

4

Business Information Systems

4.1 Introduction

Information technologies, including Internet-based information systems, are playing vital and expanding roles in business. Information technology can help all kinds of businesses improve the efficiency and effectiveness of their business processes, managerial decision making and workgroup collaboration, which strengthens their competitive positions in rapidly changing market places. **Business Information Systems (BIS)** is a preferred software engine for the development of Information Technology (IT) in most recent years. This chapter summarizes in about various Information Systems, their application and their impact on organizations.

4.2 Information Technology as a Key Business Enabler & Driver

Information represents an organization's tangible and intangible resources and all transactions relating to those resources. Information influences the way an organization operates. The right information, if it is transported to the right person, in the right fashion, and at the right time, can progress and guarantee organizational effectiveness and competence. The BIS is the mechanism used to manage and control the information resource.

4.3 Information Systems

Information System: An **Information System (IS)** is a combination of people, hardware, software, communication devices, network and data resources that processes (can be storing, retrieving, transforming information) data and information for a specific purpose. Any specific Information System aims to support operations, management and decision-making.

4.3.1 Components of Information System

The main aim and purpose of each Information System is to convert the data into information which is useful and meaningful. People, Hardware, Software, and Data Resources are four basic resources of Information Systems; a process is required to convert data into information for end users. Any Information process consists of input, processing, output, storage, and control processes.

Business Information System: Business Information Systems (BIS) may be defined as systems integrating Information Technology, people and business.

4.4 Organizations, Information Systems and Business Processes

Business Process: A **Business Process** is an activity or set of activities that will accomplish a specific organization goal. A business process has a goal, specific inputs and outputs, uses resources, and has a number of activities that are performed in some order, creates value of some kind for the customer and may affect more than one organizational unit.

4.5 Information Systems and their role in Businesses

Many business organizations obtain a competitive advantage by employing new information systems. The backbone of Information System is the World Wide Web, Internet; or within a business a Local Area Network (LAN), along with EDI, EIS, ERP, SCM, e-CRM, e-Commerce and host of others, which portray new ways in which IS can be employed to cultivate business.

4.6 Types of Information Systems

Types of Information Systems	Description	Example	Groups Served
Strategic - Level Systems	Used for strategic managers to track and deal with strategic issues, assisting long-range planning.	ESS	For Senior Managers
Management -Level Systems	Used for the monitoring, controlling, decision-making, and administrative activities of middle management.	MIS and DSS	Middle Managers
Knowledge - Level Systems	These systems support discovery, processing and storage of knowledge and data workers. These further control the flow of paper work and enable group working.	KWS and OAS	Knowledge and Data Workers
Operational - Level Systems	Support operational managers tracking elementary activities that include tracking customer orders, invoice tracking, etc. Operational-level systems ensure that business procedures are followed.	TPS	Operational Managers

4.6.1 Transaction Processing System (TPS)

A **Transaction Processing System (TPS)** may be defined as a type of information system that collects, stores, modifies and retrieves the day-to-day data transactions of an enterprise. The pre-requisites of **ACID Test** for any TPS are **Atomicity, Consistency, Isolation and Durability**.

4.6.2 Office Automation System (OAS)
Office Automation System (OAS) is amalgamation of hardware, software, and other resources used to smooth the progress of communications and augment efficiency. Office automation refers to the use of computer and software to digitally generate, collect, store, manipulate, and relay office information needed for accomplishing basic tasks and goals.
4.6.3 Knowledge Management System (KMS)
Knowledge Management System (KMS) refer to any kind of IT system that stores and retrieves knowledge, improves collaboration, locates knowledge sources, mines repositories for hidden knowledge, captures and uses knowledge, or in some other way enhances the KM process. Explicit and Tacit are two broad types of knowledge. A Knowledge discovery in database system is a value – added Intranet with facilities to search and identify captured knowledge or identify experts who have the knowledge.
Knowledge Discovery and Data Mining (KDD) fundamentally deals with ways and means of capturing and making obtainable knowledge of the experts to others, in electronic form. KDD systems also assist us establish, contact and communicate with experts (knowledgeable people) on various subjects, surrounded by our organization, or perhaps even outside.
4.6.4 Management Information System (MIS)
Most simply, Management Information System is an integrated, user-machine system for providing information to support operation, management and decision-making functions in an organization. In other words, Management Information System is a system which provides accurate, timely and meaningful data for management planning, analysis and control to optimize the growth of the organization. For example - Airline reservations (seat, booking, payment, schedules, boarding list, special needs, etc.), Bank operations (deposit, transfer, withdrawal) electronically with a distinguish payment gateways, etc.
4.6.5 Decision Support System (DSS)
A Decision Support System (DSS) is a computer-based information system that supports business or organizational decision-making activities. DSSs serve the management, operations, and planning levels of an organization (usually mid and higher management) and help to make decisions, which may be rapidly changing and not easily specified in advance. DSS can be either fully computerized, human or a combination of both. DSS has four basic components: The user, one or more databases, Planning languages and Model Base .
4.6.6 Executive Information Systems (EIS)
An Executive Information System (EIS) is the nature of IS used by executives to access and administer the data they entail to make informed business decisions. Even though there are tools for managing an Executive Information System, the EIS in itself is not an instrument, but rather, an infrastructure within a company. Components of an EIS are Hardware, Software, User Interface and Telecommunication .

4.7 Specialized Systems

Specialized Systems provide comprehensive end to end IT solutions and services (including systems integration, implementation, engineering services, software application customization and maintenance) to various sectors to confront challenges, and convert every challenge into an opportunity. For example- ERP, SCM, CRM, HRMS etc.

4.7.1 Enterprise Resource Planning (ERP)

Enterprise Resource Planning (ERP) systems integrate internal and external management information across an entire organization—taking on finance/accounting, manufacturing, sales and service, customer relationship management etc., and control the connections to exterior stakeholders.

