Fall semestre

DATABASE DESIGN and

its applications in architecture

Information System Design and Applications in Construction Industry

by

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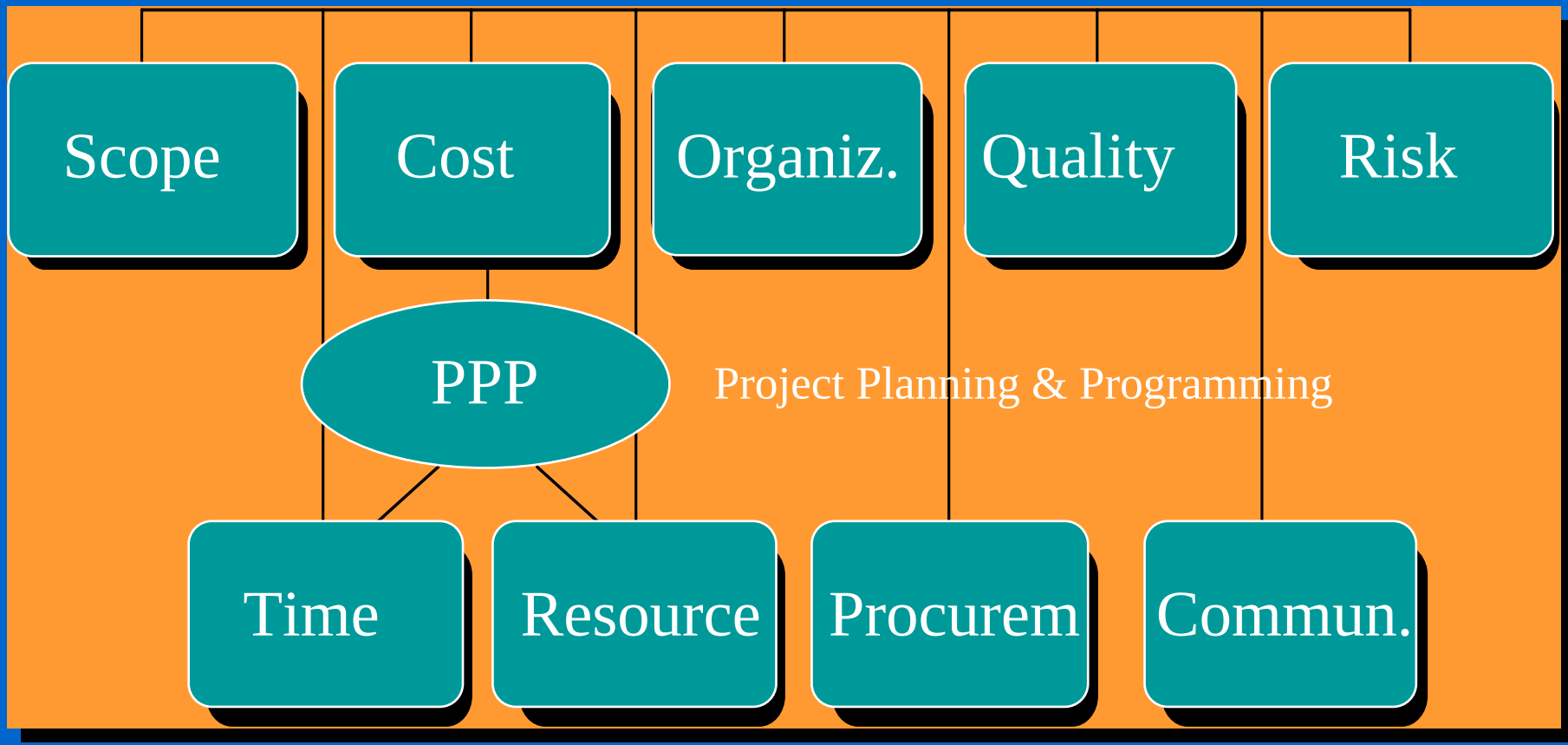
Outline

- Basic concepts
- Basic problem areas in CM
- Basic objectives of IS
- Information types required in Building Production Process
- Components of CBIS in conceptual dimension
- Information System analysis
- Steps of IS analysis
- Eras of IS
- Diffusion and Infusion concepts in IS
- Patterns of IS
- Basic dimensions of IT in Building Production Process

Basic Concepts

- Information
- Information System (IS)
- Information Technology (IT)
- Information Society

Basic problem areas in construction project



Information concept

1. Knowledge obtained by education, experience etc.
2. Intelligence related to a certain event or situation,
3. Data Group*: statistical information,*
4. News
5. Messages transmitted as sounds and images via phone lines or computer networks or radio waves , neural impulses in living organisms etc..

Types of Information

- knowledge
- intelligence
- data
- news
- impressions
- messages
- etc.

What is information system?

