ACS-1803 Introduction to Information Systems

Instructor: Kevin Robertson

Management Information Systems Frameworks

Lecture Outline 3

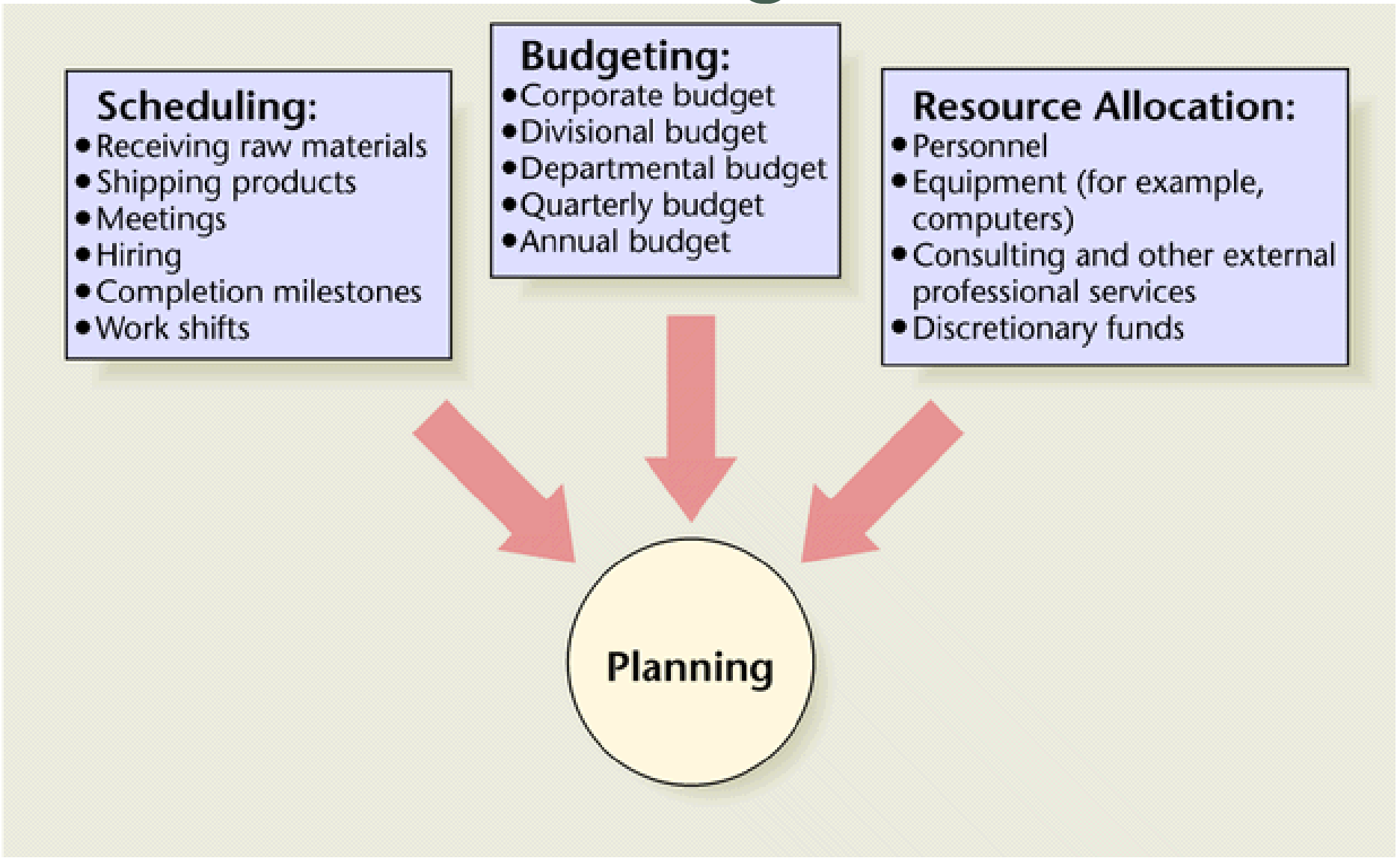
Learning Objectives

- Describe the characteristics that differentiate the operational, managerial, and executive levels of an organization
- Explain the characteristics of the three information systems designed to support each unique level of an organization: Transaction Processing Systems (TPS), Management Information Systems (MIS), and Executive Information Systems (EIS)
- Understand the nature of Functional Area systems as a system that spans organizational boundaries

The Nature of Managerial Work

- Management
  - the process of directing tasks and directing resources to achieve organizational goals
  - management functions: planning, organizing, directing, motivating, controlling...
- Planning: done at different Levels
  - Long-term mission and vision
  - Strategic goals
  - Tactical objectives
- Most important planning activities
  - Scheduling
  - Budgeting
  - Resource allocation

The Nature of Managerial Work



The Nature of Managerial Work

- Control
  - Managers control activities by comparing plans to results.

- Reviewing project resources and updating milestones
- Tracking receiving times of raw materials
- Tracking shipping dates
- Periodically comparing actual expenditures with budgetary figures
- Periodically examining exception reports
- Discussing project progress
- Periodically examining project progress reports
- Periodically examining performance ratios (for example, revenue-per-employee, inventory turnover)

The Nature of Managerial Work

- Decision Making
  - Both planning and control call for decision making

- The higher the level of management:
  - The less routine the manager's activities
  - The more open the options
  - The more decision-making involved

The Nature of Managerial Work

- Managers need to make decisions, often under uncertainty; each level of management has different information needs.

- There is often a need for efficiency and effectiveness
  - efficiency:
    - doing things right: with minimum input
  - effectiveness:
    - doing right things, to satisfy main org. goal

- Example: *Killing mosquito with sledge hammer –effective, but not efficient*

Reporting Activity: Management by Exception

- Management focuses on acting on situations in which actual results differ significantly from planned results

10 percent Exception Report

Plant: 3706 Cockpit Wiring
Period: 1/1/2000–3/31/2000

ITEM	BUDGET AMOUNT	ACTUAL AMOUNT	DEVIATION
Wages	$12,236,000	$10,236,876.34	(-16.4%)
Telephone	$4,700	$5,202.87	10.7%
Office Supply	$2,500	$3,002.00	12.8%

The Organizational Pyramid

The Organizational Pyramid

- Senior (Executive) Managers:
  - Strategic/ Executive Information Systems
  - Make long-term decisions about products / services to produce [control direction]
- Middle (Tactical) Managers:
  - Tactical/ Management Information Systems
  - Carry out programs and plans of senior managers [control resources]
  - Budgeting, monthly scheduling, personnel plans
- Operational (Transaction Processing) Managers:
  - Operational/ Transaction Processing Systems (TPS)
  - Monitor firm's daily activities [control activity]
  - Daily scheduling, inventory handling.

New Realities in Business

- More organizations are becoming information-based
- More network-based, rather than hierarchical organizations
- People drawn into process teams to accomplish projects
- Companies are beginning to pay more attention to customers and their preferences
- Instead of mass production, we have more customization
  - Information technology (hardware and application software) makes customization possible on a larger scale

New Realities in Business

- Customer service is more critical
- Innovative approaches to competition based on increasing IT capability
- World-wide communication enable businesses to operate in global markets [programmers in India work with project leaders in USA on large software development projects]
- Business process re-engineering
- Radical redesign of how businesses carry out certain activities
- IT is a critical factor in changing business processes

A View of the Future

- More organizations will function as networks of specialists
- What constitutes "work" will require more high-ordered thinking and constant learning, and less of a "9 to 5“ mentality
- Critical thinking and innovation will be essential [will produce critical and innovative information systems]
- More and more organizations are becoming information-based
  - e.g., insurance, banking, IT Services, not as much factory work
- Information technology continues to play an influential (central) role in business

