CS507

Defining Needs

Understanding needs is critical in information systems and organizational management. This involves recognizing what information is required for decision-making and operations.

Need for Information

- Information is essential for planning, decision-making, and performance improvement.
- Helps organizations identify opportunities, mitigate risks, and stay competitive.

Sources of Information

Primary Sources

- Original data or firsthand accounts, e.g., interviews, surveys, or experiments.

Secondary Sources

- Analyzed or interpreted information from primary sources, e.g., books, journal articles, or reports.

Tertiary Sources

- Aggregated summaries of primary and secondary sources, e.g., encyclopedias, directories.

Changing Needs

- Information requirements evolve due to internal growth or external environmental changes, e.g., new regulations or market trends.

Areas Covered

- Operations, finance, marketing, human resources, and customer relations.

Need for Organization

- Effective information management ensures accurate, timely, and relevant data for decision-making.

Data vs. Information

- **Data**: Raw facts and figures without context.
- **Information**: Processed data that provides meaningful insights.

Information Quality Checklist

- Accuracy, relevance, timeliness, completeness, and accessibility.

Organization & Information Requirements

Size of the Organization

1. **Small Organizations**
    - Require simple, cost-effective information systems.
    - Often rely on manual or basic computerized systems.
2. **Medium-Sized Organizations**
    - Require more structured systems for handling moderate complexity.
    - Use specialized software like ERP or CRM systems.
3. **Large Organizations**
    - Need complex, scalable, and integrated systems.
    - Often employ CBIS for managing vast amounts of data.

Nature of Business & Information Requirements

- Requirements differ based on the industry, e.g., healthcare needs patient records; retail requires inventory tracking.

Unique Attributes of Organization

- Specific needs based on organizational goals, culture, and structure.

Organizational Structure

Pyramid/Tall/Hierarchical

- A structure with multiple layers of management.

Hierarchical Organization

- Decisions flow from top to bottom.
- Well-suited for stable environments but less adaptable to change.

Culture of the Organization

- Organizational culture influences information flow, decision-making, and management styles.

Management Styles

1. **Authoritative**: Centralized decision-making.
2. **Participative**: Collaborative approach.
3. **Mixed**: Combines authoritative and participative styles.

Decision-Making Approach

- Ranges from centralized (authoritative) to decentralized (participative).

Sources of Information in Organizations

Direction of Information Flow

- **Upward**: Feedback from employees to management.
- **Downward**: Instructions from management to employees.
- **Horizontal**: Communication between peers.

Effect of Changes in Environment

Elements of Environment

1. **Legal**: Compliance with regulations.
2. **Economic**: Market conditions, inflation, and globalization.
3. **Social**: Cultural trends and societal expectations.
4. **Technological**: Emerging technologies impacting operations.

Corporate Social Responsibility (CSR)

- Ethical practices and community contributions.

Ethics

- Integrity in using information and decision-making.

Systems vs. Procedures

Purpose of Systems & Procedures

- **Systems**: Framework for processing information.
- **Procedures**: Specific methods for completing tasks.

Data & Information

- Transition from raw data to actionable insights is facilitated by systems and procedures.

Manual vs. Computerized Information Systems

What is Computer-Based Information System (CBIS)?

- A system that uses computer technology to collect, process, store, and disseminate information.

Why Information Systems?

- Enhance efficiency, support decision-making, and facilitate strategic planning.

Emerging Global Economies

- Information systems enable businesses to operate in global markets.

Transforming Industrial Economies

- Transition to service-oriented and knowledge-based economies.

Transformed Business Enterprise

- Digitization reshapes operations, communication, and customer interaction.

Emerging Digital Firms

- Fully digitized businesses leveraging information systems for operations and strategy.

Types of Systems

What are Systems?

- A set of interconnected components working together to achieve a goal.

Components of a System

1. Input: Data or resources.
2. Process: Transformation of inputs.
3. Output: Information or products.

Types of Systems

1. **Open-Loop System**: No feedback mechanism.
2. **Closed-Loop System**: Feedback is used to adjust processes.

Open Systems

- Interact with the environment and adapt to changes.

Closed Systems

- Operate independently, with no external interaction.

Level of Planning

Strategic Planning for Information Resources (SPIR)

- Aligns information system goals with organizational strategy.

