Chapter One

Business Functions and Business Processes
Objectives

After completing this chapter, you will be able to:

- Name the main functional areas of operation used in business
- Differentiate between a business process and a business function
- Identify the kinds of data each main functional area produces
- Identify the kinds of data each main functional area needs
- Define integrated information systems, and explain why they are essential in today’s globally competitive business environment
Introduction

- **Enterprise Resource Planning (ERP) programs**: Core software used by companies to coordinate information in every area of business
  - Help manage companywide business processes
  - Use common database and shared management reporting tools

- **Business process**: Collection of activities that takes some input and creates an output that is of value to the customer
Functional Areas and Business Processes

- To understand ERP, you must understand how a business works
  - Functional areas of operation
  - Business processes
Functional Areas of Operation

- Marketing and Sales (M/S)
- Supply Chain Management (SCM)
- Accounting and Finance (A/F)
- Human Resources (HR)

**Business functions**: Activities specific to a functional area of operation
## Functional Areas of Operation (cont’d.)

<table>
<thead>
<tr>
<th>Functional area of operation</th>
<th>Marketing and Sales</th>
<th>Supply Chain Management</th>
<th>Accounting and Finance</th>
<th>Human Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marketing a product</td>
<td>Purchasing goods and raw materials</td>
<td>Financial accounting of payments from customers and to suppliers</td>
<td>Recruiting and hiring</td>
<td></td>
</tr>
<tr>
<td>Taking sales orders</td>
<td>Receiving goods and raw materials</td>
<td>Cost allocation and control</td>
<td>Training</td>
<td></td>
</tr>
<tr>
<td>Customer support</td>
<td>Transportation and logistics</td>
<td>Planning and budgeting</td>
<td>Payroll</td>
<td></td>
</tr>
<tr>
<td>Customer relationship management</td>
<td>Scheduling production runs</td>
<td>Cash-flow management</td>
<td>Benefits</td>
<td></td>
</tr>
<tr>
<td>Sales forecasting</td>
<td>Manufacturing goods</td>
<td>Government compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advertising</td>
<td>Plant maintenance</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1-1  Examples of functional areas of operation and their business functions
Functional Areas of Operation (cont’d.)

- Functional areas are interdependent
  - Each requires data from the others

- Better integration of functional areas leads to improvements in communication, workflow, and success of company

- **Information system (IS):** Computers, people, procedures, and software that store, organize, and deliver information

![Diagram of Hardware, Software, Database, Network, Procedures, People]
Types of Information Systems

Information Systems Inside an Organization
Types of Information Systems

Information Systems Among Organizations
Business Processes

- Collection of activities that takes one or more kinds of input and creates an output that is of value to customer
  - Customer can be traditional external customer or internal customer

- Thinking in terms of business processes helps managers to look at their organization from the customer’s perspective
## Business Processes (cont’d.)

<table>
<thead>
<tr>
<th>Input</th>
<th>Functional area responsible for input</th>
<th>Process</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Request to purchase smartphone</td>
<td>Marketing and Sales</td>
<td>Sales order</td>
<td>Order is generated</td>
</tr>
<tr>
<td>Financial help for purchase</td>
<td>Accounting and Finance in-house</td>
<td>Arranging financing in-house</td>
<td>Customer finances through the smartphone company</td>
</tr>
<tr>
<td>Fulfillment of order</td>
<td>Supply Chain Management</td>
<td>Shipping and delivery</td>
<td>Customer receives smartphone</td>
</tr>
<tr>
<td>Technical support</td>
<td>Marketing and Sales</td>
<td>24-hour help line available</td>
<td>Customer’s technical query is resolved</td>
</tr>
</tbody>
</table>

Figure 1-2 Sample business processes related to the sale of a personal smartphone
Business Processes (cont’d.)

- Businesses must always consider customer’s viewpoint in any transaction

- Successful customer interaction
  - Customer (either internal or external) is not required to interact with each business function involved in the process, i.e. customer-facing functions versus support functions

- Successful business managers view business operations from the perspective of a satisfied customer
Sharing data effectively and efficiently between and within functional areas leads to more efficient business processes

**Integrated information systems:** Systems in which functional areas share data
Figure 1-3  A process view of business
Business Processes (cont’d.)

