INFORMATION
SYSTEMS IN THE ENTERPRISE
• What are the key system applications in a business? What role do they play?

• How do information systems support the major business functions?

• Why should managers pay attention to business processes?
What are the business benefits of using collaborative commerce, private industrial networks and enterprise systems?

What types of information systems are used by companies that operate internationally?
1. **Integration**: Different systems serve a variety of functions, connecting organizational levels difficult, costly.

2. **Enlarging scope of management thinking**: Huge system investments, long development time must be guided by common objectives.
Types of Information Systems

Figure 2-1
Major Types of Systems

- Executive Support Systems (ESS)
- Decision Support Systems (DSS)
- Management Information Systems (MIS)
- Knowledge Work Systems (KWS)
- Office Automation Systems (OAS)
- Transaction Processing Systems (TPS)
Figure 2-2

TYPES OF INFORMATION SYSTEMS

Executive Support Systems (ESS)
- 5-year sales trend forecasting
- Operating budget forecasting
- Profit planning
- Personnel planning

Management Information Systems (MIS)
- Sales management control
- Annual budgeting
- Capital investment analysis
- Relocation analysis

Decision-Support Systems (DSS)
- Sales region analysis
- Production scheduling analysis
- Pricing/profitability analysis
- Contract cost analysis

Knowledge Work Systems (KWS)
- Engineering workstations
- Graphics workstations
- Managerial workstations

Office Systems
- Word processing
- Document imaging
- Electronic calendars

Transaction Processing Systems (TPS)
- Order tracking
- Plant scheduling
- Accounts payable
- Training & development

Sales and Marketing
- Machine control
- Securities trading
- Accounts payable
- Employee record keeping

Manufacturing
- Order processing
- Material movement
- Accounts receivable

Finance
- Payroll
- Cash management

Accounting
- Compensation

Human Resources
- Training & development
- Employee record keeping
Transaction Processing Systems (TPS):

- Basic business systems that serve the operational level
- A computerized system that performs and records the daily routine transactions necessary to the conduct of the business
KEY SYSTEM APPLICATIONS IN THE ORGANIZATION

Payroll TPS

Figure 2-3
## Types of TPS Systems

<table>
<thead>
<tr>
<th>Major functions of system</th>
<th>Major application systems</th>
<th>Type of TPS system</th>
<th>Other types (e.g., university)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales/marketing systems</td>
<td>Scheduling</td>
<td>Budgeting</td>
<td>Personnel records</td>
</tr>
<tr>
<td></td>
<td>Purchasing</td>
<td>General ledger</td>
<td>Benefits</td>
</tr>
<tr>
<td></td>
<td>Shipping/receiving</td>
<td>Billing</td>
<td>Compensation</td>
</tr>
<tr>
<td></td>
<td>Engineering</td>
<td>Cost accounting</td>
<td>Labor relations</td>
</tr>
<tr>
<td></td>
<td>Operations</td>
<td></td>
<td>Training</td>
</tr>
<tr>
<td>Sales order information system</td>
<td>Machine control systems</td>
<td>General ledger</td>
<td>Payroll</td>
</tr>
<tr>
<td></td>
<td>Purchase order systems</td>
<td>Accounts receivable/payable</td>
<td>Employee records</td>
</tr>
<tr>
<td></td>
<td>Quality control systems</td>
<td>Funds management systems</td>
<td>Student transcript system</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Benefit systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Career path systems</td>
</tr>
</tbody>
</table>

**Figure 2-4**
Knowledge Work Systems (KWS):  

**Knowledge level**  
- **Inputs:** Design specs  
- **Processing:** Modeling  
- **Outputs:** Designs, graphics  
- **Users:** Technical staff  

**Example:** Engineering work station
Management Information System (MIS):

Management level

- **Inputs:** High volume data
- **Processing:** Simple models
- **Outputs:** Summary reports
- **Users:** Middle managers

Example: Annual budgeting
KEY SYSTEM APPLICATIONS IN THE ORGANIZATION

Management Information System (MIS)

Figure 2-5
Management Information System (MIS)

- Structured and semi-structured decisions
- Report control oriented
- Past and present data
- Internal orientation
- Lengthy design process
Decision Support System (DSS):

Management level

- **Inputs:** Low volume data
- **Processing:** Interactive
- **Outputs:** Decision analysis
- **Users:** Professionals, staff

