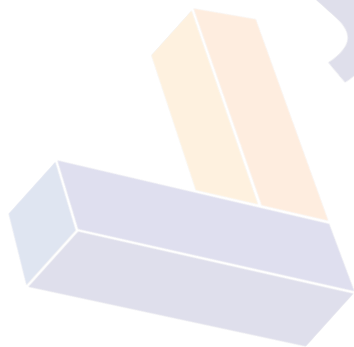


AAT II

Digital Transformation

&

Information Systems



Unit 03

Information Systems

in Organizations

3.1 Evolution of Information Systems in Organizations

Information systems combine hardware, software, processes, people, infrastructure, and standards to manage and share information.

They help organizations improve efficiency, communication, and decision-making.

Information technology (IT) has evolved from a support tool into a strategic business driver.

IT enables business process reengineering, organizational restructuring, and market transformation.

Advanced technologies connect employees and knowledge, reducing boundaries between departments and organizational levels.

1950 – 1960	1960 – 1970	1970 – 1980	1980 – 1990	1990 – 2000	2000 – Present
Data Processing	Management Reporting Tools	Decision Support System	Executive Support System	Knowledge Management System	E-Business
collects, stores, modifies and retrieve day-to-day transactions of an organization	Generate reports and displays to support decision-making	Interactive ad-hoc support for the decision-making process	Provide both internal and external information relevant to the strategic goals of the organization	Supports the creation, organization, analysis and dissemination of business knowledge	Better connectivity with business and customers, higher level of integration across all applications

3.2 Classification of Information Systems in Organizations



Operational Management level

The operational level is mainly concerned with performing day to day business activities or transactions of the organization.

Examples of users at this level of management include cashiers at a point of sale (POS), bank tellers, nurses in a hospital, customer care staff, etc.

Users at this level use make structured decisions. This means that they have defined rules that guide them while making decisions and when performing tasks.

Operational-level users make **structured decisions** based on predefined rules and system data (e.g., credit approval based on limits).

Their key responsibilities include:

1. **Assigning tasks** and guiding daily work
2. **Supervising workers** and ensuring productivity
3. Maintaining **quality and quantity of output**
4. Ensuring **discipline, safety, and motivation**
5. Providing **training and necessary resources**
6. Preparing **performance reports**
7. Handling **worker issues and communication with management**

Their overall role ensures:

1. Work as a link in between middle management and work force
2. Quality maintenance
3. Act as a guide to the workers
4. Act as supervisors
5. Discipline
6. Safety
7. Training

Operational planning

- Operational planning **focuses on short-term goals** (usually within one year). It **outlines the specific actions and daily operations** needed to achieve these goals.
- It helps **ensure deadlines are met**. It supports coordination and communication within the organization. It involves taking technical and practical measures to achieve objectives efficiently.

An operational plan addresses four questions.

- Where are we now?
- Where do we want to be?
- How do we get there?
- How do we measure our progress?

Operational risks

- Operational **risks are those arising from the people, systems and processes through which a company operates and can include other types of risks, such as frauds, legal risks, physical or environmental risks involve.**
- Operational **risks are those arise from inadequate or failed internal processes, people and systems, or from some other external events (man-made threats or natural hazards)**

The type of risks associated with business and operations relate to:

- Business interruption
- Errors or omissions by employees
- Product failure
- Health and safety issues
- Failure of IT systems in an organization
- Frauds
- Loss of key people
- Due to legal situations
- Loss of suppliers.

Operational risks are generally within the control of the organization through risk assessment and risk management practices, including internal control and insurance.

Tactical Management Level

- At this level **where, middle-level managers, heads of departments, supervisors, etc.** are involved.
- The users at this level usually manage the activities of the operational management level. Tactical level users **make semi-structured decisions.**
- The decision is **partly structured**, that the manager has to use existing information to identify a payments history of the client and take a decision that benefits

Their role can be emphasized as,

- They make plans for the sub-units of the organization.
- They participate in employment and training of lower level management.
- They interpret and explain policies from top level management to lower level.
- They are responsible for coordinating the activities within the division or department.
- They send important reports and other important data to top level management.
- They evaluate performance of junior managers
- They are responsible for inspiring lower level managers towards better performance.

Tactical planning

- Tactical planning is **short-range planning mainly focusing on the current operations of various parts of the organization.**
- Managers use tactical planning to outline what the various parts of the organization must do for the organization to be successful. Tactical plans are **usually developed in the areas of production, marketing, personnel and finance.**

Strategic Management Level

- The users at this level make **unstructured decisions**.
- It consists of board of directors, senior level managers, chief operating officers (COOs) or chief executive officers (CEOs) are concerned with the long-term planning of the organization.

The role of the top level management can be summarized as follows.

