
Components of Decision Support System

Decision support systems vary greatly in application and complexity, but they all share specific features. A typical DSS has four components:

1. Inputs: Factors, numbers, and characteristics to analyze.
2. User Knowledge and Expertise: Inputs requiring manual analysis by the user.
3. Outputs: Transformed data from which DSS "decisions" are generated.
4. Decisions: Results generated by the DSS based on user criteria

Types of Decision Support Systems

There are several ways to classify DSS applications. Not every DSS fits neatly into one category, but a mix of two or more architecture in one.

- Communication-driven DSS supports more than one person working on a shared task; examples include integrated tools like Microsoft's NetMeeting or Groove.
- Data-driven DSS or data-oriented DSS emphasizes access to and manipulation of a time series of internal organization data and, sometimes, external data.
- Document-driven DSS manages, retrieves, and manipulates unstructured information in a variety of electronic formats.
- Knowledge-driven DSS provides specialized problem-solving expertise stored as facts, rules, procedures, or in similar structures.
- Model-driven DSS emphasizes access to and manipulation of a statistical, optimization, or simulation model. Model-driven DSS use data and parameters provided by users to assist decision makers in analyzing a situation; they are not necessarily data-intensive.

Benefits of DSS

1. Improves personal efficiency.
2. Expedites problem solving (speed up the progress of problems solving in an organization).
3. Facilitates interpersonal communication.
4. Promotes learning or training.
5. Increases organizational control.
6. Creates a competitive advantage over competition.
7. Helps automate the managerial processes.

The Evolution of Support Systems

The first applications of computers did repetitive, large-volume, transactions-computing tasks. As the cost of computing decreased and computers' capabilities increased, a new breed of information system, started to develop. These systems accessed, organized, summarized, and displayed information for supporting routine decision making in the functional areas. Office automation systems (OAS) such as airline reservation systems were developed to support office workers. Computers also were introduced in the manufacturing environment, with applications ranging from robotics to computer-aided design and manufacturing (CAD/CAM).

Additional increasing computing capabilities and reduced costs justified computerized support for a growing number of non-routine applications, and decision support systems were developed to provide computerized support for complex, non-routine decisions. The microcomputer revolution, which started around 1980, began the era of end-user computing, in which analysts, managers, and many other professionals can build and use systems on their own desktop

computers. Decision support expanded in two directions: first, toward executives and then managers (executive support systems and enterprise information systems), and second, to people working in groups (group support systems).

Eventually, interest in programming computers to perform intelligent problem solving led to commercial applications known as intelligent support systems (ISSs). These include expert systems, which provide the stored knowledge of experts to non-experts, and a new breed of intelligent systems with machine learning capabilities such as artificial neural networks and case-based reasoning that can learn from historical cases.

A major innovation in the evolution of support systems has been the development of data warehousing. A data warehouse is a database designed to support DSS, ESS, and other analytical and end-user activities. The use of data warehouses is a part of business intelligence, the gathering and use of large amounts of data for query or analysis by DSS, ESS, and intelligent systems.

The latest support system in organizations is mobile computing. Mobile computing supports mobile employees, those who are working with customers or business partners, at least part of the time, outside the physical boundaries of their companies. The mobile employees carry portable devices, which can access the Internet. These devices enable communication with organizations and other individuals via wireline or wireless networks.

Table 5 Evolution of Support Systems

Systems	Employees Supported	Description
Transaction processing system (TPS)	All employees	Processes an organization's basic business transactions (e.g., purchasing, billing, and payroll).
Management information system (MIS)	All employees	Provides routine information for planning, organizing, and controlling operations in functional areas.
Office automation system (OAS)	Office workers	Increases productivity of office workers; includes word processing.
Word processing system	Office workers	Helps create, edit, format, distribute, and print documents.
CAD/CAM	Engineers, drafts people	Allows engineers to design and test prototypes; transfers specifications to manufacturing facilities.
Document management system (DMS)	Office workers	Automates flow of electronic documents.
Decision support system (DSS)	Decision makers, managers	Combines models and data to solve Semi-structured problems with extensive user involvement.
Executive support system (ESS)	Executives, senior managers	Supports decisions of top managers.
Group support system (GSS)	People working in groups	Supports working processes of groups of people (including those in different locations).
Expert system (ES)	Knowledge workers, non-experts	Provides stored knowledge of experts to non-experts and decision recommendations based on built-in expertise.
Knowledge work system (KWS)	Managers, knowledge workers	Supports the gathering, organizing, and use of an organization's knowledge.
Data warehouse	Managers, knowledge workers	Stores huge amounts of data that can be easily accessed and manipulated for decision support.
Business intelligence	Decision makers, managers	Gathers and uses large amounts of data for analysis by DSS, ESS and intelligent systems.
Mobile computing systems	Mobile employees	Support employees who work with customers or business partners outside the physical boundaries of the organization.

