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Unit-1

Decision support systems:-

Decision support systems (DSS) are a subset of computer-based information systems (CBIS). The general term 'computer-based information systems' is a constellation of a variety of information systems such as office Automation systems, transaction processing systems, management information systems and management support Systems. Management support systems consist of DSS, expert systems and executive information systems. In the Early 1970s, scholars in the CBIS area began to recognize the important roles information systems play in Supporting managers in their semi-structured or unstructured decision-making activities. It was argued that Information systems should exist only to support decisions, and that the focus of the information systems Development efforts should be shifted away from structured operational control to unstructured critical decisions In organizations. Decisions are irreversible and have far-reaching consequences for the rest of organizational life. The importance of effective decision making can never be overemphasized. Decision making is, in effect, Synonymous with management

characteristics of a decision support system:-

1. DSS are designed specifically to facilitate decision processes,
2. DSS should support rather than automate decision making.
3. DSS should be able to respond quickly to the changing needs of decision makers.

Some Other Characteristics of DSS:-

Facilitation. DSS facilitate and support specific decision-making activities and/or decision processes.

- **Interaction**. DSS are computer-based systems designed for interactive use by decision makers or staff users who control the sequence of interaction and the operations performed.
- **Ancillary**. DSS can support decision makers at any level in an organization. They are NOT intended to replace decision makers.
- **Repeated Use**. DSS are intended for repeated use. A specific DSS may be used routinely or used as needed for ad hoc decision support tasks.
- **Task-oriented**. DSS provide specific capabilities that support one or more tasks related to decision-making, including: intelligence and data analysis; identification and design of alternatives; choice among alternatives; and decision implementation.
- **Identifiable**. DSS may be independent systems that collect or replicate data from other information systems OR subsystems of a larger, more integrated information system.
- **Decision Impact**. DSS are intended to improve the accuracy, timeliness, quality and overall effectiveness of a specific decision or a set of related decisions.

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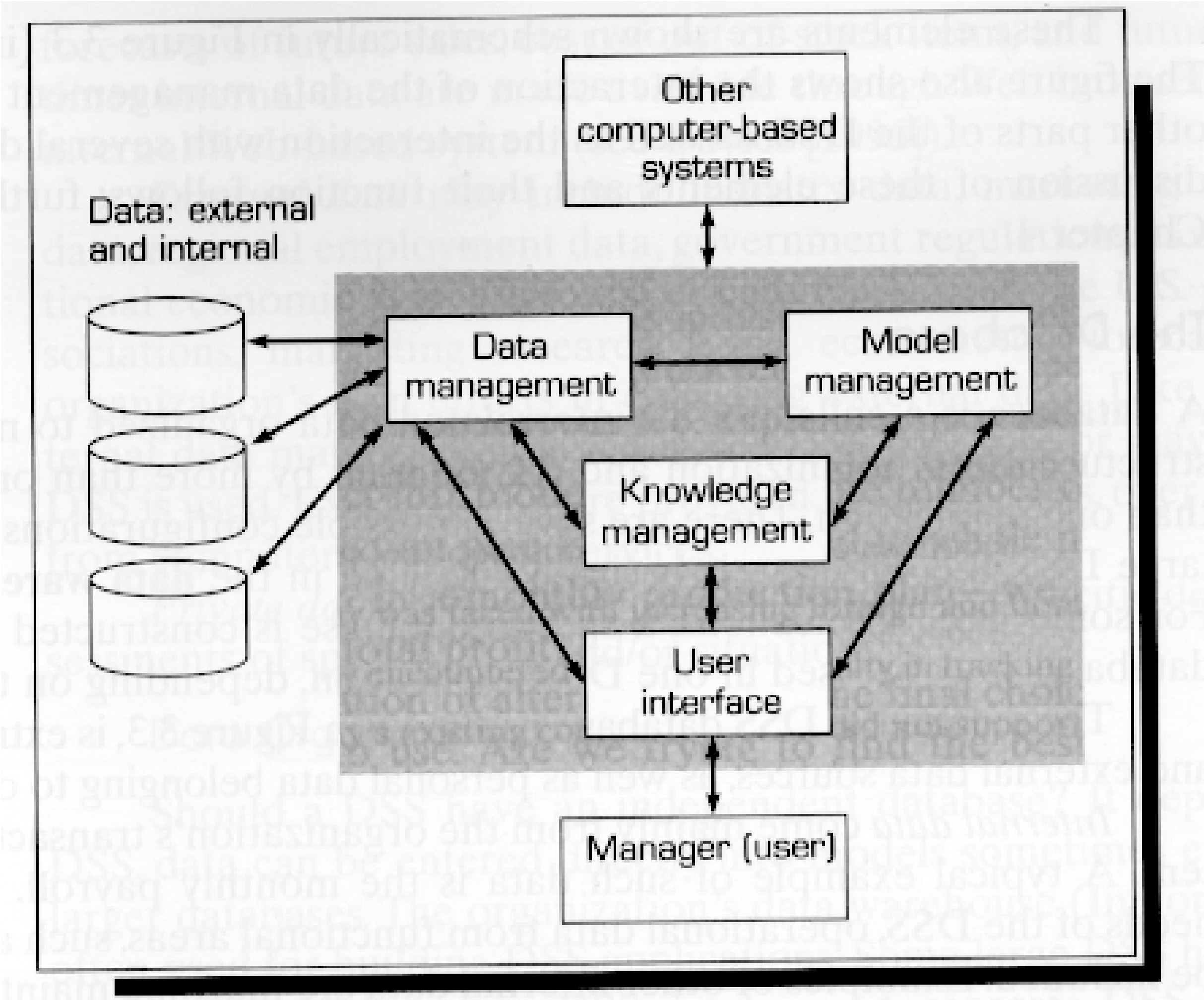
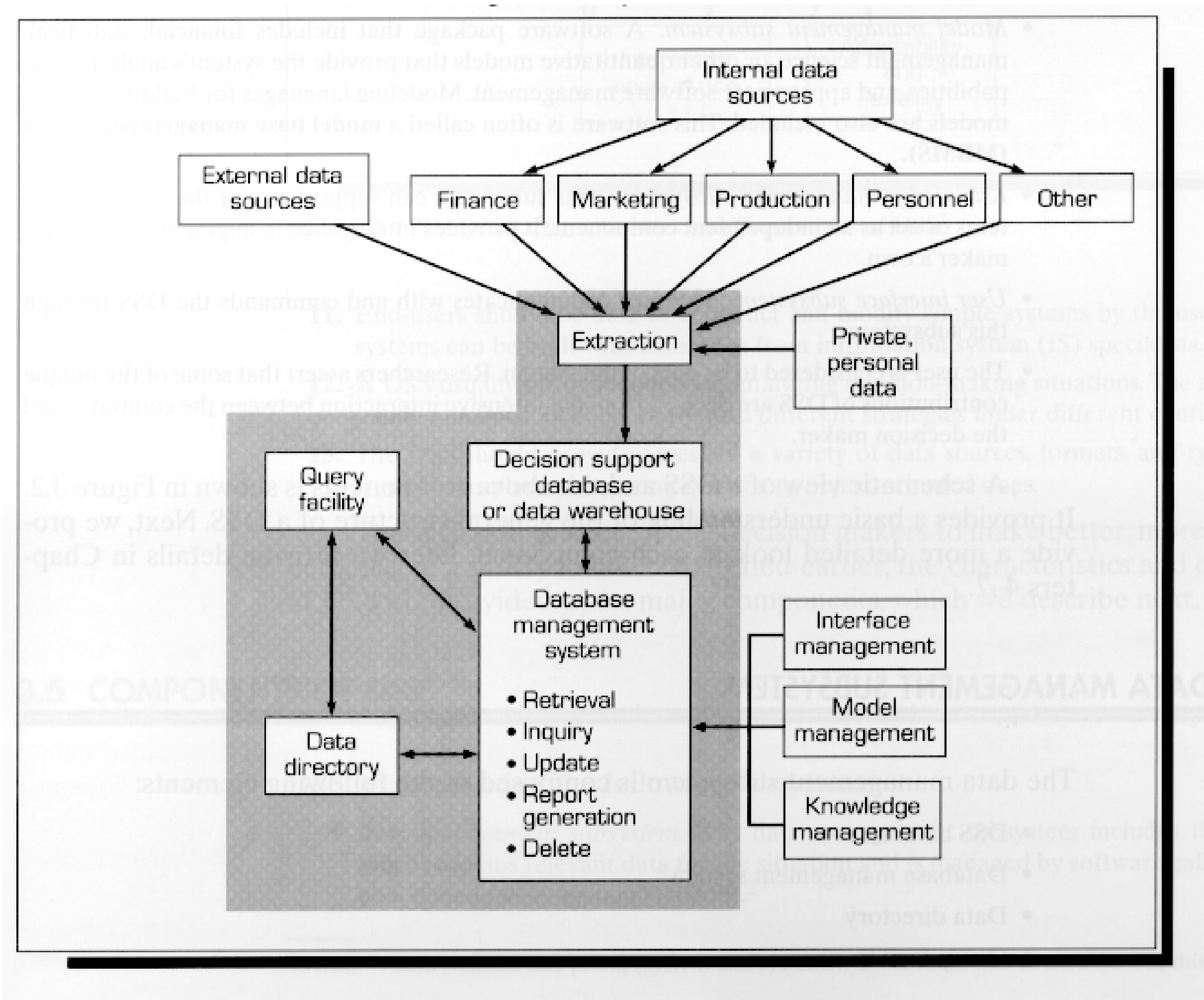
Component Of DSS:-



- **Data management subsystem** includes the database, which contains relevant data for the situation and is managed by software called the database management system (DBMS).
- **Model management subsystem** includes financial, statistical, management science, or other models and usually contains a modelling language for building custom models. It is managed by software called the model base management system (MBMS).

- **Knowledge management subsystem** provides intelligence to augment the operations of the other DSS components.
- **User interface subsystem** enables the user to communicate with the DSS.

1. Data Management Subsystem :-



♦ Database - a collection of interrelated data organised to meet
 the needs and structure of an organisation

- Data warehouse - combines various data sources into a single resource
  - Internal data
    - transaction information systems
    - Intranet - internal web-based system
  - External data
    - Internet
  - Private data
- Extraction - to capture data from several sources

Database Management System (DBMS)

Solves two problems:

- – centralisation, coordination, and diffusion of information
- – logical independence between data and DSS application
- – Functions of the DBMS:
- – Data definition

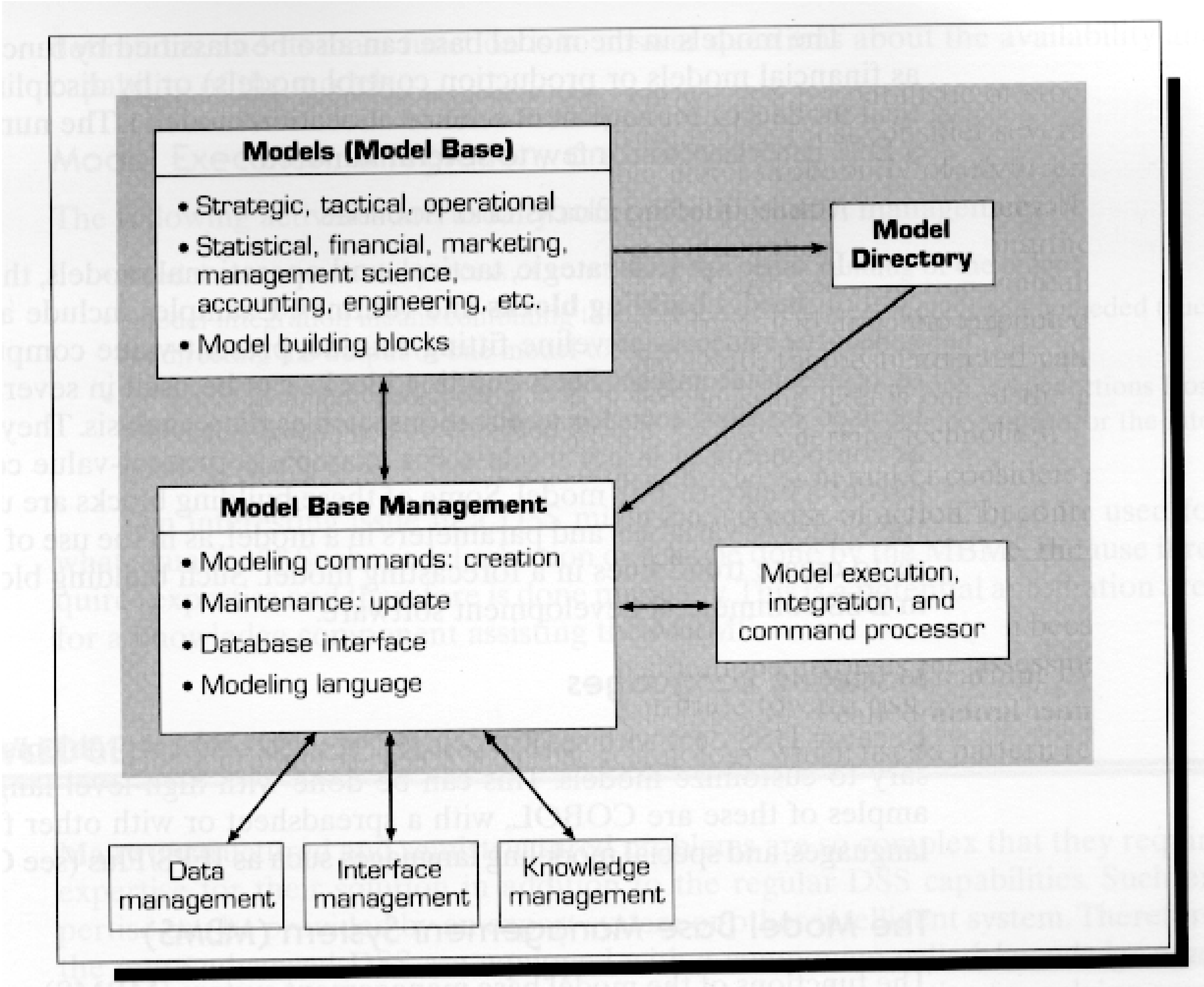
  describes the data entities and their relationships
- Data manipulation

  updates data records and files (adds records, deletes, modifies)
- Data integrity

  integrity constraints - rules to maintain the integrity of the database
- Control of access rights

  subsets of data must be used only by authorised persons

2. Model Management Subsystem:-



- Model base contains routine and special statistical, financial, forecasting,
  management science and other quantitative models.
- Four major categories:
  - Strategic models
    support top-management's strategic planning responsibilities
  - Managerial (tactical) models
    assist in allocating and controlling the organisational resources
  - Operational models

supports the day-to-day activities of the organisation

- Model Building Blocks and Routines
  random number generator routine
  regression analysis

♦ Other classifications:
  – by functional areas
  – by discipline

♦ **3. Knowledge Management Subsystem:-**

♦ Terms: intelligent DSS, knowledge-based DSS, DSS/ES

♦ Provides expertise for solving some aspects of the problem and provides knowledge that can enhance the operation of other DSS components.
  – support the steps of the decision process unaddressed by mathematics
  – help user to build, apply and manage libraries of models
  – integrate methods to handle uncertainty

Structured, Unstructured and Semi-Structured Data:-

.1 Unstructured Data:-

the term unstructured refers to the fact that no identi_able structure within this kind of data is available. Unstrucured data is also described as data, that cannot be stored in rows and columns in a relational database.

Storing data in an unstructured form without any de_ned data schema is a common way of _ling information. An example for unstructured data is a document that is archived in a _le folder

2 Fully Structured Data

Fully structured data follows a prede_ned schema. "An instance of such a schema is some data that conforms to this speci_cation,"]. A typical example for fully structured data is a relational database system. Designing a database schema is an elaborate process, because a schema has to be de_ned before the content is created and the database is populated. The schema de_nes the type and structure of data and its relations.

3 Semi-Structured Data

Semi-structured data is often explained as "...schema less or self-describing, terms that indicate that there is no separate description of the type or structure of the data". Semi-structured data does not require a schema definition. This does not mean that the dentition of a schema is not possible, it is rather optional. The instances do also exist in the case that the schema changes. Furthermore, a schema can also be de_ned according to already existing instances (posterior). The types of semi-structured data instances may be de_ned for a part of the data and it is also possible that a data instance has more than one type

Characteristics of structured decisions:

_ Goals are defined.
_ Information is obtainable and manageable.
_ Appear in a well defined context and procedures are known.

Characteristics of unstructured decisions:

_ The outcomes are uncertain
_ Appear in unique context
_ The required information and resources are hard to assess

Simon's model of decision making:-

According to Simon there are three phases of decision making: Intelligence, Design and Choice. The process can be shown by the following diagram: The outcome of the intelligence phase is problem statement, outcome of the design phase is a set of alternative solutions and outcome of the choice phase is a selected solution.

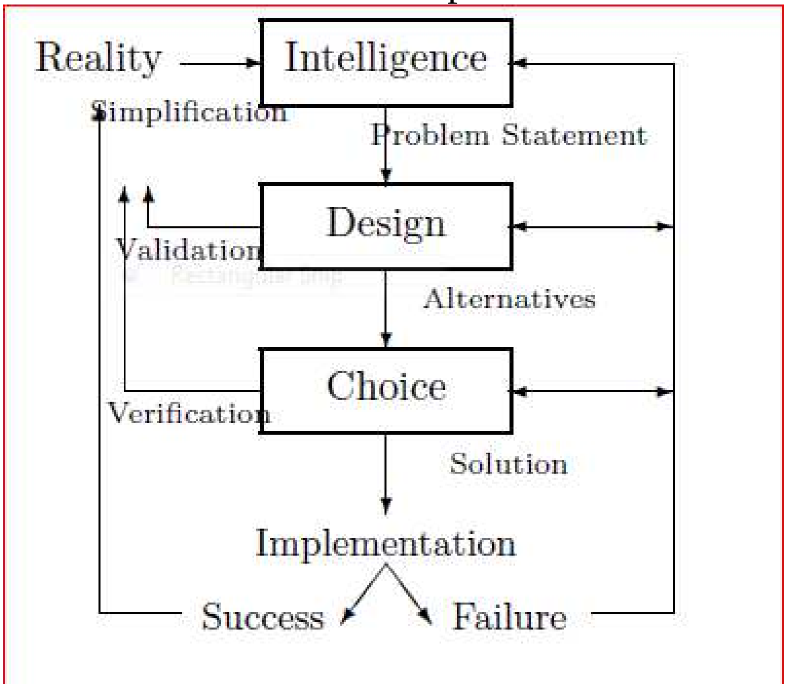


Figure 1: Decision making model.

Phases of decision making:-

Declare

Decision Point 1: Frame the problem. What are you deciding and why? What shouldn't you be deciding and why? What's not in the box is as important as what is.

Without a good definition of the problem or opportunity to be worked, there is no possibility that you'll reliably reach a high quality decision.

Frames are mental structures we create to simplify and organize our lives. They help us reduce complexity. That's the good news and the root of another set of problems. Says J. Edward Russo in his book, Winning Decisions, "Frames have enormous power. The way people frame a problem greatly influences the solution they will ultimately choose. And the frames that people or organizations routinely use for their problems control how they will react to almost everything they encounter."

Decision Point 2: The Right People. If you're a single actor, or hold all the prerogatives of a dictator, this one is easy. It's just you. In other cases, you'll want to put some thought into declaring who needs to be involved in what steps of this decision. Too few, or miss some, and you risk the problems of rework, low adoption rate and poor buy in. Too many—too much inclusion—and you invite the possibility of an unnecessarily painful or drawn out decision process.

Decision Point 3: The Right Process. Will you flip a coin? Throw darts? Check with your boss? Make decision tables? Use a decision tree or a bubble chart? Build a business case? It would depend on the decision situation. Making a high quality decision doesn't have to be time consuming. In some cases, the best process might just be a coin toss or relying on some rules of thumb. In other cases, the only way to work a decision is to really work it, and that will take time.

The only rule is that the mechanics of how you'll work the decision to conclusion need to be appropriate to the size, significance, and complexity of the decision. How long is too long? When the cost of working the decision any further outweighs the benefits of making a choice.

This element of declaration pulls the frame and people together into a coherent whole that will govern how you will reason this decision through.

Work

Decision Point 4: A complete set of alternatives. "The more options you generate, the greater your chance of finding an excellent one . . . You should only stop generating more options when the cost and delay of further search are likely to exceed the benefit." (Russo)

What is the right number of alternatives? That depends on how you've framed the question. Two terms are helpful in this regard. "Collectively exhaustive" means that the alternatives you're considering fill the frame: a rational observer would conclude that you've thought of everything that matters. "Mutually exclusive" means that the alternatives are unique and different from each other: they're not just restatements of the same choice.

