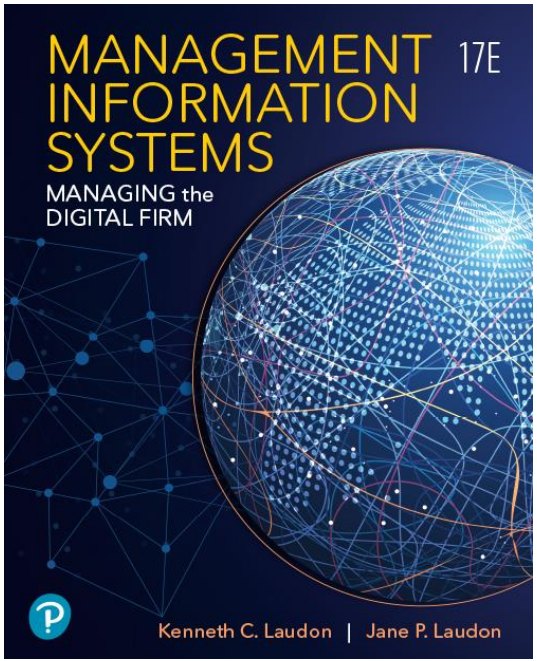
Management Information Systems: Managing the Digital Firm

Seventeenth Edition



Chapter 12

Enhancing Decision Making

Learning Objectives

12.1 What are the different types of decisions, and how does the decision-making process work?

12.2 How do information systems support the activities of managers and management decision making?

12.3 How do business intelligence and business analytics support decision making?

12.4 How do different decision-making constituencies in an organization use business intelligence?

12.5 How will MIS help my career?

Video Cases

- Case 1: PSEG Leverages Big Data and Business Analytics Using GE's PREDIX Platform
- Case 2: FreshDirect Uses Business Intelligence to Manage Its Online Grocery
- Case 3: Business Intelligence Helps the Cincinnati Zoo Work Smarter

Big Data and the Internet of Things Drive Precision Agriculture (1 of 2)

- Problem
  - Explosive population growth
  - Opportunities from new technology
- Solutions
  - Identify technologies and decisions for improvement
  - Collect agricultural data and develop improvements for farmer processes
  - IoT wireless sensors
  - Supercomputer processing
  - Business intelligence analytic software
  - Mobile devices

Big Data and the Internet of Things Drive Precision Agriculture (2 of 2)

- Precision Agriculture Systems
- Demonstrates IT's role in providing information and business intelligence that help small business like farmers improve efficiency
- Illustrates how information systems can improve an entire industry

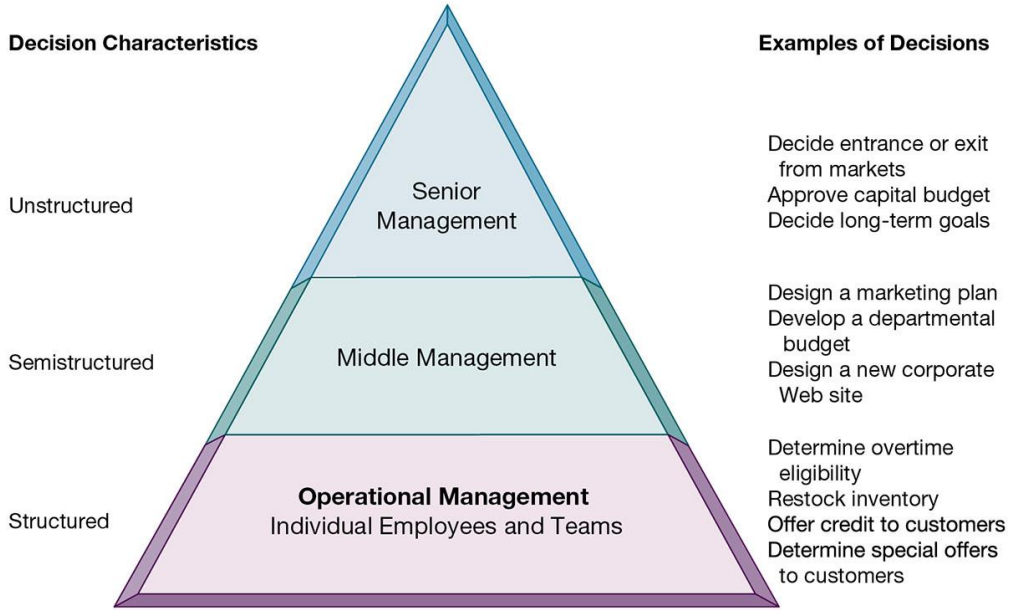
What Are the Different Types of Decisions, and How Does the Decision-Making Process Work? (1 of 2)

