

INTRODUCTION to COMPUTER AND ICT

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For BS Computer Science, BS (IT),
BS Geology, BS Mathematics,
BS Commerce, BS Statistics

MANAGEMENT Information System **1st Edition** Dr. Rahman Ali



MANAGEMENT Information System

1st Edition

In accordance with approved curriculum
for BS Commerce, Master of Commerce,
BBA and MBA program of the HEC
and University of Peshawar.



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Chapter 7:

Types of Information Systems in Business

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Outlines

✓ 7.1. Operations Support Systems

- Transaction processing systems,
- Process Control Systems and
- Enterprise Collaboration Systems.

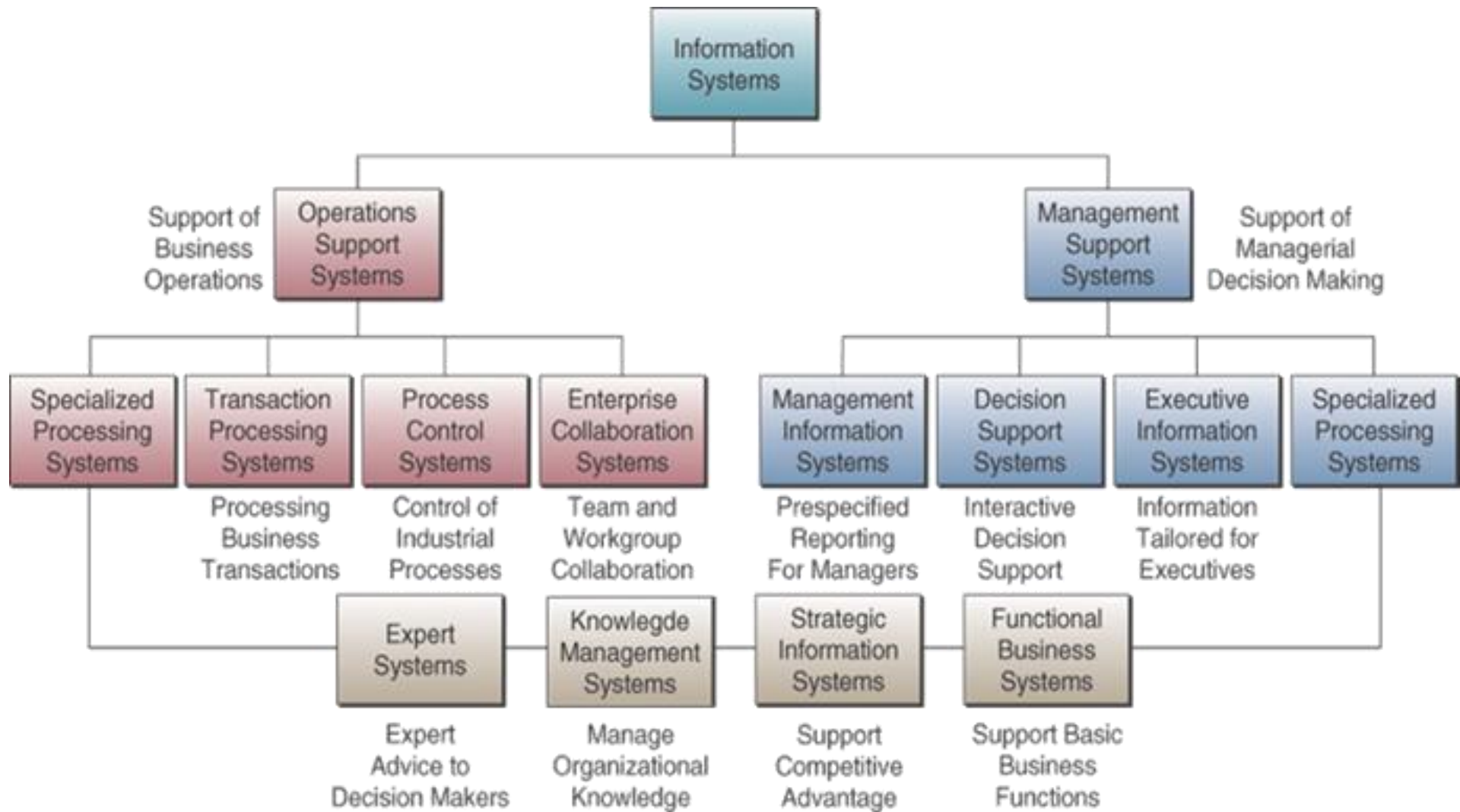
✓ 7.2. Management Support Systems

- Management Information Systems.
- Decision Support Systems.
- Executive Support Systems.

✓ 7.3. Other Classification

- 1. Expert System.
- 2. Knowledge-based System.
- 3. Business Information Systems.
- 4. Strategic Information Systems.
- 5. Group Decision Support Systems.
- 6. Marketing Information Systems.

Types of Information Systems



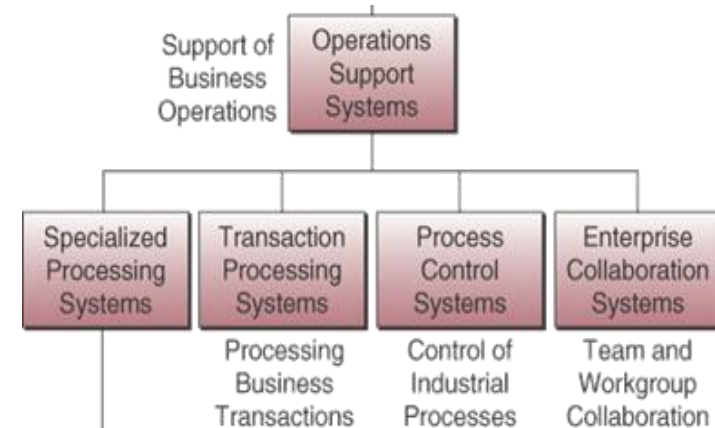
Operation Support Systems (OSS)

➤ Operation Support System (OSS)

- Support businesses in their daily operations are called operation support systems.
- These systems efficiently process business:
 - transactions,
 - control industrial processes during production or manufacturing and
 - support communication and collaboration among business partners and teams.
- As a result of these operations, corporates' databases are updated.

