involved in a business process and to find opportunities for improvements in the current process.

Business Process Reengineering (BPR) aims at major transformation in business processes to achieve dramatic improvements. Here, the business objectives of the enterprise are achieved by “transformation” of business processes which may, or may not, require the use of Information Technology (IT).

The Payback achieved by industries through implementing BPM need be quantitatively assessed to identify the areas of improvement. The numerous stumbling-blocks that organizations face with BPM systems are due to inadequate investment in ongoing training for involved personnel, including those implementing and testing changes, as well as a lack of corporate policy protecting the integrity of the data in the BPM systems and the way it is used.