- Top management lays down the objectives and broad policies for the entire enterprise.
- Issuing necessary instructions to set departmental budgets, procedures, schedules.
- Preparing strategic plans and policies for the enterprise.
- Appointing middle level departmental managers.
- Controlling and coordinating the activities of all the departments across the organization.
- Responsible for maintaining contacts with the outside world.
- Providing guidance and direction.
- This layer management is also responsible towards the shareholders for the performance of the business.

Strategic Planning,

Strategic planning is an organization's process of **defining its strategy or direction**, and making decisions on allocating its resources to accomplish the set goals.

Time horizon and the nature of the questions dealt, changes occur during the execution of a strategic plans get affected and the management may have very little control over the situation. **These situations and potential consequences are called "strategic risks".**

Information systems in different management levels

The various types of information systems that an organization uses may be classified into the following categories:

1. Office Automation Systems (OAS)
2. Transaction Processing System (TPS)
3. Management Information System (MIS)
4. Decision Support Systems (DSS)
5. Executive Information Systems (EIS)
6. Business Expert System (BES)

1. Office Automation Systems (OAS)

Here is the **summary with all the exact main points kept**:

- Office automation is the process of **collecting, merging, and managing organizational information** using **software and hardware** to complete business tasks.
- It helps in **automating office tasks** and mainly supports **operational-level activities**.
- It has a **limited role in decision-making**, but supports **rule-based decisions** for operational managers.
- It helps create a **paperless office environment** and improves **productivity and efficiency**.

Advantages of Office Automation Systems

- Reduces **manual effort** in routine/repetitive tasks
- Minimizes **manual errors**
- Reduces **processing time**
- Improves **process visibility** and identifies bottlenecks
- Supports **better data-based business decisions**
- Makes office functions **faster and more process-driven**
- Allows **efficient digital storage of data** for future use
- Example: **MS Office applications** (Word, Excel, PowerPoint) used for automating office tasks such as **word processing, spreadsheets, and presentations**.

2. Transaction Processing System (TPS)

- TPS **monitors, collects, stores, and processes data** from business transactions.
- Its purpose is to **provide information for management** and ensure **efficient business operations**.

Characteristics of TPS

- Processes a **large volume of data**
- Data is mainly **collected internally**
- **Structured input and output**
- **Low computational complexity**
- Requires **high accuracy and data integrity**

Examples of TPS

- **EPOS systems** – record daily sales
- **Payroll systems** – manage salaries and loans
- **Stock control systems** – track inventory
- **Airline reservation systems** – manage seat bookings

TPS in Functional Areas

- **Accounting & Finance:** Financial IS, Accounting IS
- **Marketing & Sales:** POS system, Sales Order IS
- **Production & Operations:** Inventory, Quality Control, Machine Control systems
- **Human Resources:** HRIS, Payroll, Staff Evaluation systems

Information Flow in TPS

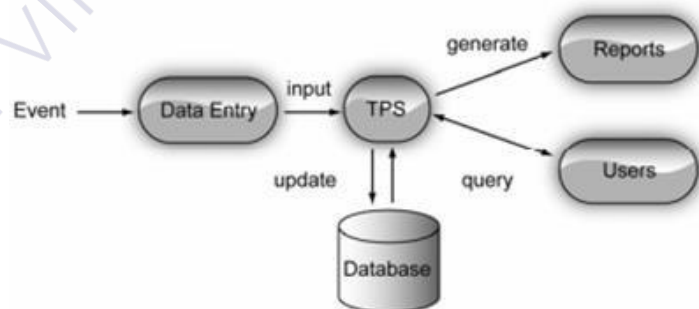
A flow of information in a typical TPS can be described as follows:

1. An event is recorded by data entry equipment.
2. The TPS program will update the database.
3. TPS program will generate routine reports and.
4. Users can also send a query to the TPS program

Types of TPS

Examples of TPS are as follows:

- Stand-alone system;
- Enterprise client-server system
- Web-based system.

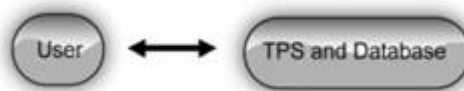


STAND ALONE SYSTEM

- A **stand-alone system** is a **simple information system** used by a **single user**.
- It is typically used in a **small office environment**.
- Both the **TPS software and data are stored on one PC**.

Example:

- A small retail shop uses a **single computer with billing software** to record daily sales and manage transactions.

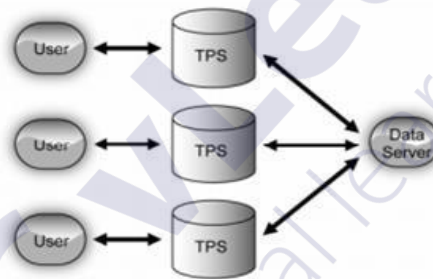


ENTERPRISE CLIENT-SERVER SYSTEM

- An **enterprise client-server system** operates in an **enterprise-wide network environment**.
- It connects **servers and client PCs** within the organization.
- **Data is stored centrally** on the server.
- **TPS client software is installed on user PCs** to access server data.
- Commonly used by **medium-sized organizations**.

