

## INFORMATION TECHNOLOGY CHARTS INDEX

Ch No.	Name of the Chapter	Volume 1 Page No.	Chart No.
1	Business Process Management & IT	1 - 33	1.1 to 1.4
2	Information Systems and IT Fundamentals	34 - 83	2.1 to 2.5
3	Telecommunication and Networks	84 - 128.11	3.1 to 3.5
4	Business Information Systems	131 - 167, 4.1 - 4.5	4.1 to 4.3
5	Business Process Automation through Application Software	168 - 190 5.1 - 5A.13	5.1 to 5.4

### Note

It is advisable to use these colourful charts for revision after completion of every chapter  
These Charts will help you to finish large volume of subject in few hours

By - CA Swapnil Patni

CA, CS, LLB, B.Com, CISA

# Chapter 1 - Business Process Management & IT (Chart 1.1)

## Cycles in Business Process Flow

Accounting	Sales	Purchase	Finances
1) Source Document	1) Customer Order	1) Purchase requisition	1) Financial Planning
2) Journal	2) Recording	2) Request for quote	2) Resource Allocation
3) Ledger	3) Pick release	3) Quotation	3) Operation & Monitoring
4) Trial Balance	4) Shipping	4) Purchase order	4) Evaluation, Analysis & Reporting
5) Adjustments	5) Invoice	5) Receipts	
6) Adjusted Trial balance	6) Receipt	6) Payments	
7) Closing Entries	7) Reconciliation		
8) Financial statement			

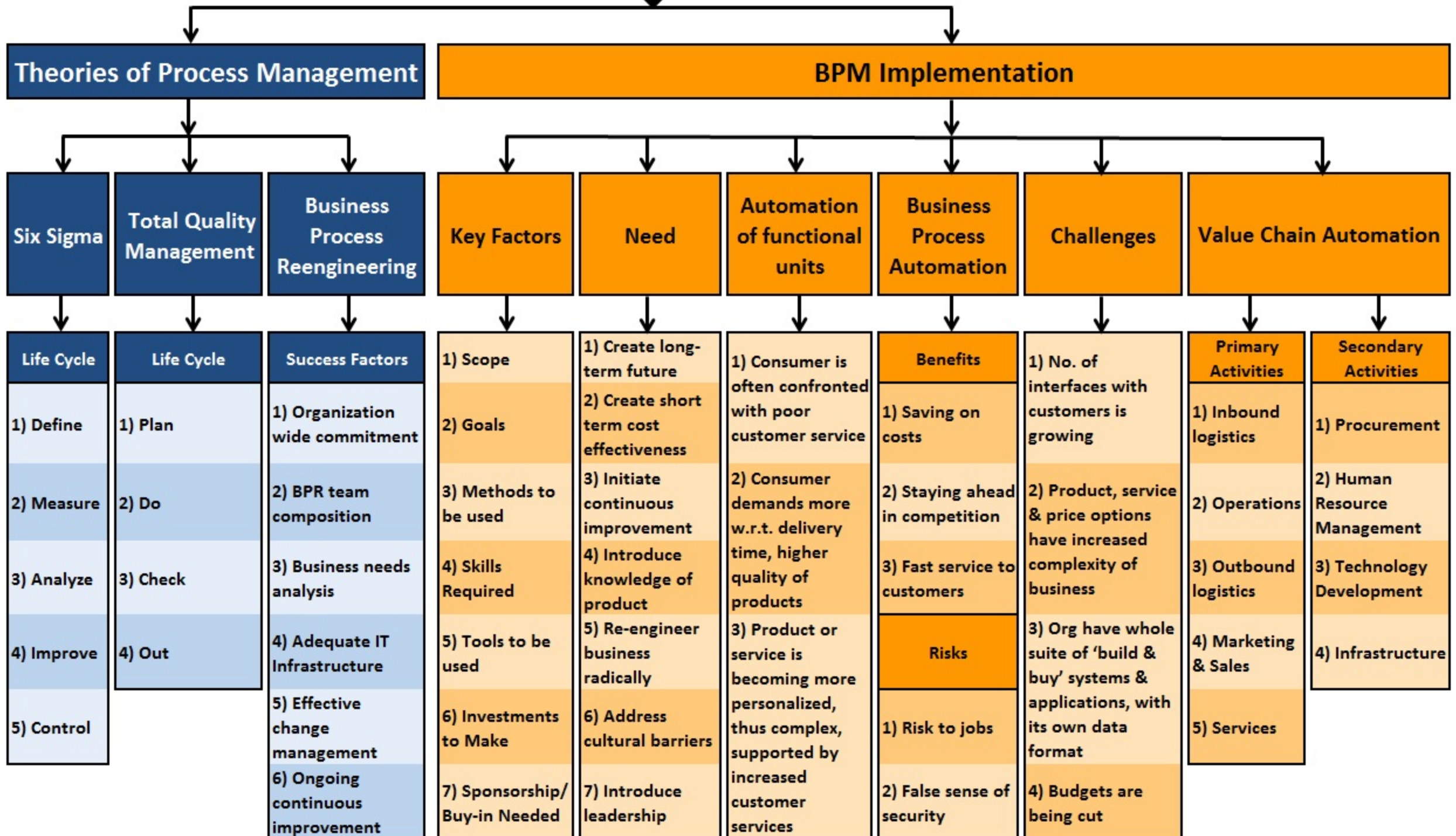
## Business Process Management

"The achievement of an organization's objectives through the improvement, management and control of essential business processes"

Benefits	Principles	Practices	Life Cycle
1) Effectiveness	1) Processes are assets	1) Process-oriented organizational structure	1) Analysis phase
2) Distribution of tasks to process participants	2) Value to customers	2) Appoint process owners	2) Design phase
3) Creation of basic operational value proposition	3) Continuous improvement	3) Top-Down Commitment, Bottom-Up Execution	3) Implementation phase
		4) Use IT to manage processes	4) Run & Monitor phase
		5) Collaborate with Business Partners	5) Optimize
		6) Continuous learning & process improvement	
		7) Align employee rewards to process performance	
		8) Utilize BPR, TQM & other process improvement tools	



# Chapter 1 - Business Process Management & IT (Chart 1.2)



# Chapter 1 - Business Process Management & IT (Chart 1.3)

## Accounting Systems Automation

## Impact of IT on BPM and Risks of failure of IT

### Basic Functions

- 1) Collect and store data
- 2) Record transaction
- 3) Safeguard organisational assets

### Processing Cycles of an Accounts BPM

#### Processing Cycles

- 1) Financing Cycles
- 2) Revenue Cycle
- 3) Expenditure Cycle
- 4) Human Resource Cycle
- 5) Production Cycle

#### General Ledger & Reporting System

Information processing operations involved in updating general ledger & preparing reports, summarize results of an organization's activities. An important function of AIS is to efficiently & effectively collect & process data about company's transactions

#### Data Processing Cycle - Steps

- 1) Data input
- 2) Data storage
- 3) Data processing
- 4) Information output

### Benefits of BPMS

- 1) Automating repetitive business processes
- 2) Works by 'loosely coupling' with existing applications
- 3) Operational Savings
- 4) Reduction in administration involved in Compliance & ISO Activities
- 5) Freeing-up of employee time

### Business Risks of failure of IT

- 1) Superficial executive involvement
- 2) Deficient project management
- 3) Breakdown in gap analysis
- 4) Limited options for customization
- 5) Not flexible, too complicated to be customized
- 6) Failure to identify future business needs
- 7) Inadequate assessment
- 8) Persistent compatibility problems
- 9) Resources not available
- 10) Software fails to meet business needs
- 11) System may be over-engineered
- 12) Technological obsolescence



# Chapter 1 - Business Process Management & IT (Chart 1.4)

## Approaches to Mapping Systems

### Techniques for mapping business processes

#### Reasons why documentation is important to Information Systems

- 1) Depicting how the system works
- 2) Training users
- 3) Designing new systems
- 4) Controlling system development and maintenance costs
- 5) Standardizing communications with others
- 6) Auditing Information Systems
- 7) Documenting business processes

#### Entity Relationship Diagram

Symbols	Types of Relationships	Advantages	Limitations
1) Boxes 2) Diamonds 3) Ovals	1) One-to-One 2) One-to-Many 3) Many-to-One 4) Many-to-Many	1) Easily understandable 2) Understood by non-technical specialist 3) Helps in Physical Database creation 4) Generalized and specialized 5) Database design	1) May have ambiguities or inconsistency 2) Lead to misinterpretations

#### Data Flow Diagram

Component's Symbols	Advantages	Limitations
1) Entity 2) Process 3) Data Store 4) Data Flow	1) Describe Boundaries 2) Communicating existing system 3) Straightforward graphical technique 4) Detailed representation 5) Part of system documentation file 6) Easier to understand 7) Supports logic	1) Confusing 2) Takes long time to create 3) Physical considerations are left out

#### Flowchart

Types	Advantages	Limitations
1) Document Flowchart 2) System Flowchart 3) Program Flowchart	1) Quicker grasp of relationships 2) Effective Analysis 3) Communication 4) Documentation 5) Efficient coding 6) Orderly check out of problem 7) Efficient program maintenance	1) Complex logic 2) Modification 3) Reproduction 4) Link between conditions and actions 5) Standardization

