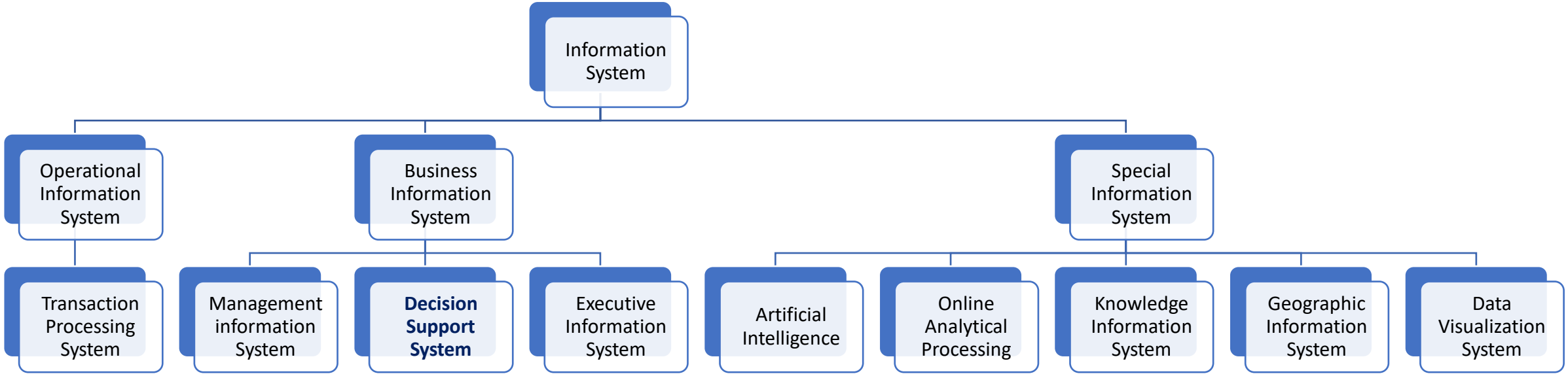
DECISION SUPPORT SYSTEM

CONCEPTS, TECHNOLOGIES, MODELS AND APPLICATIONS

TEACHING TEAM

DECISION SUPPORT SYSTEM COURSE

Information System Topology



Relationship between MIS and DSS

- Flow-processing procedures based on computer data,and integrated with other procedures to **provide information in a timely and effective manner to support decision-making** and other management functions

1. Procedure
2. **Data**
3. **Information**
4. **Time**
5. Effective
6. **Decision-making**

Difference between MIS and DSS

Factor	DSS	MIS
Approach	Serves as a direct support system that provides interactive reports on computer screens.	Typically serves as an indirect support system that uses regularly produced reports.
Development	Has users who are usually more directly involved in its development. User involvement usually means better systems that provide superior support. For all systems, user involvement is the most important factor for the development of a successful system.	Is frequently several years old and often was developed for people who are no longer performing the work supported by the MIS.
Emphasis	Emphasizes actual decisions and decision-making styles.	Usually emphasizes information only.
Output	Produces reports that are usually screen oriented, with the ability to generate reports on a printer.	Is oriented toward printed reports and documents.
Problem type	Can handle unstructured problems that cannot be easily programmed.	Normally used only with structured problems.
Speed	Is flexible and can be implemented by users, so it usually takes less time to develop and is better able to respond to user requests.	Provides response time usually longer than a DSS.
Support	Supports all aspects and phases of decision making; it does not replace the decision maker—people still make the decisions.	In some cases, makes automatic decisions and replaces the decision maker.
System	Uses computer equipment that is usually online (directly connected to the computer system) and related to real time (providing immediate results). Computer terminals and display screens are examples—these devices can provide immediate information and answers to questions.	Uses printed reports that might be delivered to managers once per week, so it cannot provide immediate results.
Users	Supports individuals, small groups, and the entire organization. In the short run, users typically have more control over a DSS.	Primarily supports the organization. In the short run, users have less control over an MIS.

