**UNIT - V**

**Information Systems for Business Functions**

**Supporting Business Functions in an Enterprise with Information**

The principal ***business functions*** in a business firm are:

1. Marketing and sales

2. Production

3. Accounting and finance

4. Human resources

Outlines a general view of information systems supporting a company's operations and management. Emphasize that management support systems (MRS), decision support systems (DSS), and executive information systems (EIS), rest on the foundation of transaction processing systems (TPS) that support business operations. TPSs are the major source of data used by the higher-level systems to derive information. Professional support systems (PSS) and office information systems (OIS), which support individual and group knowledge work, are also a part of this foundation.

**Marketing Information Systems**

Marketing activities are directed toward planning, promoting, and selling goods and services to satisfy the needs of customers and the objectives of the organization.

Marketing information systems support decision making regarding the marketing mix. These include:

1. Product

2. Price

3. Place

4. Promotion

In order to support decision making on the marketing mix, a marketing information system draws on several sources of data and information.

**Sources of Data and Information for Marketing: Boundary-Spanning and Transaction Processing Subsystems**

A marketing information system relies on external information to a far greater degree than other organizational information systems. It includes two subsystems designed for boundary spanning - bringing into the firm data and information about the marketplace.

The objective of **marketing research** is to collect data on the actual customers and the potential customers, known as prospects. The identification of the needs of the customer is a fundamental starting point for total quality management (TQM). Electronic commerce on the WEB makes it easy to compile statistics on actual buyer behaviour.

Marketing research software supports statistical analysis of data. It enables the firm to correlate buyer behaviour with very detailed geographic variables, demographic variables, and psychographic variables.

***Marketing (competitive) intelligence*** is responsible for the gathering and interpretation of data regarding the firm's competitors, and for the dissemination of the competitive information to the appropriate users. Most of the competitor information comes from corporate annual reports, media-tracking services, and from reports purchased from external providers, including on-line database services. The Internet has become a major source of competitive intelligence.

**Marketing Mix Subsystems**

The marketing mix subsystems support decision making regarding product introduction, pricing, promotion (advertising and personal selling), and distribution. These decisions are integrated into the sales forecast and marketing plans against which the ongoing sales results are compared.

Marketing mix subsystems include:

1. Product subsystem

2. Place subsystem

3. Promotion subsystem

4. Price subsystem

5. Sales forecasting

**Product Subsystem**

The product subsystem helps to plan the introduction of new products. Continually bringing new products to market is vital in today's competitive environment of rapid change. The product subsystem should support balancing the degree of risk in the overall new-product portfolio, with more aggressive competitors assuming higher degrees of risk for a potentially higher payoff.

Although decisions regarding the introduction of new products are unstructured, information systems support this process in several ways:

1. Professional support systems assist designers in their knowledge work

2. DSSs are used to evaluate proposed new products

3. With a DSS, a marketing manager can score the desirability of a new product.

4. Electronic meeting systems help bring the expertise of people dispersed in space and time to bear on the problem

5. Information derived from marketing intelligence and research is vital in evaluating new product ideas.

**Place Subsystem**

The place subsystem assists the decision makers in making the product available to the customer at the right place at the right time. The place subsystem helps plan the distribution channels for the product and track their performance.

The use of information technology has dramatically increased the availability of information on product movement in the distribution channel. Examples include:

1. Bar-coded Universal Product Code (UPC)

2. Point-of-sale (POS) scanning

3. Electronic data interchange (EDI)

4. Supports just-in-time product delivery and customized delivery

**Promotion Subsystem**

The promotion subsystem is often the most elaborate in the marketing information system, since it supports both personal selling and advertising. Media selection packages assist in selecting a mix of avenues to persuade the potential purchaser, including direct mail, television, print media, and the electronic media such as the Internet and the WEB in particular. The effectiveness of the selected media mix is monitored and its composition is continually adjusted.

**Database marketing** relies on the accumulation and use of extensive databases to segment potential customers and reach them with personalized promotional information.

The role of ***telemarketing***, marketing over the telephone, has increased. Telemarketing calls are well supported by information technology.

Sales management is thoroughly supported with information technology. Customer profitability analysis help identify high-profit and high-growth customers and target marketing efforts in order to retain and develop these accounts.

***Sales force automation***, involves equipping salespeople with portable computers tied into the corporate information systems. This gives the salespeople instantaneous access to information and frees them from the reporting paperwork. This increases selling time and the level of performance. Access to corporate databases is sometimes accompanied by access to corporate expertise, either by being able to contact the experts or by using expert systems that help specify the product meeting customer requirements.

**Price Subsystem**

Pricing decisions find a degree of support from DSSs and access to databases that contain industry prices. These highly unstructured decisions are made in pursuit of the companies pricing objectives. General strategies range from profit maximization to forgoing a part of the profit in order to increase a market share.

Information systems provide an opportunity to finely segment customer groups, and charge different prices depending on the combination of products and services provided, as well as the circumstances of the sale transaction.

