Chapter 12

Functional Management Information Systems

Financial Information System

The finance area is the functional arm of a firm that is responsible for overall financial planning and raising capital. Because the finance area controls the cash flow of the organisation and because we are living in a merger-and-acquisition era in which financial deals can make or break a company, finance is often one of the fastest tracks to the top of an organisation.

Three important decision activities comprise the finance area:

(1) Forecasting (2) Funds management and (3) Auditing overall financial performance. The first two activities are important to managerial planning, especially strategic planning. The third areas of –auditing is primarily oriented towards managerial control.

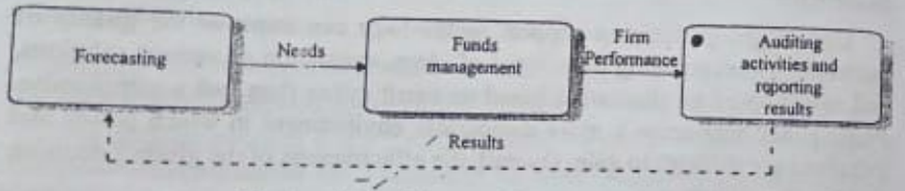

Figure 12.1 – Finance Functions

(i) Forecasting: Based on forecast submitted by each of the functional areas and on key external environment data, a *financial forecast* is prepared. Forecasts normally show sources of money coming into the firm and uses of money going out. Often, these forecasts cover a relatively long period of time, perhaps ten years or more. The forecast shows when the firm is likely to have a cash surplus and when a cash deficit may exist. Cash is a major financial concern because employees, creditors, stockholders and bondholders all require cash payments at pre-specified times.

(ii) Funds management: Once a forecast is prepared that shows when revenues will be collected and payments disbursed, the next step in financial planning is to determine whether any external financing is necessary. If the company is unable to meet its obligations at any time, the finance area must decide how to raise needed funds. Some possible sources are getting a loan, issuing bonds, issuing stock, merging with a company and becoming acquired by another organisation. The master schedule that combines the financial forecast with the income and disbursements related to external financing sources is often called the *financial plan.*

Whether or not a company chooses to borrow money depends in part on the leverage it gains through tax benefits and the strength of its current financial portfolio. Many companies have liquid assets to meet short-term obligations as well as stocks and bonds in other organisations. A major responsibility of the finance area is managing this portfolio in a manner consistent with the goals of the organisation.

(iii) Auditing: An audit is an inspection that determines whether something is working according to organisational guidelines. There are two types of audits: (1) Internal audit and (2) External audit.

Every large company has an *internal auditing* staff. The tasks of an internal audit vary. A *financial audit*, for example, verifies the accuracy of the company's financial accounting records. The results of the financial audit can also verify how close portions of the forecast came to what actually happened. An *operational audit* on the other hand, verifies whether a procedure works as claimed.

External audits are financial audits performed by independent audit firms. External audits are a periodic necessity because creditors and investors require an unbiased testament that the wealth, revenues and expenses claimed by the firm are legitimate. The principle outputs of the external audit are a *balance sheet*, showing a firm's assets and equities and *an income statement, reporting revenues* and *expenses.*

