Introduction to Management Information Systems

Management Information Systems

Functional Applications of Information Systems

Learning objectives

- to understand information systems used in the support of decision making
- to identify the different types and differences between support systems
- to know aspects of different information systems that use intelligence
- to understand the impact of information systems growth of use and expansion of functionality to a global level

support systems

decision support systems

- internal & external data
- past & future strategy
- targeted to a functional area (department)
- different level of management
- high level - what-if analysis
- knowledge – data relationships

alternative – use human expertise & knowledge

group DSS

- group DSS software
- improves the decision-making process for a group
- electronic meeting room
- anonymous
- brainstorming
- use of groupware

reporting systems

decision support – data warehouses

- updated periodically
- wider scope
- data from multiple sources

tools

- statistical analysis
- data mining
- online analytical processing
- geographical IS (GIS)

decision support systems

specialized software

deal with data issues

- duplication removal
- missing fields

complex analysis

- hidden patterns
- e.g.
- relationship between customers, fraud detection
- identify potential customers , reposition products

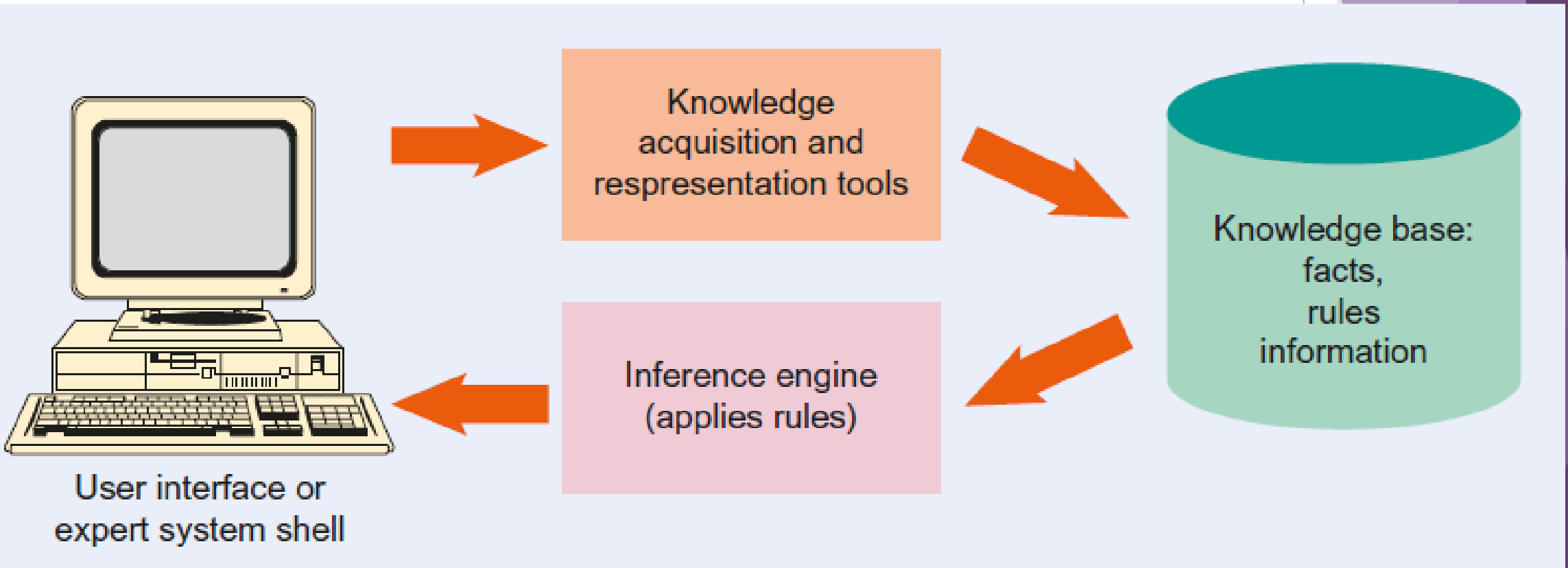
more support systems

many terms used to describe software developed to help solve unstructured and semi-structured problems

