

INFORMATION SYSTEM

YEAR/PART: IV/II

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SYLLABUS

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■ Chapter 1: Information system (3 hours)

1. Classification and evolution of IS [IT vs. IS]
2. IS in functional area
3. Information system architecture
4. Qualities of information systems
5. Managing Information System resources
6. Balanced scorecard – case studies

■ Chapter 2: Control, Audit and Security of Information system (5 hours)

1. Control of information system
2. Audit of information system
3. Security of information system
4. Consumer layered security strategy
5. Enterprise layered security strategy
6. Extended validation and SSL certificate

7. Remote access authentication
8. Content control and policy based encryption
9. Example of security in e-Commerce transaction

➤ **Chapter 3: Enterprise Management Systems (4 hours)**

1. Enterprise management Systems (EMS)
2. Enterprise Software: ERP/SCM/CRM
3. Information Management and Technology of Enterprise Software
4. Role of IS and IT in Enterprise Management
5. Enterprise engineering, Electronic organism, Loose integration vs full integration, Process alignment, Frame work to manage integrated change, future trends

➤ **Chapter 4: Decision support and Intelligent systems (7 hours)**

1. DSS, operations research models
2. Group decision support systems

3. Enterprise and executive decision support systems
4. Knowledge Management, Knowledge based Expert system
5. AI Neural Networks, virtual reality, Intelligent Agents
6. Data mining, Data ware housing, OLAP, OLTP
7. Anomaly and fraud detection

► **Chapter 5: Planning for IS (3 hours)**

1. Strategic information system
2. Tactical information system
3. Operational information system

► **Chapter 6: Implementation of information systems (7 hours)**

1. Change Management
2. Critical Success Factors
3. Next generation Balanced scorecard

► Chapter 7: Web based information system and navigation

1. The structure of the web
2. Link Analysis
3. Searching the web
4. Navigating the web
5. Web uses mining
6. Collaborative filtering
7. Recommender systems
8. Collective intelligence

► Chapter 8: Scalable and Emerging information System techniques (8 hours)

1. Techniques for voluminous data
2. Cloud computing technologies and their types
3. MapReduce and Hadoop systems
4. Data management in the cloud
5. Information retrieval in the cloud
6. Link analysis in cloud setup
7. Case studies of voluminous data environment

➤ Practicals:

- The practical exercise shall include following three types of projects on designing of information system
- E-commerce based information system for online transaction processing
- web uses mining or collaborative filtering based processing system
- Scalable and emerging information system
- Balanced scorecard, Strategy Map

➤ References:

- Leonard Jessup and Joseph valacich, "Information Systems Today." Prentice hall
- J.Kanter, "Managing With Information System", PHI
- M Levene, " An Introduction to Search Engines and Web Navigation" Pearson Education
- Jimmy Lin and Chris Dyer, "Data-Intensive Text Processing with Map Reduce", Morgan and Claypool.

Evaluation and Marking Scheme

Chapters	Hours	Mark Distribution
1	4	8
2	8	14
3	4	8
4	7	12
5	3	5
6	3	5
7	8	14
8	8	14
Total	45	80

CHAPTER 1

Information System (IS)

