



## 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*




## Management Information Systems

### Chapter 12: Enhancing Decision Making

#### Learning Objectives

- Describe the different types of decisions and how the decision-making process works.
- Explain how information systems support the activities of managers and management decision making.
- Explain how business intelligence and business analytics support decision making.
- Explain how different decision-making constituencies in an organization use business intelligence.
- Describe the role of information systems in helping people working in a group make decisions more efficiently.




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**Moneyball: Data-Driven Baseball**

- **Problem:** Limited resources and outdated metrics
- **Solutions:** Use improved statistical analysis to identify affordable, overlooked players
- Demonstrates the use of business intelligence to optimize performance and keep costs low
- Illustrates how information systems can provide advantages for a limited time

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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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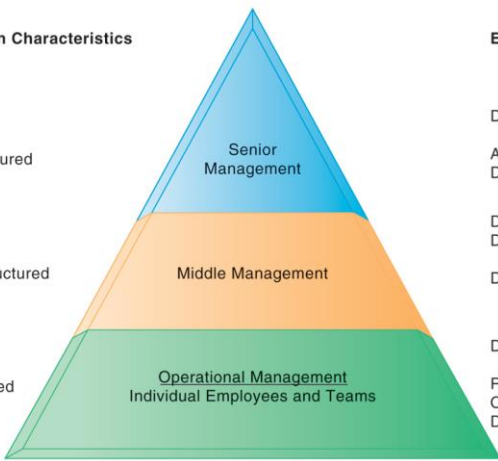


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INFORMATION REQUIREMENTS OF KEY DECISION-MAKING GROUPS IN A FIRM

Decision Characteristics		Examples of Decisions
Unstructured		Decide entrance or exit from markets Approve capital budget Decide long-term goals
Semistructured	Middle Management	Design a marketing plan Develop a departmental budget Design a new corporate Web site
Structured	Operational Management Individual Employees and Teams	Determine overtime eligibility Restock inventory Offer credit to customers Determine special offers to customers

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**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

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- **The four stages of the decision-making process**
  1. **Intelligence**
    - Discovering, identifying, and understanding the problems occurring in the organization
  2. **Design**
    - Identifying and exploring solutions to the problem
  3. **Choice**
    - Choosing among solution alternatives
  4. **Implementation**
    - Making chosen alternative work and continuing to monitor how well solution is working

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### STAGES IN DECISION MAKING

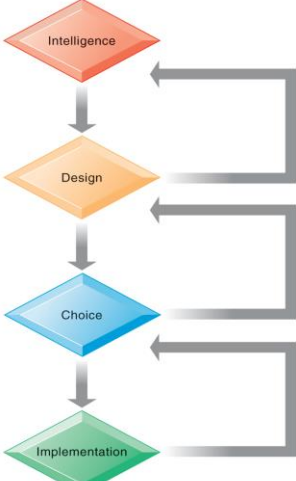
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The decision-making process is broken down into four stages.


**FIGURE 12-2**



<p>Problem discovery: What is the problem?</p>	
<p>Solution discovery: What are the possible solutions?</p>	
<p>Choosing solutions: What is the best solution?</p>	
<p>Solution testing: Is the solution working? Can we make it work better?</p>	



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

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**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**

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**Business Intelligence in the Enterprise**

