

The background features a dark blue gradient with faint, light-colored technical diagrams. On the left side, there is a large circular scale with numerical markings from 140 to 260 in increments of 10. Several circular diagrams with arrows and dashed lines are scattered across the background, suggesting a technical or engineering context.

SYSTEM DEFINITION AND CONCEPTS

DR. KRISHNENDU GUHA

ASSISTANT PROFESSOR (ON CONTRACT)

NATIONAL INSTITUTE OF TECHNOLOGY (NIT), JAMSHEDPUR

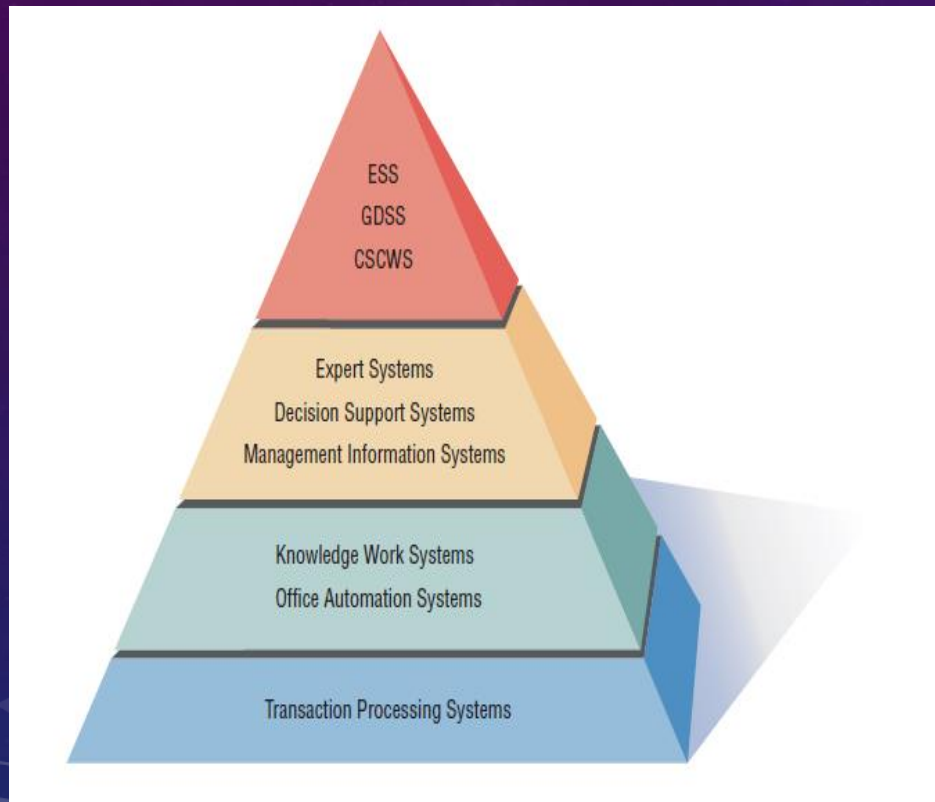
EMAIL: KRISHNENDU.CA@NITJSR.AC.IN

INTRODUCTION



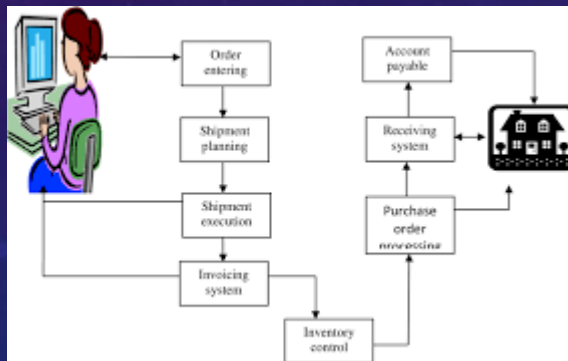
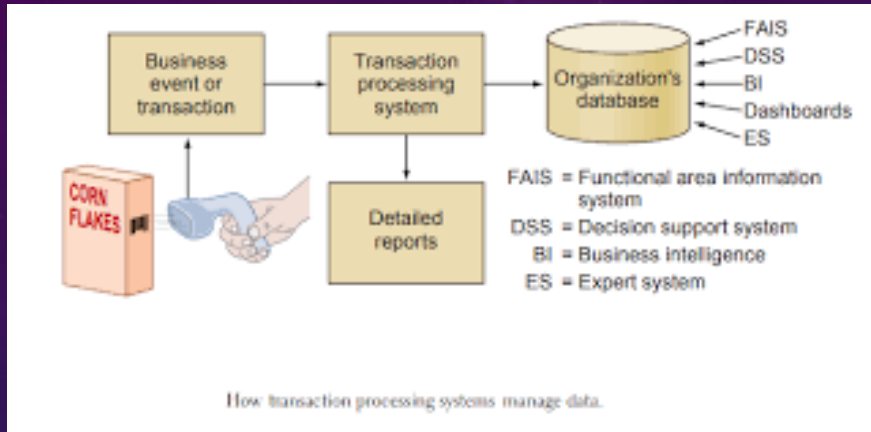
- Organizations have long recognized the importance of managing key resources such as people and raw materials.
- Information has now moved to its rightful place as a key resource.
- Decision makers now understand that information is not just a by-product of conducting business; rather, it fuels business and can be the critical factor in determining the success or failure
- Managers need to understand that costs are associated with the production, distribution, security, storage, and retrieval of all information.
- Although information is all around us, it is not free, and its strategic use for positioning a business competitively should not be taken for granted.