#### Decision Tree

Advantages	Limitations
1) Simple to understand 2) Possible scenarios can be added 3) Determine worst, best & expected values	1) Biased 2) Calculations get complex

#### Decision Table

Parts	Advantages	Limitations
1) Condition Stub 2) Action Stub 3) Condition Entries 4) Action Entries	1) Easy to Draw 2) Compact Documentation 3) Simplicity 4) Direct Codification 5) Better Analysis 6) Modularity 7) Non-technical	1) All programmers not familiar 2) Do not express total sequence



# Chapter 2 - Information Systems and IT Fundamentals

## (Chart 2.1)

### Auditing in IT Environment

#### Audit Objectives

- 1) Existence
- 2) Authorization
- 3) Valuation
- 4) Cutoff
- 5) Compliance
- 6) Operational
- 7) Assisting management in implementing Internal Controls
- 8) Participating in designing Computer Control
- 9) Determining efficient use of Computer resources is made
- 10) Determining Computer system accomplishes business objectives

#### Differences in Audit Procedures

- 1) Study Technical Aspects
- 2) Use Unique Techniques
- 3) Audit Software Usage

#### IT Risks & Issues

##### Risks

- 1) Business risks
- 2) Technology risks
- 3) Operational risk
- 4) Other risks

##### Issues

- 1) What type of process will enterprise use to identify business & technology risks when changes in technology occur
- 2) What are risks faced by enterprise when it makes changes to critical system which cannot afford to fail?

#### Impact of IT on Risks and Controls

- 1) Ready access to terminals as CIS are highly distributed & leads to ease in perpetration of computer related crimes thereby increasing temptation for abuse
- 2) On-line processing of data & validation checks would help prospective perpetrator in guessing passwords
- 3) If threats are not anticipated & adequate controls not designed to mitigate them, system & its resources will be vulnerable
- 4) Failure to recognize risks or potential impacts of those risks

#### Auditors' Concern

- 1) Develop & apply new criteria in evaluating control weaknesses in CIS
- 2) Tailor testing techniques to CIS under study
- 3) Use computers to perform some portions of audit examination





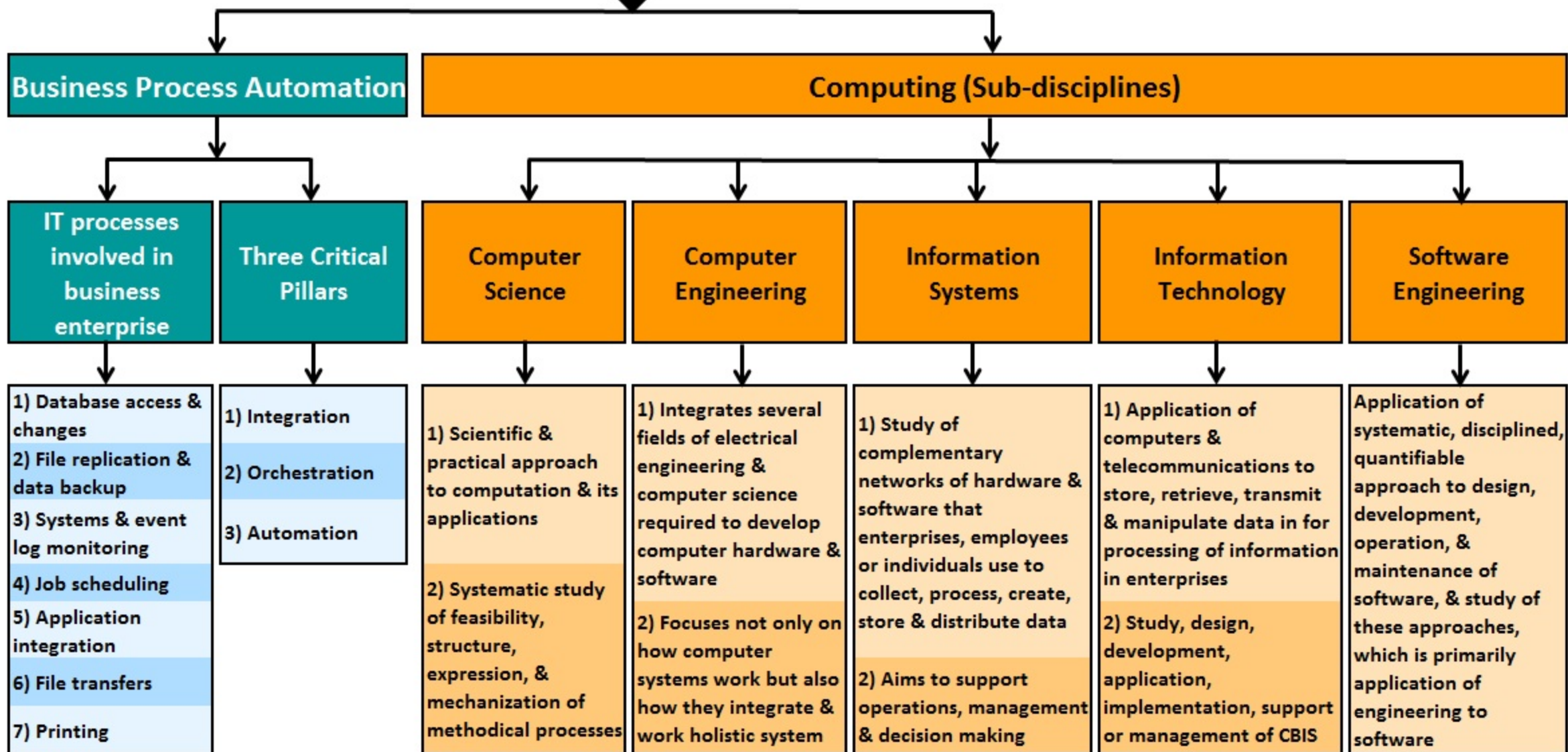
# SWAPNIL PATNI'S CLASSES

## ALL INDIA RANKERS - NOV 2018

एक ही साथ, एक ही मंच पर



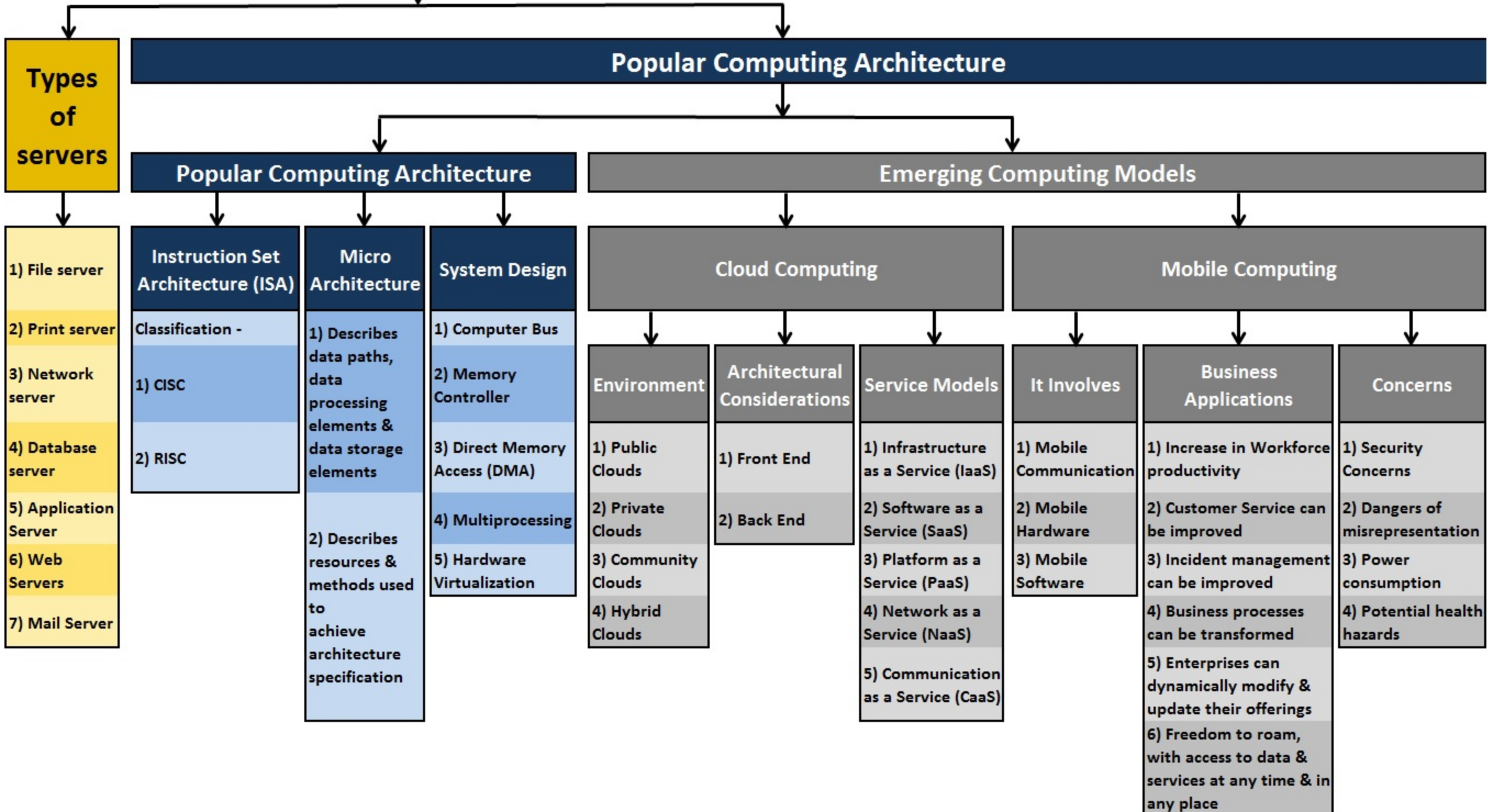
## Chapter 2 - Information Systems and IT Fundamentals (Chart 2.2)