Levels of the Organization

Basic Systems Architecture Model

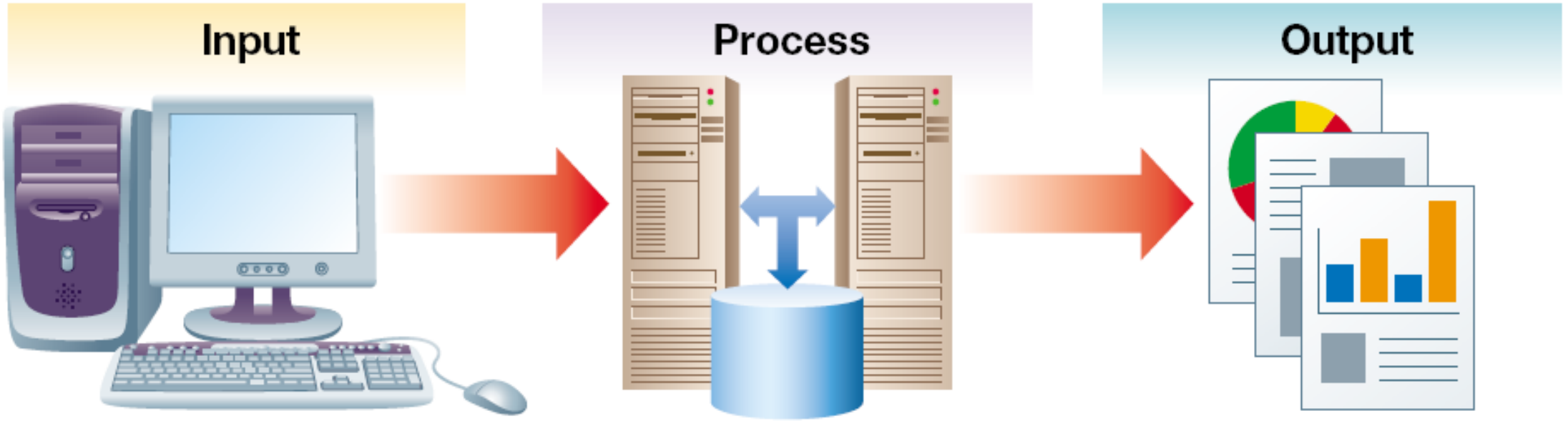
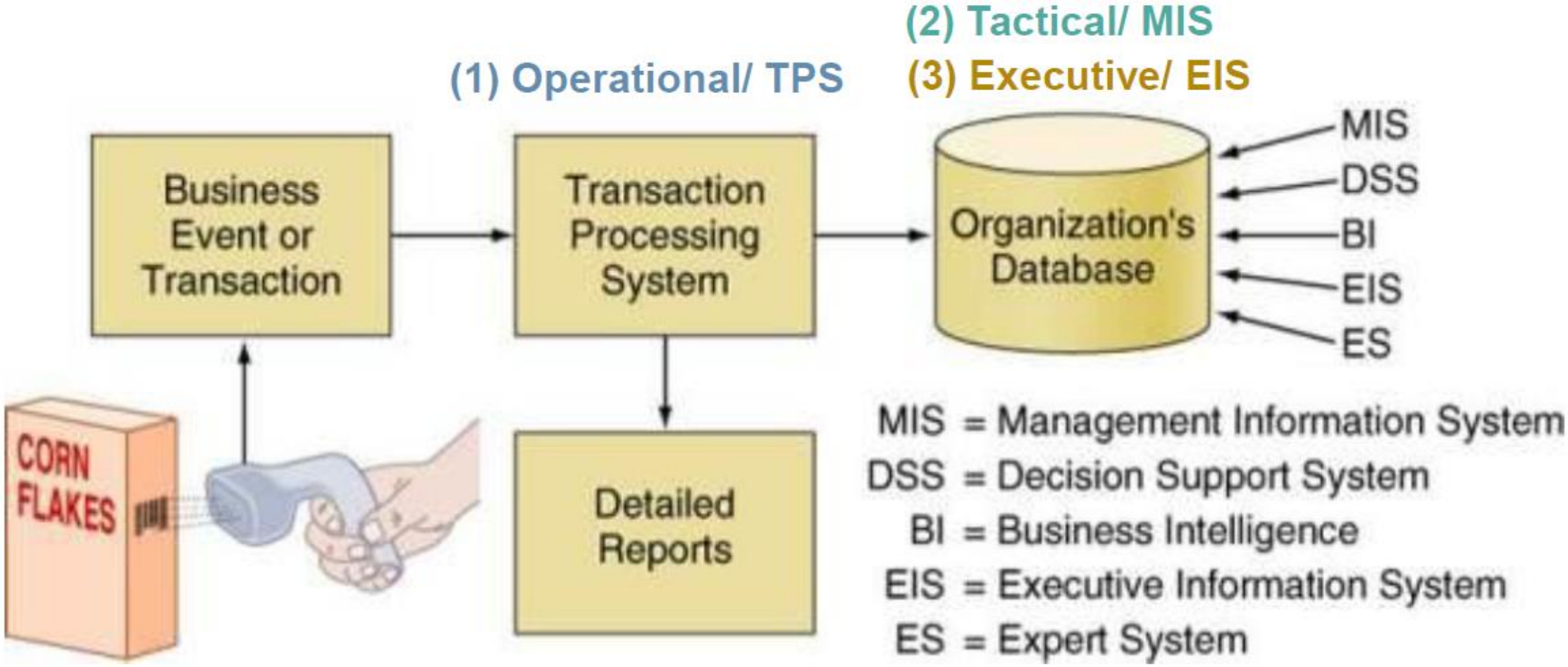
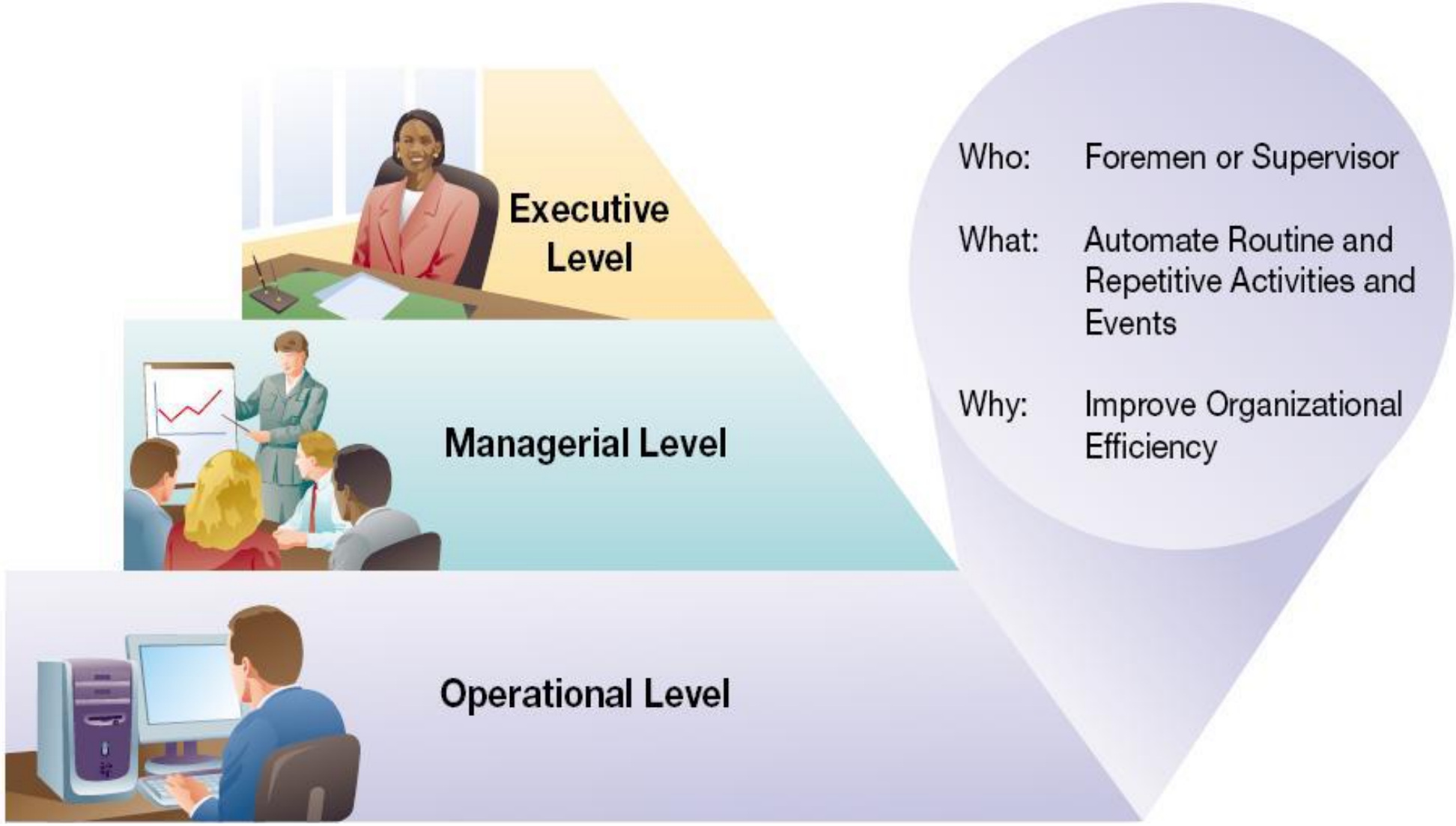


Figure 6.6 ➥ The basic systems model can be used to describe all types of information systems.

Three Organizational Systems



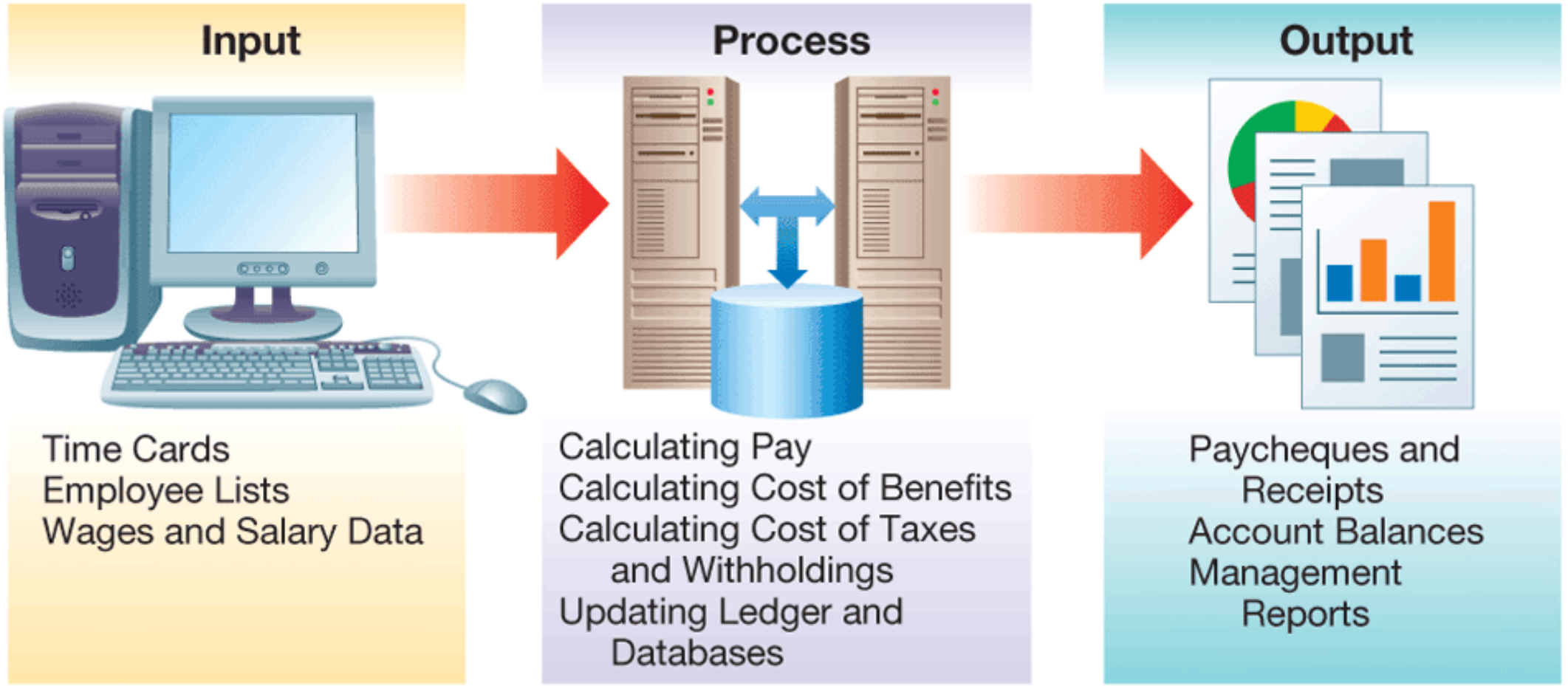
Who, What, Why: Organizational Level



A Framework for Operational/ TPS

- Operational/ Transaction Processing Systems (TPS)
- Collect, validate, and record transactional data
  - Example: Order Entry System
    - Input: Order is accepted by warehouse (on credit)
      - Record data about what was ordered (order entry)
    - Processing: Adjust inventory level
    - Output: Produce packing slip and shipping label
      - Generate an invoice to be sent to customer
  - Example: Payroll System
    - Input: Time cards are entered
    - Processing: Calculate pay/ benefits/ taxes
    - Ouput: Produce pay cheque