TYPES OF SYSTEMS



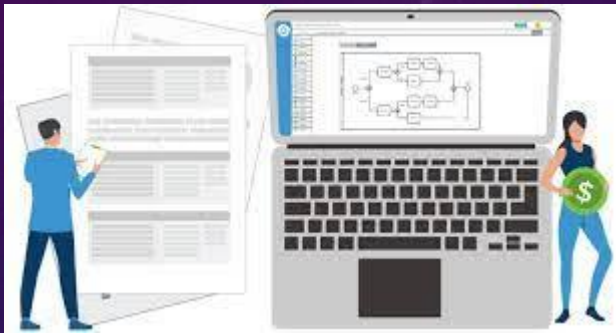
- Information systems are developed for different purposes, depending on the needs of human users and the business.
- **Transaction processing systems (TPS)** function at the operational level of the organization;
- **office automation systems (OAS)** and **knowledge work systems (KWS)** support work at the knowledge level.
- Higher-level systems include **management information systems (MIS)** and **decision support systems (DSS)**.
- **Expert systems** apply the expertise of decision makers to solve specific, structured problems.
- On the strategic level of management we find **executive support systems (ESS)**.
- Group decision support systems (GDSS) and the more generally described computer-supported collaborative work systems (CSCWS) aid group-level decision making of a semi-structured or unstructured variety.

TRANSACTION PROCESSING SYSTEMS

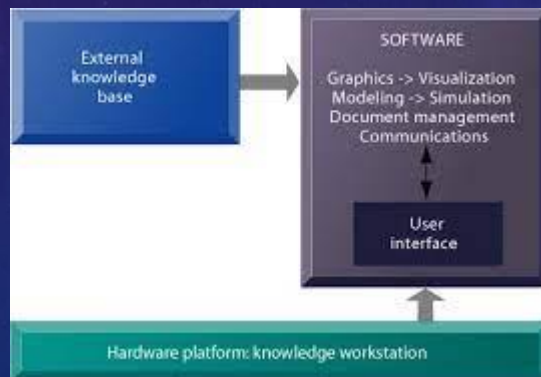


- Transaction processing systems (TPS) are computerized information systems that were developed to process large amounts of data for routine business transactions such as payroll and inventory.
- A TPS eliminates the tedium of necessary operational transactions and reduces the time required to perform them manually, although people must still input data to computerized systems.
- Transaction processing systems are boundary-spanning systems that permit the organization to interact with external environments.
- Because managers look to the data generated by the TPS for up-to-the-minute information about what is happening in their companies, it is essential to the day-to-day operations of business that these systems function smoothly and without interruption.

OFFICE AUTOMATION SYSTEMS AND KNOWLEDGE WORK SYSTEMS



- At the knowledge level of the organization are two classes of systems.
- (i) Office automation system (OAS) support data workers, who do not usually create new knowledge but rather analyze information to transform data or manipulate
- Familiar aspects of OAS include word processing, spreadsheets, desktop publishing, electronic scheduling, and communication through voice mail, email (electronic mail), and teleconferencing.



- (ii) Knowledge work systems (KWS) support professional workers such as scientists, engineers, and doctors by aiding them in their efforts to create new knowledge (often in teams) and by allowing them to contribute it to their organization or to society at large.