## Chapter 2 - Information Systems and IT Fundamentals (Chart 2.3)

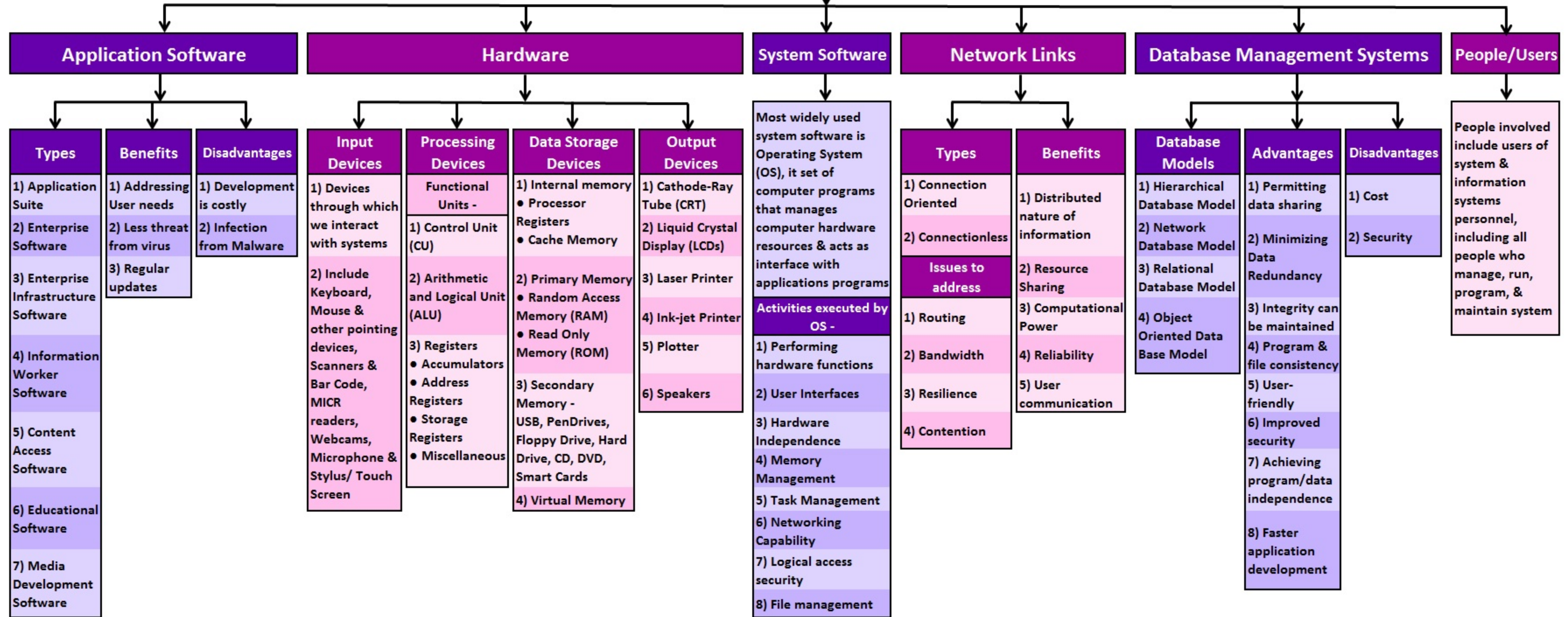
### Computing Technologies





## Chapter 2 - Information Systems and IT Fundamentals (Chart 2.4)

### Information System Layers





# Chapter 2 - Information Systems and IT Fundamentals

## (Chart 2.5)

### Information System Life Cycle

#### Phase 1 - System Investigation

'What is problem & is it worth solving?

Feasibility study  
Dimensions -

- 1) Economic feasibility
- 2) Legal feasibility
- 3) Operational feasibility
- 4) Schedule feasibility
- 5) Technical feasibility

MT : Economical LOST

#### Phase 2 - System Analysis

What must Information System do to solve problem?

- 1) Interviewing staff
- 2) Examine current business
- 3) Sending out questionnaires
- 4) Observation of current procedures

#### Phase 3 - System Designing

How will Information System do that it must do to obtain solution to problem?

Specifies technical aspects of proposed system -

- 1) Hardware platform
- 2) Software
- 3) Outputs
- 4) Inputs
- 5) User interface
- 6) Modular design
- 7) Test plan
- 8) Conversion plan
- 9) Documentation

#### Phase 4 - System Implementation

How will Solution be put into effect?

Installation -

- 1) New Hardware
- 2) Training users
- 3) Conversion/ creation of new of master files

Conversion -

- 1) Direct Changeover
- 2) Parallel Conversion
- 3) Phased Conversion
- 4) Pilot Conversion

#### Phase 5 - System Maintenance & Review

Evaluates results of solution & modifies system to meet changing needs

Post implementation review done to address -

- 1) Programming amendments
- 2) Adjustment of clerical procedures
- 3) Modification of Reports
- 4) Request for new programs

System maintenance objectives

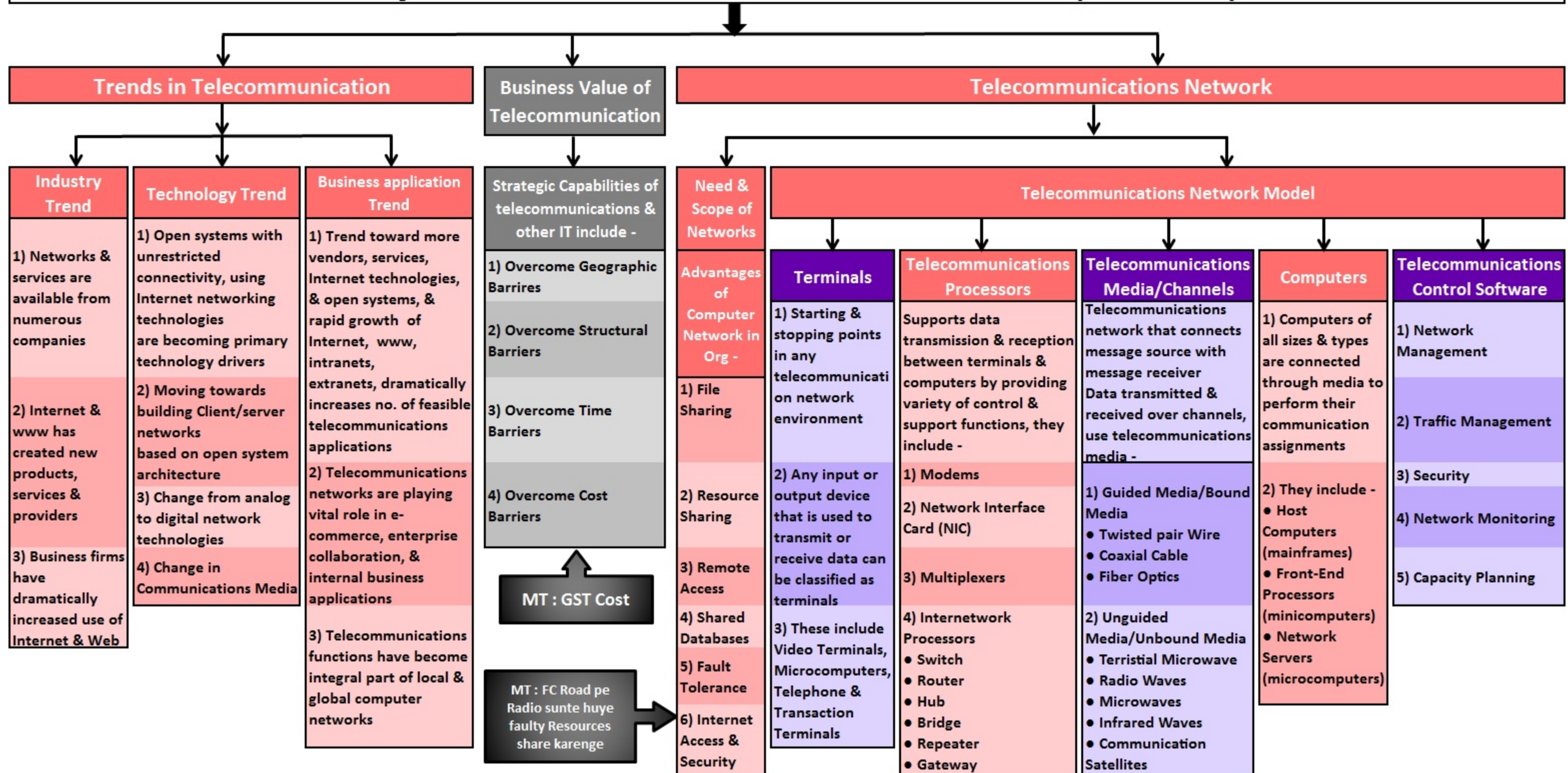
- 1) Perfective Maintenance
- 2) Adaptive Maintenance
- 3) Corrective Maintenance

