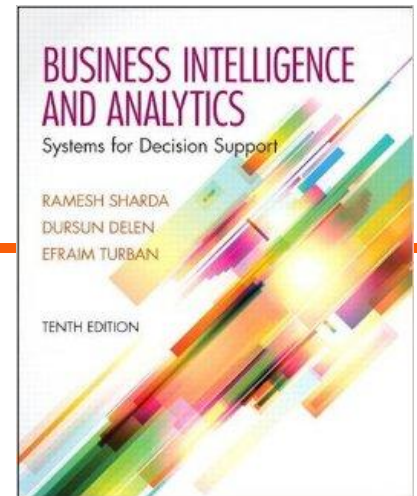


Business Intelligence and Analytics: Systems for Decision Support

[10th Edition]



Chapter 1:

An Overview of Business
Intelligence, Analytics, and
Decision Support



Learning Objectives

- Understand today's turbulent business environment and describe how organizations survive and even excel in such an environment (solving problems and exploiting opportunities)
- Understand the need for computerized support of managerial decision making
- Understand an early framework for managerial decision making
- ...

(Continued...)



Learning Objectives

- Learn the conceptual foundations of the DSS methodology
- Describe the BI methodology and concepts and relate them to DSS
- Understand the various types of analytics
- List the major tools of computerized decision support



Opening Vignette...

Magpie Sensing Employs Analytics to Manage a Vaccine Supply Chain Effectively and Safely

- Company background
- Problem
- Proposed solution and results
- Answer & discuss the case questions...



Opening Vignette...

Questions for the Opening Vignette

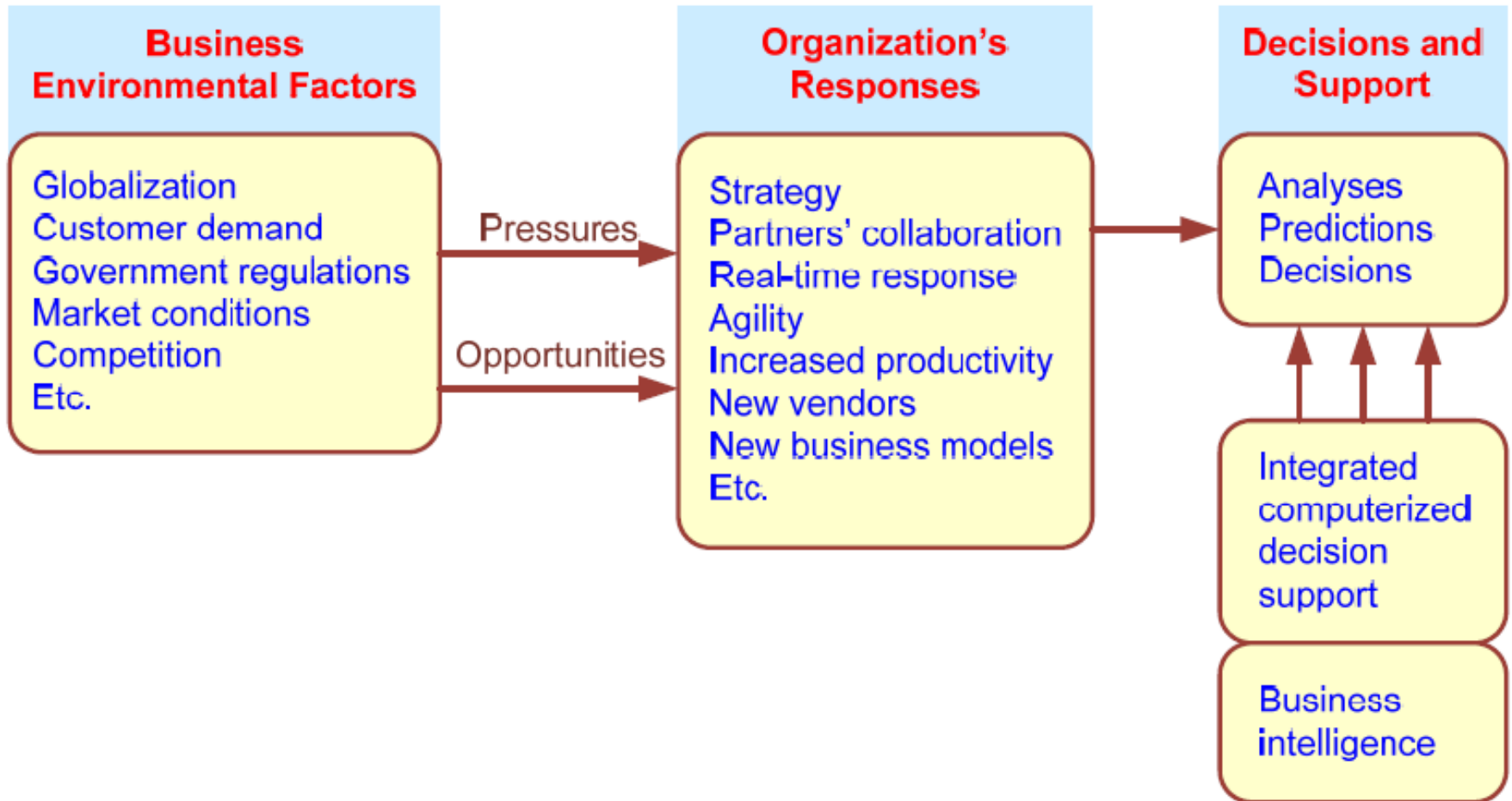
1. What information is provided by the descriptive analytics employed at Magpie Sensing?
2. What type of support is provided by the predictive analytics employed at Magpie Sensing?
3. How does prescriptive analytics help in business decision making?
4. In what ways can actionable information be reported in real time to concerned users of the system?
5. In what other situations might real-time monitoring applications be needed?