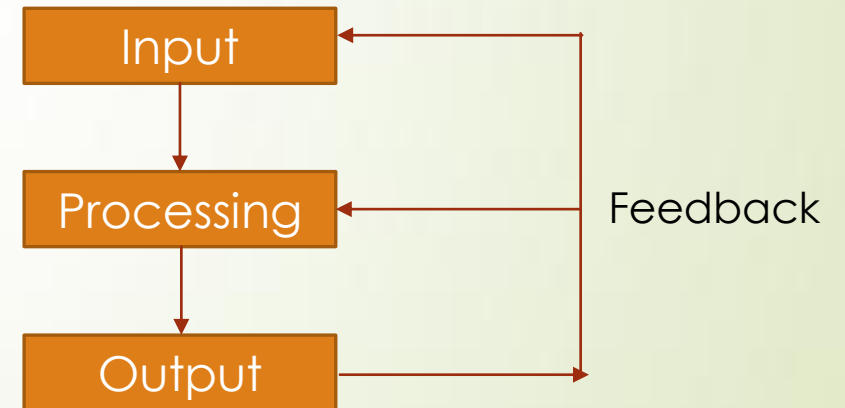
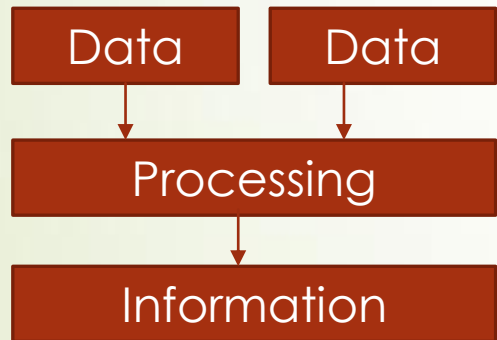
- A combination of hardware, software, infrastructure and trained personnel organized to facilitate planning, control, coordination, and decision making in an organization.
- **Made up of 5 components:**
 - Hardware: Physical components of the technology
 - Software: set of instructions that tells the hardware what to do
 - Data: Collection of facts. E.g. your street address details and your phone number are all pieces of data
 - People: All people (Staffs) involved in IS
 - Process: series of steps undertaken to achieve a desired outcome or goal

Data Vs Information

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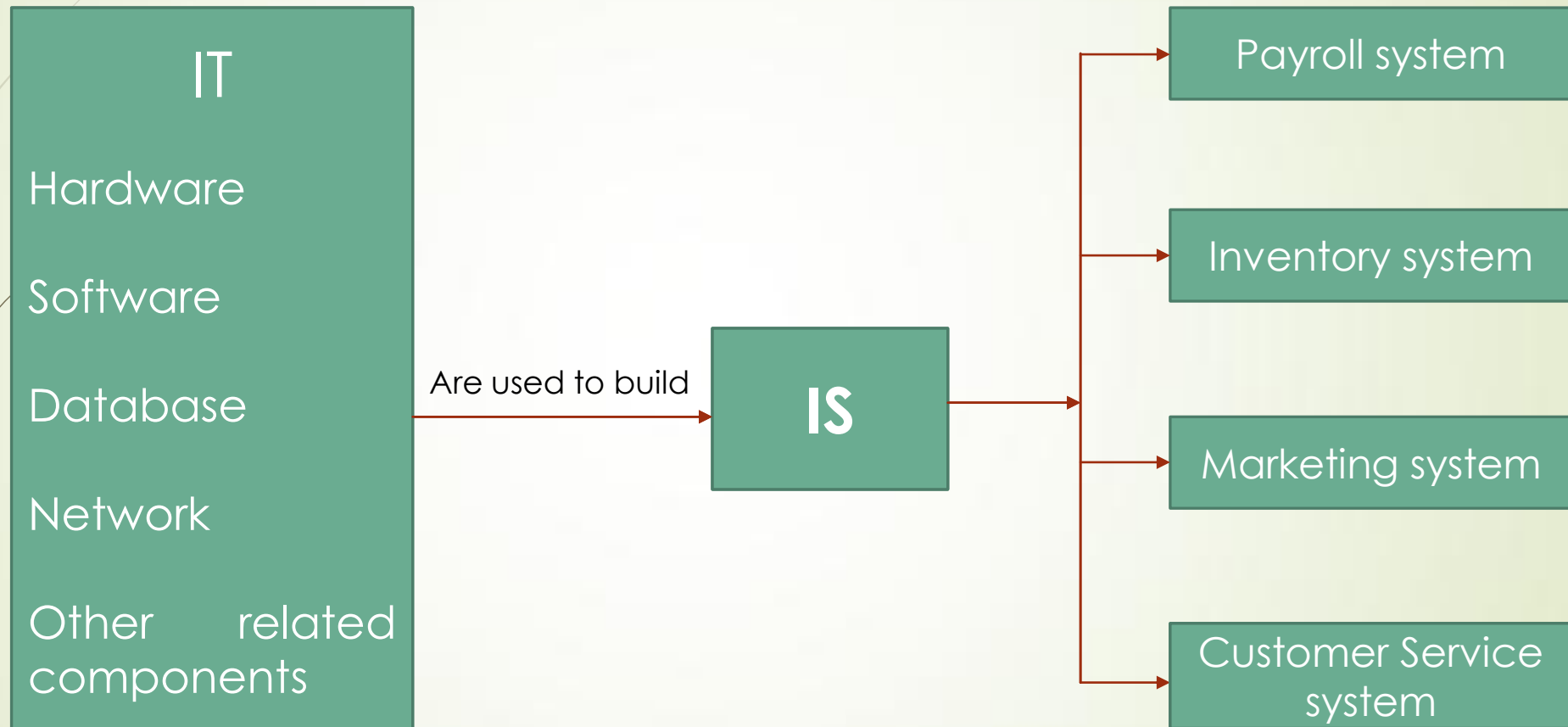
DATA	INFORMATION
Data are simply facts or figures that need to be processed	When data is processed, organized, structured or processed in a given context so as to make it useful is called information