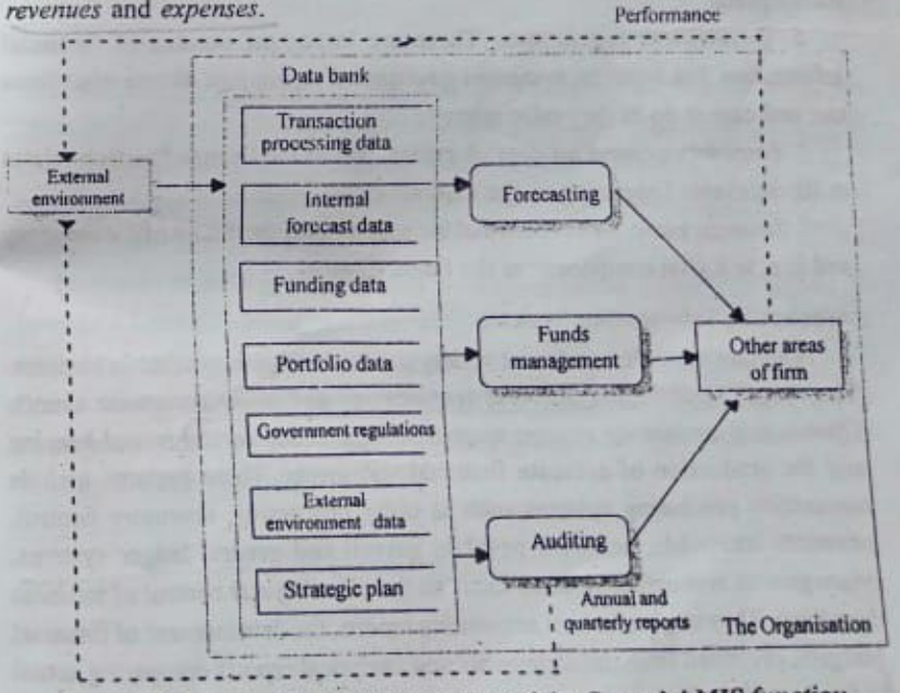

Figure 12.2 – Data Flow representation of the financial MIS function

Sources of Financial Information: Figure 12.2 shows a number of important data sources for information needed to make financial decisions. They are discussed below:

1. Transaction processing data are most useful for control and audit purposes. These data include the revenues for the firm as a whole and the expenses incurred in each of the functional areas.

2. Internal forecast data: For planning purposes, the company needs estimates of expected expenses from each of the functional areas as well as sales and revenue projections from the marketing department. These types of planning data can be used later by the firm and by each functional area for control purposes, to determine how actual results differed from projected results.

3. Funding data: They provide information on specific sources of funds as well as on the availability and terms that are associated with alternative funding packages.

4. Portfolio data: Portfolio data show the current portfolio of securities held by the organisation as well as prices of securities in the financial marketplace.

5. Government regulations: These are important sources of financial information. For instance, numerous government regulations dictate what firms can and cannot do as they raise money.

6. External environment data: A critical part of the finance function relates to future events happening in the external environment.

7. Strategic plan: This is essential because it charts the future of the company and is also a vital component of the financial plan.

Accounting Information Systems

These are the oldest and most widely used information systems in business. They record and report business transactions and other economic events. *Operational accounting systems* emphasise legal and historical record-keeping and the production of accurate financial statements. These systems include transaction processing systems such as order processing, inventory control, accounts receivable, accounts payable, payroll and general ledger systems. Management accounting systems focus on the planning and control of business operation. They emphasise cost accounting reports, the development of financial budgets, projected financial statements and analytical reports comparing actual to forecasted performance.

The following figure illustrates the interrelationships of important accounting information systems commonly computerised by both large and small business.

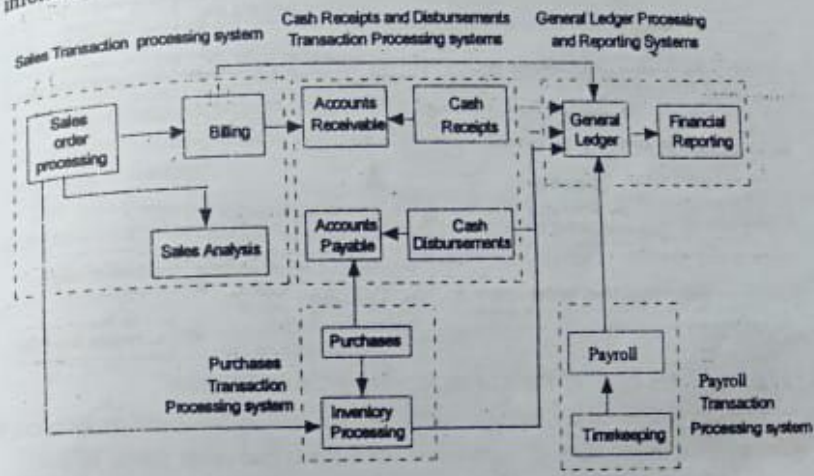

Figure 12.3 – Interrelationships of Various Accounting Information Systems

Sales order processing

Sales order processing is an important transaction processing system which captures and processes customer orders and produces invoices for customers and data needed for sales analysis and inventory control. It also provides inventory control systems with information on accepted orders, so they can be filled as quickly as possible.

Inventory control systems process data reflecting changes to items in inventory. Once data about customer orders is received from an order processing system, a computer based inventory control system records changes to inventory levels and prepares appropriate shipping documents. Then it may notify managers about items that need re-ordering and provide them with a variety of inventory status reports.

The figure 12.4 illustrates the data flows in an inventory control system.

