



Chapter 12

Enhancing Decision Making

VIDEO CASES

Video Case 1: FreshDirect Uses Business Intelligence to Manage Its Online Grocery

Video Case 2: Business Intelligence Helps the Cincinnati Zoo

Instructional Video 1: FreshDirect's Secret Sauce: Customer Data From the Website

Instructional Video 2: A Demonstration of Oracle's Mobile Business Intelligence App



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Chapter 12: Enhancing Decision Making

Learning Objectives

- **What are the different types of decisions and how does the decision-making process work? How do information systems support the activities of managers and management decision making?**
- **How do business intelligence and business analytics support decision making?**
- **How do different decision-making constituencies in an organization use business intelligence? What is the role of information systems in helping people working in a group make decisions more efficiently?**



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Germany Wins the World Cup with Big Data at Its Side

- **Problem:** Extreme competition; opportunities from new technology
- **Solutions:** Use improved statistical analysis to identify player weaknesses and strengths, use new metrics to improve player and team performance
- Demonstrates the use of business intelligence to develop better performance metrics



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Decision Making and Information Systems

- **Business value of improved decision making**
 - Improving hundreds of thousands of “small” decisions adds up to large annual value for the business
- **Types of decisions:**
 - **Unstructured:** Decision maker must provide judgment, evaluation, and insight to solve problem
 - **Structured:** Repetitive and routine; involve definite procedure for handling so they do not have to be treated each time as new
 - **Semistructured:** Only part of problem has clear-cut answer provided by accepted procedure



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Decision Making and Information Systems