MANAGEMENT INFORMATION SYSTEMS



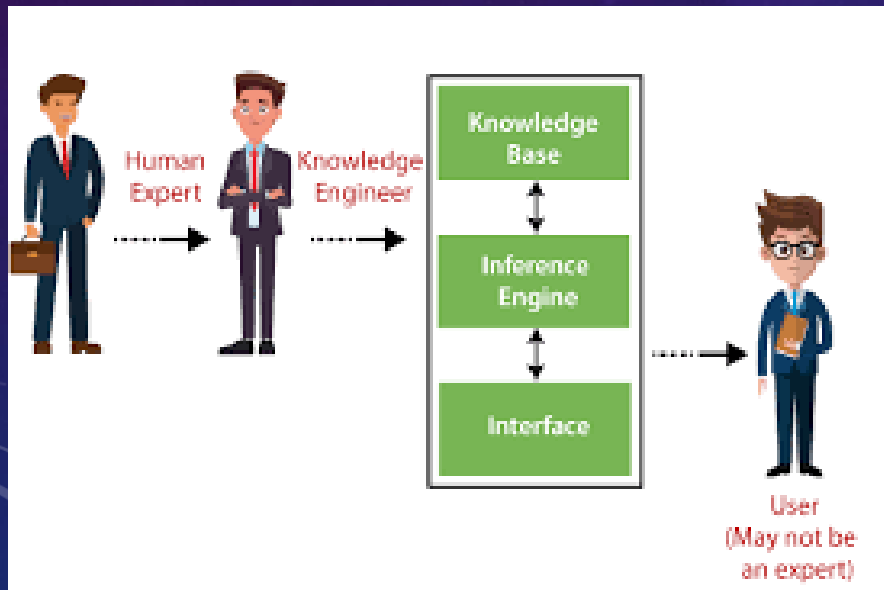
- Management information systems (MIS) include transaction processing.
- MIS are computerized information systems that work because of the purposeful interaction between people and computers.
- By requiring people, software, and hardware to function in concert, management information systems support users in accomplishing a broader spectrum of organizational tasks than transaction processing systems, including decision analysis and decision making.
- To access information, users of the management information system share a common database.
- The database stores both data and models that help the user interact with, interpret, and apply that data.
- Management information systems output information that is used in decision making.
- MIS can also help integrate some of the computerized information functions of a business.

DECISION SUPPORT SYSTEMS (DSS)



- DSS are similar to the traditional management information system because they both depend on a database as a source of data.
- A decision support system departs from the traditional management information system because it emphasizes the support of decision making in all its phases, although the actual decision is still the exclusive province of the decision maker.
- Decision support systems are more closely tailored to the person or group using them than is a traditional management information system.
- Sometimes they are discussed as systems that focus on business intelligence.

ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS



- The general thrust of AI has been to develop machines that behave intelligently.
- Two avenues of AI research are (1) understanding natural language and (2) analyzing the ability to reason through a problem to its logical conclusion.
- Expert systems use the approaches of AI reasoning to solve the problems put to them by business (and other) users.
- Expert systems are a very special class of information system that has been made practicable for use by business as a result of widespread availability of hardware and software such as personal computers (PCs) and expert system shells.
- An expert system (also called a knowledge based system) effectively captures and uses the knowledge of a human expert or experts for solving a particular problem experienced in an organization.
- An expert system selects the best solution to a problem or a specific class of problems and does not leave judgement to the user
- The basic components of an expert system are the knowledge base, an inference engine connecting the user with the system by processing queries via languages such as structured query language (SQL), and the user interface.

GROUP DECISION SUPPORT SYSTEMS AND COMPUTER-SUPPORTED COLLABORATIVE WORK SYSTEMS

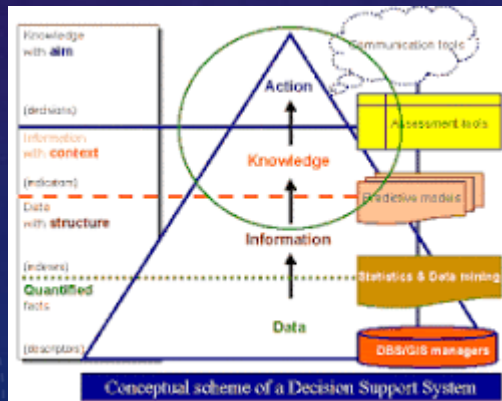


- Organizations are becoming increasingly reliant on groups or teams to make decisions together.
- When groups make semistructured or unstructured decisions, a group decision support system may afford a solution.
- Group decision support systems (GDSS), which are used in special rooms equipped in a number of different configurations, permit group members to interact with electronic support—often in the form of specialized software—and a special group facilitator.
- Group decision support systems are intended to bring a group together to solve a problem with the help of various supports such as polling, questionnaires, brainstorming, and scenario creation.
- GDSS are discussed under the more general term *computer-supported collaborative work systems (CSCWS)*, which might include software support called groupware for team collaboration via networked computers.
- Group decision support systems can also be used in a virtual setting.