Diverse stages involved in ERP implementation are - Inventory Control, ABC Analysis, Economic Order Quantity (EoQ), Just-In-Time (JIT), Material Requirement Planning (MRP-I), Manufacturing Resource Planning – II (MRP-II), Distribution Resource Planning (DRP), Enterprise Resource Planning (ERP), Money Resource Planning (MRP-III) and EIS-Web Enabled. Some of the "popular" ERP packages are SAP, JD Edwards, Baan, Oracle 9 i.

4.7.2 Customer Relationship Management (CRM)

Customer Relationship Management (CRM) may be defined as a business process in which client relationships; customer loyalty and brand value are built through marketing strategies and activities. CRM allows businesses to develop long-term relationships with established and new customers while helping modernize corporate performance. CRM incorporates commercial and client-specific strategies via employee training, marketing planning, relationship building and advertising.

CRM establishes the benefits of generating customer loyalty, raising a market intelligence enterprise and an integrated relationship. CRM applications smoothen the progress to capture, consolidate, analysis and enterprise-wide dissemination of data from existing and potential customers.

4.7.3 Supply Chain Management (SCM)

Supply Chain Management (SCM) is a chain that starts with customers and ends with customers. It may be defined as the process of planning, implementing and controlling the operations of the supply chain with the purpose of satisfying the customer's requirement as efficiently as possible. Supply Chain spans all movement and storage of raw materials, Work-in-process, inventory and finished goods from the point of origin to the point of consumption. Components of SCM are **Procurement/Purchasing, Operations, Distribution and Integration.**

4.7.4 Human Resource Management Systems (HRMS)

A **Human Resources Management System (HRMS)** is a software application that coalesce many human resources functions, together with benefits of administration, payroll, recruiting and training, and performance analysis and assessment into one parcel. In other words, HRMS or Human Resources Information System (HRIS) refers to the systems and processes at the intersection between Human Resource Management (HRM) and Information Technology.

Some of the key modules of HRMS are **Workforce Management, Time and Attendance Management, Payroll Management, Training Management, Compensation Management, Recruitment Management, Personnel Management, Organizational Management, Employee Self Service (ESS) and Analytics.**

4.7.5 Core Banking System (CBS)

Nowadays, most banks use core banking applications to sustain their operations where **CORE** stands for "**Centralized Online Real-time Environment**". **Core Banking System (CBS)** may be defined as the set of basic software components that manage the services provided by a bank to its customers through its branches (branch network). In other words, the platform where communication technology and information technology are merged to suit core needs of banking is known as **Core Banking Solutions (CBS)**. Normal core banking functions will include deposit accounts, loans, mortgages and payments. Banks make these services available across multiple channels like ATMs, Internet banking, and branches.

4.7.6 Accounting Information System (AIS)

Accounting Information System (AIS) is defined as a system of collection, storage and processing of financial and accounting data that is used by decision makers. AIS 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. Six key elements that compose the typical Accounting Information System are **People, Procedures and Instructions, Data, Software, Information Technology Infrastructure and Internal controls.**

4.8 Artificial Intelligence

Artificial Intelligence (AI) is a research field that studies how to comprehend the intelligent human behaviors on a computer. The decisive objective of AI is to make a computer that can discover, sketch, and crack problems in parallel. Expert systems, Pattern Recognition, Natural language processing, and many others are some of the various purposes on which AI may be applied.

4.9 Expert System

An **Expert System (ES)** is a computerized information system that allows non-experts to make decisions comparable to those of an expert. The aim of the Expert System is to have a team of seasoned specialists holding industry-wide experience who further spread across implementations. Expert system takes into consideration Knowledge base, Database of facts, Inference Engine, Explanation mechanism and User Interface. Expert Systems can be **Example-based, Rule-based or Frame-based.**

4.10 Business Intelligence

Business Intelligence (BI), in simple words, refers to the process of collecting and refining information from many sources, analyzing and presenting the information in useful ways so that users can make better business decisions. BI enables managers to see things with more clarity, and empowers them to peek into the possible future.

4.10.1 Business Intelligence Tools

Business Intelligence Tools are a type of software that is designed to retrieve, analyze and report data. Some of the key Business Intelligence tools are Simple Reporting and Querying, Business Analysis, Dashboards, Scorecards, and Data Mining or Statistical Analysis.

4.10.2 Business Reporting through MIS and IT

Business Intelligence (BI) caters to strategic, tactical and operational needs and provides a platform for complete, comprehensive performance management for today's global, competitive businesses. Business reports are routinely assigned to facilitate us to accomplish conclusions about a trouble or issue; demonstrate short and apparent communication skills; endow with recommendations for upcoming accomplishing; exhibit our analytical, reasoning, and evaluation skills in identifying and weighing-up potential solutions and outcomes; pertain business and management theory to a practical situation and scrutinize obtainable and potential solutions to a problem, situation, or question.

- ◆ Some of the benefits for micro-businesses and small to medium enterprises are paperless lodgment; electronic record keeping; pre-filled forms; ease of sharing; secure AUSkey authentication and same-time validation.
- ◆ Some of the benefits for large business are use of a single reporting language to report to government - eXtensible Business Reporting Language (XBRL); reduce costs; streamline of the process of aggregating data; increased access to comparable performance information; secure AUSkey authentication and same-time validation.

4.11 Importance of Access and Privilege Controls

To safeguard software systems, procedures are developed and implemented for protecting them from unauthorized modification, disclosure or destruction to ensure that information remains accurate, confidential and is available when required. Access controls help us to restrict whom and what accesses our information resources, and they possess four general functions: **Identity verification, Authentication, Authorization, and Accountability**. These functions work together to grant access to resources and constrain what a subject can do with them.

4.11.1 Approaches to Access Control

Role-based Access Control (RBAC) and Rules-based Access Control (RAC) are the two major approaches to establish access controls while safeguarding the software system.