#### Recent Technologies

- 1) Bluetooth
- 2) Wi-Fi
- 3) Laptop/ Notebook
- 4) Tablet
- 5) Smart Phone
- 6) Touchpad
- 7) iPad
- 8) iPod
- 9) Ultra-Mobile PC
- 10) Android



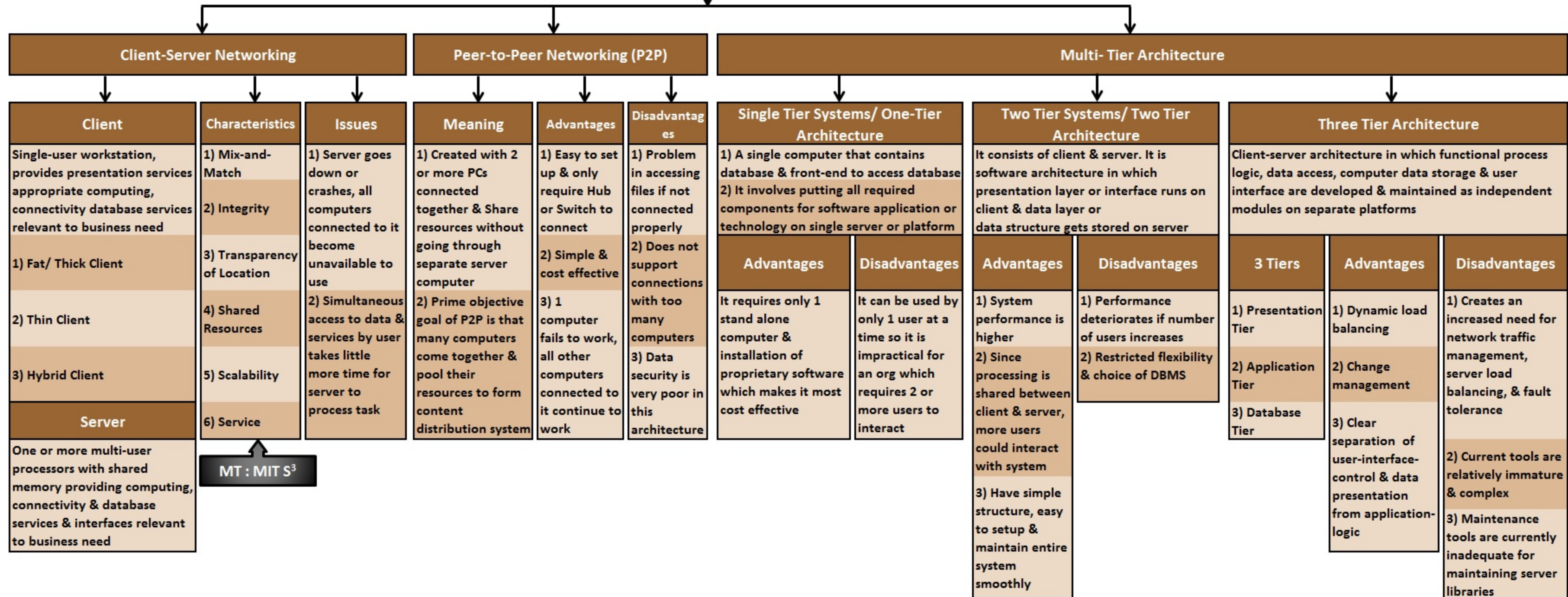
## Chapter 3 - Telecommunication and Networks (Chart 3.1)





## Chapter 3 - Telecommunication and Networks (Chart 3.2b)

### Classification of Telecommunication Networks - Functional Based Classification





## Chapter 3 - Telecommunication and Networks (Chart 3.3a)

### Network Computing

#### Centralized Computing

- 1) Computing done at central location, using terminals that are attached to central computer
- 2) It offers greater security over decentralized systems because all of processing is controlled in central location

#### Decentralized Computing

- 1) Allocation of resources both hardware and software, to each individual workstation, or office location
- 2) Decentralized systems enable file sharing & all computers can share peripherals such as printers as well as modems, allowing all computers in network to connect to internet

### Network Topology

#### Star Network

##### Characteristics

- 1) Ties end user computers to central computer
- 2) Central unit acts as traffic controller
- 3) Well suited to companies with one large data processing facility shared by number of smaller departments

##### Advantages

- 1) Several users can use central unit at same time
- 2) Easy to add new nodes & remove existing nodes
- 3) Node failure does not bring down entire network
- 4) Easier to diagnose network problems through central hub

##### Disadvantages

- 1) Whole network is affected if main unit goes down
- 2) Considered less reliable
- 3) Cost of cabling are very high

#### Bus Network

##### Features

- 1) All communications travel along this cable called bus
- 2) Bus networks have decentralized approach

##### Advantages

- 1) Reliable as well as easy to use & understand
- 2) One of microcomputers fails, it will not affect entire network
- 3) Requires least amount of cable
- 4) Easy to extend
- 5) Repeater can be used to extend

##### Disadvantages

- 1) Heavy network traffic can slow
- 2) Each connection between 2 cables weakens electrical signal
- 3) Bus configuration can be difficult to troubleshoot

#### Ring Network

##### Characteristics

- 1) Local computer processors are tied together sequentially
- 2) Has decentralized approach
- 3) Data is passed along ring
- 4) Reliable & less costly

##### Advantages

- 1) Do not require central computer
- 2) Direct communication between each computer
- 3) Not susceptible to breakdowns
- 4) Offer high performance
- 5) Span longer distances
- 6) Easily extendable

##### Disadvantages

- 1) Relatively expensive & difficult to install
- 2) Failure of one computer can affect whole network
- 3) Difficult to troubleshoot
- 4) Adding or removing computers can disrupt network

#### Mesh Network

##### Meaning

- 1) Random connection of nodes using communication links
- 2) Reliability is very high as there are always alternate paths available if direct link between two nodes is down or dysfunctional
- 3) Military installations, which need high degree of redundancy, may have such networks

##### Advantages

- 1) Yields greatest amount of redundancy if one of nodes fails, network traffic can be redirected to another node
- 2) Network problems are easier to diagnose

##### Disadvantages

High cost of installation & maintenance, more cable is required



## Chapter 3 - Telecommunication and Networks (Chart 3.3b)

### Network Computing - Digital Data Transmission

#### Serial versus Parallel Transmission

##### Parallel Transmission

There are separate parallel paths corresponding to each bit of byte so that all character bits are transmitted simultaneously

##### Serial Transmission

Bits of each byte are sent along single path one after another

##### Asynchronous Transmission

- 1) Each character is sent at irregular intervals in time as in case of characters entered at keyboard in real time
- 2) Sender provides synchronization signal to receiver before starting transfer of each message

##### Synchronous Transmission

- 1) Transmitter & receiver are paced by same clock
- 2) Receiver continuously receives (even when no bits are transmitted) information at same rate transmitter sends it

#### Transmission Mode

##### Simplex

- 1) Data flows in only one direction (ie.. unidirectional) from transmitter to receiver
- 2) This type of connection is useful if data do not need to flow in both directions
- 3) Eg - Keyboard

##### Half-Duplex

- 1) Data flows in one direction or other, but not both at same time
- 2) This type of connection makes it possible to have bidirectional communications using full capacity of line
- 3) Eg - Walkie Talkie

##### Full-Duplex

- 1) Data flows in both directions simultaneously
- 2) Each end of line can transmit & receive at same time, which means that bandwidth is divided in 2 for each direction of data transmission
- 3) Eg - Mobile Phone

#### Transmission Techniques

##### Broadcast Networks

- 1) Data transmitted by one node is received by many, sometimes all, of other nodes
- 2) Method of transferring message to all recipients simultaneously

##### Switched Networks

- 1) Data transferred from source to destination is routed through switch nodes
  - 2) Way in which nodes switch data from one link to another, as it is transmitted from source to destination node
- ##### Switching techniques
- 1) Circuit Switching
  - 2) Packet Switching
  - 3) Message Switching

#### Network Architectures and Protocols

##### Network Architectures

Layout of network consisting of hardware, software, connectivity, communication protocols & mode of transmission, such as wired or wireless

##### Protocols

Set of rules for inter-computer communication that have been agreed upon & implemented by vendors, users & standards bodies to ensure that info being exchanged between two parties is received & interpreted correctly