- **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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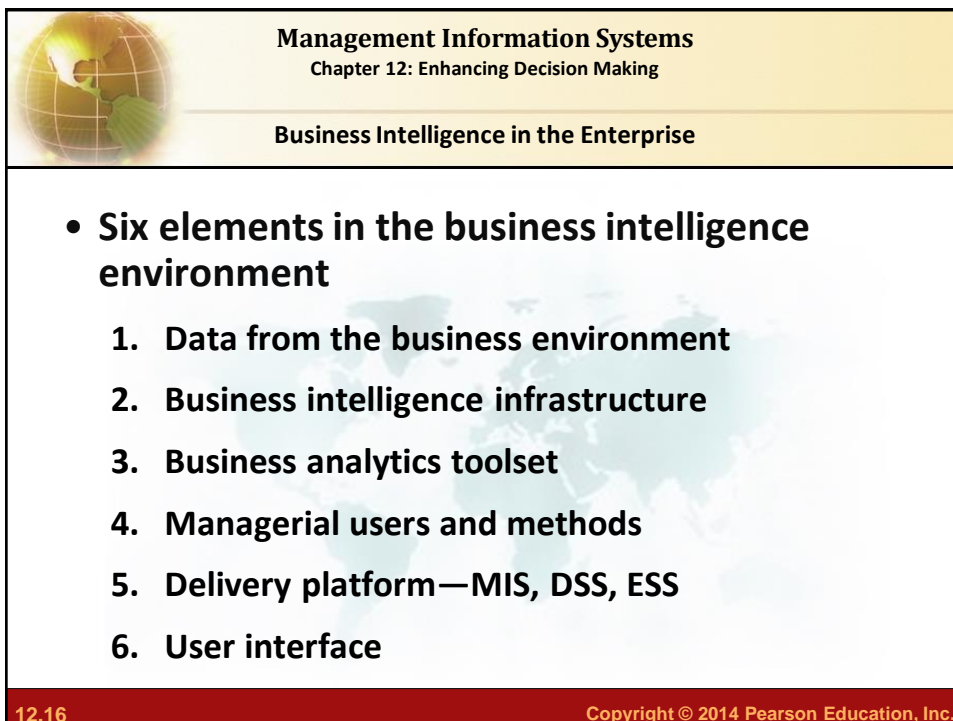
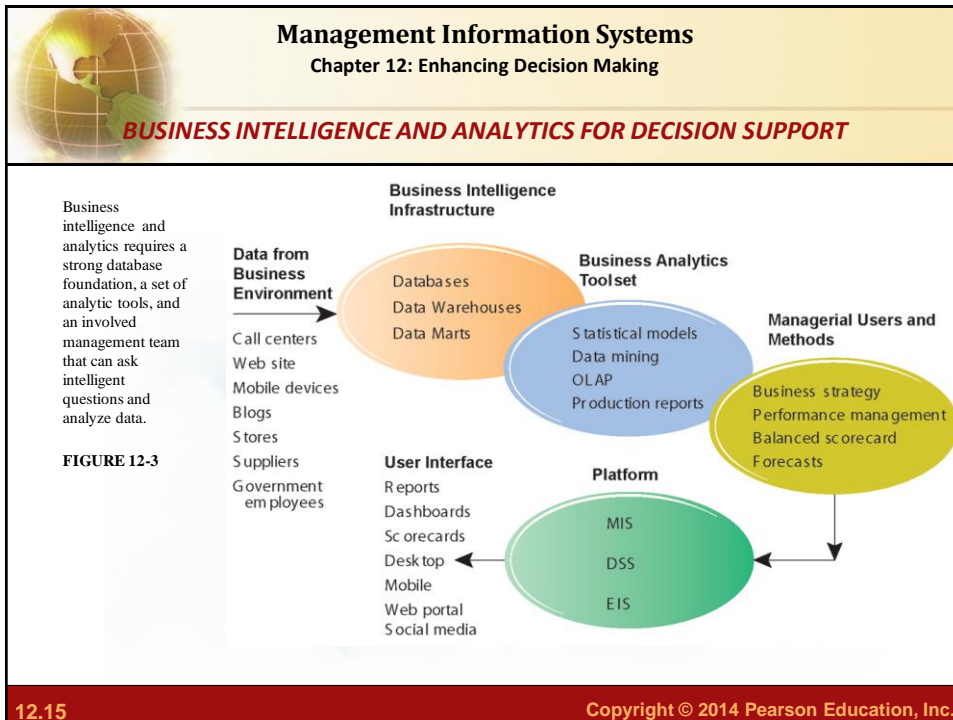
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**Interactive Session: Organizations**


**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.

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**Business Intelligence in the Enterprise**