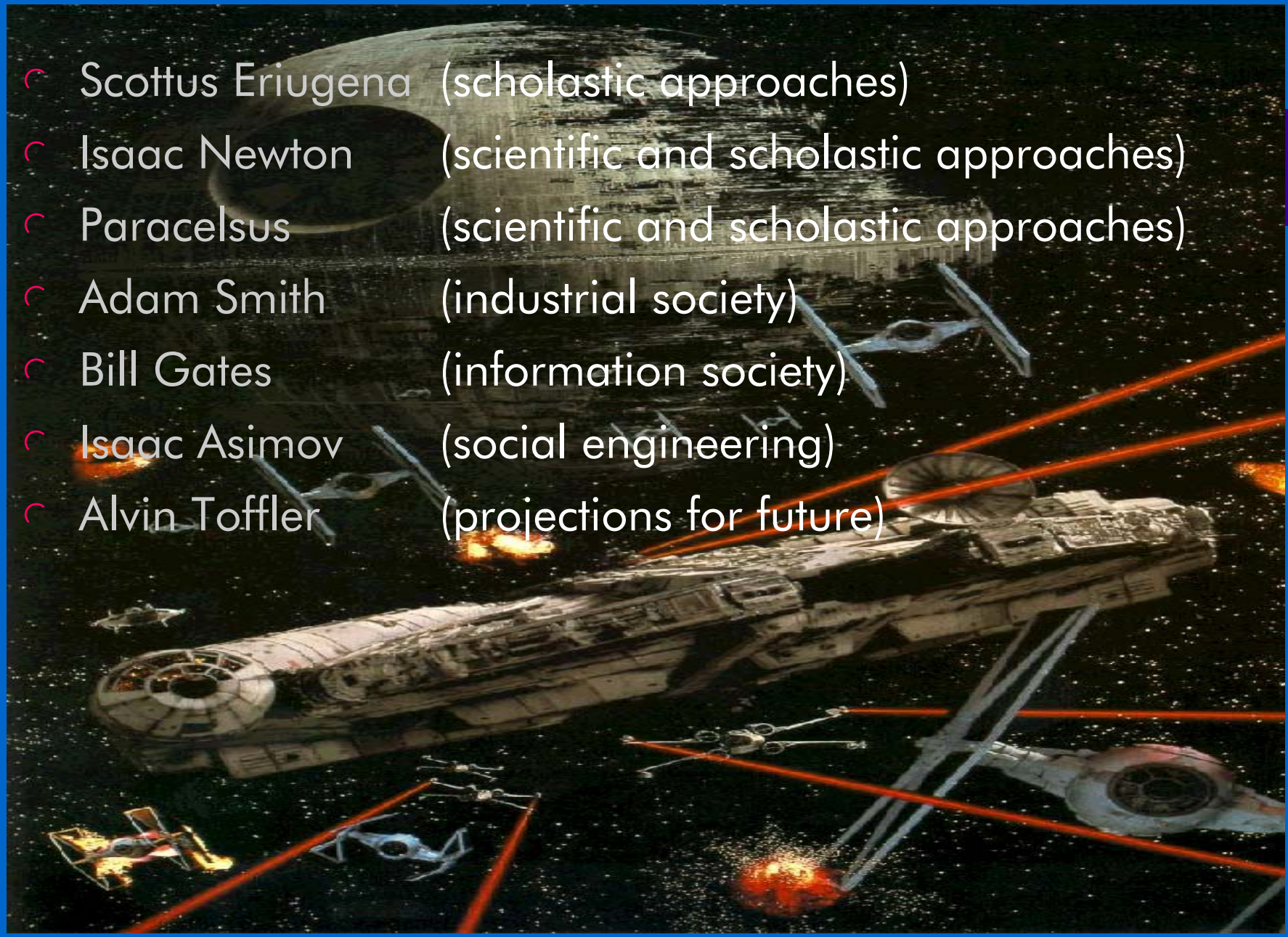
Information system (IS):

An organized combination of people, hardware, software, communication networks, and data resources that collects, transforms and disseminates information in an organization.

What is information technology?

Information technology (IT):

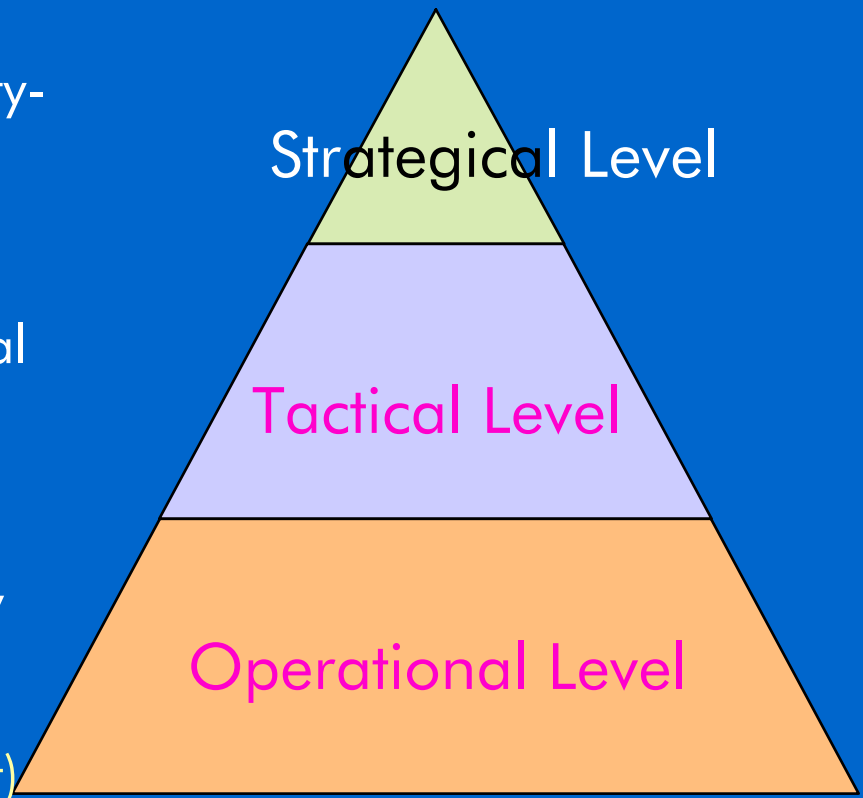
Any device which is used for gathering, recording, transforming and disseminating the information.