TPS Example: Payroll System



A Framework for Operational/ TPS

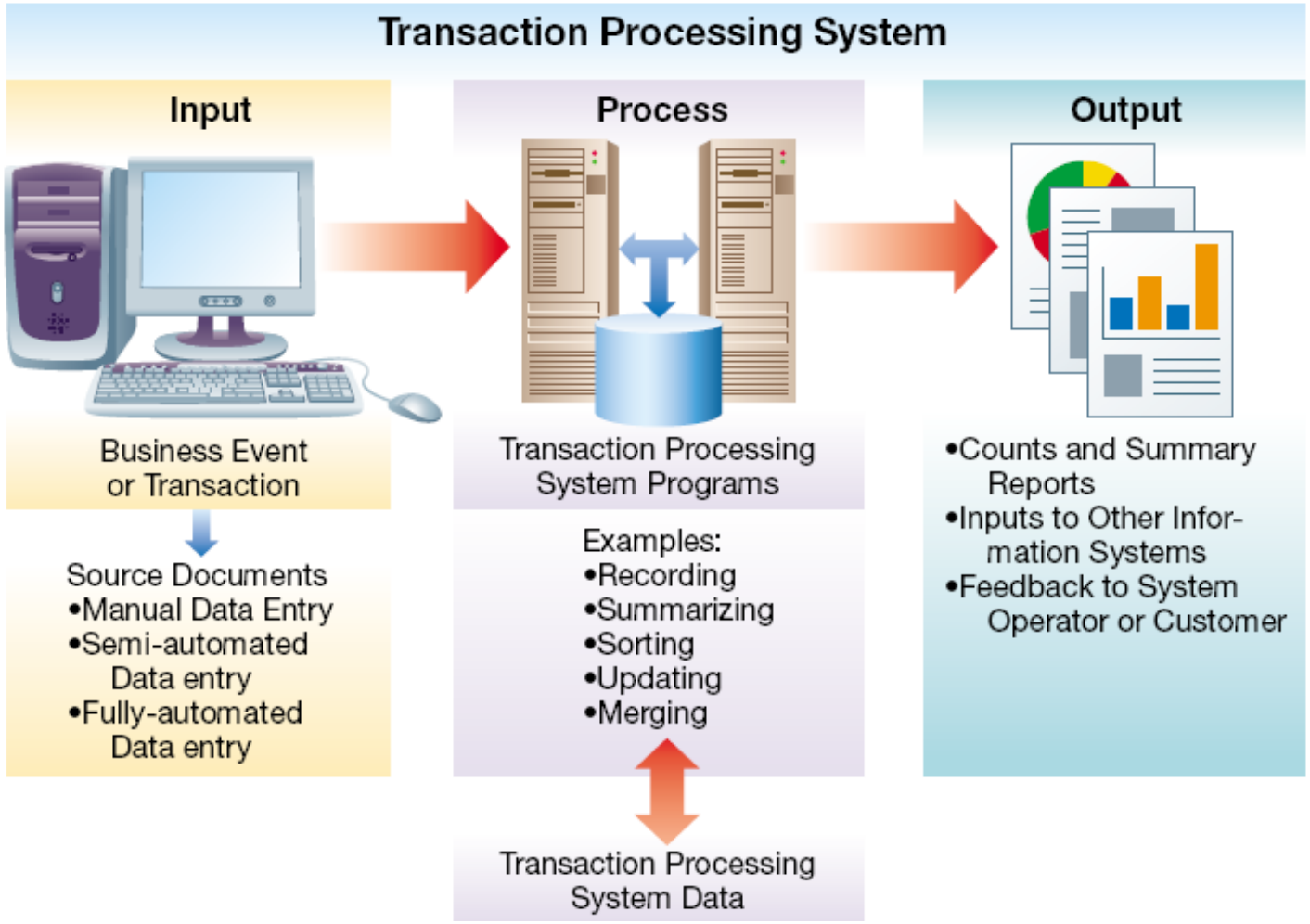
- Characteristics of Operational/TPS Systems:
  - repetitiveness
  - predictability
  - emphasis on past
  - very detailed data
  - accuracy of data input is very high (checking)
  - data come entirely from internal sources
  - format of data input and information output is highly structured
  - *Apply the above to a familiar situation*
- Operational systems are often used by clerical workers and low level management

System Description: Transaction Processing Systems (TPS)

- **TPS**s are a special class of information system designed to process business events and transactions

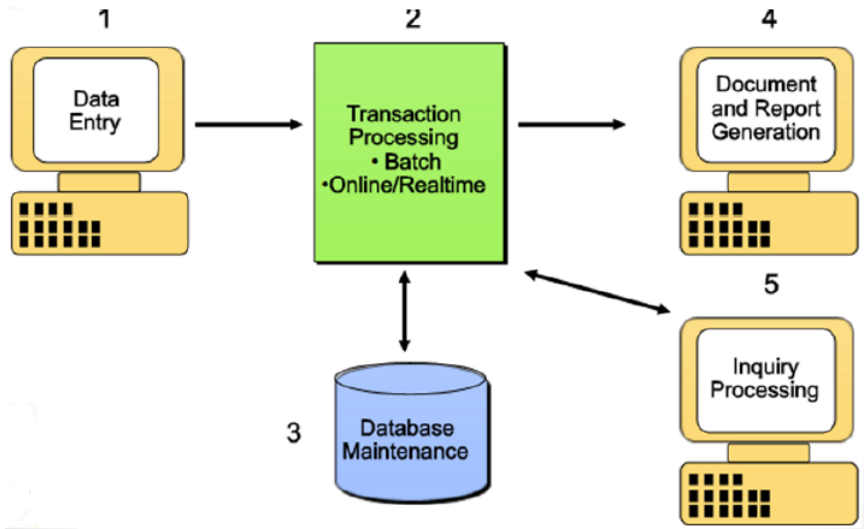
- **Architecture Components**
  - **Source Documents** – these contain the event or transaction information to be processed by system
  - **Data Entry Methods**
    - **Manual** – a person entering a source document by hand
    - **Semi-automated** – using a capture device to enter the source document (e.g. a barcode scanner)
    - **Fully Automated** – no human intervention, one computer talks or feeds another computer (e.g. automatic orders from inventory systems)
  - **Processing** – transactions can be either:
    - **Online** – processed individually in real-time
    - **Batch** – grouped and processed together at a later time

System Architecture: Transaction Processing System

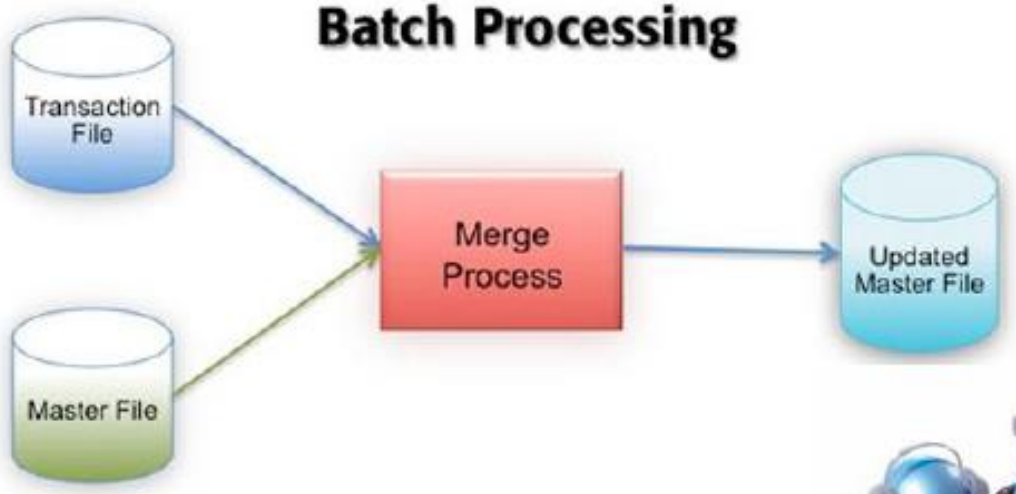


Transaction Processing & Management Information Systems

- TPS
  - Capture and process the detailed data necessary to update current records about operations
  - E.g. Order Entry, inventory Control, payroll, accounts payable, accounts receivable, etc…



Batch vs. Online Processing

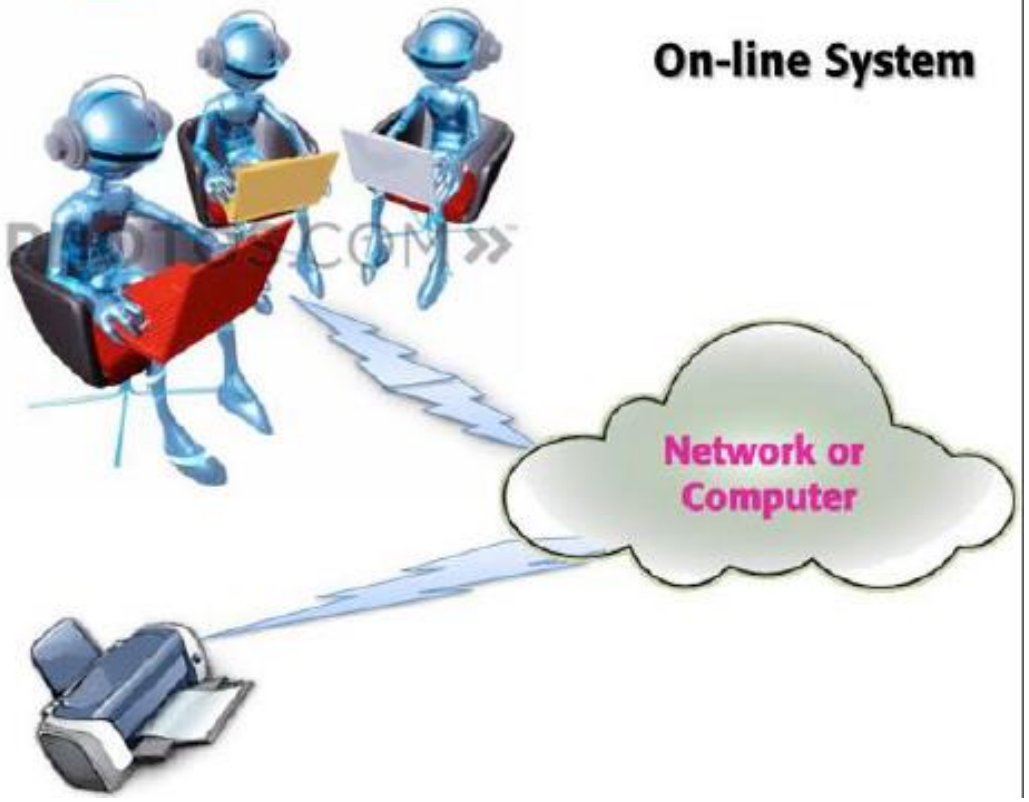


Batch:

- Transactions are accumulated over time, and prepared for entry or processing as a single unit or a batch

Online:

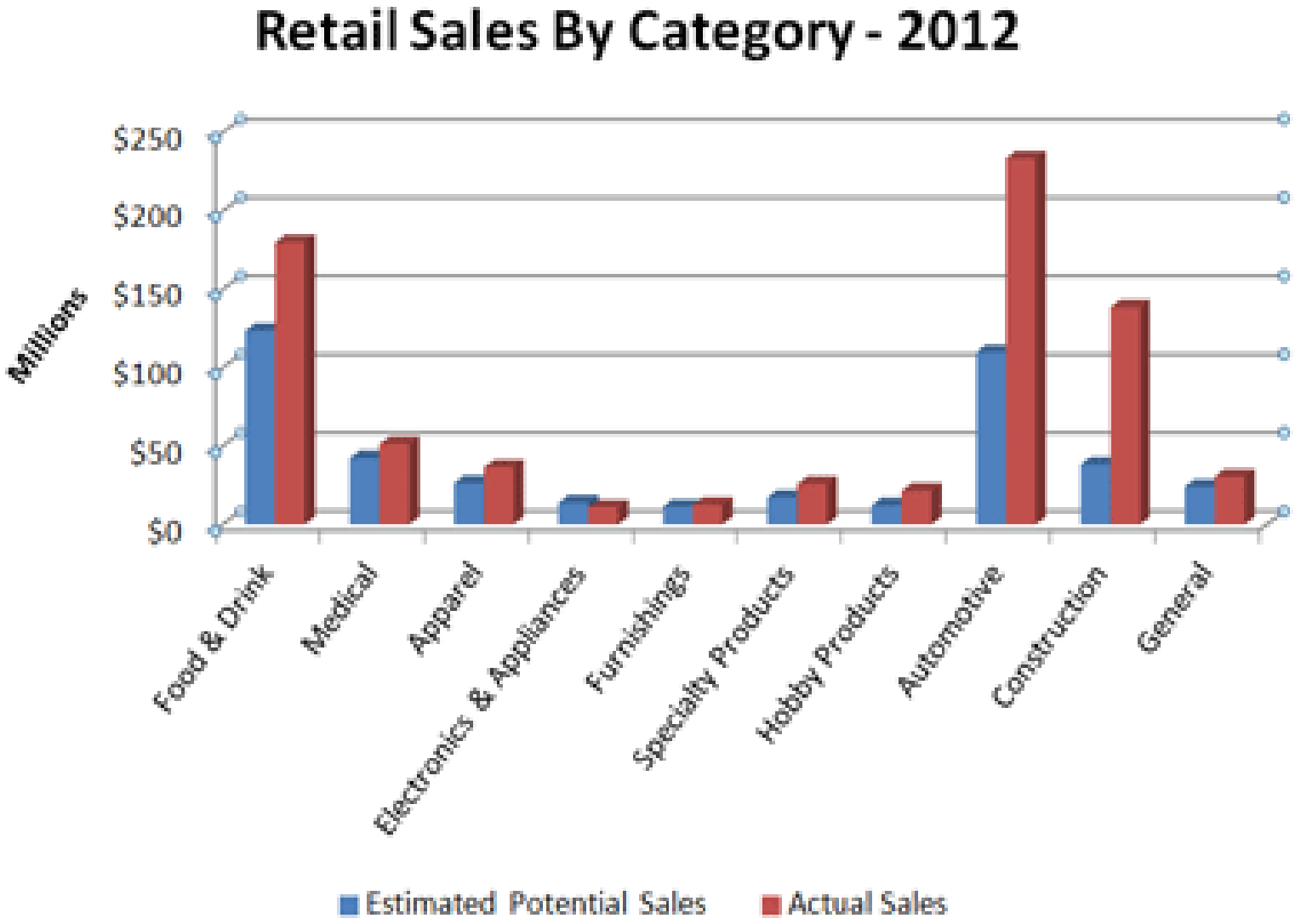
- Transactions input into the system as they occur.