**Sales Forecasting**

Based on the planned marketing mix and outstanding orders, sales are forecast and a full marketing plan is developed. ***Sale forecasting*** is an area where any quantitative methods employed must be tempered with human insight and experience. The actual sales will depend to a large degree on the dynamics of the environment.

Qualitative techniques are generally used for ***environmental forecasting*** - an attempt to predict the social, economic, legal, and technological environment in which the company will try to realize its plans. Sales forecasting uses numerous techniques, which include:

1. Group decision making techniques are used to elicit broad expert opinion

2. Scenario analysis in which each scenario in this process is a plausible future environment

3. Extrapolation of trends and cycles through a time-series analysis.

**Manufacturing Information Systems**

Global competitive pressures of the information society have been highly pronounced in manufacturing and have radically changed it. The new marketplace calls for manufacturing that are:

1. Lean - highly efficient, using fewer input resources in production through better engineering and through production processes that rely on low inventories and result in less waste.

2. Agile - fit for time-based competition. Both the new product design and order fulfilment are drastically shortened.

3. Flexible - able to adjust the product to a customer's preferences rapidly and cost effectively.

4. Managed for quality - by measuring quality throughout the production process and following world standards, manufacturers treat quality as a necessity and not a high-price option.

**Structure of Manufacturing Information Systems**

Information technology must play a vital role in the design and manufacturing processes. Manufacturing information systems are among the most difficult both to develop and to implement.

TPSs are embedded in the production process or in other company processes. The data provided by the transaction processing systems are used by management support subsystems, which are tightly integrated and interdependent.

Manufacturing information subsystems include:

1. Product design and engineering

2. Product scheduling

3. Quality control

4. Facilities planning, production costing, logistics and inventory subsystems

**Product Design and Engineering**

Product design and engineering are widely supported today by ***computer-aided design*** (CAD) and ***computer-aided engineering***(CAE) systems. CAD systems assist the designer with automatic calculations and display of surfaces while storing the design information in databases. The produced designs are subject to processing with CAE systems to ensure their quality, safety, manufacturability, and cost-effectiveness. CAD/CAE systems increasingly eliminate paperwork from the design process, while speeding up the process itself. As well, the combined techniques of CAD/CAE and rapid prototyping cut time to market.

**Product Scheduling**

Production scheduling is the heart of the manufacturing information system. This complex subsystem has to ensure that an appropriate combination of human, machinery, and material resources will be provided at an appropriate time in order to manufacture the goods.

Production scheduling and the ancillary processes are today frequently controlled with a ***manufacturing resource planning*** system as the main informational tool. This elaborate software converts the sales forecast for the plants products into a detailed production plan and further into a master schedule of production.

***Computer integrated manufacturing***(CIM) is a strategy through which a manufacturer takes control of the entire manufacturing process. The process starts with CAD and CAE and continues on the factory floor where robots and numerically controlled machinery are installed - and thus ***computer-aided manufacturing***(CAM) is implemented. A manufacturing system based on this concept can turn out very small batches of a particular product as cost-effectively as a traditional production line can turn out millions of identical products. A full-fledged CIM is extremely difficult to implement; indeed, many firms have failed in their attempts to do so.

**Quality Control**

The quality control subsystem of a manufacturing information system relies on the data collected on the shop floor by the sensors embedded in the process control systems.

***Total quality management*** (TQM) is a management technique for continuously improving the performance of all members and units of a firm to ensure customer satisfaction. In particular, the principles of TQM state that quality comes from improving the design and manufacturing process, rather than Ainspecting out@ defective products. The foundation of quality is also understanding and reducing variation in the overall manufacturing process.

**Facilities Planning, Production Costing, Logistics and Inventory Subsystems**

Among the higher-level decision making supported by manufacturing information systems are facilities planning - locating the sites for manufacturing plants, deciding on their production capacities, and laying out the plant floors.

Manufacturing management requires a cost control program, relying on the information systems. Among the informational outputs of the production costing subsystem are labor and equipment productivity reports, performance of plants as cost centers, and schedules for equipment maintenance and replacement.

Managing the raw-materials, packaging, and the work in progress inventory is a responsibility of the manufacturing function. In some cases, inventory management is combined with the general logistics systems, which plan and control the arrival of purchased goods into the firm as well as shipments to the customers.

**Accounting and Financial Information Systems**

The financial function of the enterprise consists in taking stock of the flows of money and other assets into and out of an organization, ensuring that its available resources are properly used and that the organization is financially fit. The components of the accounting system include:

1. Accounts receivable records

2. Accounts payable records

3. Payroll records

4. Inventory control records

5. General ledgers

Financial information systems rely on external sources, such as on-line databases and custom produced reports, particularly in the areas of financial forecasting and funds management. The essential functions that financial information systems perform include:

1. Financial forecasting and planning

2. Financial control

3. Funds management

4. Internal auditing

**Financial Forecasting**

Financial forecasting is the process of predicting the inflows of funds into the company and the outflows of funds from it for a long term into the future. Outflows of funds must be balanced over the long term with the inflows. With the globalization of business, the function of financial forecasting has become more complex, since the activities in multiple national markets have to be consolidated, taking into consideration the vagaries of multiple national currencies. Scenario analysis is frequently employed in order to prepare the firm for various contingencies.