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



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INFORMATION REQUIREMENTS OF KEY DECISION-MAKING GROUPS IN A FIRM

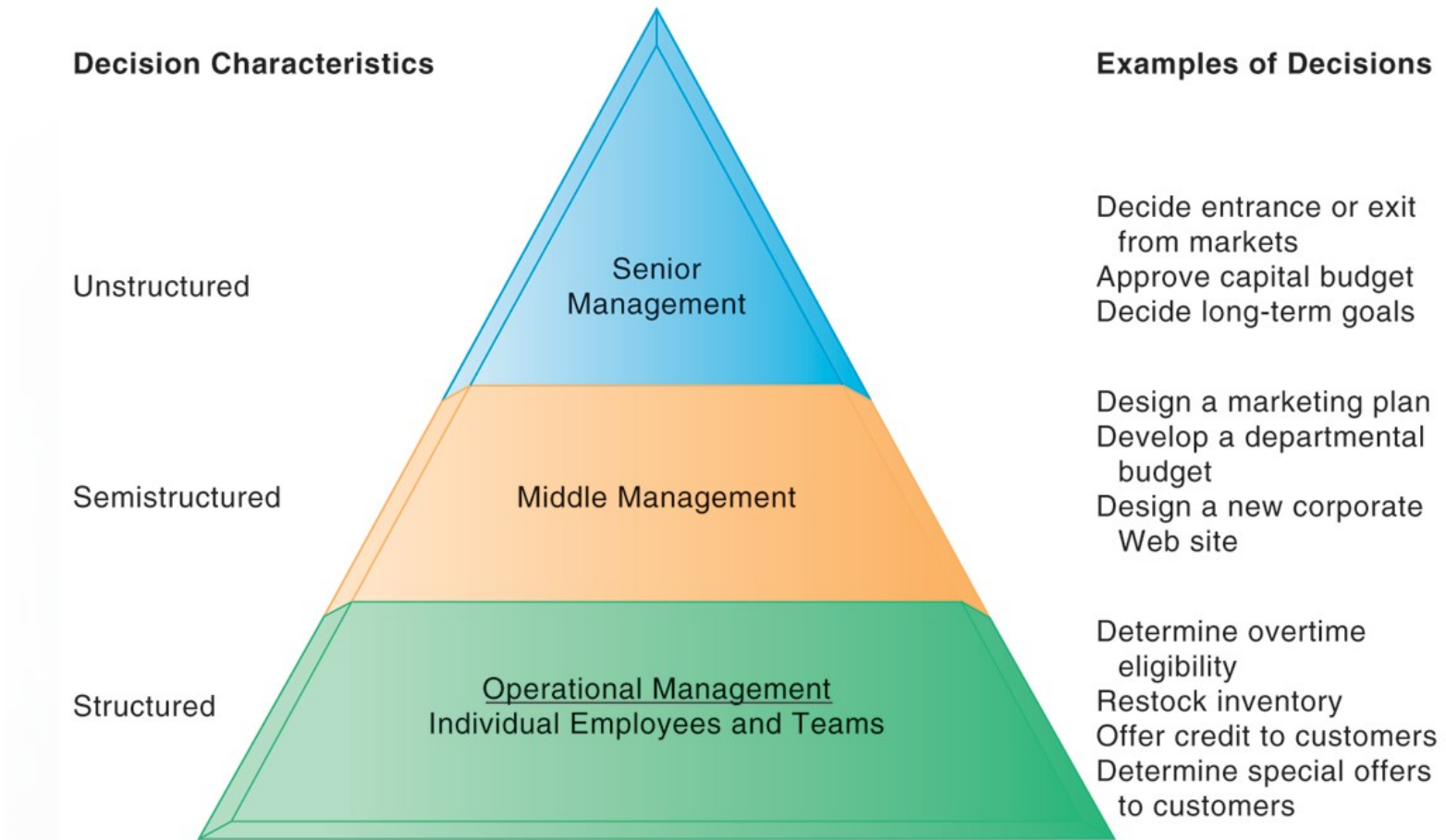


FIGURE 12-1 Senior managers, middle managers, operational managers, and employees have different types of decisions and information requirements.



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Decision Making and Information Systems

- **The four stages of the decision-making process**

- 1. Intelligence**

- Discovering, identifying, and understanding the problems occurring in the organization

- 1. Design**

- Identifying and exploring solutions to the problem

- 1. Choice**

- Choosing among solution alternatives

- 1. Implementation**

- Making chosen alternative work and continuing to monitor how well solution is working



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STAGES IN DECISION MAKING

The decision-making process is broken down into four stages.

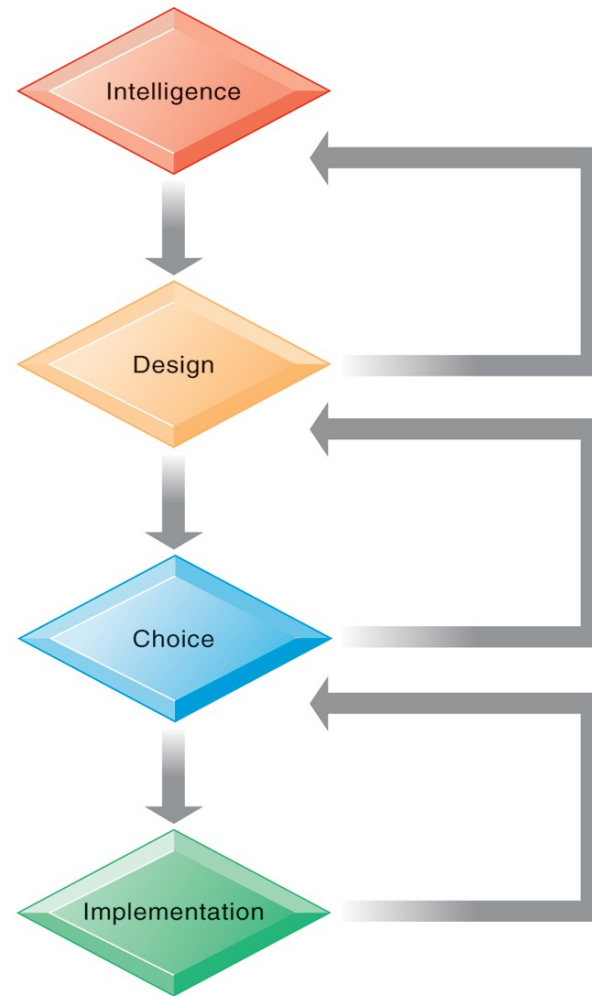
FIGURE 12-2

Problem discovery:
What is the problem?

Solution discovery:
What are the possible solutions?

Choosing solutions:
What is the best solution?