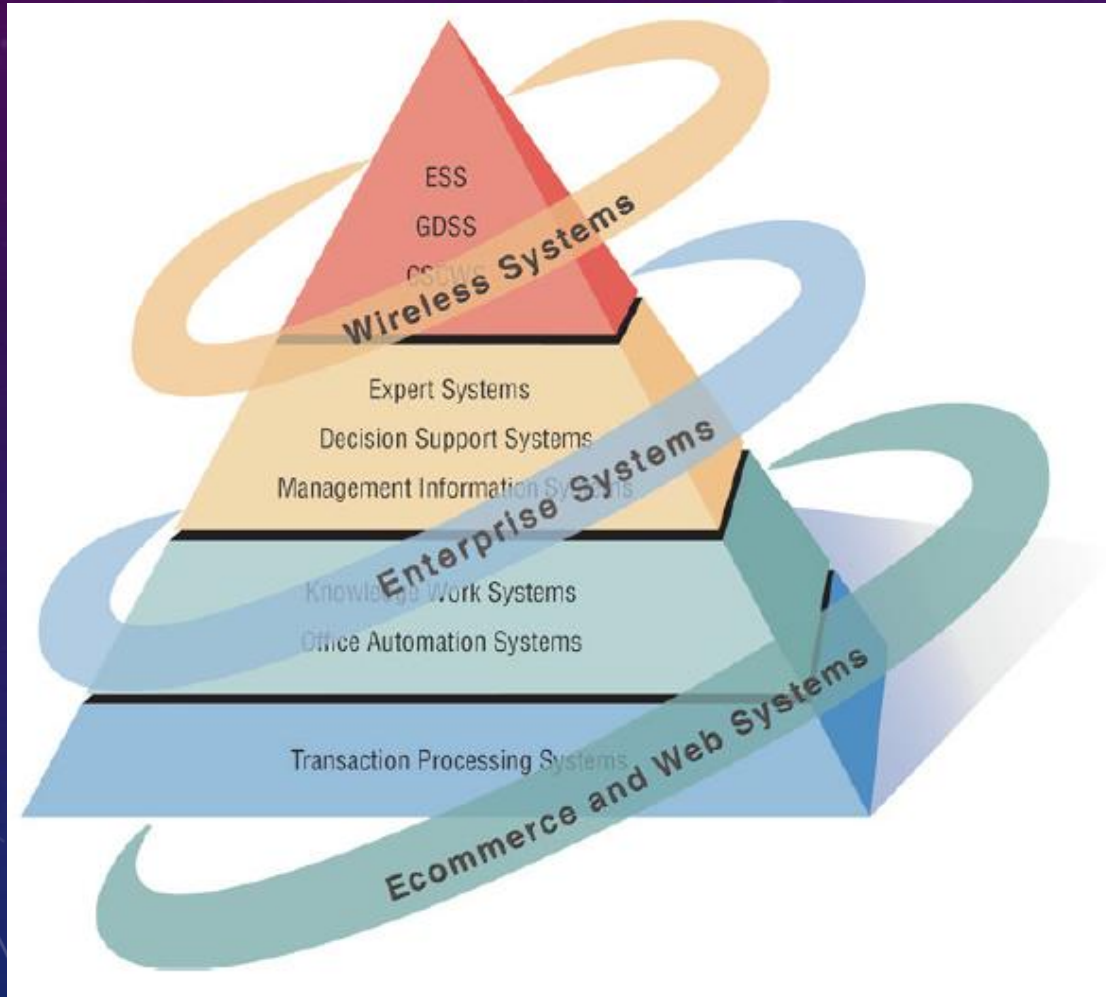
EXECUTIVE SUPPORT SYSTEMS



- When executives turn to the computer, they are often looking for ways to help them make decisions on the strategic level.
- Executive support systems (ESS) help executives organize their interactions with the external environment by providing graphics and communications technologies in accessible places such as boardrooms or personal corporate offices.
- Although ESS rely on the information generated by TPS and MIS, executive support systems help their users address unstructured decision problems, which are not application specific, by creating an environment that helps them think about strategic problems in an informed way.
- ESS extend and support the capabilities of executives, permitting them to make sense of their environments.