- **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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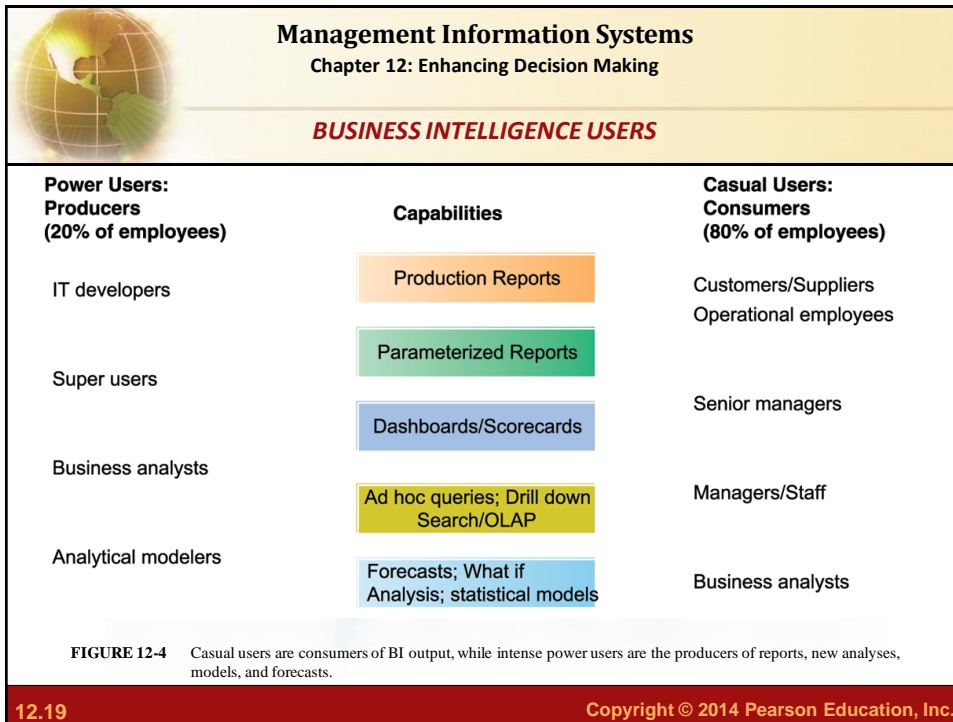
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**Business Intelligence in the Enterprise**

- **Business intelligence users**
  - **80% 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 in the Enterprise**

- **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

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**Business Intelligence in the Enterprise**

- **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

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**Business Intelligence in the Enterprise**

- **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**
  - **Hunch.com, used by eBay**
    - Customized recommendations
    - Database includes purchase data, social networks
    - Taste graphs map users with product affinities

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**Business Intelligence in the Enterprise**

- **Additional BI applications**
  - **Data visualization and visual analytics tools**
    - Help users see patterns and relationships that would be difficult to see in text lists
      - Rich graphs, charts
      - Dashboards
      - Maps
  - **Geographic information systems (GIS)**
    - Ties location-related data to maps
    - Example: For helping local governments calculate response times to disasters

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**Business Intelligence in the Enterprise**

- **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
  2. **Multiple best-of-breed solution**
    - Greater flexibility and independence
    - Potential difficulties in integration
    - Must deal with multiple vendors

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**Business Intelligence 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

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**Business Intelligence Constituencies**

- **Decision support systems**
  - **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**

Region	Source	Count of Cust ID
East	Email	24
East	Web	77
East	Grand Total	101
North	Email	28
North	Web	64
North	Grand Total	92
South	Email	33
South	Web	73
South	Grand Total	106
West	Email	67
West	Web	154
West	Grand Total	221
<b>Grand Total</b>		<b>142</b>
		<b>368</b>
		<b>510</b>




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**Business Intelligence 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**




The diagram illustrates the Balanced Scorecard Framework. At the center is a blue box labeled "Firm Strategy and Objectives". Four arrows point outwards from this central box to four surrounding boxes, each representing a dimension of the scorecard:

- Financial** (top, green box):
  - Cash flow
  - Return on investment
  - Financial result
  - Return on capital employed
  - Return on equity
- Business Processes** (right, yellow box):
  - Number of activities
  - Process execution time
  - Accident ratios
  - Resource efficiency
  - Equipment downtime
- Learning and Growth** (bottom, orange box):
  - Investment rate
  - Illness rate
  - Internal promotions %
  - Employee turnover
  - Gender ratios
- Customers** (left, blue box):
  - Delivery performance
  - Quality performance
  - Customer satisfaction
  - Customer loyalty
  - Customer retention

**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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**Business Intelligence 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

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***Interactive Session: Management***


**Colgate-Palmolive Keeps Managers Smiling with Executive Dashboards**  
*Read the Interactive Session and discuss the following questions*

- Describe the different types of business intelligence users at Colgate-Palmolive.
- Describe the “people” issues that were affecting Colgate’s ability to use business intelligence.
- What management, organization, and technology factors had to be addressed in providing business intelligence capabilities for each type of user?
- What kind of decisions does Colgate’s new business intelligence capability support? Give three examples. What is their potential business impact?

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**Business Intelligence 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

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