Enhancing Decision Making

LEARNING OBJECTIVES

- **Describe different types of decisions and the decision-making process.**
- **Assess how information systems support the activities of managers and management decision making.**
- **Demonstrate how decision-support systems (DSS) differ from MIS and how they provide value to the business.**

LEARNING OBJECTIVES (cont'd)

- **Demonstrate how executive support systems (ESS) help senior managers make better decisions.**
- **Evaluate the role of information systems in helping people working in a group make decisions more efficiently.**

Example of Supply Chain

- **Problem:** Cost pressures, complex supply chain.
- **Solutions:** Deploy modeling and optimization software to maximize return on investment and predict the most successful supply chain.
- Modeling software fueled with data from Oracle data warehouse improved efficiency and reduced costs.
- Demonstrates IT's role in restructuring a supply chain.
- Illustrates digital technology improving decision making through information systems.

Decision Making and Information Systems

- **Senior managers:**
  - Make many unstructured decisions
  - E.g. Should we enter a new market?
- **Middle managers:**
  - Make more structured decisions but these may include unstructured components
  - E.g. Why is order fulfillment report showing decline in Minneapolis?
- **Operational managers, rank and file employees**
  - Make more structured decisions
  - E.g. Does customer meet criteria for credit?

Decision Making and Information Systems

- **Information systems can only assist in some of the roles played by managers**
- **Classical model of management**
  - Five functions of managers
    - Planning, organizing, coordinating, deciding, and controlling
- **More contemporary behavioral models**
  - Actual behavior of managers appears to be less systematic, more informal, less reflective, more reactive, and less well organized than in classical model
  - Mintzberg's behavioral model of managers defines 10 managerial roles falling into 3 categories

Decision Making and Information Systems

- **Three main reasons why investments in information technology do not always produce positive results**

1. **Information quality**
   - High-quality decisions require high-quality information
2. **Management filters**
   - Managers have selective attention and have variety of biases that reject information that does not conform to prior conceptions
3. **Organizational culture**
   - Strong forces within organizations resist making decisions calling for major change

Systems for Decision Support

- **Management information systems (MIS)**
  - Help managers monitor and control business by providing information on firm's performance and address structured problems
  - Typically produce fixed, regularly scheduled reports based on data from TPS
    - E.g. **exception reports**: Highlighting exceptional conditions, such as sales quotas below anticipated level
  - E.g. **California Pizza Kitchen MIS**
    - For each restaurant, compares amount of ingredients used per ordered menu item to predefined portion measurements and identifies restaurants with out-of-line portions

Systems for Decision Support

- **Model:**
  - Abstract representation that illustrates components or relationships of phenomenon; may be physical, mathematical, or verbal model
  - **Statistical models**
  - **Optimization models**
  - **Forecasting models**
  - **Sensitivity analysis models**

Systems for Decision Support

Sensitivity Analysis

Total fixed costs	19000					
Variable cost per unit	3					
Average sales price	17					
Contribution margin	14					
Break-even point	1357					
		Variable Cost per Unit				
Sales	1357	2	3	4	5	6
Price	14	1583	1727	1900	2111	2375
	15	1462	1583	1727	1900	2111
	16	1357	1462	1583	1727	1900
	17	1267	1357	1462	1583	1727
	18	1188	1267	1357	1462	1583

This table displays the results of a sensitivity analysis of the effect of changing the sales price of a necktie and the cost per unit on the product's break-even point. It answers the question, "What happens to the break-even point if the sales price and the cost to make each unit increase or decrease?"

Figure 12-4

Systems for Decision Support

- **Using spreadsheet pivot tables to support decision making**
  - Online Management Training Inc. (OMT Inc.), sells online management training books and streaming online videos to corporations and individuals
  - Records of online transactions can be analyzed using Excel to help business decisions, e.g.:
    - Where do most customers come from?
    - Where are average purchases higher?
    - What time of day do people buy?
    - What kinds of ads work best?

Systems for Decision Support

Sample List of Transactions for Online Management Training Inc.

