Chapter 6 E- Business Decision Support

E-Business Decision Support Trends: Major changes are taking place in traditional MIS, DSS, and EIS tools for providing the information and modeling managers need to support their decision making. Decision support in business is changing, driven by rapid developments in end user computing and networking: Internet, Web browser, and related technologies; and the explosion of E-commerce activity. The growth of corporate intranets, extranets, as well as the Web, has accelerated the development of "executive class" interfaces like enterprise information portals, enterprise knowledge portals, and Web-enabled decision support software tools, and their use by lower levels of management and by individuals and teams of business professionals. In addition, the dramatic expansion of E-commerce has opened the door to the use of enterprise portals and DSS tools by the suppliers, customers, and other business stakeholders of a company for customer relationship and supply chain management and other E-business applications.

Information, Decisions, and Management: Information systems can support a variety of management decision-making levels and decisions. These include the three levels of management activity (strategic, tactical, and operational decision making) and three types of decision structures (structured, semi-structured, and unstructured). Information systems provide a wide range of information products to support these types of decisions at all levels of the organization.

Management Information Systems: Management information systems provide pre-specified reports and responses to managers on a periodic, exception, demand, or push reporting basis, to meet their need for information to support decision making.

OLAP and Data Mining: Online analytical processing interactively analyzes complex relationships among large amounts of data stored in multidimensional databases. Data mining analyzes the vast amounts of historical data that have been prepared for analysis in data warehouses. Both technologies discover patterns, trends, and exception conditions in a company's data that support their business analysis and decision making.

Decision Support Systems: Decision support systems are interactive, computer-based information systems that use DSS software and a model base and database to provide information tailored to support semi-structured and unstructured decisions faced by individual managers. They are designed to use a decision maker's own insights and judgments in an ad hoc, interactive, analytical modeling process leading to a specific decision.

Analytical Modeling: Using a decision support system is an interactive, analytical modeling process, consisting of what-if analysis, sensitivity analysis, goal-seeking analysis, and optimization analysis activities. Decision support system applications may be institutional or ad hoc but are typically developed to support the types of decisions faced by specific industries, functional areas, and decision makers.

Executive Information Systems: Executive information systems are information systems originally designed to support the strategic information needs of top management. However, their use is spreading to lower levels of management. EIS are easy to use and enable executives to retrieve information tailored to their needs and preferences. Thus, EIS can provide information about a company's critical success factors to executives to support their planning and control responsibilities.

Artificial Intelligence: The major application domains of artificial intelligence (AI) include a variety of applications in cognitive science, robotics, and natural interfaces. The goal of AI is the development of computer functions normally associated with human physical and mental capabilities, such as robots that see, hear, talk, feel, and move, and software capable of reasoning, learning, and problem solving. Thus, AI is being applied to many applications in business operations and managerial decision making, as well as in many other fields. AI Technologies. The many application areas of AI are summarized in Figure 6.21, including neural networks, fuzzy logic, genetic algorithms, virtual reality, and intelligent agents. Neural nets are hardware or software systems based on simple models of the brain's neuron structure that can learn to recognize patterns in data. Fuzzy logic systems use rules of approximate reasoning to solve problems where data are incomplete or ambiguous. Genetic algorithms use selection, randomizing, and other mathematics functions to simulate an evolutionary process that can yield increasingly better solutions to problems. Virtual reality systems are multisensory systems that enable human users to experience computer-simulated environments as if they actually existed. Intelligent agents are knowledge-based software surrogates for a user or process in the accomplishment of selected tasks.
**Expert Systems**: Expert systems are knowledge-based information systems that use software and a knowledge base about a specific, complex application area to act as expert consultants to users in many business and technical applications. Software includes an inference engine program that makes inferences based on the facts and rules stored in the knowledge base. A knowledge base consists of facts about a specific subject area and heuristics (rules of thumb) that express the reasoning procedures of an expert. The benefits of expert systems (such as preservation and replication of expertise) must be balanced with their limited applicability in many problem situations.