Financial forecasts are based on computerized models known as cash-flow models. They range from rather simple spreadsheet templates to sophisticated models developed for the given industry and customized for the firm or, in the case of large corporations to specify modeling of their financial operations. Financial forecasting serves to identify the need for funds and their sources.

**Financial Control**

The primary tools of financial control are budgets. A ***budget*** specifies the resources committed to a plan for a given project or time period. Fixed budgets are independent of the level of activity of the unit for which the budget is drawn up. Flexible budgets commit resources depending on the level of activity.

Spreadsheet programs are the main budgeting tools. Spreadsheets are the personal productivity tools in use today in budget preparation.

In the systems-theoretic view, budgets serve as the standard against which managers can compare the actual results by using information systems. Performance reports are used to monitor budgets of various managerial levels. A performance report states the actual financial results achieved by the unit and compares them with the planned results.

Along with budgets and performance reports, financial control employs a number of financial ratios indicating the performance of the business unit. A widely employed financial ratio is ***return on investment*** (ROI). ROS shows how well a business unit uses its resources. Its value is obtained by dividing the earnings of the business unit by its total assets.

**Funds Management**

Financial information systems help to manage the organization's liquid assets, such as cash or securities, for high yields with the lowest degree of loss risk. Some firms deploy computerized systems to manage their securities portfolios and automatically generate buy or sell orders.

**Internal Auditing**

The ***audit*** function provides an independent appraisal of an organization's accounting, financial, and operational procedures and information. All large firms have ***internal auditors***, answerable only to the audit committee of the board of directors. The staff of the chief financial officer of the company performs financial and operational audits. During a ***financial audit***, an appraisal is made of the reliability and integrity of the company's financial information and of the means used to process it. An ***operational audit*** is an appraisal of how well management utilizes company resources and how well corporate plans are being carried out.

**Human Resource Information Systems**

A human resource information system (HRIS) supports the human resources function of an organization with information. The name of this function reflects the recognition that people who work in a firm are frequently its most valuable resources. The complexity of human resource management has grown immensely over recent years, primary due to the need to conform with new laws and regulations.

A HRIS has to ensure the appropriate degree of access to a great variety of internal stakeholders, including:

1. The employees of the Human Resources department in performance of their duties

2. All the employees of the firm wishing ti inspect their own records

3. All the employees of the firm seeking information regarding open positions or available benefit plans

4. Employees availing themselves of the computer-assisted training and evaluation opportunities

5. Managers throughout the firm in the process of evaluating their subordinates and making personnel decisions

6. Corporate executives involved in tactical and strategic planning and control

**Transaction Processing Subsystems and Databases of Human Resource Information Systems**

At the heart of HRIS are its databases, which are in some cases integrated into a single human resource database. The record of each employee in a sophisticated employee database may contain 150 to 200 data items, including the personal data, educational history and skills, occupational background, and the history of occupied positions, salary, and performance in the firm. Richer multimedia databases are not assembled by some firms in order to facilitate fast formation of compatible teams of people with complementary skills.

Other HRIS databases include:

1. Applicant databases

2. Position inventory

3. Skills inventory

4. Benefit databases

5. External databases

**Information Subsystems for Human Resource Management**

The information subsystems of HRIS reflect the flow of human resources through the firm, from planning and recruitment to termination. A sophisticated HRIS includes the following subsystems:

1. Human resource planning

2. Recruiting and workforce management

3. Compensation and benefits

4. Government reporting and labour relations support

**Human Resource Planning**

To identify the human resources necessary to accomplish the long-term objectives of a firm, we need to project the skills, knowledge, and experience of the future employees.

**Recruiting and Workforce Management**

Based on the long-term resource plan, a recruitment plan is developed. The plan lists the currently unfilled positions and those expected to become vacant due to turnover.

The life-cycle transitions of the firm's workforce - hiring, promotion and transfer, and termination - have to be supported with the appropriate information system components.

**Compensation and Benefits**

Two principal external stakeholders have an abiding interest in the human resource policies of organizations. These are:

1. Various levels of government

2. Labor unions

**Integrating Functional Systems for Superior Organizational Performance**

Functional information systems rarely stand alone. This reflects the fact that the functions they support should, as much as possible, connect with each other seamlessly in order to serve the firms customers. Customers expect timely order delivery, often on a just-in-time schedule; quality inspection to their own standards; flexible credit terms; post-delivery service; and often, participation in the product design process.

Information technology provides vital support for integrating internal business processes, cutting across functional lines, and for integrating operations with the firm's business partners, its customers and suppliers.