Decision Point 5: Values against which to make tradeoffs. Values define your preferences among alternatives. They are your criteria. Values can be expressed by "attributes."Attributes are characteristics of the outcomes that we find desirable or undesirable. They typically occur over time and may have some degree of uncertainty associated with them.

For each decision, particularly those involving others, you need to make your definition of value visible, clear, and distinct. In commerce, the acid test of a value is often that you can measure it.

Decision Point 6: Information that describes the value of each alternative. Good decision-making requires not only knowing the facts, but understanding the limits of your knowledge. The most valuable insights are often found in exploring uncertainties and "disconfirming" information. "The effective decision does not, as so many texts on decision-making proclaim, flow from a consensus on the facts. The understanding that underlies the right decisions grows out of the clash and conflict of divergent opinions and out of the serious consideration of competing alternatives." (Peter Drucker, *The Effective Executive*)

You can wear yourself out gathering and analyzing information. What you want is insight that will help you judge the relative and comparative value of the alternatives you're considering.

Leaders should focus on creating the dynamics that support organizational decision quality—on putting in place a decision framework and process that supports organizational decision quality—rather than raking through the detailed minutia of specific decisions. A high quality decision process highlights the frame, potential alternatives, and key assumptions the drive value. This allows leaders to spend their time declaring the right decisions, providing a set of common criteria, and testing the key assumptions of each decision.

Types of Decision Support Systems (DSS):-

There are a number of Decision Support Systems. These can be categorized into five types:

- **Communication-driven DSS**
  Most communications-driven DSSs are targetted at internal teams, including partners. Its purpose are to help conduct a meeting, or for users to collaborate. The most common technology used to deploy the DSS is a web or client server. Examples: chats and instant messaging softwares, online collaboration and net-meeting systems.
- **Data-driven DSS**
  Most data-driven DSSs are targeted at managers, staff and also product/service suppliers. It is used to query a database or data warehouse to seek specific answers for specific purposes. It is deployed via a main frame system, client/server link, or via the web. Examples: computer-based databases that have a query system to check (including the incorporation of data to add value to existing databases.
- **Document-driven DSS**
  Document-driven DSSs are more common, targeted at a broad base of user groups. The purpose of such a DSS is to search web pages and find documents on a specific set of keywords or search terms. The usual technology used to set up such DSSs are via the web or a client/server system.
- **Knowledge-driven DSS:**
  Knowledge-driven DSSs or 'knowledgebase' are they are known, are a catch-all category covering a broad range of systems covering users within the organization seting it up, but may also include others interacting with the organization - for example, consumers of a business. It is essentially used to provide management advice or to choose products/services. The typical deployment technology used to set up such systems could be slient/server systems, the web, or software runnung on stand-alone PCs.

Model-driven DSS

Model-driven DSSs are complex systems that help analyse decisions or choose between different options. These are used by managers and staff members of a business, or people who interact with the organization, for a number of purposes depending on how the model is set up - scheduling, decision analyses etc. These DSSs can be deployed via software/hardware in stand-alone PCs, client/server systems, or the web.

Overview of different types of Decision making:

Strategic. Strategic decisions are the highest level. Here a decision concerns general direction, long term goals, philosophies and values. These decisions are the least structured and most imaginative; they are the most risky and of the most uncertain outcome, partly because they reach so far into the future and partly because they are of such importance.

For example: Decisions about what to do with your life, what to learn, or what methods to use to gain knowledge (travel, work, and school) would be strategic. Whether to produce a low priced product and gain market share or produce a high priced product for a niche market would be a strategic decision.

Tactical. Tactical decisions support strategic decisions. They tend to be medium range, medium significance, with moderate consequences.

For example: If your strategic decision were to become a forest ranger, a tactical decision would include where to go to school and what books to read. Or if your company decided to produce a low priced product, a tactical decision might be to build a new factory to produce them at a low manufacturing cost.

Operational. These are every day decisions, used to support tactical decisions. They are often made with little thought and are structured. Their impact is immediate, short term, short range, and usually low cost. The consequences of a bad operational decision will be minimal, although a *series* of bad or sloppy operational decisions can cause harm. Operational decisions can be preprogrammed, pre-made, or set out clearly in policy manuals.

For example: If your tactical decision is to read some books on forestry, your operational decision would involve where to shop for the books. You might have a personal policy of shopping for books at a certain store or two. Thus, the operational decision is highly structured: "Whenever books are needed, look at Joe's Books."

An important comment should be made here. Issues should be examined and decisions should be made at all of these levels. If you discover that nearly all of your thinking and decision making is taking place at the operational level, then you are probably not doing enough strategic thinking and planning. As a result you will lead a reactive life, responding only to the forces around you and never getting control of your life, your direction or your goal

.Management information system: A **management information system** (**MIS**) is a system that provides information needed to manage organizations effectively. Management information systems are regarded to be a subset of the overall internal controls procedures in a business, which cover the application of people, documents, technologies, and procedures used by management accountants to solve business problems such as costing a product, service or a business-wide strategy. Management information systems are distinct from regular information systems in that they are used to analyze other information systems applied in operational activities in the organization. Academically, the term is commonly used to refer to the group of information management methods tied to the automation or support of human decision making, e.g. Decision Support Systems, Expert systems, and Executive information systems.

Overview

Initially in businesses and other organizations, internal reporting was made manually and only periodically, as a by-product of the accounting system and with some additional statistic(s), and gave limited and delayed information on management performance. Previously, data had to be separated individually by the people as per the requirement and necessity of the organization. Later, data was distinguished from information, and so instead of the collection of mass of data, important and to the point data that is needed by the organization was stored.

Earlier, business computers were mostly used for relatively simple operations such as tracking sales or payroll data, often without much detail. Over time, these applications became more complex and began to store increasing amount of information while also interlinking with previously separate information systems. As more and more data was stored and linked man began to analyze this information into further detail, creating entire management reports from the raw, stored data. The term "MIS" arose to describe these kinds of applications, which were developed to provide managers with information about sales, inventories, and other data that would help in managing the enterprise. Today, the term is used broadly in a number of contexts and includes (but is not limited to): decision support systems, resource and people management applications, Enterprise Resource Planning (ERP), Supply Chain Management (SCM), Customer Relationship Management (CRM), project management and database retrieval applications.

An 'MIS' is a planned system of the collection, processing, storage and dissemination of data in the form of information needed to carry out the management functions. In a way, it is a documented report of the activities that were planned and executed. According to Philip Kotler "A marketing information system consists of people, equipment, and procedures to gather, sort, analyze, evaluate, and distribute needed, timely, and accurate information to marketing decision makers." [3]

The terms *MIS* and *information system* are often confused. Information systems include systems that are not intended for decision making. The area of study called MIS is sometimes referred to, in a restrictive sense, as information technology management. That area of study should not be confused with computer science. IT service management is a practitioner-focused discipline. MIS has also some differences with ERP which incorporates elements that are not necessarily focused on decision support.

Any successful MIS must support a business's Five Year Plan or its equivalent. It must provide for reports based upon performance analysis in areas critical to that plan, with feedback loops that allow for titivation of every aspect of the business, including recruitment and training regimens. In effect, MIS must not only indicate how things are going, but why they are not going as well as planned where that is the case. These reports would include performance relative to cost centers and projects that drive profit or loss, and do so in such a way that identifies individual accountability, and in virtual real-time.

Anytime a business is looking at implementing a new business system it is very important to use a system development method such as System Development Life Cycle. The life cycle includes Analysis, Requirements, Design, Development, Testing and Implementation

.Executive information system

An **Executive Information System** (EIS) is a type of management information system intended to facilitate and support the information and decision-making needs of senior executives by providing easy access to both internal and external information relevant to meeting the strategic goals of the organization. It is commonly considered as a specialized form of a Decision Support System (DSS)

The emphasis of EIS is on graphical displays and easy-to-use user interfaces. They offer strong reporting and drill-down capabilities. In general, EIS are enterprise-wide DSS that help top-level executives analyze, compare, and highlight trends in important variables so that they can monitor performance and identify opportunities and problems. EIS and data warehousing technologies are converging in the marketplace.

In recent years, the term EIS has lost popularity in favor of Business Intelligence (with the sub areas of reporting, analytics, and digital dashboards).

History

Traditionally, executive information systems were developed as mainframe computer-based programs. The purpose was to package a company’s data and to provide sales performance or market research statistics for decision makers, such as financial officers, marketing directors, and chief executive officers, who were not necessarily well acquainted with computers. The objective was to develop computer applications that would highlight information to satisfy senior executives’ needs. Typically, an EIS provides data that would only need to support executive level decisions instead of the data for all the company.

Today, the application of EIS is not only in typical corporate hierarchies, but also at personal computers on a local area network. EIS now cross computer hardware platforms and integrate information stored on mainframes, personal computer systems, and minicomputers. As some client service companies adopt the latest enterprise information systems, employees can use their personal computers to get access to the company’s data and decide which data are relevant for their decision makings. This arrangement makes all users able to customize their access to the proper company’s data and provide relevant information to both upper and lower levels in companies.

Components

The components of an EIS can typically be classified as:

Hardware

When talking about hardware for an EIS environment, we should focus on the hardware that meet the executive's needs. The executive must be put first and the executive's needs must be defined before the hardware can be selected. The basic computer hardware needed for a typical EIS includes four components:

1. Input data-entry devices. These devices allow the executive to enter, verify, and update data immediately;
2. The central processing unit (CPU), which is the kernel because it controls the other computer system components;
3. Data storage files. The executive can use this part to save useful business information, and this part also help the executive to search historical business information easily;
4. Output devices, which provide a visual or permanent record for the executive to save or read. This device refers to the visual output device or printer.

In addition, with the advent of local area networks (LAN), several EIS products for networked workstations became available. These systems require less support and less expensive computer hardware. They also increase access of the EIS information to many more users within a company.

Software

Choosing the appropriate software is vital to design an effective EIS.Therefore, the software components and how they integrate the data into one system are very important. The basic software needed for a typical EIS includes four components:

1. Text base software. The most common form of text are probably documents;
2. Database. Heterogeneous databases residing on a range of vendor-specific and open computer platforms help executives access both internal and external data;
3. Graphic base. Graphics can turn volumes of text and statistics into visual information for executives. Typical graphic types are: time series charts, scatter diagrams, maps, motion graphics, sequence charts, and comparison-oriented graphs (i.e., bar charts);
4. Model base. The EIS models contain routine and special statistical, financial, and other quantitative analysis.

Perhaps a more difficult problem for executives is choosing from a range of highly technical software packages. Ease of use, responsiveness to executives' requests, and price are all reasonable considerations. Further, it should be considered whether the package can run on existing hardware.

User Interface

An EIS needs to be efficient to retrieve relevant data for decision makers, so the user interface is very important. 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. It is crucial that the interface must fit the decision maker’s decision-making style. If the executive is not comfortable with the information questions/answers style, the EIS will not be fully utilized. The ideal interface for an EIS would be simple to use and highly flexible, providing consistent performance, reflecting the executive’s world, and containing help information.

Telecommunication

As decentralizing is becoming the current trend in companies, telecommunications will play a pivotal role in networked information systems. Transmitting data from one place to another has become crucial for establishing a reliable network. In addition, telecommunications within an EIS can accelerate the need for access to distributed data.

Applications

EIS enables executives to find those data according to user-defined criteria and promote information-based insight and understanding. Unlike a traditional management information system presentation, EIS can distinguish between vital and seldom-used data, and track different key critical activities for executives, both which are helpful in evaluating if the company is meeting its corporate objectives. After realizing its advantages, people have applied EIS in many areas, especially, in manufacturing, marketing, and finance areas.

Manufacturing

Basically, manufacturing is the transformation of raw materials into finished goods for sale, or intermediate processes involving the production or finishing of semi-manufactures. It is a large branch of industry and of secondary production. Manufacturing operational control focuses on day-to-day operations, and the central idea of this process is effectiveness and efficiency. To produce meaningful managerial and operational information for controlling manufacturing operations, the executive has to make changes in the decision processes. EIS provides the evaluation of vendors and buyers, the evaluation of purchased materials and parts, and analysis of critical purchasing areas. Therefore, the executive can oversee and review purchasing operations effectively with EIS. In addition, because production planning and control depends heavily on the plant's data base and its communications with all manufacturing work centers, EIS also provides an approach to improve production planning and control

Marketing

In an organization, marketing executives' role is to create the future. Their main duty is managing available marketing resources to create a more effective future. For this, they need make judgments about risk and uncertainty of a project and its impact on the company in short term and long term. To assist marketing executives in making effective marketing decisions, an EIS can be applied. EIS provides an approach to sales forecasting, which can allow the market executive to compare sales forecast with past sales. EIS also offers an approach to product price, which is found in venture analysis. The market executive can evaluate pricing as related to competition along with the relationship of product quality with price charged. In summary, EIS software package enables marketing executives to manipulate the data by looking for trends, performing audits of the sales data, and calculating totals, averages, changes, variances, or ratios. All of these sales analysis functions help marketing executives to make final decisions.

Financial

A financial analysis is one of the most important steps to companies today. The executive needs to use financial ratios and cash flow analysis to estimate the trends and make capital investment decisions. An EIS is a responsibility-oriented approach that integrates planning or budgeting with control of performance reporting, and it can be extremely helpful to finance executives. Basically, EIS focuses on accountability of financial performance and it recognizes the importance of cost standards and flexible budgeting in developing the quality of information provided for all executive levels. EIS enables executives to focus more on the long-term basis of current year and beyond, which means that the executive not only can manage a sufficient flow to maintain current operations but also can figure out how to expand operations that are contemplated over the coming years. Also, the combination of EIS and EDI environment can help cash managers to review the company's financial structure so that the best method of financing for an accepted capital project can be concluded. In addition, the EIS is a good tool to help the executive to review financial ratios, highlight financial trends and analyze a company's performance and its competitors.

Advantages and Disadvantages EIS

Advantages of EIS

- Easy for upper-level executives to use, extensive computer experience is not required in operations
- Provides timely delivery of company summary information
- Information that is provided is better understood

- Filters data for management
- Improves to tracking information
- Offers efficiency to decision makers

Disadvantages of EIS

- System dependent
- Limited functionality, by design
- Information overload for some managers
- Benefits hard to quantify
- High implementation costs
- System may become slow, large, and hard to manage
- Need good internal processes for data management
- May lead to less reliable and less secure data

Future Trends

The future of executive info systems will not be bound by mainframe computer systems. This trend allows executives escaping from learning different computer operating systems and substantially decreases the implementation costs for companies. Because utilizing existing software applications lies in this trend, executives will also eliminate the need to learn a new or special language for the EIS package. Future executive information systems will not only provide a system that supports senior executives, but also contain the information needs for middle managers. The future executive information systems will become diverse because of integrating potential new applications and technology into the systems, such as incorporating artificial intelligence (AI) and integrating multimedia characteristics and ISDN technology into an EIS.

EIS - timely, efficient and effective in supporting the decision making process.

.Expert systems:

Introduction: An expert system is a set of programs that manipulate encoded knowledge to solve problems in a specialized domain that normally requires human expertise. An expert system's knowledge is obtained form expert sources and coded in a form suitable for the system to use in its interference or reasoning processes. The expert knowledge must be obtained from specialists or other sources of expertise, such as texts, journal articles, and data bases. This type of knowledge usually requires much training and experience in some specialized field such as medicine, geology, system configuration, or engineering design.

Characteristic Features of Expert systems: Expert systems differ from conventional computer systems in several important ways.

1. Expert systems use knowledge rather than data to control the solution process. Much of the knowledge used is heuristic in nature rather than algorithmic.
2. The knowledge is encoded and maintained as an entity separate from the control program. As such, it is not compiled together with the control program itself. This permits the incremental addition and modification (refinement) of the knowledge base without recompilation

of the control programs. Furthermore, it is possible in some cases to use different knowledge bases with the same control programs to produce different types of expert systems.

3. Expert systems are capable of explaining how a particular conclusion was reached, and why requested information is needed during a consultation. This is important as it gives the user a chance to assess and understand the system's reasoning ability, thereby improving the user's confidence in the system.
4. Expert systems use symbolic representations for knowledge (rules, networks, or frames) and perform their interference through symbolic computations that closely resemble manipulations of natural language.

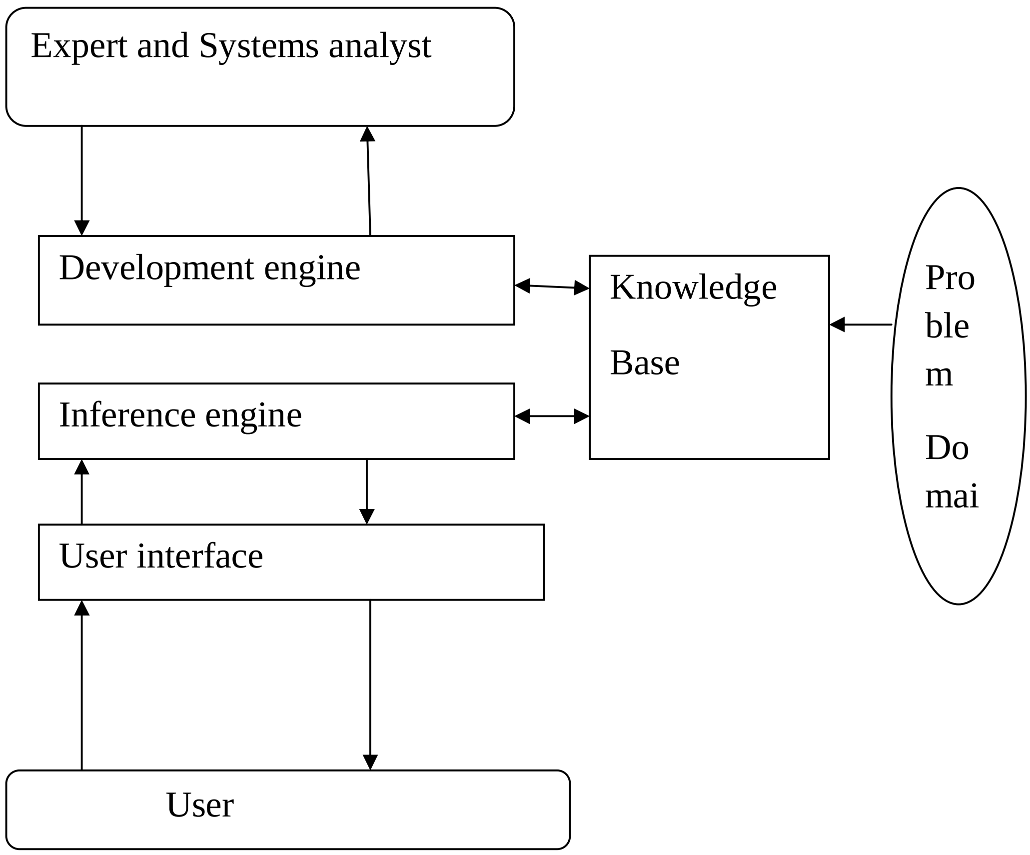


Fig. An expert system model

Expert Systems
- Expertise, Transferring Experts, Inference Rules, Explanation Capability

Three Major ES Components
- Knowledge Base
- Inference Engine
- User Interface

The Human Element in Expert Systems
- Expert
- Knowledge Engineer
- User
- Others

The Expert
- Has the special knowledge, judgment, experience and methods to give advice and solve problems
- Provides knowledge about task performance

The Knowledge Engineer
- Helps the expert(s) structure the problem area by interpreting and integrating human answers to questions, drawing analogies, posing counterexamples, and bringing to light conceptual difficulties
- Usually also the System Builder

The User
- Possible Classes of Users

– A non-expert client seeking direct advice (ES acts as a *Consultant* or *Advisor*)
– A student who wants to learn (*Instructor*)
– An ES builder improving or increasing the knowledge base

(*Partner*)
– An expert (*Colleague* or *Assistant*)
n The Expert and the Knowledge Engineer Should Anticipate Users
Other Participants
n System Builder
n Systems Analyst
n Tool Builder
n Vendors
n Support Staff
n Network Expert
Problem Areas Addressed by Expert Systems
n Interpretation systems
n Prediction systems
n Diagnostic systems
n Design systems
n Planning systems
n Monitoring systems
n Debugging systems
n Repair systems
n Instruction systems
n Control systems
Expert Systems Benefits
n Increased Output and Productivity
n Decreased Decision Making Time
n Increased Process(es) and Product Quality
n Reduced Downtime
n Capture Scarce Expertise
n Flexibility
n Easier Equipment Operation
n Elimination of Expensive

Problems and Limitations of Expert Systems

- Knowledge is not always readily available
- n Expertise can be hard to extract from humans
- n Each expert's approach may be different, yet correct
- n Hard, even for a highly skilled expert,to work under time pressure
- n Expert system users have natural cognitive limits
- n ES work well only in a *narrow domain*

Expert Systems Types

- n Expert Systems Versus Knowledge-based Systems
- n Rule-based Expert Systems
- n Frame-based Systems
- n Hybrid Systems
- n Model-based Systems
- n Ready-made (Off-the-Shelf) Systems
- n Real Decision

Using ES on the Web

- n Provide knowledge and advice
- n Help desks
- n Knowledge acquisition
- n Spread of multimedia-based expert systems (Intel media **systems)**

<u>5.Knowledge-based systems</u>: Knowledge based systems are artificial intelligent tools working in a narrow domain to provide intelligent decisions with justification. Knowledge is acquired and represented using various knowledge representation techniques rules, frames and scripts. The basic advantages offered by such system are documentation of knowledge, intelligent decision support, self learning, reasoning and explanation. **Knowledge-based systems** are systems based on the methods and techniques of Artificial Intelligence. Their core components are:

- knowledge base
- acquisition mechanisms
- inference mechanisms

While for some author's expert systems, case-based reasoning systems and neural networks are all particular types of knowledge-based systems, there are others who consider that neural networks are different, and exclude it from this category

KBS is a frequently used abbreviation for **knowledge-based system**.