- business intelligence (BI) systems (*previous lesson*)
- expert systems
- artificial intelligence (AI)
- neural networks

These assist decision making by using software to mimic the way decisions are made by experts in their own field

expert systems



expert systems

- mimics expert
- do you need expertise?
- what is an expert?
  - years of experience
  - specialized knowledge
  - able to make decisions
    - correctly
    - quickly

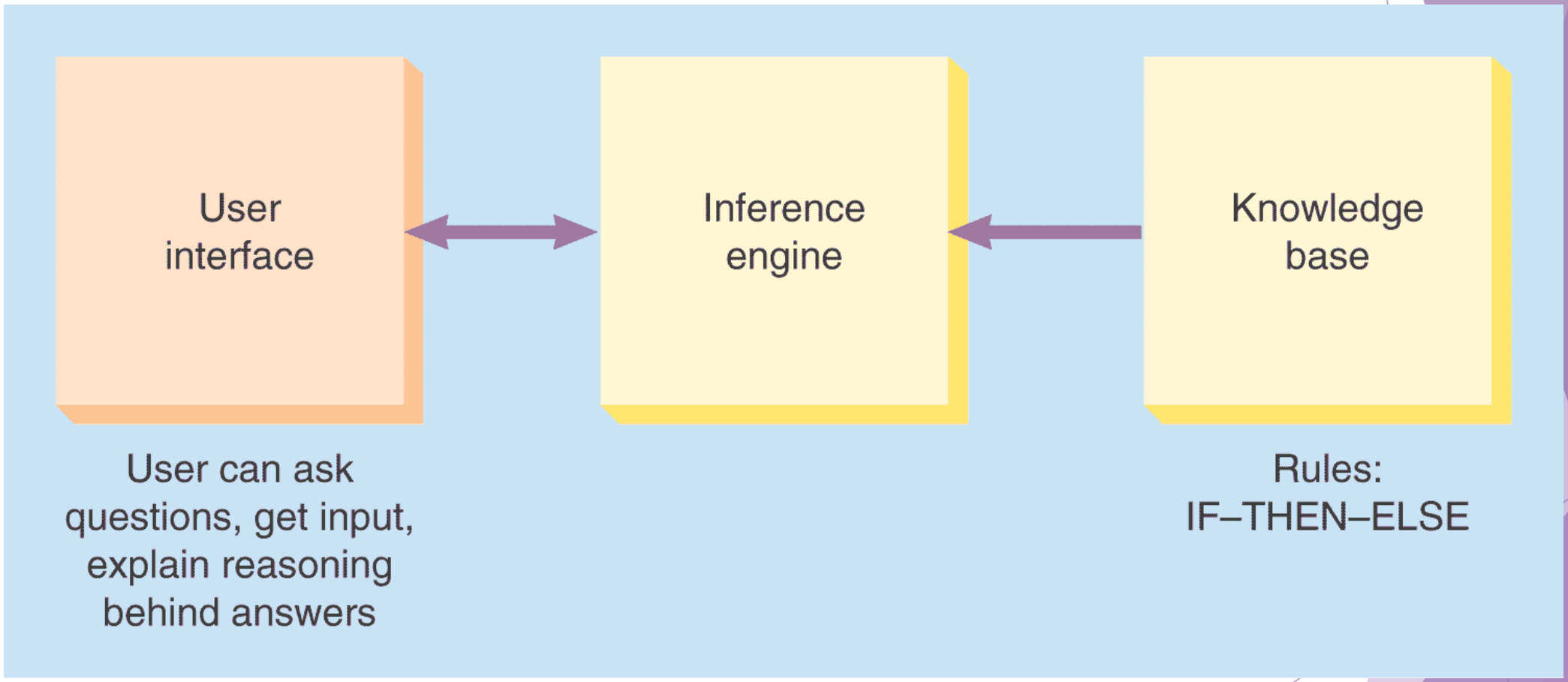
benefits of expert ‘systems’

- consistency
- memory
- logic
- diligence
- persistence
- availability
- longevity

disadvantages of expert ‘systems’

