IS101 Principles of Information Systems

Enterprise Systems
Business Intelligence and Analytics

Lecturer: Dr Maya Krayneva

Textbook: Stair, R., & Reynolds, G. (2016). *Principles of information systems* (13th ed.). Cengage Learning.

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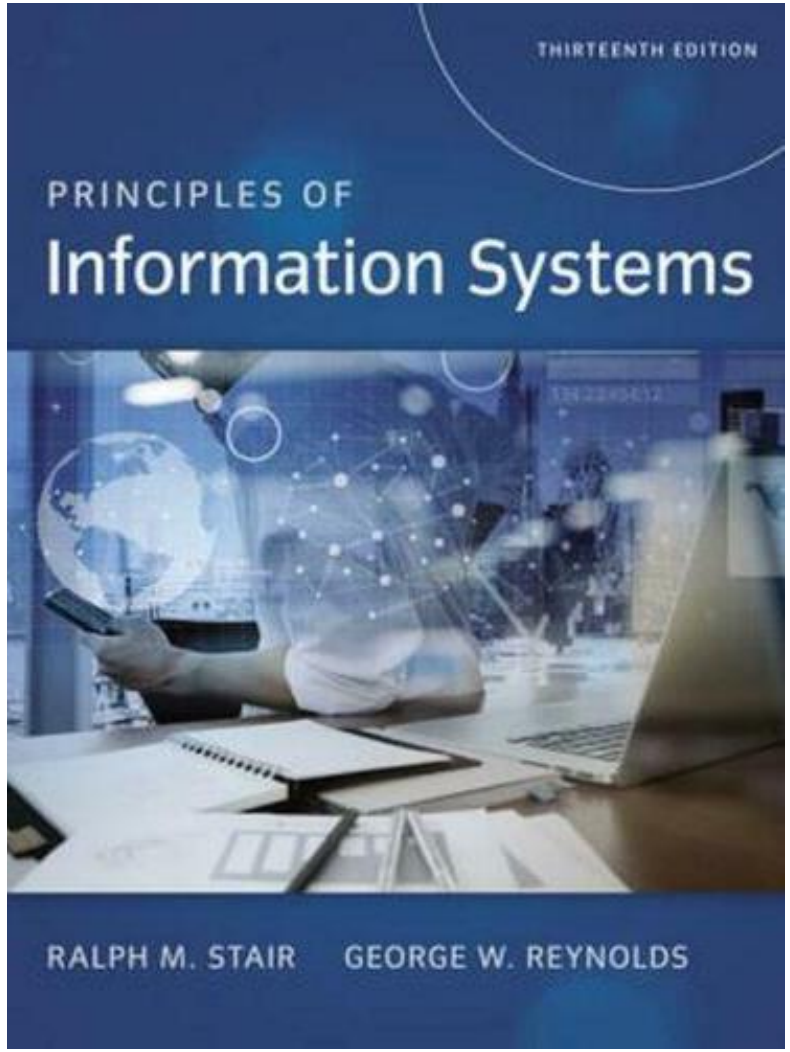


Chapter 8: Enterprise Systems

Transaction Processing Systems

Enterprise Systems

Enterprise Resource Planning
- ERP: Supply Chain Management
- ERP: Customer Relationship Management
- ERP: Product Lifecycle Management

Transaction Processing Systems

Transaction processing systems (TPSs):

- Capture and process detailed data necessary to update the organization's records about fundamental business operations
- Include order entry, inventory control, payroll, accounts payable, accounts receivable, general ledger, etc.

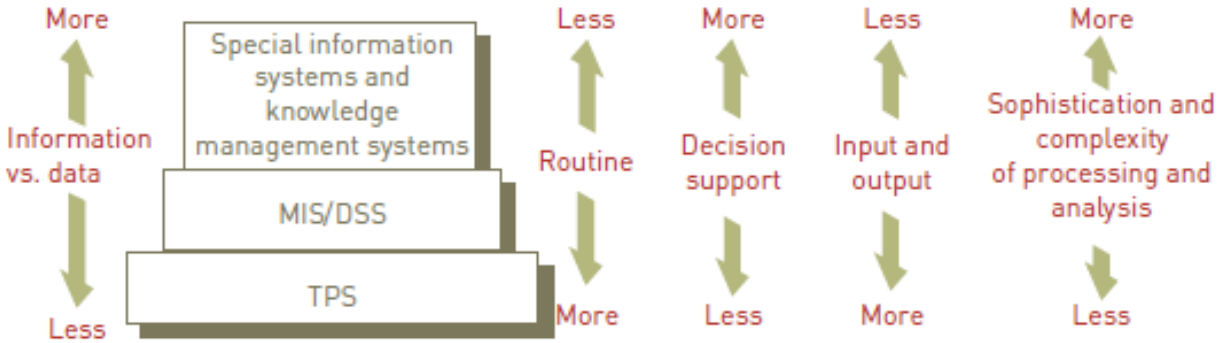


FIGURE 8.1
TPS, MIS/DSS, and special information systems in perspective
A TPS provides valuable input to MIS, DSS, and KM systems.

A TPS provides valuable **data input to**:

- Management information systems (MIS)
- Decision support systems (DSS)
- Knowledge management systems (KMS)

Difference between Batch versus Online Transaction Processing (“in groups” versus “as they occur”)

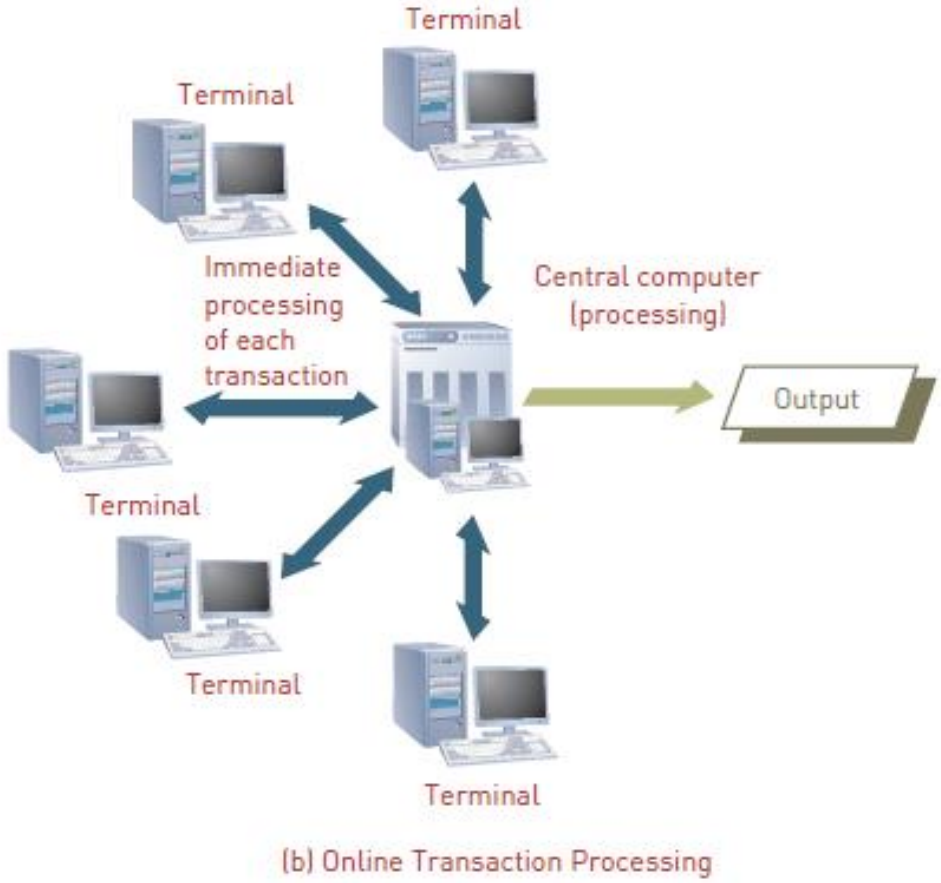


FIGURE 8.2

Batch versus online transaction processing

(a) Batch processing inputs and processes data in groups. (b) In online processing, transactions are completed as they occur.