Changing Business Environment & Computerized Decision Support

- Companies are moving aggressively to computerized support of their operations
⇒ Business Intelligence
- Business Pressures–Responses–Support Model
 - **Business pressures** result of today's competitive business climate
 - **Responses** to counter the pressures
 - **Support** to better facilitate the process

Business Pressures–Responses–Support Model





The Business Environment

- The environment in which organizations operate today is becoming more and more complex, creating
 - opportunities, and
 - problems.
 - Example: globalization.
- Business environment factors:
 - markets, consumer demands, technology, and societal...



Business Environment Factors

FACTOR

DESCRIPTION

Markets

Strong competition
Expanding global markets
Blooming electronic markets on the Internet
Innovative marketing methods
Opportunities for outsourcing with IT support
Need for real-time, on-demand transactions

Consumer demand

Desire for customization
Desire for quality, diversity of products, and speed of delivery
Customers getting powerful and less loyal

Technology

More innovations, new products, and new services
Increasing obsolescence rate
Increasing information overload
Social networking, Web 2.0 and beyond

Societal

Growing government regulations and deregulation
Workforce more diversified, older, and composed of more women
Prime concerns of homeland security and terrorist attacks
Necessity of Sarbanes-Oxley Act and other reporting-related legislation
Increasing social responsibility of companies
Greater emphasis on sustainability



Organizational Responses

- Be Reactive, Anticipative, Adaptive, and Proactive
- Managers may take actions, such as
 - Employ strategic planning.
 - Use new and innovative business models.
 - Restructure business processes.
 - Participate in business alliances.
 - Improve corporate information systems.
 - ... more [in your book]



Closing the Strategy Gap

- One of the major objectives of computerized decision support is to facilitate closing the gap between the current performance of an organization and its desired performance, as expressed in its mission, objectives, and goals, and the strategy to achieve them.



