

DCA 202 – Information Technology**LESSON** : 14**WEEK** : 14**TOPIC 1** : Management Support Systems**OBJECTIVE :** To give the student an understanding of Management Support Systems**LEARNING OUTCOMES:**

After completing this chapter, you should be able to:

1. Know the classic functions of managers - planning, organizing, staffing, directing and controlling.
2. Understand the purpose and components of a management information system.
3. Understand how computer networking and related software have flattened the classic management pyramid.
4. Be aware that many companies use employees in task-oriented teams.
5. Be aware of sophisticated software for top managers.
6. Understand the problems and solutions related to managing personal computers.
7. Become acquainted with the concept and total cost of personal computer ownership.

Chapter 14

Managerial Support Systems

14.1 Managers and Decision Making

14.2 Decision Support Systems

14.3 Enterprise and Executive Decision Support Systems

14.4 Intelligent Systems

Learning Objectives

Understand the concepts of management, decision making and computerized support for decision making.

Discuss decision support systems (DSSs), focusing on their structure and the benefits they provide for managers.

Understand computerized support for group decision making.

Understand artificial intelligence (AI).

Define an expert system and identify its components.

Describe natural language processing and natural language generation and neural networks.

14.1 Managers and Decision Making

Management is a process by which organizational goals are achieved through the use of resource (people, money, energy, materials, space, time).

These resources are considered to be inputs;

The attainment of the goals is viewed as the output of the process;

The ratio between inputs and outputs is an indication of the organization's productivity.

The Manager's Job & Decision Making

Manages three basic roles (Mintzberg, 1973)

1. Interpersonal roles: figurehead, leader, liaison
2. Informational roles: monitor, disseminator, spokesperson
3. Decisional roles: entrepreneur, disturbance handler, resource allocator, negotiator.

Decision refers to a choice that individuals and group make among two or more alternatives.

Decision making is a systematic process composed of three major phases: intelligence, design and choice (Simon, 1977)

Implementation phase was added later.

Decision Making Process

Why Managers Need IT Support

A key to good decision making is to explore and compare many relevant alternatives. The more alternatives that exist, the more computer-assisted search and comparison are needed.

Typically, decisions must be made under time pressure. Frequently it is not possible to manually process the needed information fast enough to be effective.

Why Managers Need IT Support (Continued)

It is usually necessary to conduct a sophisticated analysis in order to make a good decision. Such analysis requires the use of modelling.

Decision makers can be in different locations and so is the information. Bringing them all together quickly and inexpensively may be a difficult task.

Managerial Support Systems (MSSs)

Information systems that provide support for managerial decision-making (i.e. decision support systems (DSSs), group DSSs, organizational DSSs, executive information systems).

Information systems that actually make a decision (i.e. expert systems).

What Information Technologies are available to support Managers?

Decision support systems (DSSs) provide support primarily to analytical, quantitative types of decisions.

Executive support systems (ESSs) support the informational roles of executives.

Group decision support systems (GDSSs) support managers and staff working in groups.

A Framework for Computerized Decision Analysis

I. Problem Structure

The first dimension deals with the problem structure, where do the decision making processes fall along the continuum ranging from highly structured to highly unstructured decisions.

Structured - routine and repetitive problems for which standard solutions exist.

Unstructured - "fuzzy", complex problems for which there are no cut-and-dried solutions.

II. The Nature of Decisions

The second dimension of decision support deals with the nature of decisions.

Operational control - executing specific tasks efficiently and effectively;

Management control - acquiring and using resources efficiently in accomplishing organizational goals;

Strategic planning - the long range goals and policies for growth and resource allocation.

Computerized Decision Analysis

The decision matrix consists of the 3 primary classes of problem structures and the 3 broad categories of the nature of decisions combined in a matrix.

Computer support for structured decisions is for each structured decision prescribed solutions have been developed through the use of mathematical functions. This approach is called management science or operations research.

14.2 Decision Support Systems (DSSs)

Decision support systems (DSSs) are computer-based information systems that combine models and data in an attempt to solve semi-structured and some unstructured problems with extensive user involvement.

DSSs can examine numerous alternatives very quickly.

DSSs can provide a systematic risk analysis.

DSSs can be integrated with communications systems and databases.

DSSs can be used to support group work.

DSSs can perform these functions at relatively low cost.

Characteristics and Capabilities of DSSs

Sensitivity analysis is the study of the impact that changes in one (or more) parts of a model have on other parts.

What-if analysis is the study of the impact of a change in the assumptions (input data) on the proposed solution.