**Key Terms and Concepts**
*These are the key terms and concepts of this chapter. The page number of their first explanation is in parentheses.*

1. Analytical modeling
   a. Goal-seeking analysis
   b. Optimization analysis
   c. Sensitivity analysis
   d. What-if analysis
2. Artificial intelligence
   a. Application areas
   b. Domains
3. Data mining
4. Data visualization system
5. Decision structure
6. Decision support versus management reporting
7. Decision support system
8. DSS software
9. E-business DSS
10. E-business decision support trends
11. Enterprise information portal
12. Executive information system
13. Expert system
   a. Applications
   b. Benefits and limitations
   c. Components
   d. System development
14. Expert system shell
15. Fuzzy logic
16. Genetic algorithms
17. Geographic information system
18. Inference engine
19. Intelligent agent
20. Knowledge base
21. Knowledge engineer
22. Knowledge management system
23. Level of management decision making
24. Management information system
25. Management support system
26. Model base
27. Neural network
28. Online analytical processing
29. Reporting alternatives
30. Robotics
31. Virtual reality
Review Quiz

Match one of the key terms and concepts listed previously with one of the brief examples or definitions that follow. Try to find the best fit for answers that seem to fit more than one term or concept. Defend your choices.

1. Internet technologies and E-commerce developments have expanded the form and use of decision support in business.
2. A Web-enabled system of decision support for E-business managers, employees, and business partners.
3. A CEO and a production team may have different needs for decision making.
4. Decision-making procedures cannot be specified in advance for some complex decision situations.
5. An information system category that includes management information systems, decision support systems, and executive information systems.
6. Systems that produce predefined reports for management.
7. Managers can receive reports periodically, on an exception basis, or on demand.
8. Provide an interactive modeling capability tailored to the specific information needs of managers.
9. Interactive responses to ad hoc inquiries versus pre-specified information.
10. A collection of mathematical models and analytical techniques.
11. Analyzing the act of changing variables and relationships and manipulating a mathematical model.
12. Changing revenues and tax rates to see the effect on net profit after taxes.
13. Changing revenues in many small increments to see revenue’s effect on net profit after taxes.
14. Changing revenues and expenses to find how you could achieve a specific amount of net profit after taxes.
15. Changing revenues and expenses subject to certain constraints in order to achieve the highest profit after taxes.
16. Information systems for the strategic information needs of top and middle managers.
17. Real-time analysis of complex business data.
18. Attempts to find patterns hidden in business data in a data warehouse.
20. Customized and personalized Web interface to company resources available through a corporate intranet.
21. Using intranets to gather, store, and share a company's best practices.
22. Information technology that focuses on the development of computer functions normally associated with human physical and mental capabilities.
23. Applications in cognitive science, robotics, and natural interfaces.
24. Development of computer-based machines that possess capabilities such as sight, hearing, dexterity, and movement.
25. Computers can provide you with computer simulated experiences.
26. An information system that integrates computer graphics, geographic databases, and DSS capabilities.
27. A knowledge-based information system that acts as an expert consultant to users in a specific application area.
28. Applications such as diagnosis, design, prediction, interpretation, and repair.
29. These systems can preserve and reproduce the knowledge of experts but have a limited application focus.
30. A collection of facts and reasoning procedures in a specific subject area.
31. A software package that manipulates a knowledge base and makes associations and inferences leading to a recommended course of action.

32. A software package consisting of an inference engine and user interface programs used as an expert system development tool.

33. One can either buy a completely developed expert system package, develop' one with an expert system shell, or develop one from scratch by custom programming.

34. An analyst who interviews experts to develop a knowledge base about a specific application area.

35. AI systems that use neuron structures to recognize patterns in data.

36. AI systems that use approximate reasoning to process ambiguous data.

37. Knowledge-based software surrogates that do things for you.

38. Software that uses mathematical functions to simulate an evolutionary process.

**Discussion Questions**

1. Is the form and use of information and decision support in E-business changing and expanding? Why or why not?

2. Has the growth of self-directed teams to manage work in organizations changed the need for strategic, tactical, and operational decision making in business?

3. What is the difference between the ability of a manager to retrieve information instantly on demand using an MIS and the capabilities provided by a DSS?

4. Refer to the Siemens/ShareNet Real World Case in the chapter. How could Siemens improve ShareNet so it could be a more useful knowledge management system? Explain your reasoning.

5. In what ways does using an electronic spreadsheet package provide you with the capabilities of a decision support system?

6. Why is the use of executive information systems expanding into the ranks of middle management and throughout an organization?

7. Refer to the Real World Case on RivalWatch.com and Others in the chapter. What other information would you like to know about your business competitors? How might AI technologies obtain it from the Web?

8. Can computers think? Will they ever be able to? Explain why or why not.

9. What are some of the most important applications of AI in business? Defend your choices.

10. What are some of the limitations or dangers you see in the use of AI technologies such as expert systems, virtual reality, and intelligent agents? What could be done to minimize such effects?