Solution testing:
Is the solution working?
Can we make it work better?





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Decision Making and Information Systems

- **Information systems can only assist in some of the roles played by managers**
- **Classical model of management: five functions**
 - 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



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Decision Making and Information Systems

- **Mintzberg's 10 managerial roles**

- **Interpersonal roles**

1. Figurehead
2. Leader
3. Liaison

- **Informational roles**

4. Nerve center
5. Disseminator
6. Spokesperson

- **Decisional roles**

7. Entrepreneur
8. Disturbance handler
9. Resource allocator
10. Negotiator



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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
 - 1. Management filters**
 - Managers have selective attention and have variety of biases that reject information that does not conform to prior conceptions
 - 1. Organizational inertia and politics**
 - Strong forces within organizations resist making decisions calling for major change



Decision Making and Information Systems

- **High-velocity automated decision making**
 - Made possible through computer algorithms precisely defining steps for a highly structured decision
 - Humans taken out of decision
 - For example: High-speed computer trading programs
 - Trades executed in 30 milliseconds
 - Responsible for “Flash Crash” of 2010
 - Require safeguards to ensure proper operation and regulation



Business Intelligence and Business Analytics

- **Business intelligence**
 - Infrastructure for collecting, storing, analyzing data produced by business
 - Databases, data warehouses, data marts
- **Business analytics**
 - Tools and techniques for analyzing data
 - OLAP, statistics, models, data mining
- **Business intelligence vendors**
 - Create business intelligence and analytics purchased by firms

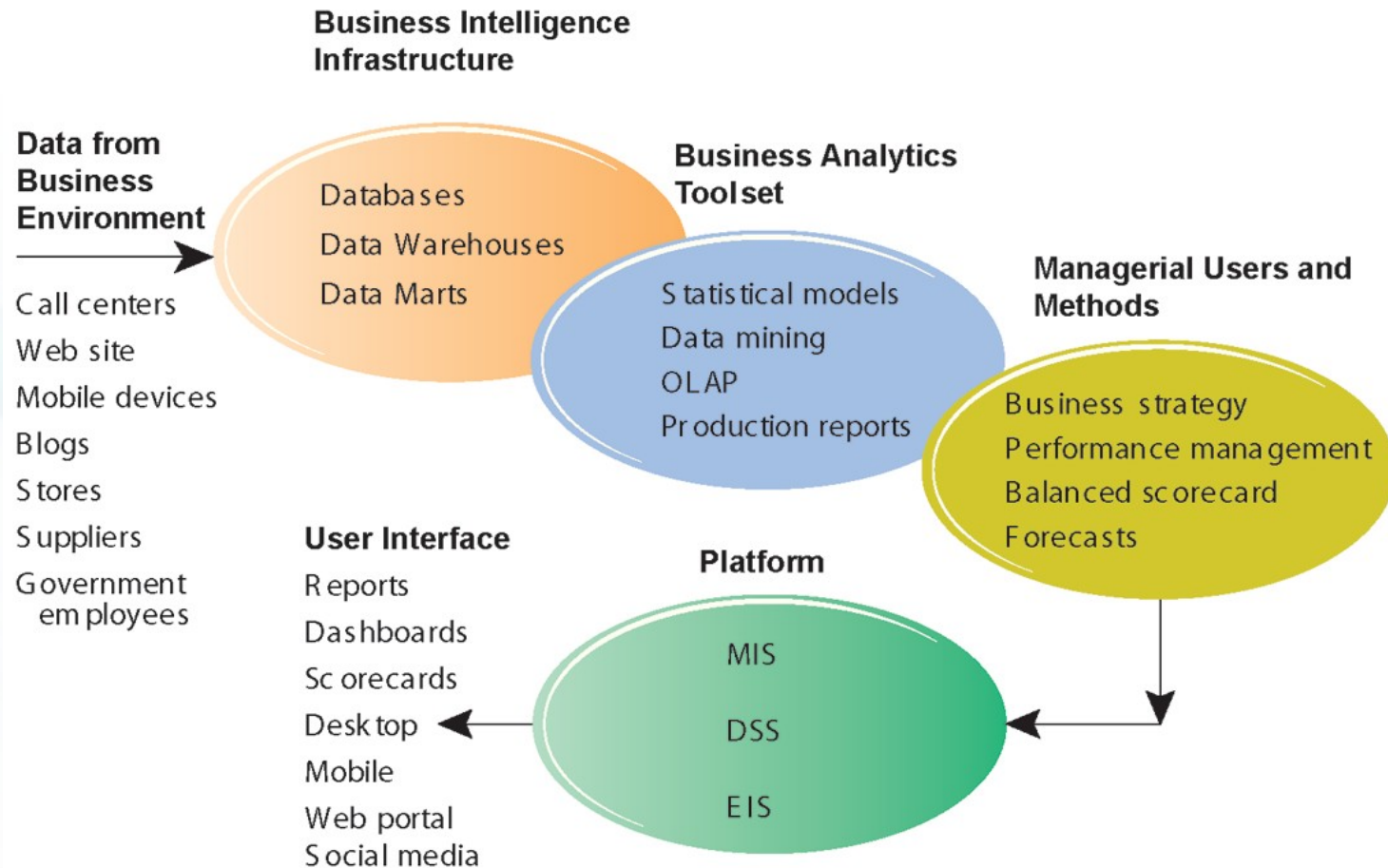
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BUSINESS INTELLIGENCE AND ANALYTICS FOR DECISION SUPPORT