##### OSI Model

ISO developed 7 layer Open Systems Interconnection (OSI) model to serve as standard model for network architectures

- L7 Application Layer
- L6 Presentation Layer
- L5 Session Layer
- L4 Transport Layer
- L3 Network Layer
- L2 Data Link Layer
- L1 Physical Layer

##### Internet's TCP/IP

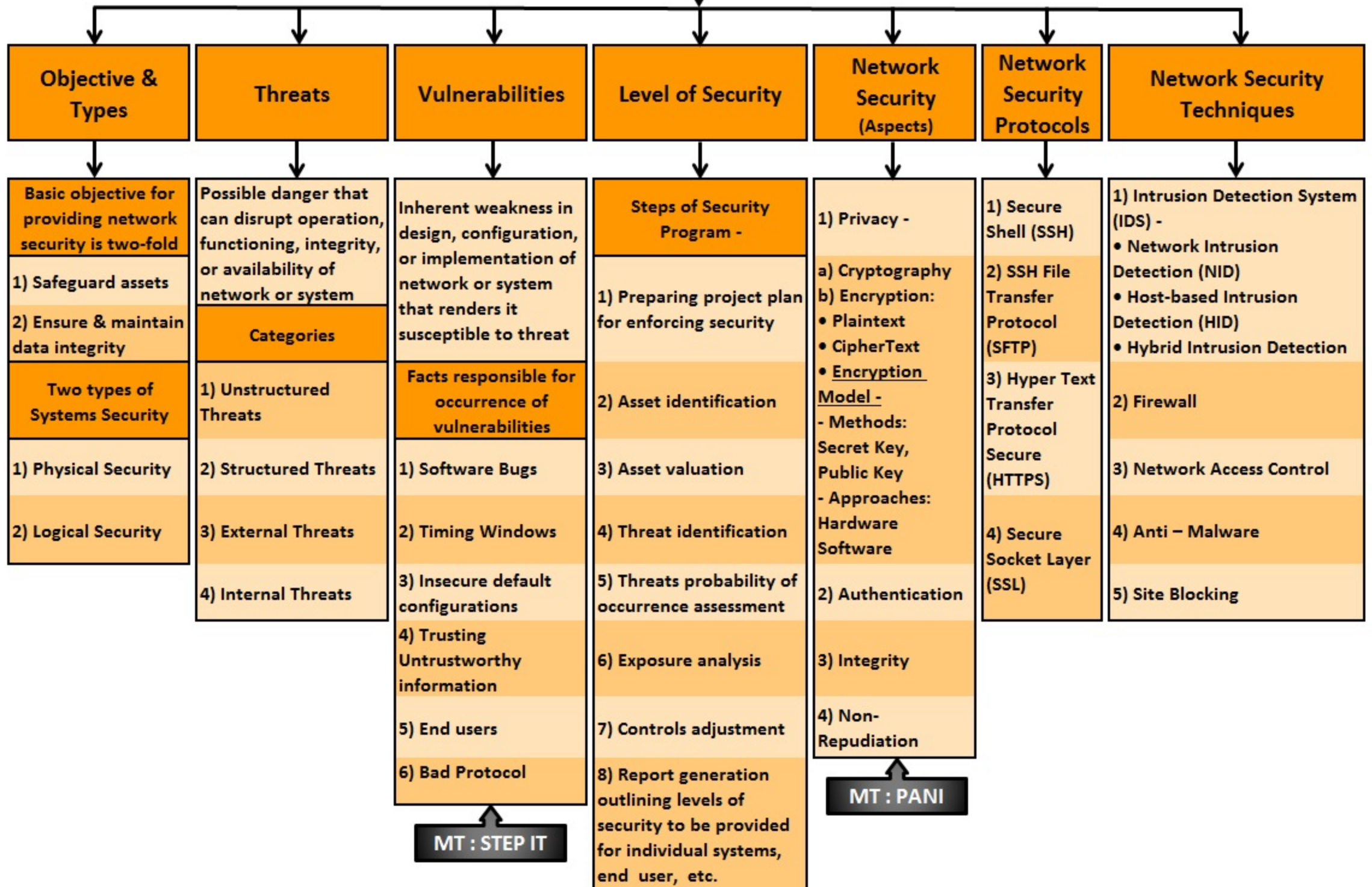
Consists of 5 levels of protocols that can be related to 7 layers of architecture OSI

- 1) Application or process layer
- 2) Host-to-Host Transport layer
- 3) Internet Protocol (IP)
- 4) Network Interface
- 5) Physical layer



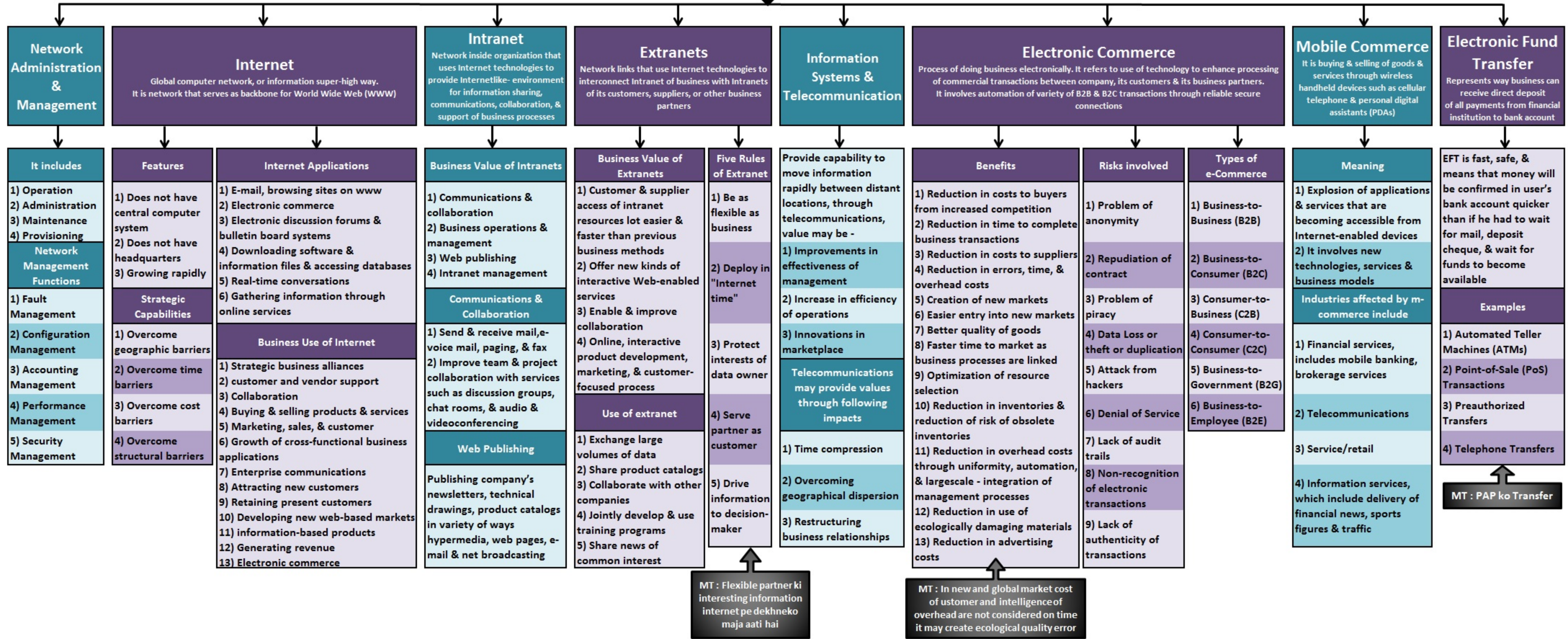
# Chapter 3 - Telecommunication and Networks (Chart 3.4)