➤ Types of OSS

- Transaction processing systems,
- Process Control Systems and
- Enterprise Collaboration Systems.



Operation Support Systems

7.1.1 Transaction Processing Systems (TPS)

➤ Definition of TPS

- TPS is a type of information system that collects, stores, modifies and retrieves the data transactions of an enterprise.
- **Transaction**
 - A business activity between seller and buyer to exchange an asset for payment is called transaction.
 - Examples
 - Customer orders, purchase orders, receipts, time cards, invoices, and payroll checks in an organization are
- **Types of Transaction**
 - **Internal Transactions:**
 - internal to the company and are related with the internal working of any organization.
 - For example
 - Recruitment Policy, Promotion Policy, Production policy etc.
 - **External Transactions:**
 - external to the organization and are related with the external sources, are regarded as External Transaction.
 - For example
 - sales, purchase etc.

Examples - TPS

➤ **Automated Teller Machine –**

- enables financial transactions without the need of a cashier/human assistance.

➤ **McDonald's Online Delivery –**

- Allows McDonald's customers to Purchase online

➤ **Airline Reservation System –**

- Allows you to purchase and reserve plane tickets online.

Working of TPS

Barcode readers and RFID

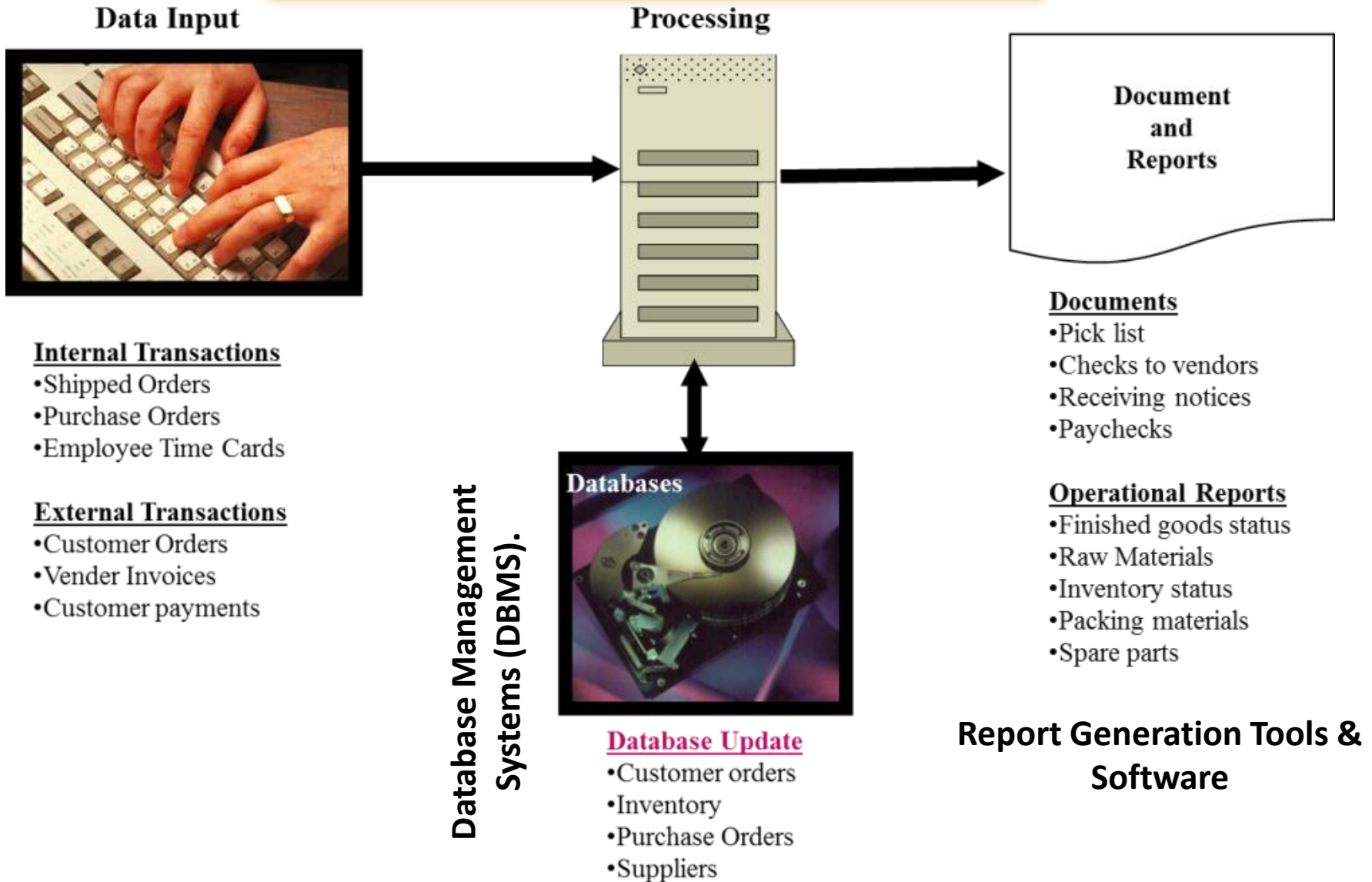


Figure 7.2: Working of TPS

Key Features of TPS

➤ **Rapid response –**

- fast performance with rapid results

➤ **Reliability –**

- well designed backup and recovery with a low failure rate

➤ **Inflexibility –**

- treat every transaction equally. It may be used many times each day which means it has to be precise and inflexible

