2. Information systems and business processes

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Learning objectives

• Define and describe business processes and their relationship to information systems.

• Evaluate the role played by systems serving the various levels of management in a business and their relationship to each other.

• Explain how enterprise applications improve organizational performance.

America’s Cup 2013: Video
ORACLE TEAM USA racing in the 34th America’s Cup on San Francisco Bay

America’s Cup 2013: USA Wins with Information Technology

• Problem: Using IT to win the America’s Cup race

• Solutions: New technology for physical engineering of boat; sensor network to monitor conditions and data analysis to improve the performance of sails and more.

• IBM Oracle Database 11g data management software provided real time analysis of boat’s sensor data.

• Demonstrates IT’s role in fostering innovation and improving performance.

• Illustrates the benefits of using data analysis and IT to improve products

http://www.youtube.com/watch?v=HiBHCAnKaSU

http://www.youtube.com/watch?v=Sr055W97l4o
Business Processes and Information Systems

- Business processes:
  - Workflows of material, information, knowledge
  - Sets of activities, steps
  - May be tied to functional area or be cross-functional
- Businesses: Can be seen as collection of business processes
- Business processes may be assets or liabilities

Outline

1. Business Processes and Information Systems
2. Types of Information Systems
3. The Information Systems Function in Business

Business Processes
The Four Major Functions of a Business

Every business, regardless of its size, must perform four functions to succeed. It must produce the product or service; market and sell the product; keep track of accounting and financial transactions; and perform basic human resources tasks, such as hiring and retaining employees.
Examples of functional business processes

<table>
<thead>
<tr>
<th>FUNCTIONAL AREA</th>
<th>BUSINESS PROCESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing and production</td>
<td>Assembling the product</td>
</tr>
<tr>
<td></td>
<td>Checking for quality</td>
</tr>
<tr>
<td></td>
<td>Producing bills of materials</td>
</tr>
<tr>
<td>Sales and marketing</td>
<td>Identifying customers</td>
</tr>
<tr>
<td></td>
<td>Making customers aware of the product</td>
</tr>
<tr>
<td></td>
<td>Selling the product</td>
</tr>
<tr>
<td>Finance and accounting</td>
<td>Paying creditors</td>
</tr>
<tr>
<td></td>
<td>Creating financial statements</td>
</tr>
<tr>
<td></td>
<td>Managing cash accounts</td>
</tr>
<tr>
<td>Human resources</td>
<td>Hiring employees</td>
</tr>
<tr>
<td></td>
<td>Evaluating employees' job performance</td>
</tr>
<tr>
<td></td>
<td>Enrolling employees in benefits plans</td>
</tr>
</tbody>
</table>

Table 2.1

Organizing a Business: Basic Business Functions

- Five basic business entities:
  - Suppliers
  - Customers
  - Employees
  - Invoices/payments
  - Products and services

Business Processes

- Logically related set of tasks that define how specific business tasks are performed
  - The tasks each employee performs, in what order, and on what schedule
  - E.g., Steps in hiring an employee
- Some processes tied to functional area
  - Sales and marketing: identifying customers
- Some processes are cross-functional
  - Fulfilling customer order

The Order Fulfillment Process

Fulfilling a customer order involves a complex set of steps that requires the close coordination of the sales, accounting, and manufacturing functions.
Information technology enhances business processes in two main ways:

1. Increasing efficiency of existing processes
   • Automating steps that were manual
2. Enabling entirely new processes
   • Change flow of information
   • Replace sequential steps with parallel steps
   • Eliminate delays in decision making
   • Support new business models

Systems for Different Levels of Management

• Transaction processing systems:
  • Keep track of basic activities and transactions of organization (e.g., sales, receipts, cash deposits, payroll, credit decisions, flow of materials in a factory).
• Management information systems and decision-support systems:
  • Help with monitoring, controlling, decision making, and administrative activities.
• Executive support systems:
  • Help address strategic issues and long-term trends, both in firm and in external environment.