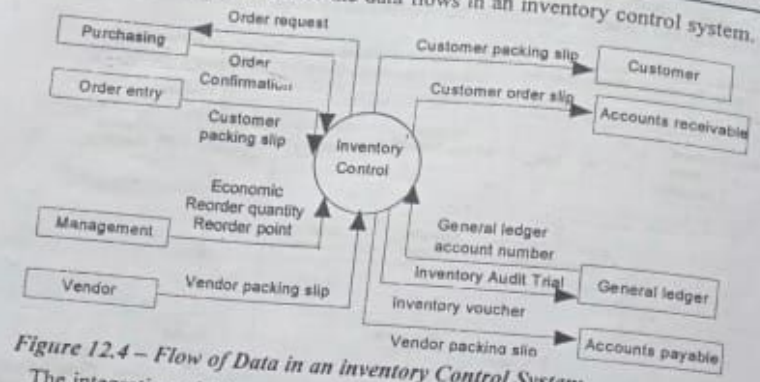

Figure 12.4 – Flow of Data in an inventory Control System

The integration of this system with other accounting information systems is quite evident in the flow of transaction documents and other forms of data.

Accounts receivable: Accounts receivable systems keep records of amount owed by customers from data generated by customer purchases and payments. They produce monthly customer statements and credit management reports.

Computer-based accounts receivable systems stimulate prompt customer payments by preparing accurate and timely invoices and monthly statements to credit customers. They provide managers with reports to help them control the amount of credit extended and the collection of money owed. This activity helps to maximise profitable credit sales while minimising losses from bad debts.

Account Payable: Accounts payable systems keep track of data concerning purchases from and payments to suppliers. They provide management with information needed for the analysis of payments, expenses, purchases, employee expense accounts and cash requirements.

Payroll: Payroll systems receive and maintain data from employee time cards and other work records. They produce pay cheques and other documents such as earnings statements, pay roll reports and labour analysis reports.

General Ledger: General ledger systems consolidate data received from accounts receivable, accounts payable, payroll and other accounting information systems. At the end of each accounting period, they produce the general ledger trial balance, the income statement and balance sheet of the firm and various income and expense reports for management.

Marketing Information Systems

The business function of *marketing* is concerned with the planning, promotion and sale of existing products in existing markets and the development of new products and new markets to better serve present and potential customers. Thus, marketing performs a vital function in the operation of a business enterprise. Computers have been a catalyst in the development of *marketing information systems*, which integrate the information flows required by many marketing activities.

The following figure illustrates how marketing information systems provide information for planning, control and transaction processing in the marketing function.

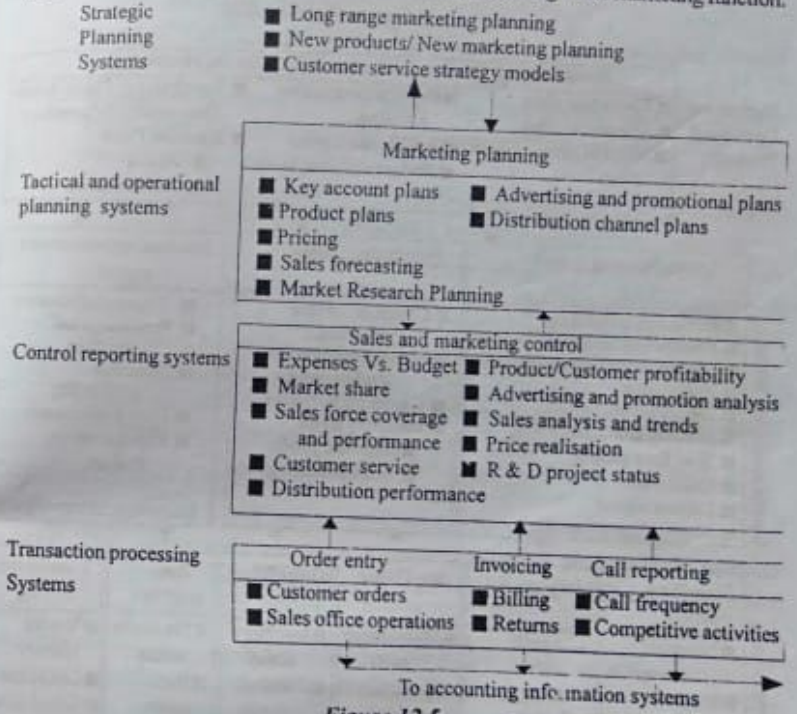

Figure 12.5 –

Strategic, tactical and operational information systems assist marketing managers in product planning, pricing decisions, advertising and sales promotion strategies and expenditure, forecasting market potential for new and present products and determining channels of distribution. Control reporting systems support the efforts of marketing managers to control the efficiency and effectiveness of the selling and distribution of products and services. Analytical reports provide information on a firm's actual performance versus planned marketing objectives.