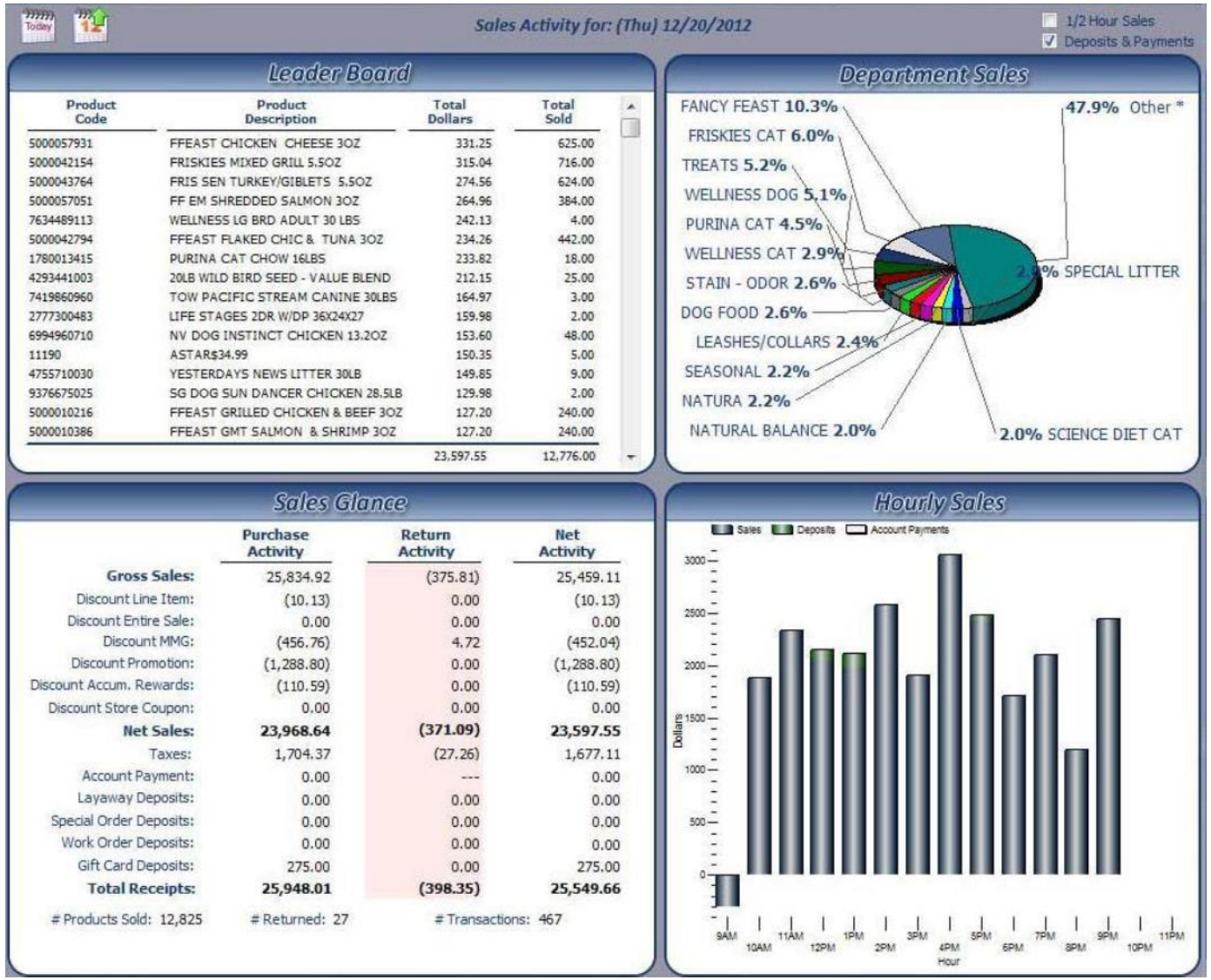
TPS Example: Point-of-Sale Systems

- e.g. electronic cash registers
  - for a ***retailing*** **business** [transaction level]
- Can decrease inventory at check-out
- Data entered in various ways
  - e.g. bar code scanning
- Quicker check-out procedures
- Decreased clerical costs

Operational/ TPS Report Example (1)



Operational/ TPS Report Example (2)



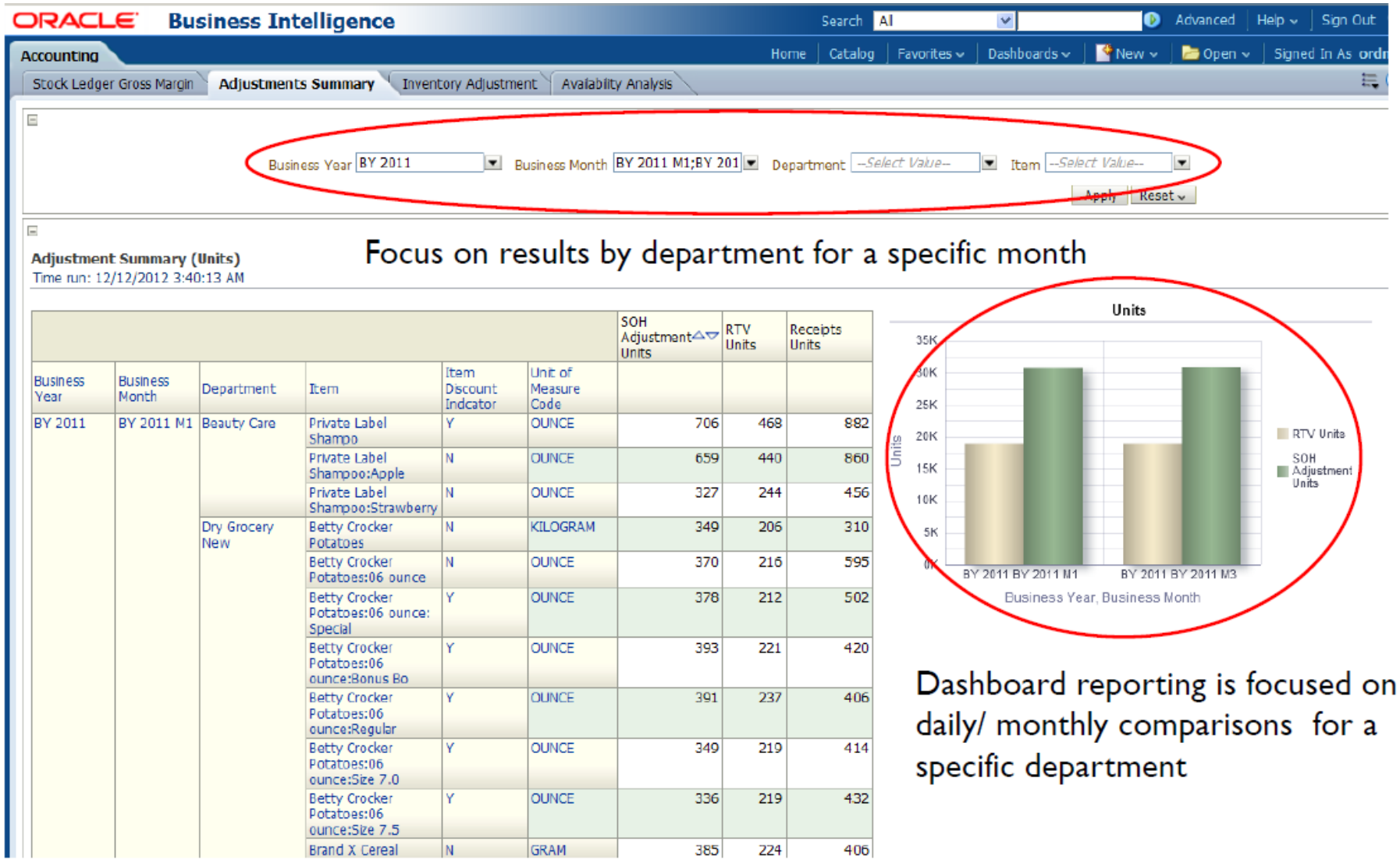
Focus on results by:

- Product
- Department
- Sales ($)

For a specific time:

- Real time
- Hourly/ daily
- Monthly

Operational/ TPS Report Example (3)



Business Year	Business Month	Department	Item	Item Discount Indcator	Unit of Measure Code	SOH Adjustment Units	RTV Units	Receipts Units
BY 2011	BY 2011 M1	Beauty Care	Private Label Shampo	Y	OUNCE	706	468	882
			Private Label Shampoo:Apple	N	OUNCE	659	440	860
			Private Label Shampoo:Strawberry	N	OUNCE	327	244	456
		Dry Grocery New	Betty Crocker Potatoes	N	KILOGRAM	349	206	310
			Betty Crocker Potatoes:06 ounce	N	OUNCE	370	216	595
			Betty Crocker Potatoes:06 ounce: Special	Y	OUNCE	378	212	502
			Betty Crocker Potatoes:06 ounce:Bonus Bo	Y	OUNCE	393	221	420
			Betty Crocker Potatoes:06 ounce:Regular	Y	OUNCE	391	237	406
			Betty Crocker Potatoes:06 ounce:Size 7.0	Y	OUNCE	349	219	414
			Betty Crocker Potatoes:06 ounce:Size 7.5	Y	OUNCE	336	219	432
			Brand X Cereal	N	GRAM	385	224	406

Dashboard reporting is focused on daily/ monthly comparisons for a specific department

Operational/ TPS Report Example (4)

Who, What, Why: Managerial Level

Framework for Tactical/ Management Information Systems (MIS)

- In operational systems, transaction data are captured and stored (in a database);
- In Tactical/ Management Information Systems, transaction data are summarized, aggregated, and analyzed for additional insight for middle managers
  - Generate a variety of reports:
  - Summary reports: totals, averages, key data
  - Total regular and overtime hours worked for each plant for the week, by job classification {what resource will this info. help to control?}

Framework for Tactical / Management Information Systems (MIS)

- Tactical MIS
  - Provide insight for managers into regular operations of the organization so they can control, organize, and plan more effectively.
  - Right info to the right person at the right time
  - Information typically provided in reports

System Description: Tactical/ Management Information Systems

- **Tactical Information Systems or Management Information Systems (MISs)** are used by **managerial employees** to support recurring decision making in managing a function or the entire business