4.11.2 Principle of Least Privilege
This is a fundamental principle of information security which refers to give only those privileges to a user account that are essential to that user's work. When applied to users, the terms Least User Access or Least-privileged User Account (LUA) are also used, referring to the concept that all user accounts at all times should run with as few privileges as possible, and also launch applications with as few privileges as possible.
4.12 Payment Mechanisms
Major types of Electronic Payments are Credit Cards, Electronic cheques, Smart cards and Electronic purses.

Question 1

Differentiate between the following:

- (a) *Data and Information*
- (b) *Role-based Access Control (RBAC) and Rules-based Access Control (RAC)*

Or

Briefly explain the two main approaches to establish access controls in Software Systems.

- (c) *Explicit Knowledge and Tacit Knowledge*
- (d) *Information and Knowledge*

Answer

- (a) The differences between Data and Information are as follows:

Data	Information
Data is raw and unorganized fact that needs to be processed.	When data is processed, organized, structured or presented in a given context so as to make it useful, it is called Information.
Data in itself is meaningless and is the lowest level of knowledge.	Information is the second level of knowledge.
Observations and recordings are done to obtain data.	Analysis of data is done to obtain information.

- (b) **Role-based Access Control (RBAC):** RBAC largely eliminates discretion when providing access to objects. Instead, administrators or automated systems place subjects into roles. Subjects receive only the rights and permissions assigned to those roles. RBAC uses a centrally administered set of controls to determine how subjects and objects interact. When an employee changes jobs, all previous access is removed, and the rights and permissions of the new role are assigned. RBAC enforces static constraints based on a user's role. It is the best system for an organization that has high turnover.

4.8 Information Technology

Rules-based Access Control (RAC): RAC takes into account the data affected, the identity attempting to perform a task, and other triggers governed by business rules. RAC uses specific rules that indicate what can and cannot happen between a subject and an object. A manager, for example, has the ability to approve his/her employees' hours worked. However, when s/he attempts to approve his/her own hours, a rule built into the application compares the employee record and the user, sees they are the same, and temporarily removes approval privilege. It is not necessarily identity based.

- (c) **Explicit knowledge:** Explicit knowledge is that knowledge which can be formalized easily and as a consequence is easily available across the organization. Explicit knowledge is articulated, and represented as spoken words, written material and compiled data. This type of knowledge is codified, easy to document, transfer and reproduce. For example - Online tutorials, Policy and procedural manuals.

Tacit knowledge: Tacit knowledge, on the other hand, resides in a few often-in just one person and hasn't been captured by the organization or made available to others. Tacit knowledge is unarticulated and represented as intuition, perspective, beliefs, and values that individuals form based on their experiences. It is personal, experimental and context-specific. It is difficult to document and communicate the tacit knowledge. For example - hand-on skills, special know-how, employee's experiences.

- (d) Differences between Information and Knowledge are given as follows:

Information	Knowledge
Information is piecemeal, fragmented and particular.	Knowledge is structured, coherent, and often universal.
Information is timely, transitory, and may even be short-lived.	Knowledge is of enduring significance.
Information is a flow of messages.	Knowledge is a stock, largely resulting from the flow, in the sense that the "input" of information may affect the stock of knowledge by adding to it, restructuring it, or changing it in any way.
Information is acquired by being told.	Knowledge can be acquired by thinking. Thus, new knowledge can be acquired without new information being received.

Question 2

Define the following:

- Business Information System*
- Business Process*
- Knowledge Management*
- eXtensible Business Reporting Language (XBRL)*

(e) *Online Analytical Processing (OLAP)*

Answer

- (a) **Business Information System:** Business Information Systems may be defined as system integrating business functions and information modules for establishing effective communication channels which are useful for making timely and accurate decisions and in turn contribute to organizational productivity and competitiveness.
- (b) **Business Process:** A Business Process is a collection of related, structured activities or tasks that produce a specific service or product (serve a particular goal) for a specific organization.
- (c) **Knowledge Management:** Knowledge Management encompasses both the content and the process of creating the content. It refers both to what is known and how it came to be known.
- (d) **eXtensible Business Reporting Language (XBRL):** XBRL is freely available international standards-based business reporting language developed by accountants for financial reporting.
- (e) **Online Analytical Processing (OLAP):** OLAP is a multi-dimensional analytical tool typically used in data mining, that gathers and process vast amounts of information into useful packets.

Question 3

What is an Information System? Discuss its components in detail.

Answer

Information System: An Information System (IS) is a combination of people, hardware, software, communication devices, network and data resources that processes (can be storing, retrieving, transforming information) data and information for a specific purpose. The system needs inputs from user (key in instructions and commands, typing, scanning) which will then be processed (calculating, reporting) using technology devices such as computers, and produce output (printing reports, displaying results) that will be sent to another user or other system via a network and a feedback method that controls the operation.

In general, any specific Information System aims to support operations, management and decision-making.

Components of Information System

The main aim and purpose of each Information System is to convert the data into information which is useful and meaningful. This process consists of four basic concepts:

- (i) People, hardware, software, and data are four basic resources of information systems;
- (ii) Human resources consist of end users and IT specialists; hardware resources involve machines and media; software resources consist of programs and procedures; and data

4.10 Information Technology

resources include data and knowledge base; and network resources include communications media and networks.

- (iii) A process is used to convert data into information for end users;
- (iv) Information processes consist of input, processing, output, storage, and control processes.

All components of information systems are mutually connected and cannot exist individually. The output could be in terms of printouts, reports, graphics; Input can be data, information and instructions; Processing may involve calculations, programming and storing; Controls could be related to decision-making and the feedback.

Question 4

Discuss Transaction Processing System (TPS).