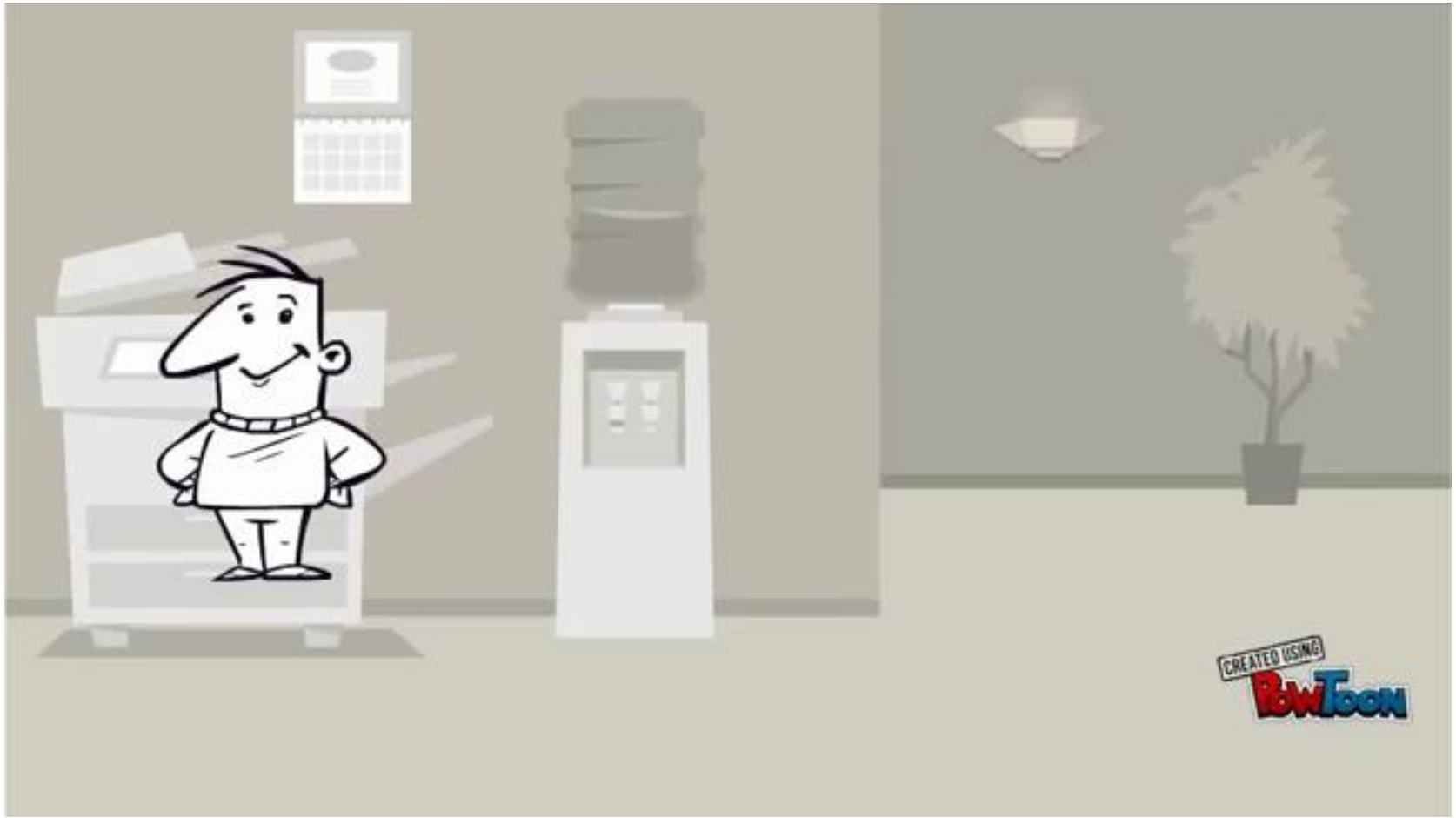
Decision Support System

- DSS is part of a computer-based information system (including knowledge-based systems (knowledge management)) intended **to support decision making** in an organization or company.
- A computer system that processes data into information to **make decisions about specific semi-structured problems**.
- An interactive information system that provides information, modeling and data manipulation to assist **decision making in semi-structured and unstructured situations**.

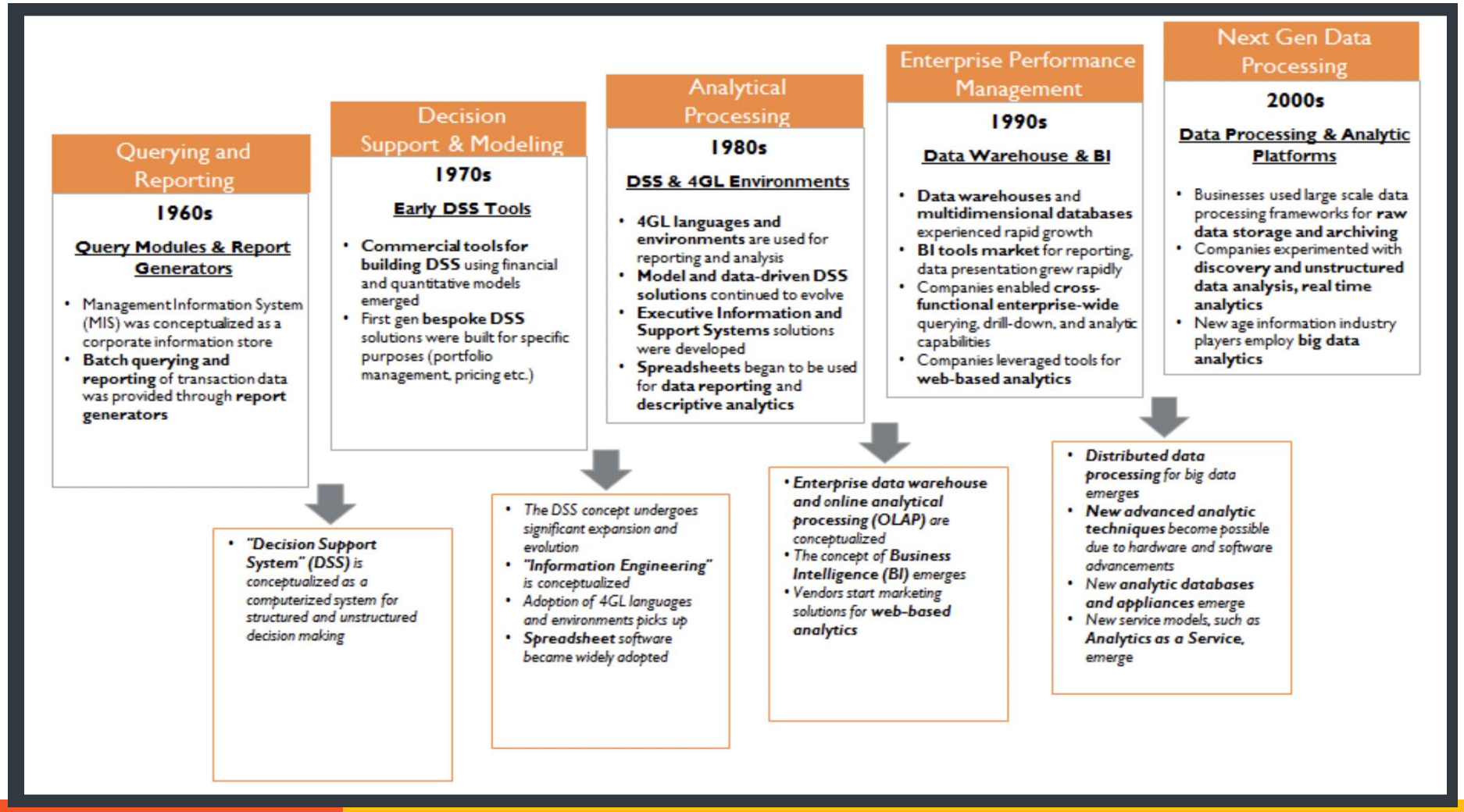
Definition of DSS

- **An organized collection** of people, procedures, software, databases, and devices used to help make decisions that solve problems.
- **The focus** of a DSS is on decision-making effectiveness when faced with unstructured or semi-structured business problems.
- Decision support systems offer the potential to generate **higher profits, lower costs, and better products and services**.