Example:

- A company uses a **central server to store employee and sales data**, while staff access it through their **office computers using a network-based system**.

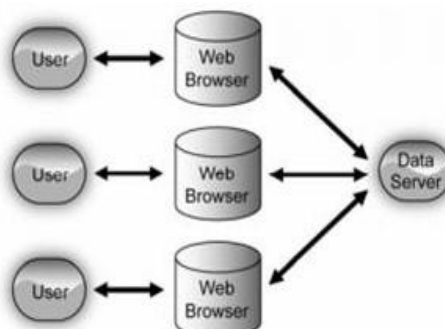


WEB BASED SYSTEM

- In a **web-based system**, TPS software is **not installed on the user's PC**.
- Users access the system through a **web browser using a URL**.
- Designed to support a **large number of users**.
- Uses **high-performance servers** to host the software and data.

Example:

- An organization uses an **online payroll system** where employees log in through a **website** to view salaries and records.



Batch or Online Processing

In batch processing, data from transactions are collected and grouped together. The system then processes the group of data (called batches) periodically, for example every hour.

In online processing, data are processed without batching, but not necessarily in real time.

3. Management Information System (MIS)

Management Information Systems (MIS) are used by middle-level tactical managers to monitor the current performance of an organization. MIS receives input data from Transaction Processing Systems (TPS) and processes it into useful information through data collection, processing, sorting, summarizing, and distributing reports.

These reports help managers monitor, regulate, and predict future performance.

Examples of MIS

- **Sales Management Systems** – use input from point of sale systems.
- **Budgeting Systems** – provide an overview of organizational spending for short-term and long-term activities.
- **Human Resource Management Systems** – manage employee welfare and information.

MIS helps managers make structured decisions based on their experience.

Major Types of MIS

- **Marketing Information System (MkIS)** – helps marketing staff evaluate past and current campaigns and plan future campaigns.
- **Business Intelligence System (BIS)** – supports business decisions through collection, integration, and analysis of data. Used by both lower-level managers and executives.
- **Customer Relationship Management System (CRM)** – stores customer information such as previous sales, contact details, and sales opportunities. Used by marketing, sales, customer service, and business development staff.
- **Sales Force Automation System (SFA)** – a part of CRM that automates sales-related tasks like contact management, tracking, and order management.
- **Knowledge Management System (KMS)** – supports creation, capture, storage, and sharing of organizational knowledge and information.
- **Financial Accounting System (FAS)** – manages financial and accounting activities such as accounts payable and receivable.
- **Human Resource Management System (HRMS)** – maintains employee performance records and payroll data.
- **Supply Chain Management System (SCM)** – used by manufacturing companies to manage the flow of resources, raw materials, and services from purchasing to shipping.

Types of MIS Reports

1. Periodic / Scheduled Reports
 - Created regularly to analyze data over time.
 - Examples: daily sales reports and weekly attendance reports.
2. Exception / Ad-hoc Reports
 - Generated when unusual situations occur.
 - Examples: credit limit exceeding approved levels or excessive damaged products in production.
3. On-demand / Real-time Reports
 - Allow monitoring of changes immediately as they happen.
 - Example: checking a customer's account report before approving a loan.

Decision Support System (DSS)

A Decision Support System (DSS) is a computerized information system that supports business and organizational decision-making activities.

DSS uses summarized information, exceptions, patterns, trends, and analytical models to assist decision-making.

It helps decision makers identify and solve problems, but it does not directly make decisions itself.

Information is collected from raw data, documents, personal knowledge, and business models.

DSS is mainly used by senior management to make ad-hoc decisions. It receives input from internal sources such as TPS and MIS systems, as well as external information systems.

The main objective of DSS is to provide solutions for unique and rapidly changing situations.

Examples of DSS

1. **Financial Planning Systems**
 - Help managers evaluate alternative ways of achieving goals.
 - Aim to find the best or optimal solution.
2. **Bank Loan Management Systems**
 - Verify the creditworthiness of loan applicants.
 - Predict the possibility of loan recovery within a given time period.

Programmed and Non-programmed Decisions

1. Programmed Decisions

- Generated through automated processes and routine work.
- Decisions have been made many times before.
- Follow defined rules or guidelines.

2. Non-programmed Decisions

- Occur in unusual and ad-hoc situations.
- Usually require new decisions.
- Do not follow fixed rules.
- Based on available information.
- Depend on the decision maker's preference, instinct, perception, and judgment.