Answer

Transaction Processing System (TPS) may be defined as a type of information system that collects, stores, modifies and retrieves the day-to-day data transactions of an enterprise. Archetypal examples of such systems would be used in an Airline Reservation Systems, Railway reservation by IRCT, Banking Systems, or the Accounting System of roughly any outsized company. These are designed to process transactions virtually instantly to ensure that customer data is available to the processes that require it. Most of the Transaction Processing Systems include one or additional of the following attributes:

- ◆ **Access Control-TPS:** Most Transaction Processing Systems come with access control to put a ceiling on users to only those allowed to accomplish so. Access Control ensures that people who are not authorized to use the system are not permissible to influence or transform the transaction process.
- ◆ **Equivalence-TPS:** Transactions are processed in the similar format every time to ensure that full effectiveness is achieved. The TPS Interfaces are designed to get hold of identical data for each transaction, despite the consequences of the source.
- ◆ **High Volume Rapid Processing-TPS:** TPS is designed to process transactions in an immediate to make confident that the transaction data is available to other users or processes that entail it. The instantaneous processing of transactions is noteworthy to the success of certain industry such as banking.
- ◆ **Trustworthiness-TPS:** A TPS system is designed to be robust and trustworthy. The system is capable to process transactions very rapidly, yet at the same time, conduct several checks to make certain that the data integrity is preserved.

Question 5

Discuss Office Automation Systems (OAS) in brief.

Answer

Office Automation System (OAS) is an amalgamation of hardware, software, and other resources used to smooth the progress of communication and augment efficiency. Office

automation refers to the use of computer and software to digitally generate, collect, store, manipulates, and relay office information needed for accomplishing basic tasks and goals.

In addition to capturing handwritten notes, it comprises of exchange of information; management of administrative documents; handling of numerical data; and meeting, planning and management of work schedules. Office Automation System takes into consideration the computer applications and other problem solving tool along with a database to transform input into output.

Office Automation is a widespread appearance that includes an all-embracing variety of applications of computer, communication and information technologies in office surroundings.

Question 6

Discuss Knowledge Management System (KMS).

Answer

Knowledge Management Systems (KMS) refers to any kind of IT system that stores and retrieves knowledge, improves collaboration, locates knowledge sources, mines repositories for hidden knowledge, captures and uses knowledge, or in some other way enhances the knowledge management process. KMS treats the knowledge component of any organization's activities as an explicit concern reflected in strategy, policy, and practice at all levels of the organization.

- ◆ Two broad categories of knowledge exist – **Explicit** and **Tacit**. Explicit Knowledge is formalized, articulated and written whereas Tacit Knowledge resides in a few often-in-just one person and has not been captured by the organization.
- ◆ Knowledge base is a special kind of database for knowledge management. It is an information repository that provides a means for information to be collected, organized, shared, searched and utilized. It can be either machine-readable or intended for human use.
- ◆ A Knowledge Discovery in databases system is a value-added intranet with facilities to search and identify captured knowledge, or identify experts who have the knowledge. The system will also help us establish contact with the expert and have a dialogue with them. It will then capture and make available the transcripts of such discussions, whether they be on chat, e-mail or discussion forums.

Question 7

Discuss Management Information System (MIS).

Answer

Management Information System (MIS) refers to the data, equipment and computer programs that are used to develop information for managerial use. It is an integrated system which provides accurate, timely and meaningful data for management planning, analysis and control to optimize the growth of the organization. Management Information Systems provide decision-makers with preselected types of information. MIS is generally in the form of computer-generated reports and usually generated from data obtained from transaction processing systems.

4.12 Information Technology

Airline reservations (seat, booking, payment, schedules, boarding list, special needs, etc.), Bank operations (deposit, transfer, withdrawal) electronically with a distinguish payment gateways, Integration of department with the help of contemporary software's like ERP, and Logistics management application to streamline the transportation system etc. are some of the examples of MIS.

Question 8

Discuss Decision Support Systems (DSS). Discuss its components in detail.

Or

Explain the different components of Decision Support Systems.

Answer

A **Decision Support System (DSS)** is a computer-based information system that supports business or organizational decision-making activities. DSSs serve the management, operations and planning levels of an organization (usually mid and higher management) and help to make decisions, which may be rapidly changing and not easily specified in advance. DSS can be either fully computerized, human or a combination of both. A properly designed DSS may be defined as an interactive software-based system intended to help decision makers compile useful information from raw data, documents, personal knowledge, and/or business models to identify and solve problems and make decisions. DSS are there to facilitate a manager in making operational decisions, but the ultimate burden of responsibility lies with the manager. Managers can sometimes be over-optimistic in their expectations of a DSS and develop an unrealistic reliance on the system.

Two types of planning languages that are commonly used in DSS are: **General-purpose Planning Languages** and **Special-purpose Planning Languages**. These are discussed below:

- **General-purpose planning languages** that allow users to perform many routine tasks, for example; retrieving various data from a database or performing statistical analyses. The languages in most electronic spreadsheets are good examples of general-purpose planning languages. These languages enable user to tackle a broad range of budgeting, forecasting, and other worksheet-oriented problems.
- **Special-purpose planning languages** are more limited in what they can do, but they usually do certain jobs better than the general-purpose planning languages. Some statistical languages, such as SAS and SPSS, are examples of special purpose planning languages.

The components of DSS are as follows:

- (a) **The user:** The user is usually a manager with an unstructured or semi-structured problem to solve and may be at management - level of an organization.

- (b) **One or more databases:** Databases contain both routine and non-routine data from both internal and external sources.
- (c) **Model Base:** Model base is the brain of the DSS as it performs data manipulations and computations with the data provided to it by the user and the database. The planning language in DSS allows the user to maintain a dialogue with the model base.

Question 9

What do you understand by the term “Executive Information System (EIS)”. Discuss its components, in detail.

Answer

An **Executive Information System (EIS)** is the nature of Information System used by executives to access and administer the data they entail to make informed business decisions. The EIS in itself is not an instrument, but rather, an infrastructure within a company. It may be defined as just not as a piece of hardware or software, but an infrastructure that supplies to a firm's executives the up-to-the-minute operational data, gathered and sifted from various databases. EIS links data from various sources both internal and external to provide the amount and kind of information executives find useful. These systems are designed for top management; easy to use; present information in condensed view; access organization's databases and data external to the organization.

The typical information mix presented to the executive may include financial information, work in process, inventory figures, sales figures, market trends, industry statistics, and market price of the firm's shares.