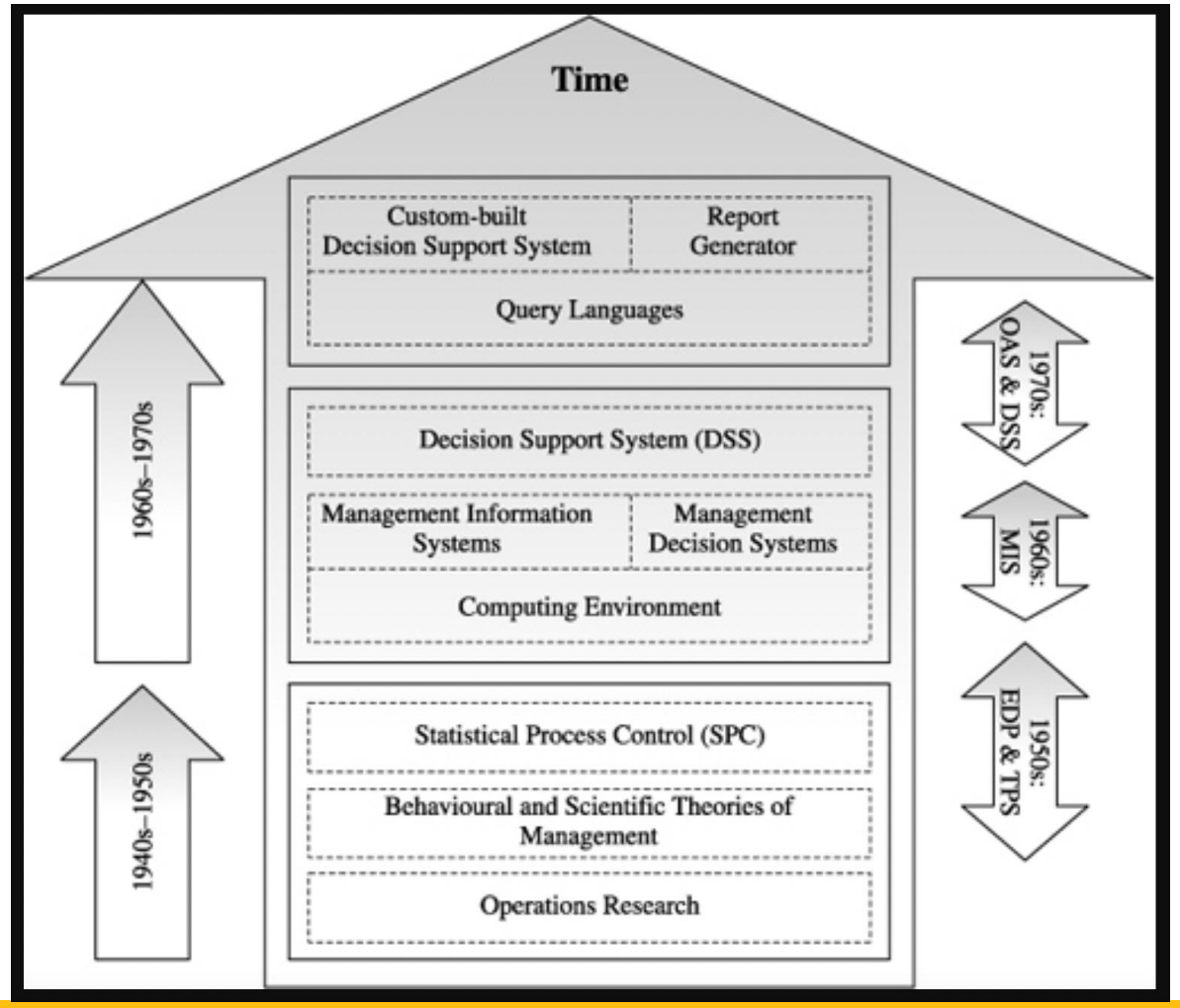
DSS Visualization



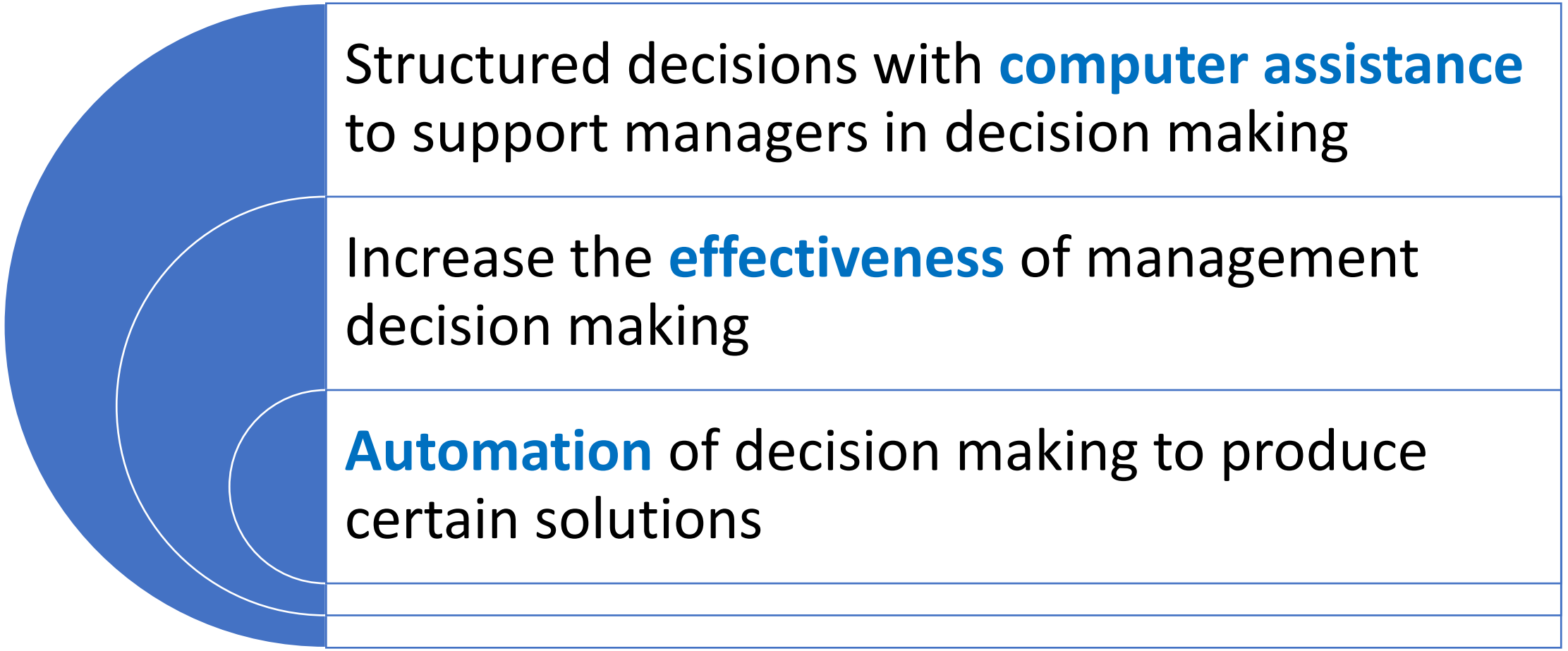
History of DSS - Technology



History of DSS - Models and Applications



Characteristics of DSS



Characteristics of DSS

- Provide **rapid access** to information.
- Handle **large amounts of data** from different sources.
- Provide **report and presentation** flexibility.
- Offer both **textual and graphical** orientation.
- Support **drill-down analysis**.
- Perform **complex, sophisticated analyses and comparisons** using advanced software packages.
- Support **optimization, satisficing, and heuristic** approaches.
- Perform **simulation analysis**.
- **Forecast** a **future opportunity or problem**.