- Businesses take inputs (resources) and transform these inputs into goods and services for customers
  - Inputs: Material, people, equipment

- Managing inputs and business processes effectively requires accurate and up-to-date information
Information Systems that Matters to You

Personal

Business

- Social Security
- Amazon
- eBay
- SAP
- Salesforce
- Tumblr
- Google
- Skype
- QuickBooks
- Netflix
- TurboTax
- Twitter
- New York Times
- RFID

Choose Easy.
Example of Business Process (Figure 2.1)

The next slide shows an example of a business process: ordering an E-ticket from an airline web site
Traveler

Plan Trip

Check Flights

Seats Available?

YES

Submit Ticket Order

Receive e-Ticket

NO
Functional Areas and Business Processes of a Very Small Business

- Example: A fictitious coffee shop
  - Examine business processes of the coffee shop
  - See why coordination of functional areas helps achieve efficient and effective business processes
  - Look at how integration of the information system improves the business
Marketing and Sales

- Functions of Marketing and Sales
  - Developing products
  - Determining pricing
  - Promoting products to customers
  - Taking customers’ orders
  - Helping create a sales forecast
Marketing and Sales (cont’d.)

- Marketing and Sales tasks for the coffee shop
  - Formal recordkeeping not required
  - Need to keep track of customers
  - Product development can be done informally
  - Good repeat customers allowed to charge purchases—up to a point
    - Records must show how much each customer owes and his or her available credit
Supply Chain Management

- Functions within Supply Chain Management
  - Making the coffee (manufacturing/production)
  - Buying raw materials (purchasing)

- Production planning requires sales forecasts from M/S functional area
  - **Sales forecasts**: Analyses that attempt to predict the future sales of a product
Supply Chain Management (cont’d.)

- Production plans used to develop requirements for raw materials and packaging
  - Raw materials: Bottled spring water, fresh lemons, artificial sweetener, raw sugar
  - Packaging: Cups, straws, napkins

- SCM and M/S must choose a recipe for each coffee product sold
Accounting and Finance

- Functions within Accounting and Finance
  - Recording raw data about transactions (including sales), raw material purchases, payroll, and receipt of cash from customers

- **Raw data**: Numbers collected from sales, manufacturing and other operations, without any manipulation, calculation, or arrangement for presentation
Accounting and Finance (cont’d.)

- Data from Accounting and Finance used by Marketing and Sales and Supply Chain Management
  - Sales records are important component of sales forecast
  - Sales forecast is used in making staffing decisions and in production planning
  - Records from accounts receivable used to monitor the overall credit-granting policy of the coffee shop
Human Resources

- Functions of Human Resources
  - Recruit, train, evaluate, and compensate employees

- HR uses sales forecasts developed by the individual departments to plan personnel needs

- Systems integrated using ERP software provide the data sharing necessary between functional areas
Functional Area Information Systems

- Potential inputs and outputs for each functional area described next
- Note the kinds of data needed by each area and how people use the data
- Information systems maintain relationships between all functional areas and processes
Marketing and Sales

- Needs information from all other functional areas

- Customers communicate orders to M/S in person or by telephone, e-mail, fax, the Web, etc.

- M/S has a role in determining product prices
  - Pricing might be determined based on a product’s unit cost, plus some percentage markup
  - Requires information from Accounting and Finance, and Supply Chain Management data
Figure 1–4 The Marketing and Sales functional area exchanges data with customers and with the Human Resources, Accounting and Finance, and Supply Chain Management functional areas.
Marketing and Sales (cont’d.)

- M/S needs to interact with Human Resources to exchange information on hiring needs, legal requirements, etc.

- Inputs for M/S
  - Customer data
  - Order data
  - Sales trend data
  - Per-unit cost
  - Company travel expense policy
Marketing and Sales (cont’d.)

- Outputs for M/S
  - Sales strategies
  - Product pricing
  - Employment needs
Supply Chain Management

- Needs information from various functional areas

- Production plans based on information about product sales (actual and projected) that comes from Marketing and Sales

- With accurate data about required production levels:
  - Raw material and packaging can be ordered as needed
  - Inventory levels can be kept low, saving money
Supply Chain Management data and records can:

- Provide data needed by Accounting and Finance to determine how much of each resource was used
- Support the M/S function by providing information about what has been produced and shipped

Supply Chain Management interacts in some ways with Human Resources
Figure 1-5  The Supply Chain Management functional area exchanges data with suppliers and with the Human Resources, Marketing and Sales, and Accounting and Finance functional areas
Supply Chain Management (cont’d.)