- **Supported Activities**
  - **Scheduled Reporting** - the system produces automatically based on a **predetermined schedule**. Some include:
    - **Key Indicator** – High-level summaries to monitor performance (e.g. Monthly Sales Report)
    - **Exception** – Highlights situations where data is out of normal range (e.g. Monthly Late Shipments)
    - **Drill Down** – Provides lower-level detail aggregated in a summary report (printed only if needed)
  - ***Ad Hoc* Reporting – unscheduled** reports that are usually custom built to answer a specific question (e.g. sales data by person report to identify issues)

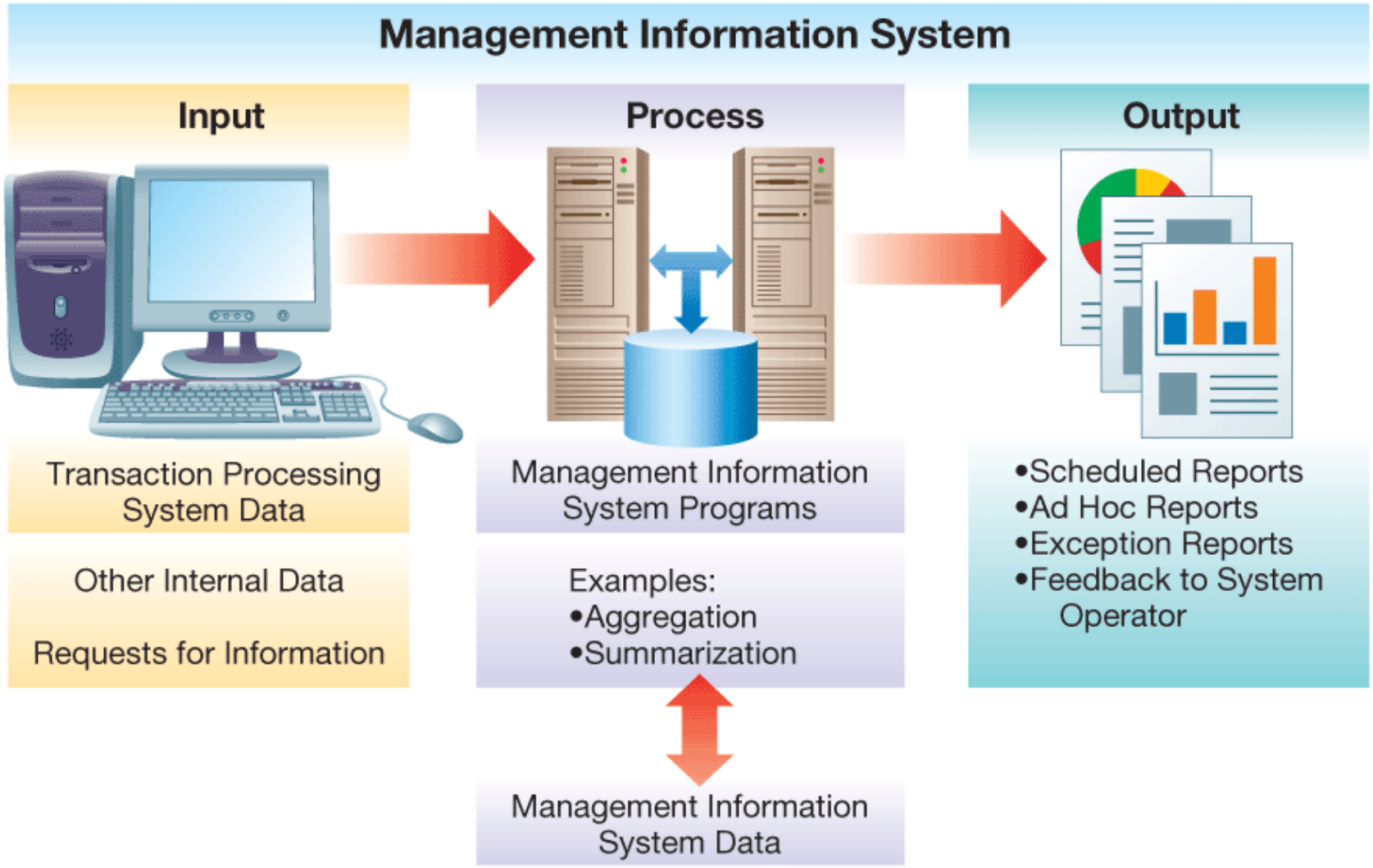
Tactical / Management Information Systems (MIS)

- One important Characteristic of Tactical Information Systems is that some of the information produced by such systems comes not from internal, but external sources (on-line subscriptions?)
- Compare overdue account information of our company with that of the entire industry
- *Tactical information systems differ from operational information systems in that their purpose is not to support the execution of operational tasks, but to help the manager control these operations*

Tactical / Management Information Systems (MIS)

- Usually tactical and sometimes strategic
- Provides managers and decision makers with information to help achieve organizational goals

System Architecture: Management Information System



Tactical / MIS Report Examples

- Key Indicator Reports: High-level summaries to monitor performance
  - Example: list of weekly sales $, by salesperson, by product and by sales region {such information would be difficult to produce without a computer}
- Exception reports: warn managers when results from a particular operation exceed or do not meet an organizational standard
  - Example: List of all plants that have logged more overtime hours than expected for the week
  - Example: List of all sales personnel whose sales fall in the top and bottom 10% of the organization

Reporting Activity: Drill-down (MIS)

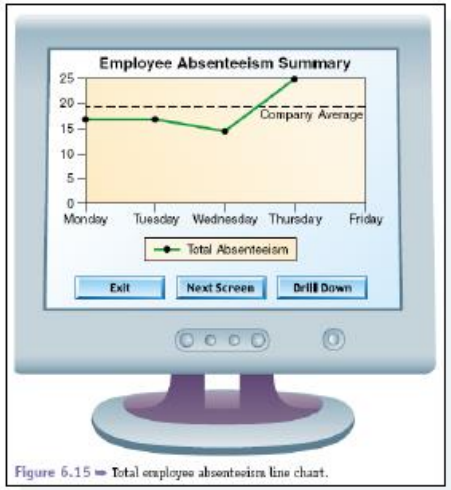


Figure 6.15 ➥ Total employee absenteeism line chart.

First Level
Graphical Summary

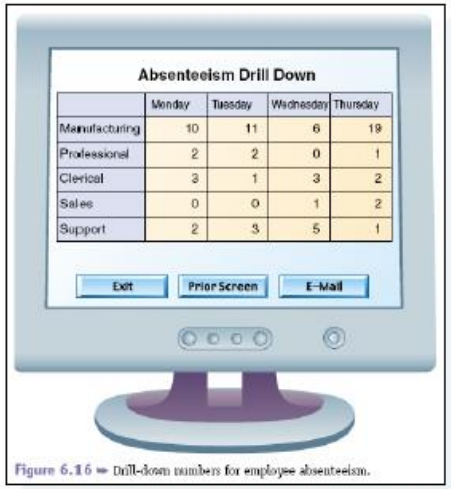
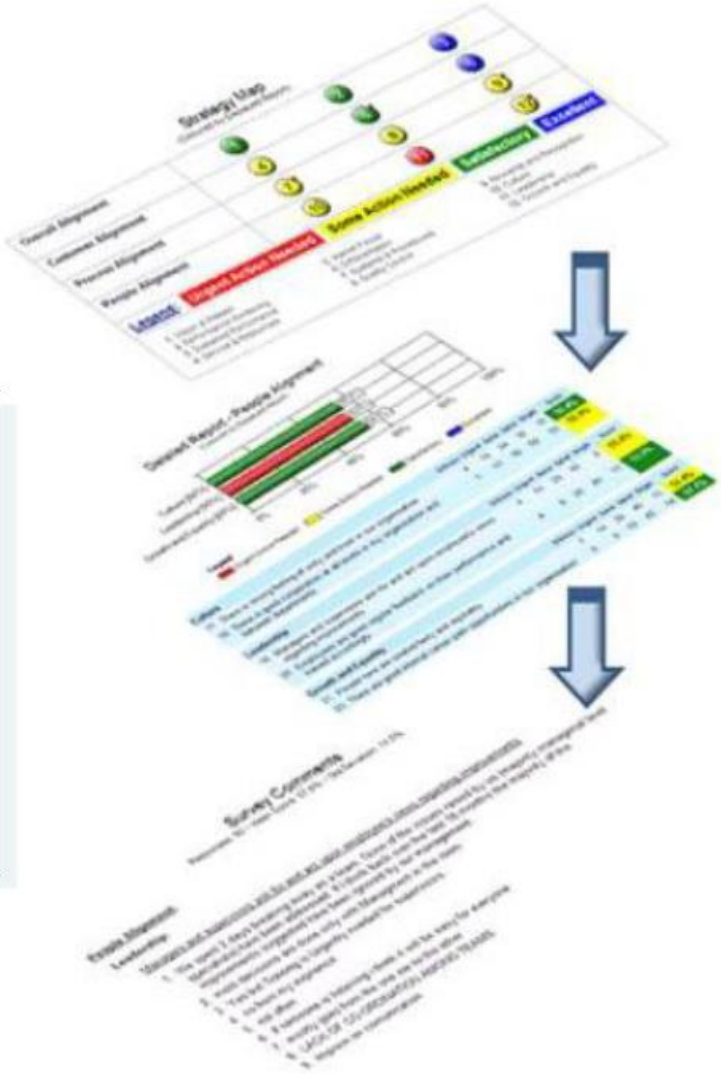


Figure 6.16 ➥ Drill-down numbers for employee absenteeism.