e.g the number of visitor to a website by country is an example of data, finding out traffic (increasing/decreasing) from some country is meaningful information.



Information System

IS Vs IT



IT can be considered as subset of IS

Evolution of Information System

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➤ **Electronic Data Processing (1950-1960)**

- During this period, the role of IS was mostly to perform activities like transaction processing, recordkeeping and accounting. IS was mainly used for electronic data processing (EDP). EDP is use of computers in recording, classifying, manipulating, and summarizing data. It helps workers.

➤ **Management Information Systems (1960-1970)**

- MIS process data into useful informative reports and provide managers with the tools to organize evaluate and efficiently manage departments within an organization. E.g. Cost trend, sales analysis and production performance reporting systems. It helps middle managers.

➤ **Decision Support Systems (1970-1980)**

- In this era, a major advancement was an introduction of the personal computers (PC). It is developed to provide computer based support for complex, non-routine decisions. It helps Senior managements. E.g product pricing and risk analysis systems.

► Executive Information Systems (1980-1990)

- This period gave rise to departmental computing due to many organizations purchasing their own hardware and software to suit their departmental needs. Instead of waiting for indirect support of centralized corporate service department, employees could use their own resources to support their job requirements. This trend led to new challenges of data incompatibility, integrity and connectivity across different departments. Top executives then not using MIS and hence EIS is developed.
- EIS offers decision making facilities to executives through providing both internal and external information relevant to meeting the strategic goals of the organization.
- Examples of the EIS are systems for easy access to actions of all competitors, economic developments to support strategic planning and analysis of business performance

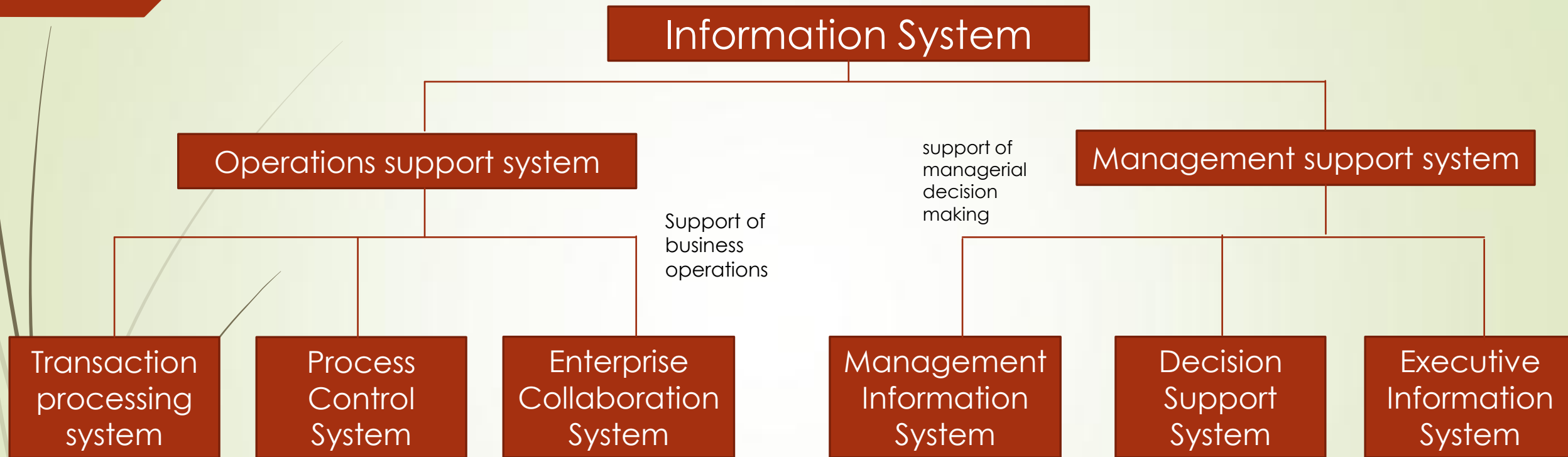
➤ Knowledge management Systems (1990-2000)