## Network Risks, Controls and Security



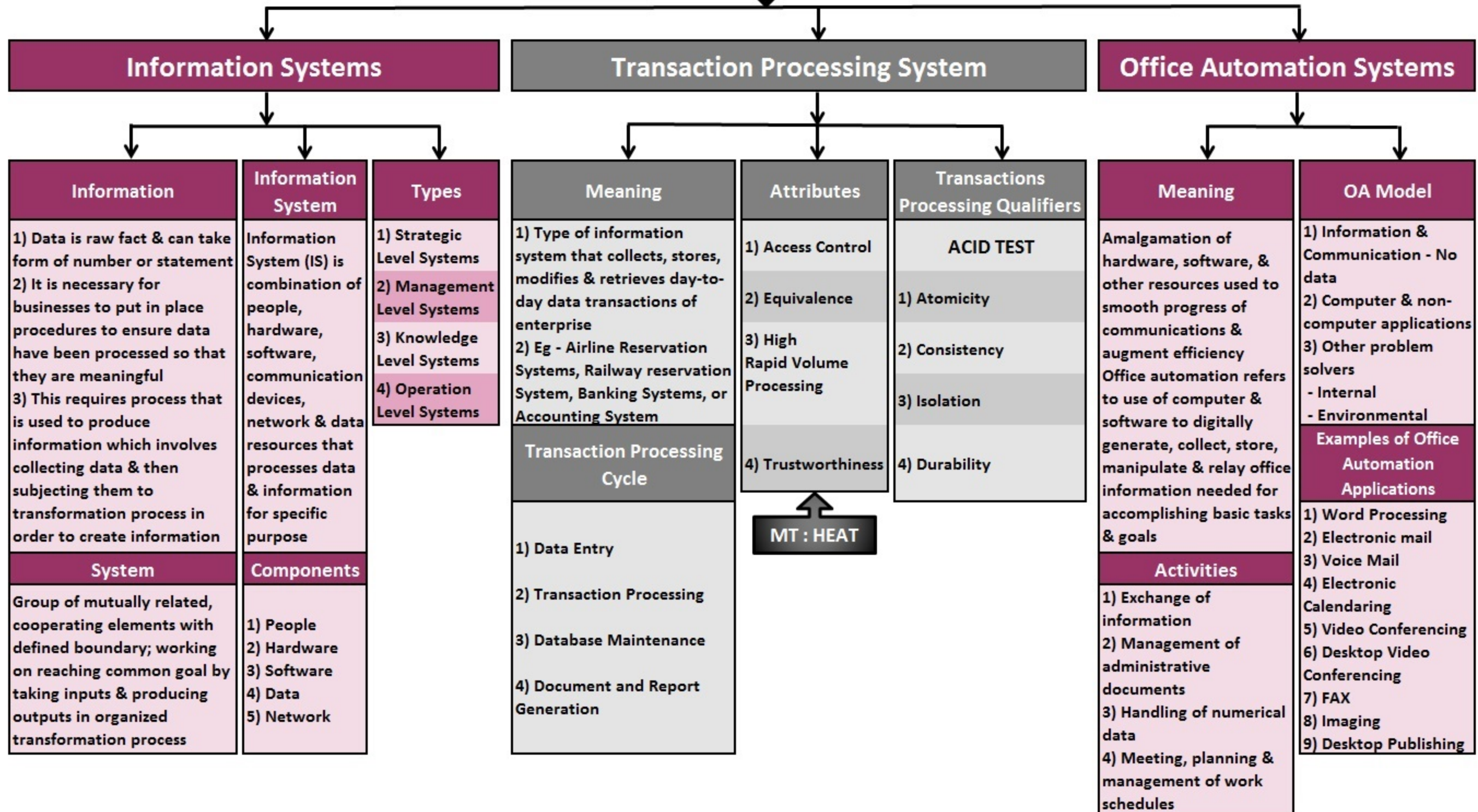


## Chapter 3 - Telecommunication and Networks (Chart 3.5)



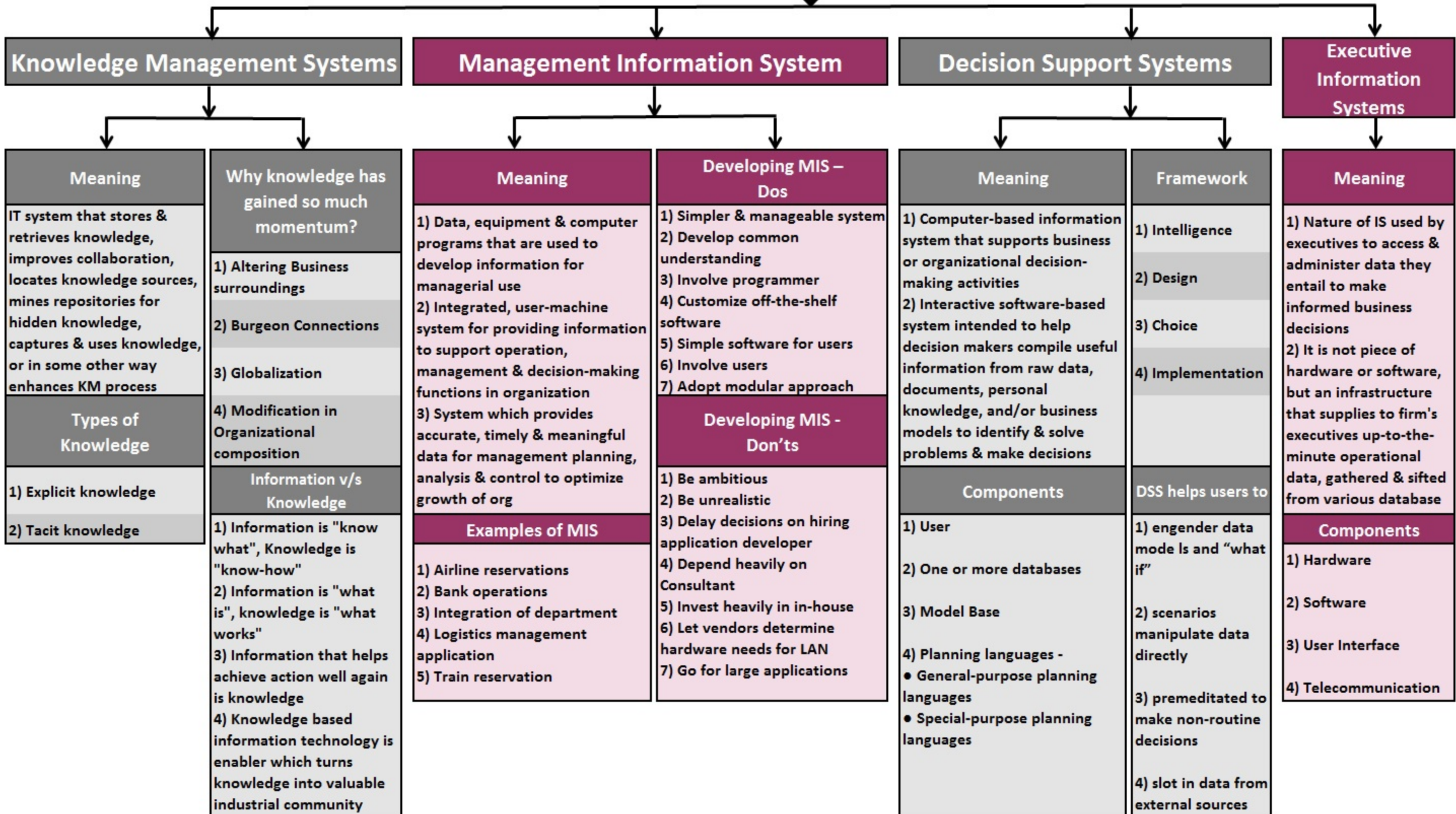


# Chapter 4 - Business Information Systems (Chart 4.1a)





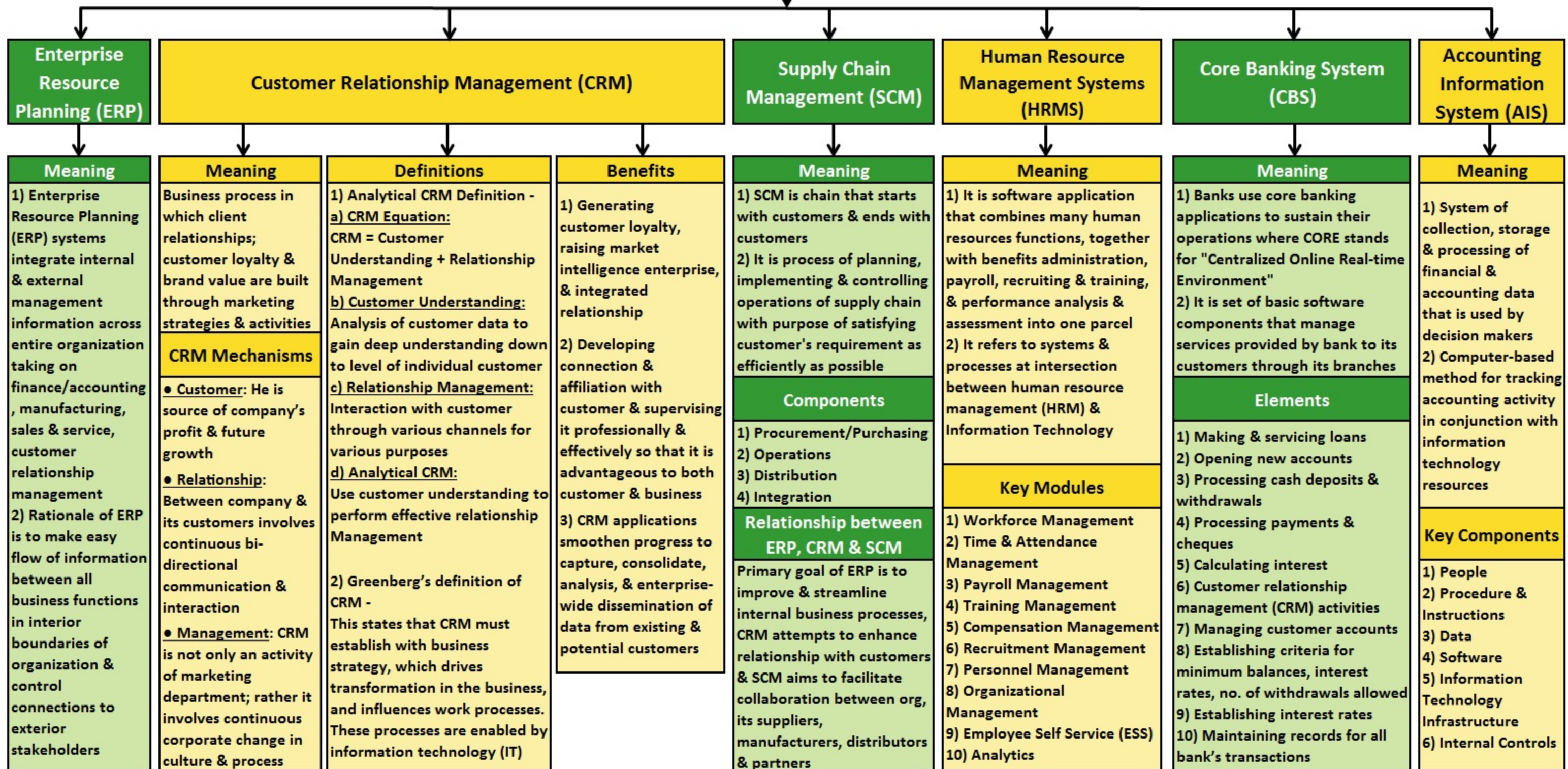
## Chapter 4 - Business Information Systems (Chart 4.1b)