Transaction processing systems (TPS)

– Perform and record daily routine transactions necessary to conduct business
  • Examples: sales order entry, payroll, shipping
– Allow managers to monitor status of operations and relations with external environment
– Serve operational levels
– Serve predefined, structured goals and decision making
A TPS for payroll processing captures employee payment transaction data (such as a timecard). System outputs include online and hard copy reports for management and employee paychecks.

Business intelligence and Business intelligence systems

- Business intelligence
  - Data and software tools for organizing and analyzing data
  - Used to help managers and users make improved decisions

- Business intelligence systems
  - Management information systems
  - Decision support systems
  - Executive support systems

Management information systems (MIS)

- Serve middle management
- Provide reports on firm’s current performance, based on data from TPS
- Provide answers to routine questions with predefined procedure for answering them
- Typically have little analytic capability

How MIS Obtain Their Data from Organization’s TPS

In the system illustrated by this diagram, three TPS supply summarized transaction data to the MIS reporting system at the end of the time period. Managers gain access to the organizational data through the MIS, which provides them with the appropriate reports.
Sample MIS Report

This report, showing summarized annual sales data, was produced by the MIS in Figure 2-3.

<table>
<thead>
<tr>
<th>PRODUCT CODE</th>
<th>PRODUCT DESCRIPTION</th>
<th>SALES REGION</th>
<th>ACTUAL SALES</th>
<th>PLANNED</th>
<th>ACTUAL versus PLANNED</th>
</tr>
</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>
</tr>
<tr>
<td></td>
<td></td>
<td>South</td>
<td>3,778,112</td>
<td>3,750,000</td>
<td>1.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Midwest</td>
<td>4,867,001</td>
<td>4,600,000</td>
<td>1.06</td>
</tr>
<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>TOTAL</td>
<td></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>3,876,700</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>TOTAL</td>
<td></td>
<td></td>
<td>18,559,253</td>
<td>17,700,000</td>
<td>1.05</td>
</tr>
</tbody>
</table>

Figure 2-4

Decision support systems (DSS)

- Serve middle management
- Support non-routine decision making
  - Example: What is impact on production schedule if December sales doubled?
- Often use external information as well from TPS and MIS
- Model driven DSS
  - Voyage-estimating systems
- Data driven DSS
  - Intrawest’s marketing analysis systems

Voyage-Estimating Decision Support System

This DSS operates on a powerful PC. It is used daily by managers who must develop bids on shipping contracts.

Executive support systems (ESS)

- Support senior management
- Address non-routine decisions
  - Requiring judgment, evaluation, and insight
- Incorporate data about external events (e.g. new tax laws or competitors) as well as summarized information from internal MIS and DSS
- Example: Digital dashboard with real-time view of firm’s financial performance: working capital, accounts receivable, accounts payable, cash flow, and inventory
Digital dashboard

This system pools data from diverse internal and external sources and makes them available to executives in an easy-to-use form.

Systems from a constituency perspective

- Transaction processing systems: supporting operational level employees
- Management information systems and decision-support systems: supporting managers
- Executive support systems: supporting executives

Relationship of systems to one another

- TPS: Major source of data for other systems
- ESS: Recipient of data from lower-level systems
- Data may be exchanged between systems
- In reality, most businesses’ systems are only loosely integrated (but they are getting better!)
Types of Information Systems

<table>
<thead>
<tr>
<th>Type of System</th>
<th>Information Inputs</th>
<th>Information Outputs</th>
<th>Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction Processing Systems (TPS)</td>
<td>Transactions; daily events</td>
<td>Detailed reports; lists; summaries</td>
<td>Operations personnel; first-line supervisors</td>
</tr>
<tr>
<td>Management Information Systems (MIS)</td>
<td>Summary transaction data; high-volume data; simple models</td>
<td>Summary and exception reports</td>
<td>Middle managers</td>
</tr>
<tr>
<td>Decision Support Systems (DSS)</td>
<td>Optimized for data analysis, analytic models and data analysis tools.</td>
<td>Interactive; simulations; analysis</td>
<td>Professionals, staff managers</td>
</tr>
<tr>
<td>Executive Support Systems (ESS)</td>
<td>Aggregate data; external, internal</td>
<td>Projections; responses to queries</td>
<td>Senior managers</td>
</tr>
</tbody>
</table>

Enterprise applications

- Systems for linking the enterprise
- Span functional areas
- Execute business processes across firm
- Include all levels of management
- Four major applications:
  - Enterprise systems
  - Supply chain management systems
  - Customer relationship management systems
  - Knowledge management systems

Enterprise Application Architecture

Enterprise applications automate processes that span multiple business functions and organizational levels and may extend outside the organization.