- 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

What Are the Different Types of Decisions, and How Does the Decision-Making Process Work? (2 of 2)

- Senior managers
  - Make many unstructured decisions
- Middle managers
  - Make more structured decisions but these may include unstructured components
- Operational managers and rank and file employees
  - Make more structured decisions

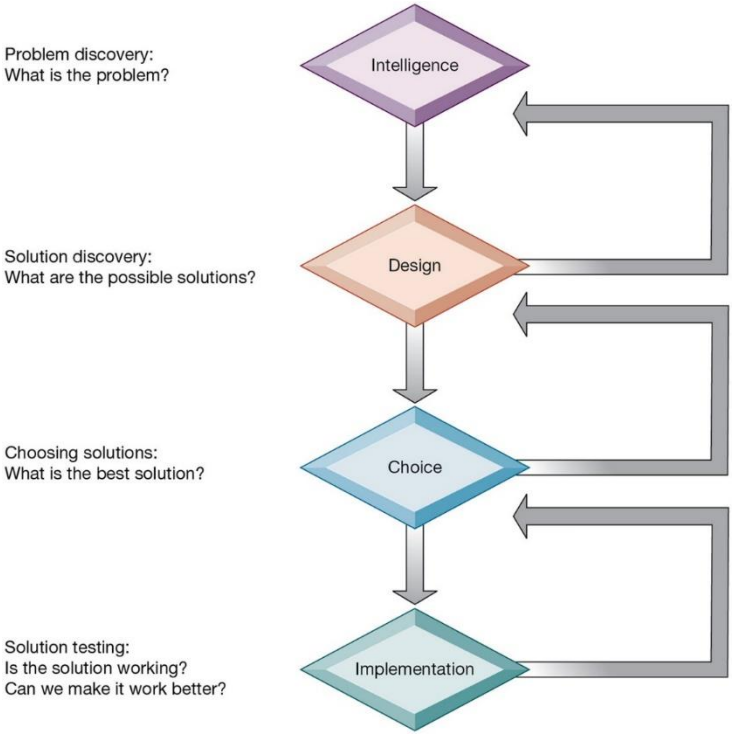
Figure 12.1 Information Requirements of Key Decision-Making Groups in a Firm



The Decision-Making Process

- Intelligence
  - Discovering, identifying, and understanding the problems occurring in the organization
- Design
  - Identifying and exploring solutions to the problem
- Choice
  - Choosing among solution alternatives
- Implementation
  - Making chosen alternative work and continuing to monitor how well solution is working

Figure 12.2 Stages in Decision Making



Managerial Roles

- 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

Mintzberg's 10 Managerial Roles (1 of 2)

- Interpersonal roles
  - Figurehead
  - Leader
  - Liaison
- Informational roles
  - Nerve center
  - Disseminator
  - Spokesperson

Mintzberg's 10 Managerial Roles (2 of 2)

- Decisional roles
  - Entrepreneur
  - Disturbance handler
  - Resource allocator
  - Negotiator

Real-World Decision Making

- Three main reasons why investments in IT do not always produce positive results
  - Information quality
    - High-quality decisions require high-quality information
  - Management filters
    - Managers have selective attention and have variety of biases that reject information that does not conform to prior conceptions
  - Organizational inertia and politics
    - Strong forces within organizations resist making decisions calling for major change