Microsoft Excel - Online Mgmt Training List.xls

File Edit View Insert Format Tools Data Window Help Adobe PDF — Type a question for help

A1 — Online Management Training Inc.

	A	B	C	D	E	F	G
1	Online Management Trainingnc.						
2	Transaction Log: October 28						
3							
4							
5	Cust ID	Region	Payment	Source	Amount	Product	Time Of Day
6	10001	East	Paypal	Web	$20.19	Online	22:19
7	10002	West	Credit	Web	$17.85	Online	13:27
8	10003	North	Credit	Web	$23.98	Online	14:27
9	10004	West	Paypal	Email	$23.51	Book	15:38
10	10005	South	Credit	Web	$15.33	Book	15:21
11	10006	West	Paypal	Email	$17.30	Online	13:11
12	10007	East	Credit	Web	$177.72	Book	21:59
13	10008	West	Credit	Web	$21.76	Book	4:04
14	10009	West	Paypal	Web	$15.92	Online	19:35
15	10010	South	Paypal	Web	$23.39	Online	13:26
16	10011	South	Paypal	Email	$24.45	Book	14:17
17	10012	East	Credit	Web	$20.39	Book	1:01
18	10013	North	Paypal	Web	$19.54	Online	10:04
19	10014	East	Credit	Web	$151.67	Book	9:09
20	10015	West	Credit	Web	$21.01	Online	5:05

hex

Ready

This list shows a portion of the order transactions for Online Management Training Inc. (OMT Inc.) on October 28, 2006.

Figure 12-5

- **Microsoft Excel spreadsheet software**
  - **Pivot table**:
    - Categorizes and summarizes data very quickly
    - Displays two or more dimensions of data in a convenient format
  - **PivotTable Wizard has three elements**
    - Empty PivotTable:
      - With labels for rows, columns, and data areas
    - PivotTable Field List
      - Lists fields in list or database
    - PivotTable Toolbar