Transaction Processing Activities

The transaction processing cycle

- Data collection
- Data editing
- Data correction
- Data manipulation (processing & correction)
- Data storage
- Document production

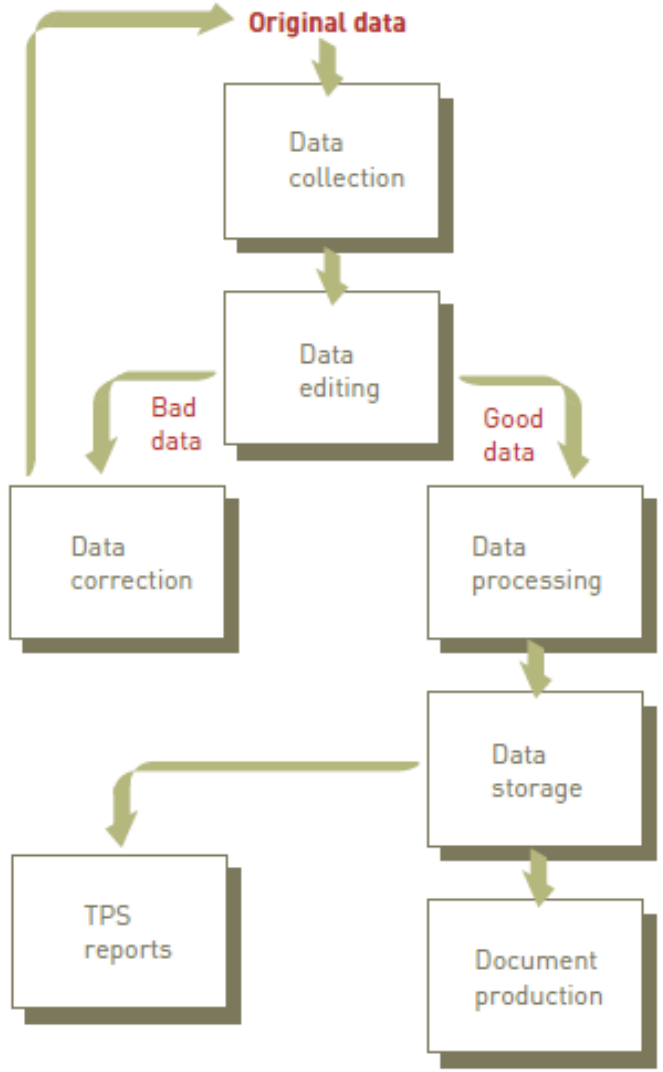


FIGURE 8.5
Transaction processing activities
A transaction processing cycle includes data collection, data editing, data correction, data processing, data storage, and document production.

Now, ask yourself again: "How do the 'data', 'processing' and 'information' look like in my project?"

EXAMPLE of a Transaction Processing Systems (*focus on transactions taking place rather than on the image*)

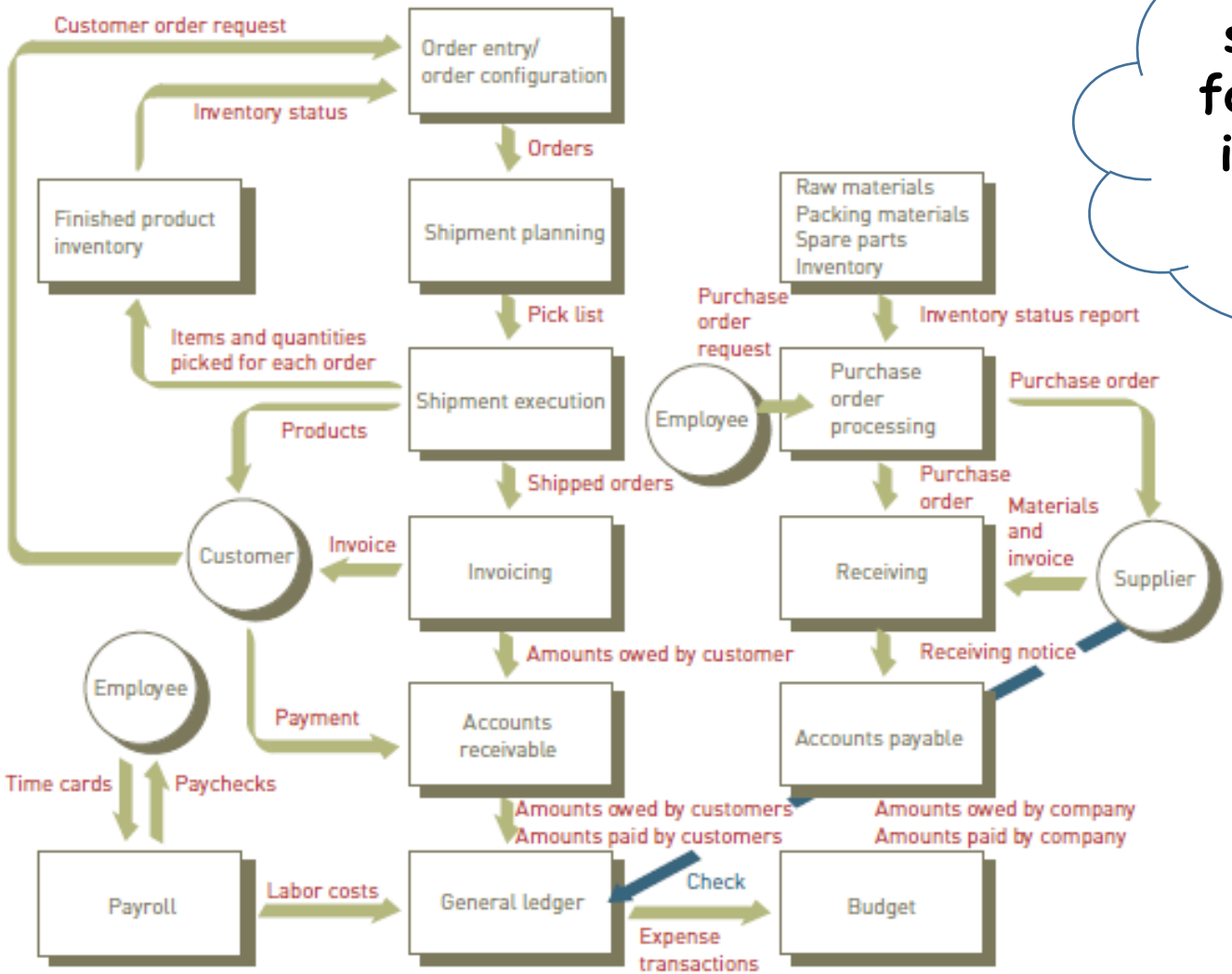


FIGURE 8.4

Integration of a firm's TPS

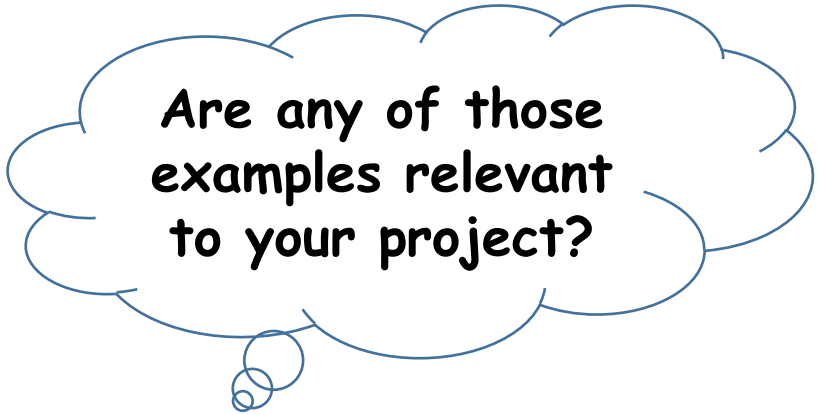
When transactions entered into one system are processed, they create new transactions that flow into another system.

Try to draw a similar diagram for your project, i.e. logical flow of activities (one by one!)

Transaction Processing Systems benefits

TABLE 8.1 Examples of TPSs yielding significant benefits

Competitive Advantage	Example
Better relationship with suppliers	Internet marketplace to allow the company to purchase products from suppliers at discounted prices
Costs dramatically reduced	Warehouse management system employing RFID technology to reduce labor hours and improve inventory accuracy
Customer loyalty increased	Customer interaction system to monitor and track each customer interaction with the company
Inventory levels reduced	Collaborative planning, forecasting, and replenishing system to ensure the right amount of inventory is in stores
Superior information gathering	Order configuration system to ensure that products ordered will meet customer's objectives
Superior service provided to customers	Tracking systems that customers can access to determine shipping status



Enterprise Systems

An **enterprise system** - Ensures that information can be shared across all business functions and all levels of management to support the running and managing of a business

Businesses rely on enterprise systems to perform daily activities in areas such as:

- Product supply and distribution
- Manufacturing
- Human resources
- Sales and marketing
- Accounting and taxes