Attributes of a DSS

1. Adaptability and flexibility according to situations
2. Highly interactive
3. Easy to use
4. High efficiency and effectiveness
5. Complete control by decision makers
6. Extendibility
7. Support for modelling and analysis
8. Better access to data

Features of DSS

1. Supports **semi-structured and unstructured decision-making problems**
2. Supports **all managerial levels** (top executives to line managers)
3. Supports **individual and group decision-making** across departments
4. Supports **interdependent and sequential decisions**
5. Supports all phases: **intelligence, design, selection, implementation**
6. Supports **different decision processes and methods**
7. **Adaptive** to time and changing situations

Benefits of DSS

1. Improves **speed and efficiency** of decision-making
2. Increases **control, competitiveness, and decision capability**
3. Enhances **interpersonal communication**
4. Supports **non-programmed decisions** and generates new insights
5. Helps **automate managerial processes**

Components of DSS

1. **Database Management System (DBMS)** – uses internal and external data (from TPS, MIS, etc.)
2. **Model Management System** – stores models for decision-making (e.g., forecasting, financial analysis)
3. **Support Tools** – includes help systems, graphical analysis, and error correction tools

Types of DSS

1. **Status Inquiry System** – supports operational and managerial decisions (e.g., job scheduling)
2. **Data Analysis System** – uses formulas/algorithms for analysis (e.g., cash flow, inventory analysis)
3. **Information Analysis System** – generates reports from data (e.g., sales, market analysis)
4. **Accounting System** – tracks financial data (e.g., accounts receivable/payable, final accounts)

5. Executive Information System (EIS)

An EIS provides **strategic information for executives and decision-makers**, with **graphical displays, easy-to-use interfaces, reporting, and drill-down capabilities**. It supports **long-term trends and strategic issues** inside and outside the organization.

Characteristics & Capabilities of EIS

1. **Drill-down capability** – detailed analysis of data (e.g., sales by region/month/year)
2. **Critical Success Factors (CSFs)** – key factors for organizational success
3. **Better access to information** – fast, real-time operational data
4. **Analysis** – uses mathematical models for optimization and prediction
5. **Exception reporting** – highlights only abnormal performance
6. **User-friendly interface** – simple, often with visual/audio alerts
7. **Better communication facilities** – email, file transfer, internet-based communication

EIS Components

1. Hardware

- Input devices – data entry and updates
- CPU – controls system operations
- Storage devices – save organizational data
- Output devices – display or print information

2. Software

- **Text base** – documents
- **Database** – internal and external data access
- **Graphic base** – charts, graphs, maps, etc.
- **Model base** – statistical and financial models

3. Interface

- Includes reports, menus, Q&A systems, command language, forms, etc.
- Must be **simple, flexible, and user-friendly** to match decision-making styles

4. Telecommunications

- Supports data transfer across networks and cloud systems
- Essential for modern decentralized organizations

Applications of EIS

- Helps users access and analyze data based on criteria
- Supports evaluation of organizational goals
- Used in **manufacturing, marketing, and finance**
- Helps distinguish between **critical and less important data**

Advantages

1. Easy for top-level users
2. Simple and understandable information
3. Filters important data
4. Improves tracking of information
5. Enhances decision-making efficiency

Disadvantages

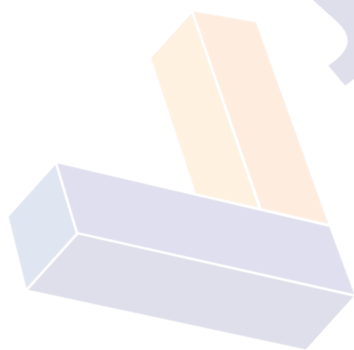
1. Limited complex calculations
2. Possible information overload
3. Can become slow and difficult to manage
4. Difficulty keeping data updated
5. Risk of unreliable or insecure data

06. Business Expert Systems (BES)

Computer-based systems using **AI and neural networks** to simulate human expert decision-making. They can make decisions using **stored expert knowledge without human intervention**.

AI systems identify patterns in large datasets and are widely used by companies like **eBay, Facebook, and Google**.

AAT II
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Unit 03
Information Systems
In Organizations
Part II

3.3 Electronic and Mobile Commerce

E-Commerce

Electronic commerce (e-commerce) refers to any business or commercial transaction conducted over the Internet involving the **transfer of information**.

It includes various types of businesses such as **retail websites, auction platforms, music sites, and business-to-business exchanges**.

E-commerce allows the **electronic exchange of goods and services without time or distance barriers**.

It provides **competitive advantages over traditional methods** of trading.

When properly implemented, e-commerce is **faster, cheaper, and more convenient** than conventional business methods.

Electronic Data Interchange (EDI) is an early form of electronic transactions used by businesses.

EDI requires **dedicated data links between suppliers and customers**, making it less flexible. In contrast, e-commerce offers a **cost-effective and flexible system with multiple connections**.

The growth of e-commerce has led to the creation of **electronic marketplaces**.

