

UNIT 3

Management Information System & E-Business

(8 Hours) — MIS and E-Business (CACS301)

This unit introduces the foundations of Management Information Systems (MIS) and explains how organizations use different categories of information systems — Transaction Processing Systems, Decision Support Systems, and Executive Information Systems — to support operations at every level. It then examines how enterprise-wide systems such as Supply Chain Management (SCM) and Customer Relationship Management (CRM) extend an organization's reach to suppliers and customers, and how international information systems support global business through outsourcing and off-shoring. Finally, the unit surveys the range of services that make up modern E-Commerce.

3.1 Introduction to Management Information System

3.1.1 Data, Information, and Computer-Based Information System (CBIS)

Data refers to raw, unorganized facts — numbers, words, measurements, or symbols — that have not yet been processed or interpreted. Data by itself carries no meaning until it is arranged in a context that makes it useful. For example, the figures "120, 145, 98" are simply data until they are labeled and organized.

Information is data that has been processed, organized, structured, or presented in a given context so that it becomes meaningful and useful to the person receiving it. Information helps in understanding a situation and supports decision making. Continuing the earlier example, "Sales for January, February, and March were 120, 145, and 98 units respectively" turns raw numbers into information because it now has context.

Example — From Data to Information

Raw data: 72, 98, 65, 80 (four numbers with no context)

Processed information: "Ram scored 72 in Math, 98 in Science, 65 in English, and 80 in Computer Science in the Grade XI final examination." The same numbers, once given context and structure, become meaningful information that a teacher or parent can act upon.

A Computer-Based Information System (CBIS) is a system that uses computer hardware, software, databases, telecommunications networks, and trained people to collect, process, store, and distribute information in support of decision making and control within an organization. A CBIS converts data (input) into information (output) through processing, and typically includes a feedback mechanism so results can be evaluated and refined.

CBIS Component	Role
Hardware	Physical devices — computers, servers, input/output devices, networking equipment
Software	Programs that instruct hardware — system software and application software
Database	Organized collection of related data stored for easy retrieval and use
Telecommunications	Networks that connect computers and allow data/information to be shared
People	Users, analysts, and IT staff who operate, maintain, and use the system
Procedures	Policies and rules that govern how the system is used and operated

3.1.2 Information System Resources

Every information system, regardless of its scale, depends on five basic categories of resources working together. Understanding these resources helps explain why information systems require investment not just in machines, but in people and organizational processes as well.

- **People resources:** end users (those who use the system in their daily work, such as managers, customers, accountants) and IS specialists (system analysts, programmers, network administrators) who build and operate the systems.
- **Hardware resources:** all physical devices used in information processing, including machines (computers, scanners, printers) and media (disks, storage devices, paper).
- **Software resources:** all sets of instructions used to process information, including system software (operating systems), application software (payroll programs, spreadsheets), and procedures (operating instructions for users).
- **Data resources:** facts and figures about business transactions, kept in organized forms such as databases (structured data) and knowledge bases (experience and expertise captured for reuse).
- **Network resources:** communications media (cables, wireless links, satellite systems) and network infrastructure (routers, servers, network operating systems) that connect computers and support telecommunications.

Note: Information systems perform three basic activities on these resources: input (capturing data), processing (converting data into information), and output (distributing information to users) — with storage and control as supporting activities throughout.

3.1.3 Management Information System (MIS)

A Management Information System (MIS) is an integrated, computer-based system that provides managers at all levels with timely, accurate, and relevant information needed for

planning, organizing, directing, and controlling organizational operations. MIS draws data from Transaction Processing Systems and internal/external sources, and converts it into summarized reports — typically periodic, exception, and demand reports — that support routine and structured decision making.

- Supports management functions at the operational and tactical levels.
- Generates pre-specified, structured reports on a regular schedule (daily, weekly, monthly).
- Focuses largely on internal data drawn from the organization's own transaction systems.
- Provides summarized, condensed information rather than raw transaction detail.

3.1.4 Transaction Processing System (TPS)

A Transaction Processing System is the most fundamental type of information system, used to record, process, and store the day-to-day routine transactions necessary for running a business — such as sales orders, payroll, inventory updates, and billing. TPS operates at the operational level of the organization and forms the foundation on which MIS, DSS, and EIS are built, since it is the source of most internal data used by higher-level systems.