- lacks emotion
- lacks creativity
- lacks common sense
  - age = -1
- data integrity
  - can’t think of the unseen
- does not learn

Expert System



expert system components

- knowledge base
  - rules e.g. if-then
- also DB facts
  - data on current situation
  - e.g. patient data
  - different patient, different data

expert system components

- Inference engine
  - Knowledge + facts -> processed -> conclusions
- explanation mechanism
  - support for human
  - i.e. options, data to support option
  - user interface

expert system

Applications of expert systems include:

- medical diagnosis
- credit decisions and insurance underwriting
- product design, management and testing

expert system

- used to represent the knowledge and decision-making skills of specialists
- encapsulate the knowledge of experts
- so that non-specialists can take decisions.
- providing tools for the acquisition of knowledge and representation of rules

expert system

knowledge base

- contain information relevant to taking the decision
- includes the rules on which the decisions are based.
- suggest actions not based only on rules and algorithms
- also use heuristic techniques that may involve searching through different ‘rules of thumb’ that recommend the best action

inference engine

- different rules are applied using a separate module of the expert system, known as the.

user interface

- sometimes referred to as the ‘expert system shell’, is used to build rules and ask questions of the system.

expert system – medical diagnosis

- MYCIN identified the treatment for blood disorders
- symptoms entered into the expert system,
- compares them with all the known symptoms
- in a knowledge base
- also a series of rules that match the symptom to the problem.
- to give a diagnosis

support systems

- used in the financial services industry
- assessing investment risk of investing in shares, futures market, loans or in personal finance
- e.g. customer loan
  - give personal details, employment history and where live,
  - expert system will assess credit risk based on pattern of behaviour

support systems

vary from assessing the individual on a series of rules or a more advanced system using neural networks

rules-based approach

- no credit if not lived in a location for six months over five years
- or loan is greater than 10% of salary.

neural network approach

- learn from the history of previous customers
- what characteristics represented a bad credit risk

expert systems

mimic human expertise

e.g. medical

- case histories
- statistical analysis
- recommend further tests

User Interface, inference engine, knowledge base

- facts from experts, answer users query

expert systems

developed

‘off-the-shelf’

expert system -> knowledge engineering -> knowledge base

backward chaining	query
forward chaining	active
	create new rules with new data

executive information systems (EIS)

information for high-ranking executives

enterprise-wide focus

like DSS

- data synthesis, trends, case analysis

can browse underlying data – not just query

- facilitates communication
  - knowledge management strategy
- increasingly groupware-orientated

executive information systems (EIS)

branch of support system

digital dashboard for examining & analyzing information

simple UI, ease of use

access to internal & external data

- spot trends, make forecasts, different types of analysis
- “critical success factors” data

executive information systems (EIS)

digital dashboard

integrated information

charts & graphs

up-to-data

rule-based

executive information systems (EIS)

- tailored to information needs

- extract, compress, filter & track data
- trend analysis, exceptions
- GUI
- statistical analysis
- wide range of platforms & formats
- supports email & video conferencing

executive information systems (EIS)

why use an EIS?

- shared analysis – improve efficiency
- fast & easy access
- report effects & trends

executive information systems (EIS)

avoid failures

- organization nor ready
- objectives not clearly defined or met
- too long development
- support discontinued
- user dislike
- lack of understanding from users

executive information systems (EIS)