Knowledge-Based Decision Support: Artificial Intelligence and Expert Systems

- Managerial Decision Makers are *Knowledge Workers*
- Use Knowledge in Decision Making
- Accessibility to Knowledge Issue

Knowledge Processing – Given facts or other representations
Knowledge Bases – Where knowledge is stored
Using the Knowledge Base in AI Programs – Interference

AI Concepts and Definitions

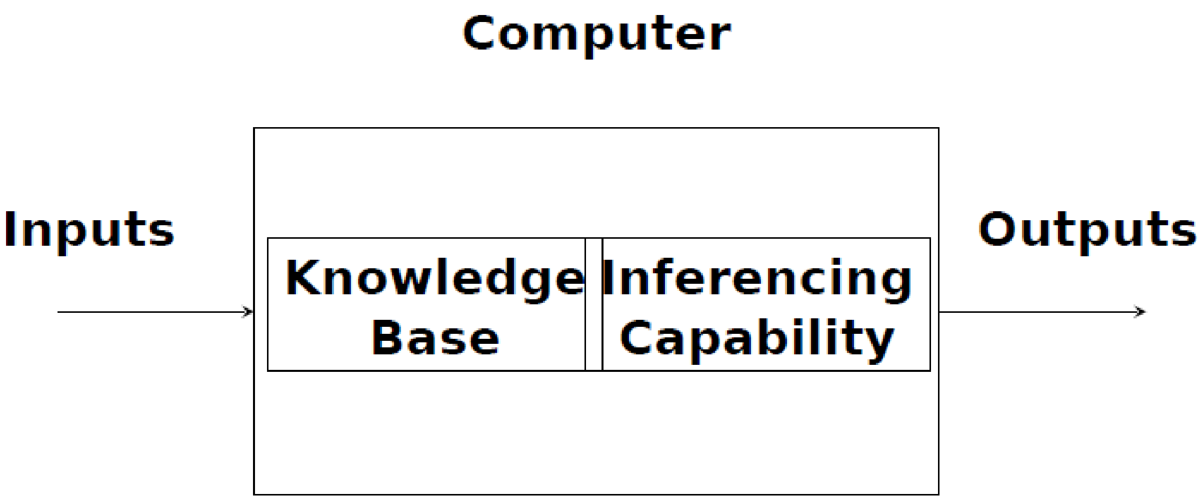
- **Encompasses Many Definitions**
- **AI Involves Studying Human**

Thought Processes

- **Representing Thought Processes on Machines**
  Make machines *smarter* (primary goal)
- **Understand what *intelligence* is (Nobel Laureate purpose)**

n **Make machines more *useful* (entrepreneurial purpose)**

Using the Knowledge Base



AI Methods are Valuable

n **Models of how we think**
n **Methods to apply our intelligence**
n **Can make computers easier to use**
n **Can make more knowledge available**
n ***Simulate* parts of the human mind**

Properties for Knowledge Representation Systems

The following properties should be possessed by a knowledge representation system.
Representational Adequacy
– the ability to represent the required knowledge;
Inferential Adequacy
- the ability to manipulate the knowledge represented to produce new knowledge corresponding to that inferred from the original;
Inferential Efficiency

- the ability to direct the inferential mechanisms into the most productive directions by storing appropriate guides;

Acquisition Efficiency

- the ability to acquire new knowledge using automatic methods wherever possible rather than reliance on human intervention.

Organizational Structures

Functional: Engineering, Marketing, Design, etc

P&L from production

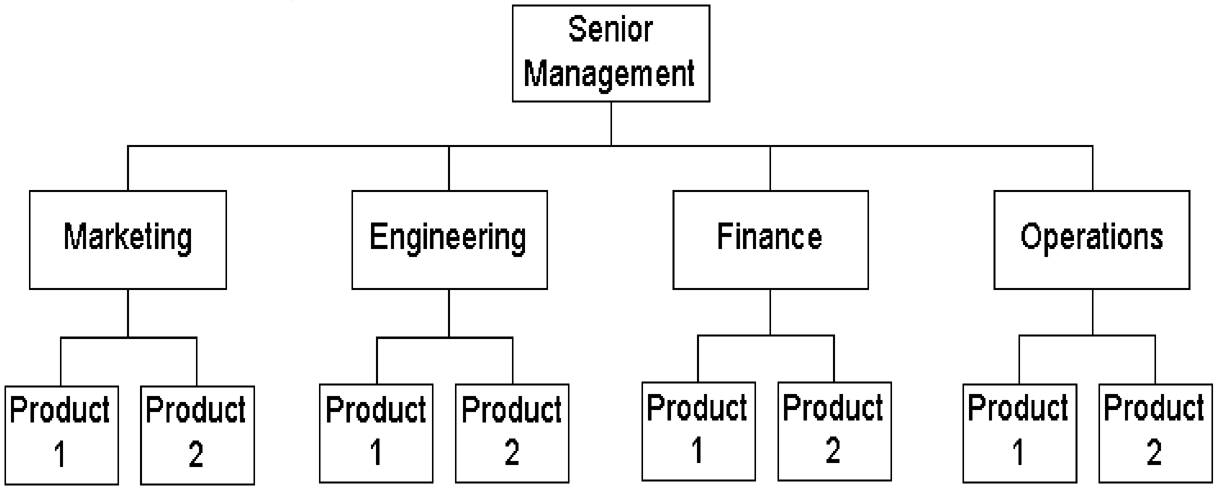
Project: Project A, Project B Income from projects

PM has P&L responsibility

Matrix: Functional and Project based

Program Mgmt. Model Shorter cycles, need for rapid development process

Functional Organization



Pros

Clear definition of authority

Eliminates duplication

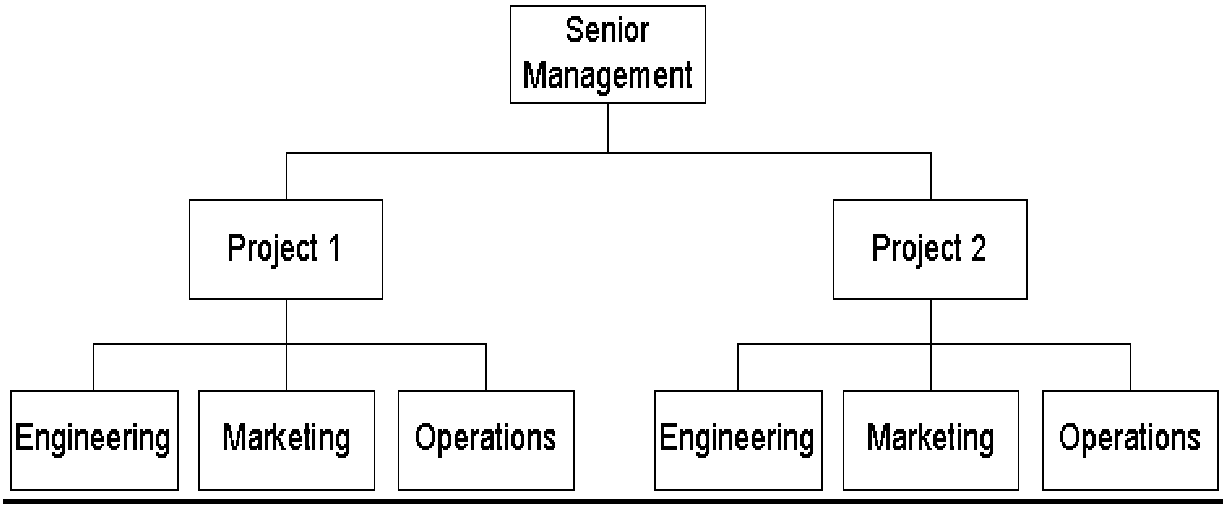
Encourages specialization

Clear career paths

Cons

- "Walls": can lack customer orientation
- "Silos" create longer decisions cycles
- Conflicts across functional areas
- Project leaders have little power

Project Organization



Pros

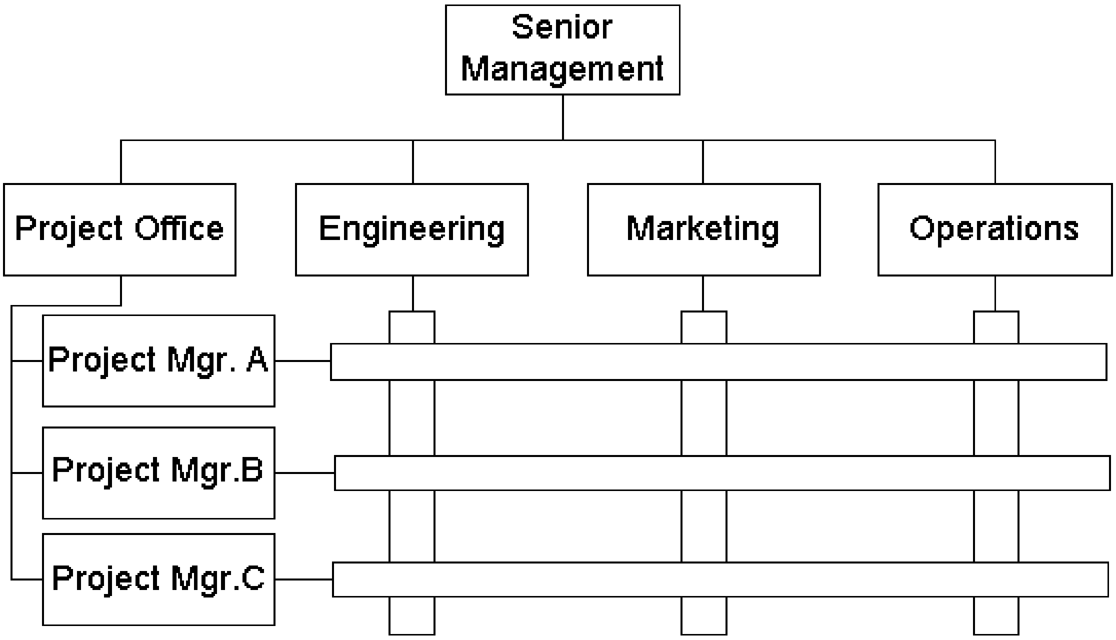
- Unity of command
- Effective inter-project communication

Cons

- Duplication of facilities

– Career path

Matrix Organization



Pros

– Project integration across functional lines

– Efficient use of resources

Retains functional teams

Cons

– Two bosses for personnel

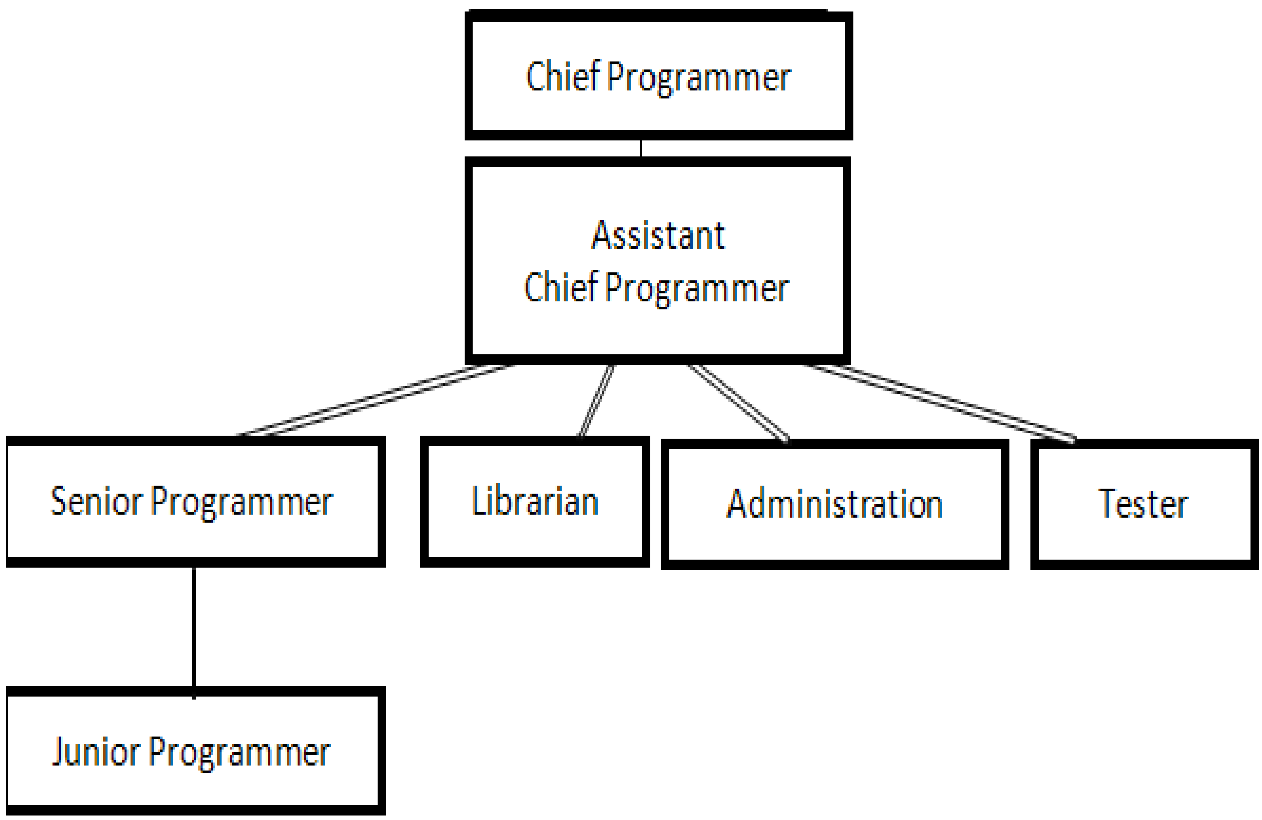
– Complexity

– Resource & priority conflicts

Associations in organizational structures

- Reporting association:
  - Used for reporting status information
- Decision association
  - Used for propagating decisions
- Communication association
  - Used for exchanging information needed for decisions (e.g., requirements, design models, issues).

Example of Hierchical Organization: Chief Programmer Team



Understanding Organizations

Structural frame: Focuses on roles and responsibilities, coordination and control. Organization charts help define this frame.	**Human resources frame:** Focuses on providing harmony between needs of the organization and needs of people.
Political frame: Assumes organizations are coalitions composed of varied individuals and interest groups. Conflict and power are key issues.	**Symbolic frame:** Focuses on symbols and meanings related to events. Culture is important.

<u>.OR modeling</u>:

1. **Linear programming**: - Linear programming is a mathematical technique by which the limited resources of an organization are allotted in optimal solution. The process of LP involves either maximization or minimization of the objective function which is bounded by the constraint of the problem.

Linear programming carried out by using either the graphic method or the simplex method

2. **Simulation: -** Simulation is a process of finding solution to complex artificial and natural system by appropriately formulating a model of the same and by experimenting on it. The process of simulation involves development of model as the basis of experimentation. Simulation methods are widely used in various areas like computer aided circuit design factory automation ecological system and engineering etc.

3. **Project scheduling techniques:**

1. PERT (Project Evaluation and research technique)

2. CPM (Critical Path Method)

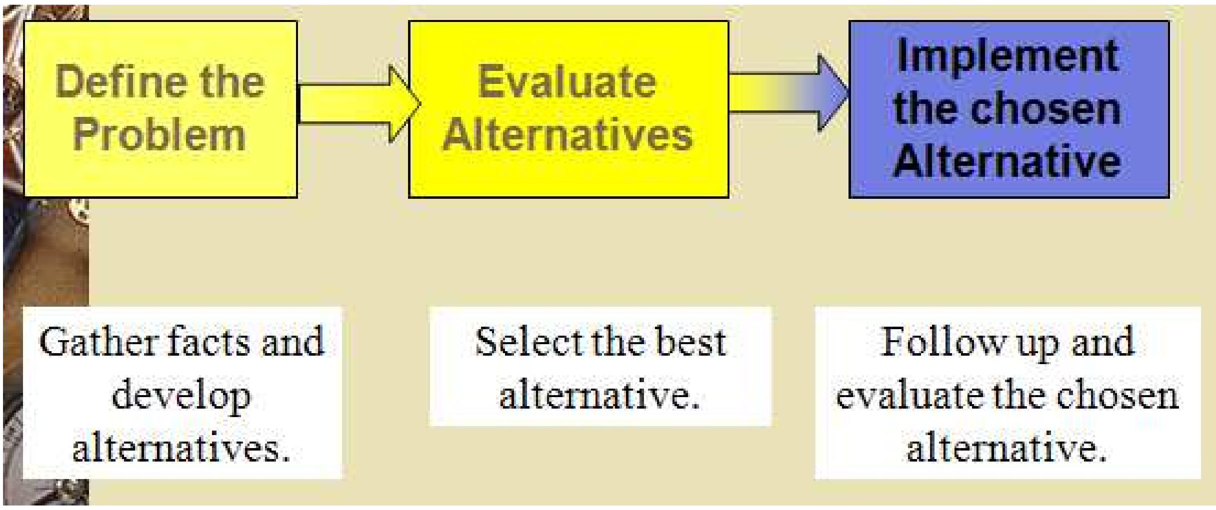
PERT and CPM are the widely adopted method for the purpose of planning and controlling and scheduling the task.

.Decision making: **Decision making** can be regarded as the mental processes (cognitive process) resulting in the selection of a course of action among several alternatives. Every decision making process produces a final choice.[1] The output can be an action or an opinion of choice.

Overview

Human performance in decision-making terms has been the subject of active research from several perspectives. From a psychological perspective, it is necessary to examine individual decisions in the context of a set of needs, preferences an individual has and values they seek. From a cognitive perspective, the decision making process must be regarded as a continuous process integrated in the interaction with the environment. From a normative perspective, the analysis of individual decisions is concerned with the logic of decision making and rationality and the invariant choice it leads to.[2]

Decision making process



- Identify a problem and decision criteria and allocating weights to the criteria.
- Developing, analyzing, and selecting an alternative that can resolve the problem.
- Implemented and selected alternatives.
- Evaluating the decision effectiveness

There are basically two kinds of decision that managers called upon to make Programmed and non-programmed

- **Programmed decision**

    *A repetitive decision the can be handled by a routine approach.

- **Non-programmed decisions**

    * Decision that are unique and nonrecurring.

    * Decision that generate unique responses

Characteristics of an Effective Decision-Making

- It focuses on what is important
- It is logical and consistent.
- It acknowledges both subjective and objective thinking and blends analytical with intuitive thinking.
- It requires only as much information and analysis as is necessary to resolve a particular dilemma.
- It encourages and guides the gathering of relevant information and informed opinion.
- It is straightforward, reliable, easy to use, and flexibile

..Decision Analytic System Onto Activities Within An Organization :-

An emergent class of DSSs known as decision-analytic DSSs applies the principles of decision theory, probability theory, and decision analysis to their decision models. Decision theory is an axiomatic theory of decision making that is built on a small set of axioms of rational decision making. It expresses uncertainty in terms of probabilities and preferences in terms of utilities. These are combined using the operation of mathematical expectation. The attractiveness of probability theory, as formalism for handling uncertainty in DSSs, lies in its soundness and its guarantees concerning long-term performance. Probability theory is often viewed as the gold standard for rationality in reasoning under uncertainty. Following its axioms offers protection from some elementary inconsistencies. Their violation, on the other hand, can be demonstrated to lead to sure losses .