Business intelligence and analytics requires a strong database foundation, a set of analytic tools, and an involved management team that can ask intelligent questions and analyze data.

FIGURE 12-3





Business Intelligence and Business Analytics

- **Six elements in the business intelligence environment**
 1. **Data from the business environment**
 2. **Business intelligence infrastructure**
 3. **Business analytics toolset**
 4. **Managerial users and methods**
 5. **Delivery platform—MIS, DSS, ESS**
 6. **User interface**



Business Intelligence and Business Analytics

- **Business intelligence and analytics capabilities**
 - **Goal is to deliver accurate real-time information to decision makers**
 - **Main functionalities of BI systems**
 1. Production reports
 2. Parameterized reports
 3. Dashboards/scorecards
 4. Ad hoc query/search/report creation
 5. Drill down
 6. Forecasts, scenarios, models



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Business Intelligence and Business Analytics

- **Business intelligence users**
 - **80 percent are casual users relying on production reports**
 - **Senior executives**
 - Use monitoring functionalities
 - **Middle managers and analysts**
 - Ad-hoc analysis
 - **Operational employees**
 - Prepackaged reports
 - For example: sales forecasts, customer satisfaction, loyalty and attrition, supply chain backlog, employee productivity



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BUSINESS INTELLIGENCE USERS

Power Users: Producers (20% of employees)

IT developers

Super users

Business analysts

Analytical modelers

Capabilities

Production Reports

Parameterized Reports

Dashboards/Scorecards

Ad hoc queries; Drill down
Search/OLAP

Forecasts; What if
Analysis; statistical models

Casual Users: Consumers (80% of employees)

Customers/Suppliers
Operational employees

Senior managers

Managers/Staff

Business analysts

FIGURE 12-4 Casual users are consumers of BI output, while intense power users are the producers of reports, new analyses, models, and forecasts.



- **Production reports**

- **Most widely used output of BI suites**
- **Common predefined, prepackaged reports**
 - **Sales:** Forecast sales; sales team performance
 - **Service/call center:** Customer satisfaction; service cost
 - **Marketing:** Campaign effectiveness; loyalty and attrition
 - **Procurement and support:** Supplier performance
 - **Supply chain:** Backlog; fulfillment status
 - **Financials:** General ledger; cash flow
 - **Human resources:** Employee productivity; compensation



- **Predictive analytics**

- **Use variety of data, techniques to predict future trends and behavior patterns**

- Statistical analysis
- Data mining
- Historical data
- Assumptions

- **Incorporated into numerous BI applications for sales, marketing, finance, fraud detection, health care**

- Credit scoring
- Predicting responses to direct marketing campaigns



- **Big data analytics**

- **Big data: Massive datasets collected from social media, online and in-store customer data, and so on**
- **Help create real-time, personalized shopping experiences for major online retailers**
- **Smart cities**
 - Public records
 - Sensors, location data from smartphones
 - Ability to evaluate effect of one service change on system