- During this era, the rapid growth of the intranets, extranets, internet and other interconnected global networks dramatically changed the capabilities of IS in business. Moreover, there was a breakthrough in the development and application of artificial intelligence (AI) techniques to business information systems. E.g. feedback database and helpdesk systems.

➤ E-Business (2000 - Present)

- The Internet and related technologies and applications changed the way businesses operate and people work. Greater connectivity and higher level of integration across application is done.

Classification of Information System



Classification of Information System

➤ Transaction Processing System:

- They record and process data resulting from business transactions, update operational databases and produce business documents.
- are designed to process routine transactions efficiently and accurately .
- e.g. billing system to send invoice to customers, system to calculate the weekly and monthly payroll and tax payments

➤ Process Control Systems:

- They monitor and control physical processes.
- In process control systems, decisions regarding the adjustment of physical process are automatically made by computers.
- e.g. petroleum refiner uses electronic sensors linked to computers to continually monitor chemical processes and make instant adjustments that control the refinery process.

➤ **Enterprise collaboration systems:**

- They use a variety of information technologies to help people work together.
- They help to communicate ideas, share resources and co-ordinate work as a team.
- These information systems are used to enhance productivity and creativity of teams in modern business.
- The team can efficiently communicate and co- ordinate their activities via electronic mail, discussion forums, videoconferencing and multimedia project

➤ **Management Information systems:**

- They provide managerial end users with information that supports day-to-day decision making needs of managers and business professionals.
- MIS provide a variety of reports and displays to management.
- e.g sales managers may use their networked computers and web browsers to get instant details about the sales of their products and access their corporate intranet for daily sales reports that evaluate sales made by each person.

► **Decision Support Systems:**

- Computer systems that provide users with support to analyze complex information and help to make decisions are called decision support systems (DSSs).
- Decision Support systems are computer based information systems that provide interactive information support to managers and business professionals during decision making process.
- e.g. GIS uses geographic databases to construct and display maps and other graphic displays that support decisions affecting geographic distribution of people and other resources.
- E.g. Credit scoring system on banks

► **Executive Information System:**

- Is a kind of decision support system (DSS) used in organizations to help executives in decision making. It does so by providing easy access to important data needed in an organization to achieve strategic goals. It usually has graphical displays on a user-friendly interface.
- E.g. top executives may use touch screen terminals to instantly view text and graphics displays that highlight key areas of organizational and competitive performance.

IS in Functional Area

➤ Sales and Marketing systems:

- Is responsible for selling the organization's products or services.
- Marketing – concerned with identifying the customers for the organization's product or service, determining what customer need or want, planning and developing products and services to meet their needs and advertising and promoting these products
- Sales- concerned with contacting customers, selling the products and services, taking order, and following on sale.

➤ Manufacturing and production Systems:

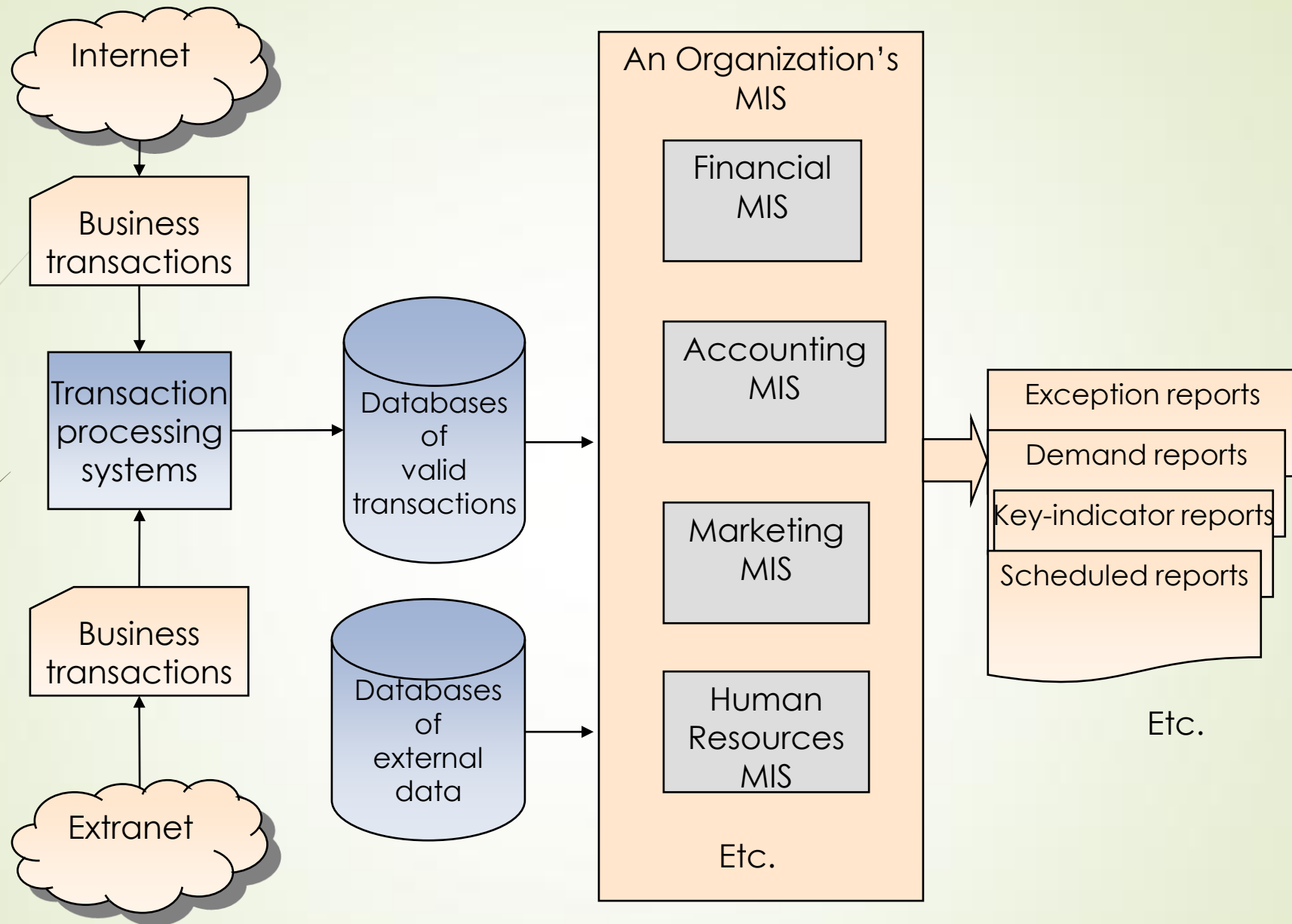
- Is responsible for actually producing the firm's goods and services.
- Deals with planning, development and maintenance of production facilities; establishment of production goal; storage and availability of production materials; scheduling of equipment, facilities, materials and labor requirement

■ Finance and Accounting System:

- Finance function is responsible for managing the firm's financial assets such as cash stock and other investments to maximize the return on these financial assets.
- To determine whether the firm is getting the best return on its investments, the finance function must obtain a considerable amount of information from sources external to the firm.
- Account function is responsible for maintaining and managing to firm's financial records – receipts, depreciation, payroll, - for the flow of fund in a firm

■ Human Resources System:

- Responsible for attracting, developing and maintaining the firm's workforce.
- Supports activities such as identifying potential employees, maintaining complete records on existing employees, and creating programs to develop employees' talents and skills.
- Manpower requirements for meeting the firm's plan (skill, education level, position, number and talent)



Qualities of information systems

➤ Understandable:

- information should already in a **summarized** form, it must be understood by the receiver so that he/she will **interpret** it correctly
- must be able to decode any abbreviations, shorthand notations or any other acronyms contained

➤ Relevant:

- should be **pertinent** and **meaningful** to the decision maker and should be in his **area of responsibility**

➤ Complete:

- should **contain all the facts** that are necessary for the decision maker
- should be **enough** to satisfactorily solve the problem at hand