Characteristics of DSS

- Support for **Problem-Solving Phases**

  Phases include intelligence, design, choice, implementation, and monitoring.

- Support for **Various Decision Frequencies**

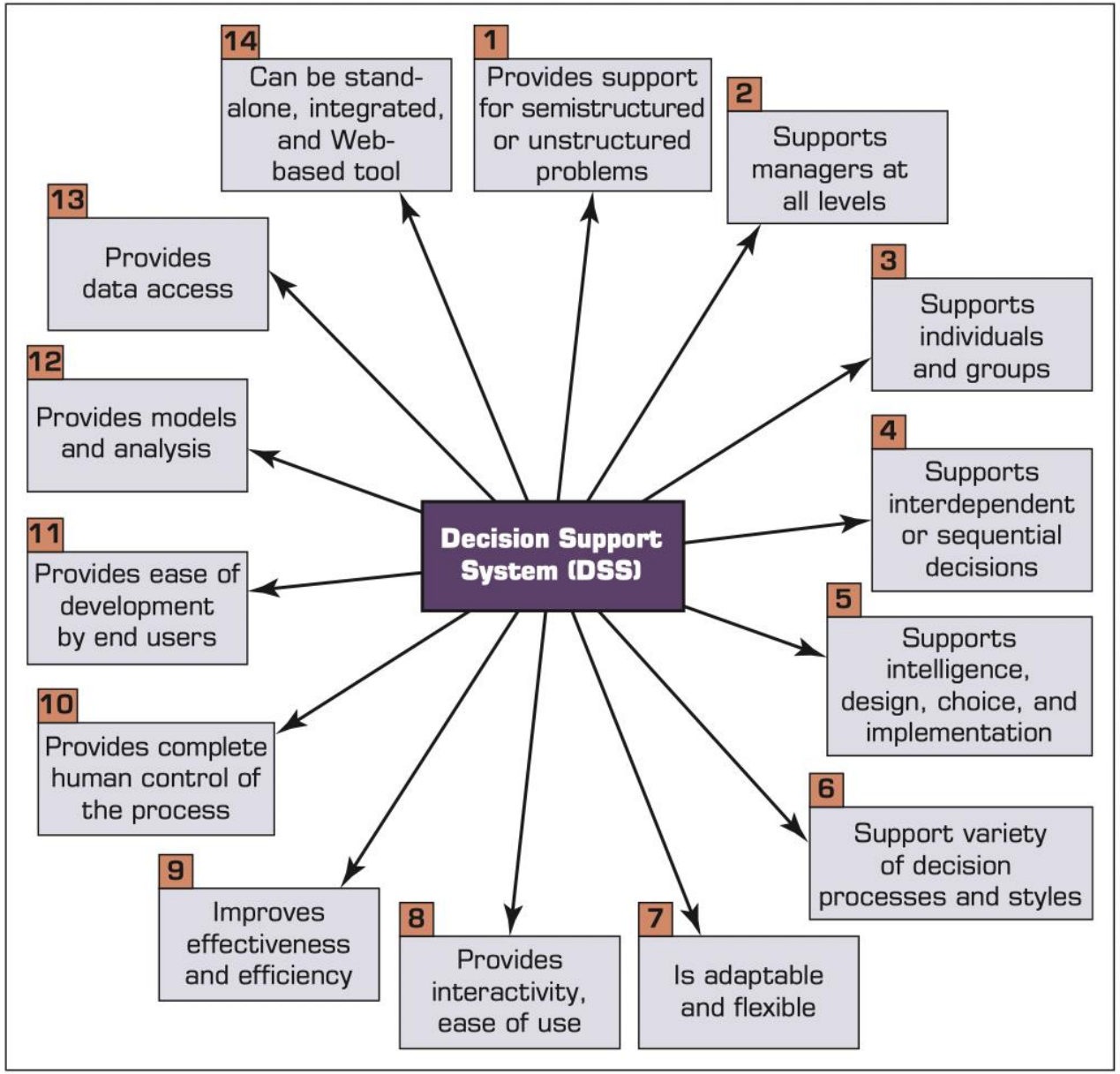
  ad hoc DSS and institutional DSS

- Support for **Various Decision-Making Levels**

  provide help for managers at various levels within an organization.

Objectives of Using DSS

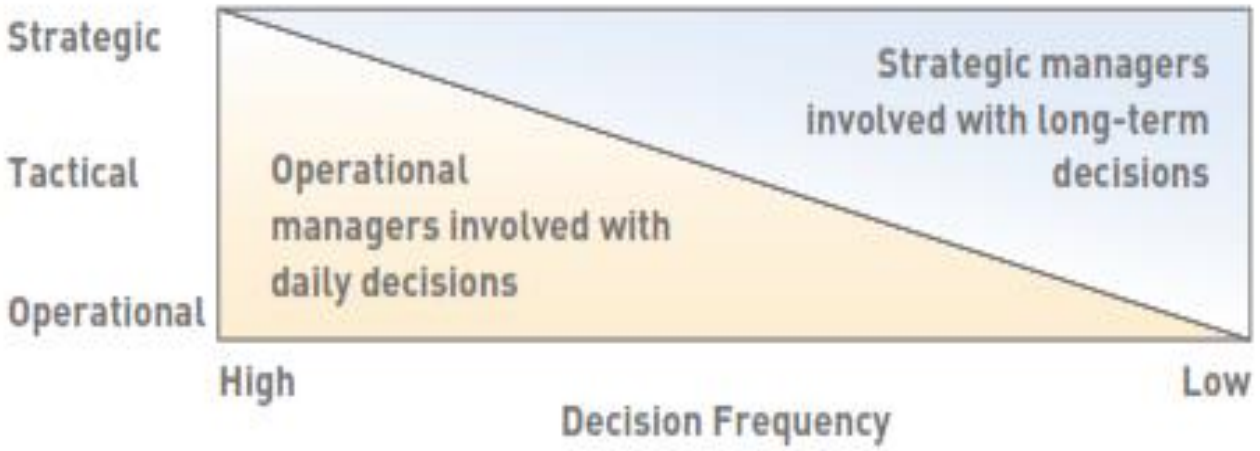
- Supports **finding solutions** to complex problems.
- **Quick response** to changing/uncertain situations and conditions.
- Implement **various strategies with different configurations** quickly and precisely.
- **New views and learning**.
- Facilitate **communication**.
- Improve management **control** and performance.
- Save **cost**.
- Speed up **decision making**.
- Increase **managerial effectiveness**, work shorter hours with less effort.
- Increase **analysis productivity**.