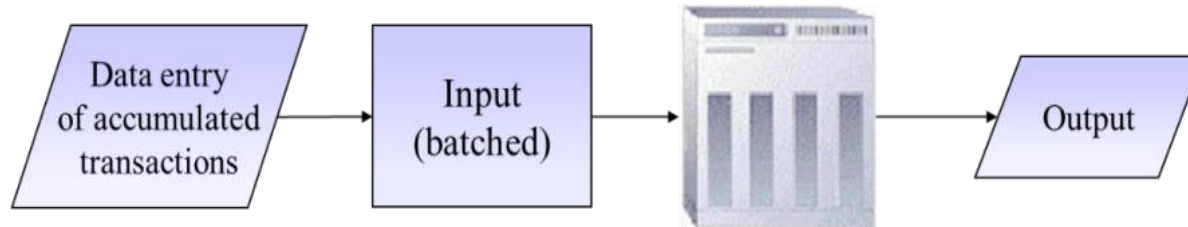
➤ **Controlled processing –**

- maintain specific requirements for the roles and responsibilities of different employees.

Types of TPS

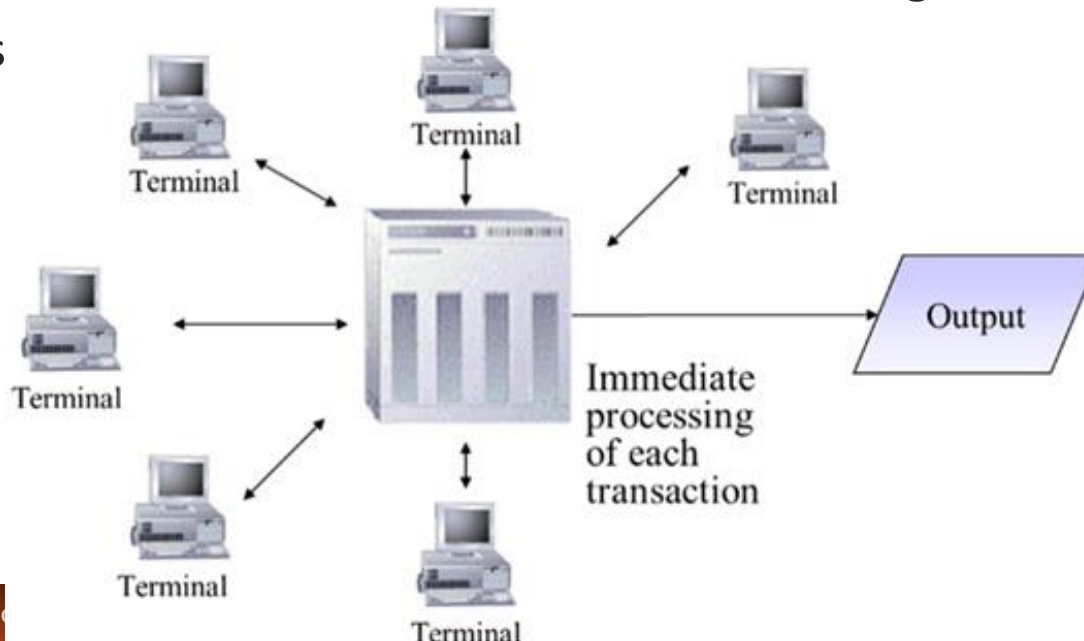
➤ 1. Batch processing –

- information is collected as a batch and then processed later on.
- Example of batch processing are paying by cheque and credit card transactions.



➤ 2. Real time processing –

- all details of the transaction are recorded and changed at the time as it occurs.
- Examples



7.1.2 Process Control Systems (PCS)

- Also called industrial control systems (ICS)
- In a manufacturing setup, different critical parameters are monitored.
- The real time values of these parameters need to be fed to CPU
- These values are compared with the preset values and necessary alerts are generated on the display system, so that corrective action can be taken.
- Examples
 - In petroleum refining
 - detection of liquid/gas in a given industrial environment



Figure 7.5: Processing Control Systems

7.1.3 Enterprise Collaborative Information System (ECIS)

➤ Definition

- Softwares that are used to collaborate, communicate ideas, share resources, and coordinate our cooperative work efforts in project teams and other workgroups.

➤ Example of collaborative problem

- Teams of engineers, marketing specialists, and other knowledge workers to develop new products or improve existing ones.
- These are experts from several departments and locations within a company, and include outside consultants as a team members.
- Such teams would make heavy use of the Internet, corporate intranets and extranets, and collaboration software know as groupware to work together in a collaborative manner.



Figure 7.6: ECIS

ECIS Virtual Tools

- **Conference calls –**
 - can be difficult to arrange the right time
- **Multiparty text chat –**
 - easier to arrange if everyone has mobile texting
- **Videoconferencing –**
 - requires everyone to have the proper equipment
- **Email –**
 - most familiar but has serious drawbacks in content
- **Discussion forums –**
 - content is more organized than email
- **Team surveys –**
 - easy to manage but don't provide very much interactive discussion
- **Multimedia project web sites on the company's intranet.**
- **Google Docs, Spreadsheet, Microsoft SharePoint.**



7.2 Management Support Systems (MSS)

➤ Definition

- MSS are computer-based systems that are supposed to be used by, or at least to support, managers to properly manage their business and help them to take correct management decisions.