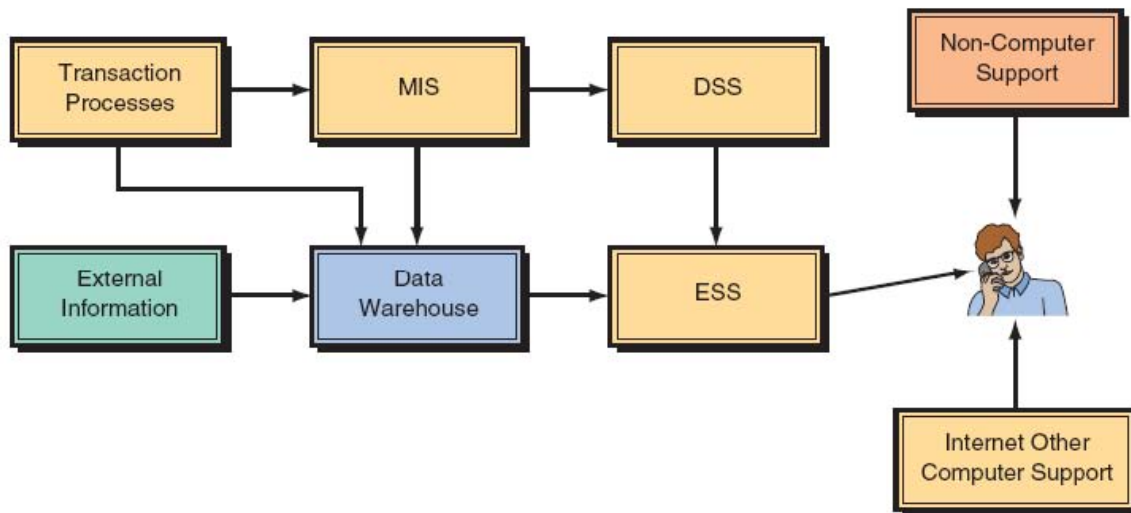


FIGURE 29 Interrelated support systems.

Group Decisions Support System

Group Decisions support system (GDSS) is an interactive computer-based system facilitating group decision-making processes to solve unstructured problems. In GDSS, members meet interactively together in specially designed rooms with online telecommunication and video conferencing facilities over Internet, extranet or private network. The decisions they arrived has group support. The decisions are largely rational, and unlikely bounded rationality- probably unbounded rationality since members have wide exposure, wide experiences and exploring all alternatives with intensity.

Expert Systems

An expert system is a knowledge-based information system; that is, it uses its knowledge about a specific area to act as an expert consultant to users. The components of an expert system are a knowledge base and software modules that perform inferences on the knowledge and offer answers to a user's questions.

Expert systems are being used in many different fields, including medicine, engineering, the physical sciences, and business. For example, expert systems now help diagnose illnesses, search for minerals, analyze compounds, recommend repairs, and do financial planning. Expert systems can support either operations or management activities.

Knowledge Management Systems

Knowledge Management systems (KMS), Workers create, organize, and share important knowledge wherever and whenever it is needed. For example, many knowledge management systems rely on Internet and intranet Web sites, knowledge bases, and discussion forums as key technologies for gathering, storing, and disseminating business knowledge.

KMS systems deal with information (although Knowledge Management as a discipline may extend beyond the information centric aspect of any system) so they are a class of information system and may build on, or utilize other information sources.

The idea of a KM system is to enable employees to have ready access to the organization's documented base of facts, sources of information, and solutions. For example a typical claim justifying the creation of a KM system might run something like this: an engineer could know the metallurgical composition of an alloy that reduces sound in gear systems. Sharing this information organization wide can lead to more effective engine design and it could also lead to ideas for new or improved equipment. A Knowledge Management system could be any of the following:

1. Document based i.e. any technology that permits creation, management, sharing of formatted documents such as Lotus Notes, web, distributed databases etc.
2. Based on AI technologies which use a customized representation scheme to represent the problem domain.
3. Provide network maps of the organization showing the flow of communication between entities and individuals.