INTEGRATING TECHNOLOGIES FOR SYSTEMS



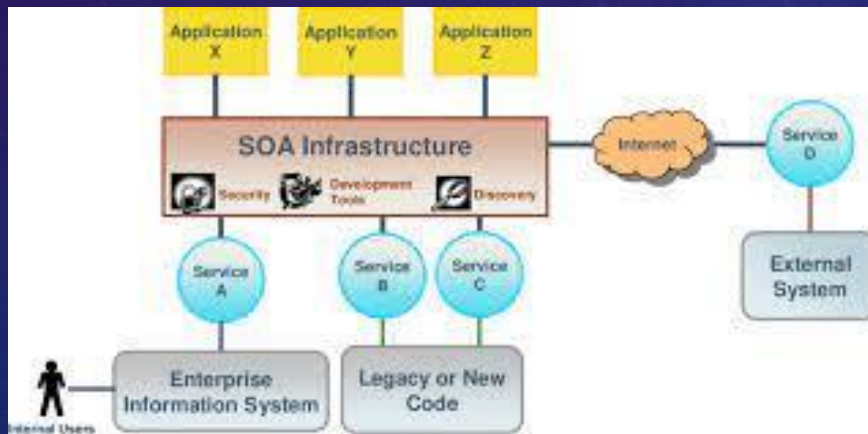
- As users adopt new technologies, some of the systems analyst's work will be devoted to integrating traditional systems with new ones to ensure a useful context
- This section describes some of the new information technologies systems analysts will be using as people work to integrate their ecommerce applications into their traditional businesses
- or as they begin entirely new e-businesses.

ECOMMERCE APPLICATIONS AND WEB SYSTEMS



- Many of the systems discussed here can be imbued with greater functionality if they are migrated to the World Wide Web
- or if they are originally conceived and implemented as Web-based technologies.
- There are many benefits to mounting or improving an application on the Web:
 1. Increasing user awareness of the availability of a service, product, industry, person, or group.
 2. The possibility of 24-hour access for users.
 3. Improving the usefulness and usability of the interface design.
 4. Creating a system that can extend globally rather than remain local, thus reaching people in remote locations without worry of the time zone in which they are located.

ENTERPRISE SYSTEMS



- Many organizations envision potential benefits from the integration of many information systems existing on different management levels and within different functions.
- Some authors discuss integration as service-oriented architecture (SOA), which exists in layers.
- Enterprise systems would comprise the top layer.
- Enterprise systems, also called enterprise resource planning (ERP) systems, are designed to perform this integration.
- ERP software includes that from SAP and Oracle.
- Some of these packages are targeted toward moving enterprises onto the Web.

SYSTEMS FOR WIRELESS AND MOBILE DEVICES



- Analysts design a plethora of new systems and applications for wireless and mobile devices such as the Apple iPhone, iPod, or the BlackBerry.
- In addition, analysts may find themselves designing standard or wireless communications networks for users that integrate voice, video, text messaging, and email into organizational intranets or industry extranets.
- Wireless ecommerce is referred to as m-commerce (mobilecommerce).
- Wireless local area networks (WLANs); wireless fidelity networks, called Wi-Fi; and personal wireless networks that bring together many types of devices under the standard called Bluetooth are all systems that you may be asked to design.
- In more advanced settings, analysts may design intelligent agents, software that can assist users with tasks in which the software learns users' preferences over time and then acts on those preferences.
- For example, in the use of pull technology, an intelligent agent would search the Web for stories of interest to the user, having observed the user's behavior patterns with information over time, and would conduct searches on the Web without continual prompting from the user.

OPEN SOURCE SOFTWARE



- With OSS, the code, or computer instructions, can be studied, shared, and modified by many users and programmers.
- Rules of this community include the idea that any program modifications must be shared with all the people on the project.
- Development of OSS has also been characterized as a philosophy rather than simply as the process of creating new software.
- Widely known open source projects include Apache for developing a Web server, the browser called Mozilla Firefox, and Linux, which is a Unix-like open source operating system.
- However, it would be an oversimplification to think of OSS as a monolithic movement, and it does little to reveal what type of users or user analysts are developing OSS projects and on what basis.
- To help us understand the open source movement, researchers have recently categorized open source communities into four community types—ad hoc, standardized, organized, and commercial—
- along six different dimensions—general structure, environment, goals, methods, user community, and licensing.
- Open source development is useful for many applications running on diverse technologies, including handheld devices and communication equipment.

NEED FOR SYSTEMS ANALYSIS AND DESIGN



- Systems analysis and design, as performed by systems analysts, seeks to understand what humans need
- analyze data input or data flow systematically, process or transform data, store data, and output information in the context of a particular organization or enterprise.
- By doing thorough analysis, analysts seek to identify and solve the right problems.
- Furthermore, systems analysis and design is used to analyze, design, and implement improvements in the support of users and the functioning of businesses that can be accomplished through the use of computerized information systems.
- Installing a system without proper planning leads to great user dissatisfaction and frequently causes the system to fall into disuse.
- Systems analysis and design lends structure to the analysis and design of information systems, a costly endeavor that might otherwise have been done in a haphazard way.