Qualities of information systems

➤ Available:

- Information may be useless if it is not readily accessible in the **desired form**, when it is needed
- Advances in technology have made high availability of information

➤ Reliable:

- information should be counted on to be **trustworthy**
- should be **accurate, consistent with facts and verifiable**
- Inadequate or **incorrect information** generally **leads to decisions of poor quality**

➤ Concise:

- **Too much information is a big burden** on management and cannot be processed in time
- information **should be to the point and just enough** – no more, no less

Qualities of information systems

► Timely:

- Information must be delivered at the **right time and the right place to the right person**
- **Premature** information can become **obsolete** or be forgotten by the time it is actually needed
- **some crucial decisions can be delayed** because proper and necessary information is not available in time, resulting in missed opportunities
- the time gap between collection of data and the presentation of the proper information to the decision maker must be reduced as much as possible.

Qualities of information systems

➤ Cost effective:

- The information is not desirable if the solution is more costly than the problem
- cost of **gathering data and processing it into information** must be weighed against the benefits derived from using such information

Balanced Scorecard

- is a strategic planning and management system used to align business activities to the vision and strategy of the organization by monitoring performance against strategic goals
- The approach is to provide 'balance' to the financial perspective.

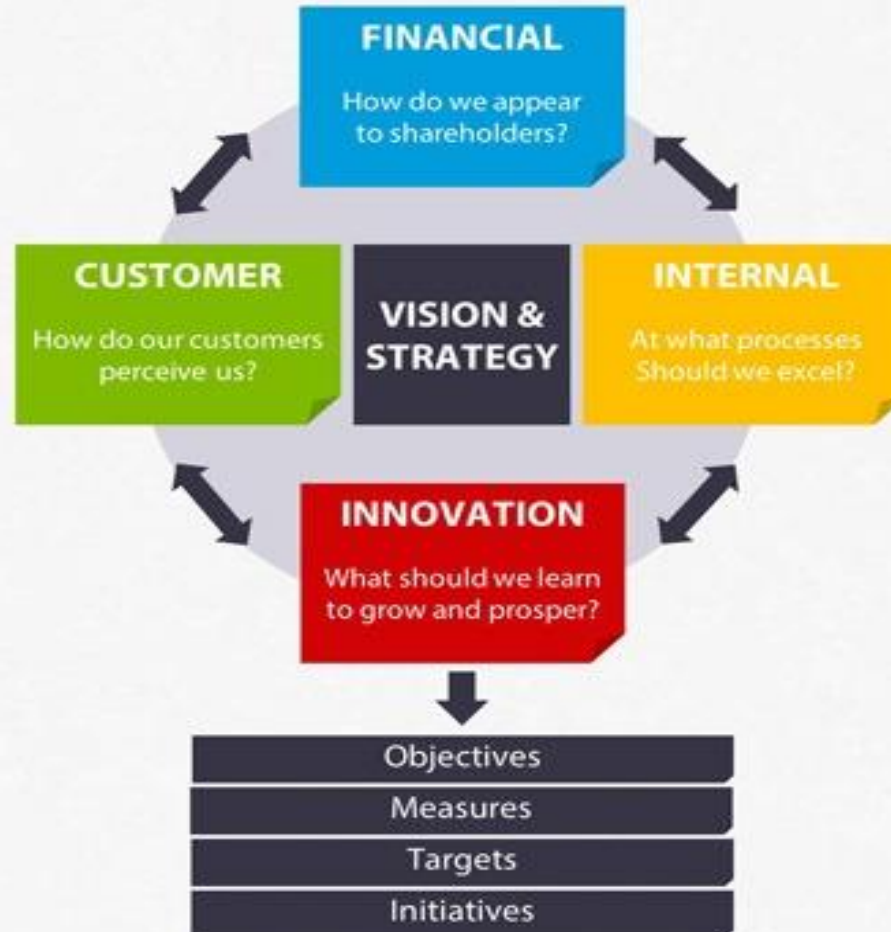
Why Use a Balanced Scorecard?