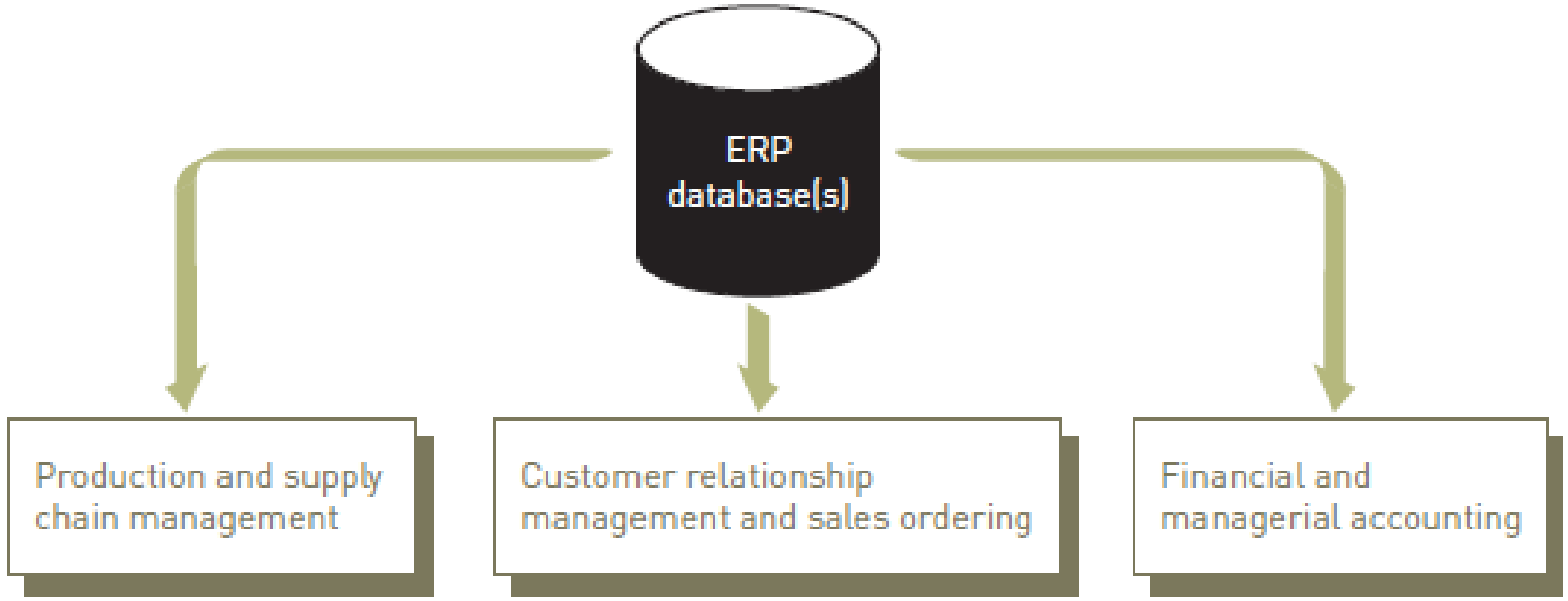


FIGURE 8.7
Enterprise resource planning system
An ERP integrates business processes and the ERP database.

Enterprise System Example : Enterprise Resource Planning

Enterprise resource planning (ERP)

- A set of integrated programs that manage a company's vital business operations for an entire organization

Netsuite link

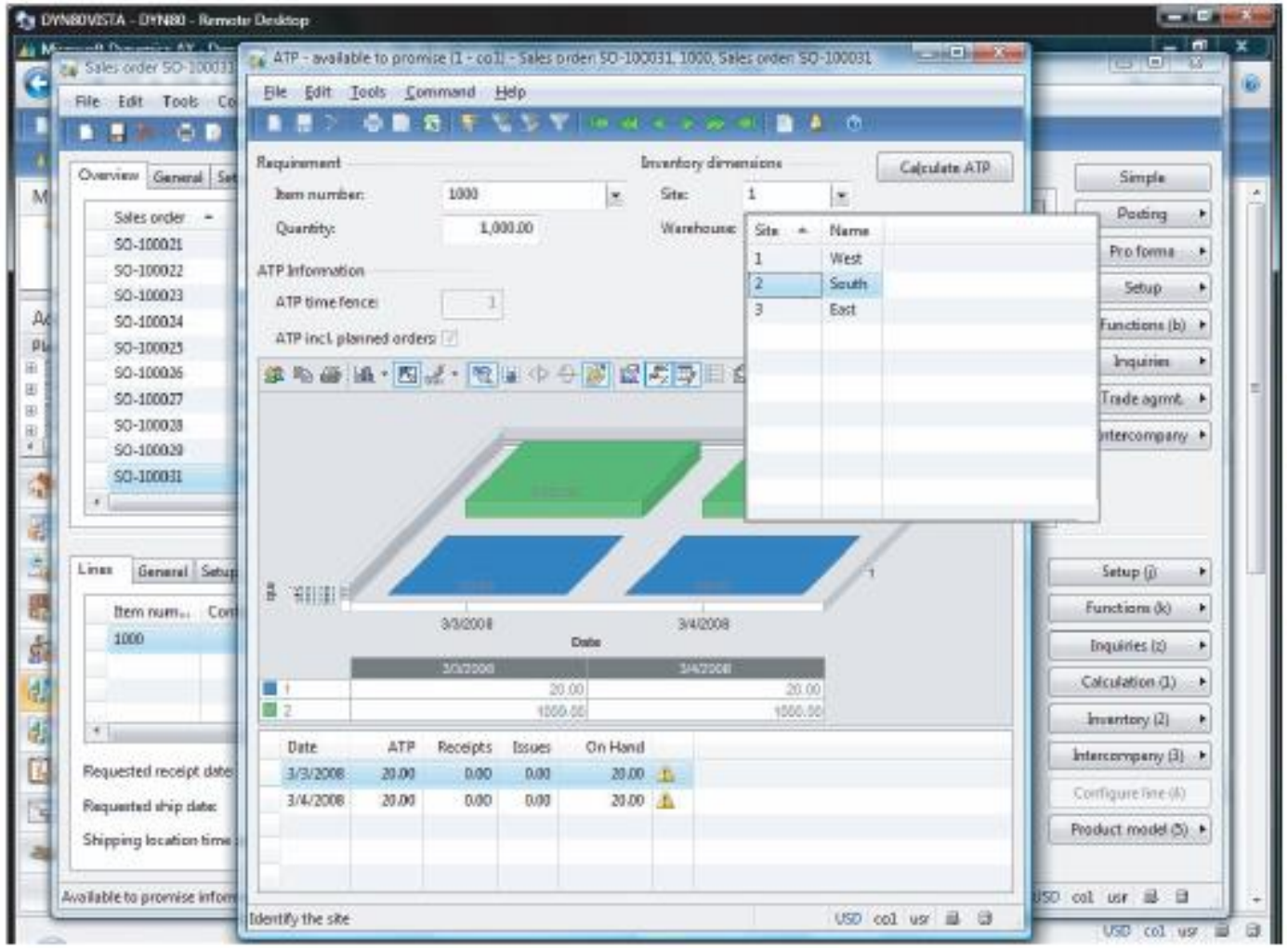


FIGURE 8.8

ERP software

Microsoft Dynamics is an ERP solution that is very popular among small businesses.

Enterprise Resource Planning: *Supply Chain Management*

Supply chain management (SCM) is a system that includes planning, executing, and controlling all activities involved in:

- Sourcing and procurement of raw materials
- Converting raw materials to finished products
- Warehousing and delivering finished product to customers

SCM manages materials, information, and finances as they move from:

- Supplier -> Manufacturer -> Wholesaler -> Retailer -> Consumer

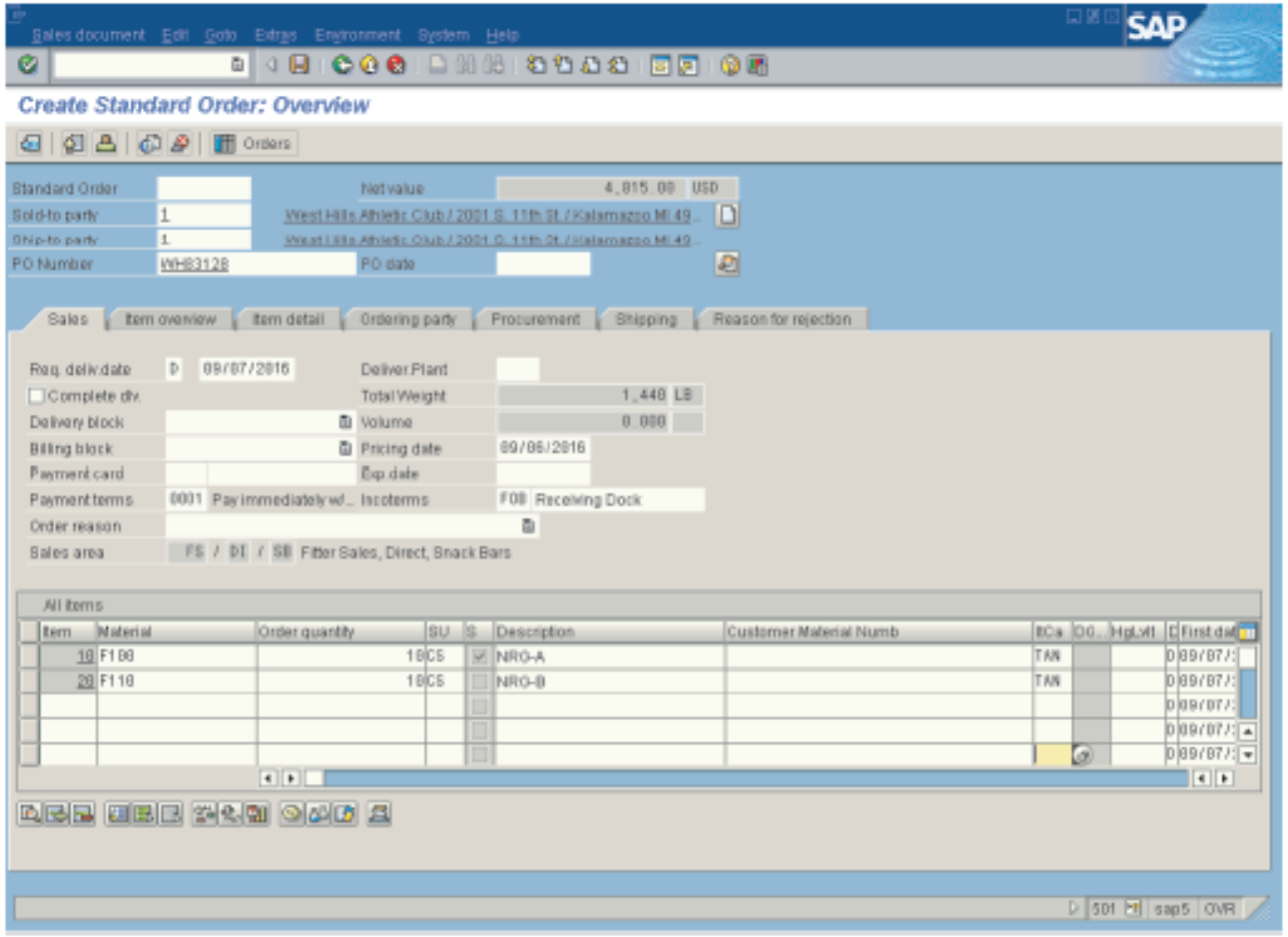


FIGURE 8.9

Sales order entry window

Sales ordering is the set of activities that must be performed to capture a customer sales order.