Goal-seeking analysis is the study that attempts to find the value of the inputs necessary to achieve a desired level of output.

Structure and Components of DSSs

Data management subsystem contains all the data that flow from several sources.

Model management subsystem contains completed models and the building blocks necessary to develop DSS applications.

User interface covers all aspects of the communications between a user and the DSS. Users are the persons faced with the problem or decision that the DSS is designed to support.

Knowledge-based subsystems provide the required expertise for solving some aspects of the problem.

How DSSs Work - The DSS and its Computing Environment

Group Decision Support Systems (GDSSs)

Virtual group is a group whose members are in different locations.

Group decision support system (GDSS) is an interactive computer-based system that supports the process of finding solutions by a group of decision makers.

Decision room is a face-to-face setting for a group DSS, in which terminals are available to the participants.

Organizational Decision Support System (ODSS)

Organizational Decision Support System (ODSS) is a DSS that focuses on an organizational task or activity involving a sequence of operations and decision makers and provides the following:

It affects several organizational units or corporate problems;

It cuts across organizational functions or hierarchical layers;

It involves computer-based and (usually) communications technologies.

14.3 Executive Information (Support) Systems

Executive information system (EIS) also known as an executive support system (ESS) is a computer-based technology designed specifically for the information needs of top executives and provides for:

Rapid access to timely information;

Direct access to management reports;

Very user friendly and supported by graphics;

Exception reporting - reporting of only the results that deviate from a set of standards;

Drill down reporting - investigating information in increasing detail;

Easily connected within online information services and e-mail;

Include analysis support, communications, office automation and intelligence support.

Enterprise Decision Simulator

Technology that supports the informational needs of executives in the so-called "corporate war room".

Management Cockpit is a strategic management room that enables top-level decision makers to pilot their businesses better.

The environment encourages more efficient management meetings and boosts team performance via effective communication.

Key performance indicators and information relating to critical success factors are displayed graphically on the walls of the meeting room.

The cockpit environment is integrated with SAP's ERP products and reporting systems.

External information can be easily imported to the room to allow competitive analysis.

14.4 Intelligence Systems

Intelligent system is a term that describes the various commercial applications of AI.

Artificial intelligence (AI) is a subfield of computer science concerned with:

Studying the thought processes of humans;

Re-creating those processes via machines such as computers and robots.

Artificial Intelligence (AI)

"Behaviour by a machine that, if performed by a human being, would be considered intelligent."

Turing test is a test for artificial intelligence, in which a human interviewer, conversing with both an unseen human being and an unseen computer, cannot determine which is which; named for British AI pioneer Alan Turing.

Expert Systems

Expertise refers to the extensive, task-specific knowledge acquired from training, reading and experience.

Expert systems (ESs) attempt to mimic human experts by applying expertise in a specific domain.

Can support decision makers or completely replace them.

The transfer of expertise from an expert to a computer and then to a user involves four activities:

Knowledge acquisition: Knowledge is from experts or from documented sources.

Knowledge representation: Acquired knowledge is organized as rules or frames (objective-oriented) and stored electronically in a knowledge base.

Knowledge inferencing: Given the necessary expertise stored in the knowledge base, the computer is programmed so that it can make inferences. The reasoning function is performed in a component called the inference engine, which is the brain of ES.

Knowledge transfer: The inferred expertise is transferred to the user in the form of a recommendation.

The Components of Expert Systems

Knowledge base contains knowledge necessary for understanding, formulating and solving problems.

Inference engine is a computer program that provides a methodology for reasoning and formulating conclusions.

User interface enables users to communicate with the computer

Blackboard is an area of working memory set aside for the description of a current problem.

Explanation subsystem explains its recommendations.

The Benefits of Expert Systems

Natural Language Processing & Voice Technologies

Natural language processing (NLP): Communicating with a computer in English or whatever language you may speak.

Natural language understanding/speech (voice) recognition: The ability of a computer to comprehend instructions given in ordinary language, via the keyboard or by voice.

Natural language generation/voice synthesis: Technology that enables computers to produce ordinary language, by "voice" or on the screen, so that people can understand computers more easily.

Neural Networks

Neural networks is a system of programs and data structures that approximates the operation of the human brain.

Neural networks are particularly good at recognizing subtle, hidden and newly emerging patterns within complex data as well as interpreting incomplete inputs.

Fuzzy Logic

Fuzzy logic deals with the uncertainties by simulating the process of human reasoning, allowing the computer to behave less precisely and logically than conventional computers do. It involves decision in gray areas.

Uses creative decision-making processes.