Systems for Decision Support

The Excel PivotTable Wizard

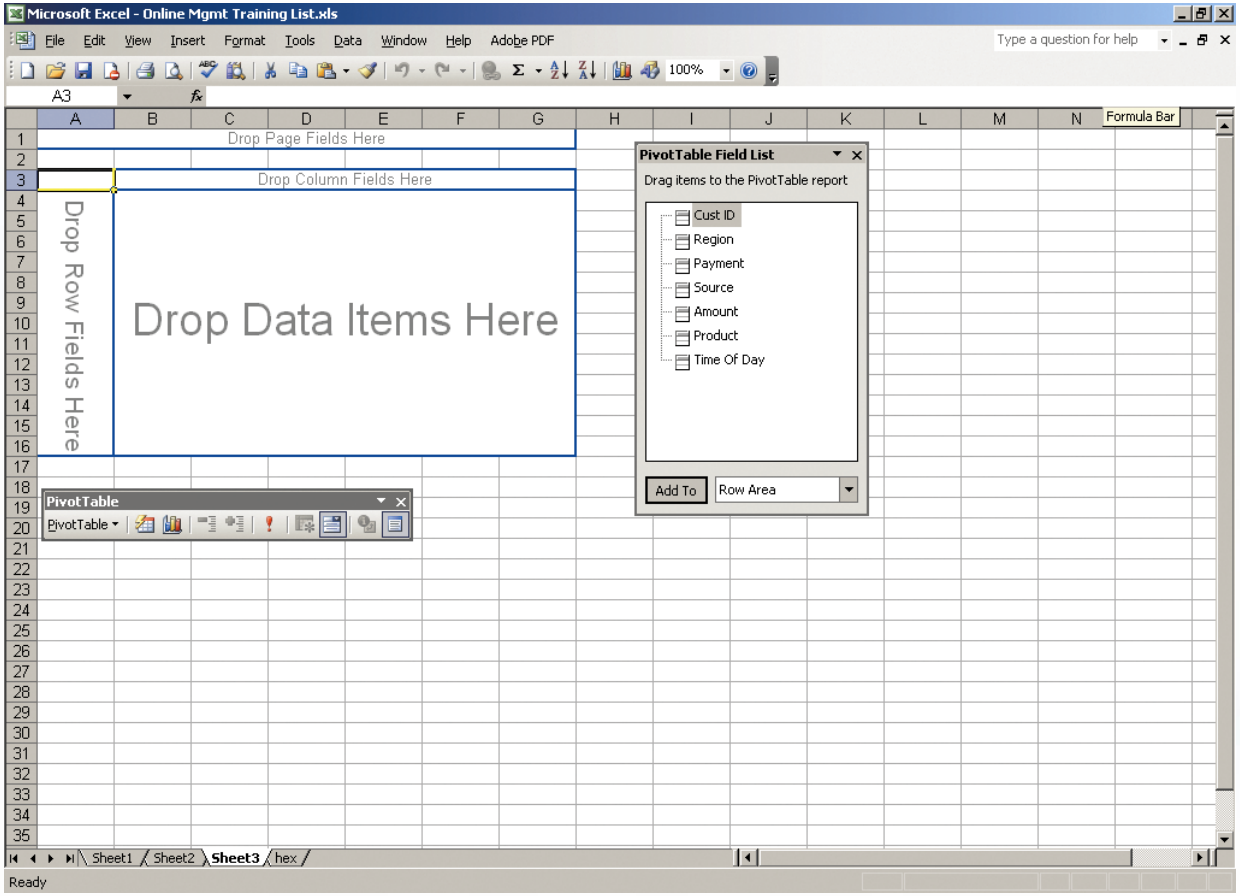


Figure 12-6

The PivotTable Wizard in Excel makes it easy to analyze lists and databases by simply dragging and dropping elements from the Field List