Scottus Eriugena (scholastic approaches)
Isaac Newton (scientific and scholastic approaches)
Paracelsus (scientific and scholastic approaches)
Adam Smith (industrial society)
Bill Gates (information society)
Isaac Asimov (social engineering)
Alvin Toffler (projections for future)

What is the objective of IS's?

A positive contribution by information systems can come in three forms;

- Efficiency measured by productivity- doing things better (support of business operations)
- Effectiveness accomplished by broadening the scope of individual tasks- doing better/right things (support of managerial decision making)
- Competitive advantage gained by enterprise - doing better and new things (support of strategic management)



Information types required in BPP?

Different types of information are needed in building production process management.

For example;

- Knowledge related to construction technology,
- Intelligence related to competitors,
- Data related to cost, duration of activities etc.,
- News related to bids, competitors, materials etc.,
- Impressions related to construction market,
- etc.

Who utilize the information technology?

- Entrepreneurs
- Designers
- Consultancy Companies
- Suppliers /Vendors
- Contractors / Sub-contractors
- Software Developers
- Education Foundations
- Research Foundations
- Information Providers
- Public Authorities
- etc.

Information required by Entrepreneurs?

- Decision Making Phase
  Information related to technical, organizational, economic feasibility studies, etc.,
- Design Phase
  Information related to costs of alternatives, etc.,
- Bid & Tender Phase
  Information related to project delivery approaches, organizational patterns, etc.,
- Contracting Phase
  Information related to preparing contracts and specifications, etc.,
- Construction Phase
  Information related to work progress, cash flow, quality, etc.,
- Marketing Phase
  Information related to Market conditions, consumer tendencies, maintenance plan, etc.,

Information required by Designers?

- Projects available in the market,
- Preliminary decisions which will be based on in design phase,
- Technology, cost limitation, customer profile,
- Legal limitations, codes and regulations related to construction and the project,
- Special information for special parts of projects,
- Feedback information from site related to problems originating from design failures ,
- Information which will be obtained from engineering offices for integration of subsystems in project…
- etc.

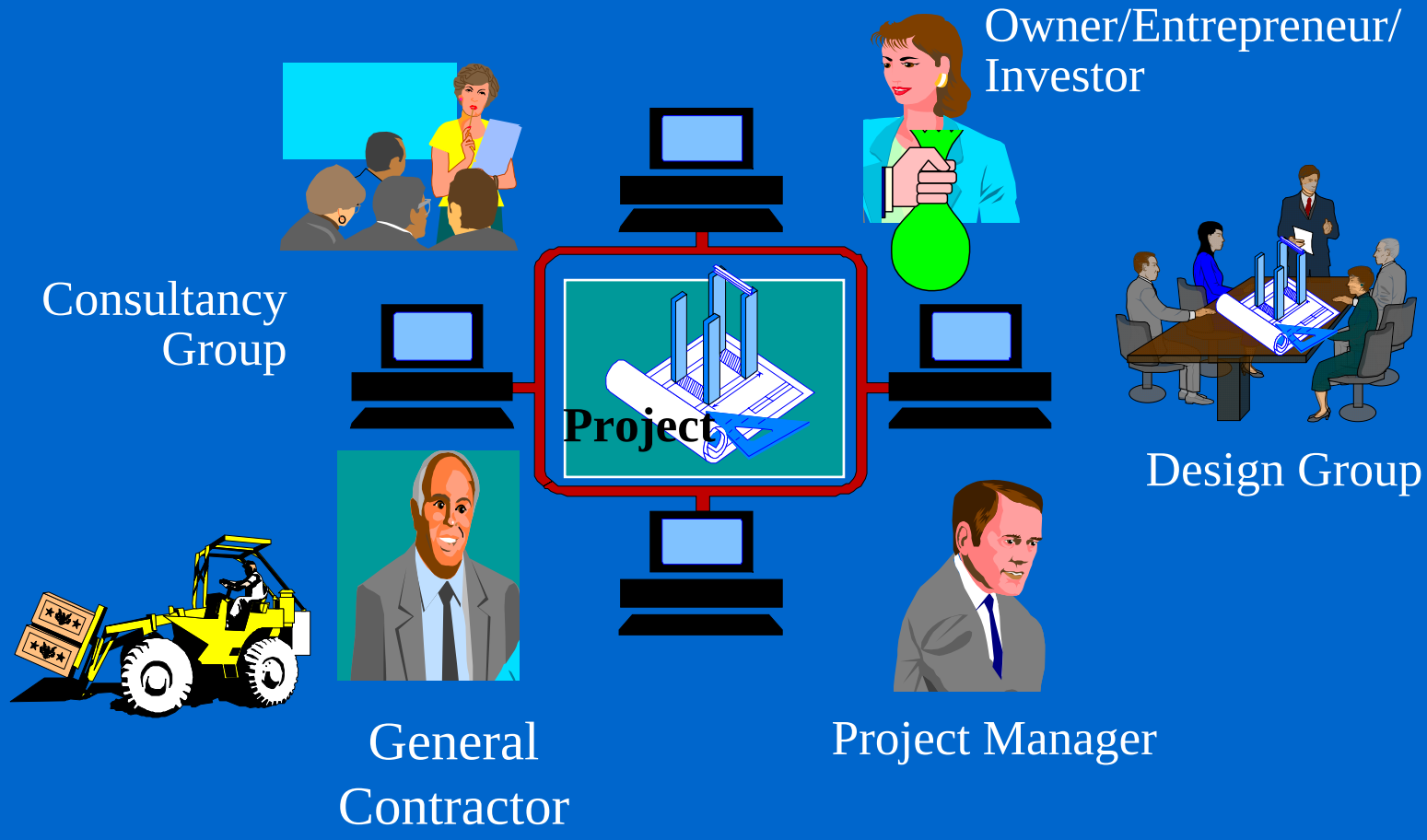
Impacts of new organizational patterns?