Decision analysis is the art and science of applying decision theory to real-world problems. It includes a wealth of techniques for model construction, such as methods for elicitation of model structure and probability distributions that allow minimization of human bias, methods for checking the sensitivity of a model to imprecision in the data, computing the value of obtaining additional information, and presentation of results. These methods have been under continuous scrutiny by psychologists working in the domain of behavioural decision theory and have proven to cope reasonably well with the dangers related to human judgmental biases.

.Mapping OF Database:-

Data mapping is the process of creating data element mappings between two distinct data models . Data mapping is used as a first step for a wide variety of data integration tasks including:-

- Data transformation or data mediation between a data source and a destination.
- Identification of data relationships as part of data lineage analysis.
- Discovery of hidden sensitive data such as the last four digits social security number hidden in another user id as part of a data masking or de-identification project
- Consolidation of multiple databases into a single data base and identifying redundant columns of data for consolidation or elimination

10.Knowledge management system

Knowledge management (**KM**) comprises a range of strategies and practices used in an organization to identify, create, represent, distribute, and enable adoption of insights and experiences. Such insights and experiences comprise knowledge, either embodied in individuals or embedded in organizations as processes or practices.

, KM includes courses taught in the fields of business administration, information systems, management, and library and information sciences (Alavi & Leidner 1999). More recently, other fields have started contributing to KM research; these include information and media, computer science, public health, and public policy.

Knowledge management efforts typically focus on organizational objectives such as improved performance, competitive advantage, innovation, the sharing of lessons learned, integration and continuous improvement of the organization.

Unit-2

.Impact of culture on decision making: Contrary to popular belief culture within a company has a huge impact on the decision making process.
Companies and cultures are of two basic types without getting into too much complication.

1) Top down- the hierarchy of the company makes the decisions and these decisions are rolled down or mandated to all levels within the company. This is archaic and usually destined for failure either because the CEO or board can't make all the right decisions all the time and as the company grows the decision making process bogs down and no major decisions are made because every one is waiting for the decision from above. There is little responsibility or accountability within the ranks and soon things come to a grinding halt as the company grows.

2) Bottom up - Decision making and empowerment to the lower levels of the organization only when within their scope to do so. There needs to be good systems in place to keep things in check and often for large expenditures and decisions the approval process can seem beurocratic but necessary. When people are empowered and are allowed to make decisions brain power is strong and people are invigorated. New ideas are generated and a company normally becomes progressive because it harnesses the power of many.

Top down, either CEO ran or entrepreneurial companies tend to fall apart at the demise of the CEO or owner. Often with much admiration but the future of the company was never really taken into consideration.

It depends on the culture; all companies have different cultures to create wealthThat depends on what culture exists in the organization and who is making the decisions. For example, if organization "A" has a very strict, male oriented culture and the company works for only the shareholders then that would suck for the employees. Furthermore, if the all decisions were made by one control freak sitting as CEO then everyone would be in trouble.

Culture issues

Social anthropologists define culture as "those socially transmitted patterns for behavior characteristic of a particular social group" and "the organized system of knowledge and belief whereby a people structure their experience and perception."(Keesing 1973). So it includes the non-linguistic human conventions that distinguish one group of people from some other group, their patterns of thinking, feeling, interacting, and ways of recording this in their art and artifacts.
These cultural aspects include the way time and dates and currency are denoted. Here there can be subtle variation, such as the use of "," and "." in the representation of numbers, through to the particular symbols used to denote currency. Typically there may be a variety of ways of writing equivalent information, such as we see in the writing of dates. One particular example is the way western number systems have used thousands and millions as major groupings, while in South Asia lakhs and crores (100 thousand and ten million) are used.

Calendar systems can vary: the western calendar works with a solar year with a Christian orientation for its origin for counting years: it uses various devices to synchronize days with years, through leap years, all worked out by calculation based on scientific theories of the earth's orbit around the sun (see Duncan 1998 for a history of the Gregorian system). By contrast many parts of the Islamic world use the Hijira calendar with is lunar months and yearly cycle of 12 lunar months with no attempt to synchronize with the solar year, while synchronization between days and months is not done by calculation as in the west, but by direct observation of the moon. A person could be 30 years old in the western calendar and 33 years old in the Islamic calendar.

The Bikram calendar system of Nepal (historically widely used in South Asia before the colonial imposition of the Gregorian calendar) uses a solar year but lunar months, and synchronizes these by having an extra month every three years and other devices (Pillai 1911). These calendar systems embody within them the deeper cultural values, so that for the West knowing the calendar for years in advance through the calculations of the Gregorian system is important — for Nepal it has always been sufficient to have the calendar for the next year determined a few months before the start of the next year.

Cultural areas are full of pitfalls for the unwary. For example, an icon depicting a hand held up with palm towards the viewer, commonly used to indicate 'Stop!' or 'Danger!' in the Apple Macintosh and Windows interface, has a completely different meaning in Greece, where it is extremely rude. The product name "Nova" could denote "new" to readers in one locations, but "does not go" in some other location.

Colors may also have radically different connotations in different cultures, so for example red is a warning color in Western countries, but in China it illustrates joy, while white is the color of mourning and black is lucky: this could be important in the coloring of maps in GIS systems, since in the west red might well be used to denote danger zones, but lose that connotation elsewhere.

.Assimilation of information: Information systems managers should expect that as new computer technology is created or evolved it will often be assimilated in organizations in a variety of ways. Applegate, McFarla and McKinney [1, p. 226] summarize a process for assimilating emerging information Technologies in organizations. This consists of a series of stages through which new technology is identified, assimilated, and institutionalized. They described the four stages of (1) technology identification, (2) technological learning and adaptation, (3) rationalization/management control,
And (4) maturity/widespread technology transfer. Technology identification examines new information systems tools, tests those tools, and leads to a determination of the desirability of Acquiring the technology. Technological learning and adaptation involves gaining knowledge about how to deploy the technology in information systems opportunities beyond the initial evaluative projects. Rationalization/management control encompasses continued evolution of the application of the technology and development of controls for guiding the design and implementation of systems that apply these technologies.

Maturity/widespread technology transfer occurs when the technology is embraced throughout the organization. During Technology identification, pilot projects are often undertaken at the strategic planning level of the organization, especially where a single project is undertaken for a key executive sponsor. When the maturity/widespread technology transfer has occurred, the technology is used across all organization levels and particularly at the operational control level by many users in the Organization. Similar to the development of other information systems tools, these stages of assimilation play an important roll in the tool kit for developing, deploying, and applying DSS in Organizations.

The assimilation of information technology tools can drive a tool from being primarily used as a DSS tool, when it first enters an organization at Stages 1 and 2, to a tool that is primarily a SDS/TPS, when it reaches Stage 4 of maturity/widespread use in an organization. With this assimilation, the realm of the SDS/TPS has expanded. Primary indicators that DSS technologies have reached Stage 4 and have become embedded in a TPS are the number of users of the system and how system support is provided. This expansion has been present since the first data processing application were begun in the 1950s. Increases in computing power, at decreasing costs for that processing capability, is a key driver in pushing technology and tools from a primarily DSS usage to SDS/TPS applications. This evolution is as likely to occur as the seasons are to change and Moore's Law [9] continues to describe the pace of computer technology evolution. For example, consider the assimilation of spreadsheet software, a popular DSS tool.

In the early days of VisiCalc, few personal computers existed in organizations. VisiCalc was applied primarily in the support of executives at the strategic planning level (Stage 1). As this technology evolved together with an organization's use of the technology, the Microsoft Excel spreadsheet (or its equivalent) is now on the desktop computer of virtually every one of these computer users, regardless of their level in the organization (Stage 4). So, a spreadsheet tool, that was once, and initially, a tool for senior level management, is now an everyday tool for all users of desktop computing. When information technology introduced at Stage 1 as a DSS application tool has reached stage 4 based on its usage pattern with the organization, then the resulting system should be recognized for what it has become considering that usage. That is, a SDS/TPS rather than a DSS application

Figure 1 illustrates technology transfer where an ad hoc DSS provides a means for facilitating the activities of assimilation Stages 1 and 2 and provides an environment where a project is undertaken for a key executive sponsor. Then the DSS tool is used at lower levels within the organization. This greatly expands the user base into that of large scale DSS, which typically exists

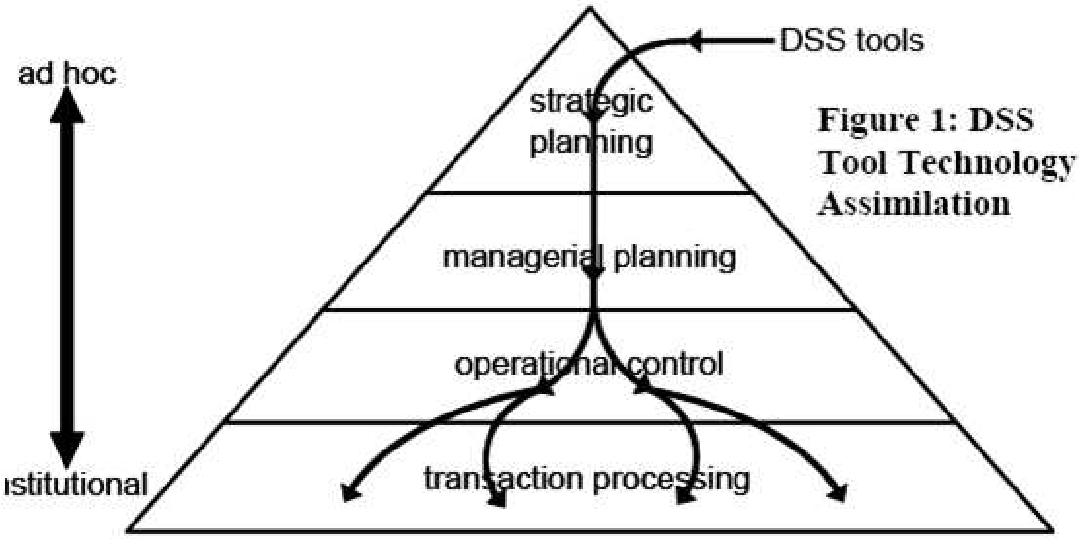


Figure 1: DSS Tool Technology Assimilation

with an institutional DSS. Now, the DSS
has evolved into a SDS/TPS in the manner
in which it is deployed and maintained within the organization. The enabling technology has reached Stage 4 of maturity/widespread technology transfer. The application developed and deployed using the enabling technology of the initial DSS tool has evolved into an application, which is a TEIS and exhibits the characteristics of a SDS/TPS.

The Model Management Subsystem

Mirrors the database management subsystem

Model Management Issues

- Model level: Strategic, managerial (tactical) and operational, model building blocks
- Modeling languages
- Model execution, integration
- Use of AI and Fuzzy logic in MBMS

.Cognitive Tools

_(Von Winterfed and Edwards)

• We would not embark on a construction project without
Effective physical tools

• We should not make important decisions without effective *cognitive tools*

– Name some cognitive tools you use in class, at work, in your life

• An effective DSS provides the decision maker with *cognitive tools* to assist in any or all of:

– Problem structuring

– Elicitation of human judgmental inputs

– Organizing and displaying relevant data

– Aggregating inputs to produce

» Predictions of outcomes for options suggested by decision maker

» Recommendations of options for decision maker to consider

– Understanding strengths and weaknesses of candidate solutions

– Selecting a solution

– Justifying the selected solution

– Implementing the selected solution

The cognitive view approach and stress the importance of the concept-to-stimulus focus that positions the decision maker at the center of the decision making and support process. Presentation of the phase model is followed by a discussion of functions and issues in managerial decision making. This provides the basis for a knowledge-based view of decision outcomes.

A cognitive system incorporates needs and values in a Structure which is often resistant to change. This system focuses on what needs can be fulfilled, to what extent and how. At the cognitive level, where the world model is formulated and maintained, needs are matched against opportunities and threats. Decision making articulated at the cognitive level involves connecting opportunities for satisfying needs with aspects of the problem and other entities in the world.

The cognitive paradigm emphasizes the two-way nature of the human-computer interaction as opposed to the one way channel of classical information systems.

The multi-faceted character of the cognitive level can be manifested by the hierarchy of the decision maker's objectives and constraints. Objectives provide a rationale for some actions the decision maker undertakes to solve problems and make decisions. Constraints provide the boundaries for choice and distinguish feasible decision alternatives from infeasible ones.

Cognitive maps, goal seeking functions and sensitivity analyses can be used to support this function

Contextual and cognitive DSS, like individuals in entrepreneurial organizations, must have multiple capabilities. They need to be able to incorporate the user’s needs and values in their processing, interact with the user on her cognitive level, present the problem in a meaningful way and use specialized (monadic and structural) tools. In an entrepreneurial organization communication encompasses all three levels of managerial problem solving. Therefore, the system needs to have similar capabilities.

The cognitive framework provided the basis for further discussion. This is in line with the knowledge-based perspective proposed by Hollsopple and Whinstone (1996).

Cognitive mapping was used as a semi structured device to generate ideas, facilitated by questions such as “why, or for what, do you think this aspect matters?” Making the map while the expert was speaking resulted in a messy handwritten graph. The purpose was to elicit from the expert a large number of concerns about the critical situation facing the textile firms. To illustrate the process and the movement from a messy and almost unreadable structure to a clean computer generated map

The cognitive map also contains inclusion links, that is, links characterized by the nesting of a variable in another, since Participants frequently referred to these types of variables when speaking of their reality. Given that these variables can be conceived as the decomposition of a concept into its different components, even if the list is not exhaustive, these variables have, by definition, the same relationship of influence that unites the concept to other concepts. By allowing such variables to appear in a cognitive map, it is possible to obtain a more refined representation of the schema of the owner-manager.”

.Communication issues:-

Communication used to promote product, services or organization relay information within business or deal with legal & similar issues.

It is also a means of relaying b/w a supply chain (for example customer & manufacturer).Business Communication is known simply as a communication. it encompasses a verity of topics including marketing,branding,customer relationship, consumer behavior,advertising,public relation, there are several methods for business communication:-

1) - Television &Telephone or web based communication.
2) –Video Conferencing.
3) –Email.
4) –Reports & presentation.
5) Face to Face Communication.

Analytical modeling:-

Interactive analytical modeling processes are involved in decision support systems. For example using a DSS software package for decision support may result in a series of displays in response to alternative what-if changes entered by a manager. This differs from the demand responses to management information systems because decision makers are not demanding prespecified information; rather, they are exploring possible alternatives. Thus, they do not have to specify their information needs in advance.

Four basic types of analytical modeling activities are involved in using a decision support system:

- what-if analysis
- sensitivity analysis
- goal-seeking analysis
- optimization analysis

Unit-3

Normative: **Normative** has specialized meanings in several academic disciplines. Generically, it means *relating to an ideal standard or model.* In practice, it has strong connotations of relating to a *typical* standard or model

In philosophy, *normative* statements affirm how things should or ought to be, how to value them, which things are good or bad, which actions are right or wrong. Normative is usually contrasted with positive (i.e. descriptive, explanatory, or connotative) when describing types of theories, beliefs, or propositions. Positive statements are factual statements that attempt to describe reality.

For example, "children should eat vegetables", "smoking is bad", and "those who would sacrifice liberty for security deserve neither" are normative claims. On the other hand, "vegetables contain a relatively high proportion of vitamins", "smoking causes cancer", and "a common consequence of sacrificing liberty for security is a loss of both" are positive claims. Whether or not a statement is normative is logically independent of whether it is verified, verifiable, or popularly held.

In law, as an academic discipline, the term "normative" is used to describe the way something ought to be done according to a value position. As such, normative arguments can be conflicting, insofar as different values can be inconsistent with one another. For example, from one normative value position the purpose of the criminal process may be to repress crime. From another value position, the purpose of the criminal justice system could be to protect individuals from the moral harm of wrongful conviction.

Recognition primed decision. Recognition-primed decision (RPD) is a model of how people make quick, effective decisions when faced with complex situations. In this model, the decision maker is assumed to generate a possible course of action, compare it to the constraints imposed by the situation, and select the first course of action that is not rejected. RPD has been described in diverse groups including ICU nurses, fire ground commanders, chess players, and stock market traders. It functions well in conditions of time pressure, and in which information is partial and goals poorly defined. The limitations of RPD include the need for extensive experience among decision-makers (in order to correctly recognize the salient features of a problem and model solutions) and the problem of the failure of recognition and modeling in unusual or misidentified circumstances. It appears to be a valid model for how human decision-makers make decisions.

Overview

The RPD model identifies a reasonable reaction as the first one that is immediately considered. RPD combines two ways of developing a decision; the first is recognizing which course of action makes sense, and the second, evaluating the cause of action through imagination to see if the actions resulting from that decision make sense. However, the difference of being experienced or inexperienced plays a major factor in the decision-making processes.

RPD reveals a critical difference between experts and novices when presented with recurring situations. Experienced people will generally be able to come up with quicker decision because the situation may match a prototypical situation they have encountered before. Novices, lacking this experience, must cycle through different possibilities, and tend to use the first course of action that they believe will work. The inexperienced also have the tendencies of using trial and error through their imagination.

Variations

There are three variations in RPD strategy. In Variation 1, decision makers recognize the situation as typical: a scenario where both the situational detail and the detail of relevant courses of action are known. Variation 1 is therefore essentially an "If… then…" reaction. A given situation will lead to an immediate course of action as a function of the situation's typicality. More experienced decision makers are more likely to have the knowledge of both prototypical situations and established courses of action that is required for an RPD strategy to qualify as Variation 1.

Variation 2 occurs when the decision maker diagnoses an unknown situation to choose from a known selection of courses of action. Variation 2 takes the form of "If (???)… then…," a phrase which implies the decision maker's specific knowledge of available courses of action but lack of knowledge regarding the parameters of the situation. In order to prevent situational complications and the accrual of misinformation, the decision maker models possible details of the situation carefully and then chooses the most relevant known course of action. Experienced decision makers are more likely to correctly model the situation, and are thus more likely to more quickly choose more appropriate courses of action.

In Variation 3, the decision maker is knowledgeable of the situation but unaware of the proper course of action. The decision maker therefore implements a mental trial and error simulation to develop the most effective course of action. Variation 3 takes the form of "If… then… (???)" where in the decision maker models outcomes of new or uncommon courses of action. The decision maker will cycle through different courses of action until a course of action appears appropriate to the goals and priorities of the situation. Due to the time constraint fundamental to the RPD model, the decision maker will choose the first course of action which appears appropriate to the situation. Experienced decision makers are likely to develop a viable course of action more quickly because their expert knowledge can rapidly be used to disqualify inappropriate courses of action.