Characteristic	Description
Level served	Operational management / clerical staff
Data volume	Very high — large numbers of routine transactions
Processing mode	Batch or real-time (online transaction processing)
Typical examples	Order entry, payroll processing, inventory control, billing
Output	Detailed transaction records, receipts, confirmations

3.1.5 Decision Support System (DSS)

A Decision Support System is an interactive, computer-based system that helps managers make semi-structured and unstructured decisions by combining data, sophisticated analytical models, and a user-friendly interface. Unlike MIS, which delivers pre-formatted routine reports, a DSS allows the user to explore "what-if" scenarios, run simulations, and manipulate data interactively to evaluate alternative courses of action.

- Supports tactical and strategic-level decisions that are not fully structured.
- Combines models (statistical, financial, optimization) with data to generate insight rather than just reports.
- Interactive — the user actively directs the analysis rather than passively receiving fixed reports.

- Common applications: financial planning, production scheduling, market analysis, "what-if" forecasting.

3.1.6 Executive Information System (EIS)

An Executive Information System, sometimes called an Executive Support System (ESS), is designed specifically for top-level (strategic) management to provide quick access to both internal and external information relevant to an organization's strategic goals. EIS presents highly summarized information — often through dashboards, graphs, and drill-down capability — so that executives can monitor performance and respond to emerging trends without wading through operational detail.

- Serves senior/top management and their strategic, long-range decision needs.
- Presents highly aggregated, easy-to-interpret visual summaries (dashboards, trend graphs, key performance indicators).
- Draws on both internal data (from TPS/MIS/DSS) and external data (market trends, competitor information, economic indicators).
- Offers drill-down capability — an executive can move from a summary figure to increasingly detailed underlying data when needed.

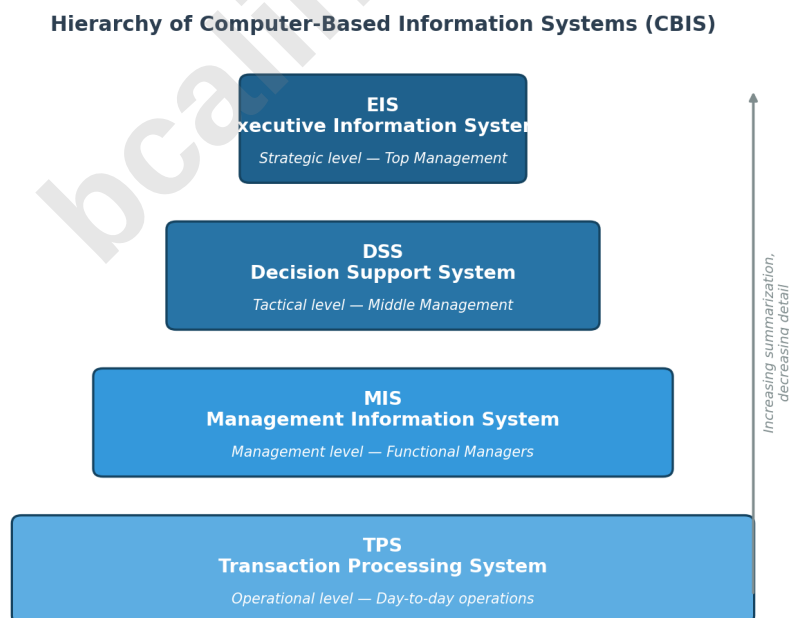


Figure 3.1: Hierarchy of computer-based information systems, from the operational TPS at the base to the strategic EIS at the top.

Key Takeaways — Section 3.1

- ✓ Data becomes information once it is organized and given context.
- ✓ A CBIS combines hardware, software, databases, networks, people, and procedures to convert data into usable information.
- ✓ Information system resources fall into five categories: people, hardware, software, data, and network resources.
- ✓ TPS, MIS, DSS, and EIS form a hierarchy that serves operational, management, tactical, and strategic decision needs respectively.

3.2 SCM, CRM and International Systems

3.2.1 Introduction

As organizations grow, information systems are no longer confined to internal operations alone. To remain competitive, firms must integrate their processes with external partners — suppliers on one side and customers on the other — while also coordinating operations that may span multiple countries. This gives rise to enterprise-wide systems such as Supply Chain Management (SCM) and Customer Relationship Management (CRM), together with the broader challenges of implementing and managing international information systems.