Manufacturing or Production Information Systems

Manufacturing information systems support the *production operations* function which includes all activities concerned with the planning and control of the processes that produce goods or services. Thus, the production /operation function is concerned with the management of the *operational systems* of all business firms. Planning and control information systems are used for operations management and transaction processing as illustrated in the following figure.

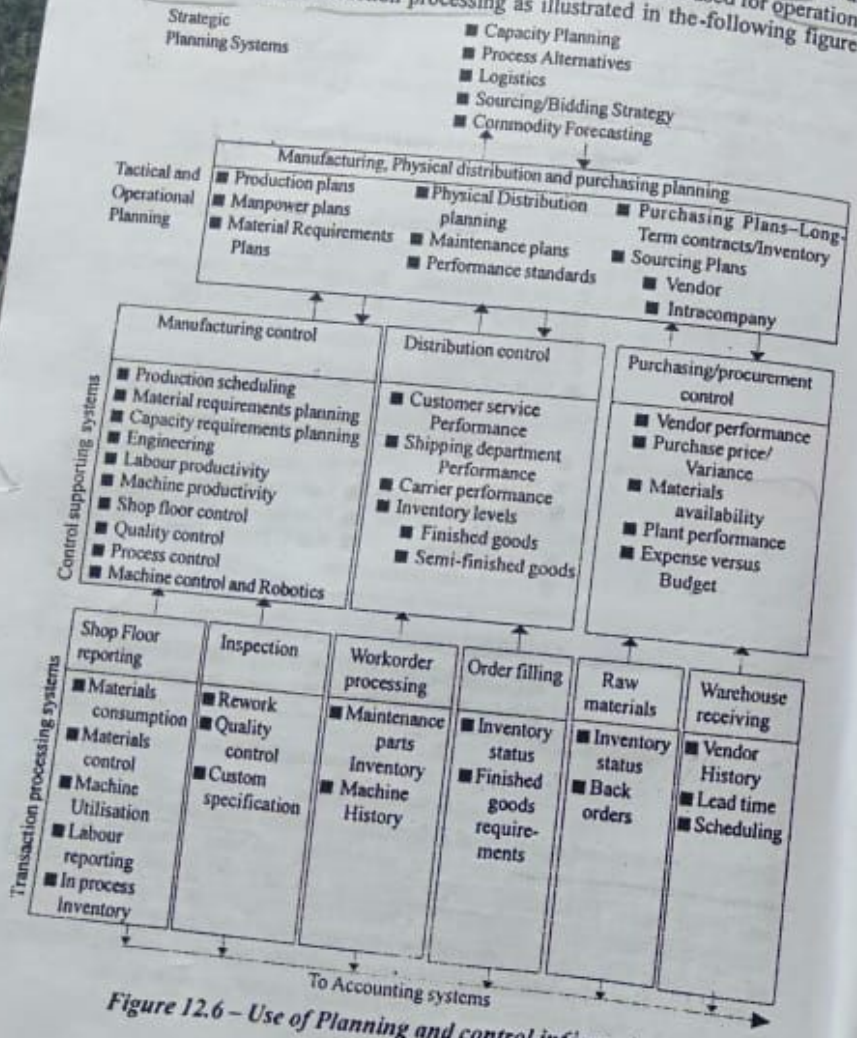

Figure 12.6 – Use of Planning and control information system for operations management

Computer-based manufacturing information systems use several major techniques to support *computer integrated manufacturing* (CIM). CIM is an overall concept that stresses that the goals of computer use in factory automation must be to:

1. *Simplify* production processes, product designs and factory organisation as a vital foundation to automation and integration.
2. *Automate* production processes and the business functions that support them with computers and robots.
3. *Integrate* all production support processes using computers and telecommunications networks.