Attributes of an IS/CBIS

- Scalability, reliability, security, and user-friendliness.

Infrastructure

- Refers to the foundational hardware, software, networking, and facilities required to support and deliver information systems within an organization.

Architecture

- The blueprint or design of a system that defines its components, their relationships, and how they work together.

Information Architecture

- Focuses on the organization and structuring of data, ensuring efficient access, usability, and consistency.

Components/Sub-Systems of CBIS (Computer-Based Information Systems)

1. **Transaction Processing System (TPS)**
    - Automates and manages routine operations such as sales, payroll, and inventory control.
2. **Management Information System (MIS)**
    - Provides summarized and structured data to aid managerial decision-making.
3. **Support Systems**
    - Helps in complex decision-making and includes tools like Decision Support Systems (DSS) and Office Automation Systems (OAS).

Support Systems Classification

1. **Office Automation Systems (OAS)**
    - Tools for managing and streamlining office tasks (e.g., document management, communication systems).
2. **Decision Support Systems (DSS)**
    - Supports semi-structured and unstructured decision-making processes.

Functionalities of MIS and DSS

- **MIS**: Provides structured reports, supports operational decisions.
- **DSS**: Interactive, supports complex and dynamic decision-making.

Types of DSS

1. **Model-Driven DSS**
    - Uses mathematical or simulation models for decision support.
2. **Data-Driven DSS**
    - Relies on large datasets for analysis and insights.

Data Mart

- A subset of a data warehouse designed for specific departmental or organizational needs.

Online Analytical Processing (OLAP)

- Analyzes multidimensional data interactively for business intelligence.

Data Mining

- Extracts patterns, trends, and insights from large datasets.

Types of Models Used in DSS

1. **Physical Models**
   - Represent tangible objects or scenarios.
2. **Narrative Models**
   - Describe processes or systems in words.
3. **Graphic Models**
   - Visual representations like charts or diagrams.
4. **Mathematical Models**
   - Quantitative models using formulas and algorithms.

Knowledge / Intelligent Systems

- Systems designed to simulate human decision-making using artificial intelligence.

Knowledge Support Systems (KSS) / Intelligent Systems

- Use AI to store, manage, and apply expert-level knowledge.

Components of an Expert System

1. **Knowledge Base**: Stores expert knowledge.
2. **Inference Engine**: Applies logical rules to data in the knowledge base.
3. **User Interface**: Facilitates interaction with the system.

CBIS from a Functional Viewpoint

Organizational Information Systems (OIS)

- Integrates information systems across various functions like marketing, finance, and HR.

Marketing Information Systems (MKIS)

- Manages marketing-related data to improve customer engagement and sales strategies.

Benefits of MKIS:

- Enhanced decision-making, customer satisfaction, and market trend analysis.

Management Levels in MKIS

1. **Operational**: Routine transaction support.
2. **Tactical**: Focus on medium-term strategies.
3. **Strategic**: Long-term planning and analysis.

CRM Tasks and Issues

- **Key Tasks**: Customer data management, segmentation, and engagement.
- **Issues**: Privacy, integration challenges, and user adoption.

Decision Making

Types of Problems

1. **Structured**: Clear solutions and procedures.
2. **Unstructured**: Requires creativity and subjective judgment.

Type of Decisions

1. **Operational**: Daily activities.
2. **Tactical**: Medium-term planning.
3. **Strategic**: Long-term goals.

Phases of Decision-Making

1. **Intelligence Phase**: Identifying and understanding problems.
2. **Design Phase**: Developing solutions.
3. **Choice Phase**: Selecting the best solution.
4. **Implementation Phase**: Executing the chosen solution.

Planning for System Development

Phases of IT Planning

- Strategy formulation, resource allocation, and implementation.

System Development Life Cycle (SDLC)

Types of SDLC

1. **Classic Lifecycle Model/Waterfall**: Sequential phases from analysis to maintenance.
2. **Incremental Model**: Delivers the system in parts.
3. **Iterative Models**: Repeatedly refines components.

System Design

1. **Entity Relationship Diagram (ERD)**: Visualizes database relationships.
2. **Information Flow Design**: Outlines data movement.
3. **User Interface Design**: Focuses on user interaction.

Incremental vs. Iterative Models

- **Incremental**: Builds the system in stages.
- **Iterative**: Revises and improves continuously.