Chapter 2

Information Technologies: Concepts, Types and IT Support

Information Technology for Management

*Improving Performance in the Digital Economy*

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Teknologi Informasi di Perusahaan

Business Intelligence & E-Commerce

Supply Chain

Enterprise Resource Planning

Customer Relationship Management

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2.1 Information Systems: Concepts and Definitions
Information System: Concepts and Definitions

An information system (IS) collects, processes, stores, analyzes, and disseminates information for a specific purpose “Application”.

- Hardware
- Software
- Data
- Network
- Procedures
- People
The basic components of information systems.
Information System — Primary Purpose

Collects data, processes it into information then converts information into knowledge for a specific purpose.

• Data
  – Elementary description of things, events, activities, and transactions that are recorded, classified, and stored, but not organized to convey any specific meaning

• Information
  – Data that has been organized so that they have meaning and value to the recipient

• Knowledge
  – Information that has been organized and processed to convey understanding, experience, and expertise as they apply to a current problem or activity
Data vs Information vs Knowledge

"Nobody ever listens to me."
-Yellow Traffic Light
The relationship among data, information, & knowledge.
2.2 Classification and Types of Information Systems
Figure 2.2

- Personal and Productivity Systems
- Transaction Processing Systems
- Functional and Management Information Systems
- Enterprise Systems (Integrated)
- Interorganizational Systems
- Global Systems
- Very Large and Special Systems
Transaction Processing System (TPS)

• TPS automates routine and repetitive tasks that are critical to the operation of the organization, such as preparing a payroll, billing customers, Point-of-Sale, and Warehouse operations.

• Data collected from this operation supports the MIS and DSS systems employed by Middle Management.

• Computerizes the primary and most of the secondary activities on the Value Chain.

• Primary purpose to perform transactions and collect data.
## Table 2.1

<table>
<thead>
<tr>
<th><strong>TABLE 2.1</strong></th>
<th>Routine Business Transactions in a Manufacturing Company</th>
</tr>
</thead>
</table>
| **Payroll and personnel** | Employee time cards  
Employee pay and deductions  
Payroll checks  
Fringe benefits |
| **Purchasing** | Purchase orders  
Deliveries  
Payments (accounts payable) |
| **Finance and accounting** | Financial statements  
Tax records  
Expense accounts |
| **Sales** | Sales records  
Invoices and billings  
Accounts receivable  
Sales returns  
Shipping |
| **Production** | Production reports  
Quality control reports |
| **Inventory management** | Material usage  
Inventory levels |
Management Information Systems (MIS)

• These systems access, organize, summarize, and display information for supporting *routine decision making* in the functional areas. Geared toward middle managers, MIS are characterized mainly by their ability to produce periodic reports such as a daily list of employees and the hours they work, or a monthly report of expenses as compared to a budget.

• Typical uses would be in Replenishment, Pricing Analysis (Markdowns) and Sales Management.

• Decisions supported are more structured.

• Primary purpose to process data into information.
Figure 2.3 – Functional information systems.
Figure 2.5 – Business processes across & beyond the enterprise.
Figure 2.6

Departmental, enterprise, and interorganizational information systems.
<table>
<thead>
<tr>
<th>System</th>
<th>Employees supported</th>
<th>Description</th>
<th>Detailed description in:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management information system (MIS)</td>
<td>Middle managers</td>
<td>Provides routine information for planning, organizing, and controlling operations in functional areas</td>
<td>Chapter 9</td>
</tr>
<tr>
<td>Office automation system (OAS)</td>
<td>Office workers</td>
<td>Increases productivity of office workers; includes word processing</td>
<td>Chapters 4, 9</td>
</tr>
<tr>
<td>CAD/CAM</td>
<td>Engineers, draftspeople</td>
<td>Allows engineers to design and test prototypes; transfers specifications to manufacturing facilities</td>
<td>Chapter 9</td>
</tr>
<tr>
<td>Communication and collaboration systems</td>
<td>All employees</td>
<td>Enables employees, partners, and customers to interact and work together more efficiently</td>
<td>Chapters 4, 8</td>
</tr>
<tr>
<td>Desktop publishing system</td>
<td>Office workers</td>
<td>Combines text, photos, graphics to produce professional-quality documents</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>Document management system (DMS)</td>
<td>Office workers</td>
<td>Automates flow of electronic documents</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>Decision support system (DSS)</td>
<td>Decision makers, managers</td>
<td>Combines models and data to solve semistructured problems with extensive user involvement</td>
<td>Chapter 12</td>
</tr>
<tr>
<td>Group support system, groupware</td>
<td>People working in groups</td>
<td>Supports working processes of groups of people (including those in different locations)</td>
<td>Chapters 4, 12</td>
</tr>
<tr>
<td>Expert system (ES)</td>
<td>Knowledge workers, nonexperts</td>
<td>Provides stored knowledge of experts to nonexperts; provides decision recommendations based on built-in expertise</td>
<td>Chapter 12</td>
</tr>
<tr>
<td>Knowledge management system (KM)</td>
<td>Managers, knowledge workers</td>
<td>Supports the gathering, organizing, and use of an organization's knowledge</td>
<td>Chapters 10</td>
</tr>
<tr>
<td>Data and text mining</td>
<td>Knowledge workers, professionals</td>
<td>Enables learning from historical cases, even with vague or incomplete information</td>
<td>Chapters 3, 12</td>
</tr>
<tr>
<td>Business intelligence</td>
<td>Decision makers, managers, knowledge workers</td>
<td>Gathers and uses large amounts of data for analysis by business analytics and intelligent systems</td>
<td>Chapters 3, 12</td>
</tr>
<tr>
<td>Mobile computing systems</td>
<td>Mobile employees</td>
<td>Support employees who work with customers or business partners outside the physical boundaries of the organization</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>Automated decision support (ADS)</td>
<td>Frontline employees, middle managers</td>
<td>Supports customer care employees and salespeople who need to make quick, real-time decisions involving small dollar amounts</td>
<td>Chapter 12</td>
</tr>
</tbody>
</table>
Business Performance Management Systems - Dashboards