- Inputs for SCM
  - Product sales data
  - Production plans
  - Inventory levels
  - Layoff and recall company policy
Supply Chain Management (cont’d.)

- Outputs for SCM
  - Raw material orders
  - Packaging orders
  - Resource expenditure data
  - Production and inventory reports
  - Hiring information
Accounting and Finance

- Needs information from all other functional areas

- A/F personnel:
  - Record company’s transactions in the books of account
  - Record accounts payable when raw materials are purchased and cash outflows when they pay for materials
  - Summarize transaction data to prepare reports about company’s financial position and profitability
People in other functional areas provide data to A/F

- M/S provides sales data
- SCM provides production and inventory data
- HR provides payroll and benefit expense data

M/S personnel require data from A/F to evaluate customer credit
Accounting and Finance (cont’d.)

Figure 1-6 The Accounting and Finance functional area exchanges data with customers and with the Human Resources, Marketing and Sales, and Supply Chain Management functional areas.
Accounting and Finance (cont’d.)

- Inputs for A/F
  - Payments from customers
  - Accounts receivable data
  - Accounts payable data
  - Sales data
  - Production and inventory data
  - Payroll and expense data
Accounting and Finance (cont’d.)

- Outputs for A/F
  - Payments to suppliers
  - Financial reports
  - Customer credit data
Human Resources

- HR needs information from the other departments
- Tasks related to employee hiring, benefits, training, and government compliance are all responsibilities of HR
- HR needs accurate forecasts of personnel needs from all functional units
- HR needs to know what skills are needed to perform a particular job and how much the company can afford to pay employees
Human Resources (cont’d.)

Figure 1-7 The Human Resources functional area exchanges data with the Accounting and Finance, Marketing and Sales, and Supply Chain Management functional areas.
Human Resources (cont’d.)

- Observing governmental regulations in recruiting, training, compensating, promoting, and terminating employees

- Inputs for HR
  - Personnel forecasts
  - Skills data
Human Resources (cont’d.)

- Outputs for HR
  - Regulation compliance
  - Employee training and certification
  - Skills database
  - Employee evaluation and compensation
Significant amount of data is maintained by and shared among the functional areas

Timeliness and accuracy of these data critical to each area’s success and to company’s ability to make a profit and generate future growth

ERP software allows all functional areas to share a common database
  ◦ Allows accurate, real-time information to be available
Summary

- Basic functional areas: Marketing and Sales, Supply Chain Management, Accounting and Finance, and Human Resources

- Marketing and Sales: Sets product prices, promotes products through advertising and marketing, takes customer orders, supports customers, and creates sales forecasts

- Supply Chain Management: Develops production plans, orders raw materials from suppliers, receives raw material, manufactures products, maintains facilities, and ships products to customers
Summary (cont’d.)

- Accounting and Finance: Financial accounting to provide summaries of operational data in managerial reports, controlling accounts, planning and budgeting, and cash-flow management.

- Human Resources: Recruits, hires, trains, and compensates employees, ensures compliance with government regulations, and oversees the evaluation of employees.

- Information systems capture, process, and store data to provide information needed for decision making.
Summary (cont’d.)

- Employees working in one functional area need data from employees in other functional areas
  - Functional area information systems should be integrated, so shared data are accurate and timely

- Managers think in terms of business processes that integrate the functional areas
  - Need to share information between functions and functional areas
  - ERP software provides this capability by means of a single common database
Data and Data Management
Annual Flood of Data from...

- Credit card swipes
- E-mails
- Digital video
- Online TV
- RFID tags
- Blogs
- Digital video surveillance
- Radiology scans
Annual Flood of New Data!

In the zettabyte range  

A zettabyte is 1,000 exabytes

$10^{21}$ or $2^{70}$

$10^{18}$ or $2^{60}$

Just under 64-bit
Difficulties in Managing Data

- Growing exponentially
- Scattered
- Multiple sources
- Timeliness
- Data Security
- Data Quality
- Data Integrity
- Data Consistency
- Federal regulations
Data Governance

• Data Governance

• Master Data Management

• Master Data
John Stevens registers for Introduction to Management Information Systems (ISMN 3140) from 10 AM until 11 AM on Mondays and Wednesdays in Room 41 Smith Hall, taught by Professor Rainer.