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 nanoseconds
- Require safeguards to ensure proper operation and regulation

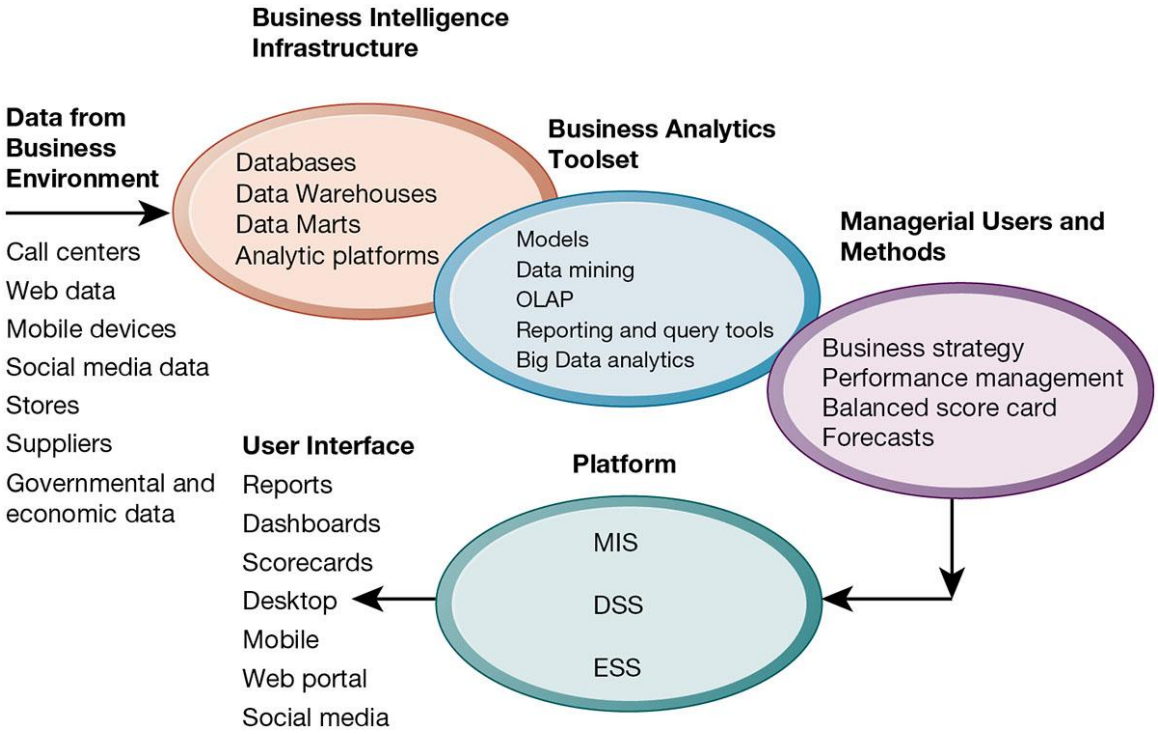
What is Business Intelligence?

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

The Business Intelligence Environment

- Six elements in the business intelligence environment
  - Data from the business environment
  - Business intelligence infrastructure
  - Business analytics toolset
  - Managerial users and methods
  - Delivery platform—MIS, DSS, ESS
  - User interface
    - Data visualization tools

Figure 12.3 Business Intelligence and Analytics for Decision Support



Business Intelligence and Analytics Capabilities

- Goal is to deliver accurate real-time information to decision makers
- Main analytic functionalities of BI systems
  - Production reports
  - Parameterized reports
  - Dashboards/scorecards
  - Ad hoc query/search/report creation
  - Drill down
  - Forecasts, scenarios, models