Category	Explanation	Key Features / Points
(B2C)	Transactions take place directly between a business and a consumer through a website.	• Requires heavy advertising to attract customers. • Needs high investment in hardware/software Requires good customer support service
(B2B)	Transactions occur between businesses , where products are sold to an intermediate buyer.	• Both buyer and seller are business entities • Builds relationships with distributors, suppliers, and resellers • Covers many industries such as: Electronics, Shipping & Warehousing, Motor Vehicles, Paper, Office Products, Food, Agriculture
(C2C)	Transactions occur between individuals selling products/services to each other.	• Involves individual sellers and buyers Uses online auction systems • Includes competitive bidding over the Internet

(G2C)	Government uses the Internet to provide services and information to citizens, businesses, and suppliers.	Provides efficient and effective services Improves interaction between government and citizens/businesses Reduces cost and increases accessibility
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Advantages of E-Commerce

Category	Advantages
Advantages to Organizations	- Expands market to national and international levels with minimum investment. - Helps find more customers, best suppliers, and business partners globally. - Reduces cost of creating, processing, distributing, and managing paper-based information. - Improves the brand image of the company. - Provides better customer service. - Simplifies business processes and makes them faster and more efficient. - Reduces paperwork. - Increases productivity through “pull-type” supply management (just-in-time).
Advantages to Customers	- Provides 24/7 access to products and services. - Offers more options and faster delivery. - Allows easy comparison of prices and quality. - Enables customers to read and give reviews before purchasing. - Supports virtual auctions. - Provides instant access to detailed information. - Increases competition, leading to better prices and discounts.
Advantages to Society	- Reduces need for travel, leading to less traffic and lower air pollution. - Lowers product costs, making goods affordable to more people. - Provides access to products and services in rural areas.

Category	Advantages
	Helps government deliver services like healthcare, education, and social services efficiently and at lower cost.

M-Commerce

Mobile commerce or m-commerce, refers to **ecommerce conducted in a wireless environment over the Internet.**

There are a number of factors supports m-commerce. These factors includes:

- The **widespread availability** and **popularity** of wireless devices like smart phones.
- The **declining cost of wireless technology**, the **convenience of instant connectivity** from any location.
- Bandwidth improvements** that **increase the speed of data** transmission.

Mobile Commerce Services with Descriptions

Mobile banking	Mobile accounting	Allows users to manage accounts, view balances, and perform basic banking transactions via mobile apps.
	Mobile brokerage	Enables users to buy and sell stocks or manage investments using mobile devices.
	Mobile financial information	Provides real-time access to financial data such as exchange rates, account updates, and market information.

Mobile entertainment	Mobile gaming	Lets users play games on mobile devices for entertainment and engagement.
	Music and ringtone downloads	Allows downloading and personalizing devices with music tracks and ringtones.
	Video and digital image downloads	Enables access and download of multimedia content like videos and images.
	Location-based entertainment services	Provides entertainment content based on the user's physical location.

	Current affairs (news, sports, finance)	Delivers up-to-date news and information on various topics in real time.
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Mobile information services	Travel information	Provides details such as routes, schedules, and travel updates for users.
	Tracking services (persons and objects)	Allows real-time tracking of people, goods, or devices using mobile technology.
	Mobile search engines	Enables users to search for information on the internet using mobile devices.

Mobile marketing	Mobile couponing	Sends digital coupons to users for discounts and promotions.
	Direct/context-sensitive marketing	Delivers targeted ads based on user behavior, location, or preferences.
	Mobile events	Promotes and manages events through mobile notifications and apps.
	Mobile newsletters	Sends regular updates and promotional content to subscribers via mobile.

Mobile shopping	Mobile purchasing of goods and services	Allows users to buy products and services directly through mobile platforms.
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Mobile ticketing	Public transport ticketing	Enables digital ticket purchase for buses, trains, and other public transport.
	Sports and cultural events	Allows booking and storing tickets for events via mobile devices.
	Air and rail traffic ticketing	Supports booking and managing airline and train tickets on mobile apps.
	Mobile parking	Allows users to pay for and manage parking digitally.

Telematics services	Remote vehicle diagnosis and maintenance	Monitors vehicle health and detects issues remotely using mobile connectivity.
	Navigation services	Provides GPS-based route guidance and location navigation.
	Vehicle tracking and theft protection	Tracks vehicle location and helps recover stolen vehicles.

	Emergency services	Sends automatic alerts and assistance during accidents or emergencies.
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Differences between E-commerce and M-commerce

- **Mobility:** E-commerce is usually done on desktops or laptops in fixed locations, while m-commerce allows users to conduct transactions anywhere using mobile devices with internet access.
- **Reachability:** M-commerce has a wider reach because mobile devices are portable and always connected, allowing businesses to target users in more locations than traditional e-commerce.
- **Convenience:** M-commerce is more convenient as transactions can be completed quickly through mobile apps with a few taps, whereas e-commerce often requires a computer and a more stable setup.
- **Location tracking:** M-commerce can use GPS and mobile technologies to identify user location and deliver personalized, location-based services, unlike e-commerce which has limited tracking ability.
- **Security:** M-commerce offers enhanced security features such as biometric authentication (fingerprint, face ID) in addition to standard methods like passwords and two-factor authentication, making it more advanced in some cases than traditional e-commerce.