Total Involvement Engineering (TIE)

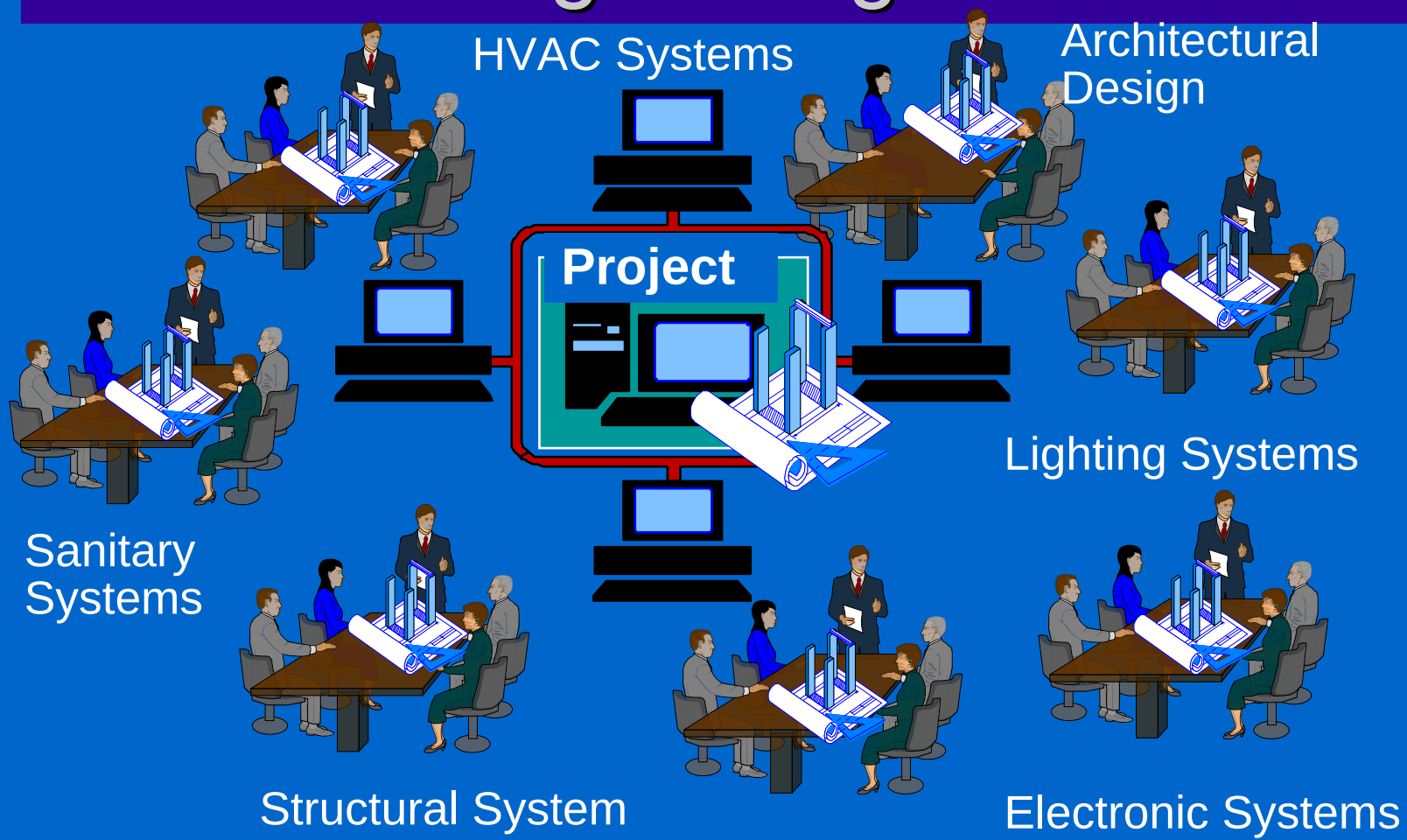
is an approach which

- is based on team concept instead of a hierarchical organization and improving this concept during construction process ,
- obtains the participation of stakeholders via more organic relationships,
- due to this, requires advanced information systems and technology

Information flow in TIE approach?