Source: SAP AG

Enterprise Resource Planning: *Customer Relationship Management*

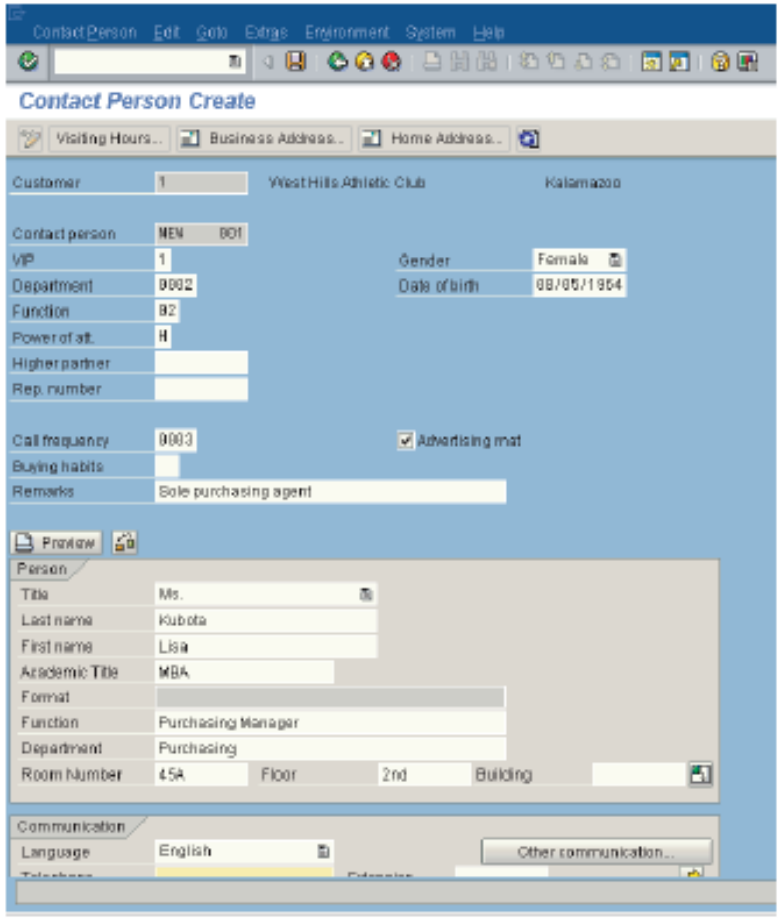


FIGURE 8.11

SAP Contact Manager

Contact management involves tracking data on individual customers and sales leads and accessing that data from any part of the organization.

Source: SAP AG

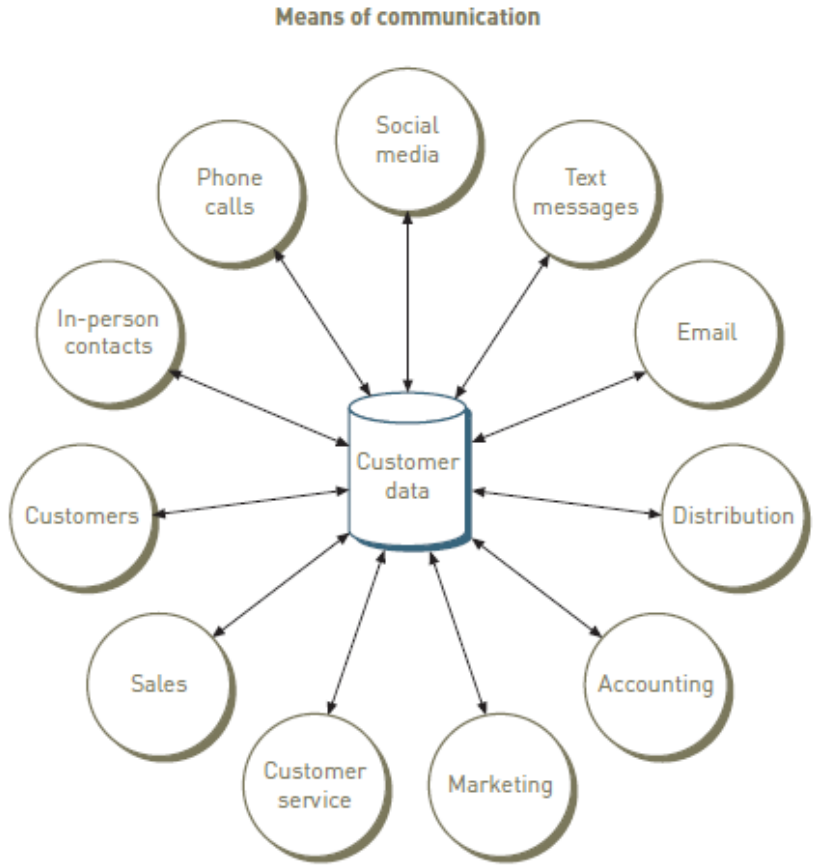


FIGURE 8.10

Customer relationship management system

A CRM system provides a central repository of customer data used by the organization.

Enterprise Resource Planning: *Product Lifecycle Management*

Product lifecycle management (PLM)

- An enterprise business strategy that creates a common repository of product information and processes
- Supports the collaborative creation, management, dissemination, and use of product and packaging definition information

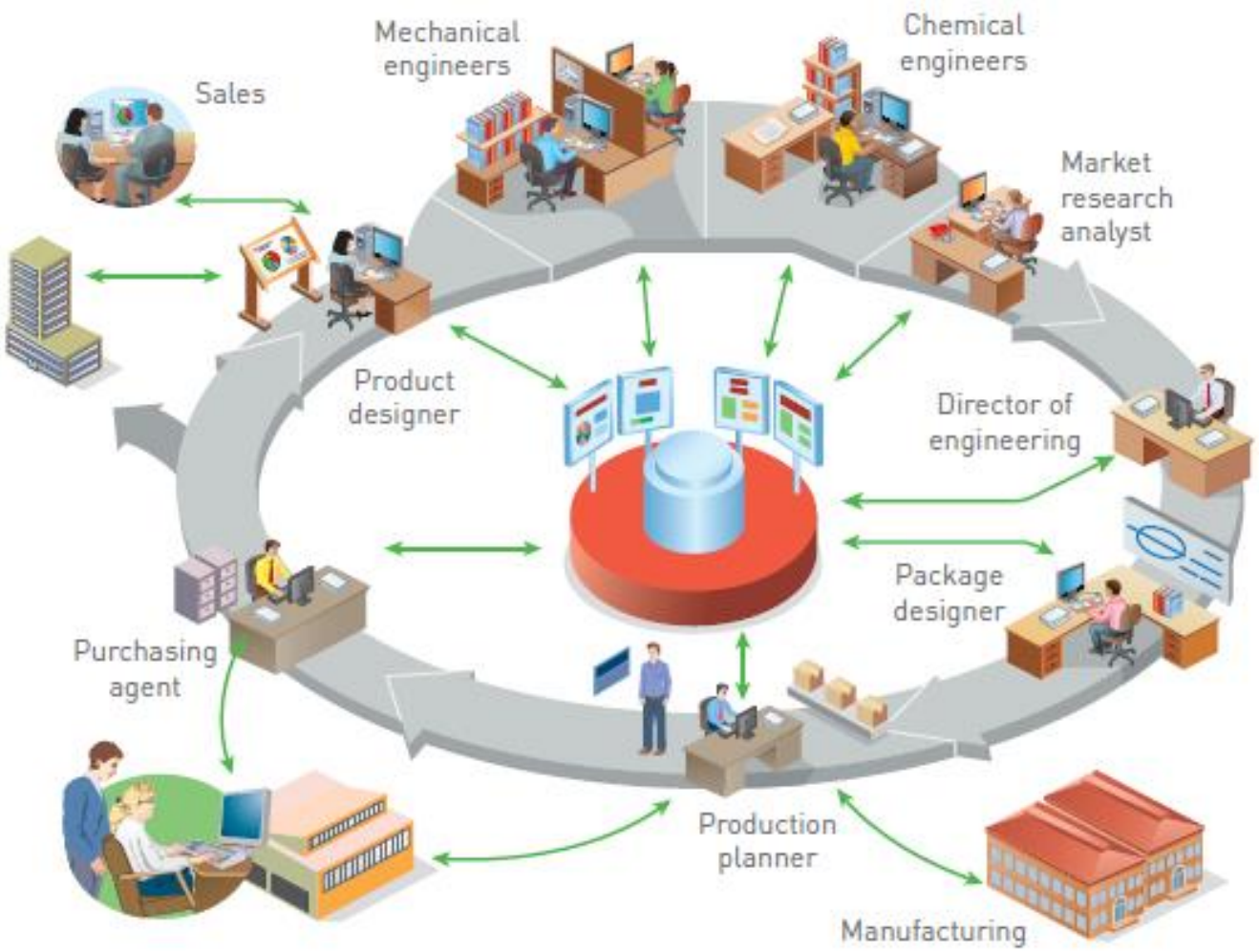


FIGURE 8.14
PLM business strategy
PLM powers innovation and improves productivity.