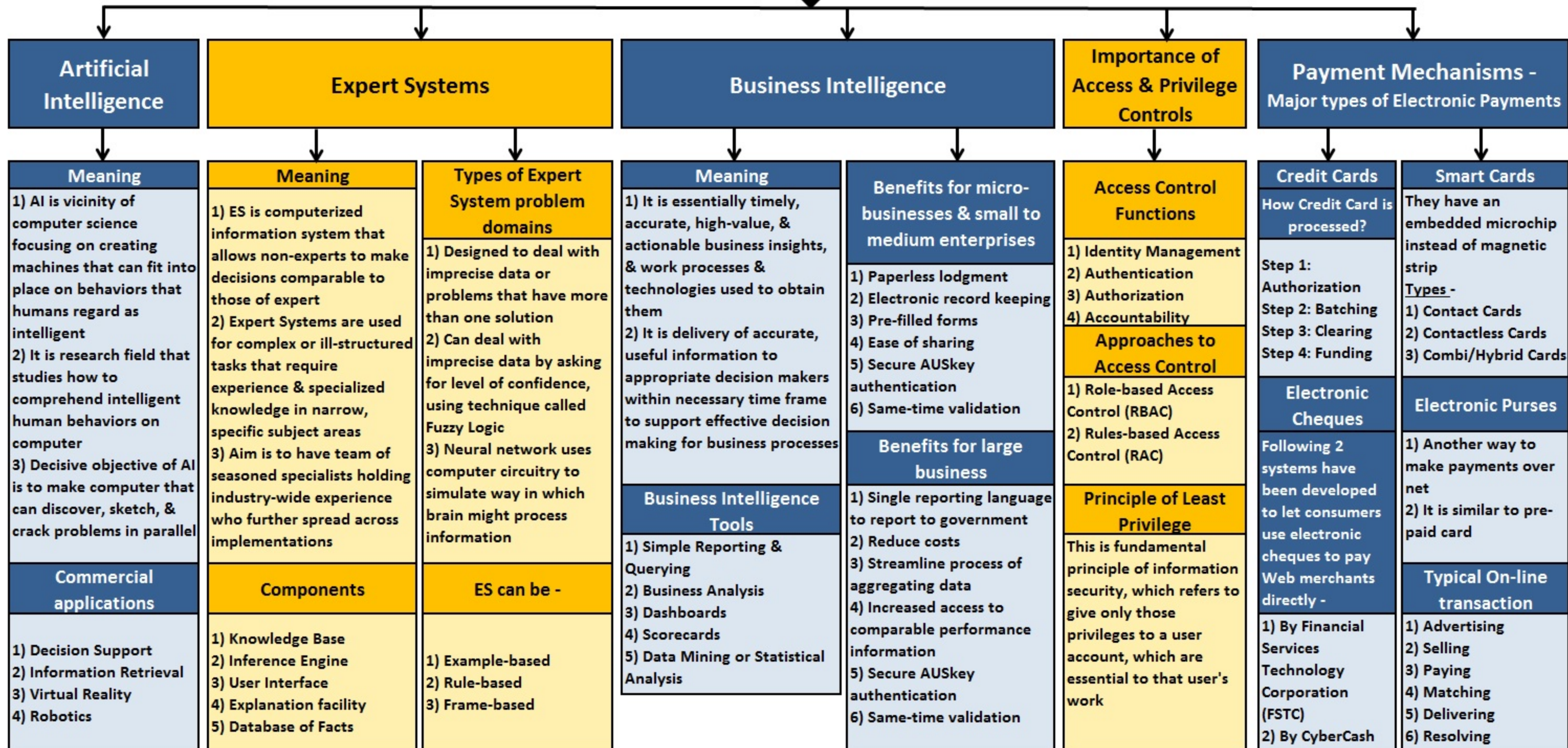
## Chapter 4 - Business Information Systems (Chart 4.2)