- Improve organizational performance by measuring what matters
- Increase focus on strategy and results
- Align organization strategy with workers on a day-to-day basis
- Improve communication of the organization's Vision and Strategy
- Prioritize Projects / Initiatives

4 Original Business Perspectives

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- The Balanced Scorecard model suggests that we view the organization from 4 perspectives
- Then Develop metrics, collect data and analyze it relative to each of these perspectives



4 Original Business Perspectives

➤ **Financial:**

- What must we do to create sustainable economic value?

➤ **Internal:**

- To satisfy our stakeholders, what must be our levels of productivity, efficiency, and quality?

➤ **Innovations:**

- Learning and growth
- To achieve our vision, how will we sustain our ability to change and improve

➤ **Customer:**

- What do our customers require from us and how are we doing according to those requirements?

Balance scorecard measurements

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Perspective	Generic Measurements
Financial	Return of capital employed, economic value added, sales growth, cash flow
Customer	Customer satisfaction, retention, acquisition, profitability, market share
Internal	measure of how well the company identifies the customer's future needs. Operation- measure of quality and costs Post sales service - measures for warranty, repair and treatment of defects and returns
Learning and growth	Includes measurement for: People - employee retention, training, skills, morale Systems - Measures of availability of critical real time information needed for front line employees.

Key Implementation Success Factors:

- Obtaining executive sponsorship and commitment
- Involving a broad base of leaders, managers and employees in scorecard development
- Choose the right Scorecard Champion
- Beginning interactive (two-way) communication first
- Viewing the scorecard as a long-term journey rather than a short-term project
- Getting outside help if needed

Framework For Information Systems Architecture

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- What is an Information Systems Architecture?
 - An information systems architecture provides a unifying framework into which various people with different perspectives can organize and view the fundamental building blocks of information systems
 - Stakeholders have different views of the system and each has something “at stake” in determining the success of the system.
 - Stakeholders can be broadly classified into four groups:
 - System Owners
 - System Users
 - System Designers
 - System Builders

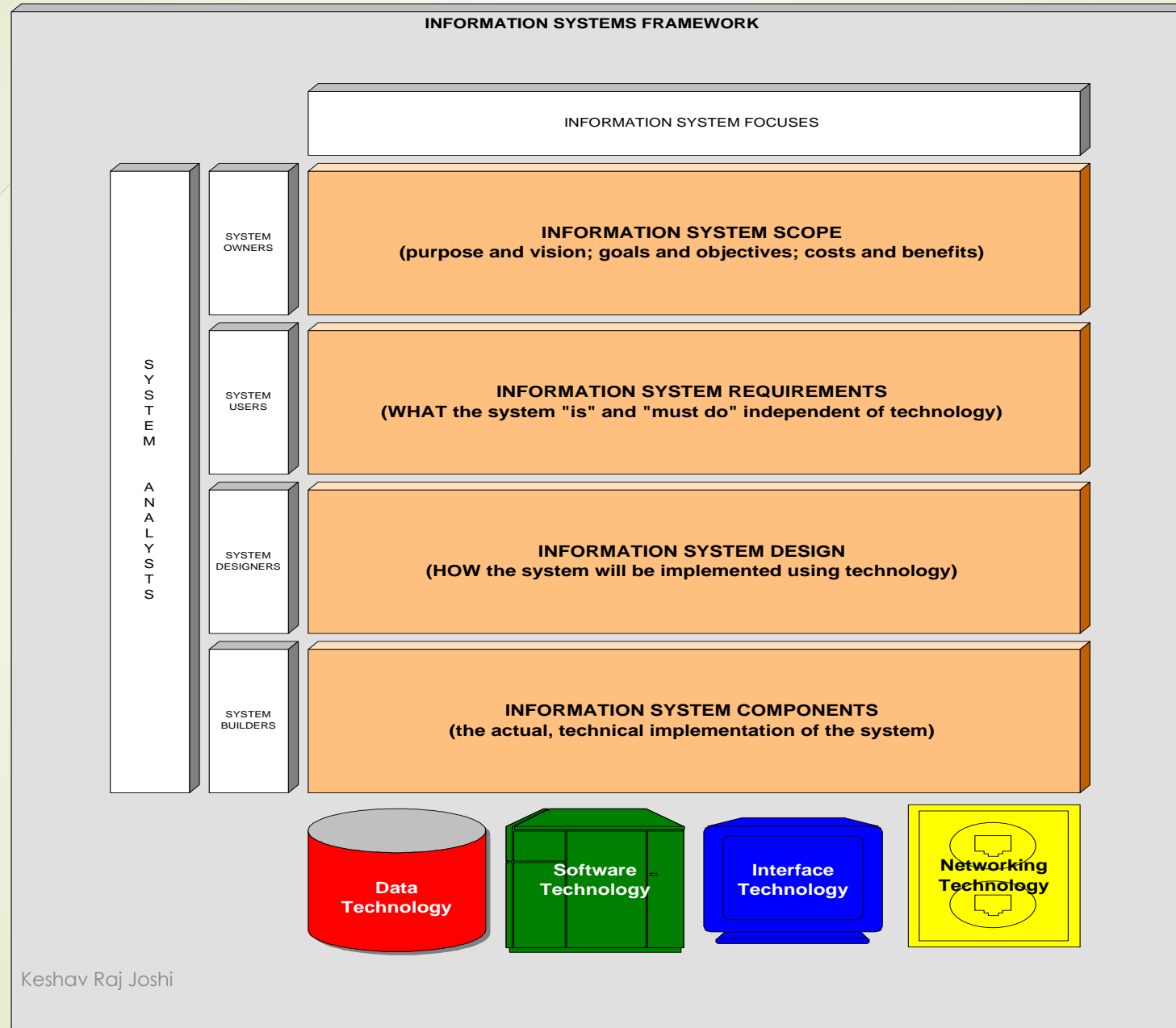
Framework For Information Systems Architecture