Concurrent Engineering



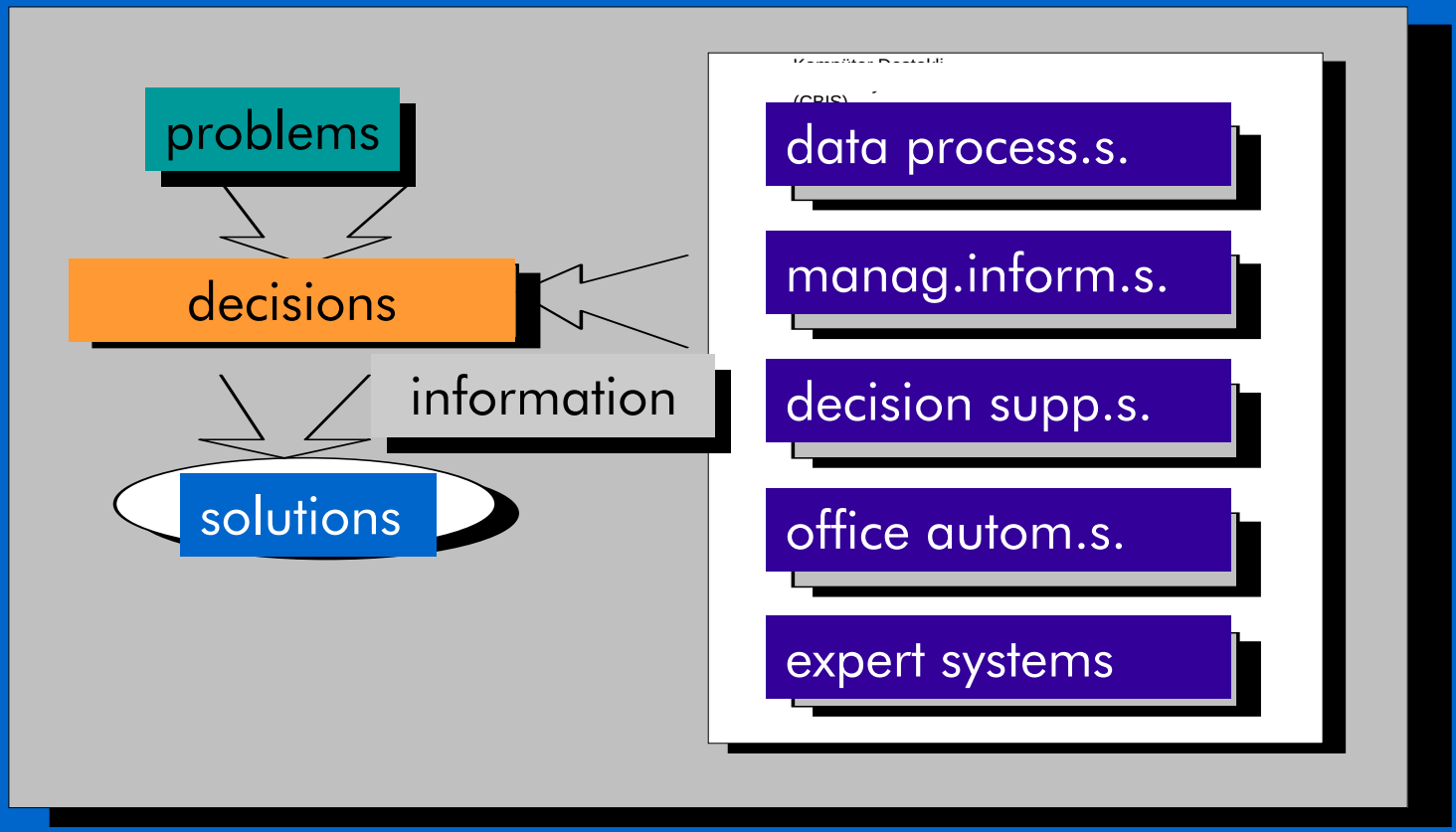
Information required by Constructors?

- Procurement Phase
  Information related to available projects, competitors, etc.
- Bidding Phase
  Information for determining bid price and markup, risks, competitors' strategies, company strategy, past experiences, etc.,
- Contracting Phase
  Information for determining contract conditions to minimize the risks, etc.,
- Planning Phase
  Information related to crews, their performances and duration of activities, etc.,
- Construction Phase
  Information related to progress, problems and solutions, etc.,
- Close out Phase
  Information related to closeout process, work progress, quality problems, etc....