Systems for Decision Support

A Pivot Table that Determines Regional Distribution of Customers

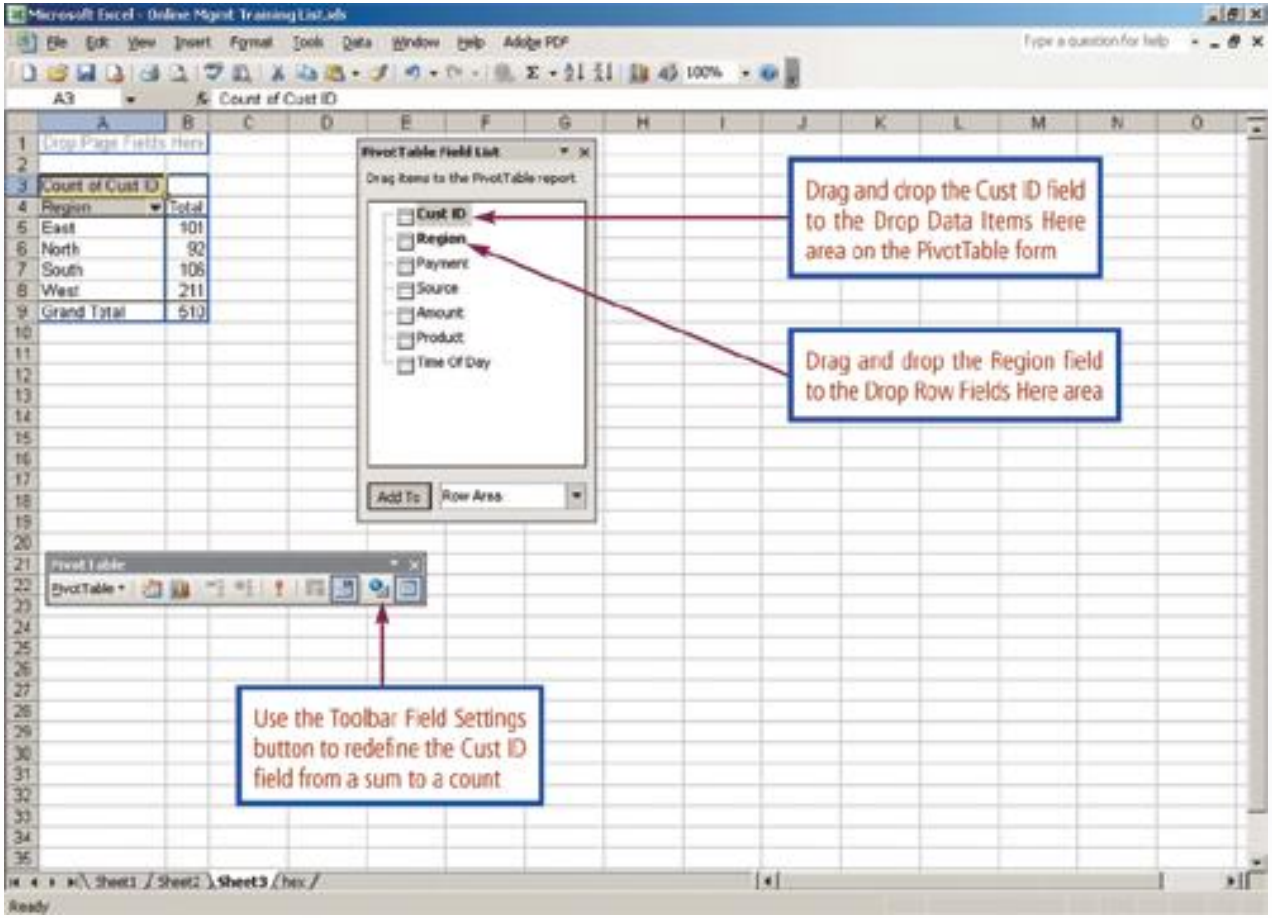


Figure 12-7

By dragging and dropping fields to row and data areas of the pivot table form, you can quickly produce a table showing the relationship between region and number of customers. You will need to use the Field Settings button on the Toolbar to produce this table in order to redefine the Cust ID field as a count rather than a sum so Excel reports the number of customers, not the sum of their customer IDs, which would be meaningless.