Table 12.4 Examples of Business Intelligence Predefined Production Reports

Business Functional Area	Production Reports
Sales	Forecast sales; sales team performance; cross-selling; sales cycle times
Service/call center	Customer satisfaction; service cost; resolution rates; churn rates
Marketing	Campaign effectiveness; loyalty and attrition; market basket analysis
Procurement and support	Direct and indirect spending; off-contract purchases; supplier performance
Supply chain	Backlog; fulfillment status; order cycle time; bill of materials analysis
Financials	General ledger; accounts receivable and payable; cash flow; profitability
Human resources	Employee productivity; compensation; workforce demographics; retention

Predictive Analytics

- Uses 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

Operational Intelligence and Analytics

- Operational intelligence: Business activity monitoring
- Collection and use of data generated by sensors
- Internet of Things (IoT)
  - 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

Interactive Session: Organizations: Predictive Maintenance in the Oil and Gas Industry

- Class discussion
  - Why is predictive maintenance so important in the oil and gas industry? What problems does it solve?
  - What is the role of the Internet of Things (IoT) and Big Data analytics in predictive maintenance?.
  - How did BP and Royal Dutch Shell's predictive maintenance applications change business operations and decision making?
  - Give an example of how predictive maintenance systems could be used in another industry.

Location Analytics and Geographic Information Systems

- 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

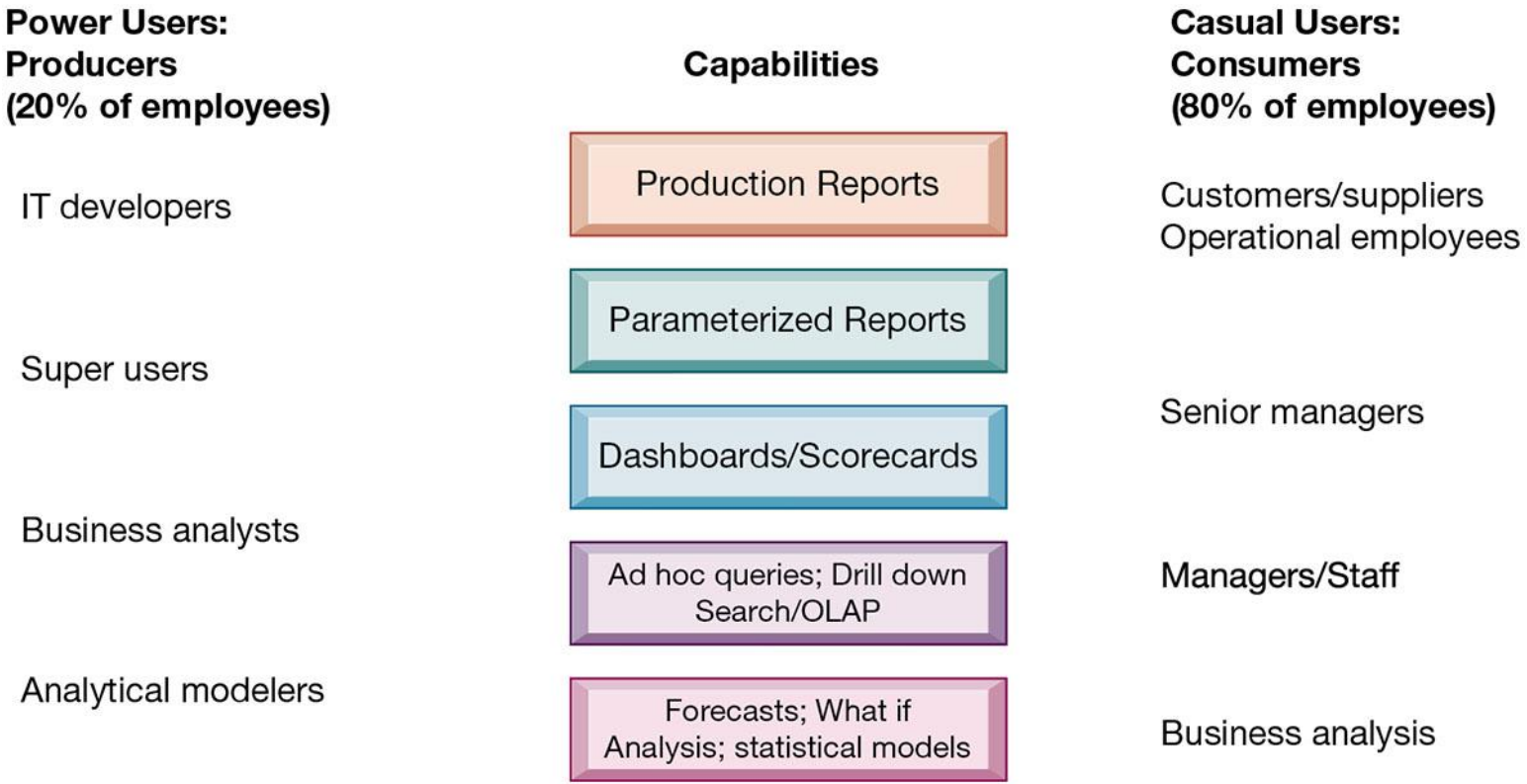
Interactive Session: Management: GIS Helps Land O'Lakes Manage Assets Strategically