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Interactive Session: Technology

Analytics Help the Cincinnati Zoo Know Its Customers

Read the Interactive Session and discuss the following questions

- What management, organization, and technology factors were behind the Cincinnati Zoo losing opportunities to increase revenue?
- Why was replacing legacy point-of-sale systems and implementing a data warehouse essential to an information system solution?
- How did the Cincinnati Zoo benefit from business intelligence? How did it enhance operational performance and decision making? What role was played by predictive analytics?
- Visit the IBM Cognos Web site and describe the business intelligence tools that would be the most useful for the Cincinnati Zoo.



Business Intelligence and Business Analytics

- **Operational intelligence and analytics**
 - **Operational intelligence: Business activity monitoring**
 - **Collection and use of data generated by sensors**
 - **Internet of Things**
 - Creating huge streams of data from Web activities, sensors, and other monitoring devices
 - **Software for operational intelligence and analytics enable companies to analyze their Big Data**



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Interactive Session: Management

America's Cup: The Tension Between Technology and Human Decision Makers

Read the Interactive Session and discuss the following questions

- How did information technology change the way America's Cup boats were managed and sailed?
- How did information technology impact decision making at Team USA?
- How much was technology responsible for Team USA's America's Cup victory? Explain your answer.
- Compare the role of big data in Team USA's America's Cup victory with its role in the German team's 2014 World Cup victory described in the chapter-opening case.



- **Location analytics**
 - **Ability to gain business insight from the location (geographic) component of data**
 - Mobile phones
 - Sensors, scanning devices
 - Map data
- **Geographic information systems (GIS)**
 - Ties location-related data to maps
 - Example: For helping local governments calculate response times to disasters



Business Intelligence and Business Analytics

- **Two main management strategies for developing BI and BA capabilities**
 1. **One-stop integrated solution**
 - Hardware firms sell software that run optimally on their hardware
 - Makes firm dependent on single vendor—switching costs
 1. **Multiple best-of-breed solution**
 - Greater flexibility and independence
 - Potential difficulties in integration
 - Must deal with multiple vendors



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Decision-Making Constituencies

- **Operational and middle managers**
 - **Use MIS (running data from TPS) for:**
 - Routine production reports
 - Exception reports
- **“Super user” and business analysts**
 - **Use DSS for:**
 - More sophisticated analysis and custom reports
 - Semistructured decisions



Decision-Making Constituencies

- **Decision support systems: Support for semistructured decisions**
 - Use mathematical or analytical models
 - Allow varied types of analysis
 - “What-if” analysis
 - Sensitivity analysis
 - Backward sensitivity analysis
 - Multidimensional analysis / OLAP
 - For example: pivot tables



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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

FIGURE 12-5 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?"