Managerial Decision Making

- Management is a process by which organizational goals are achieved by using resources.
 - **Inputs:** resources
 - **Output:** attainment of goals
 - **Measure of success:** outputs / inputs
- Management \cong Decision Making
- Decision making: selecting the best solution from two or more alternatives



The Nature of Managers' Work

Mintzberg's 10 Managerial Roles

Interpersonal

1. Figurehead
2. Leader
3. Liaison

Informational

4. Monitor
5. Disseminator
6. Spokesperson

Decisional

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



Decision-Making Process

- Managers usually make decisions by following a four-step process (a.k.a. the scientific approach)
 1. Define the problem (or opportunity)
 2. Construct a model that describes the real-world problem.
 3. Identify possible solutions to the modeled problem and evaluate the solutions.
 4. Compare, choose, and recommend a potential solution to the problem.



Information Systems Support for Decision Making

- Group communication and collaboration
- Improved data management
- Managing data warehouses and Big Data
- Analytical support
- Overcoming cognitive limits in processing and storing information
- Knowledge management
- Anywhere, anytime support

An Early Decision Support Framework (by Gory and Scott-Morten, 1971)

Type of Decision	Type of Control		
	Operational Control	Managerial Control	Strategic Planning
Structured	Accounts receivable 1 Accounts payable Order entry	Budget analysis 2 Short-term forecasting Personnel reports Make-or-buy	Financial management 3 Investment portfolio Warehouse location Distribution systems
Semistructured	Production scheduling 4 Inventory control	Credit evaluation 5 Budget preparation Plant layout Project scheduling Reward system design Inventory categorization	Building a new plant 6 Mergers & acquisitions New product planning Compensation planning Quality assurance HR policies Inventory planning
Unstructured	Buying software 7 Approving loans Operating a help desk Selecting a cover for a magazine	Negotiating 8 Recruiting an executive Buying hardware Lobbying	R & D planning 9 New tech. development Social responsibility planning

An Early Decision Support Framework



- Degree of Structuredness (Simon, 1977)
 - Decisions are classified as
 - Highly structured (a.k.a. programmed)
 - Semi-structured
 - Highly unstructured (i.e., nonprogrammed)
- Types of Control (Anthony, 1965)
 - Strategic planning (top-level, long-range)
 - Management control (tactical planning)
 - Operational control



The Concept of DSS

- DSS - interactive computer-based systems, which help decision makers utilize data and models to solve unstructured problems

(Gorry and Scott-Morton, 1971)

- Decision support systems couple the intellectual resources of individuals with the capabilities of the computer to improve the quality of decisions.
- DS as an Umbrella Term
- Evolution of DS into Business Intelligence



A Framework for Business Intelligence (BI)

- BI is an evolution of decision support concepts over time
 - **Then:** Executive Information System
 - **Now:** Everybody's Information System (BI)
- BI systems are enhanced with additional visualizations, alerts, and performance measurement capabilities
- The term BI emerged from industry



Definition of BI

- BI is an umbrella term that combines architectures, tools, databases, analytical tools, applications, and methodologies
- BI is a content-free expression, so it means different things to different people
- BI's major objective is to enable easy access to data (and models) to provide business managers with the ability to conduct analysis
- BI helps *transform* data, to information (and knowledge), to decisions, and finally to action



A Brief History of BI

- The term BI was coined by the Gartner Group in the mid-1990s
- However, the concept is much older
 - 1970s - MIS reporting - static/periodic reports
 - 1980s - Executive Information Systems (EIS)
 - 1990s - OLAP, dynamic, multidimensional, ad-hoc reporting -> coining of the term "BI"
 - 2010s - Inclusion of AI and Data/Text Mining capabilities; Web-based Portals/Dashboards, Big Data, Social Media, Analytics
 - 2020s - yet to be seen