Key Characteristics and Capabilities of DSS

Types of Decision Forms and Their Users

Type of Decision	Type of Control: Operational Control	Type of Control: Managerial Control	Type of Control: Strategic Planning
Structured	1 Monitoring accounts receivable Monitoring accounts payable Placing order entries	2 Analyzing budget Forecasting short-term Reporting on personnel Making or buying	3 Managing finances Monitoring investment portfolio Locating warehouse Monitoring distribution systems
Semistructured	4 Scheduling production Controlling inventory	5 Evaluating credit Preparing budget Laying out plant Scheduling project Designing reward system Categorizing inventory	6 Building a new plant Planning mergers and acquisitions Planning new products Planning compensation Providing quality assurance Establishing human resources policies Planning inventory
Unstructured	7 Buying software Approving loans Operating a help desk Selecting a cover for a magazine	8 Negotiating Recruiting an executive Buying hardware Lobbying	9 Planning research and development Developing new technologies Planning social responsibility

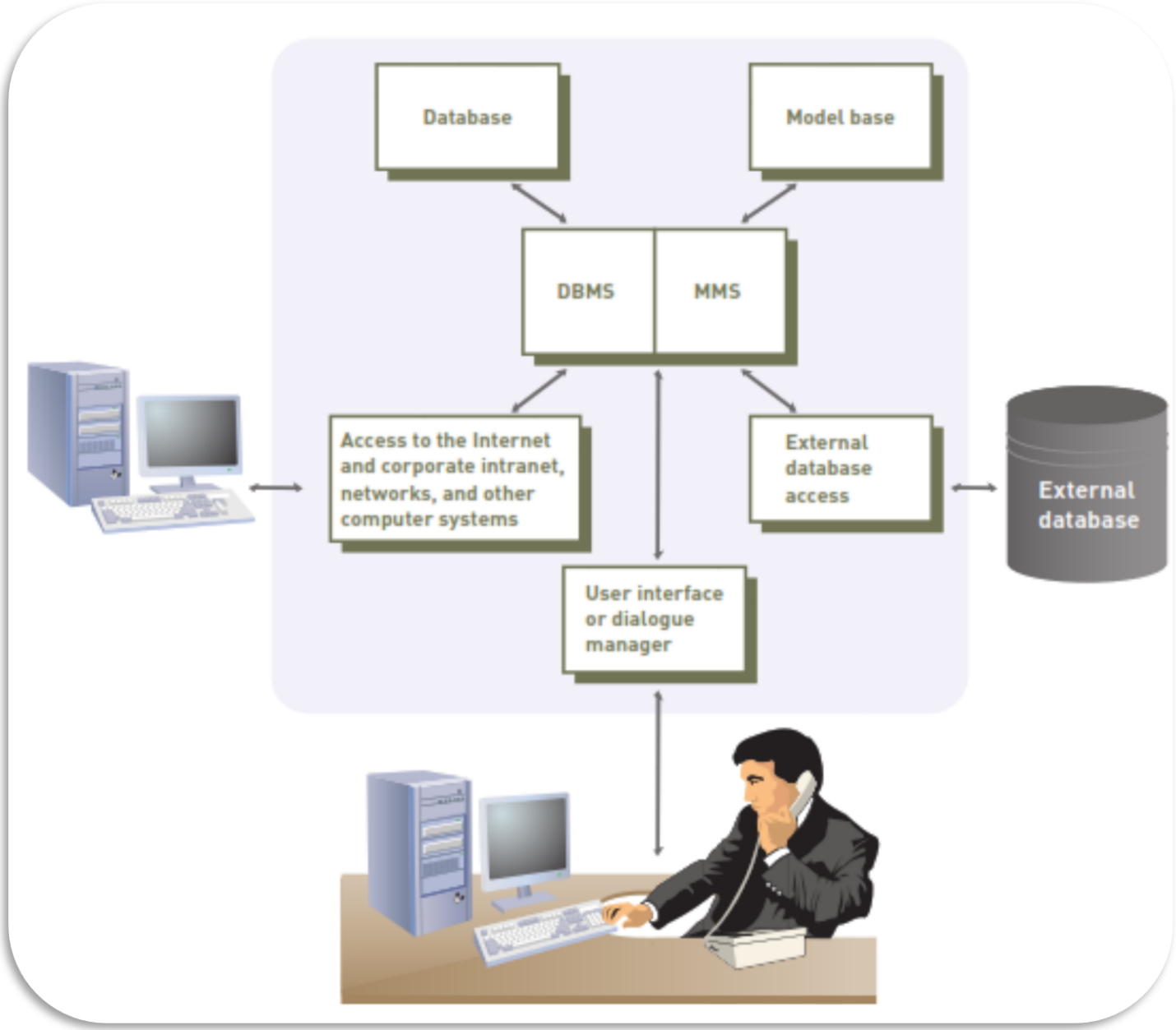


Problems → Decision

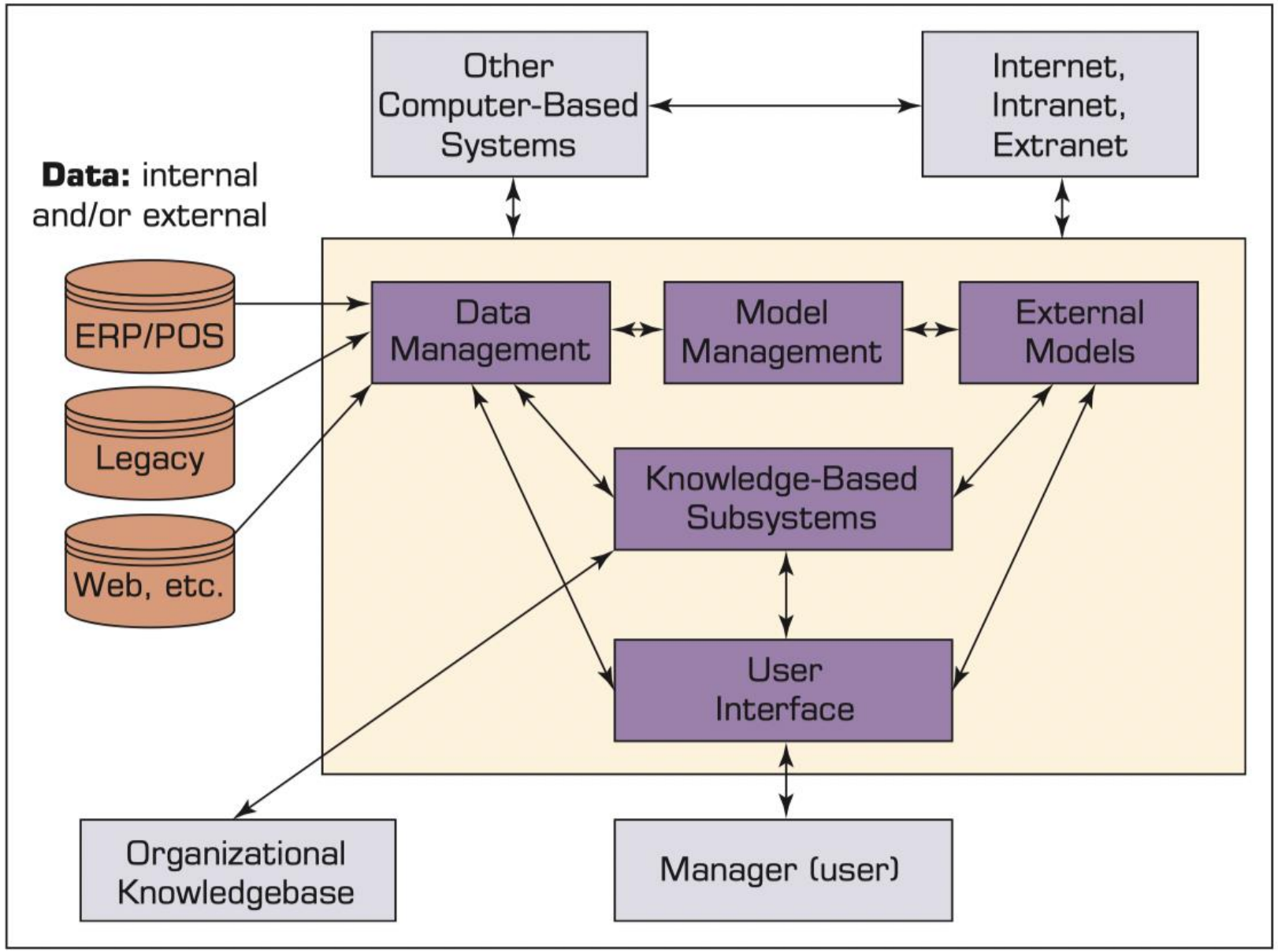
Problems	Decision
• Structured: 3 stages including intelligent, design, choice • Unstructured: does not include 3 stages • Semi Structured: one/2 stages	1. There are many alternatives 2. There are conditions 3. Follows a structured or unstructured pattern 4. There are many inputs/variables 5. There are risk factors 6. It requires speed, accuracy and precision

Components of DSS

Data Management	• Database Management Systems (DBMS), which organize relevant data
Model Management	• Analytical skills, which involving financial models, statistics, management science, or various other quantitative models
Communication (Dialog Subsytem)	• User interface, to interact with DSS
Knowledge Management	• Independent subsystem, which is optimal and supports other subsystems