Example: Contract cost analysis
## Decision Support System (DSS)

### Consolidated Consumer Products Corporation
Sales by Product and Sales Region: 2001

<table>
<thead>
<tr>
<th>PRODUCT CODE</th>
<th>PRODUCT DESCRIPTION</th>
<th>SALES REGION</th>
<th>ACTUAL SALES</th>
<th>PLANNED</th>
<th>ACTUAL VS. PLANNED</th>
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</thead>
<tbody>
<tr>
<td>4469</td>
<td>Carpet Cleaner</td>
<td>Northeast</td>
<td>4,066,700</td>
<td>4,800,000</td>
<td>0.85</td>
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<tr>
<td></td>
<td></td>
<td>South</td>
<td>3,778,112</td>
<td>3,750,000</td>
<td>1.01</td>
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<tr>
<td></td>
<td></td>
<td>Midwest</td>
<td>4,867,001</td>
<td>4,600,000</td>
<td>1.06</td>
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<tr>
<td></td>
<td></td>
<td>West</td>
<td>4,003,440</td>
<td>4,400,000</td>
<td>0.91</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td></td>
<td>16,715,253</td>
<td>17,550,000</td>
<td>0.95</td>
</tr>
<tr>
<td>5674</td>
<td>Room Freshener</td>
<td>Northeast</td>
<td>3,676,700</td>
<td>3,900,000</td>
<td>0.94</td>
</tr>
<tr>
<td></td>
<td></td>
<td>South</td>
<td>5,608,112</td>
<td>4,700,000</td>
<td>1.19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Midwest</td>
<td>4,711,001</td>
<td>4,200,000</td>
<td>1.12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>West</td>
<td>4,563,440</td>
<td>4,900,000</td>
<td>0.93</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td></td>
<td>18,559,253</td>
<td>17,700,000</td>
<td>1.05</td>
</tr>
</tbody>
</table>
Decision Support System (DSS)

Figure 2-7
Executive Support System (ESS):

Strategic level
- **Inputs**: Aggregate data
- **Processing**: Interactive
- **Outputs**: Projections
- **Users**: Senior managers

Example: 5-year operating plan
Executive Support System (ESS)

Figure 2-8
Executive support system (ESS)

- Top level management
- Designed to the individual
- Ties CEO to all levels
- Very expensive to keep up
- Extensive support staff
Figure 2-9
Major functions of systems:

- Sales management, market research, promotion, pricing, new products

Major application systems:

- Sales order info system, market research system, pricing system
### Sales and Marketing Systems

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>DESCRIPTION</th>
<th>ORGANIZATIONAL LEVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORDER PROCESSING</td>
<td>ENTER, PROCESS, TRACK ORDERS</td>
<td>OPERATIONAL</td>
</tr>
<tr>
<td>MARKET ANALYSIS</td>
<td>IDENTIFY CUSTOMERS &amp; MARKETS</td>
<td>KNOWLEDGE</td>
</tr>
<tr>
<td>PRICING ANALYSIS</td>
<td>DETERMINE PRICES</td>
<td>MANAGEMENT</td>
</tr>
<tr>
<td>SALES TRENDS</td>
<td>PREPARE 5-YEAR FORECASTS</td>
<td>STRATEGIC</td>
</tr>
</tbody>
</table>
Major functions of systems:
• Scheduling, purchasing, shipping, receiving, engineering, operations

Major application systems:
• Materials resource planning systems, purchase order control systems, engineering systems, quality control systems
### Manufacturing and Production Systems

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>DESCRIPTION</th>
<th>ORGANIZATIONAL LEVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>MACHINE CONTROL</td>
<td>CONTROL ACTIONS OF EQUIPMENT</td>
<td>OPERATIONAL</td>
</tr>
<tr>
<td>COMPUTER-AIDED-DESIGN</td>
<td>DESIGN NEW PRODUCTS</td>
<td>KNOWLEDGE</td>
</tr>
<tr>
<td>PRODUCTION PLANNING</td>
<td>DECIDE NUMBER, SCHEDULE OF PRODUCTS</td>
<td>MANAGEMENT</td>
</tr>
<tr>
<td>FACILITIES LOCATION</td>
<td>DECIDE WHERE TO LOCATE FACILITIES</td>
<td>STRATEGIC</td>
</tr>
</tbody>
</table>
Overview of Inventory Systems