Giving the Boss the Big Picture

Analyzer Dashboard Screen Shot

Ctuit Radar - Configurable Dashboard for Restaurants
Dashboards – cont’d

BrightPoint's Google Finance Dashboard

Click for interactive version of dashboard

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Figure 2.7 Sample of a performance dashboard.

Source: Dundas Software
(demos1.undadas.com/DundasGauge/MarketingDashboard/Summary.aspx)

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Executive Support Systems (ESS)

- ESS systems or Enterprise Information Systems (EIS) were originally implemented to support senior management. These systems have been expanded to support other managers within the enterprise.
- At the senior management level they support Strategic Activities which deals with situations that may significantly change the manner in which business is done.
Interrelated support systems. The TPS collects information that is used to build the MIS and the data warehouse. These feed the BI and other enterprise systems.
2.3 How IT Supports People
Figure 2.9 – The information systems support of people in organizations.
Inter-Organizational Systems (IOS)

- IOS are systems that connect two or more organizations. These systems are common among business partners and play a major role in e-commerce as well as in supply chain management support.
- The first type of IT system that was developed in the 1980s to improve communications with business partners was electronic data interchange (EDI), which involved computer-to-computer direct communication of standard business documents (such as purchase orders and order confirmations) between business partners. These systems became the basis for electronic markets, which later developed into electronic commerce.
- Web-based systems (many using XML) deliver business applications via the Internet. Using browsers and the Internet, people in different organizations communicate, collaborate, access vast amounts of information, and run most of the organization’s tasks and processes.
Information Infrastructure

- Hardware
- Software
- Networks & communication facilities
- Databases
- IS personnel
A common way to classify information architecture is by computing paradigms, which are the core of the architecture.

- Mainframe Environment
- PC Environment
- PC-LAN Environment
- Distributed Computing Environment
- Client/Server Environment
- Enterprise-wide Computing Environment
- Legacy systems
The Web Based IT Architectures

Web-based systems refer to applications or services that are resident on a server that is accessible using a Web browser. The only client-side software needed to access and execute these applications is a Web browser environment.

- The Internet
- Intranets
- Extranets
- Corporate Portals
- E-commerce Systems
- Electronic Storefronts
- Electronic Markets
- Electronic Exchanges
- M-Commerce
- Enterprise Web
Extranets

• Connect several intranets via the Internet, by adding a security mechanism and some additional functionalities

• Form a larger virtual network that allows remote users (such as business partners or mobile employees) to securely connect over the Internet to the enterprise’s main intranet

• Extranets are also employed by two or more enterprises (suppliers & buyers) to share information in a controlled fashion, and therefore they play a major role in the development of business-to-business electronic commerce and Supply Chain systems
E-Business and E-Commerce
The Structure of E-Commerce
E-commerce transactions can be done between various parties.

- **Business-to-business (B2B):** Both the sellers and the buyers are business organizations.

- **Collaborative commerce (c-commerce):** In c-commerce, business partners collaborate electronically.

- **Business-to-consumers (B2C):** The sellers are organizations, and the buyers are individuals.

- **Consumers-to-businesses (C2B):** Consumers make known a particular need for a product or service, and suppliers compete to provide it.
E-commerce transactions can be done between various parties.

- **Consumer-to-consumer (C2C):** Individuals sell products or services to other individuals

- **Intrabusiness (intraorganizational) commerce:** An organization uses EC internally to improve its operations. A special case is known as B2E (business to its employees)

- **Government-to-citizens (G2C):** A government provides services to its citizens via EC technologies

- **Mobile commerce (m-commerce):** When e-commerce is done in a wireless environment
Figure 6.2 A framework for E-commerce.
(Source: Drawn by E. Turban)
Figure 6.3 E-commerce support services. (Source: Drawn by E. Turban. Based on S.Y. Choi et al., 1997, p. 18.)
Order fulfillment and the logistics system.

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