Application

Recognition primed decision making is highly relevant to the leaders or officers of organizations that are affiliated with emergency services such as fire fighters, search and rescue units, police, and other emergency services. It is applied to both the experienced and the inexperienced, and how they manage their decision making processes. The Recognition primed decision making model is developed as samples for organizations on how important decisions can affect important situations which may either save lives or take lives. The model develop can be used as a study for organizations to fill in the gaps and to determine

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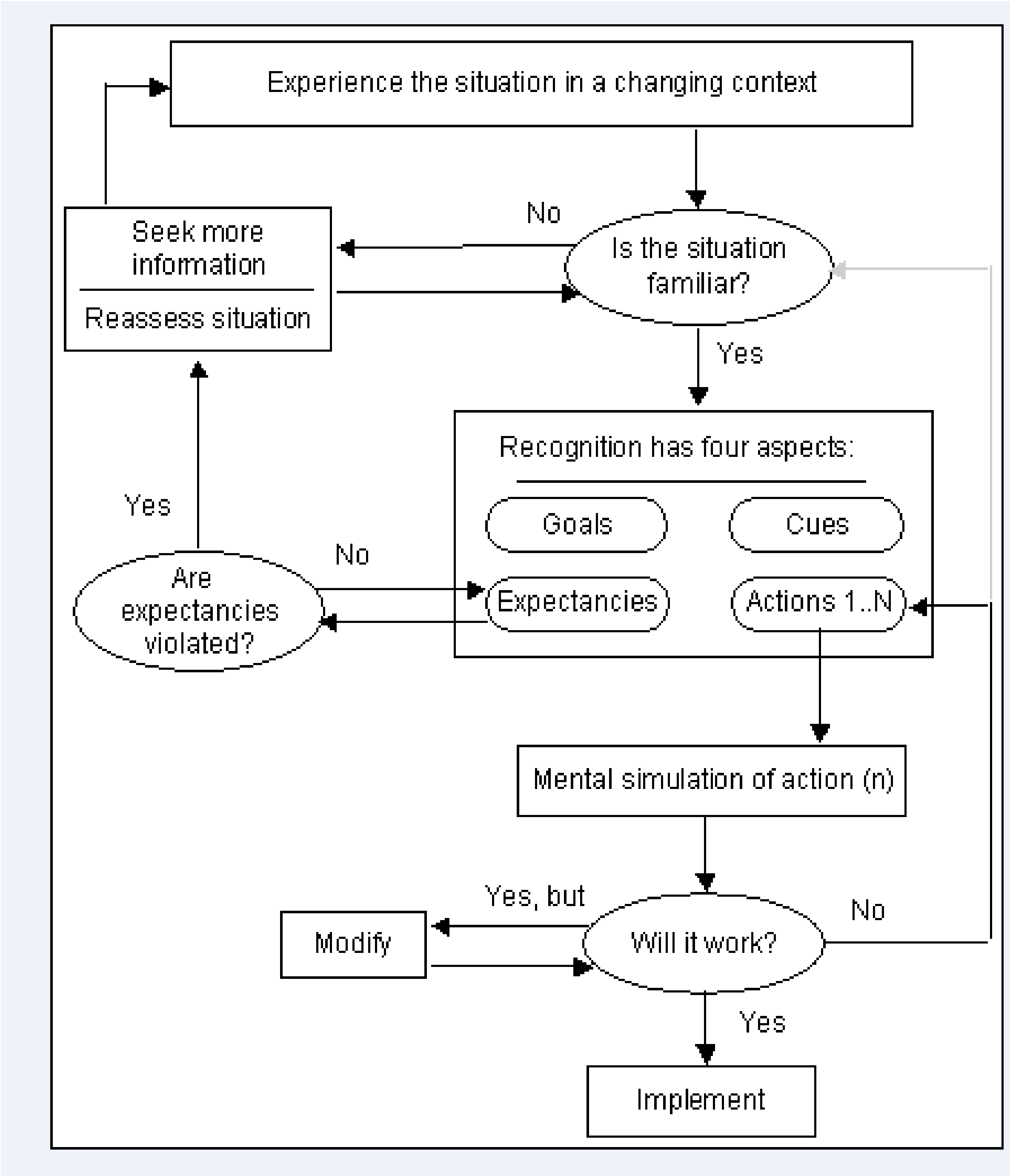
which type of RPD variation is more applicable to the organization



Requisite Decision Modelling

- Definition
  - Model is requisite when its form and content are sufficient to resolve the issues of concern.
- Generation
  - Through iterative and consultative interaction amongst specialists and key players, facilitated by an impartial decision analyst.

- Process: Uses participants' sense of unease about model results
- Criterion: When no new intuitions arise.
- Represents: A shared social reality.
- Model Status: At best, conditionally prescriptive; shows what *can* be done.
- Goal: To help construct a new reality.

Prescriptive Analysis: A prescriptive analysis examines a set of circumstances in order to determine what should be, rather than what is. In certain contexts, this can be more useful to decision makers than simple data. Instead, a prescriptive analysis recommends how the decision maker ought to use or how the data should affect future decision-making

Contrast to Descriptive Analysis

Descriptive analysis seeks only to measure and explain what is, rather than what should be. A descriptive analysis does not have a point of view but only describes reality without normative opinion; it is a guide for future action but does not directly advocate any action.

Example of a Prescriptive Analysis

The prescriptive/descriptive distinction arises in philosophy. For example, if the philosophy of science seeks to understand the goals of scientific progress, a descriptive approach would ask the actual aim of scientists in conducting their research, while a prescriptive approach would ask what the aim should be. The prescriptive approach may or may not coincide with actual occurrence, but it is useful perhaps as a goal or ideal.

Abstract Modeling: Modeling is one of the most powerful tools available for understanding, documenting, and managing the complexity of the infrastructures required operating the energy system of the future. It is far less expensive to construct a model to test theories or techniques than to construct an actual entity only to find out that one crucial technique is wrong and the entire entity must be re-constructed.

Models have been used extensively by many industries as the basis to analyze and design complex systems. The telecommunications industries have made extensive use of modeling to develop the diverse communications infrastructure(s) in widespread use today. Physical models are used in many industries, ranging from airplanes and Mars Landers to circuit breakers and transformers. Building architects use paper models (blueprints) to capture all the complexity in a modern high-rise building. Virtual models are increasingly being used to model even more complex concepts, from weather patterns to cosmology and, of particular interest to IntelliGrid Architecture project, to information management.

The following abstract modeling methodologies and concepts were incorporated into the IntelliGrid Architecture:

Reference Model for Open Distributed Processing and the Unified Modeling Language– Years of engineering have been invested in defining how enterprise level architecture should be defined. RM-ODP is an international standard (ISO/IEC 10746) prescribing a methodology for architectural development. The methodology provides guidance on breaking the problem into understandable pieces and helps to ensure that important design details are not forgotten.

By design, RM-ODP provides the methodology, but does not include a recommended notation for documenting architecture. The most popular standardized notation for system modeling is the Unified Modeling Language (UML), which provides a standardized way to graphically document the systems and components of architecture. Together RM-ODP provides the architectural guidance and UML provides the standardized notation. It should be noted that as of this writing, the standards for applying UML to RM-ODP concepts are under development.

As the energy industry moves forward in the development of advanced automation systems, the adoption of these sophisticated methods should be encouraged.

Object Modeling and Information models define data names and structures. These information models can be described informally as consisting of nouns. Nouns consist of data names and their structure. Examples include simple data points such as a point called ‘State’ that consists of one 8-bit integer, as well as more complex data points that include the value, the quality of the value, the description of the point, etc. These nouns can also range to complete descriptions of a utility’s power system, for example ‘ABC Power System’, which consists of thousands of components in some well-known structure. There can be millions of nouns in any system.

In the power industry, IEC61850 includes such a model, which is focused on field device characteristics. Another information model is IEC61970 Common Information Model (CIM), which is focused on modeling **what** information about the power system structure is to be exchanged among application programs. It has been expanded to model other types of information to be exchanged among application programs. As an information model specifies **what** information is exchanged, it is part of an RM ODP information view.

Abstract Service/Interface Models –A **service** model describes the functionality that a software application provides. Intellect Grid Architecture’s Common Services describe common functionality needed to operate a utility. For example, the common service of ‘Log On’ specifies the common function of initiating a secure session with a software application.

An **interface models** define the mechanics of how data is passed to get the right information to the right destination at the right time. These interface models can be described informally as consisting of verbs. Verbs are the abstract services used to exchange the nouns, such as ‘request’, ‘send’, ‘report if changed’, ‘add to log’, etc. Although different verbs/services are used in different environments, the number of different types of abstract verbs/services is generally on the order of 10 to 20.

In the power industry, IEC61850 includes such a model, which is focused on field device operation. Another service model is IEC61970 Generic Interface Definition (GID), which is focused on **how** information about the power system structure is to be exchanged among application programs. An interface model specifies **how** information is exchanged; it is part of an RM ODP Computational View.

Naming and avoiding ambiguity (name collisions)–One aspect of information models is the need to uniquely identify all objects within the model. In addition, as the number of names being used proliferates, there is a need to avoid ‘name’ collisions. That is the same name used with two different meanings. This is handled by namespace allocation. Namespace allocation is a very simple concept: different groups can have the authority to give names their own objects so long as those names are unique within the group’s domain; however, they do not need to be universally unique. This permits different groups, whether they are whole industries, or standards organizations, or types of products, or a department within a company, to define their own terminology and abstract model names and structure.

.An example of namespaces within the IEC TC 57 is the allocation substations to the IEC61850 namespace and the allocation of transmission power system applications to the IEC61970 namespace.

Self-Description and Discovery–Future advanced automation systems must have more capable methods for managing networks, connected equipment and the applications that run on this equipment. This will require more sophisticated systems to assist system administrators in managing large scale networks and massively distributed equipment. Concepts such as self-description and discovery will become a necessary part of future systems or maintenance could easily become unwieldy.

Self-description and discovery is a fancy name for what happens when you plug a new printer into a PC: For example:

§ 1st message: “New hardware detected”

§ 2nd message: “Driver xxx is being installed”

§ 3rd message: “Printer is ready for use”

Now, imagine a SCADA/EMS system performing equivalent actions:

§ 1st message: “New RTU detected”

§ 2nd message: “SCADA database being updated”

§ 3rd message: “Data acquisition commencing”

§ 4th message: “Power System Model being updated”

§ 5th message: "Contingency Analysis is ready to execute"

Self-description and discovery form the basis for 'plug-and-play' technologies. The concept behind self-description and discovery is that data models can be stored electronically in repositories, servers, and other distributed databases, using a language for describing data such as XML. These XML descriptions of the data models are 'self-describing': they contain the standardized name of the data along with the structure and formatting of the data. Thus, they can be browsed by users who can immediately understand what they are browsing.

Technology Independent Design–Using a technology independent design is an important concept when developing interoperable systems and equipment today. A technology independent design must focus on the behavior and structure of the components within a system and abstract the implementation details of any particular technology. This key concept allows for different implementations and technologies to exist, yet still allow these components to be used interchangeably. Using technology independent design enables a coherent architecture to be created independently of deployment specifics. When implemented, the technologies are chosen to meet requirements but are implemented in a way that complies with the technology independent design.

Descriptive Analysis: The analysis aims to provide an overview of the respondents and an insight into their behavioral patterns. It also means that description of the any project and traveling. Showing an example of travelling.

A description of the travel behavior of independent and group travelers, and their demographic profiles.

Travel behavior

In total, 1,096 travelers were interviewed. Of these 77.8% (853) are independent travelers and 22.2% (243) are travelling on a package tour. In terms of travel purpose, 74.8% of the entire sample is on holiday, 7.5% travelling on business,
5.9% visiting friends and relatives, and 11.8% travelling for other purposes.

There is a statistically significant difference (Pearson Chi Square = 10.362; df = 3; p =.016) between independent travelers and package travelers in terms of travel purpose. The majority of both groups are travelling for holiday purposes (73.7% of independent travelers and 78.6% of package tour travellers), but 7.2% of independent travelers are travelling to visit friends and relatives, while only 1.6% of group tourists are doing so.
A greater proportion of the respondents are travelling with friends or colleagues
(39.6%), than are travelling alone (27.2%) or with a partner (20.5%). There is a significant difference (the two sample test for proportions resulted in Z equals to
8.790 Which is higher than the critical value 1.645, therefore the null hypothesis is rejected) between independent and group travelers: only 5% of group travelers are
Travelling within the group without a partner, friends, or family members, while 33.5% of independent travelers are travelling alone.
The length of trip varies from less than 5 days to over 150 days: 20% are travelling
From 1 to 5 days, 24.3% from 6 to 10 days, 11.9% from 11 to 15 days and the

remaining 44.3% for at least 16 days, including 9.6% travelling for more than 151 days. Independent travellers tend to take longer trips with 46.9% travelling for more than 20 days; only 13.7% of group travellers are on a trip longer than 20 days.

The Pearson Chi-square test (Pearson Chi-Square=109.381; df=5, p=.000) shows a statistically significant difference in the length of trip between group travellers and independent travellers.

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Unit-4

Executive information system : An **Executive Information System** (EIS) is a type of management information system intended to facilitate and support the information and decision-making needs of senior executives by providing easy access to both internal and external information relevant to meeting the strategic goals of the organization. It is commonly considered as a specialized form of a Decision Support System (DSS)

The emphasis of EIS is on graphical displays and easy-to-use user interfaces. They offer strong reporting and drill-down capabilities. In general, EIS are enterprise-wide DSS that help top-level executives analyze, compare, and highlight trends in important variables so that they can monitor performance and identify opportunities and problems. EIS and data warehousing technologies are converging in the marketplace.

In recent years, the term EIS has lost popularity in favor of Business Intelligence (with the sub areas of reporting, analytics, and digital dashboards).

History

Traditionally, executive information systems were developed as mainframe computer-based programs. The purpose was to package a company's data and to provide sales performance or market research statistics for decision makers, such as financial officers, marketing directors, and chief executive officers, who were not necessarily well acquainted with computers. The objective was to develop computer applications that would highlight information to satisfy senior executives' needs. Typically, an EIS provides data that would only need to support executive level decisions instead of the data for all the company.

Today, the application of EIS is not only in typical corporate hierarchies, but also at personal computers on a local area network. EIS now cross computer hardware platforms and integrate information stored on mainframes, personal computer systems, and minicomputers. As some client service companies adopt the latest enterprise information systems, employees can use their personal computers to get access to the company's data and decide which data are relevant for their decision makings. This arrangement makes all users able to customize their access to the proper company's data and provide relevant information to both upper and lower levels in companies.

Components

The components of an EIS can typically be classified as:

Hardware

When talking about hardware for an EIS environment, we should focus on the hardware that meet the executive's needs. The executive must be put first and the executive's needs must be defined before the hardware can be selected. The basic computer hardware needed for a typical EIS includes four components:

1. Input data-entry devices. These devices allow the executive to enter, verify, and update data immediately;

2. The central processing unit (CPU), which is the kernel because it controls the other computer system components;

3. Data storage files. The executive can use this part to save useful business information, and this part also help the executive to search historical business information easily;

4. Output devices, which provide a visual or permanent record for the executive to save or read. This device refers to the visual output device or printer.

In addition, with the advent of local area networks (LAN), several EIS products for networked workstations became available. These systems require less support and less expensive computer hardware. They also increase access of the EIS information to many more users within a company.

Software

Choosing the appropriate software is vital to design an effective EIS.Therefore, the software components and how they integrate the data into one system are very important. The basic software needed for a typical EIS includes four components:

5. Text base software. The most common form of text are probably documents;
6. Database. Heterogeneous databases residing on a range of vendor-specific and open computer platforms help executives access both internal and external data;
7. Graphic base. Graphics can turn volumes of text and statistics into visual information for executives. Typical graphic types are: time series charts, scatter diagrams,

maps, motion graphics, sequence charts, and comparison-oriented graphs (i.e., bar charts);

8. Model base. The EIS models contain routine and special statistical, financial, and other quantitative analysis.

Perhaps a more difficult problem for executives is choosing from a range of highly technical software packages. Ease of use, responsiveness to executives' requests, and price are all reasonable considerations. Further, it should be considered whether the package can run on existing hardware.

User Interface

An EIS needs to be efficient to retrieve relevant data for decision makers, so the user interface is very important. 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. It is crucial that the interface must fit the decision maker's decision-making style. If the executive is not comfortable with the information questions/answers style, the EIS will not be fully utilized. The ideal interface for an EIS would be simple to use and highly flexible, providing consistent performance, reflecting the executive's world, and containing help information.

Telecommunication

As decentralizing is becoming the current trend in companies, telecommunications will play a pivotal role in networked information systems. Transmitting data from one place to another has become crucial for establishing a reliable network.

In addition, telecommunications within an EIS can accelerate the need for access to distributed data.

Applications

EIS enables executives to find those data according to user-defined criteria and promote information-based insight and understanding. Unlike a traditional management information system presentation, EIS can distinguish between vital and seldom-used data, and track different key critical activities for executives, both which are helpful in evaluating if the company is meeting its corporate objectives. After realizing its advantages, people have applied EIS in many areas, especially, in manufacturing, marketing, and finance areas.

Manufacturing

Basically, manufacturing is the transformation of raw materials into finished goods for sale, or intermediate processes involving the production or finishing of semi-manufactures. It is a large branch of industry and of secondary production. Manufacturing operational control focuses on day-to-day operations, and the central idea of this process is effectiveness and efficiency. To produce meaningful managerial and operational information for controlling manufacturing operations, the executive has to make changes in the decision processes. EIS provides the evaluation of vendors and buyers, the evaluation of purchased materials and parts, and analysis of critical purchasing areas. Therefore, the executive can oversee and review purchasing operations effectively with EIS. In addition, because production planning and control depends heavily on the plant's data base and its communications with all manufacturing work centers, EIS also provides an approach to improve production planning and control

Marketing

In an organization, marketing executives' role is to create the future. Their main duty is managing available marketing resources to create a more effective future. For this, they need make judgments about risk and uncertainty of a project and its impact on the company in short term and long term. To assist marketing executives in making effective marketing decisions, an EIS can be applied. EIS provides an approach to sales forecasting, which can allow the market executive to compare sales forecast with past sales. EIS also offers an approach to product price, which is found in venture analysis. The market executive can evaluate pricing as related to competition along with the relationship of product quality with price charged. In summary, EIS software package enables marketing executives to manipulate the data by looking for trends, performing audits of the sales data, and calculating totals, averages, changes, variances, or ratios. All of these sales analysis functions help marketing executives to make final decisions.

Financial

A financial analysis is one of the most important steps to companies today. The executive needs to use financial ratios and cash flow analysis to estimate the trends and make capital investment decisions. An EIS is a responsibility-oriented approach that integrates planning or budgeting with control of performance reporting, and it can be extremely helpful to finance executives. Basically, EIS focuses on accountability of financial performance and it recognizes the importance of cost standards and flexible budgeting in developing the quality of information provided for all executive levels. EIS enables executives to focus more on the long-term basis of current year and beyond, which means that the executive not only can manage a sufficient flow to maintain current operations but also can figure out how to expand operations that are contemplated over the coming years. Also, the combination of EIS and EDI environment can help cash managers to review the company's financial structure so that the best method of financing for an accepted capital project can be concluded. In addition, the EIS is a good tool to help the executive to review financial ratios, highlight financial trends and analyze a company's performance and its competitors.

Advantages and Disadvantages EIS

Advantages of EIS

- Easy for upper-level executives to use, extensive computer experience is not required in operations
- Provides timely delivery of company summary information
- Information that is provided is better understood
- Filters data for management
- Improves to tracking information
- Offers efficiency to decision makers

Disadvantages of EIS

- System dependent
- Limited functionality, by design
- Information overload for some managers

- Benefits hard to quantify
- High implementation costs
- System may become slow, large, and hard to manage
- Need good internal processes for data management
- May lead to less reliable and less secure data

Future Trends

The future of executive info systems will not be bound by mainframe computer systems. This trend allows executives escaping from learning different computer operating systems and substantially decreases the implementation costs for companies. Because utilizing existing software applications lies in this trend, executives will also eliminate the need to learn a new or special language for the EIS package. Future executive information systems will not only provide a system that supports senior executives, but also contain the information needs for middle managers. The future executive information systems will become diverse because of integrating potential new applications and technology into the systems, such as incorporating artificial intelligence (AI) and integrating multimedia characteristics and ISDN technology into an EIS. EIS - timely, efficient and effective in supporting the decision making process.

Management information system: A **management information system** (**MIS**) is a system that provides information needed to manage organizations effectively [1]. Management information systems are regarded to be a subset of the overall internal controls procedures in a business, which cover the application of people, documents, technologies, and procedures used by management accountants to solve business problems such as costing a product, service or a business-wide strategy. Management information systems are distinct from regular information systems in that they are used to analyze other information systems applied in operational activities in the organization. Academically, the term is commonly used to refer to the group of information management methods tied to the automation or support of human decision making, e.g. Decision Support Systems, Expert systems, and Executive information systems.

Overview

Initially in businesses and other organizations, internal reporting was made manually and only periodically, as a by-product of the accounting system and with some additional statistic(s), and gave limited and delayed information on management performance. Previously, data had to be separated individually by the people as per the requirement and necessity of the organization. Later, data was distinguished from information, and so instead of the collection of mass of data, important and to the point data that is needed by the organization was stored.

Earlier, business computers were mostly used for relatively simple operations such as tracking sales or payroll data, often without much detail. Over time, these applications became more complex and began to store increasing amount of information while also interlinking with previously separate information systems. As more and more data was stored and linked man began to analyze this information into further detail, creating entire management reports from the raw, stored data. The term "MIS" arose to describe these kinds of applications, which were developed to provide managers with information about sales, inventories, and other data that would help in managing the enterprise. Today, the term is used broadly in a number of contexts and includes (but is not limited to): decision support systems, resource and people management applications, Enterprise Resource Planning (ERP), Supply Chain Management (SCM), Customer Relationship Management (CRM), project management and database retrieval applications.

An 'MIS' is a planned system of the collection, processing, storage and dissemination of data in the form of information needed to carry out the management functions. In a way, it is a documented report of the activities that were planned and executed. According to Philip Kotler "A marketing information system consists of people, equipment, and procedures to gather, sort, analyze, evaluate, and distribute needed, timely, and accurate information to marketing decision makers."

The terms *MIS* and *information system* are often confused. Information systems include systems that are not intended for decision making. The area of study called MIS is sometimes referred to, in a restrictive sense, as information technology management. That area of study should not be confused with computer science. IT service management is a practitioner-focused discipline. MIS has also some differences with ERP which incorporates elements that are not necessarily focused on decision support.