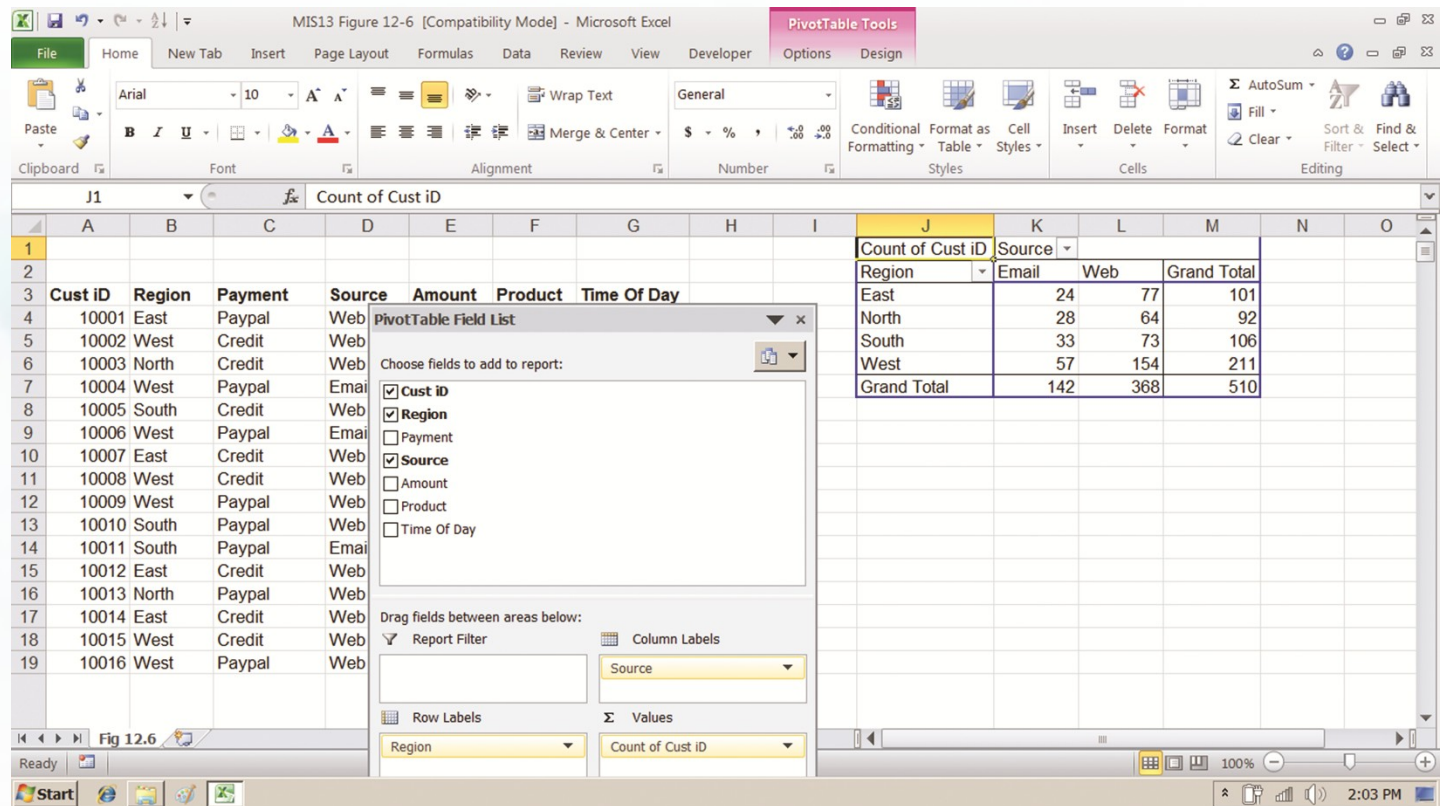
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A PIVOT TABLE THAT EXAMINES CUSTOMER REGIONAL DISTRIBUTION AND ADVERTISING SOURCE

In this pivot table, we are able to examine where an online training company's customers come from in terms of region and advertising source.

FIGURE 12-6





Decision-Making Constituencies

- **ESS: decision support for senior management**
 - **Help executives focus on important performance information**
 - **Balanced scorecard method:**
 - Measures outcomes on four dimensions:
 1. Financial
 2. Business process
 3. Customer
 4. Learning and growth
 - Key performance indicators (KPIs) measure each dimension



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THE BALANCED SCORECARD FRAMEWORK



FIGURE 12-7

In the balanced scorecard framework, the firm's strategic objectives are operationalized along four dimensions: financial, business process, customer, and learning and growth. Each dimension is measured using several KPIs.



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Decision-Making Constituencies

- **Decision support for senior management (cont.)**
 - **Business performance management (BPM)**
 - Translates firm's strategies (e.g., differentiation, low-cost producer, scope of operation) into operational targets
 - KPIs developed to measure progress toward targets
 - **Data for ESS**
 - Internal data from enterprise applications
 - External data such as financial market databases
 - Drill-down capabilities



Decision-Making Constituencies

- **Group decision support systems (GDSS)**
 - **Interactive system to facilitate solution of unstructured problems by group**
 - **Specialized hardware and software; typically used in conference rooms**
 - Overhead projectors, display screens
 - Software to collect, rank, edit participant ideas and responses
 - May require facilitator and staff
 - **Enables increasing meeting size and increasing productivity**
 - **Promotes collaborative atmosphere, anonymity**
 - **Uses structured methods to organize and evaluate ideas**