### Specialized Systems



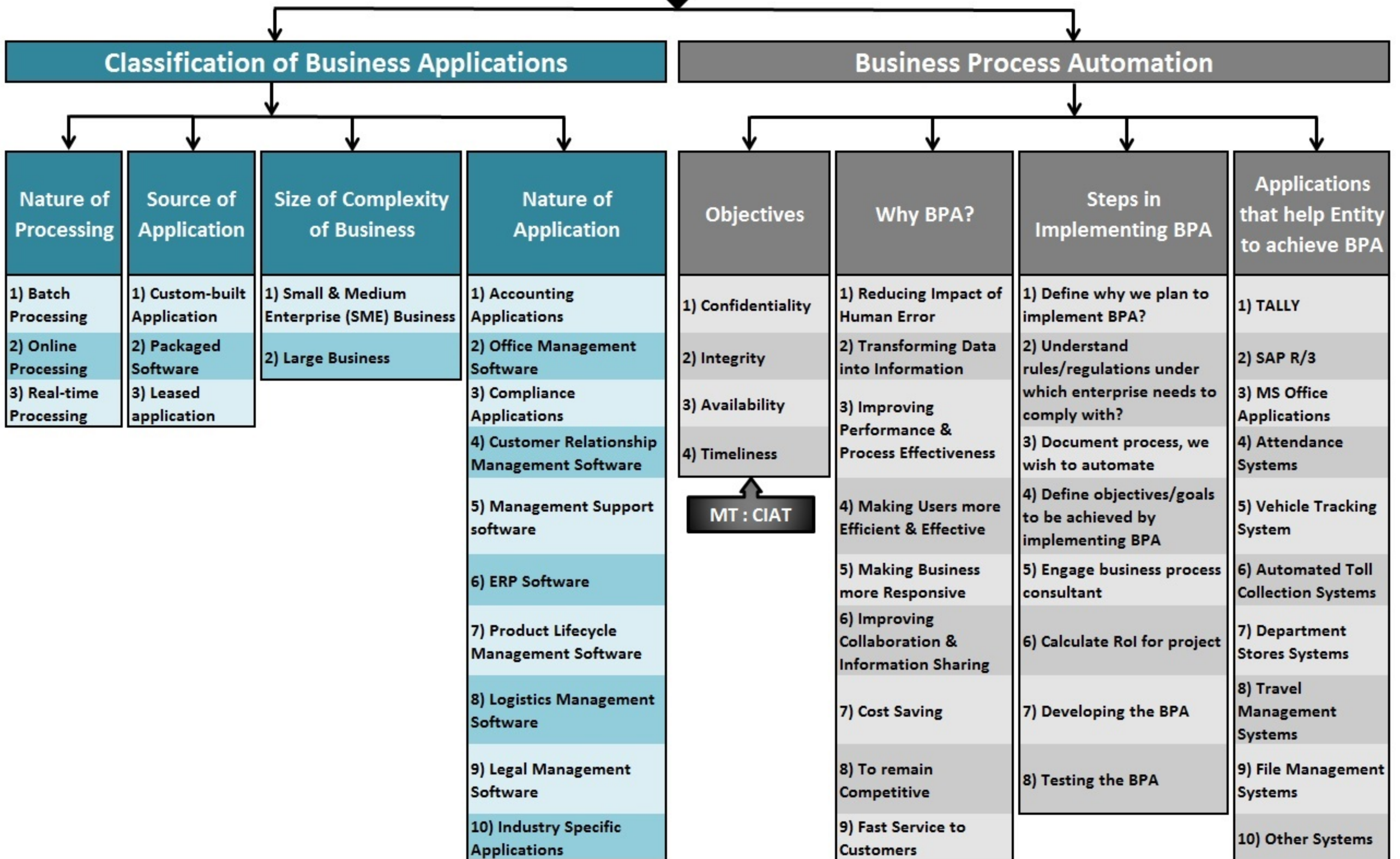


## Chapter 4 - Business Information Systems (Chart 4.3)



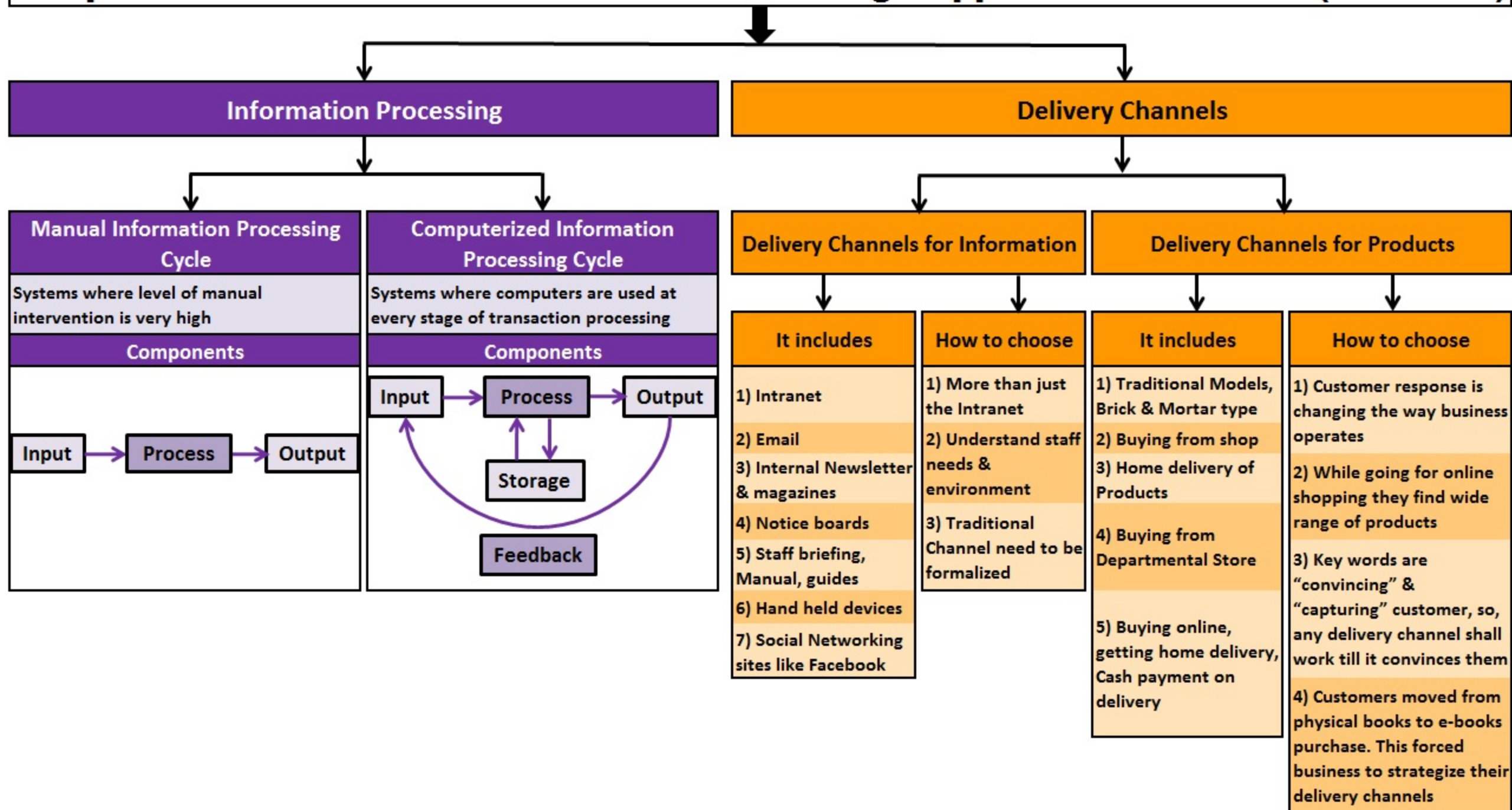


# Chapter 5 - Business Process Automation through Application Software (Chart 5.1)





## Chapter 5 - Business Process Automation through Application Software (Chart 5.2)





# Chapter 5 - Business Process Automation through Application Software (Chart 5.3)

## Controls in BPA

### Information Systems Control

#### Control Objectives

- 1) Authorization
- 2) Completeness
- 3) Accuracy
- 4) Validity
- 5) Physical Safeguards & Security
- 6) Error Handling
- 7) Segregation of Duties

#### Managerial Controls

##### Top Management & Information Systems Management

Major functions Senior Manager must perform -

- 1) Planning
- 2) Organizing
- 3) Leading
- 4) Controlling

##### Systems Development Management

Audits conducted during System Development process -

- 1) Concurrent Audit
- 2) Post-Implementation Audit
- 3) General Audit

##### Programming Management

Phases of Program Development life cycle -

- 1) Planning
- 2) Design
- 3) Coding
- 4) Testing
- 5) Operation & Maintenance

##### Data Resource Management

Data is critical resource that must be managed properly. It must be controlled carefully because consequences are serious if data definition is compromised or destroyed. Careful control be exercised over roles by appointing senior, trustworthy persons, separating duties to extent possible & maintaining & monitoring logs of data & database administrator's activities

##### Quality Assurance Management

Users are becoming more demanding in terms of quality of software they employ to undertake their work. Organizations are undertaking more ambitious information systems projects that require more stringent quality requirements & are becoming more concerned about their liabilities if they produce & sell defective software

##### Security Management

Major Threats -

- 1) Fire
- 2) Water
- 3) Energy Variations
- 4) Structural Damage
- 5) Pollution
- 6) Unauthorised Intrusion
- 7) Viruses & Worms
- 8) Misuse of Software, data & Services
- 9) Hackers

##### Operations Management

Operations Mtg performs controls over functions like Computer Operations, Communications Network Control, Data Preparation & Entry, Production control, File Library; Documentation & Program Library; Planning & Performance Monitoring. Controls must continuously monitor performance of hardware/software platform to ensure that systems are executing efficiently, an acceptable response time or turnaround time is being achieved

#### Applications Controls

##### Boundary

- 1) Cryptographic Controls
- 2) Access Controls
- 3) Personal Identification Numbers(PIN)
- 4) Digital Signatures
- 5) Plastic Cards

##### Input

- 1) Source Document Control
- 2) Data Coding Control
- 3) Batch Control
- 4) Validation Control

##### Communication

- 1) Physical Component Controls
- 2) Line Error Controls
- 3) Flow Controls
- 4) Link Controls
- 5) Topological Controls
- 6) Channel Access Controls
- 7) Internetworking Controls

##### Processing

- 1) Run-to-run totals
- 2) Reasonableness Verification
- 3) Edit Checks
- 4) Field Initialization
- 5) Exception Reports
- 6) Existence/Recovery Controls

##### Output

- 1) Storage & Logging of Sensitive Forms
- 2) Logging of output program executions
- 3) Controls over Printing
- 4) Report Distribution & Collection Controls
- 5) Retention Controls
- 6) Existence/Recovery Controls

##### Database

- 1) Sequence Check Transaction & Master
- 2) Ensure all records on files are processed
- 3) Process Multiple transactions for single record in correct order



## Chapter 5 - Business Process Automation through Application Software (Chart 5.4)

### Emerging Technologies

#### Virtualization

Meaning	Major Applications	Common Types
1) Virtualization means to create virtual version of device or resource, such as server, storage device, network or even operating system where framework divides resource into one or more execution environments 2) It refers to technologies designed to provide layer of abstraction between computer hardware systems & software running on them	1) Server Consolidation 2) Disaster Recovery 3) Testing & Training 4) Portable Applications 5) Portable Workspaces	1) Hardware Virtualization 2) Network Virtualization 3) Storage Virtualization

#### Grid Computing

Benefits	Types of Resources	Using a Grid : User's Perspective	Using a Grid : Administrative Purpose	Grid Computing Security
1) Making use of Underutilized Resources 2) Resource balancing 3) Parallel CPU Capacity 4) Virtual Resources & Virtual Organizations for Collaboration 5) Access to Additional Resources 6) Reliability 7) Management	1) Computation 2) Storage 3) Communications 4) Software & Licenses 5) Special Equipment, Capacities, Architectures & Policies	1) Enrolling & Installing Grid Software 2) Logging onto the Grid 3) Queries Submitting Jobs 4) Data Configuration 5) Monitoring Progress & Recovery 6) Reserving Resources	1) Planning • Security • Organization 2) Installation 3) Managing enrollment of Donors & Users 4) Certificate Authority 5) Resource Management 6) Data Sharing	1) Single Sign-on 2) Protection of Credentials 3) Interoperability with Local Security Solutions 4) Exportability 5) Support for Secure Group Communication 6) Support for Multiple Implementations

#### Cloud Computing

Characteristics	Advantages	Disadvantages
1) Elasticity & Scalability 2) Pay-Per-Use 3) On-demand 4) Resiliency 5) Multi-Tenancy 6) Workload Movement	1) Cost efficient 2) Almost Unlimited storage 3) Backup & Recovery 4) Automatic Software Integration 5) Easy Access to Information 6) Quick Deployment	1) Technical Issues 2) Security in the Cloud 3) Prone to Attack