Enterprise systems

- Collects data from different firm functions and stores data in single central data repository
- Resolves problem of fragmented, redundant data sets and systems
- Enable:
  - Coordination of daily activities
  - Efficient response to customer orders (production, inventory)
  - Provide valuable information for improving management decision making
Supply Chain Management Systems

- Manage firm's relationships with suppliers
- Share information about
  - Orders, production, inventory levels, delivery of products and services
- Goal:
  - Right amount of products to destination with least amount of time and lowest cost

Customer Relationship Management Systems

- Provide information to coordinate all of the business processes that deal with customers
  - Sales
  - Marketing
  - Customer service
- Helps firms identify, attract, and retain most profitable customers
- E.g., Saab CRM applications to achieve 360 degree view of customers resulted in greater follow-up rate on sales leads and increased customer satisfaction.

Knowledge Management Systems (KMS)

- Support processes for acquiring, creating, storing, distributing, applying, integrating knowledge
  - How to create, produce, distribute products and services
- Collect internal knowledge and experience within firm and make it available to employees
- Link to external sources of knowledge

Intranets and Extranets

- Also used to increase integration and expedite the flow of information
  - Intranets:
    - Internal company Web sites accessible only by employees
  - Extranets:
    - Company Web sites accessible externally only to vendors and suppliers
- Often used to coordinate supply chain
E-Business, E-Commerce, and E-Government

- E-business:
  - Use of digital technology and Internet to drive major business processes
- E-commerce:
  - Subset of e-business
  - Buying and selling goods and services through Internet
- E-government:
  - Using Internet technology to deliver information and services to citizens, employees, and businesses

Outline

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3. The Information Systems Function in Business

Information systems department

- Formal organizational unit responsible for information technology services
- Often headed by chief information officer (CIO)
  - Other senior positions include chief security officer (CSO), chief knowledge officer (CKO), chief privacy officer (CPO)
- Programmers
- Systems analysts
- Information systems managers

End users and IT Governance

- End users
  - Representatives of other departments for whom applications are developed
  - Increasing role in system design, development
- IT Governance
  - Strategies and policies for using IT in the organization
  - Decision rights
  - Accountability
  - Organization of information systems function
    - Centralized, decentralized, and so on
1. List the business processes displayed in the video.

Business processes displayed in the video include:
- picking up a package,
- transporting a package to a hub,
- processing and sorting a package in a warehouse,
- shipping packages to airports,
- processing the package locally, and
- delivering the package.

2. List the types of information systems shown in the video. Can you describe how systems that were not shown might be used at FedEx?

Types of systems included in the video are:
- transaction processing systems,
- management information systems (at the FedEx air control center,
- MIS monitor the trucks and planes coming and going and the number of packages being handled).
- An executive might receive a report of the day’s activities via an executive support system.
- Customer complaints or questions might be resolved via a customer relationship management system.
3. The system displayed in the video is an enterprise system. Why is this true? Explain your answer.

The system in the video is an enterprise system because key business processes of FedEx are integrated into a single software system.

4. How important is technology to FedEx's business processes?

Having top-end technology is critical to the completion of critical business processes for FedEx. Whether at the sorting centers or on the road in the hands of FedEx delivery workers, technology that never fails and gets the job done quickly is necessary to maintain the level of customer satisfaction FedEx is accustomed to.

5. How could FedEx's shipping process be made even more efficient?

The sorting process could potentially become completely automated, FedEx could use more energy efficient vehicles, or they could continue to innovate and develop even more efficient technologies across the enterprise.