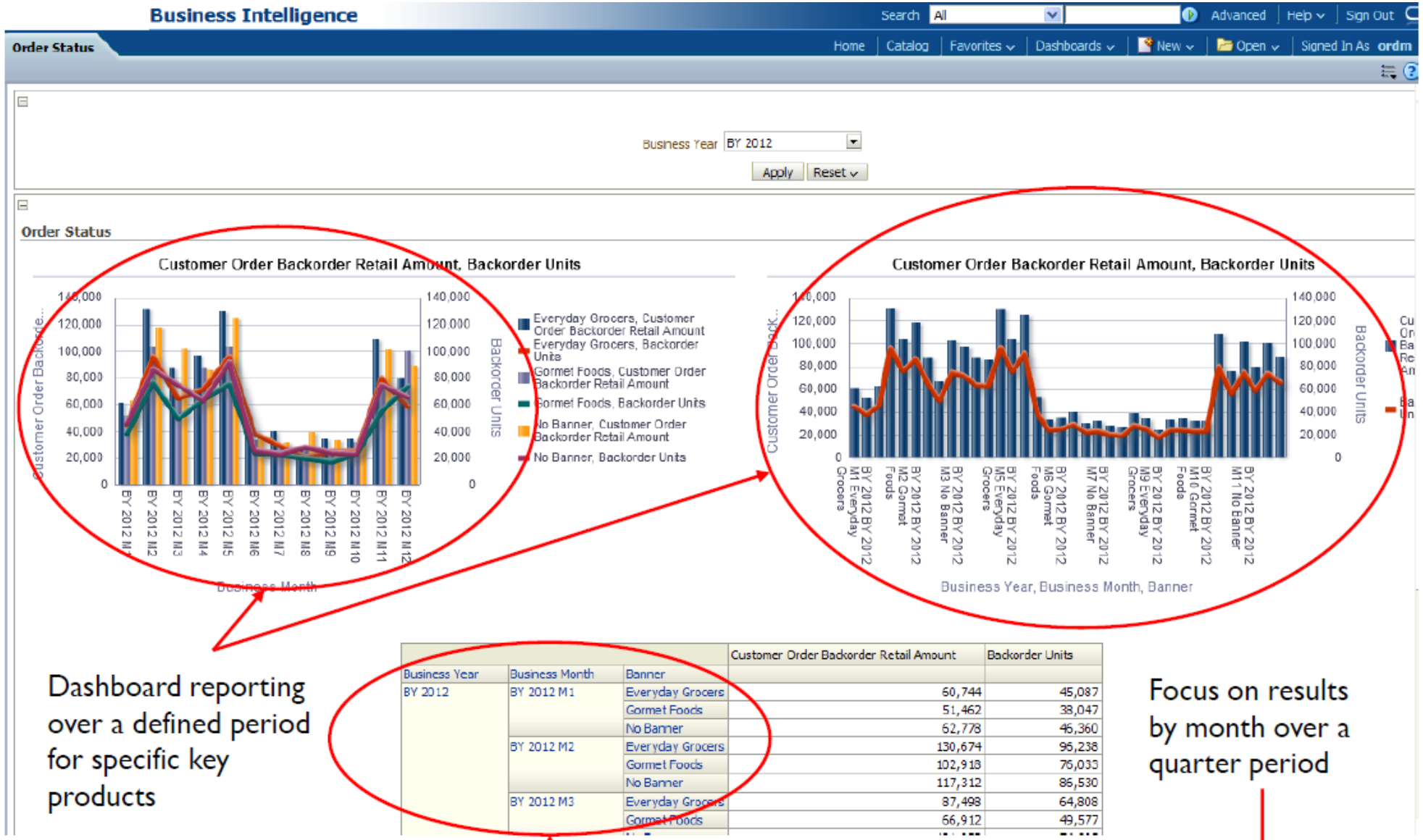
Second Level
Data Drill Down



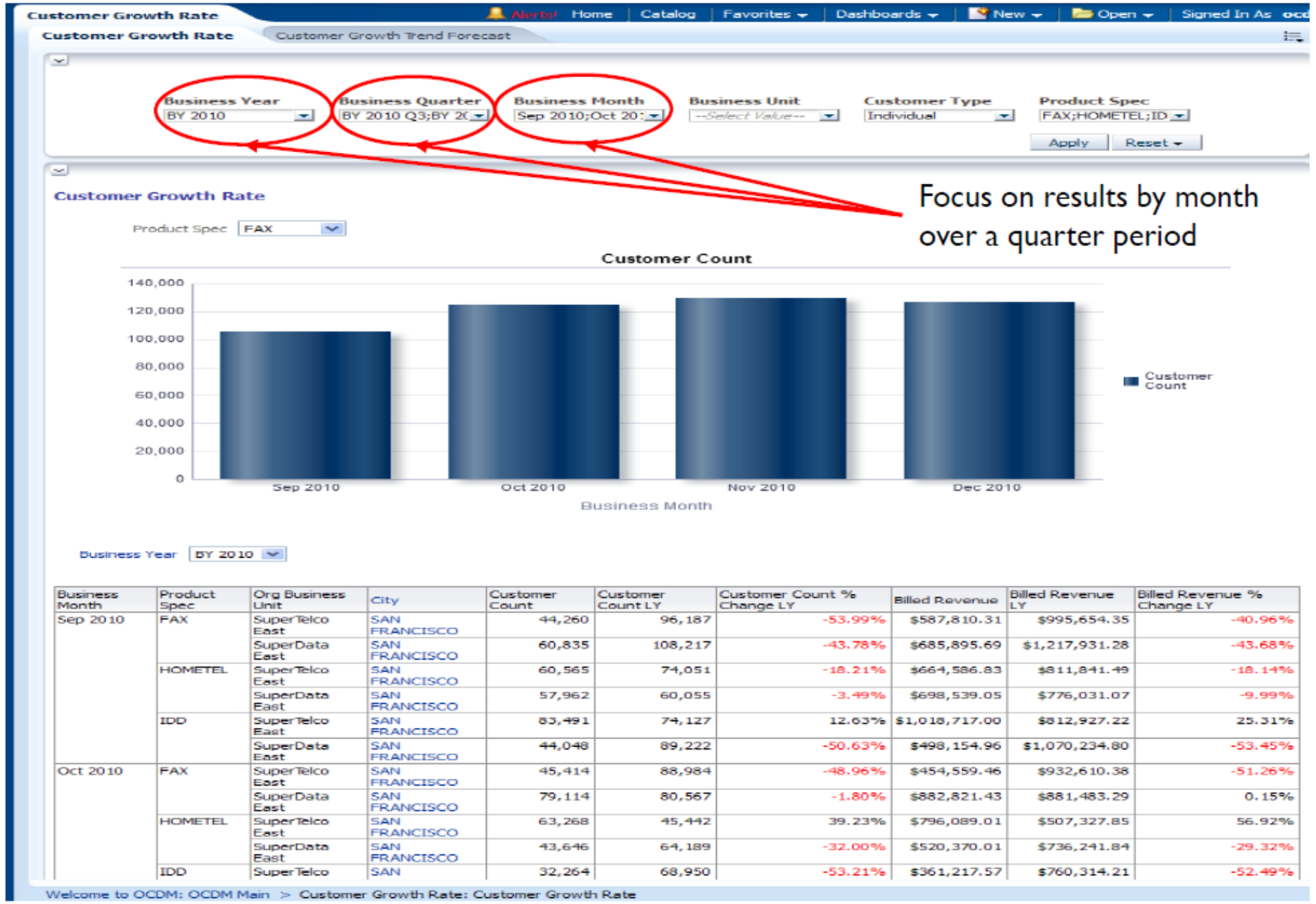
Tactical/ MIS Report Examples

- ad hoc reports: "spur-of-the-moment"; unplanned
  - needed by manager to solve a unique problem
  - E.g. a list of the total number of employees absent during the week, arranged by plant and by job title, along with the hours or days missed
- If an exception report has shown high overtime earnings at some plants, then a manager might ask for a report showing the production record of each plant for the week; to help investigate why there was an overtime problem.

Tactical/ MIS Report Example (1)

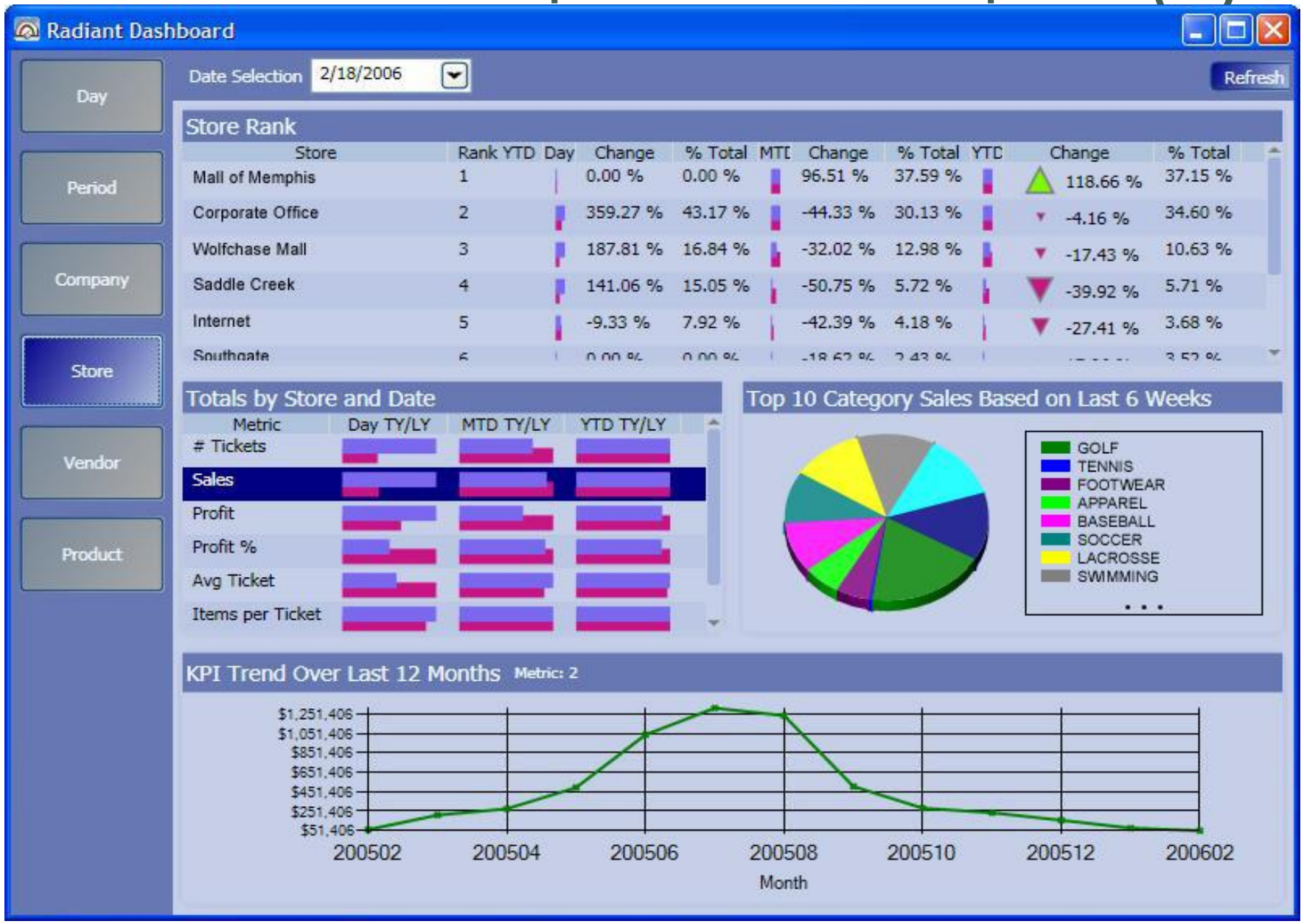


Tactical/ MIS Report Example (2)



Business Month	Product Spec	Org Business Unit	City	Customer Count	Customer Count LY	Customer Count % Change LY	Billed Revenue	Billed Revenue LY	Billed Revenue % Change LY
Sep 2010	FAX	SuperTelco East	SAN FRANCISCO	44,260	96,187	-53.99%	$587,810.31	$995,654.35	-40.96%
		SuperData East	SAN FRANCISCO	60,835	108,217	-43.78%	$685,895.69	$1,217,931.28	-43.68%
	HOMETEL	SuperTelco East	SAN FRANCISCO	60,565	74,051	-18.21%	$664,586.83	$811,841.49	-18.14%
		SuperData East	SAN FRANCISCO	57,962	60,055	-3.49%	$698,539.05	$776,031.07	-9.99%
	IDD	SuperTelco East	SAN FRANCISCO	83,491	74,127	12.63%	$1,018,717.00	$812,927.22	25.31%
		SuperData East	SAN FRANCISCO	44,048	89,222	-50.63%	$498,154.96	$1,070,234.80	-53.45%
Oct 2010	FAX	SuperTelco East	SAN FRANCISCO	45,414	88,984	-48.96%	$454,559.46	$932,610.38	-51.26%
		SuperData East	SAN FRANCISCO	79,114	80,567	-1.80%	$882,821.43	$881,483.29	0.15%
	HOMETEL	SuperTelco East	SAN FRANCISCO	63,268	45,442	39.23%	$796,089.01	$507,327.85	56.92%
		SuperData East	SAN FRANCISCO	43,646	64,189	-32.00%	$520,370.01	$736,241.84	-29.32%
	IDD	SuperTelco	SAN	32,264	68,950	-53.21%	$361,217.57	$760,314.21	-52.49%