Transaction Data
- John Stevens
- Intro to Management Information Systems
- ISMN 3140
- 10 AM until 11 AM
- Mondays and Wednesdays
- Room 41 Smith Hall
- Professor Rainer

Master Data
- Student
- Course
- Course No.
- Time
- Weekday
- Location
- Instructor
The Database Approach

Database management system (DBMS) minimize the following problems:

Data redundancy
Data isolation
Data inconsistency
DBMSs maximize the following issues:

- Data security
- Data integrity
- Data independence
Entity-relationship diagram model

(a) ER diagram

<table>
<thead>
<tr>
<th>STUDENT</th>
<th>PARKING PERMIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Identification Number</td>
<td>Permit Number</td>
</tr>
<tr>
<td>Student Name</td>
<td>Student Identification Number</td>
</tr>
<tr>
<td>Student Address</td>
<td>Car Type</td>
</tr>
</tbody>
</table>

(b) Entities, Attributes, and Identifiers

<table>
<thead>
<tr>
<th>CLASS</th>
<th>PROFESSOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Number</td>
<td>Professor Identification Number</td>
</tr>
<tr>
<td>Class Name</td>
<td>Professor Name</td>
</tr>
<tr>
<td>Class Time</td>
<td>Professor Department</td>
</tr>
<tr>
<td>Class Place</td>
<td></td>
</tr>
</tbody>
</table>
Database Management Systems

- Database management system (DBMS)

- Relational database model
  - Structured Query Language (SQL)
  - Query by Example (QBE)
Student Database Example
Normalization

- Minimum redundancy
- Maximum data integrity
- Best processing performance (most of the time)

Normalized data occurs when attributes in the table depend only on the primary key.
### Non-Normalized Relation

A non-normalized relation is a type of database table structure that is not optimized for efficient data retrieval and update operations. It violates the principles of normalization, which are designed to eliminate data redundancy and improve data integrity. The diagram shows a sample of a non-normalized relation in a Microsoft Access table format, with fields including Order Number, Part, Supplier Name, Supplier Address, Order Date, Delivery Date, and Customer details. The table contains various parts such as 'Left side panel', 'Hood', 'Head Light', 'Windshield Wiper', 'Roof panel', 'Chrome Hubcap', 'Gas Cap', 'Trunk Lid', 'Rear Windshield', 'Tail Light', and 'Rear Bumper', each with associated order and delivery information and customer details.
Normalizing the Database (part A)
Normalizing the Database (part B)
Normalization Produces Order

1. Multiple parts can be contained in an order.
2. Each part can be ordered multiple times.
3. Which parts are supplied by which supplier.
4. Which order belongs to which customer.
Data Warehousing

- Organized by business dimension or subject
- Multidimensional
- Historical
- Use online analytical processing
Systems Development Methods
Traditional Systems Development Life Cycle (SDLC)

- Systems Investigation
- Systems Analysis (i.e. Define)
- Systems Design
- Programming and Testing
- Implementation (i.e. Deploy)
- Operation and Maintenance
Six-Stage Systems Development Life Cycle (SDLC) with Supporting Tools

1. Business Need
2. Systems Investigation
   - Deliverable: Go/No Go Decision
3. Systems Analysis
   - Deliverable: User Requirement
4. Systems Design
   - Deliverable: Technical Specification
5. Programming and Testing
6. Implement The System
7. Operation and Maintenance

Supporting Tools:
- Upper CASE Tools
- Joint Application Design (JAD)
- Lower CASE Tools
Alternative Methods and Tools for Systems Development

- Joint application design (JAD)
- Rapid application development (RAD)
- Agile development
- End-user development
RAD versus SDLC

Traditional Development

Planning → Analysis → Design → Build → Test → Deploy

Compress

RAD

Development Requirements → Design

Iterative Development

JAD → Design → Develop → Test

User Review → Test
Road to an Operational System

- Development
- Change Management
- Deployment
- Release Management

- Development
- Integration – common to all developers to commit code changes
- Staging – can double for demonstration and training
- Production

Stages

Traditional Environments
Software Deployment

Deployment Activities

- Release
- Install and Activate (executable component of software)
- Deactivate
- Adapt (modify what is already installed. Usually initiated by local event)
- Update (from remote software producer)
- Built-in
- Version Tracking
- Uninstall
- Retire

Deployment Roles

- Pre-Production Environment
  - Application Developer
  - Build-and-release engineer
  - Release manager
  - Development Coordinators

- Production Environment
  - System Administrator
  - Database Administrator
  - Release Coordinators
  - Operations project manager
DevOps (Development and Operations)