Key Factors in Investment Appraisal for IT Infrastructure & Information Systems

Factor	Explanation
Usability	The system should be user-friendly for all staff levels and support different access permissions based on roles.
Visualization & Reporting	It must provide clear data analysis, dashboards, and easy-to-understand reports for decision-making.
Security	Strong protection of data is essential against hacking, theft, system failure, and human error, including both physical and digital security.
Functionality	The system must include required features such as data extraction, analysis, segmentation, automation, forecasting, and reporting.
Support & Development	Reliable vendor support (email, phone, etc.) and continuous system upgrades are necessary for long-term sustainability.
Integration	The system should integrate smoothly with existing software, databases, and hardware without compatibility issues.
Scalability	It should be able to handle increasing data volumes and expand with business growth.

Factor	Explanation
Cost & Suitability	The system should offer value for money and match business requirements rather than being chosen only based on price.
Hosting	The organization must decide whether to host the system internally or use cloud/third-party hosting, considering cost, security, and performance.
Updates	The system should support regular, preferably automated updates to ensure data accuracy and system efficiency.

3.4 Data Analysis and Business Intelligence

Business Intelligence (BI)

Business Intelligence (BI) refers to the tools, technologies, applications and practices used to collect, integrate, analyze and present an organization's raw data in order to create information which is useful to entire business.

Data mining

Data Mining is defined as extracting information from large data sets called, data warehouses. In other words, that data mining is a technique of mining knowledge to identify trends and hidden relationships exist in data sets.

The information or knowledge extracted so can be used for any of the following application areas.

- Market Analysis
- Fraud Detection
- Customer Retention
- Production Control
- Science Exploration

Data mining applications

Data mining is highly useful in the following domains.

1. Market analysis and management
2. Corporate analysis & risk management
3. Fraud detection

Apart from these areas, data mining can also be used in the areas of production control, customer retention, science exploration, sports and Internet web surfing.

Area	Key Uses	Explanation
Market Analysis & Management	Customer profiling	Identifies what types of customers buy specific products.
	Identifying customer requirements	Predicts customer needs and suggests suitable products.
	Cross market analysis	Finds relationships and correlations between product sales.
	Target marketing	Groups customers with similar characteristics like income, interests, and behavior.
	Purchasing pattern analysis	Understands how and when customers buy products.
	Summary reporting	Provides multidimensional reports for decision-making.

Corporate Analysis & Risk Management	Financial planning & asset evaluation	Analyzes cash flow and predicts financial outcomes to evaluate assets.
	Resource planning	Compares and manages organizational resources and expenses.
	Competition analysis	Monitors competitors and market trends.

Fraud Detection	Fraud identification	Detects suspicious activities in banking and telecom sectors.
	Call pattern analysis	Studies call duration, timing, and destination to identify fraud.
	Anomaly detection	Finds deviations from normal patterns to prevent fraud.

Online Analytical Processing (OLAP)

OLAP refers to the process of analyzing data from data warehouses or data marts for decision-making purposes. It focuses on:

Querying: Retrieving data from databases by selecting or filtering based on specific criteria.

Reporting: Generating business intelligence (BI) reports to present information to users for analysis and decision-making.

Benefits of Business Intelligence (BI)

- Faster and better decision-making
- Improved business process efficiency
- Increased operational efficiency
- Identification of new revenue opportunities
- Competitive advantage
- Detection of market trends and patterns
- Identification of business problems

Business Intelligence Systems

BI systems help users analyze data using tools such as reports, dashboards, and visualizations. They allow users to make decisions based on data rather than assumptions.

BI systems typically provide:

- Historical data analysis
- Current performance tracking
- Predictive insights

Common Issues in BI Systems

- User resistance to new systems
- Poor data quality or inconsistent data
- Lack of understanding of business processes

Business Analytics (Data Analytics)

Business Analytics (BA) refers to the use of data, statistical analysis, and tools to examine business performance and support decision-making. It helps organizations convert raw data into meaningful insights for better decisions.

Modern businesses collect large amounts of digital data, but this data must be analyzed to be useful. BA tools help connect data from multiple sources, analyze it, and present results in a way that decision-makers can understand.

Types of Business Analytics

- **Descriptive Analytics:** Analyses historical and current data to understand business performance (e.g., KPIs).
- **Predictive Analytics:** Uses trends and historical data to predict future outcomes.
- **Prescriptive Analytics:** Provides recommendations on actions to take based on analysis.

Business Analytics Process

- First, the business goal is identified and the method of analysis is selected. Data is then collected to support the analysis.
- Data is gathered from different business systems, cleaned, and stored in one place such as a data warehouse or data mart.
- A small sample of data is first analyzed to understand the basic situation.
- Different tools like spreadsheets, statistics tools, data mining, and predictive models are used for analysis.
- As results appear, new questions are asked and the process is repeated until the goal is achieved.
- Predictive models are then used to score data and help make real-time business decisions.
- This process also helps organizations respond quickly to unexpected situations, and sometimes decisions are automated.