Substructure for information flow

- Communication among functional departments within design office or site - Intranet
- Communication among HQ's functional departments - Intranet
- Communication among HQ and offices/sites - Internet
- Communication among offices/sites - Internet

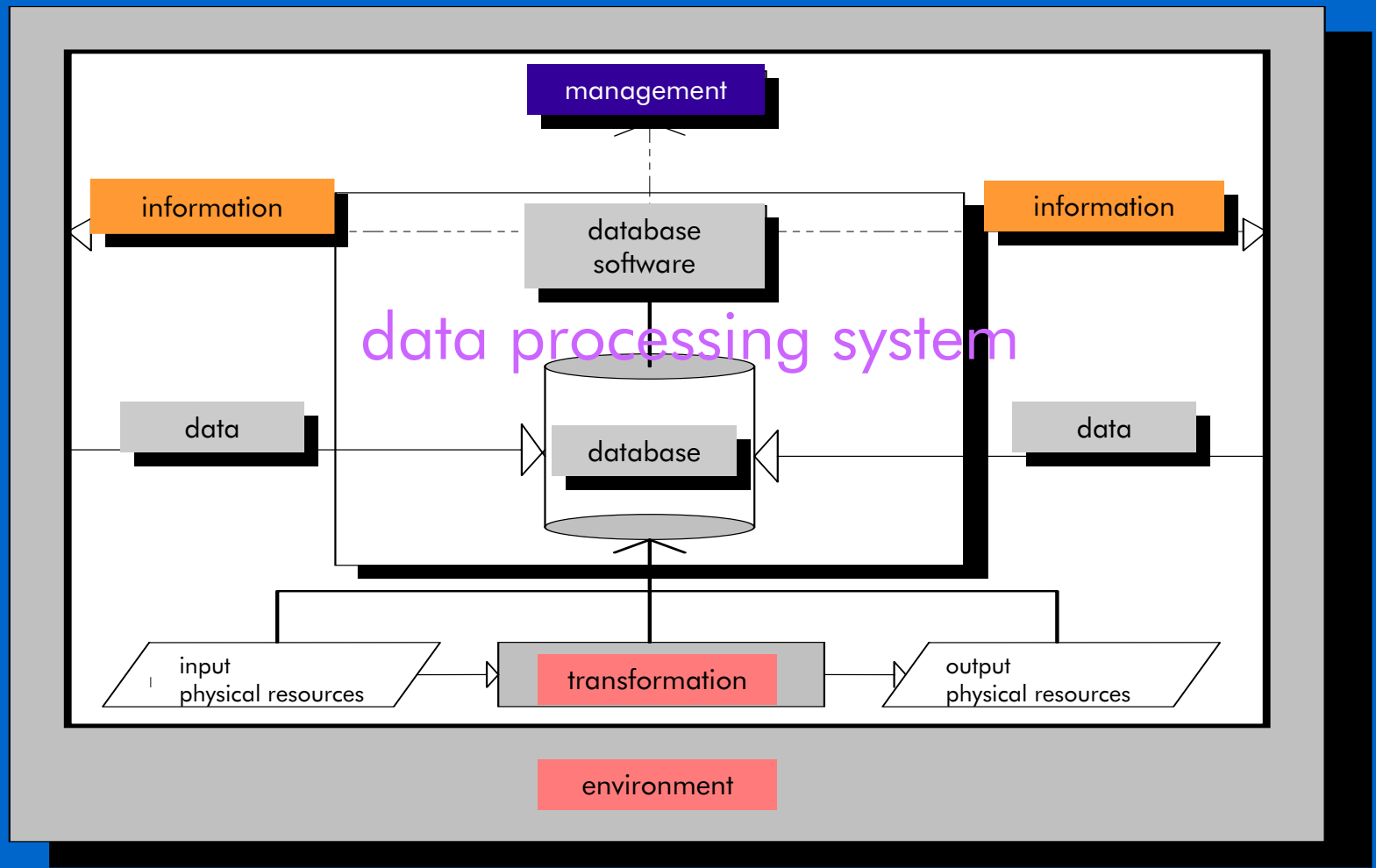
Components of CBIS Model ?