Some of the benefits of computer integrated manufacturing systems are:

1. Increased efficiency through work simplification and automation, better production schedule planning and better balancing of production workload to production capacity.
2. Improved utilisation of the production facilities, higher productivity and better quality control resulting from continuous monitoring, feedback and control of factory operations, equipment and robots.
3. Reduced investment in production inventories and the facilities through work simplification, just-in-time inventory policies, and better planning and control of production and finished goods requirements.
4. Improved customer service by drastically reducing out-of-stock situations and producing higher quality products that better meet customer requirements.

Computer-Aided Engineering

Process control is the use of computers to control an ongoing physical process. Process control computers are used to control physical processes in petroleum refineries, cement plants, steel mills, chemical plants, food product manufacturing plants, pulp and paper mills, electric power plants, and so on. Many process control computers are special-purpose minicomputer systems. A process control computer system requires the use of special sensing devices that measure physical phenomena such as temperature or pressure changes. These continuous physical measurements are converted to digital form by analog-to-digital converters and relayed to computers for processing. Process control programs use mathematical models to analyse the data generated by the ongoing process and compare them to standards or forecasts of required results. Output of a process control system can take three forms:

(i) Periodic and on-demand reports analysing the performance of the production process. Personal computers have become a popular method of analysing and reporting process control data.

(ii) Messages and displays about the status of the process. A human operator can then take appropriate measures to control the process.

(iii) Direct control of the process by the use of control devices that adjust thermostats, valves, switches, and so on.

Machine control is the use of a computer to control the actions of a machine. This is also popularly called *numerical control*. The control of machine tools in factories is a typical numerical control application, though it also refers to the control of welding machines, weaving machines, and other industrial machinery.

Numerical control computer programs for machine tools convert geometric data from engineering drawings and machining instructions from process planning into a numerical code of commands that controls the actions of a machine tool. Machine control can be accomplished offline by using special paper tape or magnetic tape units, which use the output of a computer to direct a machine. *Direct numerical control* (DNC) involves the online control of a machine by a computer.

Machine control may involve the use of special-purpose microcomputers called *programmable logic controllers* (PLCs). These devices operate one or more machines according to the directions of a numerical control program. Specially equipped personal computers that can withstand a factory environment are used to develop and instal numerical control programs in PLCs. They are also used to analyse production data furnished by the PLCs. This analysis helps engineers fine-tune machine performance.

Robotics:– An important development in machine control and computer-aided manufacturing is the creation of smart machines and robots. These devices directly control their own activities with the aid of microcomputers. *Robotics* is the *technology* of building and using machines (robots) with *computer intelligence* and computer-controlled *humanlike physical capabilities*.

Robots are used as "steel-collar" workers to increase productivity and cut costs. For example, one robot regularly assembles compressor valves with 12 parts at the rate of 320 units per hour, which is 10 times the rate of human workers. Robots are also particularly valuable for hazardous areas or work activities. Robots follow programs loaded into separate or on-board special-purpose microcomputers. Input is received from visual and/or tactile sensors, processed by the microcomputer, and translated into movements of the robot. This typically involves moving its "arms" and "hands" to pick up and load

items or perform some other work assignment such as painting, drilling, or welding. Robotics developments are expected to make robots more intelligent, flexible, and mobile by improving their computing, visual, tactile, and navigational capabilities.

Manufacturing engineers use *computer-aided engineering* to simulate, analyse, and evaluate the models of product designs they have developed using *computer-aided design* methods. *Powerful engineering workstations* with enhanced graphics and computational capabilities are used to analyse and design products and manufacturing facilities. Products are designed according to product specifications determined in cooperation with the product design efforts of marketing research and product development specialists. One of the final outputs of this design process is the *bill of materials* (specification of all required materials) used by the materials resources planning application. The engineering subsystem is frequently responsible for determining standards for product quality (*i.e., quality assurance*). It also is responsible for the design of the production processes needed to manufacture the products it designs. This function depends heavily on the use of computers to perform the necessary analysis and design, and it is known as *computer-aided process planning*.

Computer-aided design packages and engineering workstations are the software and hardware resources used to give engineers their engineering workstations. Engineers use these high-powered computing and advanced graphics workstations for the design and testing of products, facilities, and processes. Input is by *light pen, joystick,* or *keyboard*, with the CAD package refining an engineer's initial drawings. Output is in two-or three-dimensional graphics that can be rotated to display all sides of the object being designed. The engineer can zoom in for close-up views of a specific part and even make parts of the product appear to move as they would in normal operation. The design can then be converted into a finished mathematical model of the product. This is used as the basis for production specifications and machine tool programs.

