Porter's strategies suggest entering markets with a competitive advantage in either overall cost leadership, differentiation, or focus.Managers should also ask, "What is the DSS not telling me before I make my final decision? 4.6.1 Artificial Intelligence Executive information systems are starting to take advantage of artificial intelligence to facilitate unstructured strategic decision making. Artificial Intelligence (AI) simulates human thinking and behavior, such as the ability to reason and learn. Its goal is to build a system that can mimic human intelligence. Intelligent systems are various commercial applications of artificial intelligence, Figure 4.9 shows how TPSS supply transactional data to a DSS. They include sensors, software, and devices that emulate and enhance human capabilities, learn, or understand from experience, make sense of ambiguous or contradictory information, and even reasoning to solve problems and make decisions effectively. Intelligent systems perform such tasks as boosting productivity in factories by monitoring equipment and signaling when preventive maintenance is required. They are beginning to show up everywhere: Expert systems are computerized advisory programs that imitate the reasoning processes of experts in solving difficult problems. Typically, they include a knowledge base containing various accumulated experience and a set of rules for applying the knowledge base to each particular situation. Expert systems are the most common form of AI in the business arena because they fill the gap when human experts are difficult to find or retain or are too expensive. The best-known systems play chess and assist in medical diagnosis. 4.6.3 Neural Networks A neural network, also called an artificial neural network, is a category of AI that attempts to emulate the way the human brain works. Neural networks analyze large quantities of information to establish patterns and characteristics in situations where the logic or rules are unknown. Neural networks' many features include: Learning and adjusting to new circumstances on their own. Lending themselves to massive parallel processing. Functioning without complete or well-structured information. Coping with huge volumes of information with many dependent variables. Analyzing nonlinear relationships in information (they have been called fancy regression analysis systems). The finance industry is a veteran in the use of neural network technology and has been relying on various forms for over two decades. It uses neural networks to review loan applications and create patterns or profiles of applications that fall into two categories approved or denied. Here are some examples of neural networks in finance: Citibank uses neural networks to find opportunities in financial markets. By carefully examining historical stock market data with neural network software, Citibank financial managers learn of interesting coincidences or small anomalies (called market inefficiencies). For example, it could be that whenever IBM stock goes up, so does Unisys stock, or that a U.S. Treasury note is selling for 1 cent less in Japan than in the United States. These snippets of information can make a big difference to Citibank's bottom line in a very competitive financial market. Visa, MasterCard, and many other credits card companies use a neural network to spot peculiarities in individual accounts and follow up by checking for fraud. MasterCard estimates neural networks save it $50 million annually. Insurance companies along with state compensation funds and other carriers use neural network software to identify fraud. The system searches for patterns in billing charges, laboratory tests, and frequency of office visits. A claim for which the diagnosis was a sprained ankle but treatment included an electrocardiogram would be flagged for the account manager. 4.6.4 Fuzzy Logic Fuzzy logic is a mathematical method of handling imprecise or

subjective information. The basic approach is to assign values between 0 and 1 to vague or ambiguous information. Zero represents information not included, while 1 represents inclusion or membership. For example, fuzzy logic is used in washing machines that determine by themselves how much water to use or how long to wash (they continue washing until the water is clean). In accounting and finance, fuzzy logic allows people to analyze information with subjective financial values (intangibles such as goodwill) that are very important considerations in economic analysis. Fuzzy logic and neural networks are often combined to express complicated and subjective concepts in a form that makes it possible to simplify the problem and apply rules that are executed with a level of certainty. 4.6.5 Genetic Algorithms A genetic algorithm is an artificial intelligence system that mimics the evolutionary, survival-of-the-fittest process to generate increasingly better solutions to a problem. A genetic algorithm is essentially an optimizing system: It finds the combination of inputs that gives the best outputs. Mutation is the process within a genetic algorithm of randomly trying combinations and evaluating the success (or failure) of the outcome. Genetic algorithms are best suited to decision-making environments in which thousands, or perhaps millions, of solutions are possible. Genetic algorithms can find and evaluate solutions with many more possibilities, faster and more thoroughly than a human. Organizations face decision- making environments for all types of problems that require optimization techniques, such as the following: Business executives use genetic algorithms to help them decide which combination of projects a firm should invest in, taking complicated tax considerations into account. Investment companies use genetic algorithms to help in trading decisions. Telecommunication companies use genetic algorithms to determine the optimal configuration of fiber-optic cable in a network that may include as many as 100,000 connection points. The genetic algorithm evaluates millions of cable configurations and selects the one that uses the least amount of cable. 4.6.6 Intelligent Agents An intelligent agent is a special-purpose knowledge-based information system that accomplishes specific tasks on behalf of its users. Intelligent agents usually have a graphical representation, such as "Sherlock Holmes" for an information search agent.("coarser" Granularity refers to the level of detail, granularity is usually used to characterize the scale or level of detail in a set of data, the model or the decision-making process.One thing to remember when making decisions is the old saying, "Garbage in, garbage out."For example, "What will happen to the supply chain if a hurricane in South Carolina reduces holding inventory from 30 percent to 10 percent?"Optimization analysis, an extension of goal-seeking analysis, finds the optimum value for a target variable by repeatedly changing other variables, subject to specified constraints.An Executive Information System (EIS) is a specialized DSS that supports senior-level executives and unstructured, long-term, non- routine decisions requiring judgment, evaluation, and insight.For example, repeatedly changing revenue in small increments to determine its effects on other variables would help a manager understand the impact of various revenue levels on other decision factors.Sensitivity analysis is useful when users are uncertain about the assumptions made in estimating the value of certain key variables.Instead of observing how changes in a variable affect other variables, goal seeking analysis sets a target value (a goal) for a variable and then repeatedly changes other variables until the target value is achieved.By changing revenue and cost variables in an optimization analysis, managers can calculate the highest potential profits.Goal-seeking analysis finds the inputs necessary to achieve a goal

such as a desired level of output.Constraints on revenue and cost variables can be taken into consideration, such as limits on the amount of raw materials the company can afford to purchase and limits on employees available to meet production needs.4.5.3 Strategic Support Systems Decision making at the strategic level requires both business intelligence and knowledge to support the uncertainty and complexity associated with business strategies.A user would be able to observe and evaluate any changes that occurred to the values in the model, especially to a variable such as profits.Sensitivity analysis, a special case of what–if analysis, is the study of the impact on other variables when one variable is changed repeatedly.For example, goal–seeking analysis could determine how many customers must purchase a new product to increase gross profits to $5 million.Users repeat this analysis with different variables until they understand all the effects of various situations.It is the reverse of what– if and sensitivity analysis.These decisions do not have a right or wrong answer, only efficient and effective answers