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- **System owners** pay for the system to be built and maintained. They own the system, set priorities for the system, and determine policies for its use. In some cases, system owners may also be system users.
- **System users** are the people who actually use the system to perform or support the work to be completed. In today's team-oriented business world, system users frequently work side-by-side with system designers.
- **System designers** are the technical specialists who design the system to meet the users requirements. In many cases, system designers may also be system builders.
- **Systems builders** are the technical specialists who construct, test, and deliver the system into operation.

Framework For Information Systems Architecture

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► System Owners

- Usually come from the ranks of management
- usually responsible for budgeting the money and time to develop, operate, and maintain the information system
- For medium-to-large information systems, the owners are usually middle or executive managers
- For smaller systems, the owners may be middle managers or supervisors
- For personal information systems, the owner and user are the same person
- They are concerned with the 'value' returned by the system. Value is measured in different ways.
 - What is the *purpose* of the system?
 - What is the vision of the system – goals and objectives?
 - How much will the system cost to build?
 - How much will the system cost to operate?
 - Will those costs be offset by measurable benefits?
 - What about intangible benefits?

➤ System Users

- Remote and Mobile Users: employees of the business
 - May be geographically separated from the business
 - An example is the sales and service representatives

- External Users

➤ System Designers

- System designers translate users' business requirements and constraints into technical solutions.
- Design the computer files, databases, inputs, outputs, screens, networks, and programs that will meet the system users' requirements.

➤ System Builders

- They construct the information system components based upon the design specifications from the system designers.
- The applications programmer is the example of a system builder
- In many cases, the system designer and builder may be the same.

➤ System Analyst

- For the system owners and users, the analyst typically constructs and validates their views
- For the system designers and builders, the analyst (at the very least) ensures that the technical views are consistent and compatible with the business views

Managing Information System resources

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- **Hardware:** Physical components of the technology
- **Software:** set of instructions that tells the hardware what to do
 - System software - operating system program
 - Application software - e.g payroll program
- **Data:** Collection of facts. E.g. your street address details and your phone number are all pieces of data
- **People:** All people (Staffs) involved in IS
- **Process:** series of steps undertaken to achieve a desired outcome or goal
- **Telecommunications:** are used to connect, or network, computer systems and portable and wearable devices and to transmit information.

Benefits Managing Information System resources

- Creating a context for IS resource decision-making
- Aligning IS and business goals
- obtaining IT capital investment approvals

Steps for managing IS resources

- Assessment of current information resources
- establishment of information system vision
- establishment of an IT architecture for that vision
- formulation of an IS strategic plan to evolve an organization's information resources from their current status toward the desired vision and IT architecture
- Formulation of short-term operational IS plans based on the IS strategic plan

THANK YOU
ANY QUESTIONS??