Any successful MIS must support a business's Five Year Plan or its equivalent. It must provide for reports based upon performance analysis in areas critical to that plan, with feedback loops that allow for titivation of every aspect of the business, including recruitment and training regimens. In effect, MIS must not only indicate how things are going, but why they are not going as well as planned where that is the case. These reports would include performance relative to cost centers and projects that drive profit or loss, and do so in such a way that identifies individual accountability, and in virtual real-time.

Anytime a business is looking at implementing a new business system it is very important to use a system development method such as System Development Life Cycle. The life cycle includes Analysis, Requirements, Design, Development, Testing and Implementation

Data mining: Data mining is the process of discovering interesting and useful knowledge from large amounts of data warehouses. The architecture of a typical data mining system as given by jiawci Han and Michelin Kamber in Data mining concepts and Techniques (2001), consists of the following components as shown in fig

Database or data warehouse or other information repository: This includes one or more **databases,** a data warehouse, or any other **information repository.** Data cleaning and data integration techniques have to be applied to the data before the data mining algorithm can be applied on it. However, in case the **Data** mining algorithms are applied directly on the: Data warehouses, then cleansing and integration functions may be skipped because a data **warehouse** already contains integrated and cleansed data.

Database or data warehouse server: The database or data warehouse server is used to fetch the relevant data, based on the user's **data mining request.**

Knowledge base: It contains the domain knowledge that is used to guide the search or used for evaluation of the interestingness of resulting patterns. Such knowledge can include concept hierarchies, user beliefs, and interestingness of resulting patterns. Such knowledge can include concept hierarchies, user beliefs, interestingness thresholds and the metadata.

Data mining engine: It consists of a set of functionalities for tasks such as a characterization, association, classification, cluster analysis, and evolution analysis.

Pattern Evaluation module: This component employs interestingness measures and other threshold values and interacts with the **data mining** engine so as to retrieve only the interesting results. For enhanced efficiency in the performance of **data mining** algorithms, the evaluation of pattern interestingness must be process so that the search can be confined to search only the interesting patterns discovered.

Graphical user interface (GUI): This module interacts with the users and the data mining system thereby allowing the user to use the data mining system either by specifying a query or a task like that of characterization, association, classification, Cluster analysis, and evolution analysis

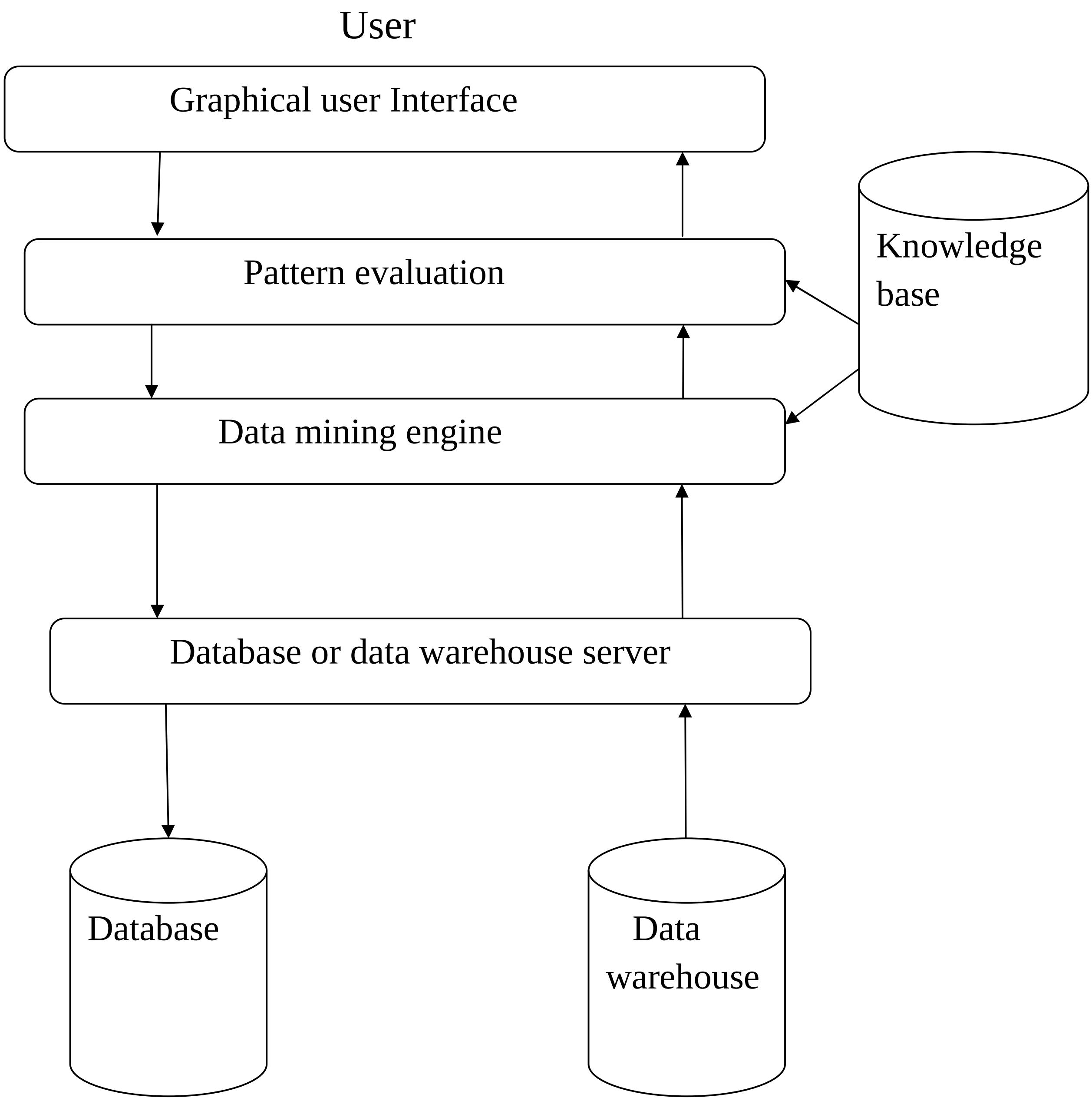


Fig Architecture of a Data mining system

With GUI, users can also provide extra information to guide the search process. In addition, the GUI component enables the end-users to browse the database, evaluate the mined patterns, and visualize the discovered patterns in different formats.

Data Mining Primitives

Five primitives for specification of a data mining task
▪ kind of knowledge to be mined
▪ background knowledge
▪ interestingness measures
▪ knowledge presentation and visualization techniques to be used for displaying the discovered.

Knowledge-based systems

Knowledge based systems are artificial intelligent tools working in a narrow domain to provide intelligent decisions with justification. Knowledge is acquired and represented using various knowledge representation techniques rules, frames and scripts. The basic advantages offered by such system are documentation of knowledge, intelligent decision support, self learning, reasoning and explanation. **Knowledge-based systems** [1] are systems based on the methods and techniques of Artificial Intelligence. Their core components are:

- knowledge base

- acquisition mechanisms
- inference mechanisms

While for some authors[who?] expert systems, case-based reasoning systems and neural networks are all particular types of knowledge-based systems, there are others who consider that neural networks are different, and exclude it from this category.

KBS is a frequently used abbreviation for **knowledge-based system**.

Knowledge-Based Decision Support: Artificial Intelligence and Expert Systems
n Managerial Decision Makers are *Knowledge Workers*
n Use Knowledge in Decision Making
n Accessibility to Knowledge Issue
n Knowledge-Based Decision Support: Applied Artificial Intelligence
Knowledge Base
n The knowledge base contains the knowledge necessary for understanding, formulating, and solving problems
n Two Basic Knowledge Base Elements
– Facts
– Special heuristics, or rules that direct the use of knowledge
– Knowledge is the primary raw material of ES
– Incorporated knowledge

Risk -assessment: A risk assessment is an important step in protecting your workers and your business, as well as complying with the law. It helps you focus on the risks that really matter in your workplace – the ones with the potential to cause real harm. In many instances, straightforward measures can readily control risks, for example ensuring spillages are cleaned up promptly so people do not slip, or cupboard drawers are kept closed to ensure people do not trip. For most, that means simple, cheap and effective measures to ensure your most valuable asset – your Workforce – is protected.

The law does not expect you to eliminate all risk, but you are required to protect people as far as 'reasonably practicable'. This guide tells you how to achieve that with a minimum of fuss. This is not the only way to do a risk assessment, there are other methods that work well, particularly for more complex risks and circumstances. However, we believe this method is the most straightforward for most organizations

What is risk assessment?

A risk assessment is simply a careful examination of what, in your work, could cause harm to people, so that you can weigh up whether you have taken enough precautions or should do more to prevent harm. Workers and others have a right to be protected from harm caused by a failure to take reasonable control measures.

Accidents and ill health can ruin lives and affect your business too if output is lost, machinery is damaged, insurance costs increase or you have to go to court. You are legally required to assess the risks in your workplace so that you put in place a plan to control the risks.

How to assess the risks in your workplace

Follow the five steps in this leaflet:

Step 1

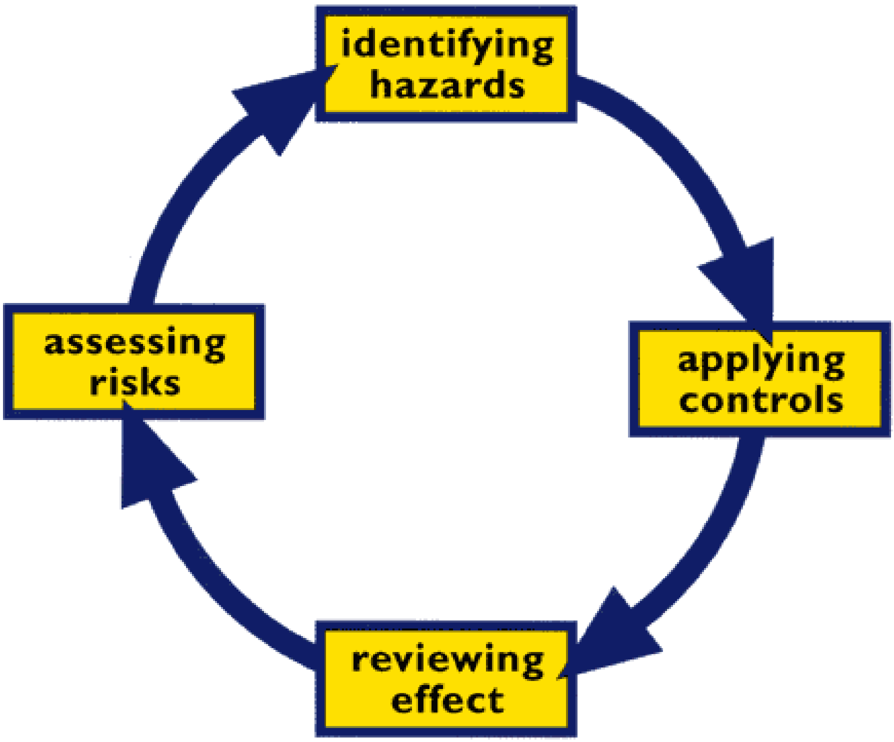
Identify the hazards

Step 2

Decide who might be harmed and how

Step 3

Evaluate the risks and decide on precautions
Step 4
Record your findings and implement them
Step 5
Review your assessment and update if necessary



Step 1
Identify the hazards

First you need to work out how people could be harmed. When you work in a place every day it is easy to overlook some hazards, so here are some tips to help
You identify the ones that matter:
_ **Walk around** your workplace and look at what could reasonably be expected to cause harm.

_ **Ask your employees** or their representatives what they think. They may have noticed things that are not immediately obvious to you.
_ **Visit the HSE website** (www.hse.gov.uk). HSE publishes practical guidance on where hazards occur and how to control them. There is much information here on the hazards that might affect your business.
_ If you are a member of a **trade association**, contact them. Many produce very helpful guidance.
_ **Check manufacturers' instructions** or data sheets for chemicals and equipment as they can be very helpful in spelling out the hazards and putting them in their true perspective.
_ Have a look back at your **accident and ill-health records** – these often help to identify the less obvious hazards.
_ **Remember to think about long-term hazards to health** (eg high levels of noise or exposure to harmful substances) as well as safety hazards.

Step 2

Decide who might be harmed and how

For each hazard you need to be clear about who might be harmed; it will help you identify the best way of managing the risk. That doesn't mean listing everyone by name, but rather identifying groups of people (eg 'people working in the store room' or 'passers-by'). In each case, identify how they might be harmed, ie what type of injury or ill health might occur. For example, 'shelf stackers may suffer back injury from repeated lifting of boxes'. Remember:
_ Some workers have particular requirements, eg new and young workers, new or expectant mothers and people with disabilities may be at particular risk. Extra thought will be needed for some hazards;

_ cleaners, visitors, contractors, maintenance workers etc, who may not be in the workplace all the time;
_ members of the public, if they could be hurt by your activities;
_ if you share your workplace, you will need to think about how your work affects others present, as well as how their work affects your staff – talk to them; and
_ ask your staff if they can think of anyone you may have missed.

Step 3

Evaluate the risks and decide on precautions

Having spotted the hazards, you then have to decide what to do about them. The law requires you to do everything 'reasonably practicable' to protect people from harm. You can work this out for yourself, but the easiest way is to compare what you are doing with good practice Then compare this with the good practice and see if there's more you should be doing to bring yourself up to standard. In asking yourself this, consider:
_ Can I get rid of the hazard altogether?
_ If not, how can I control the risks so that harm is unlikely?
When controlling risks, apply the principles below, if possible in the following order:
_ try a less risky option (eg switch to using a less hazardous chemical);
_ prevent access to the hazard (eg by guarding);
_ organize work to reduce exposure to the hazard (eg put barriers between pedestrians and traffic);
_ issue personal protective equipment (eg clothing, footwear, goggles etc); and
_ provide welfare facilities (eg first aid and washing facilities for removal of contamination).

Improving health and safety need not cost a lot. For instance, placing a mirror on a dangerous blind corner to help prevent vehicle accidents is a low-cost precaution considering the risks. Failure to take simple precautions can cost you a lot more if an accident does happen. Involve staff, so that you can be sure that what you propose to do will work in practice and won't introduce any new hazards.

Step 4

Record your findings and implement them

Putting the results of your risk assessment into practice will make a difference when looking after people and your business. Writing down the results of your risk assessment, and sharing them with your staff, encourages you to do this. If you have fewer than five employees you do not have to write anything down, though it is useful so that you can review it at a later date if, for example, something changes We do not expect a risk assessment to be perfect, but it must be suitable and sufficient. You need to be able to show that:

_ a proper check was made;
_ you asked who might be affected;
_ you dealt with all the significant hazards, taking into account the number of people who could be involved;
_ the precautions are reasonable, and the remaining risk is low;
_ you involved your staff or their representatives in the process

Step 5

Review your risk assessment and update if necessary

Few workplaces stay the same. Sooner or later, you will bring in new equipment, substances and procedures that could lead to new hazards. It makes sense, therefore, to review what you are doing on an ongoing basis. Every year or so formally review where you are, to make sure you are still improving, or at least

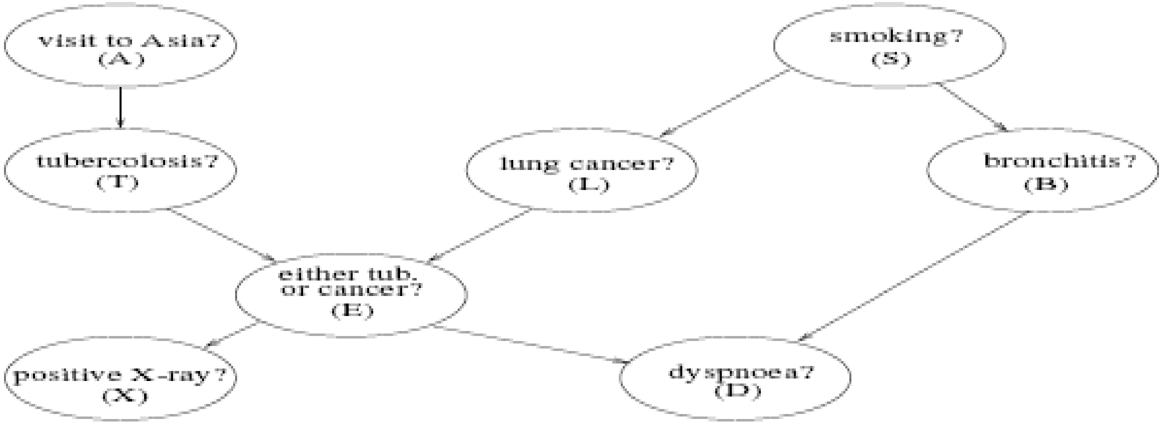
not sliding back. Look at your risk assessment again. Have there been any changes? Are there improvements you still need to make? Have your workers spotted a problem?
Have you learnt anything from accidents or near misses? Make sure your risk assessment stays up to date.

Belief nets: Belief Nets use probability theory to manage uncertainty by explicitly representing the conditional dependencies between the different knowledge components. This provides an intuitive graphical visualization of the knowledge including the interactions among the various sources of uncertainty.

One can use this observation to create a belief net that can be queried to determine the probability of success of the Plan. There are many ways to do this—one example is shown in Figure. Its nodes are random variables representing either the value of state descriptors at a point in time or the outcomes of actions taken in the plan.

Bays nets (BN) (also referred to as Probabilistic Graphical Models and Bayesian Belief Networks) are directed acyclic graphs (DAGs) where each node represents a random variable. The intuitive meaning of an arrow from a parent to a child is that the parent directly influences the child. These influences are quantified by conditional probabilities.

BNs are graphical representations of joint distributions. The BN for the medical expert system mentioned previously represents a joint distribution over 8 binary random variables {A, T, E, L, S, B, D, X}.



Conditional Probability Tables

Each node in a Bayesian net has an associated conditional probability table or CPT. (Assume all random variables have only a finite number of possible values). This gives the probability values for the random variable at the node conditional on values for its parents. Here is a part of one of the CPTs from the medical expert system network.

$$P(D=t|E=t,B=t) = 0.9 \qquad P(D=t|E=t,B=f) = 0.7$$
$$P(D=t|E=f,B=t) = 0.8 \qquad P(D=t|E=f,B=f) = 0.1$$

If a node has no parents, then the CPT reduces to a table giving the marginal distribution on that random variable

$$P(A=t) = 0.1$$
$$P(A=f) = 0.9$$

Consider another example, in which all nodes are binary, i.e., have two possible values, which we will denote by T (true) and F (false).

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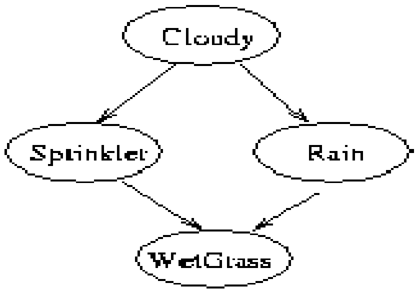
P(C=F)	P(C=T)
0.5	0.5



C	P(S=F)	P(S=T)
F	0.5	0.5
T	0.9	0.1

C	P(R=F)	P(R=T)
F	0.8	0.2
T	0.2	0.8

S	R	P(W=F)	P(W=T)
F	F	1.0	0.0
T	F	0.1	0.9
F	T	0.1	0.9
T	T	0.01	0.99

We see that the event "grass is wet" (W=true) has two possible causes: either the water sprinkler is on (S=true) or it is raining (R=true). The strength of this relationship is shown in the table. For example, we see that Pr(W=true | S=true, R=false) = 0.9 (second row), and hence, Pr(W=false | S=true, R=false) = 1 - 0.9 = 0.1, since each row must sum to one. Since the C node has no parents, its CPT specifies the prior probability that it is cloudy (in this case, 0.5). (Think of C as representing the season: if it is a cloudy season, it is less likely that the sprinkler is on and more likely that the rain is on.)

Semantics of Bayesian Networks

The simplest conditional independence relationship encoded in a Bayesian network can be stated as follows: a node is independent of its ancestors given its parents, where the ancestor/parent relationship is with respect to some fixed topological ordering of the nodes.

Conditional Independence in Bayes Net

A Bayes net represents the assumption that each node is conditionally independent of all its non-descendants given its parents.

Decision analysis : **Decision Analysis** (DA) is the discipline comprising the philosophy, theory, methodology, and professional practice necessary to address important decisions in a formal manner. Decision analysis includes many procedures, methods, and tools for identifying, clearly representing, and formally assessing important aspects of a decision, for prescribing a recommended course of action by applying the maximum expected utility action axiom to a well-formed representation of the decision, and for translating the formal representation of a decision and its corresponding recommendation into insight for the decision maker and other stakeholders.

History and Methodology

The term *decision analysis* was coined in 1964 by Ronald A. Howard[1], who since then, as a professor at Stanford University, has been instrumental in developing much of the practice and professional application of DA.