➤ Management decisions

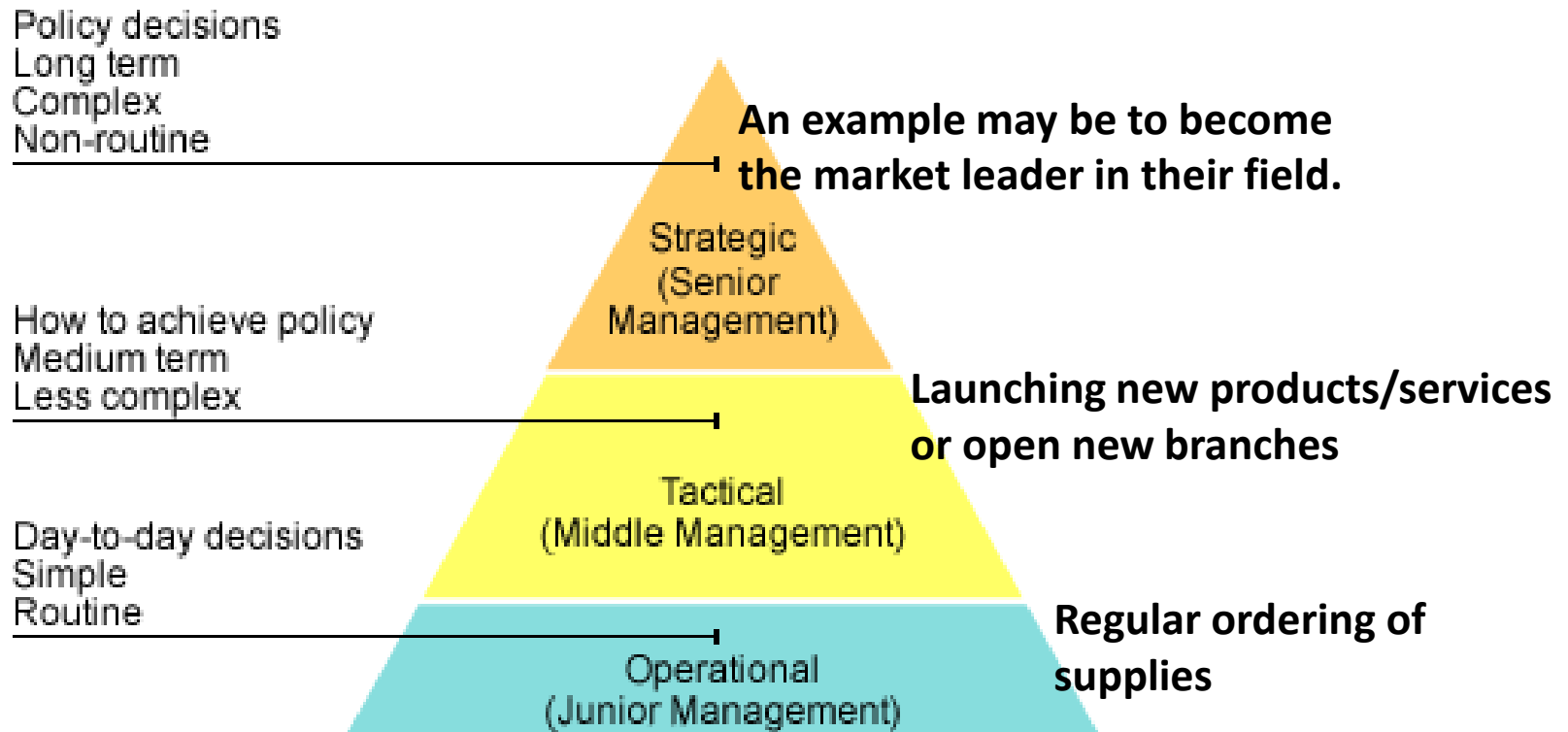
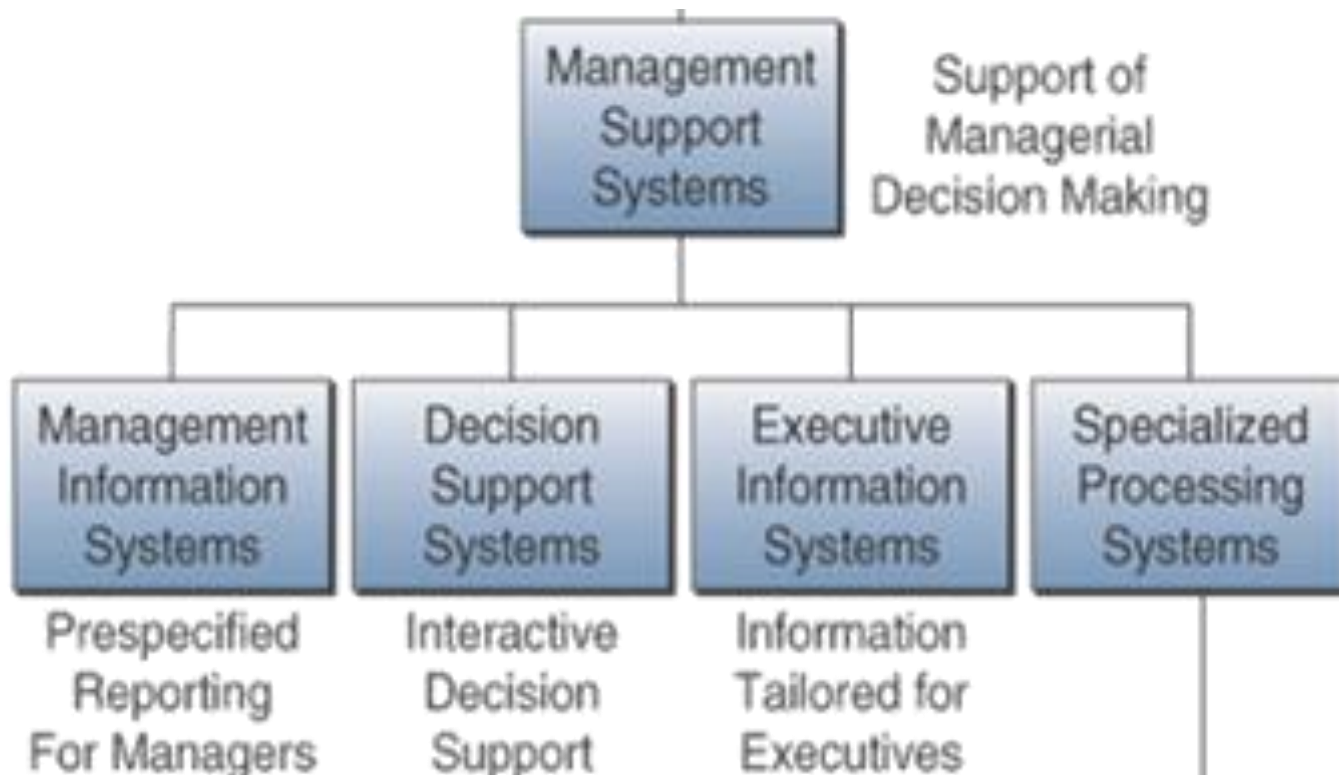