Human resource information systems

Human resources information management or [personnel] function involves the recruitment, placement, evaluation, compensation and development of the employees of an organisation. Originally businesses used computer based information systems to:

(1) Produce paycheques and payroll reports

(2) Maintain personnel records.

(3) Analyse the use of personnel in business operations.

Many organisations have gone beyond these traditional functions and have developed human resources information systems, which also support :

(1) Recruitment, selection and hiring
(2) Job placement
(3) Performance Appraisals
(4) Employee benefits analysis
(5) Training and development
(6) Health, safety and security.

Such information systems support the *concept of human resource management*. This business function emphasises the following:

(1) Planning to meet the personnel needs of the business.
(2) Development of employees to their full potential.
(3) Control of all personnel policies and programs

The goal of human resources management is the effective and efficient control of human resources of an organisation. Some of the major applications of information systems that support human resource management are furnished below:

	Staffing	Training/ development	Performance review and appraisal	Compensation administration
Strategic Information Systems	Man Power planning; Labour force Tracking	Succession Planning	Performance appraisal planning	Contract costing salary forecasting benefits tracking
Tactical Information Systems	Budget analysis Turnover analysis Turnover cost Absenteeism/ performance	Training effectiveness Career matching	Performance/training correlation	Compensation effectiveness Benefit preference models
Operational Information Systems	Recruiting Structured interview/ assessment workforce planning Scheduling selection models	Skill Assessment	Computer-based evaluation programs	Compensation Equality

Figure 12.7 – Various Information Systems supporting HRM

Managing information services involve, the management of managerial, technical and clerical personnel. One of the most important jobs of information service, managers is to recruit qualified personnel and to develop, organise and

direct the capabilities of existing personnel. Employees must be continually trained to keep up with the latest developments in a fast moving and highly technical field. Employee job performance must be continually evaluated and outstanding performances rewarded with increment in salary or promotions. The management and development of information services personnel pose some unique problems for management.

For example, system analysts and computer programmers are creative professional personnel. Many firms have found that such professionals cannot be managed with traditional work rules. There is a wide variety of career choices and job types in many computer using organisations. However, information services personnel can be grouped into three occupational categories that coincide with three functional categories of system development, operation and technical service. Managing the technical personnel in an information services department is a major human resources management assignment.

Review Questions

1. Explain what is meant by a functional area of business.
2. Identify sources of information needed to make financial decisions.
3. Identify sources of information needed to make marketing decisions.
4. Describe the role and major decision activities of the manufacturing function and how technology can support this function.
5. Describe the information systems that support the human resource management (HRM) functions.

Chapter 13

Business Process Outsourcing

Introduction

The purpose of this chapter is to describe how information technology can be applied to redesign business processes that go beyond functional boundaries. Business process redesign can be defined as the analysis and design of work flows and processes within and between organisations. Information technology – the capabilities offered by computers, software, and telecommunications – is a key factor in making business process redesign possible.

A business process consists of a set of logically related tasks performed to achieve a defined business outcome. Business processes have two important characteristics: (i) they have customers; and (ii) they cross functional boundaries. Business processes include such things as developing a new product, ordering goods from a supplier, and creating a marketing plan. Analysing business processes sometimes shows that certain processes can be quite lengthy and unwieldy. For example, analysis of a customer ordering process may show that the time taken for a customer's order to delivery is much greater than what the competition can offer. Analysis of the existing process may reveal bottlenecks that occur when each department organises to maximise its own performance but fails to coordinate with other departments in order to achieve the desired outcome – timely delivery of an order to the customer.

Information technology (IT) can have a critical and important impact on the redesign of business processes. To determine how the use of technology can support new processes, it becomes essential for us to understand the impact of IT in this regard. Possible impacts of technology include routinizing transactions, bridging geographical boundaries, human tasks, and facilitating simultaneous completion of tasks.

Steps in Business Process Redesign

Two important questions are, how can IT support a business process? And how can business processes be transformed using IT? These questions can be answered by understanding the five steps to redesigning business processes with IT.

1. *Develop business vision and process objectives* : Business objectives are *time and cost reductions* as well as *quality improvement*. These objectives should be quantified (e.g., we will increase productivity by 40 percent) and prioritised.