Components of an Executive Information Systems (EIS) are as follows:

Component	Description
Hardware	Includes Input data-entry devices, CPU, Data Storage files and Output Devices.
Software	Includes Text base software, Database, and Graphic types such as time series charts, scatter diagrams, maps, motion graphics, sequence charts, and comparison-oriented graphs (i.e., bar charts) Model base.
User Interface	Includes hardware (physical) and software (logical) components by which people (users) interact with a machine. Several types of interfaces can be available to the EIS structure, such as scheduled reports, questions/answers, menu driven, command language, natural language, and input/output.
Telecommunication	Involves transmitting data from one place to another in a reliable networked system.

Question 10

Discuss Customer Relationship Management (CRM).

Answer

Customer Relationship Management (CRM) may be defined as a business process in which client relationships; customer loyalty and brand value are built through marketing strategies and activities. CRM allows businesses to develop long-term relationships with established and new customers while helping modernize corporate performance. CRM incorporates commercial and client-specific strategies via employee training, marketing planning, relationship building and advertising. The main objective is to retain as much loyal customers as one can.

To accomplish with CRM, companies need to match products and campaigns to prospect elegantly the customer life cycle. CRM encompasses the function and responsibilities of those employees who directly work with customers. CRM establishes the benefits of generating customer loyalty, raising a market intelligence enterprise, and an integrated relationship. Preserving existing customers and providing enhanced services to accomplish the loyalty is expressed as CRM. CRM applications smoothen the progress to capture, consolidate, analysis, and enterprise-wide dissemination of data from existing and potential customers. CRM can be considered as an amalgamation of people, process and systems rather than just IT application.

Question 11

What is Supply Chain Management (SCM)? Discuss its components.

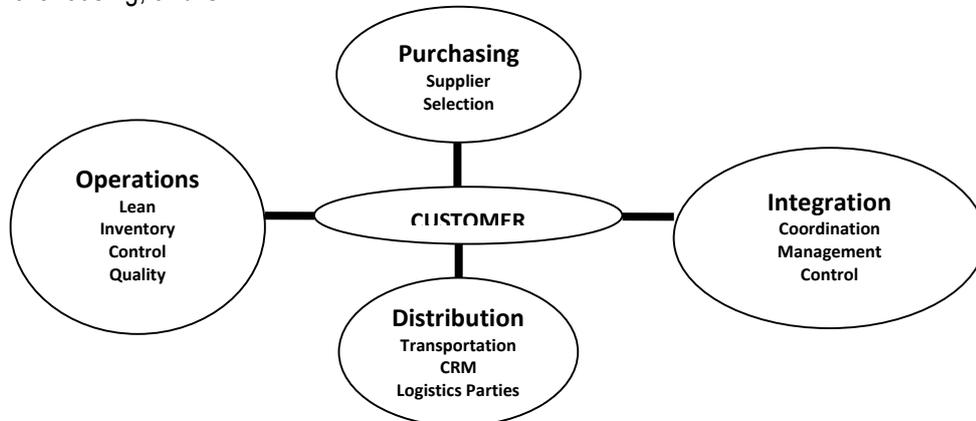
Answer

Supply Chain Management (SCM) is a chain that starts with customers and ends with customers. Supply Chain Management may be defined as the process of planning, implementing and controlling the operations of the supply chain with the purpose of satisfying the customer's requirement as efficiently as possible. Supply Chain spans all movement and storage of raw materials, work-in-process, inventory and finished goods from the point of origin to the point of consumption.

Components of SCM: The main elements of a supply chain are as follows:

- (a) **Procurement/Purchasing** – It begins with the purchasing of parts, components, or services. Procurement must ensure that the right items are delivered in the exact quantities at the correct location on the specified time schedule at minimal cost. The key issue in procurement is how one goes about selecting and maintaining a supplier, which can be approached from two directions. The first concentrates on how a firm might evaluate a potential supplier whereas the second is how a firm evaluates those businesses that are already suppliers to an operation.
- (b) **Operations** – The second major element of SCM is Operations. Having received raw materials, parts, components, assemblies, or services from suppliers, the firm must transform them and produce the products or the services that meet the needs of its consumers. It must conduct this transformation in an efficient and effective manner for the benefit of SCM system.

- (c) **Distribution** – The third element of the SCM system is distribution. Distribution involves several activities - transportation (logistics) of goods across the entire supply chain, warehousing, and CRM.



Core elements of a SCM

- (d) **Integration** - The last element of SCM is the need for integration. It is critical that all participants in the service chain recognize the entirety of the service chain. The impact of the failure to adopt a system-wide perspective - that is, examining the totality of the chain can significantly increase costs and destroy value.

Question 12

What is HRMS? Discuss its key modules.

Answer

A Human Resource Management System (HRMS) is a software application that coalesce many human resources functions together with benefits like administration, payroll, recruiting and training, performance analysis and assessment into one parcel.

Key Modules of HRMS are as follows:

- ◆ **Workforce Management:** Integrated across the strategic Human Capital Management (HCM) solution; Workforce Management provides powerful tools to effectively manage labour rules, ensure compliance, and control labour costs and expenses.
- ◆ **Time and Attendance Management:** The time and attendance module gathers standardized time and work related efforts. The most advanced modules provide broad flexibility in data collection methods, labor distribution capabilities and data analysis features. Cost analysis and efficiency metrics are the primary functions.
- ◆ **Payroll Management:** This module of the system is designed to automate manual payroll functions and facilitate salary, deductions, calculations etc.; eliminates errors and free up HR staff for more productive tasks. Data is generally fed from the human resources and time keeping modules to calculate automatic deposit and manual cheque writing

4.16 Information Technology

capabilities. This module can encompass all employee-related transactions as well as integrate with existing financial management systems.