Figure 7.7: Management Decisions

Types of MSS

- **Management Information Systems (MIS)**
- **Decision Support Systems (DSS)**
- **Executive Information Systems (EIS)**



7.2.1 Management Information Systems (MIS)

➤ MIS Definitions

- Softwares that produce fixed, regularly scheduled reports based on data extracted and summarized from the organization's underlying transaction processing systems (TPS) to middle and operational level managers for their day-to-day decision making.

➤ Frequency of reports

- Regular basis, such as daily, weekly, monthly or annually but
- Sometimes need on demand basis to fulfill an urgent query.

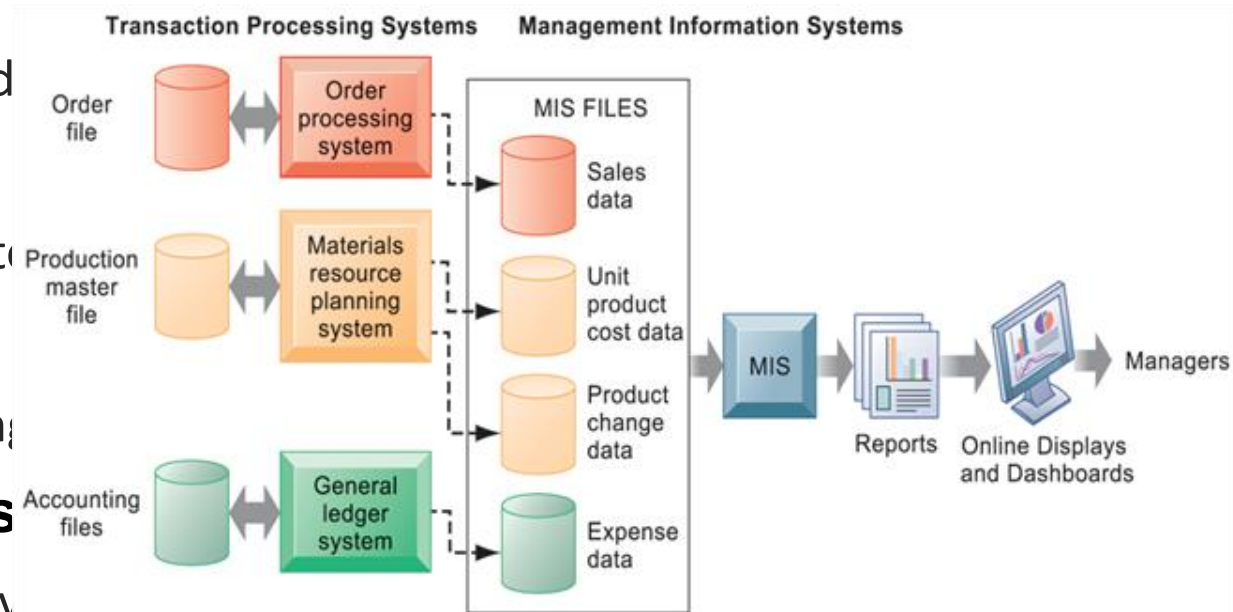


Figure 7.8: How MIS obtain it data from organizational TPSs

7.2.1 MIS - Examples

➤ **Sale MIS –**

- sales manager may use their network computer, net web browser to get instant display of the sales and generate daily, weekly, and monthly reports.

➤ **Financial MIS –**

- accountants and financial analysts may use daily revenues and expenses at a glance and associate them to specific organizational objective.
- They also compare historic and current financial activities.

➤ **Marketing MIS –**

- supports activities which take place within marketing departments.
- These may include marketing research, product development and delivery, promotion and advertising, product pricing and sales analysis.

Groupware - Voice Mail

- Mood of Communication
 - Asynchronous
- How it Works:
 - Stored on the server for the user to listen and respond later.
- When to Use:
 - It is used when the user is not available to respond to the phone call.
- Applications used
 - Facebook messenger Whatsapp etc.