Functions vs IS Components

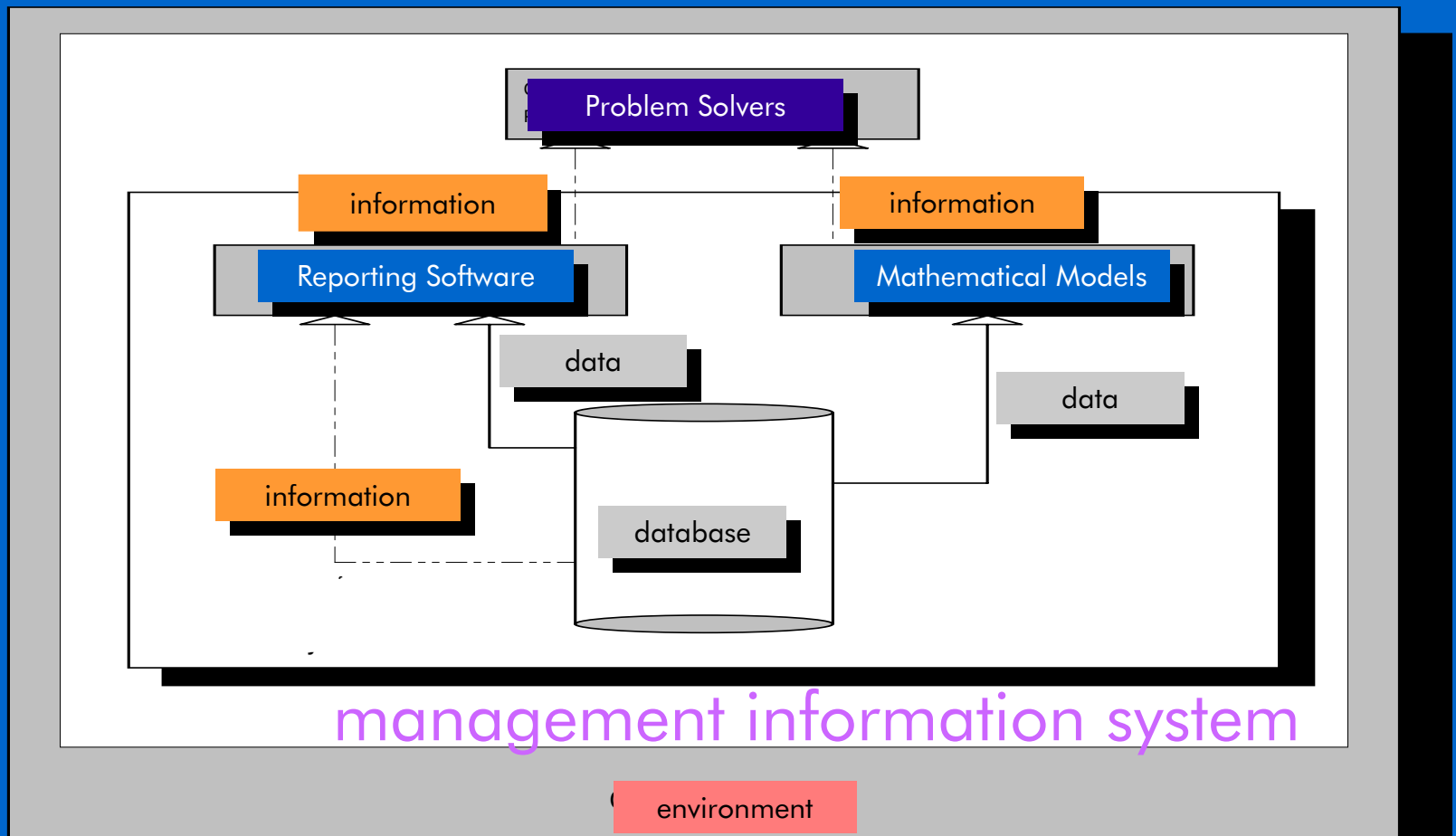
Functions	Information System Components				
	DB	MIS	DSS	ES	OAS
Planning	X	X	X	X	
Personnel	X	X	X		
Equipment	X		X		
Material	X	X	X	X	
Cost	XXX	X	XXX		
Quality	X	X	X		
Subcontractor	X	X			X
Communication	X				XXX
Design	X		X		X