Systems for Decision Support

A Pivot Table that Examines Two Dimensions

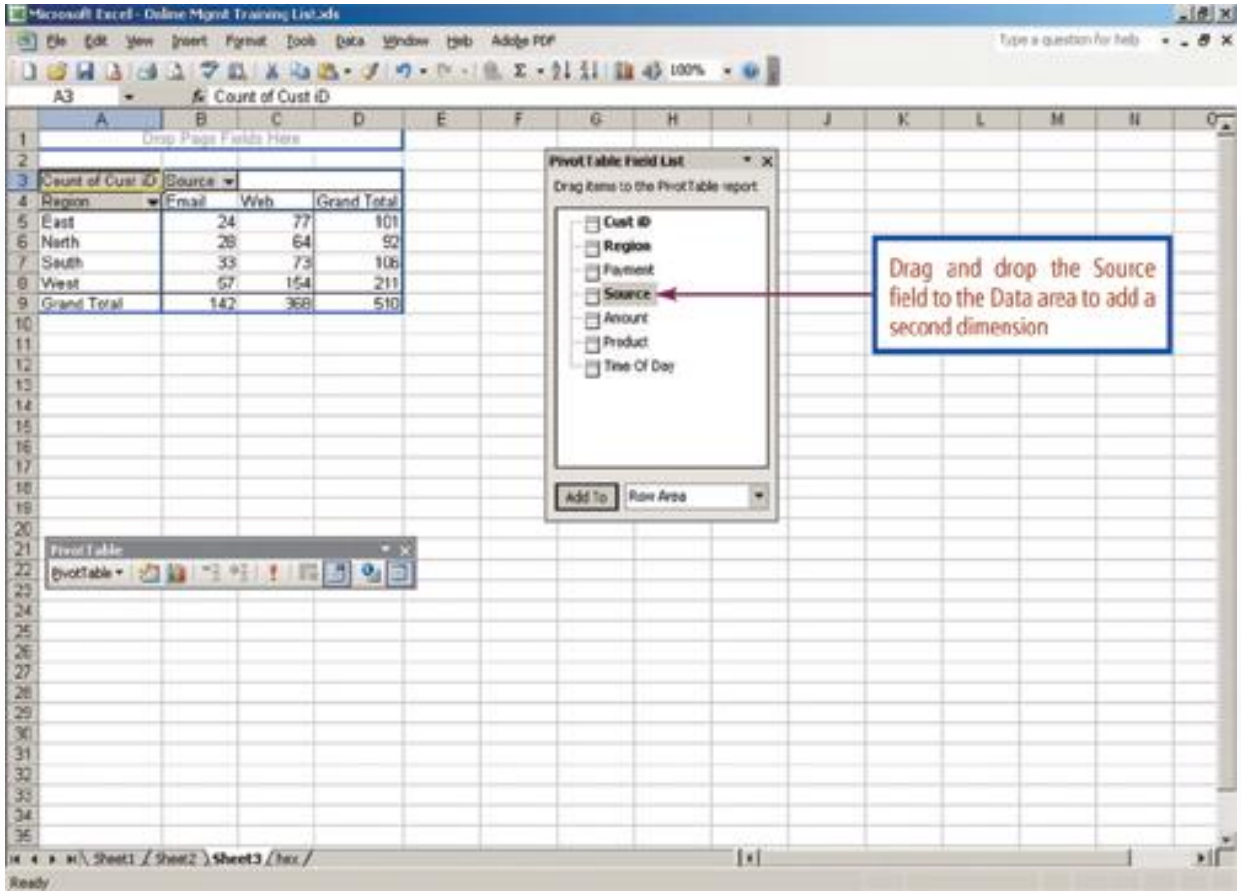


Figure 12-8

In this pivot table, we can examine where our customers come from in terms of two dimensions: region and advertising source. It appears nearly 40 percent of the customers respond to e-mail campaigns, and there are some regional variations in this theme.

Systems for Decision Support

- **Business value of DSS**
- **Burlington Coat Factory: DSS for pricing**
  - DSS manages pricing and inventory nationwide, considering complex interdependencies between initial prices, promotions, markdowns, cross-item pricing effects and item seasonality
- **Syngenta: DSS for profitability analysis**
  - DSS determines if freight charges, employee sales commissions, currency shifts, and other costs in proposed sale make that sale or product unprofitable
- **Compass Bank: DSS for customer relationship management**
  - DSS analyzes relationship between checking and savings account activity and default risk to help it minimize default risk in credit card business