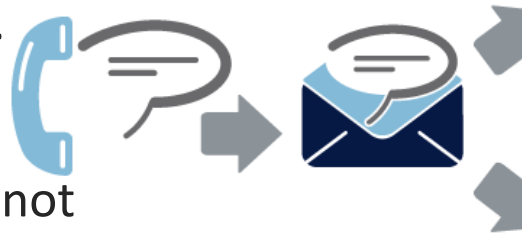


Figure: Whatsapp Voice Message

7.2.2 Decision Support Systems (DSS)

➤ Decision Support System (DSS)

- type of MSS used by middle and higher management to compile information from a wide range of sources to support problem solving and decision making.
- DSS decisions
 - the decisions are drawn by generating statistical projections from the already analyzed data produced by Management Information System.
 - A DSS does not eliminate the need for the manager's judgment, however it significantly improves quality of the decision by offering forecasts that help determine the best course of action.
- DSS data sources
 - **Internal sources**
 - data from sales, manufacturing, inventory or financial reports generated by MIS, utilizing the organization's database.
 - **External sources**
 - data include interest rates, population trends, cost of new house constructions etc.

7.2.2 DSS - Examples

➤ **Product pricing**

- based on cost price, demand of the product in the market and some other parameters.

➤ **Risk analysis of**

- investments in different sectors based on the reports of past investments in those particular sectors.

➤ **A what-if analysis**

- to determine where and how much to spend on advertising a product.

➤ **Clinical decision support system,**

- in the context of diagnosing a patient disease.

➤ **CompareNet,**

- which helps users compare two or more different brands of a product and assist them in the final purchase decision.

➤ **A voyage-estimating system,**

- used by managers on daily basis to develop bids on shipping contracts.

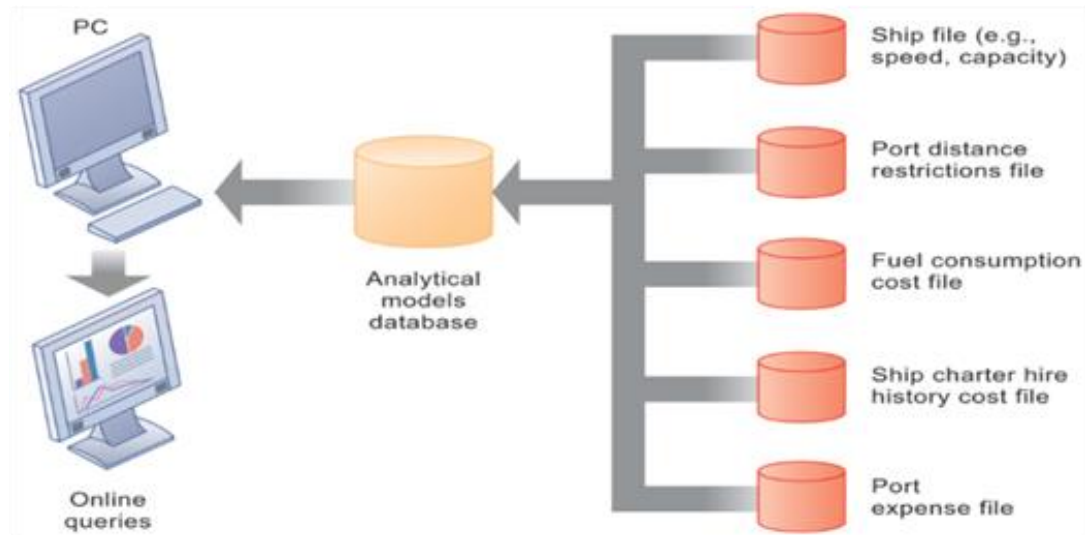


Figure 7.9: A Voyage Estimating Decision Support System

7.2.3 Executive Information Systems (EIS)

➤ Executive Information Systems

- also known as Executive Support System, is a tool used for reporting enterprise-wide data to top executives.
- **EIS data sources**
 - reports coming from all company's levels and departments, such as accounting, human resources and operations, which are generated by MIS and DSS.
- **EIS output/decision**
 - reports that are presented in graphical displays, such as time series charts, scatter diagrams, motion graphics, sequence charts, and bar charts, which help executives in easier and quick comparison and comprehension that leads to final decisions.
- **EIS Example**
 - A digital dashboard with real-time view of firm's financial performance: working capital, accounts receivable, accounts payable, cash flow, and inventory



Figure 7.10: An EIS Dashboard for Real-time Data View of a Firm

7.3 Other Classifications of Information System

- **Expert System**
- **Business Information Systems (BIS)**
- **Knowledge Management Systems (KMS)**
- **Strategic Information Systems (SIS)**
- **Group Decision Support Systems (GDSS)**

7.3.1 Expert System

➤ Expert systems

- is an information system that captures and stores the knowledge of human expert and then emulates human reasoning and decision making process for those who have less expertise.
- The first expert systems were created in the 1970s and then increased in the 1980s.
- Expert systems were among the first truly successful forms of artificial intelligence (AI) software.

• Components

- User interface
- Knowledge base
- Inference engine
 - Perform reasoning
 - Rule-based reasoning
 - Case-based reasoning
 - Inference
 - Probabilistic

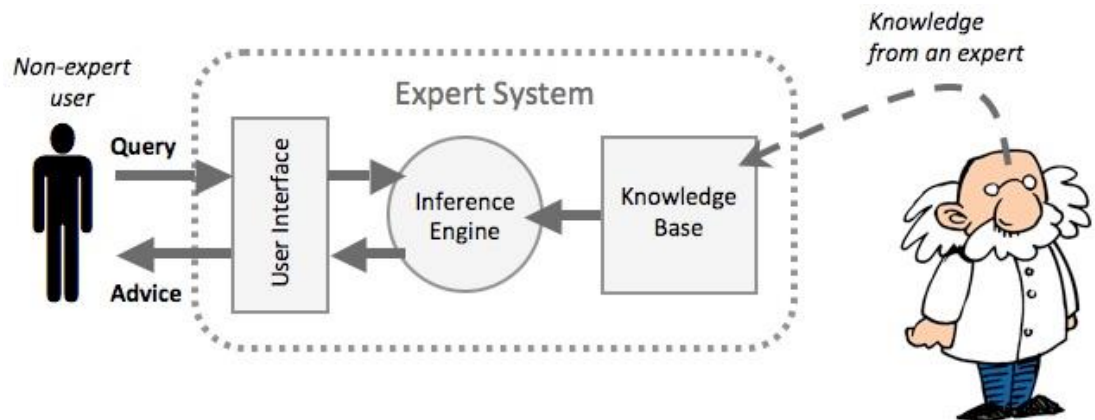


Figure 7.11: Working of ES

7.3.1 Expert System - Examples

➤ **An insurance organization**

- can build expert systems to help a clerk classify insurance applications.