- Class discussion
  - Why is geographic location data so important to Land O'Lakes. What categories of geographic information does Land O'Lakes use?
  - How did using GIS improve operations and decision making at Land O'Lakes?
  - Give examples of three decisions at Land O'Lakes that were improved by using GIS.

Decisional Support for Operational and Middle Management

- Charged with monitoring key aspects of business
- Most decisions fairly structured
- Middle managers typically use MIS
  - Increasingly online; can be queried interactively
  - Exception reports

Figure 12.4 Business Intelligence Users



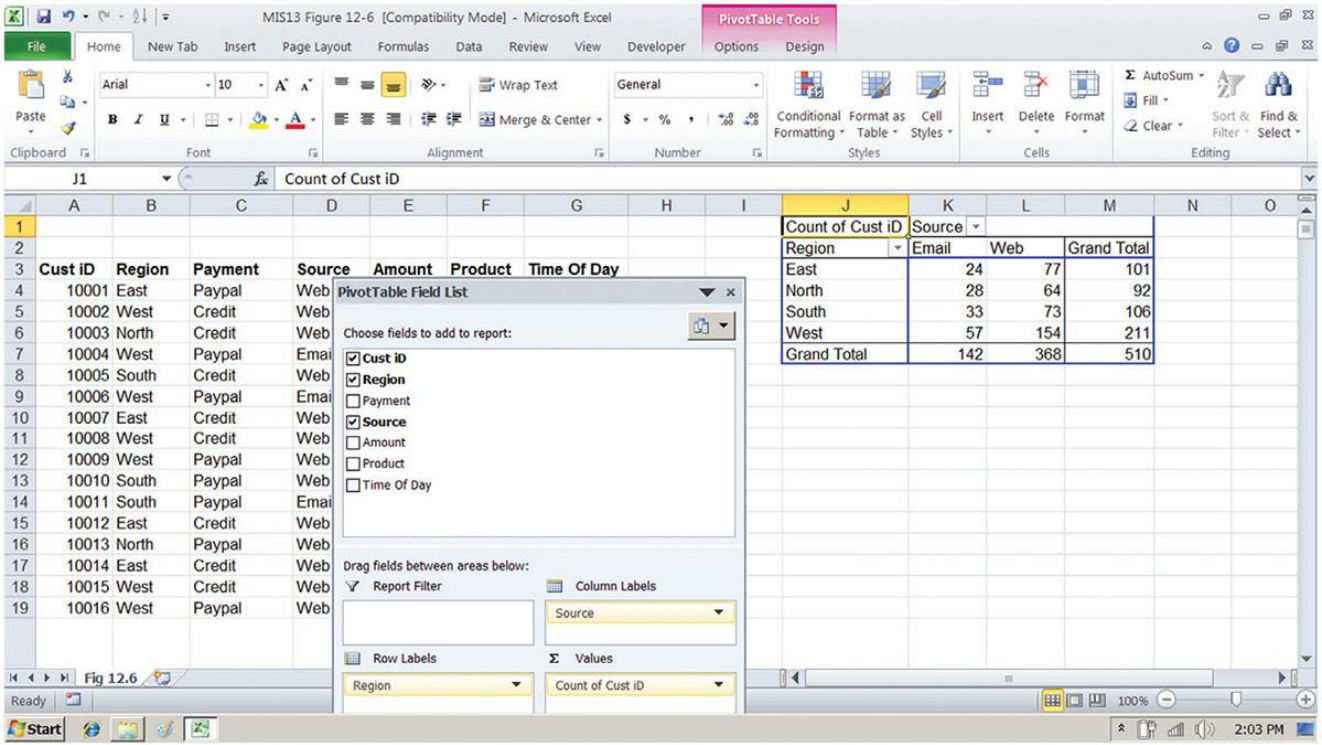
Support for Semistructured Decisions

- 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

Figure 12.5 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