Enterprise Resource Planning: *Product Lifecycle Management*

Product lifecycle management (PLM) software

- Provides a means for **managing the data and processes** associated with the various phases of the lifecycle of a product

FIGURE 8.12
Scope of PLM software
Using PLM software, organizations can manage the data and processes associated with the various phases of the product life cycle.

Enterprise Resource Planning: *Product Lifecycle Management*

The scope of PLM software may include:

- computer-aided **design (CAD)**
- computer-aided **engineering (CAE)**
- computer-aided **manufacturing (CAM)**

[Autodesk link]

Are ERP, CRM, SRM, SCM or PLM relevant to your project?

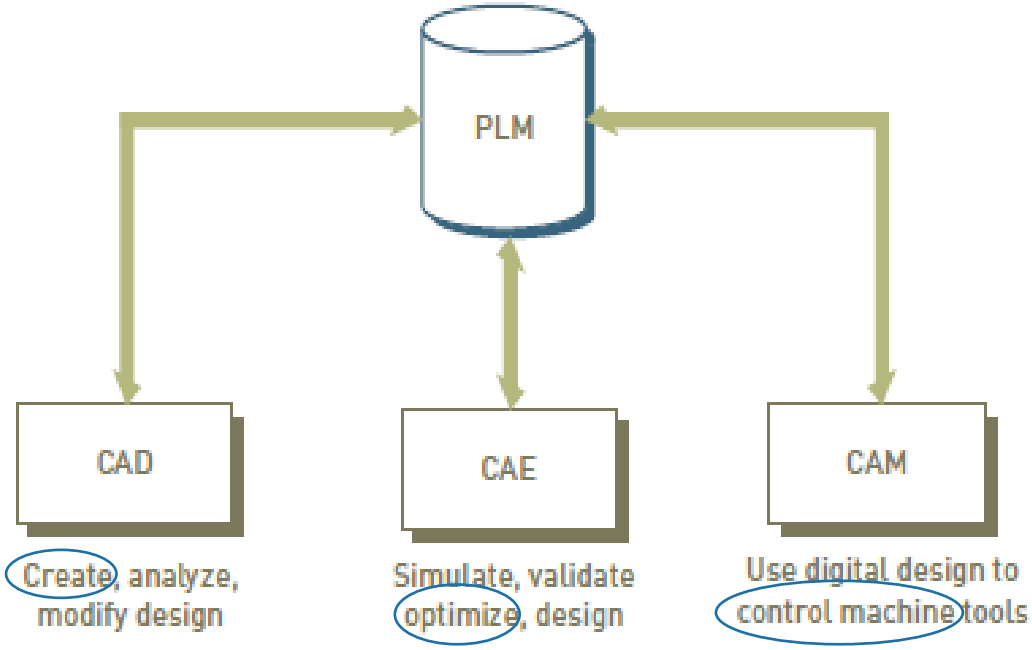


FIGURE 8.13
CAD, CAE, and CAM software
In manufacturing, the model generated in CAD and verified in CAE can be entered into CAM software, which then controls the machine tool.

Overcoming Challenges in Implementing Enterprise Systems

Tips for avoiding a failed implementation

- Assign a full-time executive to manage the project
- Appoint an experienced, independent resource to provide project oversight and to verify and validate system performance
- Allow sufficient time to transition from the old way of doing things to the new system and new processes
- Allocate sufficient time and money training people
- Define metrics to assess project progress and to identify project-related risks
- Keep the scope of the project well defined and contained to essential business processes
- Be wary of modifying the enterprise system software to conform to your firm's business practices

*Read Case One on p. 379 (**SAP's Business Suite**): a bundle of business applications/constituents: Enterprise Resource Planning, Customer Relationship Management, Supplier Relationship Management, Supply Chain Management and Product Lifecycle Management*

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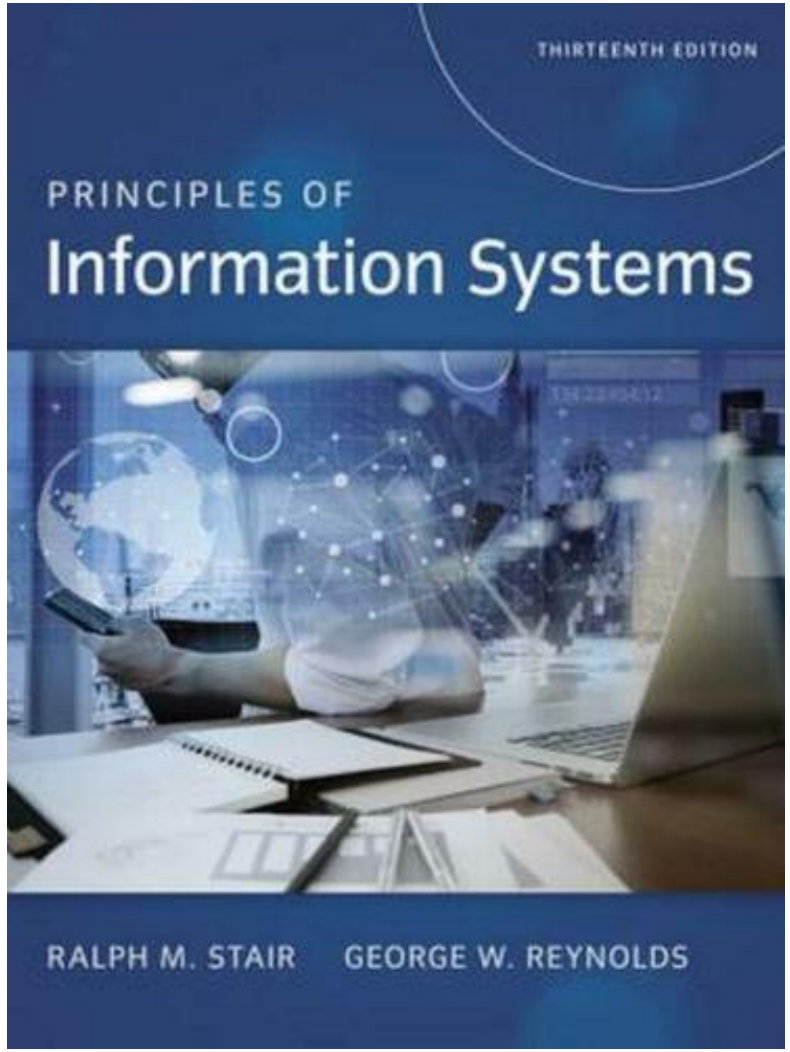


Chapter 9: Business Intelligence and Analytics

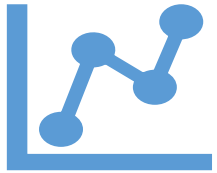
Business Analytics

Business Intelligence

- Business Intelligence and Analytics Tools
  - Spreadsheets
  - Data visualization tools
  - Online analytical processing (OLAP)
  - Linear regression
  - Data Mining
  - Dashboards

Self-Service Analytics

Business Analytics



Business Analytics

The extensive use of data and **quantitative analysis** to support fact-based decision making within organizations

Business Analytics can be used to:

Gain a better understanding of current business performance

Reveal new business patterns and relationships

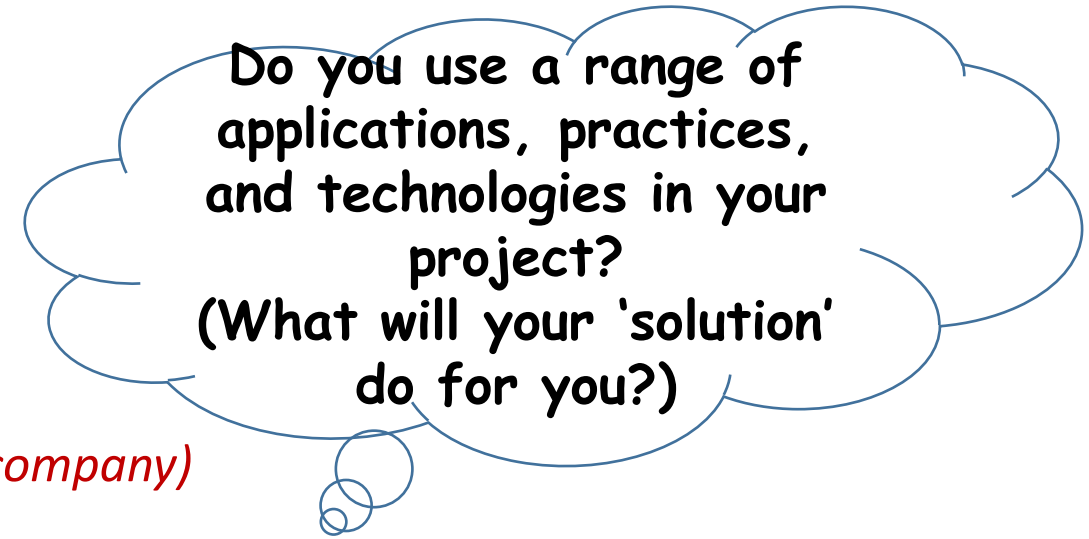
Explain why certain results occurred

Optimize current operations

Forecast future business results

Business Intelligence (BI)

- Includes a wide range of applications, practices, and technologies for the extraction, transformation, integration, visualization, analysis interpretation, and presentation of data to support improved decision making
  - Data used in BI is often pulled from multiple sources and may come from sources internal and external to the organization
  - Data can be used to build large collections of data called data warehouses, data marts, and data lakes



See also example on p. 387 (data warehouse for a gaming company)

Spreadsheets

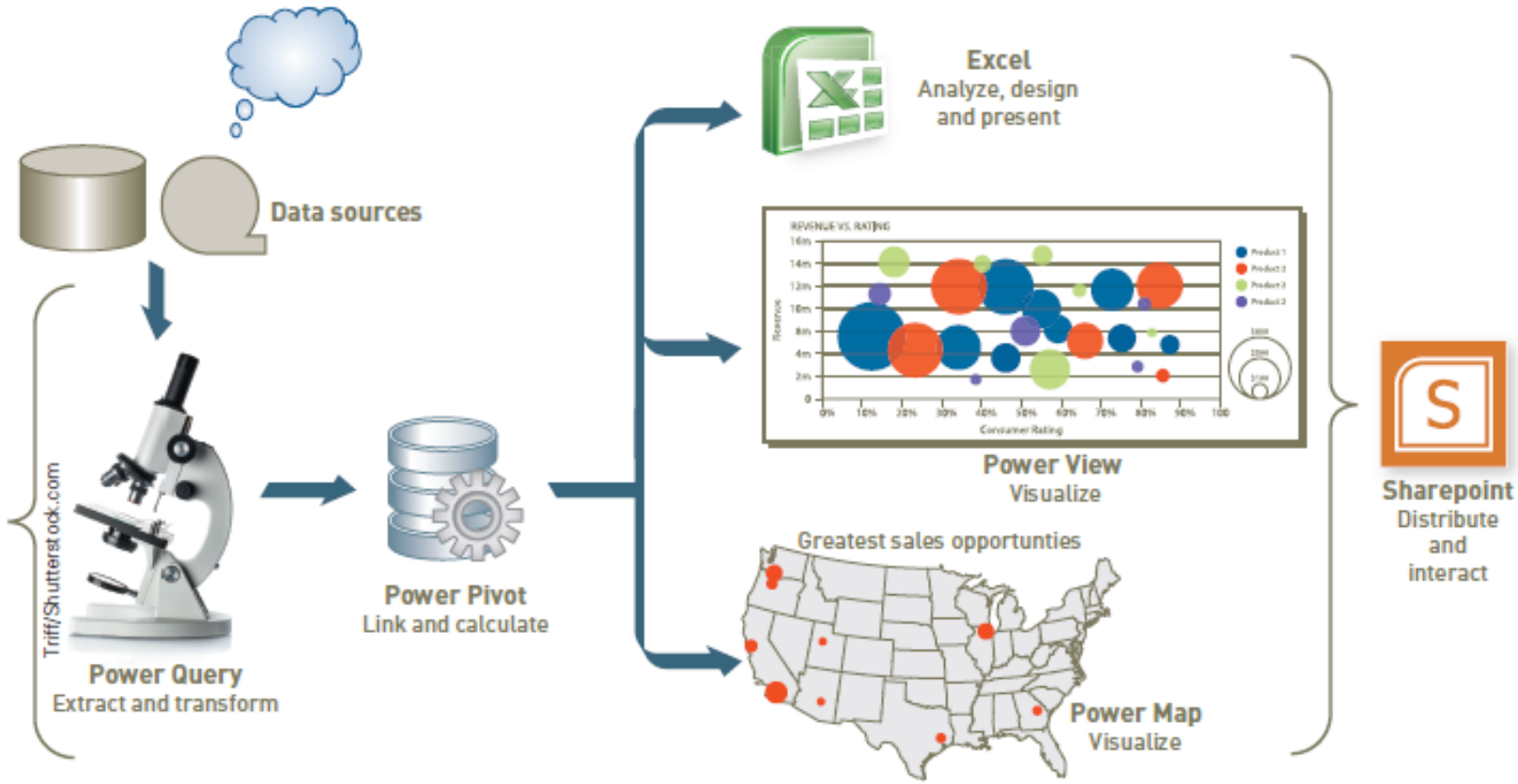


FIGURE 9.1

Components of Microsoft Power BI for Office 365

Microsoft Power BI has been used to better understand the clinical use of drugs, the efficacy of treatment, and the associated costs.

Source: Access Analytics, Power BI for Business, Power Analytics, *http://www.accessanalytic.com.au/Power-BI.html.*

Data Visualization Tools: *Word Cloud*

FIGURE 9.2

Word cloud

This Word cloud shows the topics covered in this chapter.

Data Visualization Tools: *The conversion funnel*

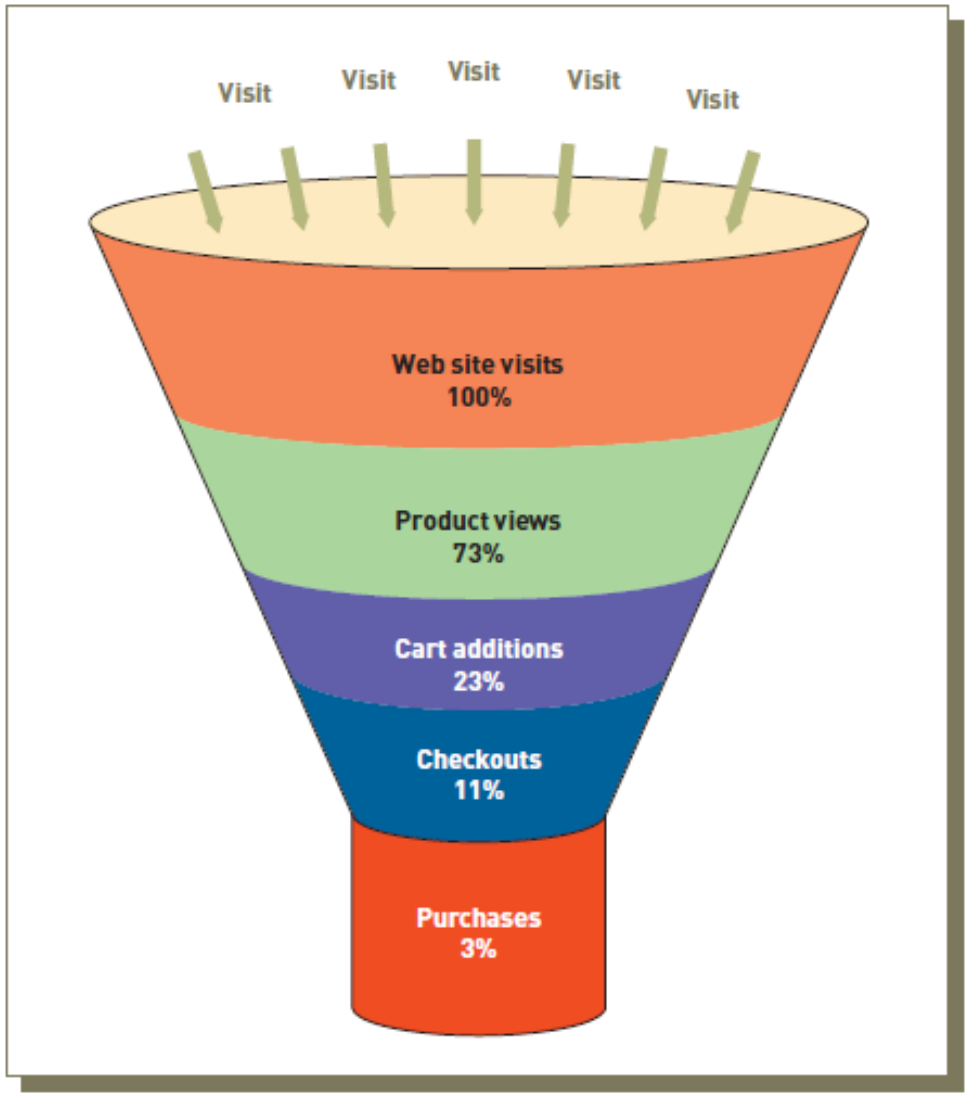


FIGURE 9.3
The conversion funnel
The conversion funnel shows the key steps in converting a consumer to a buyer.