➤ **A secretary can use an expert system**

- to determine where a piece of correspondence item might have been routed by answering questions such as when the item was mailed, from what department, and by whom, etc.

➤ **CADUCEUS and MYCIN**

- medical diagnosis systems.
- The user describes their symptoms to the computer as they would to a doctor and the computer returns a medical diagnosis.

➤ **DENDRAL**

- was a tool to study hypothesis formation in the identification of organic molecules.

➤ **MISTRAL**

- is an expert system to monitor dam safety, developed in the 90's by Ismes (Italy).

7.3.2 Business Information Systems (BIS)

➤ **Definition BIS**

- Also called Functional Business Systems, is a system which automate any functional activity of a business.
- **Functional Activity/Units/Areas of a Business**
 - An information system for sale department is a BIS for sale
 - An information system for inventory control is an inventory IS
 - human resource management system
 - An information system for purchase department is a BIS for purchase
 - others

7.3.3 Knowledge Management Systems (KMS)

➤ **Definition of KMS**

- refers to an IT-based system used for supporting capturing, creation, storage and dissemination of useful business information within the organization.

➤ **Objective/idea of a KM system**

- To enable employees to have ready access to the organization's sources of information, i.e., knowledge and solutions to different problems.

➤ **Types of Knowledge**

- *Explicit knowledge* –
 - data, documents, and things written down or stored in computers are called explicit knowledge
- *Tacit (silent, understood) knowledge* –
 - the “how-to” knowledge in workers’ minds is the best example of Tacit knowledge.

➤ **Examples of Knowledge**

- “an engineer could know the metallurgical composition of an alloy that reduces sound in gear systems”
- processes, procedures, patents, reference works, formulas, best practices, and fixes

7.3.3 KMS

➤ Knowledge-creating Company

- The company working on and using KMS are called knowledge-creating company. These companies
 - (1) consistently creates new business knowledge,
 - (2) disseminates it throughout the company and
 - (3) builds it into its products and services.

➤ Technology for KMS

- Some of the key technologies commonly used by KMS are
 - internet,
 - intranet web sites,
 - groupware,
 - data mining,
 - knowledge bases, and
 - online discussion groups/forums

7.3.4. Strategic Information Systems (SIS)

➤ **Definition SIS**

- Information System that support or shape the competitive position and strategies of an enterprise within the market and get competitive advantages.
- ***Objectives/Aims/Targets of SIS***
 - to change the organizational goals, operations, products, and services whenever pressure of competitive forces is built over the organization.
 - Organizations try to adopt competitive strategies in order to gain complete advantages over the competitors.

➤ **Competitive Forces**

- Rivalry of competitors within its industry
- New entrants into an industry and its markets
- Substitute products that may capture market share
- Bargaining power of customers
- Bargaining power of suppliers

➤ **Competitive Strategy – Example**

- Fed Ex. Online Tracking Strategy over conventional courier/postal services Companies