The Evolution of BI Capabilities

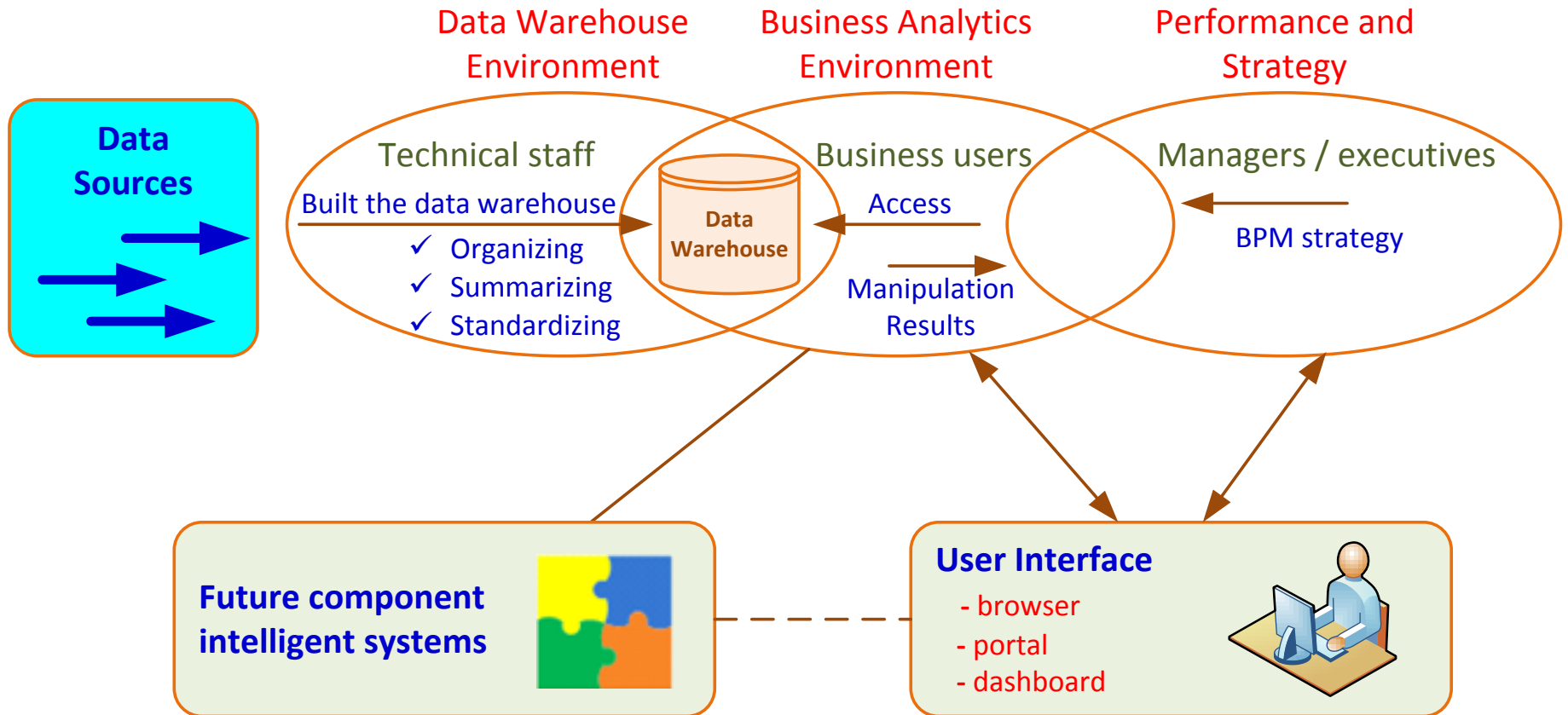




The Architecture of BI

- A BI system has four major components
 - a data warehouse, with its source data
 - business analytics, a collection of tools for manipulating, mining, and analyzing the data in the data warehouse
 - business performance management (BPM) for monitoring and analyzing performance
 - a user interface (e.g., dashboard)

A High-Level Architecture of BI



Business Value of BI Analytical Applications

- Customer segmentation
- Propensity to buy
- Customer profitability
- Fraud detection
- Customer attrition
- Channel optimization





Application Case 1.1

Sabre Helps Its Clients Through Dashboards and Analytics

Questions for Discussion

1. What is traditional reporting? How is it used in the organization?
2. How can analytics be used to transform the traditional reporting?
3. How can interactive reporting assist organizations in decision making?