3.2.2 Supply Chain Management (SCM) Systems

A Supply Chain is the network of organizations, people, activities, information, and resources involved in moving a product or service from raw material to the final customer. Supply Chain Management Systems are information systems that automate the flow of information between a firm and its suppliers in order to optimize the planning, sourcing, production, and delivery of products and services.

- Upstream supply chain: the firm's relationships with suppliers and their own suppliers (raw materials and components).
- Downstream supply chain: the organizations and processes responsible for delivering products to the final customer.
- Internal supply chain: the processes used in transforming inputs received from suppliers into the firm's outputs.

SCM systems help firms manage relationships with suppliers, streamline procurement, coordinate logistics and inventory levels, and match supply with demand — reducing costs, minimizing stock-outs and excess inventory, and shortening the time it takes to get products to market.

Benefits of SCM Systems

Decide when and what to produce, store, and move — based on real-time data.

Reduce inventory holding costs and eliminate excess stock.

Improve accuracy of order fulfillment and delivery scheduling.

Strengthen coordination and information sharing among supply chain partners.

Enable faster response to changes in demand or supply disruptions.

3.2.3 Customer Relationship Management (CRM) Systems

Customer Relationship Management Systems capture and integrate customer data from across the organization — sales, marketing, and customer service — consolidating the data into a single, organization-wide view of each customer. CRM systems help firms identify, attract, and retain the most profitable customers, and provide better and more consistent service across every channel of interaction.

CRM Function	Purpose
Sales force automation	Track leads, sales opportunities, and customer contact history
Customer service & support	Manage service requests, complaints, and support tickets
Marketing automation	Plan, execute, and analyze targeted marketing campaigns
Analytics	Analyze customer data to identify patterns, value, and churn risk

Note: A well-implemented CRM system does not just store customer data — it turns that data into a single, unified customer view accessible to every department that interacts with the customer.

3.2.4 Enterprise Systems and the Challenges of Enterprise Systems Implementation

Enterprise Systems (often built around Enterprise Resource Planning, or ERP, software) integrate the key internal business processes of a firm — finance, human resources, manufacturing, and sales — into a single, unified software system built around a common database. This allows information to flow seamlessly across the organization and gives management a firm-wide view of operations and performance.

Despite their benefits, implementing enterprise systems is difficult and risky. Common challenges include:

- High cost and long implementation time: ERP projects often run over budget and over schedule due to their scale and complexity.

- Business process re-engineering: the organization must often change its own processes to match the software, which can meet strong internal resistance.
- Data migration and integration issues: consolidating data from many legacy systems into a single database is technically demanding and error-prone.
- Employee resistance to change: staff accustomed to old systems and procedures may resist adopting new, unfamiliar workflows.
- Need for strong change management: successful implementation requires leadership commitment, training, and a clear plan for managing organizational change throughout the rollout.

Managing the implementation of an enterprise system therefore requires careful planning: securing top management support, involving end users early, investing in training, migrating and cleaning data carefully, and rolling the system out in manageable phases rather than all at once.

3.2.5 International Information Systems: Outsourcing and Off-shoring

As firms expand across national borders, their information systems must support coordination among units located in different countries, each often operating under different regulations, currencies, languages, and business cultures. International Information Systems are built to manage this complexity by linking geographically dispersed business units through shared data, applications, and communication networks.

Two related strategies firms use to manage costs and access specialized skills globally are outsourcing and off-shoring:

Term	Meaning
Outsourcing	Contracting out a business function or IT service to a third-party provider, which may be located domestically or abroad.
Off-shoring	Relocating a business process or IT function to a different country — often to take advantage of lower labor costs or specialized talent — while the work may still be performed by the firm's own subsidiary or by a third party.

- Advantages: lower operating costs, access to specialized expertise, round-the-clock development cycles ("follow-the-sun" model), and the ability to focus internal resources on core business activities.
- Challenges: communication and time-zone barriers, cultural and language differences, data security and privacy concerns, and the difficulty of managing quality and coordination across distant teams.