Tactical/ MIS Report Example (3)



Who, What, Why: Executive Level

Framework for Strategic/ Executive Information Systems (EIS)

- Strategic Systems/ Executive Information Systems
- Provide top managers with information that assists them in making long-range planning decisions for the organization
- Used to set long-term organizational goals
- Middle managers then need to allocate resources to meet these organizational goals
- Produced regularly, but more often on ad hoc basis

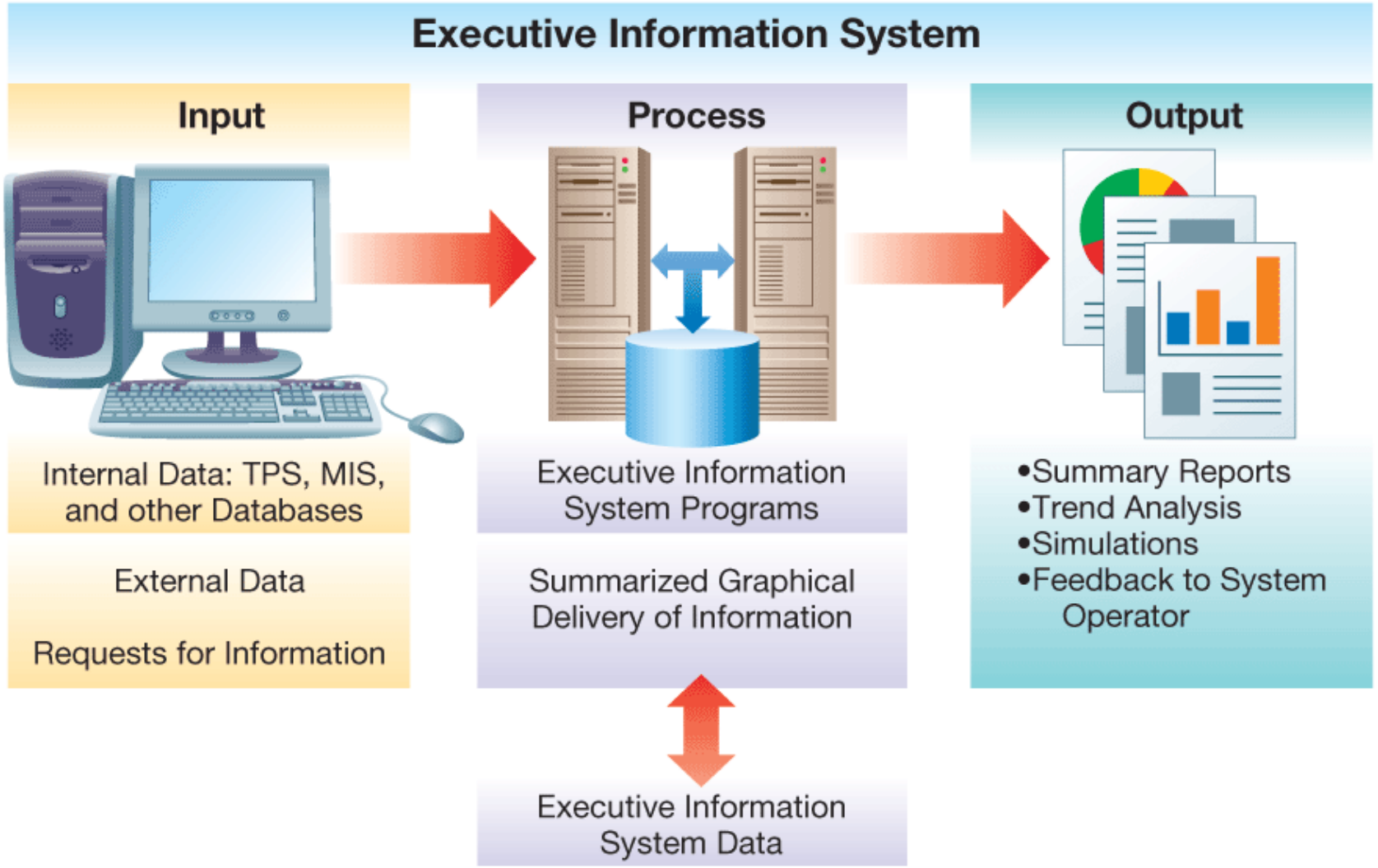
Framework for Strategic/ Executive Information Systems (EIS)

- One important characteristic of Strategic. Executive Information Systems is that a significant portion of the information produced by such systems comes not from internal, but external sources (market intelligence)
- Compare key performance information of our company with that of the entire industry

System Description: Strategic/ Executive Information Systems

- **Strategic Systems,** also called **Executive Information Systems (EIS) or Executive Support Systems (ESS)** or, are special purpose information systems to support executive decision-making
- **System Details** These systems use **graphical user interfaces** to display consolidated information and can deliver both:
  - **Soft Data** - textual news stories or non-analytical data (unstructured)
  - **Hard Data** – facts, numbers, calculations, etc. (structured)
- **Supported Activities**
  - The activities supported by these kinds of systems include:
    - **Executive Decision Making**
    - **Long-range Strategic Planning**
    - **Monitoring of Internal and External Events**
    - **Crisis Management**
    - **Staffing and Labour Relations**

System Architecture: Executive Information Systems (EIS)



Reporting Activity: Drill-down (EIS)

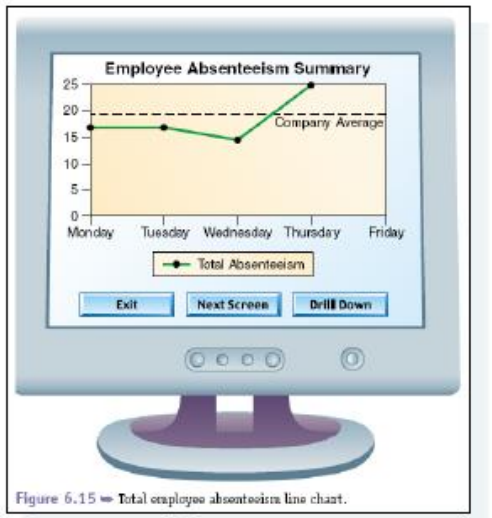


Figure 6.15 ➡ Total employee absenteeism line chart.

First Level
Graphical Summary

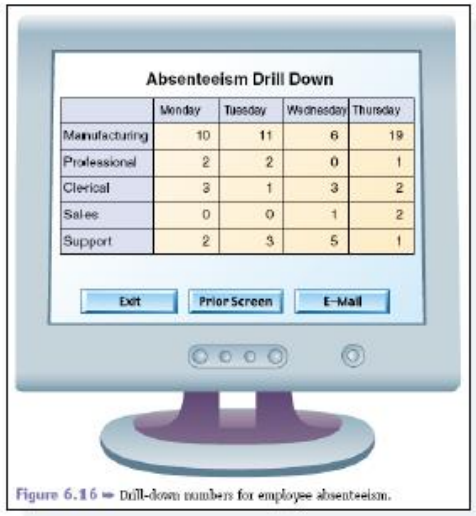
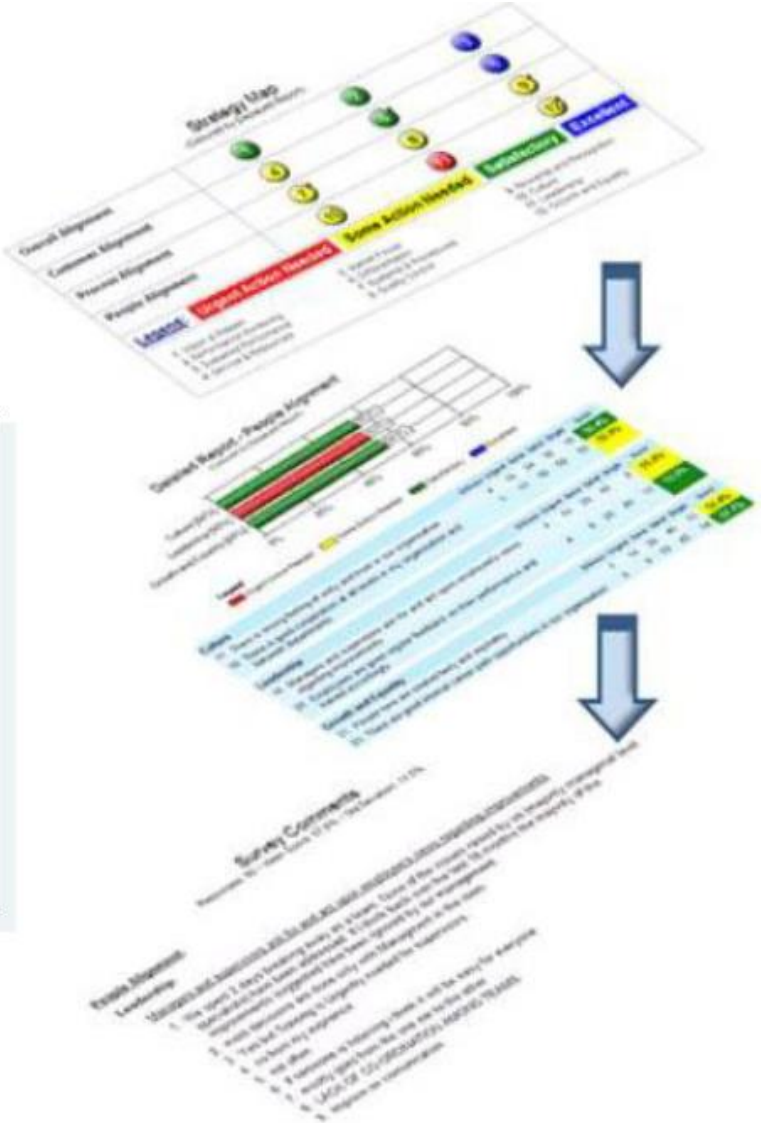
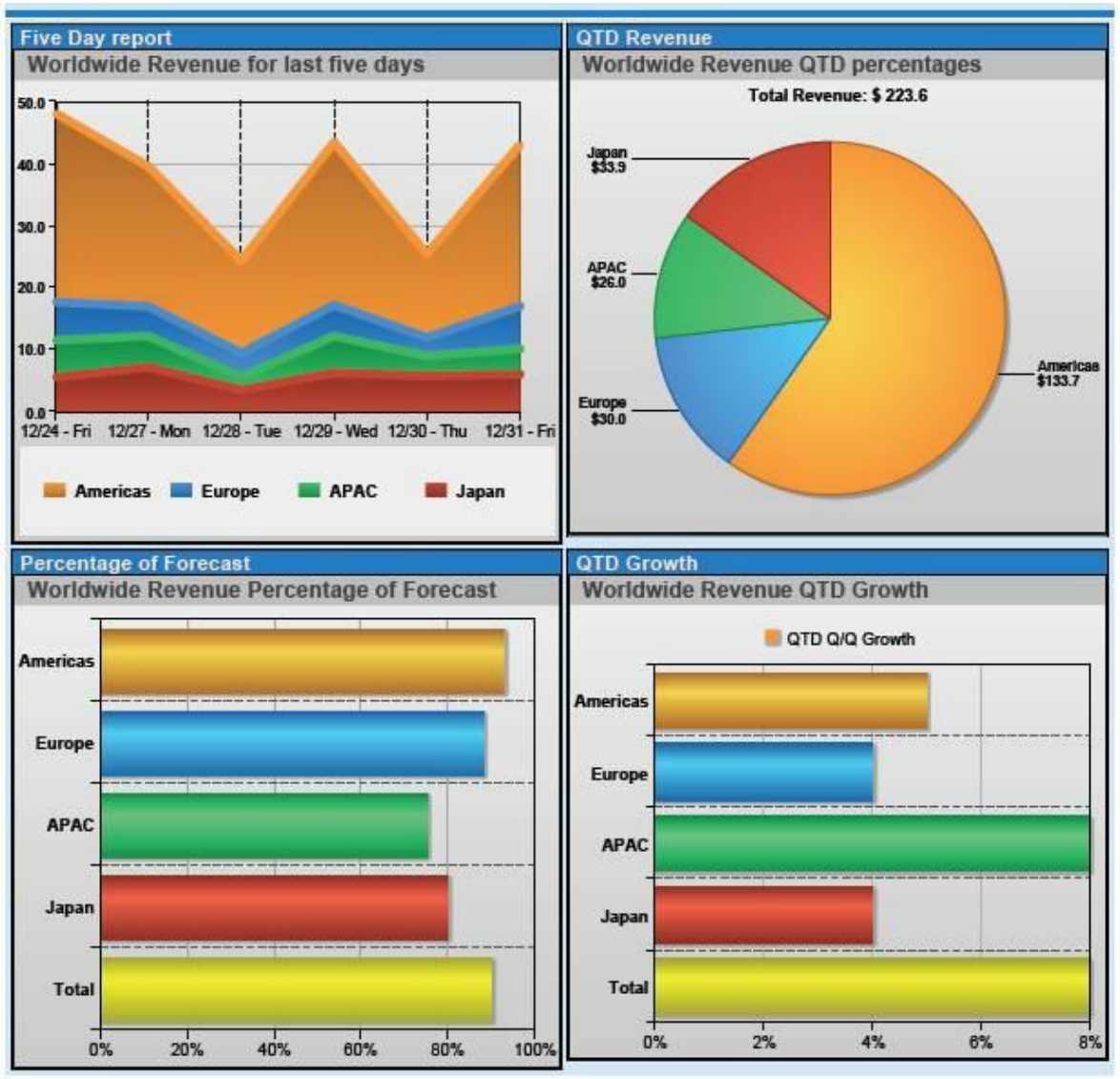