A Multimedia Exercise in Business Intelligence

- Teradata University Network (TUN)

www.teradatauniversitynetwork.com

- BSI Videos (Business Scenario Investigations)

www.youtube.com/watch?v=NXEL5F4_aKA

- Also look for other BSI Videos at TUN



DSS-BI Connections

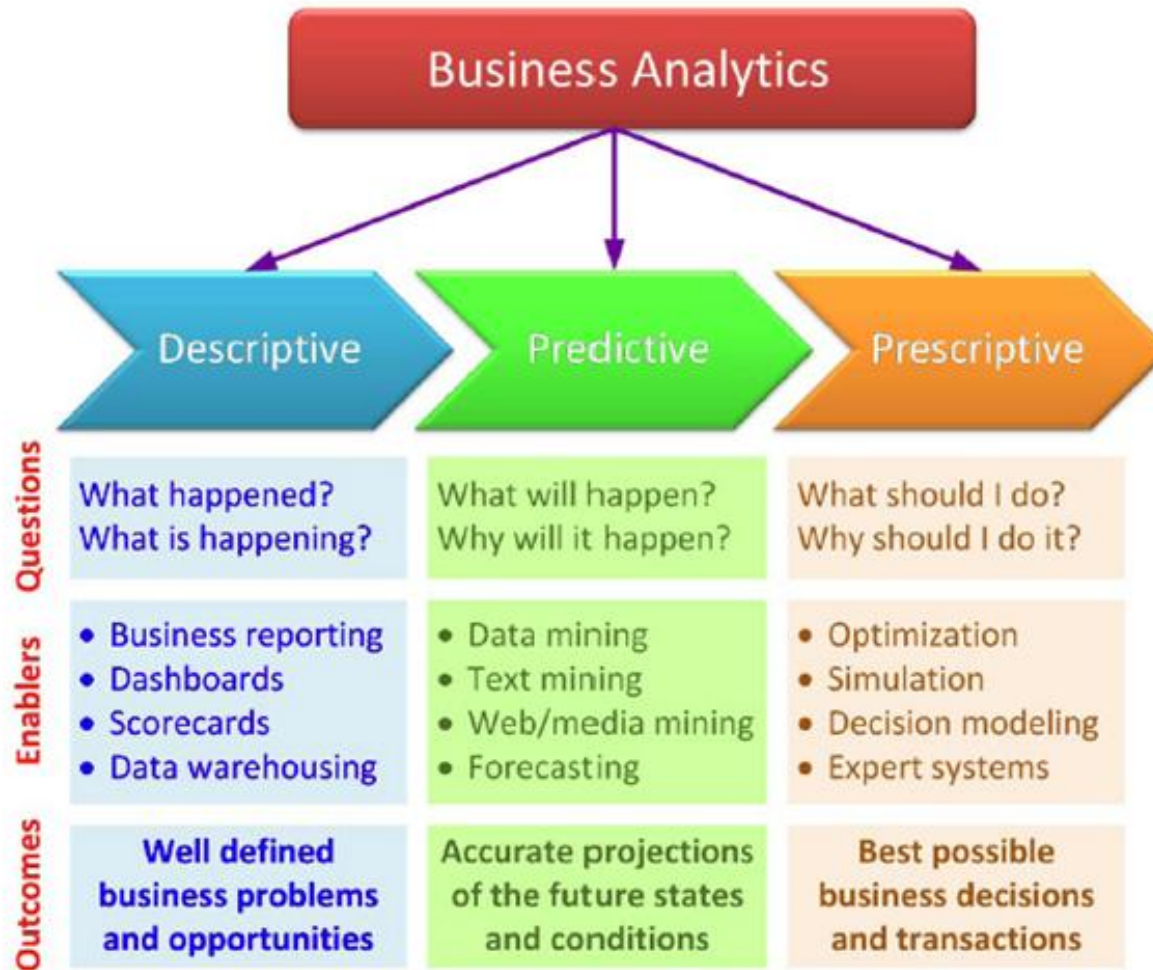
- Similarities and differences?
 - Similar architectures, data focus, ...
- Direct vs. indirect support
- Different target audiences
- Commercially available systems versus in-house development of solutions
- Origination – Industry vs. Academia
- So, is DSS = BI ?