Data Visualization Tools: *The scatter diagram*

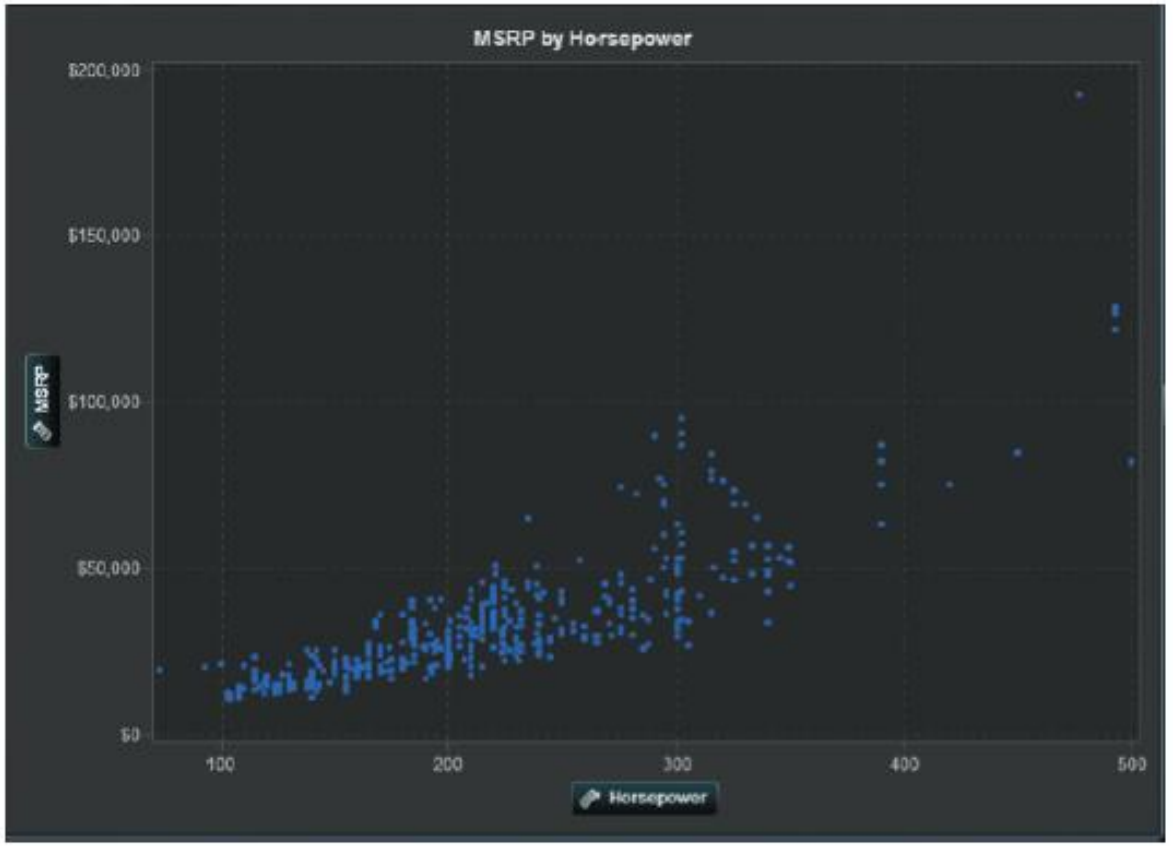


FIGURE 9.4

Data visualization

This scatter diagram shows the relationship between MSRP and horsepower.

Source: "Data Visualization," SAS, *http://www.sas.com/en_us/insights/big-data/data-visualization.html#m=lightbox5*, accessed April 19, 2016.

Online Analytical Processing

Online Analytical Processing (OLAP)

- A method to analyze multidimensional data from many different perspectives

Data cubes

- Contain numeric facts called measures, which are categorized by dimensions, such as time and geography

e.g. summarize unit sales of a specific item on a specific day for a specific store

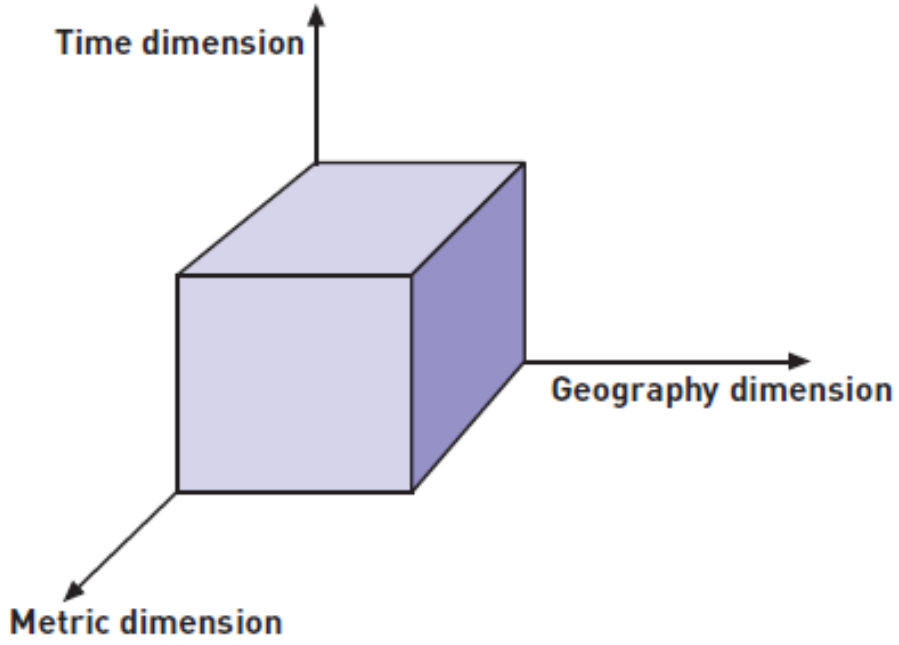


FIGURE 9.5
A data cube
The data cube contains numeric facts that are categorized by dimensions, such as time and geography.

Linear Regression

Linear regression

- A mathematical technique for predicting the value of a dependent variable Y ($Y = a + b\ X + \varepsilon$)
- A linear relationship between the independent X and dependent variable Y; **a** is value of Y when X is 0, b is the slope of the regression line, ε is error in predicting the value Y, given a value of X

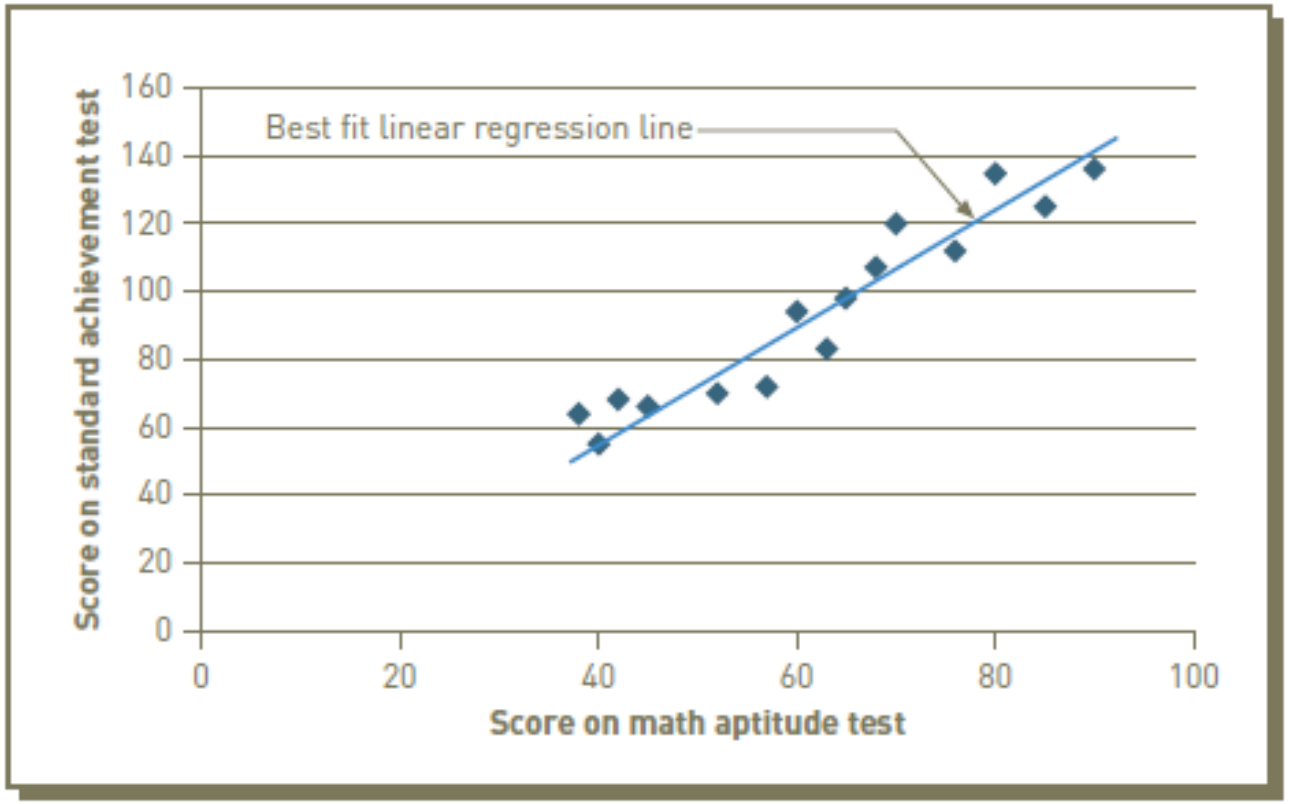


FIGURE 9.6

Simple linear regression

This graph shows a linear regression that predicts students' final exam scores based on their math aptitude test score.