Uses of Business Analytics

- Analyze data from multiple sources.
- Use advanced analytics and statistics to find hidden patterns in large datasets.
- Disseminate information to relevant stakeholders through interactive dashboards and reports.
- Monitor KPIs and react to changing trends in real-time.
- Justify and revise decisions based on up-to-date information.

Business Intelligence vs Business Analytics

Aspect	Business Intelligence (BI)	Business Analytics (BA)
Focus Questions	What happened? When did it happen? Who was involved? How many?	Why did it happen? Will it happen again? What will happen if we change X? What other insights can be found?
Purpose	Describes past and current business performance	Explains, predicts, and improves future outcomes
Type of Analysis	Descriptive analysis	Statistical, predictive, and advanced analysis
Includes	Reports Dashboards	Data mining Statistical analysis

Aspect	Business Intelligence (BI)	Business Analytics (BA)
	Automated alerts Ad-hoc queries	Predictive modelling
Nature of Output	Structured reports and summaries	Insights, predictions, and recommendations

Business Analytics Tools

Business analytics uses different types of tools, including:

- Data visualization tools (charts, graphs, dashboards)
- Business intelligence reporting tools
- Self-service analytics platforms
- Statistical analysis tools
- Big data platforms

3.5 Optimizing Organizational Efficiency and Effectiveness

Information Technology (IT) plays a vital role in boosting the efficiency and effectiveness of in organizations by **assisting both Business Process Reengineering (BPR) and Business Process Outsourcing (BPO)**.

Key Features of BPR

Feature	Explanation
Focus on Core Processes	BPR identifies the most important business processes that affect customer satisfaction and organizational goals, then improves or redesigns them for better performance.
Customer-Centric Approach	The redesign process focuses on customer needs, ensuring products and services meet or exceed expectations.
Use of Technology	Modern technologies like automation, data analytics, and workflow systems are used to improve efficiency and reduce manual work.
Elimination of Redundancies	Unnecessary steps, repeated tasks, and non-value-adding activities are removed to make processes more efficient.
Cross-Functional Integration	BPR encourages collaboration between departments by breaking down silos and improving coordination.
Emphasis on Outcomes	Focus is placed on measurable results such as cost reduction, higher productivity, improved quality, and faster service delivery.

Key Challenges of Business Process Reengineering (BPR)

Challenge	Explanation
Resistance to Change	Employees and management may resist due to fear of job loss or disruption, and organizational culture may oppose major changes.
High Costs	Implementing BPR requires investment in technology, training, and system redesign, which can be expensive.
Lack of Clear Vision	Without clear goals, BPR efforts may become unfocused and fail to achieve expected outcomes.
Process Complexity	Large organizations have complex workflows, making it difficult to properly analyse and redesign processes.
Business Disruption	Changes can temporarily reduce productivity and affect customer service during implementation.
Difficulty Measuring Success	It can be hard to measure improvements if proper performance indicators are not defined.

3.5.2 Business Process Outsourcing (BPO)

Business Process Outsourcing (BPO) is the practice of outsourcing non-core business activities to external service providers. These activities include functions such as customer support, data entry, payroll, human resources, and accounting.

BPO is mainly divided into two types:

- **Back-Office BPO:** Involves internal business functions such as accounting, IT services, human resources, payment processing, compliance, and quality assurance.
- **Front-Office BPO:** Involves customer-facing services such as technical support, sales, and marketing.



Types of services provided by outsourcing companies

Service Type	Description	Examples
Information Technology Enabled Services (ITES)	Uses IT systems and networks to deliver efficient business solutions. Focuses on technology-based support services.	Service desk analyst, IT analyst, production support
Knowledge Process Outsourcing (KPO)	Provides knowledge-intensive and core business functions. Requires specialized skills and domain expertise.	Research, data analysis, product rebranding
Legal Process Outsourcing (LPO)	A subset of KPO that handles high-level legal services and support.	Contract preparation, legal research, reviewing agreements
Research Process Outsourcing (RPO)	A subset of KPO focused on research and analytical services across various industries.	Market research, financial analysis, scientific research
Travel and Logistics	Manages travel and logistics operations to reduce costs and improve customer service.	Ticketing, hotel booking, transportation arrangements

Advantages of BPO

- **Financial Benefits**
Outsourcing reduces costs as external providers can perform tasks more cheaply due to lower labour and operational expenses.
- **Flexibility**
Organizations can easily adjust outsourced processes according to market changes and business needs.
- **Competitive Advantage**
Companies can focus on core activities like customer service and innovation by outsourcing non-core functions.
- **Higher Quality & Better Performance**
Specialized BPO providers deliver services with greater accuracy, efficiency, and speed.
- **Innovation and Technology**
Access to modern technologies and improved processes used by outsourcing partners.