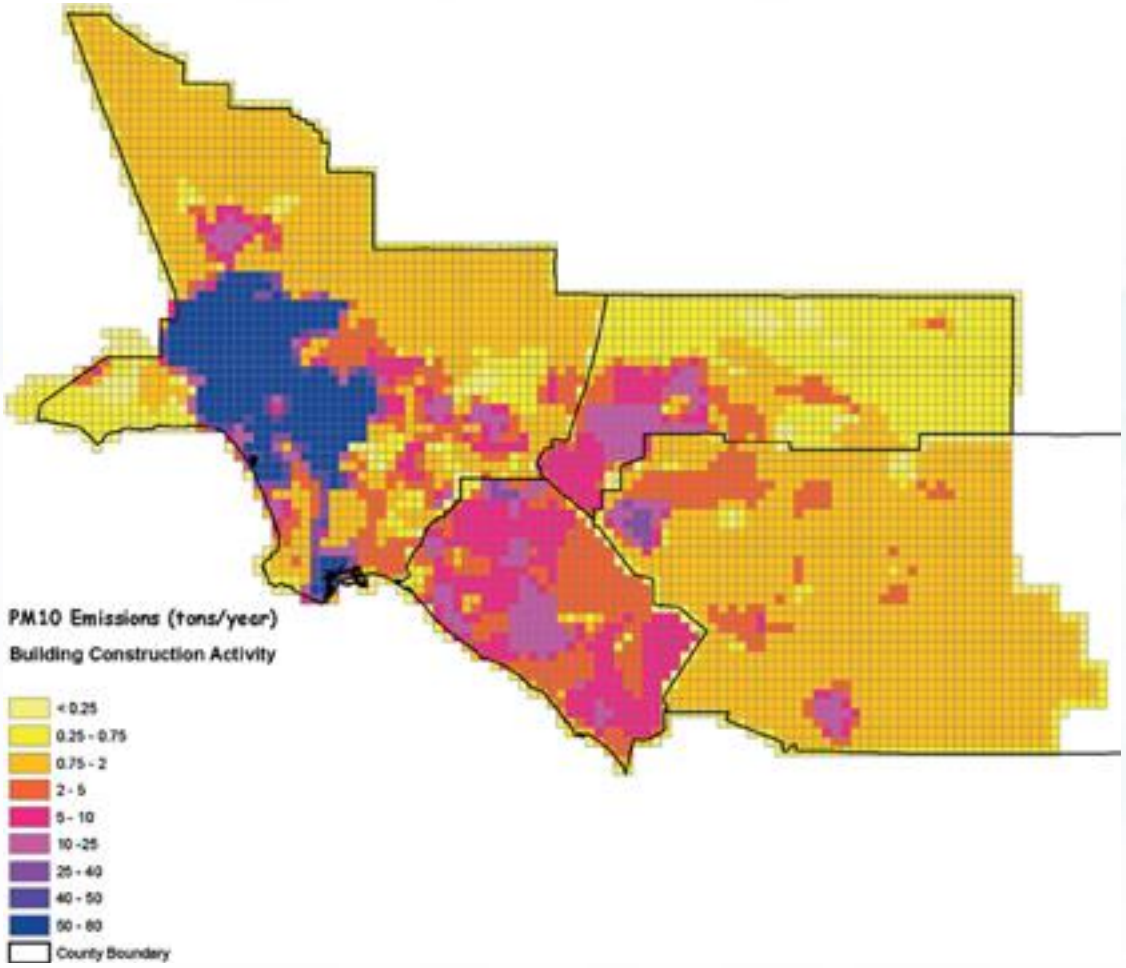
Renault Speeds Up Delivery with a New DSS

- **Read the Interactive Session: Technology, and then discuss the following questions:**
  - **How did this DSS improve decision making at Renault? Describe some of the decisions that were improved by using this system.**
  - **How much of an impact did this DSS have on business performance? Explain your answer.**
  - **What management, organization, and technology factors had to be addressed in order to make this system successful?**

Systems for Decision Support

- **Data visualization tools:**
  - Help users see patterns and relationships in large amounts of data that would be difficult to discern if data were presented as traditional lists of text
- **Geographic information systems (GIS):**
  - Category of DSS that use data visualization technology to analyze and display data in form of digitized maps
  - Used for decisions that require knowledge about geographic distribution of people or other resources, e.g.:
    - Helping local governments calculate emergency response times to natural disasters
    - Help retail chains identify profitable new store locations

Systems for Decision Support



California's South Coast Air Quality Management District (AQMD) is responsible for monitoring and controlling emissions in all of Orange County and the urban portions of Los Angeles, Riverside, and San Bernardino counties. Displayed is a map produced with ESRI GIS software tracking particulate matter emissions from building construction activity in a two-by-two kilometer area.

Systems for Decision Support

- **Web-based customer decision-support systems (CDSS):**
  - Support decision-making process of existing or potential customer
  - Use Web information resources and capabilities for interactivity and personalization to help users select products and services
    - E.g. search engines, intelligent agents, online catalogs, Web directories, newsgroup discussions, other tools
  - Automobile companies that use CDSS to allow Web site visitors to configure desired car
  - Financial services companies with Web-based asset-management tools for customers

Does CompStat Reduce Crime?