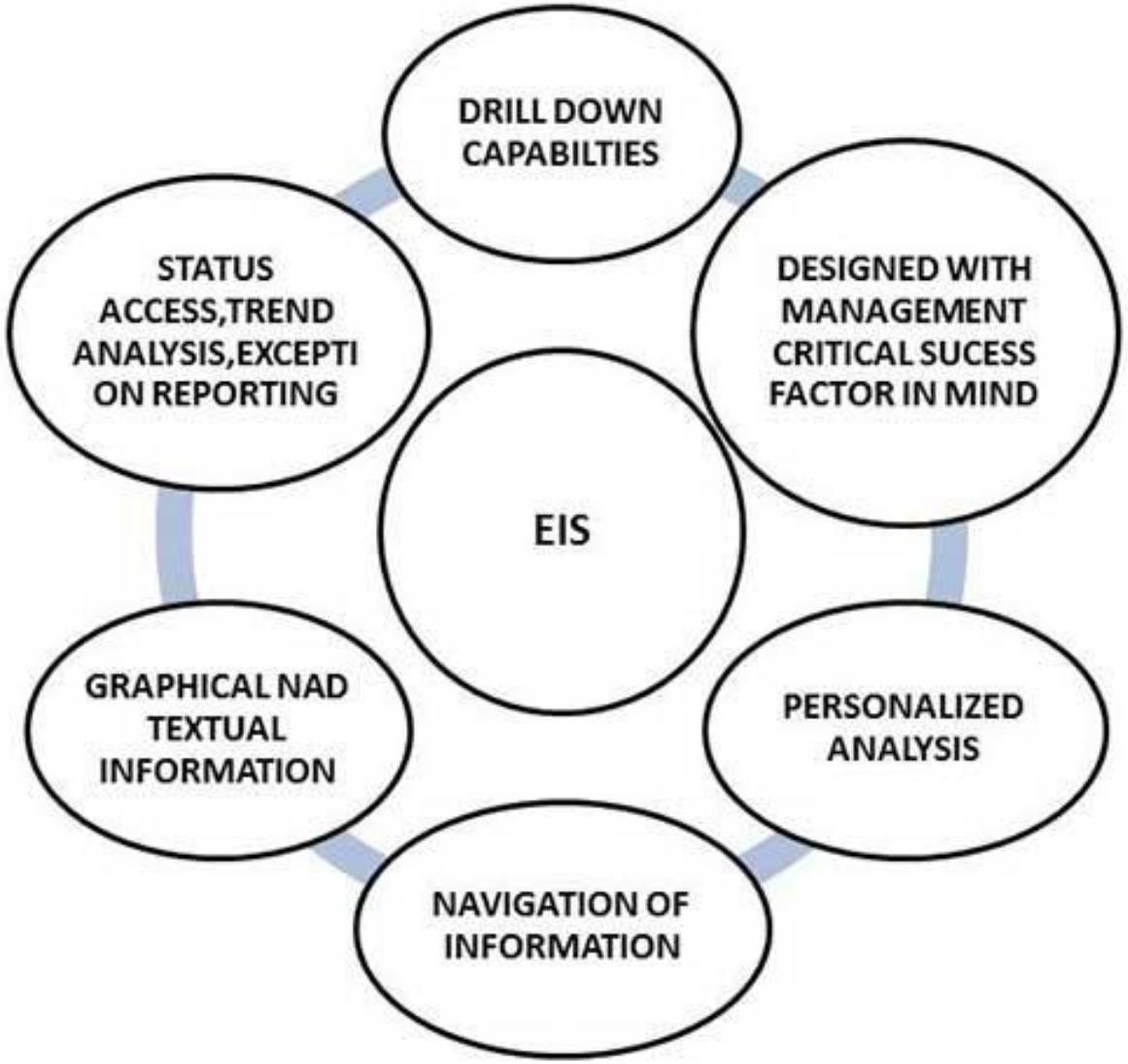
EIS packages & tools

provides additional tools to

- track performance, flag exceptions, spot trends
- investigate / explore

- admin module data access
- builder module developers
- runtime module using the system

executive information systems (EIS)



executive support systems (ESS)

- intended to be used by the senior managers
- provide support to non-programmed strategic decisions
- external, unstructured, uncertain
- not exact scope
- intelligence based–information
  - Market intelligence
  - Investment intelligence
  - Technology intelligence

ESS advantages

- Easy for upper level executive to use
- Ability to analyze trends
- Augmentation of managers' leadership capabilities
- Enhance personal thinking and decision-making
- Contribution to strategic control flexibility
- Enhance organizational competitiveness in the market-place
- Instruments of change
- Increased executive time horizons
- Better reporting system