7.3.4. Examples of Competitive Forces & Strategies

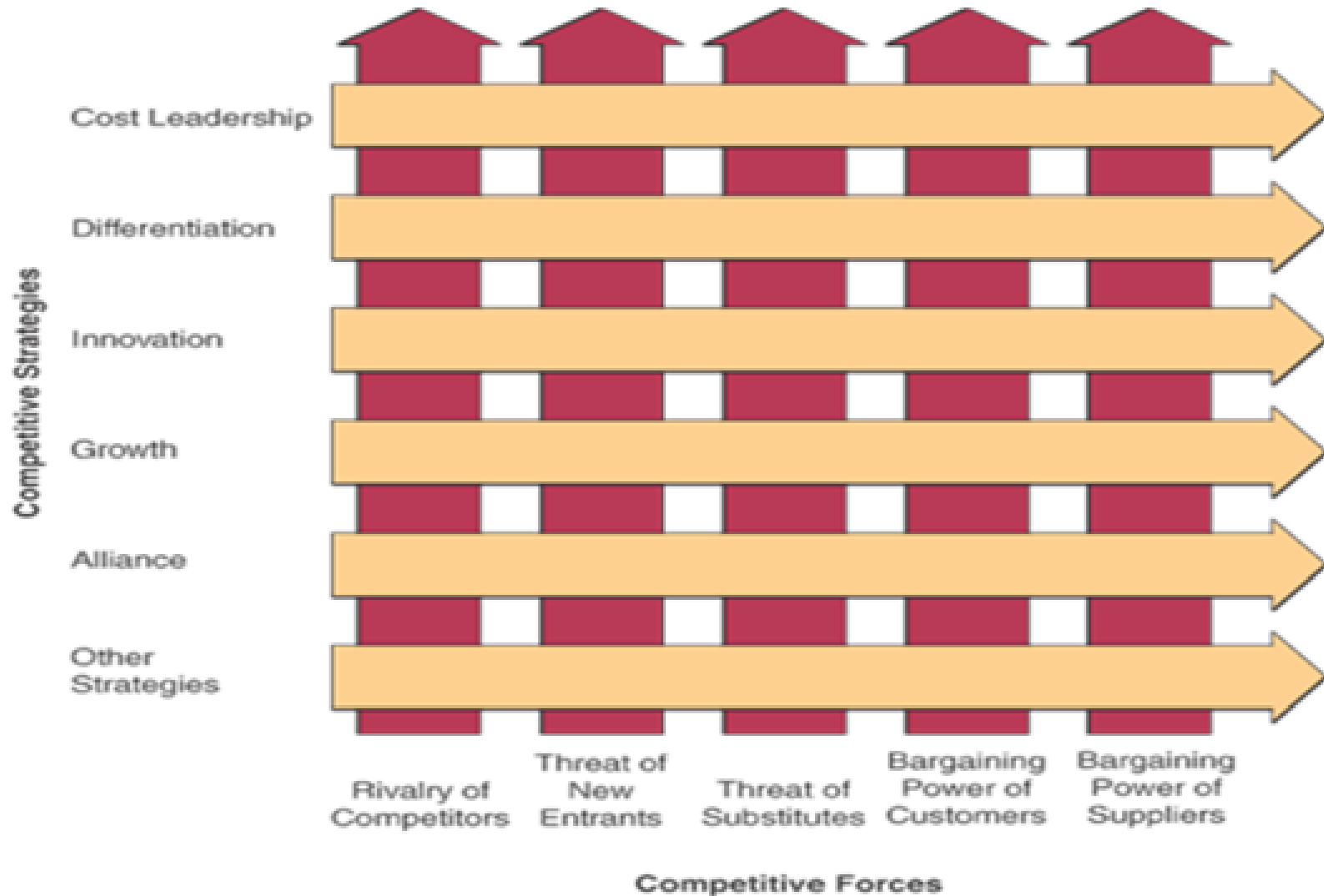


Figure 7.12: Competitive Strategies

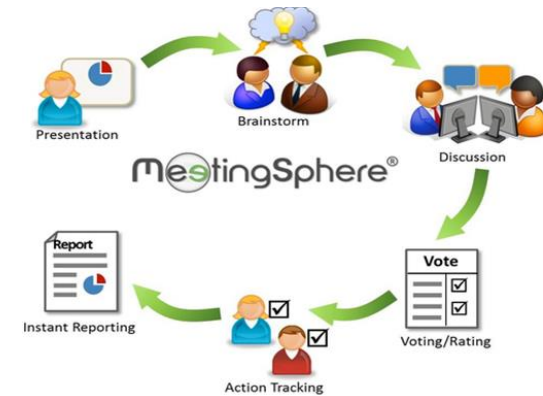
Competitive Strategies

- **Cost Leadership –**
 - become low-cost producers. It helps suppliers or customers to reduce costs so that to increase sale.
- **Differentiation Strategy –**
 - differentiate a firm's products from its competitors' by focusing on a particular segment or niche (position) of market.
- **Innovation Strategy –**
 - launch unique products and services by bringing radical changes to business processes.
- **Growth Strategy –**
 - expanding company's goods and services in-terms of global markets and diversity (customization)
- **Alliance Strategy –**
 - linkages with customers, suppliers, and other companies to overcome loss in profit or kick-out new entrants into the market.
- **Lock in Customers and Suppliers – Building Switching Costs –**
 - invest in IT to build valuable relationship with stakeholders to Deter (try to prevent) them from switching to competitors
- **Erect Barriers (roadblocks) to Entry –**
 - discourage companies from entering the market by increasing the technology or investment needed for them to enter the market.
- **Build Strategic IT Capabilities –**
 - take advantage of strategic opportunities when they arise and improve efficiency of business practices.
- **Investment in IT –**
 - develop products and service that would not be possible without a strong IT capability. e.g. intranet and extranet to leverage its previous investment in software, browsers, PC's, servers and client/server network.

7.3.5 Group Decision Support Systems (GDSS)

➤ GDSS Definition

- An interactive computer-based system that supports the process of finding solutions by a virtual group of decision makers.
- It provides an auxiliary support feature for brainstorming before decision making.
- **Virtual group** –
 - a group of decision makers physically available far away from each other in different locations and taking part in decision making process.
- **Virtual decision room** –
 - a face-to-face setting for a group DSS, in which terminals are available to the participants of the virtual group.
- **Examples of GDSS**
 - **MeetingSphere** - an online tool for productive and efficient meetings.
 - **ThinkTank** - helps leaders of large organizations to execute core processes with greater efficiency, consistency, and transparency.
 - **PowerNoodle** - helps decision makers and participants in decision making



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7.3.6 Marketing Information Systems (MkIS)

➤ **MkIS Definition**

- a continuing and interacting structure of people, equipment and procedures to gather, sort, analyze, evaluate, and distribute relevant, timely and accurate information for use by marketing decision makers to improve their marketing planning, implementation, and control.
- **Architecture/Components of MkIS** (Robert Jamon (2003),)
 - *User interfaces* –
 - the method used by the managers for interaction with the system
 - *Application software* –
 - the programs used to collect, analyze, and manage data.
 - *Database marketing* –
 - is a system in which marketing data files are organized and stored.
 - *System support* –
 - system managers who manage and maintain the system assets including software and hardware network, monitor its activities and ensure compliance with organizational policies.
- **Examples of MkIS**
 - [Microsoft Excel](#), [SPSS](#), and on-line analytical tools that help collect and analyze marketing data

References

- Ali, R. & Ali, A. (2018). Chapter 7: Types of Information Systems in Business. *Management Information System – 1st Edition* (pp. 130-155). Muhalla Jangi, Qissa Khawani, Peshawar, Pakistan: Al-ilum Publications.

Thanks!
Any Questions
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