- **Faster Turnaround Times**
Enables quick reporting, improved productivity, and faster response to business requirements.
- **Scalability**
Businesses can increase or decrease operations without investing in additional resources.
- **Compliance with Regulations**
Providers ensure adherence to industry standards and legal requirements.
- **Data Insights and Analytics**
Access to analytical insights that support better decision-making.
- **24/7 Operations**
Allows continuous service delivery, especially for global operations and customer support.

Disadvantages of BPO

- **Risk of Data Breaches**
Sharing sensitive data with external providers increases security risks.
- **Security Issues**
Technology connections between companies and providers can be vulnerable to cyber threats.
- **Unanticipated / Higher Costs**
Hidden costs may arise if the scope of work or contract terms are not properly understood.
- **Communication and Relationship Issues**
Language barriers, cultural differences, and time zones can cause misunderstandings.
- **Quality Issues**
The service quality may not always meet expected standards.
- **Employee Morale and Job Losses**
Outsourcing may lead to layoffs or reduced roles, affecting employee motivation.
- **Dependency on Provider**
Over-reliance on external providers can be risky if they fail to deliver or stop operations.

Future Directions of BPO

- **Automation & AI:**
Automation, artificial intelligence (AI), and robotic process automation (RPA) will become more widely used in BPO operations.

These technologies will reduce manual workloads, improve efficiency, streamline routine tasks, enhance accuracy, and support better decision-making and workflow optimization.

- **Cloud-based Solutions:**

Cloud computing will continue to transform the BPO industry by enabling flexible, scalable, and remote operations.

It allows organizations and service providers to collaborate more effectively, access and share data in real time, and deliver services seamlessly across different locations.

- **Data Analytics and Insights:**

BPO providers will increasingly rely on big data analytics and business intelligence tools to generate meaningful insights.

This helps organizations understand customer behaviour, market trends, and operational performance, leading to more informed and strategic decision-making.

- **Industry-Specific BPO Services:**

The future of BPO will move toward specialized services tailored to specific industries such as healthcare, finance, and retail.

This specialization allows providers to better address unique industry challenges, improve service quality, and deliver more value-added solutions to clients.

3.6 Digital Transformation Initiatives

Digital Transformation

Digital transformation is the integration of digital technologies such as cloud computing, AI, automation, and data analytics into all areas of a business, changing how it operates and delivers value to customers.

It focuses on improving efficiency, enhancing customer experience, creating innovation, and developing new business models.

It helps organizations work faster, reduce costs, and improve productivity while encouraging innovation and better collaboration.

Key components include:

- **Technology Integration:** Using modern technologies like cloud, AI, IoT, and big data.
- **Process Automation:** Streamlining and automating tasks to improve efficiency and reduce errors.
- **Customer Focus:** Improving customer experience through personalized and faster digital services.
- **Cultural Change:** Promoting innovation and adaptability within the organization.

- **Data-Driven Decisions:** Using data analytics to support better decision-making and improve performance.

Digital transformation initiatives can significantly impact organizational efficiency and innovation in several ways:

Category	Aspect	Summary
Improved Efficiency	Automation of Processes	Repetitive tasks are automated using digital tools, reducing errors and improving speed and productivity.
	Data-Driven Decision Making	Real-time data analysis helps identify inefficiencies, predict issues, and support faster, smarter decisions.
	Communication & Collaboration	Cloud tools enable real-time communication, remote teamwork, and easier sharing of information and resources.
	Cost Reduction	Digital systems reduce manual work and physical resources, lowering operational costs and improving efficiency.
Promoting Innovation	New Business Models	Enables models like subscriptions and digital platforms, creating new revenue streams and flexibility.
	Faster Product Development	Digital tools speed up design, testing, and development, reducing time to market.
	Enhanced Customer Experience	Personalization and digital engagement improve satisfaction, loyalty, and customer retention.
	Emerging Technologies	AI, IoT, and ML support automation, real-time insights, and smarter business solutions.

3.6.2 Challenges of Digital Transformation

1. **High Initial Costs:** Significant investment is needed for new technologies, infrastructure, and employee training.
2. **Resistance to Change:** Employees may struggle to adapt to new systems, causing delays in adoption and reduced productivity.
3. **Complexity:** Integrating multiple digital systems and processes requires proper planning and expertise.

4. **Security Risks:** Increased use of digital and cloud systems raises risks of cyberattacks and data breaches.
5. **Skill Gaps:** Lack of skilled employees may require additional training or hiring.
6. **Implementation Downtime:** System changes can temporarily disrupt normal business operations.
7. **Over-reliance on Technology:** Dependence on systems increases vulnerability to technical failures.
8. **Loss of Personal Touch:** Automation may reduce human interaction in customer service and internal communication.
9. **Uncertain ROI:** Benefits may take time to appear, making returns on investment unclear initially.
10. **Data Management Issues:** Large volumes of data can be difficult to manage, analyze, and secure effectively.