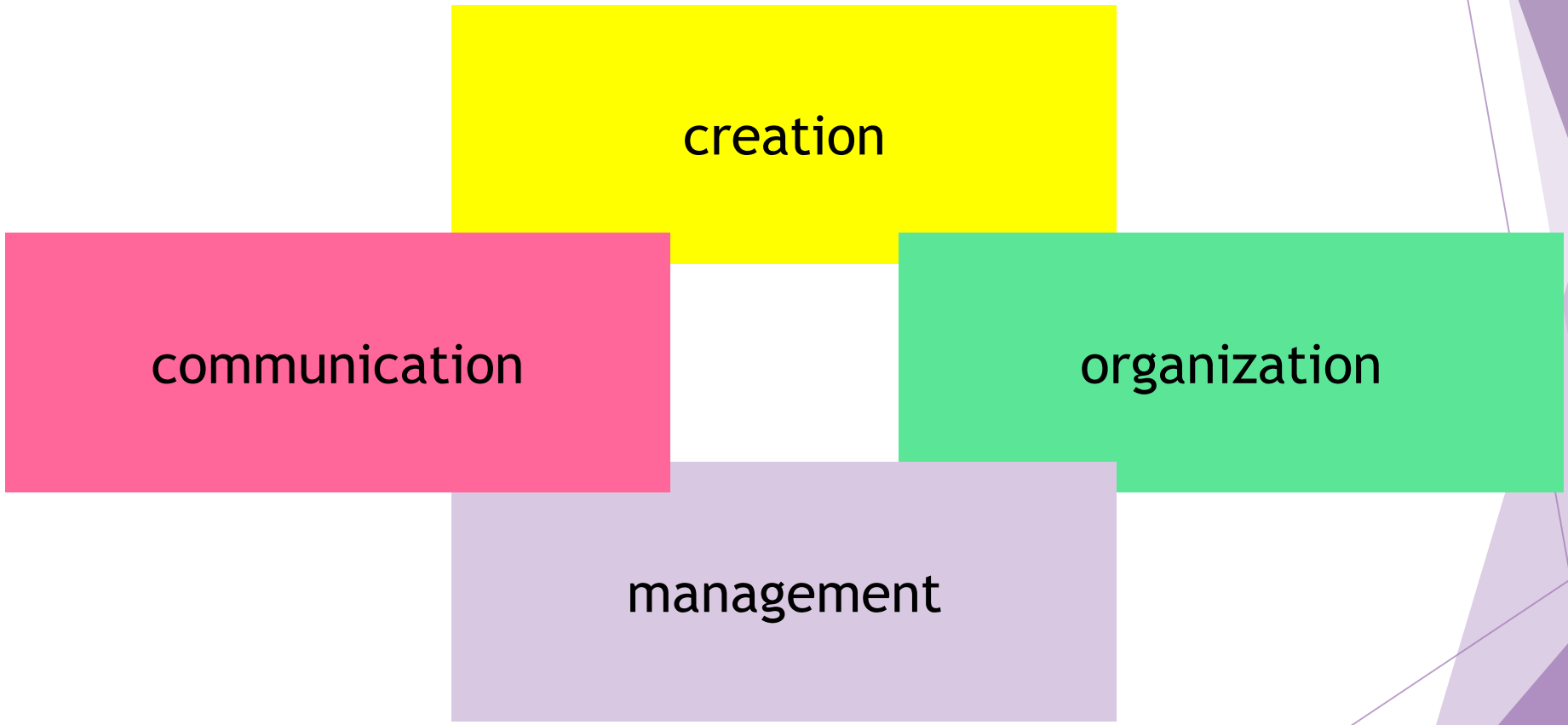
ESS advantages

- Improved mental model of business executive
- Help improve consensus building and communication
- Improve office automation
- Reduce time for finding information
- Early identification of company performance
- Detail examination of critical success factor
- Better understanding
- Time management
- Increased communication capacity and quality