- ◆ **Training Management:** Training programs can be entered with future dates which allow managers to track progress of employees through these programs, examine the results of courses taken and reschedule specific courses when needed. The module tracks the trainer or training organization; costs associated with training schedules, tracks training locations, required supplies and equipment and registered attendees.
- ◆ **Compensation Management:** Compensation Management is more than just the means to attract and retain talented employees. In today's competitive labor market, organizations need to fully leverage their human capital to sustain a competitive position. This requires integrating employee processes, information and programs with organizational processes and strategies to achieve optimal organizational results.
- ◆ **Recruitment Management:** This module helps in hiring the right people with the right target skills. This module includes processes for managing open positions/requisitions, applicant screening, assessments, selection and hiring, correspondence, reporting and cost analysis.
- ◆ **Personnel Management:** The personnel management module comprises of HR master-data, personnel administration, recruitment and salary administration.
- ◆ **Organizational Management:** Organizational Management module includes organizational structure, staffing schedules and job description.
- ◆ **Employee Self Service (ESS):** The Employee Self Service module allows employees to query HR related data and perform some Human Resource transactions over the system. For example - Employees may query their attendance record from the system without asking the information from HR personnel.
- ◆ **Analytics:** The Analytics module enables organizations to extend the value of an HRMS implementation by extracting HR related data for use with other business intelligence platforms. For example, organizations combine HR metrics with other business data to identify trends and anomalies in headcount in order to better predict the impact of employee turnover on future output.

Question 13

Discuss Core Banking System (CBS).

Answer

Core Banking System (CBS) may be defined as the set of basic software components that manage the services provided by a bank to its customers through its branches (branch network). The absolute bank's branches access applications from centralized data centers. All transactions budge through core systems, which, at an absolute minimum, must remain running and responsive during business hours. Increasingly, these systems are running 24x7 to support

Internet banking, global operations, and real time transactions via ATM, Internet, phone, and debit card.

The various elements of core banking include making and servicing loans; opening new accounts; processing cash deposits and withdrawals; processing payments and cheques; calculating interest; Customer Relationship Management (CRM) activities; managing customer accounts; establishing criteria for minimum balances, interest rates, number of withdrawals allowed and so on; establishing interest rates; and maintaining records for all the bank's transactions.

Normal core banking functions include deposit accounts, loans, mortgages and payments. Banks make these services available across multiple channels like ATMs, Internet banking, and branches. Examples of major core banking products include Infosys' Finacle, Nucleus FinnOne and Oracle's Flexcube application (from their acquisition of Indian IT vendor i-flex).

Question 14

What do you understand by Accounting Information System (AIS)? Also discuss its key elements.

Answer

Accounting Information System (AIS) is defined as a system of collection, storage and processing of financial and accounting data that is used by decision makers. An AIS 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. Accounting information system takes into consideration different aspects, which are composed of smaller subsystems, which help an organization in achieving its goal. The different sub components in AIS include Budgeting and Planning, Expenses Management, Revenue Management, Cash and Treasury Management, Accounting software, Electronic Banking, Activity-based Management, Payroll etc.

The key elements that compose the typical Accounting Information System are as follows:

- (i) **People:** AIS helps various system users that include accountants, consultants, business analysts, managers, chief financial officers and auditors etc. from different departments within a company to work together. With well-designed AIS, everyone within an organization who is authorized to do so can access the same system and get the same information. AIS also simplify getting information to people outside of the organization when necessary.
- (ii) **Procedure and Instructions:** These include both manual and automated methods for collecting, storing, retrieving and processing data.
- (iii) **Data:** It refers to the information pertinent to the organization's business practices that may include sales orders, customer billing statements, sales analysis reports, purchase requisitions, vendor invoices, check registers, general ledger, inventory data, payroll

4.18 Information Technology

information, timekeeping, tax information etc. This data can then be used to prepare accounting statements and reports such as accounts receivable aging, depreciation/amortization schedules, trial balance, profit and loss, and so on.

- (iv) **Software:** These are the computer programs that provide quality, reliability and security to the company's financial data that may be stored, retrieved, processed and analyzed. Managers rely on the information it outputs to make decisions for the company, and they need high-quality information to make sound decisions.
- (v) **Information Technology Infrastructure:** This include hardware such as personal computers, servers, printers, surge protectors, routers, storage media, and possibly a backup power supply used to operate the system. The hardware selected for AIS must be compatible with the intended software.
- (vi) **Internal Controls:** These are the security measures such as passwords or as complex as biometric identification to protect sensitive data against unauthorized computer access and to limit access to authorized users. Internal controls also protect against computer viruses, hackers and other internal and external threats to network security.

Question 15

Write a short note on the following:

- (a) *Artificial Intelligence*
- (b) *Just-In-Time (JIT)*
- (c) **Nucleus FinnOne**
- (d) **Data Mining**

Answer

- (a) **Artificial Intelligence (AI)** is the vicinity of computer science focusing on creating machines that can fit into place on behaviors that humans regard as intelligent. It is a research field that studies how to comprehend the intelligent human behaviors on a computer. The decisive objective of AI is to make a computer that can discover, sketch, and crack problems in parallel. The subject of artificial intelligence spans a wide horizon dealing with various kinds of knowledge representation schemes, different techniques of intelligent search, various methods for resolving uncertainty of data and knowledge, different schemes for automated machine learning and many others. Expert systems, Pattern Recognition, Natural language processing, and many others are some of the various purposes on which AI may be applied.
- (b) JIT is a philosophy of continuous improvement in which non-value-adding activities (or wastes) are identified and removed for the purposes of:
 - Reducing Cost
 - Improving Quality

- Improving Performance
- Improving Delivery
- Adding Flexibility
- Increase Innovativeness

When the JIT principles are implemented successfully, significant competitive advantages are realized. JIT principles can be applied to all parts of an organization: order taking, purchasing, operations, distribution, sales, accounting, design, etc.