Figure 6.16 ➡ Drill-down numbers for employee absenteeism.

Second Level
Data Drill Down



Strategic/ EIS Dashboard Reporting



"A picture says a thousand words"

Results are aggregated for the organization and presented in a graphical format or "executive dashboard" for quick viewing and timely decision making

KBI Dashboard

Strategic/ EIS Report Example (1)

Owner

- Andy Grant
- Brandon Armstrong
- Frank Cohen
- George Cohen
- James Bond
- John Smith

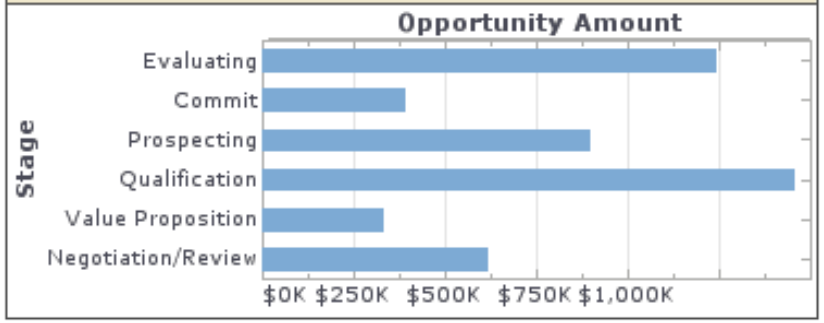
Exceptions

Exception	Count
Leads Inactive For 30 Days	0
Opportunities Past Close Date	56
Opportunities Inactive For 30 Days	59

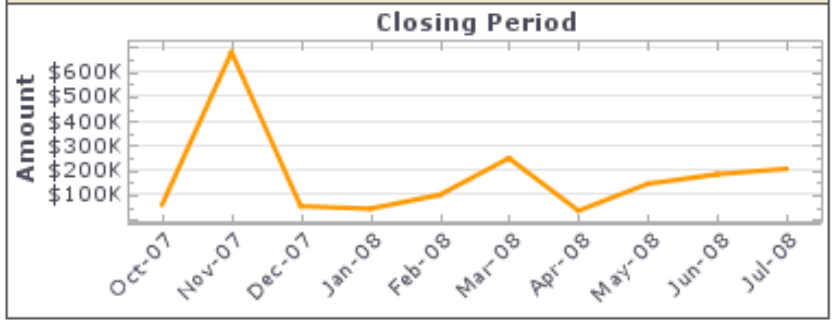
Top Opportunities

ID	Name	Account	Amount
0067000000Dr	Commun Europ	Commun Europe	$250,000.00
0067000000Dr	SpringShield -	SpringShield	$249,480.00
0068000000Lx	GenAsi esign -	GenAsi esign	$207,000.00
0067000000Dr	EquAll rated - I	EquAll rated	$159,000.00
0067000000Dr	Aspied - Gener	Aspied	$150,000.00
0067000000Dr	EquAll rated - I	EquAll rated	$119,326.00
0067000000Dr	Foratas - Gene	Foratas	$110,349.00

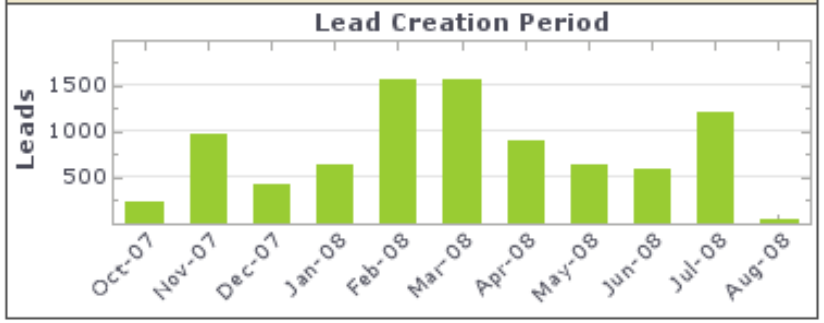
Current Pipeline



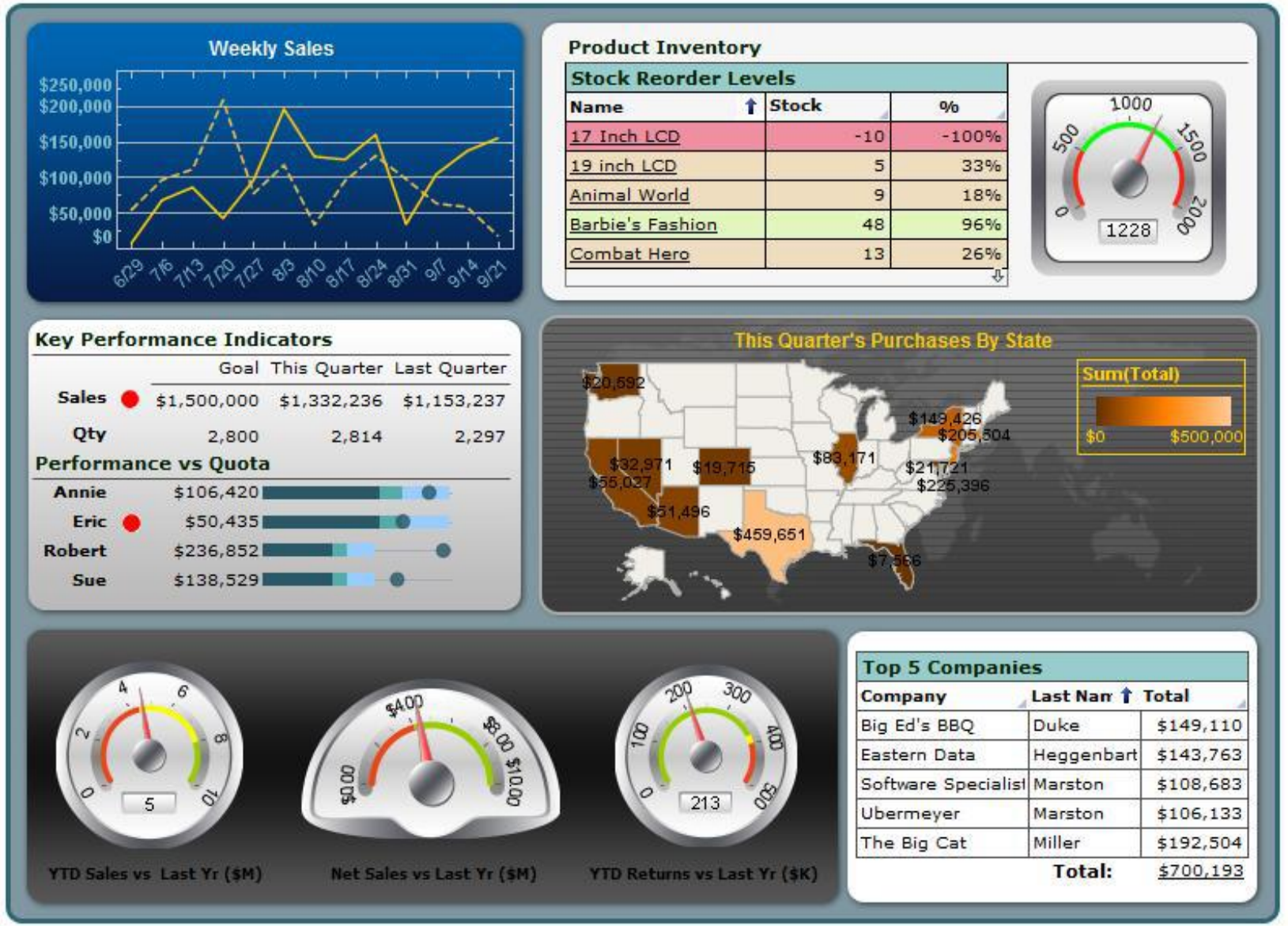
Opportunities Won



Leads Created



Strategic/ EIS Report Example (2)



Executive Information Systems (EIS)

- Questions: What kind of tactical information would be useful to a branch manager of a Coca-Cola or Pepsi distributorship?

- What kind of *strategic* information would be useful to the president of a four-year liberal arts college?

Review Levels of the Organization

Review: Categorize Each Decision as Strategic, Tactical, or Operational

Rejecting credit for a company with an overdue account

Analyzing sales by product line within each geographic region, this year to date vs. last year to date

Using a simulation model to forecast profitability of a new product, using projected sales data, competitive industry statistics, and economic trends

Comparing planned vs. actual expenses for department staff

Allocating salespeople's time to the highest potential market prospects

Review: Categorize Each Decision as Strategic, Tactical, or Operational

- Rejecting credit for a company with an overdue account (Operational)
- Analyzing sales by product line within each geographic region, this year to date vs. last year to date (Tactical)
- Using a simulation model to forecast profitability of a new product, using projected sales data, competitive industry statistics, and economic trends (Strategic)
- Comparing planned vs. actual expenses for department staff (Tactical)
- Allocating salespeople's time to the highest potential market prospects (Tactical)

The Organizational Pyramid - Summary

Executive Level

Strategic planning and responses to **strategic issues** occur here. Executive **decisions** are usually **unstructured** and are made using **consolidated internal** and **external** information

Managerial Level

Monitoring and **controlling** of operational activities and **executive information support** occur here. Managerial **decisions** are usually **semistructured** and are made using **procedures** and ***ad hoc*** tools

Operational Level

Day-to-day business processes and interactions with customers occur here. Operational **decisions** are usually **structured** and are made using established **policies and procedures**

Management Information Systems Frameworks

End of Lecture 3