Data Mining

Data mining

- A BI analytics tool used to explore large amounts of data for hidden patterns to predict future trends and behaviors for use in decision making

E.g. data mining **techniques**:

- Association analysis: a specialized set of algorithms *sorts through data and forms statistical rules* about *relationships among the items*
- Neural computing: *historical data* is examined for patterns that are then used to make *predictions*
- Case-based reasoning: *if-then-else cases* are used to recognize patterns

Orange Datamining

Orange Tutorial

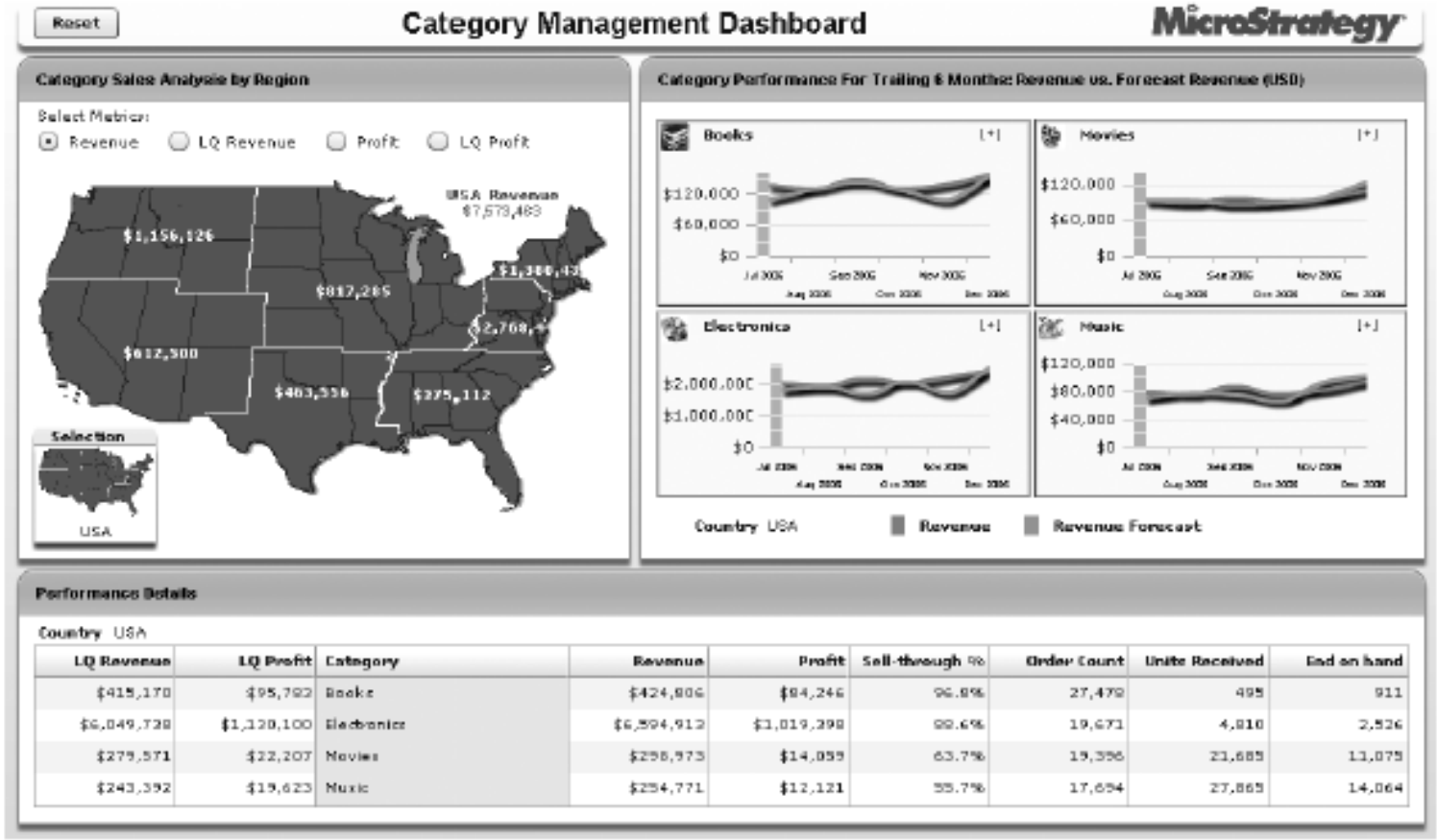
Data Mining

Data mining can be **used to**:

- identify consumers most likely to take advantage of future mailings (based on past responses to promotional mailings)
- identify seemingly unrelated products that are frequently purchased together (based on examining retail sales data)
- identify likely fraudulent requests for authorization (based on monitoring credit card transactions)
- adjust room rates so as to maximize revenue (based on examining hotel booking data)
- identify the most profitable customers to recruit (based on behavior data about potential customers)
- help focus future recruiting efforts (based on data about organization's most valuable employees)
- Recognize how changes in an individual's DNA sequence affect the risk of developing common diseases such as Alzheimer's or cancer

See also example on pp. 399-400 (BI analytics system for NYC fire department)

Dashboards – overview of KPIs



LQ Revenue	LQ Profit	Category	Revenue	Profit	Sell-through %	Order Count	Units Received	End on hand
$415,170	$95,702	Books	$424,806	$84,246	96.8%	27,479	495	911
$6,049,728	$1,120,100	Electronics	$6,594,912	$1,019,298	99.6%	19,671	4,810	2,526
$279,571	$22,207	Movies	$298,973	$14,059	63.7%	19,396	21,685	11,075
$243,392	$19,623	Music	$254,771	$12,121	55.7%	17,694	27,865	14,064

FIGURE 9.8

Category management dashboard for total U.S. region

This dashboard summarizes a number of sales measures.

Source: *www.microstrategy.com/us/analytics/technology*.

Business Intelligence and Analytics Tools

- Spreadsheets
- Reporting and querying tools
- Data visualization tools
- Online analytical processing (OLAP)
- Linear regression
- Data Mining
- Dashboards

Self-Service Analytics

Self-service analytics

- Includes training, techniques, and processes that empower end users to work independently to access data from approved sources to perform their own analyses using an endorsed set of tools
- Encourages nontechnical users to make decisions based on facts and analyses rather than intuition

*Read Case Two on p. 405 (**Self-Service Business Intelligence solution**)*

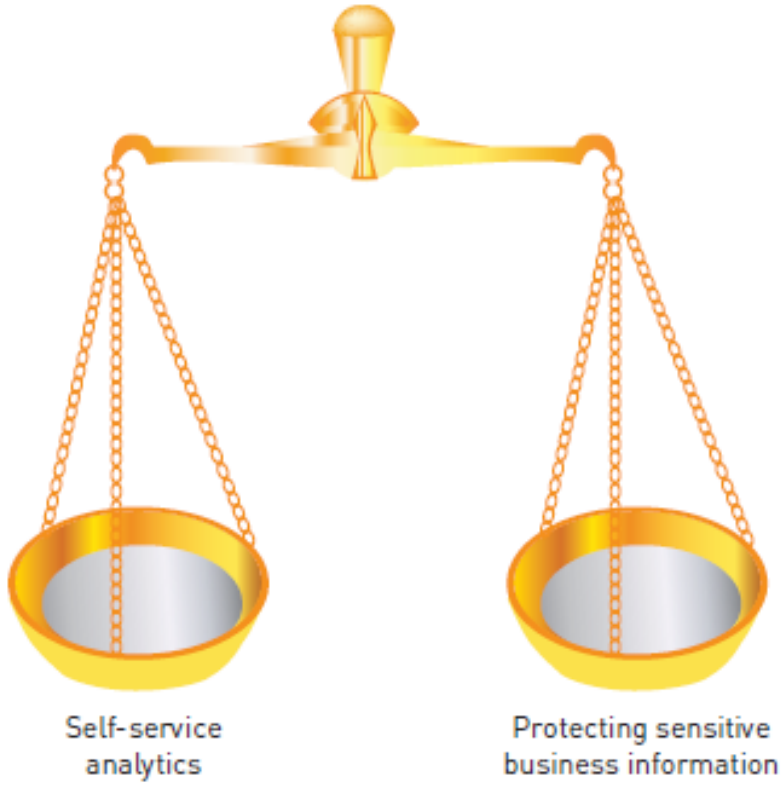


FIGURE 9.10
Importance of data management
Modern data management requires a true balancing act between enabling self-service analysis and protecting sensitive business information.