Components of DSS

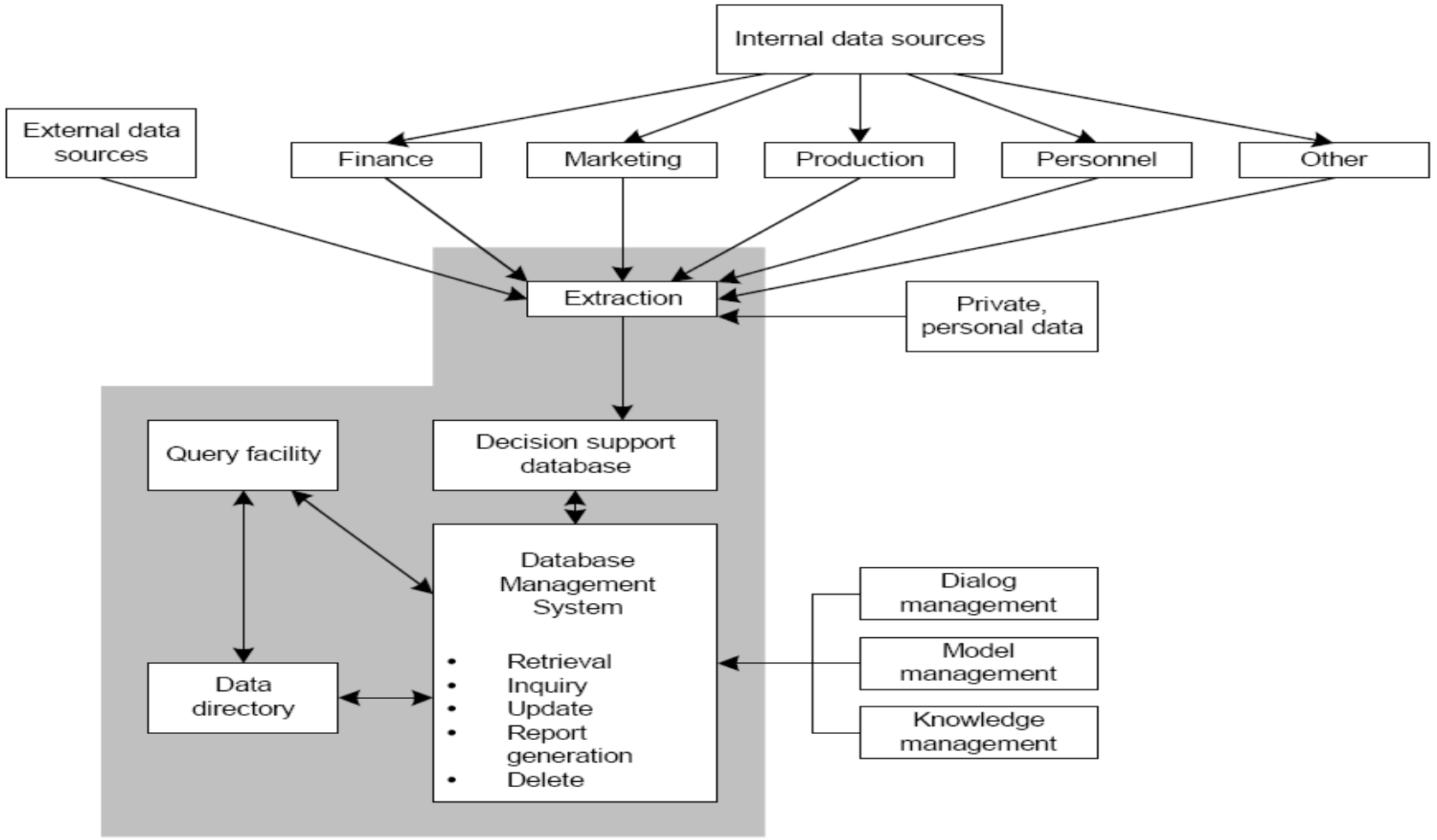


Schematic View of DSS

Technical Stages of DSS

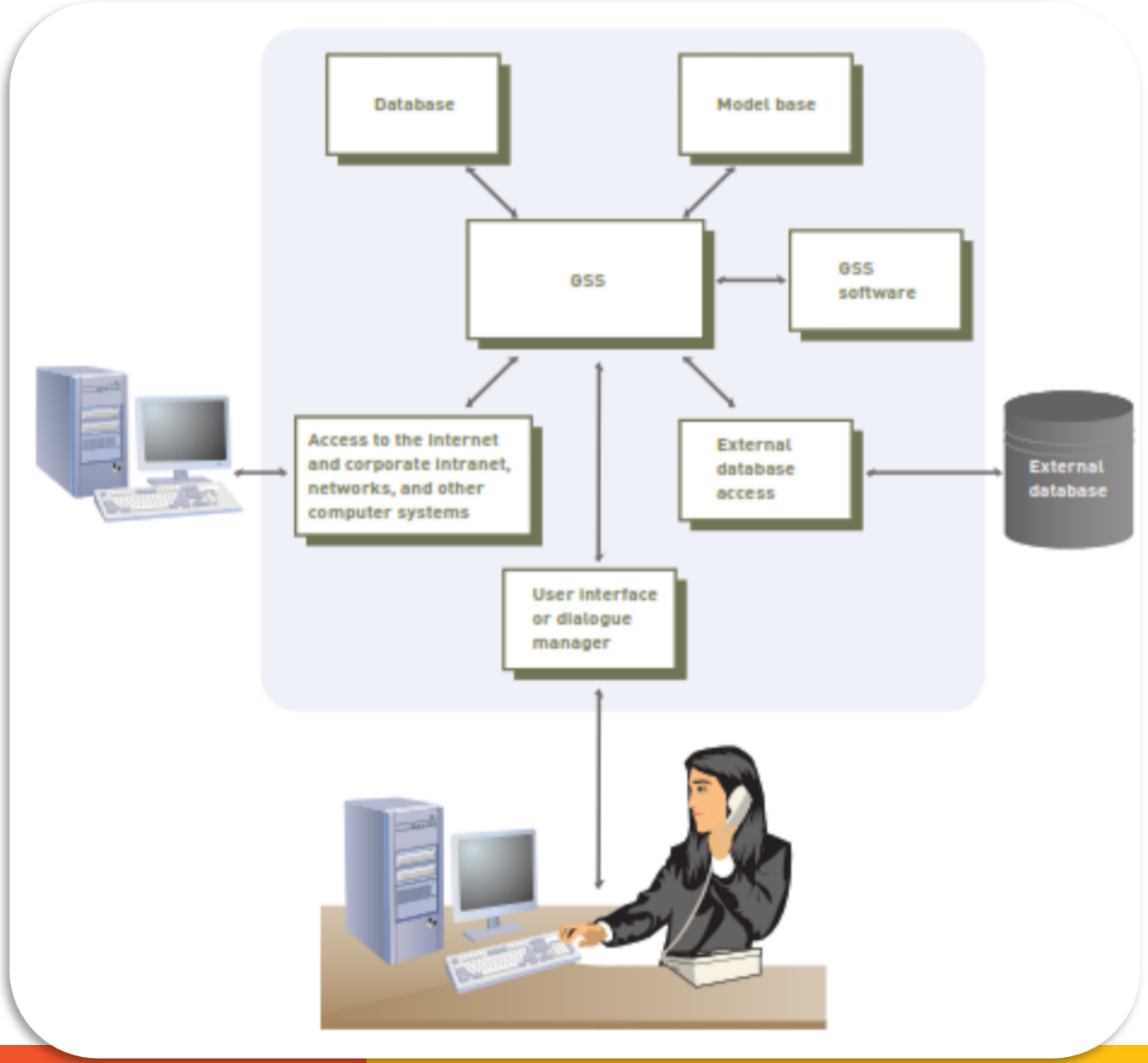
1. **Problem** definition
2. **Collection of relevant data** or information elements
3. **Processing data** into information in the form of graphic and written reports
4. **Determination of alternative solutions** (can be in percentage)

Example of DSS Architecture



Limitations of DSS

- There are management capabilities and human talents **that cannot be modeled** into a system.
- **Knowledge treasury**.
- **Depends** on the capabilities of the software used.
- **Does not have intuitive abilities**.