ESS disadvantages

- Functions are limited
- Hard to quantify benefits
- Executive may encounter information overload
- System may become slow
- Difficult to keep current data
- May lead to less reliable and insecure data
- Excessive cost for small company

groupware



groupware

computer-supported cooperative workgroups

- communication
  - synchronous - same time
  - asynchronous - different time
- organization
  - different formats

groupware

computer-supported cooperative workgroups

- creation
  - shared files, shared editing
- management
  - shared documents, security = restrictive access
  - cost savings ROI
  - use of information agents
    - project management, progress chasing

groupware

issues

- information overload
- inappropriate information sharing
- time wasting
- human factors

group support systems (GSS)

group support systems

- assist decision-makers working in groups
- ICT technology
- good for order & efficiency
- clearer focus
- used for:
  - committees, review panels, board meetings
  - task forces, multiple decision-makers

group support systems (GSS)

advantages

- less formal
- time management
- anonymity
- better collaboration
- greater effectiveness

group support systems (GSS)

disadvantages

- no human touch
- no body language
- unnecessary meetings
- higher costs
- less security

departmental applications

departmental applications

Human resource management (HRM) information systems

- employees
- hiring & firing
- employees have required skills
- training
- contracts
- HR regulations
  - e.g. immigration

departmental applications

HRIS

- recruitment
- job descriptions
- job management
  - salary, benefits, promotion

departmental applications

Marketing

functional

- market research, brand/product management, public relations and customer service

focus

- market and competitor focus
- customer focus

departmental applications

Marketing

functional

- market research, brand/product management, public relations and customer service
- telemarketing

focus

- market and competitor focus
- customer focus

departmental applications

Accounting IS

financial activities

planning & control of business finance

- sales order processing
  - e.g. linked to payroll
- inventory
- payroll

departmental applications

Accounting IS

- budgeting systems
- capital budgeting systems
- cash flow reporting
- forecasting systems
- financial analysis systems

Global information systems

global information systems (GIS)

US company selling shoes

supply chain logistics in USA

▶ materials in Italy	high quality leather
▶ manufactured in China	cheap manufacturing
▶ tested in Ireland	high-tech testing
▶ retail in USA	

global information systems (GIS)

operating in a variety of markets & cultures

- customs, laws
- tech issues, transport

original industries

- airlines, hotels, car rentals, credit card

- reduce costs
- access to cheaper labour

global information systems (GIS)

global coordination

language	communication
currency	payments
cultural differences	e.g. white = mourning
logistics	listings
data format	date
localization	website for each location
technology	

global information systems (GIS)

global markets

- IS across borders, HQ & branches
- gain access to new / global markets
- strategic
- share information
  - track performance
  - product scheduling
  - shipping
  - accounts

global information systems (GIS)

global architecture

- control & coordination
- centralized architecture for data
  - standards
  - performance tracking
- decentralized architecture for data
  - departmental standards
  - communication
  - tech support

global information systems (GIS)

global architecture

balance depends on

- cultural dependance
- global strategy

need knowledge transfer

advantages

- local flexibility, adaptability and control
- effective customer service
- reduces operational costs

global database

databases

- different vendors, format, etc.
- different language, currencies
- handled by GIS e.g. SAP

global information systems (GIS)

information-sharing technologies

- remote data entry
- video conferencing
- distributed databases
- value-added networks (now use secure web)
  - EDI, encryption, email, data synchronization

global information systems (GIS)

network needs

- media
  - fiber optics, satellite
- bandwidth
- transmission technology
  - asynchronous, broadband, multiplexing

global information systems (GIS)

network objectives

- low file sharing
- video conferencing advantages
  - half / full duplex
- how to share information?
  - FTP, app sharing

GIS requirements

deal with issues & risks

- legal — laws, regulations, Intellectual property
- cultural — language, beliefs
- economic — currency, policies
- political — policies, government

GIS levels

strategic, tactical & operational

- global data access
- global reporting
- HQ communication
- risk management
  - e.g. foreign exchange risks

global information systems (GIS)

GIS structures

multinational	Tyco
global	KFC
international	caterpillar
transnational	Nestle

GIS problems

- language, cultural, currency etc.
- lack of standards
- regulations
- communication infrastructure
- lack of skills

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Thank you!

any questions?