- **Read the Interactive Session: Management, and then discuss the following questions:**
  - **What management, organization, and technology factors make CompStat effective?**
  - **Can police departments effectively combat crime without the CompStat system? Explain your answer.**
  - **Why do you think the police need a computer system to tell them where to deploy resources?**

Executive Support Systems (ESS)

- **Executive support systems (ESS)**
  - Integrate data from different functional systems for firmwide view
  - Incorporate external data, e.g. stock market news, competitor information, industry trends, legislative action
  - Include tools for modeling and analysis
    - Primarily for status, comparison information about performance
  - Facilities for environmental scanning - detecting signals of problems, threats, or strategic opportunities
  - Able to **drill down** from summary information to lower levels of detail

Executive Support Systems (ESS)

- **Business value of executive support systems**
  - Enables executive to review more data in less time with greater clarity than paper-based systems
    - Result: Needed actions identified and carried out earlier
  - Improves management performance
  - Increases upper management's span of control
    - Can enable decision making to be decentralized and take place at lower operating levels
  - Increases executives' ability to monitor activities of lower units reporting to them

- **National Life: ESS for business intelligence**
  - **National Life:** Markets life insurance, health insurance, and retirement/investment products executive information system
  - Executive information system:
    - Allows senior managers to access corporate databases through Web interface
    - Shows premium dollars by salesperson
    - Authorized users can drill down into these data to see product, agent, and client for each sale
    - Data can be examined by region, by product, and by broker, and accessed for monthly, quarterly, and annual time periods

Executive Support Systems (ESS)

- **Bonita Bay Properties: Monitoring corporate performance with digital dashboards**
  - **Digital dashboard:** Displays on single screen key performance indicators as graphs and charts for executives
  - **Bonita Bay Properties Inc.:** Develops planned communities centered around golf courses and fitness centers
  - Executive dashboard displays:
    - Summaries from point-of-sale systems and general ledger accounts
    - Staffing levels
    - Executives can drill down to performance of fitness centers, activity on golf courses

Executive Support Systems (ESS)

- **Pharmacia Corporation: Monitoring corporate performance with balanced scorecard systems**
  - **Balanced scorecard model**: Supplements traditional financial metrics with measurements from additional perspectives (customers, internal business processes, etc.)
  - **Pharmacia Corporation**: global pharmaceutical firm
  - Balanced scorecard shows:
    - Performance of U.S. or European clinical operations in relation to corporate objectives
    - Attrition rate of new compounds under study
    - Number of patents in clinical trials
    - How funds allocated for research are being spent

Executive Support Systems (ESS)

- **Caesar's Entertainment: Enterprise-wide performance analysis**
  - Has integrated reporting structure to help management determine how well it is performing against forecasts on a daily basis
  - Integrates data from internal TPS with other internal and external sources
    - Financial data from general ledger system, personnel data, weather pattern and real estate data
    - Delivers daily cost, effect, impact analysis, and profit-and-loss reports
    - Reports predict combined effect of these factors on company's business performance
  - System lets executives adjust plans as required online

Group Decision-Support Systems (GDSS)

- **What Is a GDSS?**
  - Interactive, computer-based system used to facilitate solution of unstructured problems by set of decision makers working together as group
  - Designed to improve quality and effectiveness of decision-making meetings
  - Make meetings more productive by providing tools to facilitate:
    - Planning, generating, organizing, and evaluating ideas
    - Establishing priorities
    - Documenting meeting proceedings for others in firm

Group Decision-Support Systems (GDSS)

- **Components of GDSS**
  - **Hardware**
    - Facility: Appropriate facility, furniture, layout
    - Electronic hardware: Audiovisual, computer, networking equipment
  - **Software**
    - Electronic questionnaires, electronic brainstorming tools, idea organizers
    - Tools for voting or setting priorities, stakeholder identification and analysis tools, policy formation tools,
    - Group dictionaries
  - **People**
    - Participants and trained facilitator, support staff

Group Decision-Support Systems (GDSS)

- **Overview of GDSS meeting**
  - Each attendee has workstation, networked to facilitator's workstation and meeting's file server
  - Whiteboards on either side of projection screen
  - Seating arrangements typically semicircular, tiered
  - Facilitator controls use of tools during meeting
  - All input saved to server, kept confidential
  - After meeting, full record (raw material and final output) assembled and distributed