- (c) **Nucleus FinnOne**: *The Nucleus FinnOne is a banking suite, made and marketed by India-based Company Nucleus software, and comes with a wide variety of integrated applications that cover different aspects of global web banking. These applications support banks and financial solution companies in dealing with assets, liabilities, core financial accounting and customer service. The solution is wholly focused on banking and financial services spanning across solutions in the areas of Retail and Corporate Banking, Cash Management, Relationship Banking, Financial CRM, Credit Risk & Appraisal, Enterprise Application Integration (EAI), Internet Banking, Data warehousing and Analytics.*

- (d) **Data Mining**: *Main points about data mining are as under –*

It is one of the business intelligence tool that involves using statistical, artificial intelligence, and related techniques to mine through large volumes of data and providing knowledge without users even having to ask specific questions.

The objective is to provide interesting and useful information to users by design even without their querying.

Data Mining involves data analysis for discovering useful patterns that are hidden in large volume of diverse data. For Example: Market segmentation - identify common characteristics of customers who buy same products.

OLAP (Online Analytical Processing) is a multi-dimensional analytical tool typically used in data mining, that gathers and process vast amounts of information into useful packets.

Question 16

What are the possible ways to make payments electronically?

Answer

Major types of Electronic Payments are as follows:

- A. **Credit Cards**: In a credit card transaction, the steps involved are authorization, batching, clearing and funding. The consumer presents preliminary proof of his ability to pay by presenting his credit card number to the merchant. The merchant can verify this with the bank, and create a purchase slip for the consumer to endorse. The merchant then uses

4.20 Information Technology

this purchase slip to collect funds from the bank, and, on the next billing cycle, the consumer receives a statement from the bank with a record of the transaction.

- B. Electronic Cheque:** Credit card payments are popular for commerce on the Internet. However, FSTC and CyberCash are two systems that let consumers use electronic cheques to pay Web merchants directly. **Financial Services Technology Corporation (FSTC)** is a consortium of banks and clearing houses that has designed an electronic cheque that is initiated electronically, and uses a digital signature for signing and endorsing. By **CyberCash**, electronic cheque functions as a message to the sender's bank to transfer funds, and, like a paper cheque, the message is given initially to the receiver who, in turn, endorses the cheque and presents it to the bank to obtain funds.
- C. Smart Cards:** Smart cards are any pocket sized card with embedded integrated circuits. Smart cards can provide identification authentications, data storage and application processing. Smart cards may serve as a credit or ATM cards, Fuel cards, mobile phone SIMs, access-control cards, public transport or public phone payment cards etc. on the card. Contact cards, Contactless cards and Combi/Hybrid Cards are the three types of Smart Cards.
- D. Electronic Purses:** Electronic Purse Card is very similar to a pre-paid card. Bank issues a stored value card to its customer, the customer can then transfer value from his/her account to the card at an ATM, a personal computer, or a specially equipped telephone. While making purchases, customers pass their cards through a vendor's Point of Sale terminal. Validation is done through a Personal Identification Number (PIN Number). Once the transaction is complete, funds are deducted directly from the cards and transferred to the vendor's terminal. When the value on a card is spent, consumers can load additional funds from their accounts to the card.

Question 17

What is an Expert System? Discuss its key components.

Answer

An **Expert System (ES)** is a computerized information system that allows non-experts to make decisions comparable to those of an expert. The aim of the expert system is to have a team of seasoned specialists holding industry-wide experience who further spread across implementations like in Defense, Government, Finance, Telecom, and Engineering sectors.

Components of an Expert System are as follows:

- (a) Knowledge Base:** This includes the data, knowledge, relationships, rules of thumb (heuristics), and decision trees used by experts to solve a particular problem. A knowledge base is the computer equivalent of all the knowledge and insight that an expert or group of experts develop through years of experience in their field. The knowledge base of expert system encloses both realistic and heuristic knowledge. Realistic knowledge is that knowledge of the job domain that is extensively shared, characteristically found in

textbooks or journals whereas heuristic knowledge is the fewer rigorous, extra empirical, supplementary judgmental knowledge of performance.

- (b) **Database of Facts:** This holds the user's input about the current problem. The user may begin by entering as much as they know about the problem or the inference engine may prompt for details or ask whether certain conditions exist. Gradually a database of facts is built up which the inference engine uses to come to a decision. The quality and quantity of data gained from the user influences the reliability of the decision.
- (c) **Inference Engine:** This program contains the logic and reasoning mechanisms that simulate the expert logic process and deliver advice. It uses data obtained from both the knowledge base and the user to make associations and inferences, form its conclusions, and recommend a course of action.
- (d) **Explanation facility:** This facility provides the user with an explanation of the logic the Expert System used to arrive at its conclusion.
- (e) **User Interface:** This program allows the user to design, create, update, use and communicate with the expert system.

Question 18

What is the difference between electronic cheque and paper cheque?

Answer

An e-cheque is an instrument where one person issues it to pay another person but there is no paper involved. Everything is electronic. An electronic cheque can be protected against any fraud by encoding sender's account number with the bank's public key thereby not revealing the sender's account number to the merchant. As with the SET protocol, digital certificates can be used to authenticate the payer, the payer's bank, and bank account. However, no such encoding of sender's account number is possible in case of paper cheque. E-cheque are faster and more convenient than paper cheque. It is environmentally friendly too.

Question 19

Explain the pre-requisites of ACID Test for any Transaction Processing System (TPS).

Answer

The ACID Test refers to the following prerequisites for any Transaction Processing System (TPS).

- **Atomicity:** This means that a transaction is either completed in full or not at all. TPS systems ensure that transactions take place in their entirety.
- **Consistency:** TPS systems exist within a set of operating rules or integrity constraints. For Example - If an integrity constraint states that all transactions in a database must have a positive value, any transaction with a negative value would be refused.

4.22 Information Technology

- **Isolation:** Transactions must appear to take place in seclusion. For example, the funds cannot be credited to an account before they are debited from another.
- **Durability:** Once transactions are completed they cannot be undone. To ensure this, a log will be created to document all completed transactions.

Question 20

You are in-charge of Customer Relationship Management (CRM). Describe the relevance of Old Pareto Rule “80/20 Rule”.