Integrated Enterprise Systems and Extended Supply Chain

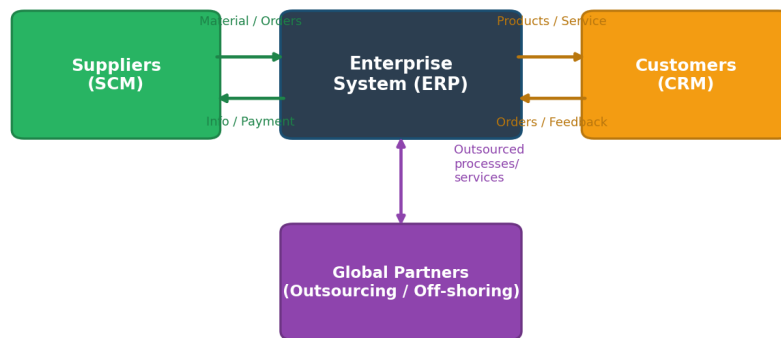


Figure 3.2: An enterprise system integrates the firm with suppliers (SCM), customers (CRM), and global partners through outsourcing and off-shoring.

Key Takeaways — Section 3.2

- ✓ SCM systems automate and optimize the flow of goods and information between a firm and its suppliers.
- ✓ CRM systems build a single, unified view of the customer to improve service, sales, and marketing.
- ✓ Enterprise systems integrate internal processes but face major implementation challenges: cost, change management, and employee resistance.
- ✓ International information systems support cross-border operations; outsourcing and off-shoring are key strategies for managing global IT and business processes.

3.3 E-Commerce Services

Electronic Commerce (E-Commerce) refers to the buying, selling, marketing, and servicing of products and services over computer networks, primarily the Internet. E-Commerce is not a single activity but a collection of related services that together let businesses and consumers conduct transactions digitally, removing many of the constraints of time and geography that limit traditional commerce.

3.3.1 Categories of E-Commerce

Category	Description	Example
Business-to-Consumer (B2C)	Businesses sell goods and services directly to individual consumers	Online retail store selling clothing to shoppers
Business-to-Business (B2B)	Businesses sell goods and services to other businesses	A manufacturer ordering raw materials from a supplier online
Consumer-to-Consumer (C2C)	Consumers sell directly to other consumers, usually via a third-party platform	An online marketplace for used goods
Consumer-to-Business (C2B)	Individuals offer products or services to businesses	A freelancer bidding on a company project online

3.3.2 Core E-Commerce Services

- Online catalogs and storefronts: digital displays of products and services that let customers browse, compare, and select items — the electronic equivalent of a shop window and shelf.
- Electronic payment systems: services that let customers pay for purchases digitally, including credit/debit card processing, digital wallets, and internet/mobile banking transfers.
- Shopping cart and order management: tools that let customers select and hold items before checkout, and that track an order from placement through fulfillment and delivery.
- Online advertising and marketing: services such as search-engine advertising, email marketing, and social-media promotion that attract customers to a business's online presence.
- Customer service and support: live chat, help desks, FAQs, and automated support (including chatbots) that assist customers before and after a purchase.
- Logistics and delivery tracking: services that coordinate shipping and allow customers to track the status and location of their order in real time.
- Security services: encryption, digital certificates, and authentication mechanisms that protect sensitive data such as payment details during online transactions.

Example — E-Commerce Services in a Single Purchase

A customer browsing an online store (catalog service) adds a jacket to their cart (shopping cart service), pays using a digital wallet (payment service), receives an automatic order confirmation email (marketing/communication service), and later tracks the courier's progress on a delivery map (logistics service) — each step powered by a distinct e-commerce service working together seamlessly.

Note: Even though E-Commerce is often thought of simply as "online shopping," it actually depends on a coordinated set of underlying information-system services — catalog, payment, logistics, marketing, and security — each of which must function reliably for the transaction to succeed.

Key Takeaways — Section 3.3

- ✓ E-Commerce covers buying, selling, marketing, and servicing products and services over computer networks.
- ✓ Major categories include B2C, B2B, C2C, and C2B, each defined by who is buying and who is selling.
- ✓ E-Commerce is delivered through a set of coordinated services: catalogs, payment processing, shopping carts, marketing, customer support, logistics, and security.

— *End of Unit 3* —

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