Figure 2-10
Major functions of systems:
- Budgeting, general ledger, billing, cost accounting

Major application systems:
- General ledger, accounts receivable, accounts payable, budgeting, funds management systems
# Financing and Accounting Systems

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>DESCRIPTION</th>
<th>ORGANIZATIONAL LEVEL</th>
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</thead>
<tbody>
<tr>
<td>ACCOUNTS RECEIVABLE</td>
<td>TRACK MONEY OWED TO FIRM</td>
<td>OPERATIONAL</td>
</tr>
<tr>
<td>PORTFOLIO ANALYSIS</td>
<td>DESIGN FIRM'S INVESTMENTS</td>
<td>KNOWLEDGE</td>
</tr>
<tr>
<td>BUDGETING</td>
<td>PREPARE SHORT TERM BUDGETS</td>
<td>MANAGEMENT</td>
</tr>
<tr>
<td>PROFIT PLANNING</td>
<td>PLAN LONG-TERM PROFITS</td>
<td>STRATEGIC</td>
</tr>
</tbody>
</table>
Major functions of systems:

- Personnel records, benefits, compensation, labor relations, training

Major application systems:

- Payroll, employee records, benefit systems, career path systems, personnel training systems
### Human Resource Systems

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>DESCRIPTION</th>
<th>ORGANIZATIONAL LEVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRAINING &amp; DEVELOPMENT</td>
<td>TRACK TRAINING, SKILLS, APPRAISALS</td>
<td>OPERATIONAL</td>
</tr>
<tr>
<td>CAREER PATHING</td>
<td>DESIGN EMPLOYEE CAREER PATHS</td>
<td>KNOWLEDGE</td>
</tr>
<tr>
<td>COMPENSATION ANALYSIS</td>
<td>MONITOR WAGES, SALARIES, BENEFITS</td>
<td>MANAGEMENT</td>
</tr>
<tr>
<td>HUMAN RESOURCES PLANNING</td>
<td>PLAN LONG-TERM LABOR FORCE NEEDS</td>
<td>STRATEGIC</td>
</tr>
</tbody>
</table>
Human Resource Systems

Data elements in employee master file:
- Employee Number
- Name
- Address
- Department
- Age
- Marital status
- Sex
- Salary
- Educational background
- Job title
- Date of hire
- Date of termination
- Termination reason

Termination Report

<table>
<thead>
<tr>
<th>Date</th>
<th>Name</th>
<th>Number</th>
<th>Reason</th>
</tr>
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<tbody>
<tr>
<td>11/12/2000</td>
<td>John Hansen</td>
<td>29433</td>
<td>Position eliminated</td>
</tr>
<tr>
<td>12/1/2000</td>
<td>Patricia Carlyle</td>
<td>14327</td>
<td>Retired</td>
</tr>
<tr>
<td>1/12/2001</td>
<td>Ellen Quimby</td>
<td>21224</td>
<td>Left</td>
</tr>
</tbody>
</table>

Figure 2-11
Business processes

- Manner in which work is organized, coordinated, and focused to produce a valuable product or service

- Concrete work flows of material, information, and knowledge—sets of activities
INTEGRATING FUNCTIONS AND BUSINESS PROCESSES

Business Processes and Information Systems

- Unique ways to coordinate work, information, and knowledge
- Ways in which management chooses to coordinate work
Information systems help organizations

- Achieve great efficiencies by automating parts of processes
- Rethink and streamline processes
Examples of Business Processes

• **Manufacturing and production:** Assembling product, checking quality, producing bills of materials

• **Sales and marketing:** Identifying customers, creating customer awareness, selling
Examples of Business Processes

- **Finance and accounting**: Paying creditors, creating financial statements, managing cash accounts

- **Human Resources**: Hiring employees, evaluating performance, enrolling employees in benefits plans
Cross-Functional Business Processes

- Transcend boundary between sales, marketing, manufacturing, and research and development
- Group employees from different functional specialties to a complete piece of work

Example: Order Fulfillment Process
INTEGRATING FUNCTIONS AND BUSINESS PROCESSES

The Order Fulfillment Process

Figure 2-12
Customer Relationship Management (CRM)

- Manages all ways used by firms to deal with existing and potential new customers
- Business and Technology discipline
- Uses information system to coordinate entire business processes of a firm
Customer Relationship Management (CRM)