Answer

Pareto Rule emphasizes that most organizations find that approximately 20% of their customer base generates 80% of the profits. It is merely based on the philosophy that indicates that old trustworthy customers are most lucrative and help in generating profits.

Question 21

What do you mean by ‘Frame Based Expert System’? Also, explain the various components of Executive Information System (EIS).

Answer

Frame Based Expert System: *These systems organize all the information (data, description, rules etc.) about a topic into logical units called Frames, which are like linked records in data files. Rules are then established about how to assemble or inter-relate the frames to meet the user’s needs.*

The components of an Executive Information System (EIS) are as follows:

- **Hardware:** *This includes Input data-entry devices, CPU, Data Storage files and Output Devices.*
- **Software:** *This includes Text base software, Database, and Graphic types such as time series charts, scatter diagrams, maps, motion graphics, sequence charts, and comparison-oriented graphs (i.e., bar charts), Model base.*
- **User Interface:** *This includes hardware (physical) and software (logical) components by which people (users) interact with a machine. Several types of interfaces can be available to the Executive Information System structure, such as scheduled reports, questions/answers, menu driven, command language, natural language, and input/output.*
- **Telecommunication:** *This involves transmitting data from one place to another in a reliable networked system.*

Question 22

Explain the ‘Dashboards’ and ‘Scorecards’ as tools of Business Intelligence.

Answer

Dashboards: This involves using the information gathered from the data warehouse and making it available to users as snapshots of many different things with the objective of getting response to the query: "Tell me a lot of things, but without too much effort". Dashboards are flexible tools that can be bent into as many different shapes as per user requirements. It includes a collection of graphs, reports, and KPIs (Key Performance Indicators) that can help monitor such business activities as progress on a specific initiative.

Scorecards: This involves providing a visual representation of the enterprise strategy by taking critical metrics and mapping them to strategic goals throughout the enterprise. Scorecards offer a rich, visual gauge to display the performance of specific initiatives, business units, or the enterprise and the individual goals in the context of larger enterprise strategy. Scorecards distil information into a small number of metrics and targets and provide users with an at-a-glance perspective of information. A scorecard has a graphical list of specific, attainable strategic milestones, combined with metrics that serve as benchmarks. Specific measures on how well the company has performed specified activities are linked in the scorecard with graphical display highlighting the status of each goal.

Question 23

You are requested to implement the Online Transaction Processing in an e-commerce environment. Briefly explain step by step Online Transaction Processing in such environment.

Answer

A typical On-line transaction can be viewed as follows:

- ◆ **Advertising:** The company communicates its products and services (catalogue);
- ◆ **Offering:** The company offers specific goods and services;
- ◆ **Selling:** The company agrees with the customer on the content of a specific order;
- ◆ **Billing:** The company produces the invoice;
- ◆ **Paying:** The buyer pays the seller by giving a payment instruction;
- ◆ **Matching:** The seller matches the payment information (the authorization results and the actual crediting of account) with the orders and feeds the result into the back-office;
- ◆ **Delivering:** The seller delivers to the buyer; and
- ◆ **Resolving:** The seller and buyer try to resolve delivery or payment issues related to the purchase.

Question 24

Briefly describe the four stages of processing Credit Card transactions.

Answer

Four stages followed for processing of Credit Card Transactions:

Stage 1: Authorization – This is the first step in processing a credit card. After a merchant swipes the card, the data is submitted to merchant's bank, called an acquirer, to request authorization for the sale. The acquirer then routes the request to the card-issuing bank, where it is authorized or denied, and the merchant can process the sale.

Stage 2: Batching – This is the second step in processing a credit card. At the end of a day, the merchant reviews all the day's sales to ensure they were authorized and signed by the cardholder. It then transmits all the sales at once, called a batch, to the acquirer to receive payment.

Stage 3: Clearing – This is the third step in processing a credit card. After the acquirer receives the batch, it sends it through the card network, where each sale is routed to the appropriate issuing bank. The issuing bank then subtracts its interchange fees, which are shared with the card network, and transfers the remaining amount through the network back to the acquirer.

Stage 4: Funding – This is the fourth and final step in processing a credit card. After receiving payment from the issuer, minus interchange fees, the acquirer subtracts its discount fee and sends the remainder to the merchant. The merchant is now paid for the transaction, and the cardholder is billed.

Question 25

Describe how the Business Community is benefitted by adopting Information Technology based CRM process.

Answer

CRM can be considered as an amalgamation of people, process and systems rather than just IT application. Business Community is benefitted by adopting Information Technology based Customer Relationship Management (CRM) process in following ways:

- *CRM applications smoothen the process to capture, consolidate, analyze, and business enterprise-wide dissemination of data from existing and potential customers.*
- *CRM allows businesses to develop long-term relationships with established and new customers while helping modernize corporate performance. CRM incorporates commercial and client-specific strategies via employee training, marketing planning, relationship building and advertising.*
- *CRM establishes the benefits of generating customer loyalty, raising a market intelligence enterprise, and an integrated relationship. Preserving existing*

customers and providing enhanced services to accomplish the loyalty is expressed as CRM.

- *CRM helps to form business strategy to handle business challenges like, declining revenue, cut-off in the profit margin, costs occurred due to lost customers etc.*
- *CRM provides a single integrated enterprise view of the customer thus providing proficiency to the business enterprises to recognize all the services/products the customer had fetched from the organization and thus being able to recognize the buying behavior/pattern of the customer.*

Exercise

1. *Discuss System and its components?*
2. *What are the various stages involved in ERP implementation?*
3. *Discuss the Principle of Least Privilege in Information Security.*
4. *With are the various steps involved in an online payment transaction?*
5. *What are the different types of Smart Cards?*
6. *Discuss importance of Access and Privilege controls in order to safeguard software systems.*
7. *How a credit card is processed?*
8. *What are the different types of Expert Systems?*
9. *What do you understand by the term "Business Intelligence"? Discuss some of the business intelligence tools.*