2. *Identify processes to be redesigned* : It is important to identify critical or bottleneck processes and pay greater attention to these processes while redesigning.
3. *Understand and measure existing processes* : It is important to understand the problems of the current system. Since a baseline is needed in order to measure the outcomes of the redesigned process, the time, cost, and outcomes of the current process must be defined before the reengineering effort begins.
4. *Identifying opportunities through Brainstorming* : The range of opportunities and ideas for using information technology to support business processes can be investigated and expanded through brainstorming. Participants in this process should be functional-area specialists, information systems professionals, and managers representing various units that could be potentially affected by the process.
5. *Design and build a prototype of the process* : A prototype of the reengineering process should be implemented. The prototype should be designed to satisfy the original process-design objectives. As a result, the experience gained from implementing the prototype will offer some new ideas and will contribute to an interactive approach to developing a new technology-supported process.

What is Outsourcing? How does it work

Any firm providing software development and training can help government agencies and private firms in a variety of ways. When a company contracts for outside computer support, it is commonly termed *outsourcing*. Here's how outsourcing works. Most large firms have an internal information systems department (now popularly known as MIS–management information systems). An in-house MIS-department is an expensive, though necessary department in industries that are information-intensive. Most of the expenses of operating an MIS department arise from the salaries that information systems professionals command.

An additional factor that affects the cost of information systems development in companies is the tremendous demand for MIS support. Computer technology has been integrated into almost every area of business from personnel management to marketing research to financial management to job scheduling. Companies are highly dependent on computer support for their daily activities. In many firms, the demand for information systems support outstrips the capabilities of the internal MIS department to meet the demand. These companies often search from an outside agency or firm to provide the MIS support they need. This situation occurs in both public and private industry. Thus, the vendor company, providing software development is positioned perfectly from a market standpoint to meet the needs of its client firms.

When a firm signs an outsourcing contract with the vendor company, the contract usually stipulates in detail the nature of the information systems product that vendor company will deliver. Typically, it is asked to reengineer an existing information system in order to enable the client firm to upgrade to new computer technology.

The vendor company's approach to large software development contracts will be to organise a project team with a team leader and the appropriate mix of skilled MIS professionals (systems analysts, computer programmers, systems engineers, data communications specialists, etc.) to accomplish the job.

Outsourced firm's training/support division also provides computer information systems training and support on an outsourcing basis to its clients.

Outsourcing of Information Systems

Outsourcing of information systems is a trend that is receiving a great deal of attention at present. Globally, India has emerged as a major player in this regard. Firms that outsource often hire external professionals to perform almost any kind of data processing service, including data centre operations, telecommunications, software maintenance, hardware support, or even application development. One of the main reasons for outsourcing is cost reduction. External contractors can often offer services at a lower cost than a company would spend to manage its data centre internally. A firm considering an outsourcing arrangement should be aware of both the benefits and disadvantages.

Advantages and Disadvantages of Outsourcing

One of the major benefits of outsourcing is the ability to redirect MIS staff members away from traditional, maintenance-type projects to application development projects that have strategic value. So, firm can outsource nonstrategic routine activities and refocus its attention on projects that have an important business impact. This approach is consistent with an overall business strategy of downsizing operations to essential core business activities.

Outsourcing has its drawbacks, too. Once management has decided to outsource certain operations, it may be difficult to organise them again. Without careful initial planning, the services provided through an outsourcing arrangement may not be better than the services provided by an internally managed operation. It is important that the outsourcing agency understands the business needs accurately and then undertakes tasks such as network management, data centre operations, database management etc.

Another pitfall to avoid is getting tied up with an inflexible contract. Contracts need to be evolutionary so that companies can pursue new technology and development methods. If a fixed-cost contract is negotiated, the vendor may not be motivated to provide anything other than minimum service. However, if revenues are tied to the success of a project, both the firm and the outsourcing

vendor win. In one case, Andersen Consulting, an outsourcing vendor, placed an accounts receivable system in a client company. The new system did not earn any money for Andersen until its clients' revenues grew. When its clients' revenues grew, the vendor's company's revenues grew as well. For an outsourcing arrangement to work, the contract should benefit both the parties. Without question, outsourcing will pave the way for many companies to refocus their MIS objectives toward projects that are critical to achieving business results.

REVIEW QUESTIONS

Section A

1. What are the objectives of Business Outsourcing?

Section B

1. Briefly explain the role information technology plays in redesigning business processes?
2. Mention the basic steps involved in Business Process Redesigning.
3. State the advantages and disadvantages outsourcing.