- Provides end-to-end customer care
- Provides a unified view of customer across the company
- Consolidates customer data from multiple sources and provides analytical tools for answering questions
Customer Relationship Management (CRM)

- Unified view of customers
- Consistent message to customers
- End-to-end customer care
- Long-term customer relationships
- Identification of best customers

Figure 2-13
Supply Chain Management (SCM)

- Close linkage and coordination of activities involved in buying, making, and moving a product
- Integrates supplier, manufacturer, distributor, and customer logistics time
- Reduces time, redundant effort, and inventory costs
Supply Chain

• **Network of organizations and business processes**

• **Helps in procurement of materials, transformation of raw materials into intermediate and finished products**
Supply Chain Management (SCM)

• Helps in distribution of the finished products to customers

• Includes reverse logistics - returned items flow in the reverse direction from the buyer back to the seller
INTEGRATING FUNCTIONS AND BUSINESS PROCESSES

Supply Chain Management

Figure 2-14
How Information Systems Facilitate Supply Chain Management

- Decide when, what to produce, store, move
- Rapidly communicate orders
- Communicate orders, track order status
- Check inventory availability, monitor levels
- Track shipments
- Plan production based on actual demand
- Rapidly communicate product design change
- Provide product specifications
- Share information about defect rates, returns
Supply Chain Management (SCM)

Limitations:

• Inefficiencies can waste as much as 25% of company’s operating costs

• Bullwhip Effect: Information about the demand for the product gets distorted as it passes from one entity to next
Supply Chain Management (SCM)

- **Supply chain planning system**: Enables the firm to generate forecasts for a product and to develop sourcing and a manufacturing plan for the product.

- **Supply chain execution system**: Manages the flow of products through distribution centers and warehouses.
Collaborative Commerce

• Uses digital technologies to enable multiple organizations to collaboratively design, develop, build, move, and manage products

• Increases efficiencies in reducing product design life cycles, minimizing excess inventory, forecasting demand, and keeping partners and customers informed
Collaborative Commerce

Engineers
- Design documents

Suppliers
- Replenishment
- Price schedules

Manufacturing
- Bills of material
- Demand forecasts
- Order status

Firm Extranet or Private Network

Customers
- Orders
- Product modification requests

Sales and Marketing
- Marketing Coordination

Figure 2-15
Industrial Networks

Private Industrial Networks

- Web-enabled networks
- Link systems of multiple firms in an industry
- Coordinate transorganizational business processes
• **Within the business:** There are functions, each having its uses of information systems

• **Outside the organization’s boundaries:** There are customers and vendors

Functions tend to work in isolation
INTEGRATING FUNCTIONS AND BUSINESS PROCESSES

Traditional View of the Systems

Figure 2-16
INTEGRATING FUNCTIONS AND BUSINESS PROCESSES

Enterprise Systems

Figure 2-17
Benefits of Enterprise Systems

- **Firm structure and organization:** One organization
- **Management:** Firm-wide knowledge-based management processes
- **Technology:** Unified platform
- **Business:** More efficient operations and customer-driven business processes
Challenges of Enterprise Systems

- **Difficult to build:** Require fundamental changes in the way the business operates

- **Technology:** Require complex pieces of software and large investments of time, money, and expertise

- **Centralized organizational coordination and decision making:** Not the best way for the firms to operate
Four main ways of organizing businesses internationally:

• **Domestic Exporter**: Heavy centralization of corporate activities in the home country of origin

• **Multinational**: Financial management and control out of a central home base, production, sales and marketing operations decentralized
Franchiser: Product created, designed, financed, and produced in the home country, relies on foreign personnel for production, marketing and human resources

Transnational: No national headquarters; value-added activities managed from a global perspective, no reference to national borders, sources of supply and demand and local competitive advantage optimized
Four types of system configuration:

- Centralized Systems
- Duplicated Systems
- Decentralized Systems
- Networked Systems
Global System Configuration

<table>
<thead>
<tr>
<th>SYSTEM CONFIGURATION</th>
<th>BUSINESS ORGANIZATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Domestic Exporter</td>
</tr>
<tr>
<td>Centralized</td>
<td>X</td>
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<tr>
<td>Duplicated</td>
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</tr>
<tr>
<td>Decentralized</td>
<td>x</td>
</tr>
<tr>
<td>Networked</td>
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</tbody>
</table>

Figure 2-18
INFORMATION SYSTEMS IN THE ENTERPRISE