Graphical representation of decision analysis problems commonly use influence diagrams and decision trees. Both of these tools represent the alternatives available to the decision maker, the uncertainty they face, and evaluation measures representing how well they achieve their objectives in the final outcome. Uncertainties are represented through probabilities and probability distributions. The decision maker's attitude to risk is represented by utility functions and their attitude to trade-offs between conflicting objectives can be made using multi-attribute value functions or multi-attribute utility functions (if there is risk involved). In some cases, utility functions can be replaced by the probability of achieving uncertain aspiration levels. Decision analysis advocates choosing that decision whose consequences have the maximum expected utility (or which maximize the probability of achieving the uncertain aspiration level). Such decision analytic methods are used in a wide variety of fields, including business (planning, marketing, and negotiation), environmental remediation, health care research and management, energy exploration, litigation and dispute resolution, etc.

Decision analysis is used by major corporations to make multi-billion dollar capital investments. In 2010, Chevron won the Decision Analysis Society Practice Award for its use of decision analysis in all major decisions. In a video detailing Chevron's use of decision analysis, Chevron Vice Chairman George Kirkland notes that "decision analysis is a part of how Chevron does business for a simple, but powerful, reason: it works."

Controversy

Decision researchers studying how individuals research decisions have found that decision analysis is rarely used [2]. High-stakes decisions, made under time pressure, are not well described by decision analysis.[3] Some decision analysts, in turn,[4] argue that their approach is prescriptive, providing a prescription of what actions to take based on sound logic, rather than a descriptive approach, describing the flaws in the way people do make decisions. Critics cite the phenomenon of paralysis by analysis as one possible consequence of over-reliance on decision analysis in organizations.

Studies have demonstrated the utility of decision analysis in creating decision-making algorithms that are superior to "unaided intuition".[5][6]

Some areas within decision analysis deal with normative results that are provably optimal for specific quantifiable decisions. For example, the optimal order scheduling in a manufacturing facility or optimal hedging strategies are purely mathematical and their results are necessarily provable. The term "decision analytic" has often been reserved for decisions that do not appear to lend themselves to mathematical optimization methods. Methods like applied information economics, however, attempt to apply more rigorous quantitative methods even to these types of decisions

History of DSS: According to Keen (1978),[1] the concept of decision support has evolved from two main areas of research: The theoretical studies of organizational decision making done at the Carnegie Institute of Technology during the late 1950s and early 1960s, and the technical work on interactive computer systems, mainly carried out at the Massachusetts Institute of Technology in the 1960s. It is considered that the concept of DSS became an area of research of its own in the middle of the 1970s, before gaining in intensity during the 1980s. In the middle and late 1980s, executive information systems (EIS), group decision support systems (GDSS), and organizational decision support systems (ODSS) evolved from the single user and model-oriented DSS.

According to Sol (1987)[2] the definition and scope of DSS has been migrating over the years. In the 1970s DSS was described as "a computer based system to aid decision making". Late 1970s the DSS movement started focusing on "interactive computer-based systems which help decision-makers utilize data bases and models to solve ill-structured problems". In the 1980s DSS should provide systems "using suitable and available technology to improve effectiveness of managerial and professional activities", and end 1980s DSS faced a new challenge towards the design of intelligent workstations.[2]

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– Move from "stovepipes" to Interoperable systems
– Distributed systems
– Web services

Artificial Intelligence

• 1950's

– Introduction of symbolic computing
– Newell and Simon: General
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– Differentiation from scientific computing
» "AI is about symbols and not numbers"

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– First expert systems
» e.g., HEARSAY I (Speech
Recognition); MYCIN
(Medical diagnosis)
– Knowledge representation -
e.g., frames, rules
– Fuzzy logic

• 1980-90's

– Commercialization of AI
– Expert system shells
– Connectionist movement
– Machine learning

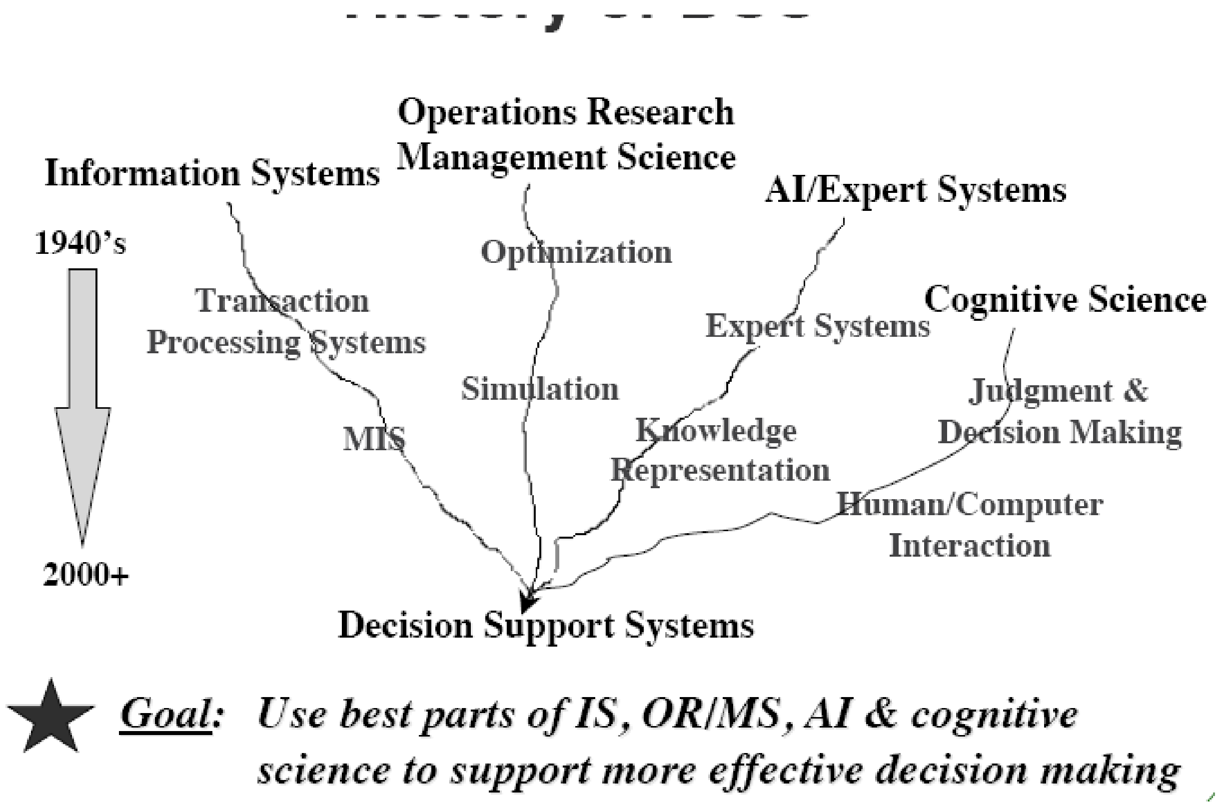
– Incorporation of methods from decision theory and operations research

• 21st Century

– Agent-based systems

– Distributed AI

– Semantic Web & Intelligent



Design: Three fundamental components of a DSS architecture are:

1. the database (or knowledge base),
2. the model (i.e., the decision context and user criteria), and
3. The user interface.

The users themselves are also important components of the architecture.

Fig. Design of a Drought Mitigation Decision Support System.

Development Frameworks

DSS systems are not entirely different from other systems and require a structured approach. Such a framework includes people, technology, and the development approach.[10]

DSS technology levels (of hardware and software) may include:

1. The actual application that will be used by the user. This is the part of the application that allows the decision maker to make decisions in a particular problem area. The user can act upon that particular problem.
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- Unreliable and slow at tedious bookkeeping tasks and complex calculations
- A poorly designed or improperly deployed decision support system can be
- *Worse* than leaving users unassisted
- *Worse* than replacing the users with automated system

Online analytical processing: In computing, **online analytical processing,** or **OLAP** (pronounced /ˈoʊlæp/) is an approach to swiftly answer multi-dimensional analytical queries.[1] OLAP is part of the broader category of business intelligence, which also encompasses relational reporting and data mining.[2] Typical applications of OLAP include business reporting for sales, marketing, management reporting, business process management (BPM)[3], budgeting and forecasting, financial reporting and similar areas, with new applications coming up, such as agriculture [4]. The term *OLAP* was created as a slight modification of the traditional database term OLTP (Online Transaction Processing).[5]

Databases configured for OLAP use a multidimensional data model, allowing for complex analytical and ad-hoc queries with a rapid execution time. They borrow aspects of navigational databases and hierarchical databases that are faster than relational databases.[6]

The output of an OLAP query is typically displayed in a matrix (or pivot) format. The dimensions form the rows and columns of the matrix; the measures form the values.

Concept

The core of any OLAP system is an OLAP cube (also called a 'multidimensional cube' or a *hypercube*). It consists of numeric facts called *measures* which are categorized by *dimensions*. The cube metadata is typically created from a star schema or snowflake schema of tables in a relational database. Measures are derived from the records in the fact table and dimensions are derived from the dimension tables.

Each *measure* can be thought of as having a set of *labels*, or meta-data associated with it. A *dimension* is what describes these *labels*; it provides information about the *measure*.

A simple example would be a cube that contains a store's sales as a *measure*, and Date/Time as a *dimension*. Each Sale has a Date/Time *label* that describes more about that sale.

Any number of *dimensions* can be added to the structure such as Store, Cashier, or Customer by adding a foreign key column to the fact table. This allows an analyst to view the *measures* along any combination of the *dimensions*.

For Example:

```
 Sales Fact Table
+-------------------------+
| sale amount | time_id  |
```

```
+-------------------------+          Time
Dimension
|      2008.10|     1234 |---+     +-------
----------------------+
+-------------------------+   |     |
time_id | timestamp         |
                              |     +-------
----------------------+
                              +---->|   1234
| 20080902 12:35:43 |
             +--------------------------+
```

Multidimensional databases

Multidimensional structure is defined as “a variation of the relational model that uses multidimensional structures to organize data and express the relationships between data”.[7] The structure is broken into cubes and the cubes are able to store and access data within the confines of each cube. “Each cell within a multidimensional structure contains aggregated data related to elements along each of its dimensions”.[8] Even when data is manipulated it is still easy to access as well as be a compact type of database. The data still remains interrelated.

Multidimensional structure is quite popular for analytical databases that use online analytical processing (OLAP) applications (O’Brien & Marakas, 2009). Analytical databases use these databases because of their ability to deliver answers swiftly to complex business queries. Data can be seen from different ways, which gives a broader picture of a problem unlike other models.[9]

Strategic Decision Support

Planning is everything, or, at least, an essential component of a successful project. Sometimes beginning the discussion about an anticipated project is difficult. Perhaps each team member has a different idea of how to proceed; perhaps no one has an idea how to proceed.

The assistance and guidance of a neutral third party with expertise can often help to start the ball rolling in the correct direction. And, keep it going in the right direction over time should that be needed.

Donna Cohen is gifted at facilitating discussions among key players. She elicits staff concerns, ideas and priorities in a comfortable setting. You may choose to have an individual discussion or brainstorming session and receive a brief summary report. Or, you may decide continued facilitated meetings would be useful. In either event, D. L. Cohen Information Services will help get your information project off to a solid start.

Settings where this service may be of use:

- You need assistance to establish your initial information goals and strategies.
- You would like to develop or remodel a public website or intranet.
- You would like to develop or enhance a virtual and/or physical library or information center.

Prepared By:-ABHINAV MISHRA , CSE (8th sem), MMCT

Various methods for choosing among alternatives

The various methods for choosing among alternatives are as follows:

1. Visual Interactive Goal Programming,
2. Supplier Selection

I. Visual Interactive Goal Programming

Visual Interactive Goal Programming (VIG) is a decision support system (Korhonen, 2007) based on a multi-criteria technique known as Pareto Race (Korhonen & Wallenius, 2006). This method treats constraints as a subset of purchasing teams' goals. Constraints of the problem define the feasible but not necessarily optimal solutions. Among these, there are some solutions such that no other feasible solution will yield an improvement in one goal (objective) without degrading the value of another goal (objective). These feasible solutions are referred to as "non-inferior", "efficient", "non-dominated", or "Pareto optimal" solutions. The method asks the decision-maker to give target values for each goal. It then finds the deviation of each goal from the target value, thereby defining a reference direction. Finally, it projects the reference direction on the set of non-dominated, efficient solutions. Therefore, in multiple criteria problems the notion of the optimal solution is replaced by the concept of the "best compromise solution".

Compromise solution is the efficient and non-dominated solution that is selected by decision-makers as their preferred solution among alternative courses of action provided by the technique.

In VIG, while the goals of the decision-maker are termed flexible goals, constraints are called inflexible goals. This helps to formulate both goals and constraints similarly and to examine them simultaneously. The goal functions can be specified (i.e., minimize (</=) or maximize (>/=)). VIG starts by finding the best possible value for flexible goals. If some goals are defined as inflexible, VIG may not be able to find a feasible solution during the initial process. However, the method still gives the current achievement levels for the inflexible goals, although some of these goals may not be satisfied. The inflexible goals (constraints) can be relaxed by changing the status of the goal from "inflexible" to "flexible". This helps to obtain feasible and non-dominated solutions. If the solution is still unfeasible, it is recommended that the decision-maker continue relaxing inflexible goals consecutively.

2.Supplier Selection: A Multi-Objective Decision Problem

With the emergence of global competitive challenges and resulting shifts in business paradigms, academics and practitioners alike have identified the growing importance of purchasing in corporate profitability (Goffin et al., 2007; Markland, Vickery & Davis, 2006, Ch. 10). Many companies have changed their focus from short-term purchasing transactions to logistics or supply chain management where they concentrated on developing long-term relations with suppliers including forming partnerships that resulted in improved coordination or supplier networks (Guinipero & Brand, 2006). There are predictions that in this decade the purchasing of goods and services will move out of purchasing's domain. Like customers, suppliers will be considered everyone's business (Leenders, et al., 2004). In other words, it is expected that more than one functional department will be involved with suppliers. Already, many companies seem to be using supplier selection/purchasing teams to replace the buyers or purchasing departments in the logistics and supply chain management era. In this new business environment, purchasing's role is one of the most significant strategic elements of the physical supply component of a logistics system, (Morash, Droge, & Vickery, 2006; Markland et al., 2006). According to Goffin et al. (2007), purchasing is not a purely tactical exercise anymore; instead it is now recognized as a strategic function, because external suppliers now exert a major influence on a company's success or failure (Goffin et al., 2007). Therefore a key issue that purchasing must address is effective management of the supplier network, including identification of supplier selection criteria, supplier selection decisions, and monitoring of supplier performance.

SIMULATION & MODELING:-

1) **Simulation**:-

A simulation of a system is the operation of a model of the system. The model can be reconfigured and experimented with; usually, this is impossible, too expensive or impractical to do in the system it represents. The operation of the model can be studied, and hence, properties concerning the behavior of the actual system or its subsystem can be inferred. In its broadest sense, simulation is a tool to evaluate the performance of a system, existing or proposed, under different configurations of interest and over long periods of real time.

Simulation is used before an existing system is altered or a new system built, to reduce the chances of failure to meet specifications, to eliminate unforeseen bottlenecks, to prevent under or over-utilization of resources, and to optimize system performance. For instance, simulation can be used to answer questions like: What is the best design for a new telecommunications network? What are the associated resource requirements? How will a telecommunication network perform when the traffic load increases by 50%? How will a new routing algorithm affect its performance? Which network protocol optimizes network performance? What will be the impact of a link failure?

2) MODELING:-

Modeling is the process of producing a model; a model is a representation of the construction and working of some system of interest. A model is similar to but simpler than the system it represents. One purpose of a model is to enable the analyst to predict the effect of changes to the system. On the one hand, a model should be a close approximation to the real system and incorporate most of its salient features. On the other hand, it should not be so complex that it is impossible to understand and experiment with it. A good model is a judicious tradeoff between realism and simplicity. Simulation practitioners recommend increasing the complexity of a model iteratively. An important issue in modeling is model validity. Model validation techniques include simulating the model under known input conditions and comparing model output with system output.

Unit-5

Group decision support systems: According to professors R.Brent Gallup, Queen's university, Ontario, and Geraldine De Sanctis, University of Minnesota, define a group decision support system, or GDSS, as a combination of computer, communications and decision technologies to support problem finding, formulation, and solution in group meeting.

The goal of the GDSS is to support the exchange of ideas, opinions, and preferences within the group. However, you know form your own experience that people who communicate in groups have special needs, and that difficulties often arise.

How the GDSS contributes to problem solving

The underlying assumption of the GDSS is that improved communications make possible improved decisions. Improved communications are achieved by keeping the discussion focused on the problem, resulting in less wasted time. The time gained can be devoted to a more through discussion of the problem, contributing to a better problem definition. Or, the gained time can be used in indentifying more alternatives than otherwise would be possible. The evaluation of more alternatives increases the likelihood of arriving at a good problem solution.

Group Decision Support Situations

- Synchronous, co-located
  – Decision conference tools
- Synchronous, distributed
  – Audio & video conferences
  – Electronic whiteboard
  – Screen sharing
  – Chat rooms
- Asynchronous
  – Bulletin boards

– Threaded discussion & electronic bulletin boards
– Document / work product sharing
– Email
– Voice mail

Common GDSS Components

- Agenda management
– Agenda entry
– Agenda display
- Brainstorming & idea generation
– Idea entry
– Commenting tool
– Idea categorization
- Electronic whiteboard
- Voting & survey tools
– Vote / survey creation
– Vote / survey response entry
– Result display
- Analysis tools

Think-tank from Group Systems

Potential Benefits of GDSS

- More thorough exploration of values
- Better sharing of information
- More creative option generation
- More systematic option evaluation
- Increased communication
- Increased participation
- Increased group cohesion
- Increased acceptance of group decision

Pitfalls of GDSS

- Reliability of software / network
- Poor usability

• Steep learning curve - User unfamiliarity with GDSS gets in the way of productive interaction
• Process assumed by GDSS designers is poor match to task and/or users
• Cost of support does not justify benefit

Intelligent decision support systems: Intelligent Decision Support Systems (IDSS) is a term that describes decision support systems that make extensive use of artificial intelligence (AI) techniques. Use of AI techniques in management information systems has a long history, indeed terms such as Knowledge-based systems (KBS) and intelligent systems have been used since the early 1980s to describe components of management systems, but the term "Intelligent decision support system" is thought to originate with Clyde Hollsopple and Andrew Whinstone[1][2] in the late 1970s. Flexible manufacturing systems (FMS) [3] and medical diagnosis systems [4] can also be considered examples of intelligent decision support systems.

Ideally, an intelligent decision support system should behave like a human consultant; supporting decision makers by gathering and analyzing evidence, identifying and diagnosing problems, proposing possible courses of action and evaluating the proposed actions. The aim of the AI techniques embedded in an intelligent decision support system is to enable these tasks to be performed by a computer, whilst emulating human capabilities as closely as possible.

Many IDSS implementations are based on expert systems, a well established type of KBS that encode the cognitive behaviors of human experts using predicate logic rules and have been shown to perform better than the original human experts in some circumstances. Expert emerged as practical applications in the 1980s based on research in artificial intelligence performed during the late 1960s and early 1970s.[8] They typically combine knowledge of a particular application domain with an inference capability to enable the system to propose decisions or diagnoses. Accuracy and consistency can be comparable to (or even exceed) that of human experts when the decision parameters are well known (e.g. if a common disease is being diagnosed), but performance can be poor when novel or uncertain circumstances arise.

Some research in AI, focused on enabling systems to respond to novelty and uncertainty in more flexible ways is starting to be used in intelligent decision support systems. For example intelligent agents[9] that perform complex cognitive tasks without any need for human intervention have been used in a range of decision support applications.[10] Capabilities of these intelligent agents include knowledge sharing, machine learning, data mining, and automated inference. A range of AI techniques such as case based reasoning, rough sets[11] and fuzzy logic have also been used to enable decision support systems to perform better in uncertain conditions.

E-participation: **e-participation** (also written **e *Participation*** and ***e-Participation***) is the generally accepted term referring to "ICT-supported participation in processes involved in government and governance". Processes may concern administration, service delivery, decision making and policy making. E-participation is hence closely related to e-government and (e-)governance participation. The need for the term has emerged as citizen benefits and values have often received less attention in e-government development than those of the service providers, and the need to distinguish the roles of citizen and customer has become clearer.

A more detailed definition sees e-participation as "the use of information and communication technologies to broaden and deepen political participation by enabling citizens to connect with one another and with their elected representatives" (Macintosh 2004). This definition includes all stakeholders in democratic decision-making processes and not only citizen related top-down government initiatives. So e-participation can be seen as part of e-democracy, whereas e-democracy means the use of ICT by governments in general used by elected officials, media, political parties and interest groups, civil society organizations, international governmental organizations, or citizens/voters within any of the political processes of states/regions, nations, and local and global communities (Clift 2003).