Group Decision-Support Systems (GDSS)

Group System Tools

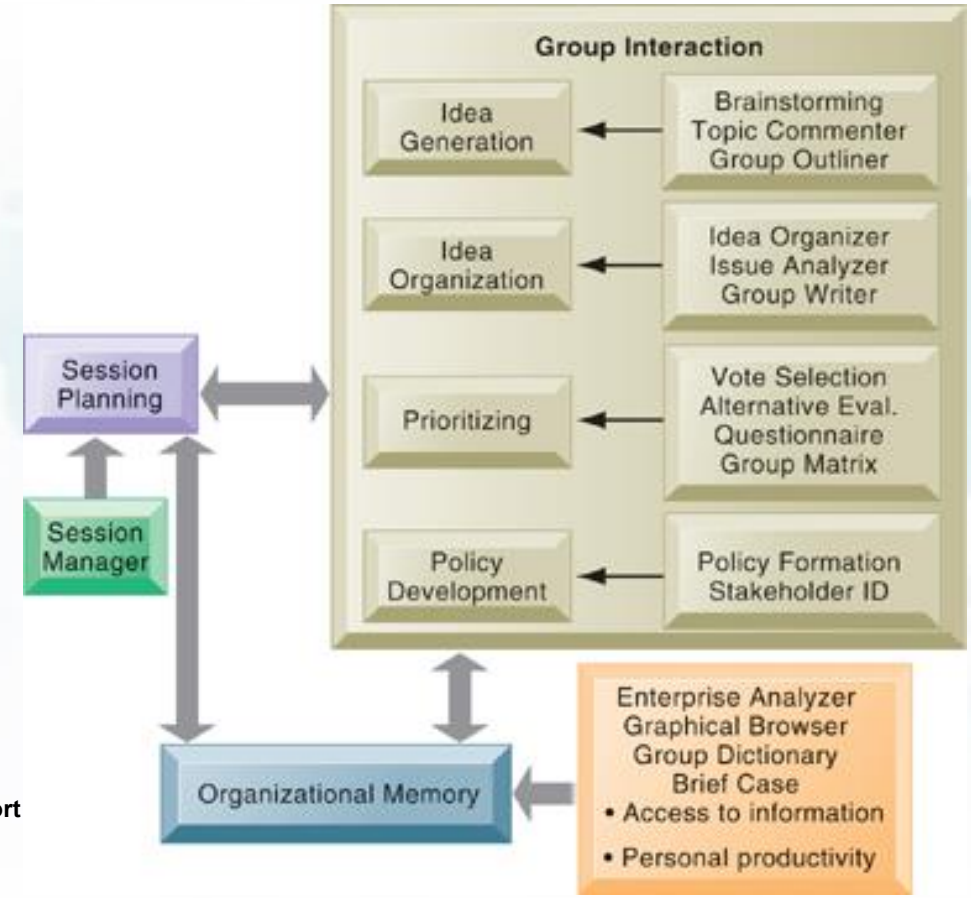


Figure 12-9

The sequence of activities and collaborative support tools used in an electronic meeting system facilitate communication among attendees and generate a full record of the meeting.

Source: From Nunamaker et al., "Electronic Meeting Systems to Support Group Work," Communications of the ACM, July 1991. Reprinted by permission.

Group Decision-Support Systems (GDSS)

- **Business value of GDSS**
  - Supports greater numbers of attendees
    - Without GDSS, decision-making meeting process breaks down with more than 5 attendees
  - More collaborative atmosphere
    - Guarantees anonymity
  - Can increase number of ideas generated and quality of decisions made

- **Business value of GDSS (cont.)**
  - Most useful for idea generation, complex problems, large groups
  - Successful use of GDSS depends on many factors
    - Facilitator's effectiveness, culture and environment, planning, composition of group, appropriateness of tools selected, etc.