Analytics Overview

- Analytics?
 - Something new or just a new name for ...
- A Simple Taxonomy of Analytics (proposed by INFORMS)
 - Descriptive Analytics
 - Predictive Analytics
 - Prescriptive Analytics
- Analytics or Data Science?

Analytics Overview





Application Case 1.2

Eliminating Inefficiencies at Seattle Children's Hospital

Questions for Discussion

1. Who are the users of the tool?
2. What is a dashboard?
3. How does visualization help in decision making?
4. What are the significant results achieved by the use of Tableau?



Application Case 1.3

Analysis at the Speed of Thought

Questions for Discussion

1. What are the desired functionalities of a reporting tool?
2. What advantages were derived by using a reporting tool in the case?



Application Case 1.4

Moneyball: Analytics in Sports and Movies

Questions for Discussion

1. How is predictive analytics applied in *Moneyball*?
2. What is the difference between objective and subjective approaches in decision making?



Application Case 1.5

Analyzing Athletic Injuries

Questions for Discussion

1. What types of analytics are applied in the injury analysis?
2. How do visualizations aid in understanding the data and delivering insights into the data?
3. What is a classification problem?
4. What can be derived by performing sequence analysis?



Application Case 1.6

Industrial and Commercial Bank of China (ICBC) Employs Models to Reconfigure Its Branch Networks

Questions for Discussion

1. How can analytical techniques help organizations to retain competitive advantage?
2. How can descriptive and predictive analytics help in pursuing prescriptive analytics?
3. What kind of prescriptive analytic techniques are employed in the case study?
4. Are the prescriptive models once built good forever?

Introduction to Big Data Analytics

- Big Data?
 - Not just big!
 - Volume
 - Variety
 - Velocity
- More of Big Data and related analytics tools and techniques are covered in Chapter 13.





Application Case 1.7

Gilt Groupe's Flash Sales Streamlined by Big Data Analytics

Questions for Discussion

1. What makes this case study an example of Big Data analytics?
2. What types of decisions does Gilt Groupe have to make?



End-of-Chapter Application Case

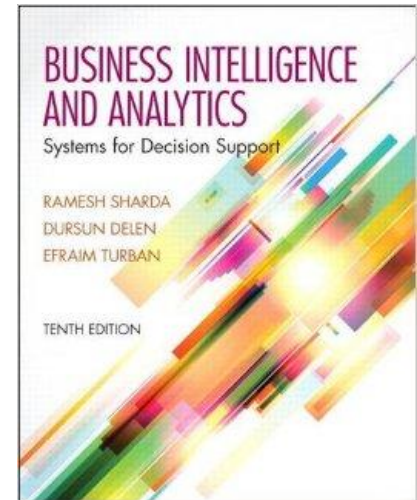
Nationwide Insurance Used BI to Enhance Customer Service

Questions for Discussion

1. Why did Nationwide need an enterprise-wide data warehouse?
2. How did integrated data drive the business value?
3. What forms of analytics are employed at Nationwide?
4. With integrated data available in an enterprise data warehouse, what other applications could Nationwide potentially develop?

Plan of the Book

- **Part I** - Decision Making and Analytics: An Overview
 - (Chapters 1 & 2)
- **Part II** - Descriptive Analytics
 - (Chapters 3 & 4)
- **Part III** - Predictive Analytics
 - Chapters 5 - 8
- **Part IV** - Prescriptive Analytics
 - Chapter 9 - 12
- **Part V** - Big Data and Future Directions for Business Analytics
 - Chapters 13 & 14
- **PLUS** - Online Supplements
 - ...





End of the Chapter

- Questions / Comments...



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