The complexity of e-participation processes results from the large number of different participation areas, involved stakeholders, levels of engagement, and stages in policy making, which characterize the research and applications

For example, a football team needs 11 players, and dancing often requires two or more people acting in a coordinated manner. But participation, even in trivial situations, also has a goal-oriented aspect which means decision making and control are involved. Participation in political science and theory of management refers to direct public participation in political, economical or management decisions. The two are not completely separated but belong on a spectrum of complexity and context. When participation becomes complicated, decision making becomes necessary. Hence, any participatory process is potentially important for the rule system governing the activities. In terms of points 2 and 3 above, this means that when service processes become complex, the implementation of them will not be in all details based on political decisions but also on what is found to be practical. Such decisions are made in many places in a situated manner.

Models and tools for e-participation

A number of tools and models have emerged as part of the Web 2.0 that can be used or inspire the design of architecture for e-participation. In particular, "the emergence of online communities oriented toward the creation of useful products suggests that it may be possible to design socially mediating technology that support public-government collaborations" (Kriplean et al. Zachry).

Participation tools

- Wikis
- Online social networking
- Blogs

Mechanisms

- eVoting
- Reputation systems
- Internet petitions
- Transparency tools (social translucence mechanisms)

Tracking and analysis

- Digital traces
- Data mining
- Data visualization
- Simulations such as agent-based social simulation

Decision support technologies

Decision Support Technology (DST) has grown from a developer of expert systems software to one of the leading developers of Internet sites for businesses. We help take the mystery out of applying technology.

The flagship of DST's Internet sites is the site you are now on, the Indy Mall. Since its grand opening on April 1, 1996, the Indy Mall has consistently increased its monthly mall traffic to where it is one of the busiest malls on the Internet serving a local geographic area. The Indy Mall is proud to have what may be the HIGHEST PERCENTAGE OF BUSINESS SUCCESS STORIES on a single site found anywhere on the Internet!

Decision Support Technologies

Management Support Systems (MSS)

- Decision Support Systems (DSS)
- Group Support Systems (GSS)
- Enterprise (Executive) Information Systems (EIS)
- Enterprise Resource Planning (ERP) and Supply-Chain Management (SCM)
- Knowledge Management Systems
- Expert Systems (ES)
- Artificial Neural Networks (ANN)

- Hybrid Support Systems
- Intelligent DSS

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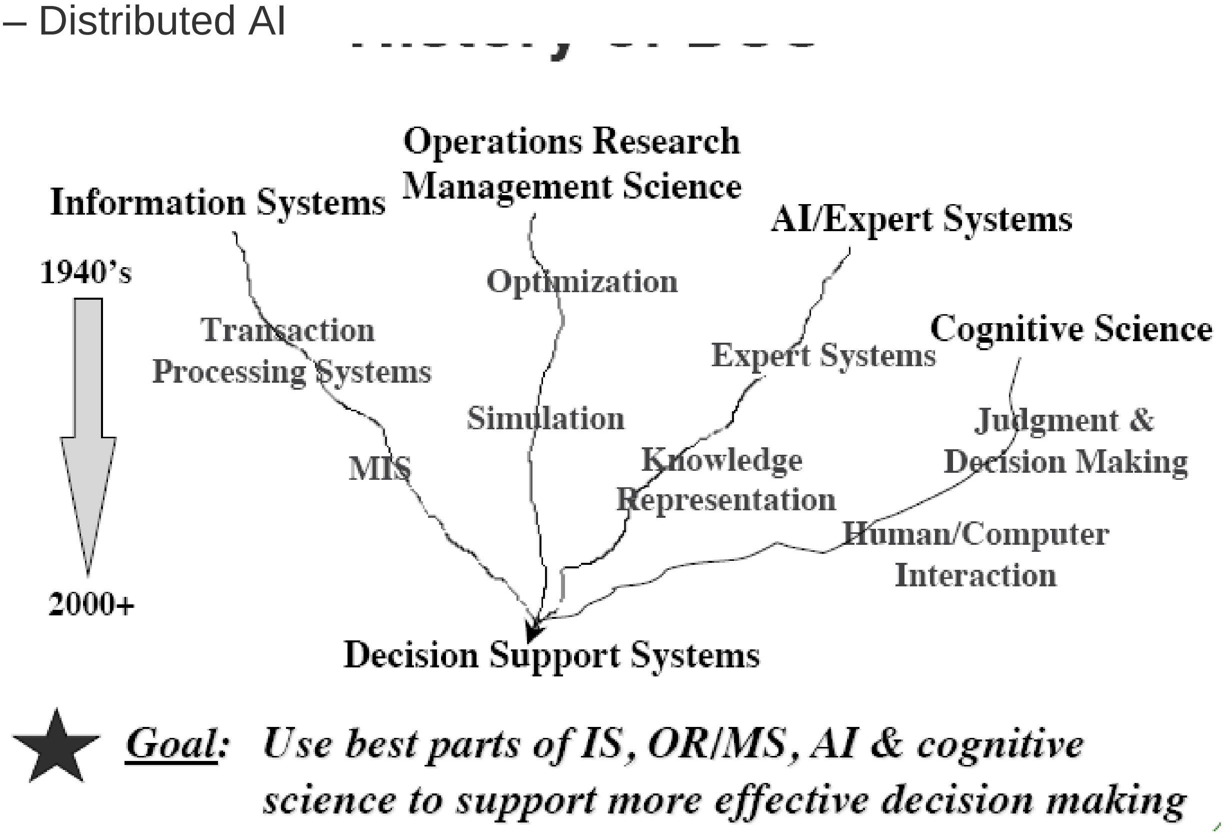

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E-democracy: E-democracy (a combination of the words *electronic* and *democracy*) refers to the use of information technologies and communication technologies and strategies in political and governance processes. Democratic actors and sectors in this context include governments, elected officials, the media, political organizations, and citizens/voters.[1]

E-democracy aims for broader and more active citizen participation enabled by the Internet, mobile communications, and other technologies in today's representative democracy, as well as through more participatory or direct forms of citizen involvement in addressing public challenges.[2]

E-democracy is a relatively new concept, which has surfaced out of the popularity of the Internet and the need to reinvigorate interest in the democratic process.[3][*page needed*] Access is the key to creating interest in the democratic process.[4] Citizens are more willing to use Web sites to support their candidates and their campaign drives.[5] In the United States, just over 50% of the population votes, and in the United Kingdom, only 69% of citizens vote.[6]

The research indicates that the political process has been alienated from ordinary people, where laws are made by representatives far removed from ordinary people.[3][*page needed*] The goal of e-democracy is to reverse the cynicism citizens have about their government institutions.[7] However, there are doubts about the real impact of electronic and digital tools on citizen participation and democratic governance, and warning against the "rhetoric" of electronic democracy.[8]

Tools and types

Social networking is an emerging area for e-democracy, as well as related technological developments, such as argument maps and eventually, the semantic web. Those are seen as important stepping stones in the maturation of the concept of e-democracy.[11] The social networking entry point, for example, is within the citizens' environment, and the engagement is on the citizens' terms. Proponents of e-government perceive government use of social networks as a medium to help government act more like the public it serves. Examples of state usage can be found at The Official Commonwealth of Virginia Homepage, where citizens can find Google tools and open social forums

Benefits

Contemporary technologies, such as electronic mailing lists, peer-to-peer networks, collaborative software, wikis, Internet forums and blogs, are clues to and early potential solutions for some aspects of e-democracy.

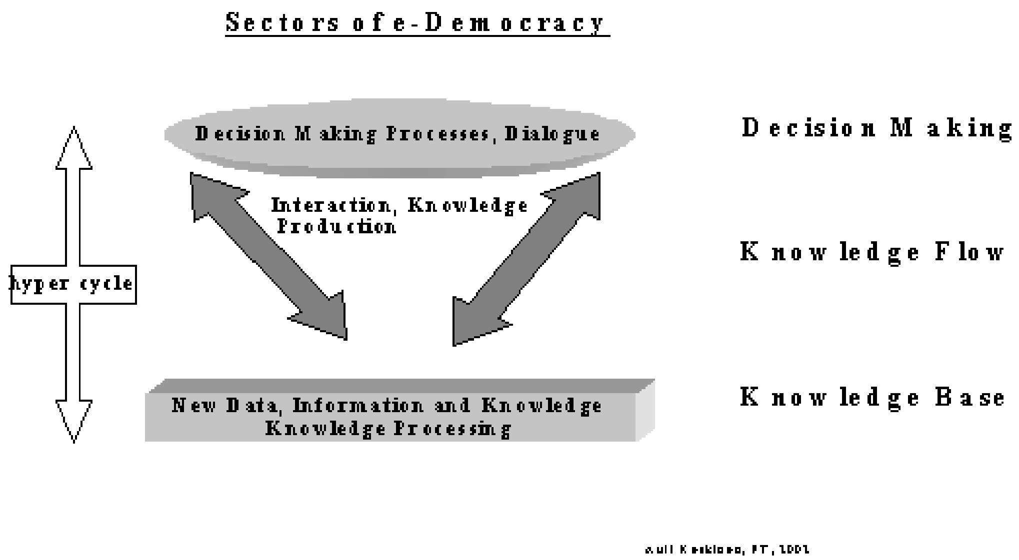
A number of non-governmental sites have developed cross-jurisdiction, customer-focused applications that extract information from thousands of governmental organizations into a system that brings consistency to data across many dissimilar providers. It is convenient and cost-effective for businesses, and the public benefits by getting easy access to the most current information available without having to expend tax dollars to get it. One example of this is transparent.gov.com, a free resource for citizens to quickly identify the various open government initiatives taking place in their community or in communities across the country.

Another valuable source is USA.gov — the official site of the United States government. The website is directly linked to every federal and state agency. The information provided by the website is valuable to all citizens, and non-citizens, of the current news and regulations of the U.S. government. These are just some examples of e-government's[24] influence in the Internet.

Disadvantages

Equally, these technologies are bellwethers of some of the issues associated with the territory, such as the inability to sustain new initiatives or protect against identity theft, information overload and vandalism.

Some traditional objections to direct democracy are argued to apply to e-democracy, such as the potential for governance to tend towards populism and demagoguery. More practical objections exist, not least in terms of the digital divide between those with access to the media of e-democracy (mobile phones and Internet connections) and those without, as well as the opportunity cost of expenditure on e-democracy innovations.



Decision conferencing: Generating a sense of common purpose and agreeing the way forward is often desired in organisations but not always achieved. The reasons are many: local concerns may conflict with the aims of the organisation, personalities may clash, individuals may be too averse to taking risks, plans that are best for each unit in the organisation may not be collectively best. Whatever the reason, there may be a place for an improved approach to decision making, so people can arrive at a shared understanding of the issues, develop a sense of common purpose and achieve commitment to action. Those are the purposes of Decision Conferencing.

What is Decision Conferencing?

Decision Conferencing is a series of intensive working meetings, called decision conferences, attended by groups of people who are concerned about some complex issues facing their organisation. There are no prepared presentations or fixed agenda; the meetings are conducted as live, working sessions lasting from one to three days. A unique feature is the creation, on-the-spot, of a computer-based model which incorporates data and the judgements of the participants in the groups. The model is often based on multi-criteria decision analysis (MCDA), which provides ample scope for representing both the many conflicting objectives expressed by participants, and the inevitable uncertainty about future consequences. The model is a ‘tool for thinking’ enabling participants to see the logical consequences of differing viewpoints, and to develop higher-level perspectives on the issues. By examining the implications of the model, then changing it and trying out different assumptions, participants develop a shared understanding and reach agreement about the way forward.

Stages in a typical Decision Conference: Four stages typify most decision conferences, though every event is different. The first phase is a broad exploration of the issues. In the second stage, a model is constructed of participants’ judgements about the issues, incorporating available data. All key perspectives are included in the model, which is continuously projected so all participants can oversee every aspect of creating the model. In the third stage, the model combines these perspectives, reveals the collective consequences of individual views, and provides a basis for extensive exploration of the model, always done online. Discrepancies between model results and members' judgements are examined, causing new intuitions to emerge, new insights to be generated and new perspectives to be revealed. Revisions are made and further discrepancies explored; after several iterations the new results and changed intuitions are more in harmony. Then the group moves on to the fourth stage summarising key issues and conclusions, formulating next steps and, if desired, agreeing an action plan or set of recommendations. The facilitator prepares a report of the event's products after the meeting and circulates it to all participants. A follow-through meeting is often held to deal with afterthoughts, additional data and new ideas.

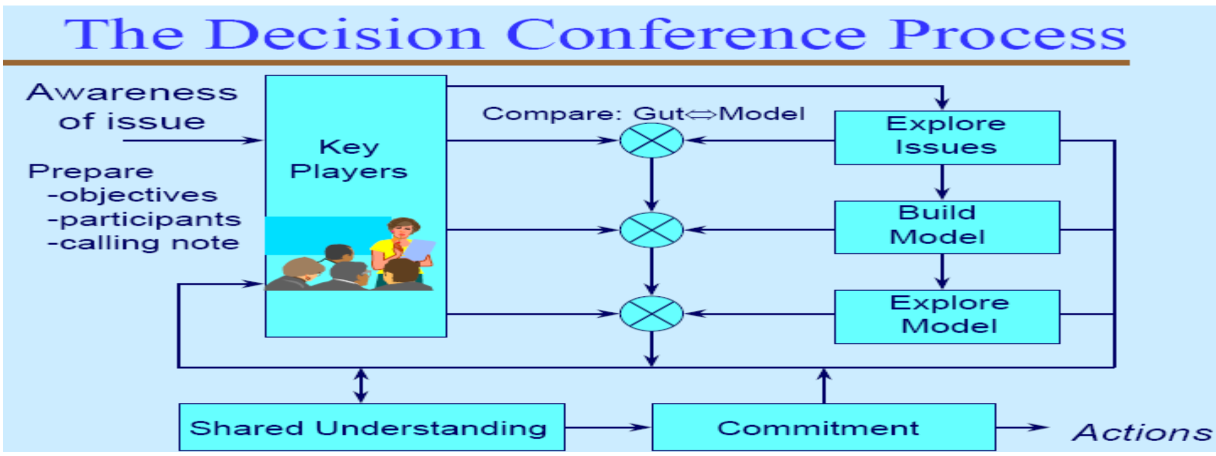
Role of the facilitators

The group is aided by two facilitators from outside the organization who are experienced in working with groups. The main tasks of the facilitators are to see and understand the group life, and to intervene, when appropriate, to help the group stay in the present and maintain a task orientation to its work. The facilitators attend to the processes occurring in the group, provide structure for the group's tasks, but refrain from contributing to content. They structure the discussions, helping participants to identify the issues and think creatively and imaginatively. The facilitators help participants in how to think about the issues without suggesting what to think.

Benefits of Decision Conferencing

The marriage in Decision Conferencing of information technology, group processes and modelling of issues provides value-added to a meeting that is more than the sum of its parts.

Follow-up studies, conducted by the Decision Analysis Unit at the London School of Economics and by the Decision Techtronics Group at the State University of New York, of decision conferences in the United Kingdom and the United States, for organisations in both the private and public sectors, consistently show higher ratings from participants for decision conferences than for traditional meetings. Organisations using Decision Conferencing report that the process helps them to arrive at better and more acceptable solutions than can be achieved using usual procedures, and agreement is reached more quickly. Many decision conferences have broken through stalemates created previously by lack of consensus, by the complexity of the problem, by vagueness and conflict of objectives, by ownership in 'fiefdoms', and by failure to think creatively and freshly about the issues.



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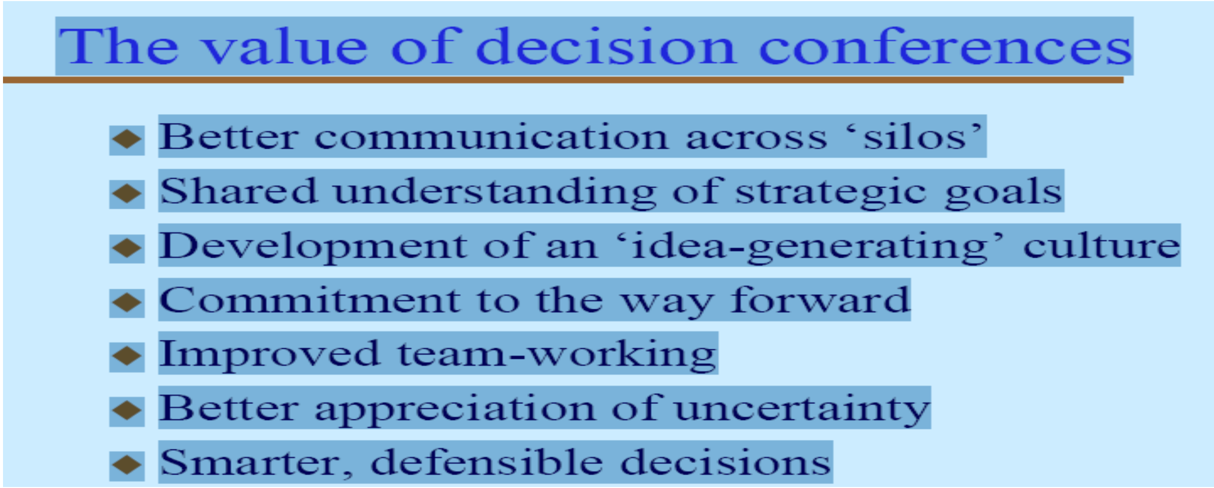

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Basic Realities of DSS Design

• Requirements cannot be pre-specified
• Communications gaps are inevitable, and should be planned for
- Users are problem experts; engineers are technology experts
- Users have implicit knowledge; engineers require explicit specifications.
• Motivation barriers often exist
- It's hard to appreciate benefits of a system you can't see
- Users may be gun-shy from overselling
- Engineers may not appreciate the user's problem
• Extensive iteration is both necessary and desirable

DSS Design – An Evolutionary Process

• Iteration and feedback built into design cycle
– Requirements evolve through design and development
– Prototyping is essential communication tool between developers and users
• Often evolution continues even after

deployment
- Additional functionality
- Changes in user needs
- Evolution in HW and SW capability

DSS Modeling
Goal: Develop a model which captures the essence of the system-to-be
- facilitate discussion about function and role of system
- identifies weak points, inconsistencies, high-risk areas

Methods:
- narrative
- flowcharting methods
- storyboards

Storyboards

• Walk user through hypothetical screen displays
• On-line storyboarding tools are becoming increasingly common
• Facilitates user reaction by giving users "look and feel"
• Rapid modification of on-line storyboard facilitates iterative requirements redefinition
• Can be used in conjunction with rapid applications prototyping
• Evolving storyboard with annotations provides a record of the system development process

Iterative Evaluation Centered
DSS Design
1. Define what is meant by "quality of decision"
2. Develop measures of decision quality
3. Develop hypotheses of factors contributing to decision quality
- characteristics of users

- characteristics of tasks
- characteristics of environment
- characteristics of decision making process

4. Develop explanation of status-quo decision quality
5. Generalize to theory which predicts decision quality under alternatives including status quo
6. Use theory to guide design of new or enhanced DSS
7. Implement and evaluate theory by testing it on this case

- Measure decision quality and features of DSS related (by theory) to decision quality

8. Refine theory in light of evaluation and iterate
9. Apply same approach to organization's DSS lifecycle process

Strategic information system

A **Strategic Information System** (SIS) [1]is a system to manage information and assist in strategic decision making. A strategic information system has been defined as, "The information system to support or change enterprise's strategy."[2]

A SIS is a type of Information System that is aligned with business strategy and structure. The alignment increases the capability to respond faster to environmental changes and thus creates a competitive advantage. An early example was the favorable position afforded American and United Airlines by their reservation systems, Sabre and Apollo. For many years these two systems ensured that the two carriers' flights appeared on the first screens observed by travel agents, thus increasing their bookings relative to competitors. A major source of controversy surrounding SIS is their sustainability.

SISs are different from other comparable systems as:

- They change the way the firm competes.
- They have an external (outward looking) focus.
- They are associated with higher project risk.
- They are innovative (and not easily copied).

Hierarchy of Information Systems

Model of 3-era information system[3]:

1. Data Processing (DP) [efficiency] — Improved efficiency by means of automating back office data processing functions.
2. Management Information Systems (MIS) [effectiveness] — Improved information flows and transfers.
3. *Strategic Information System* (SIS) [competitiveness] — Enhance competitiveness of the organization through the application of IT to business processes. Davenport's point of view is that "Information is power and people are unlikely to give it away

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ALL THE BEST