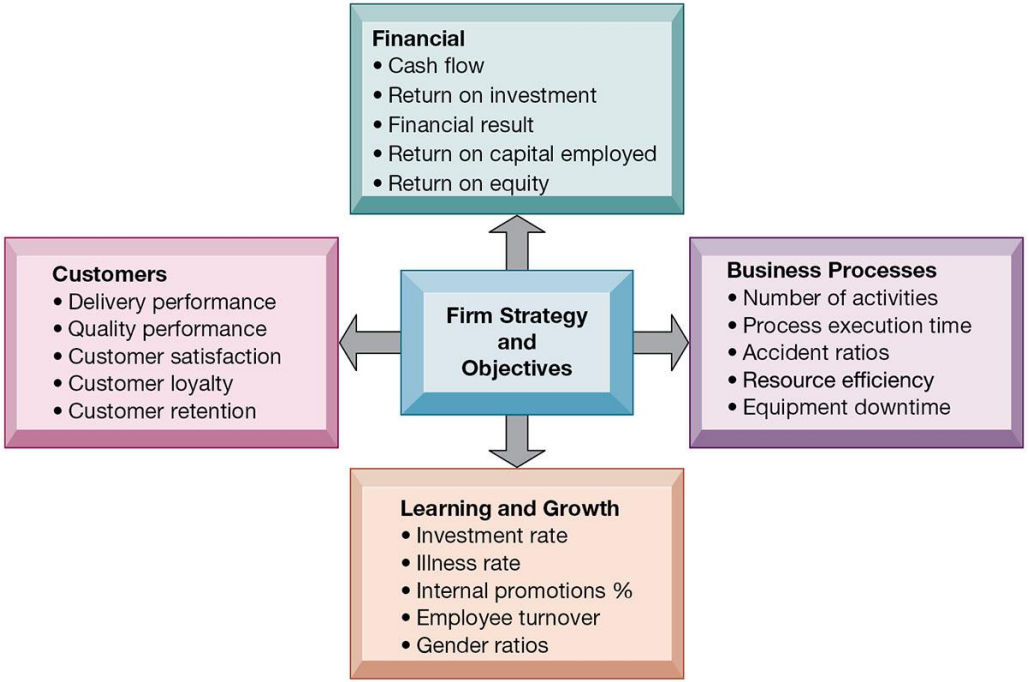
Figure 12.6 A Pivot Table That Examines Customer Regional Distribution and Advertising Source



Decision Support for Senior Management: Balanced Scorecard and Enterprise Performance Management Methods (1 of 2)

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

Figure 12.7 The Balanced Scorecard Framework



Decision Support for Senior Management: Balanced Scorecard and Enterprise Performance Management Methods (2 of 2)

- 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

How Will MIS Help My Career?

- The Company: Western Well Health
- Position Description: Entry-level data analyst
- Job Requirements
- Interview Questions
- Author Tips

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