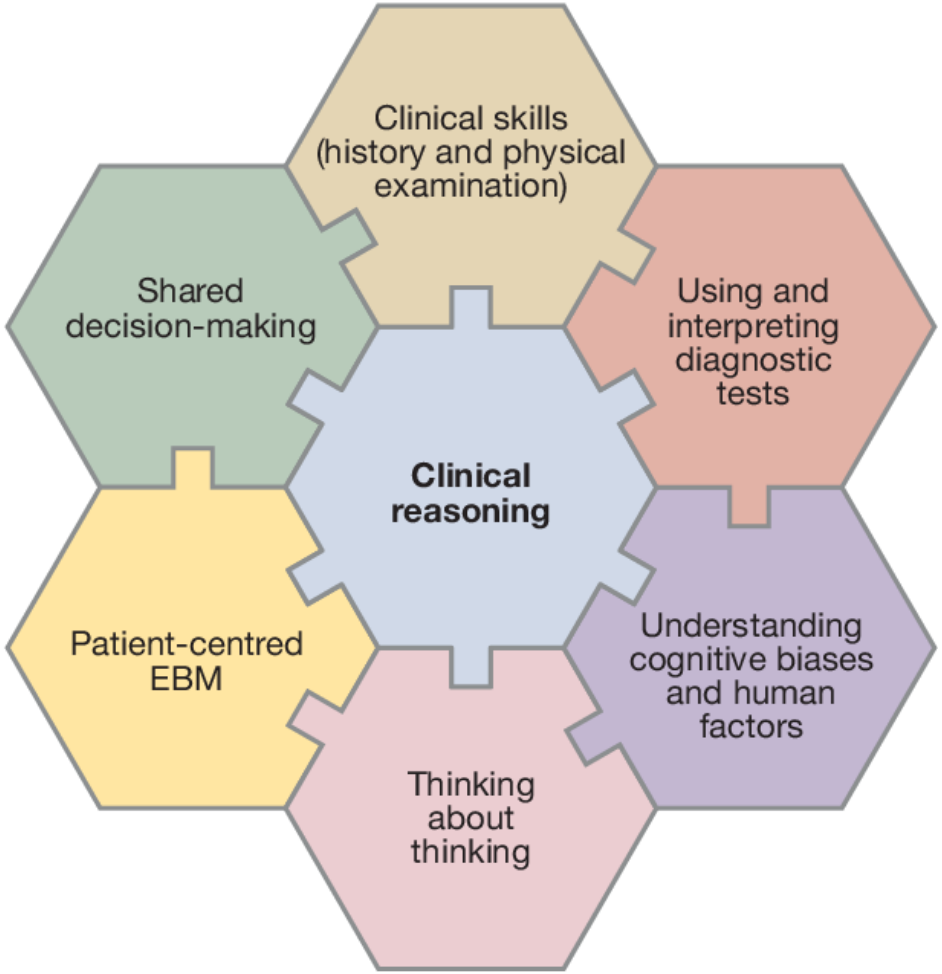
Group DSS (GDSS)

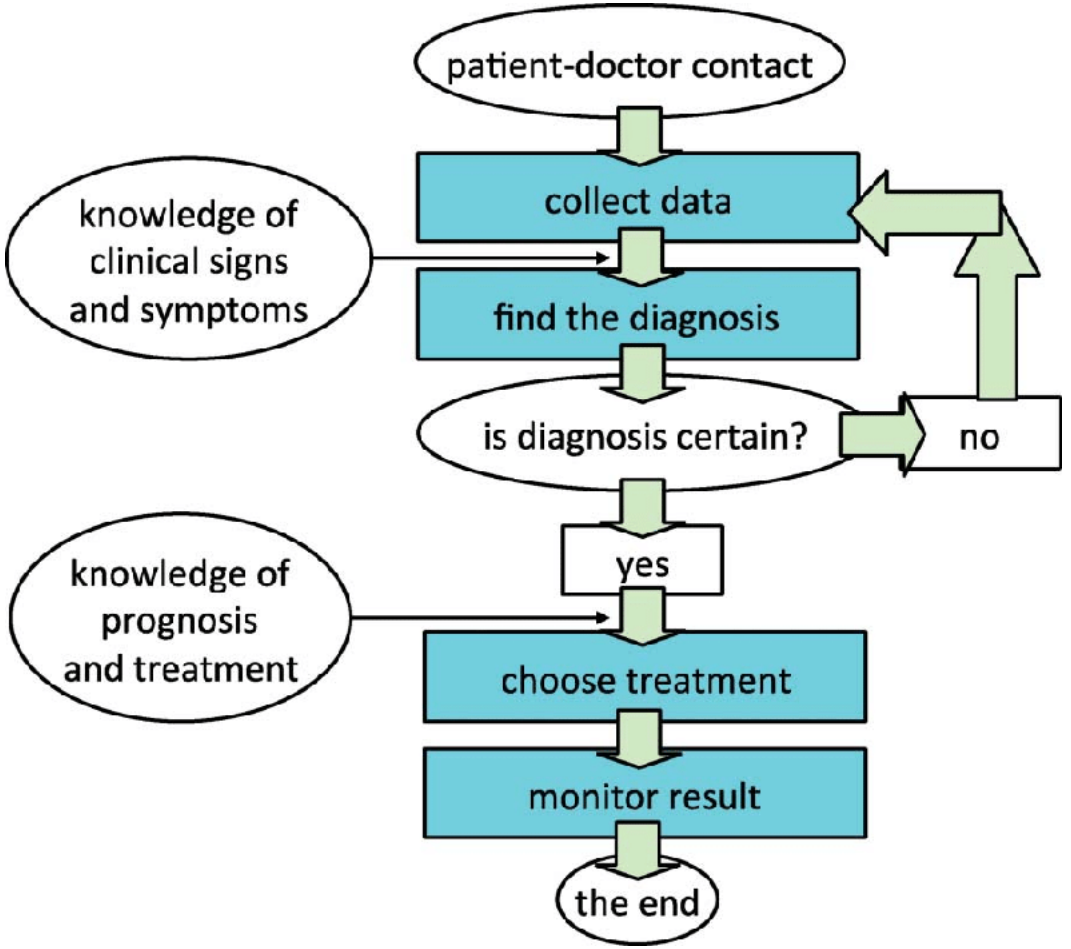
- **A group support system and a computerized collaborative work system**, consists of most of the elements in a DSS, plus software to provide effective support in group decision-making settings

Clinical Decision Making

- **Clinical decision making** is a contextual, continuous, and evolving process, where data are gathered, interpreted, and evaluated to select **an evidence-based choice of action**.

Clinical Decision Making





OODA Decision Making Loop

- A way of thinking about the decision-making process
- Encourages decision-makers to think critically, anticipate threats, and neutralize them before they become critical