Data Processing System Model

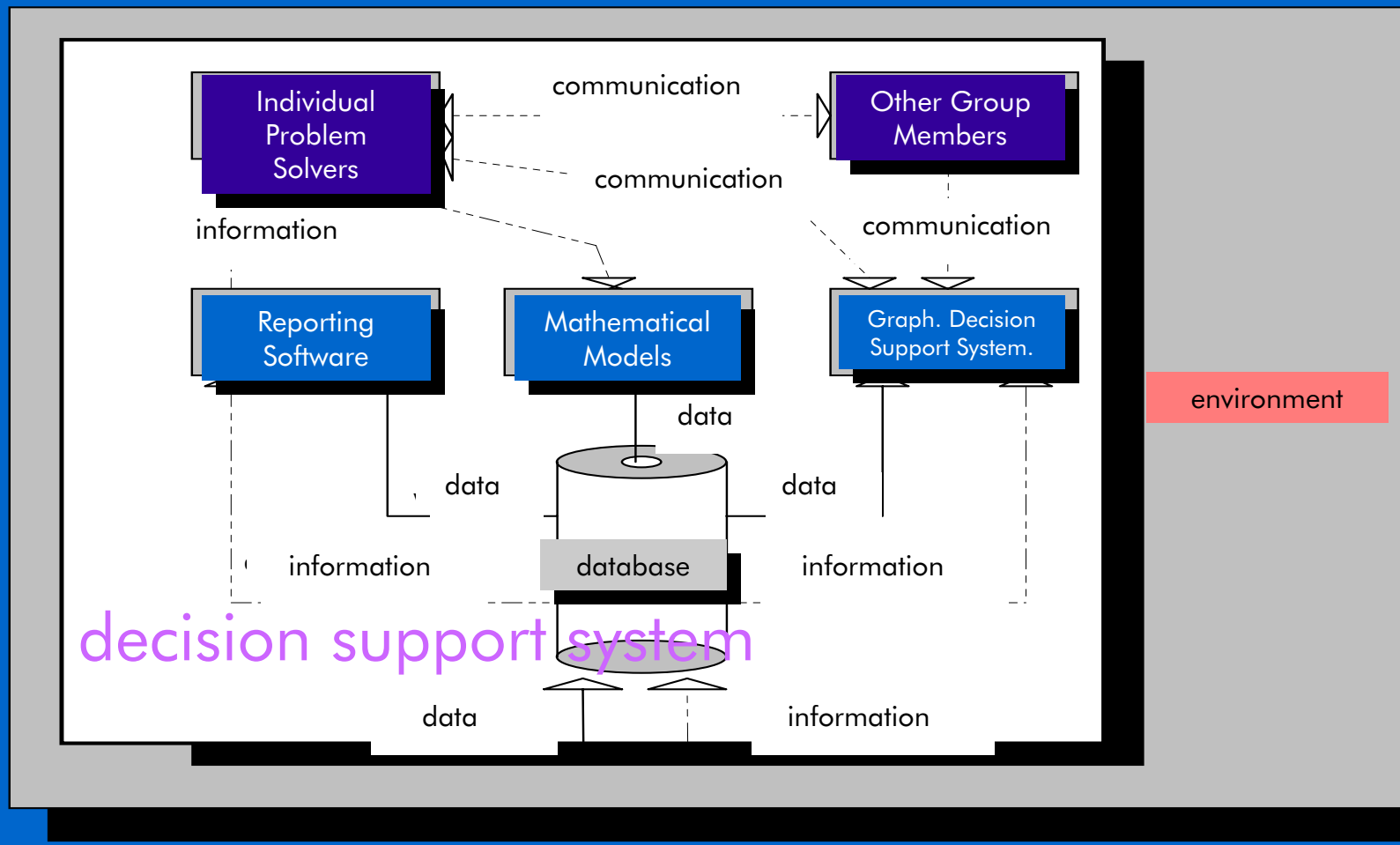


Şekil 5 - Veri Yönetme Sistemi Modeli

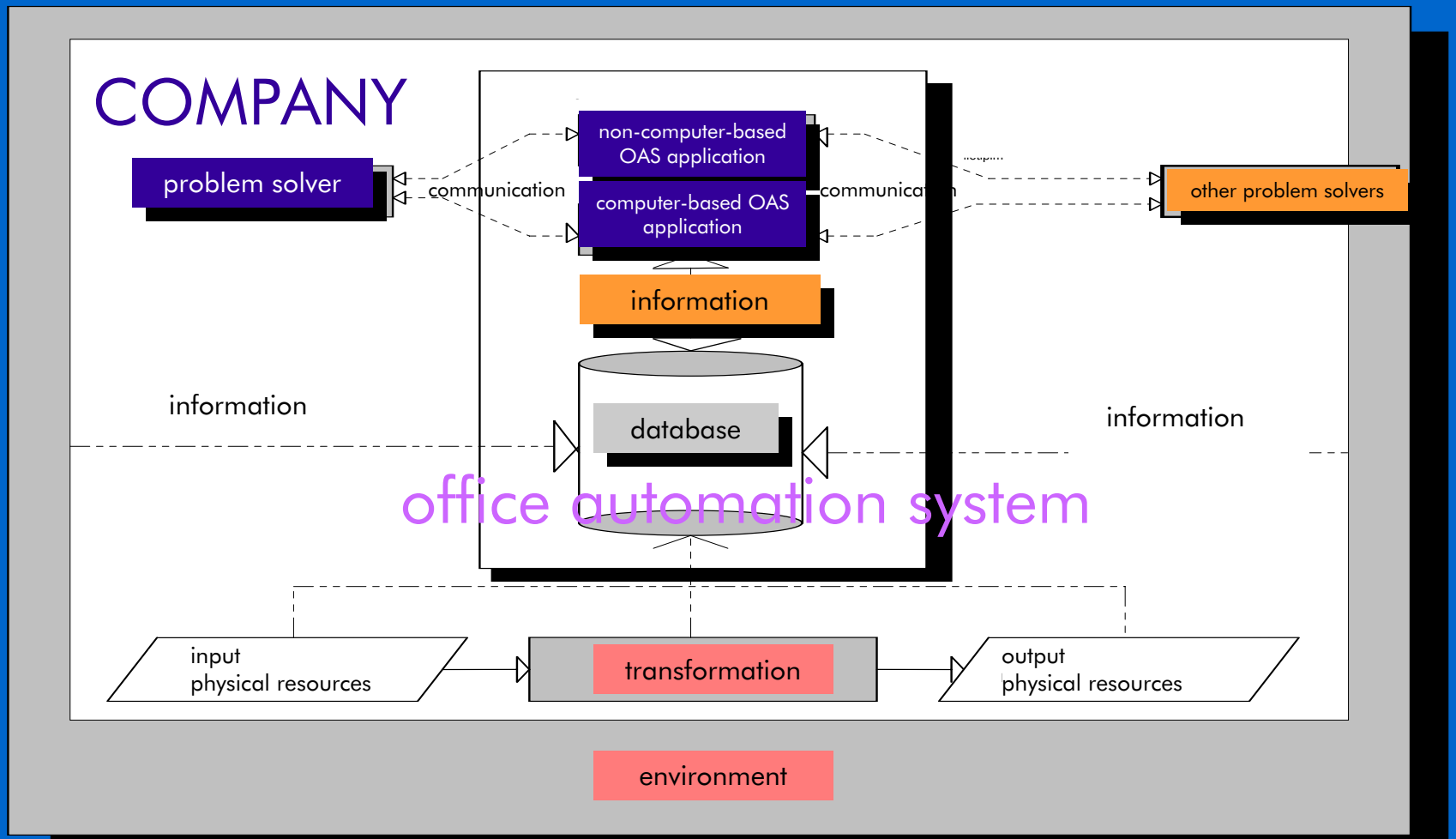
Management Information System Model



Decision Support System Model

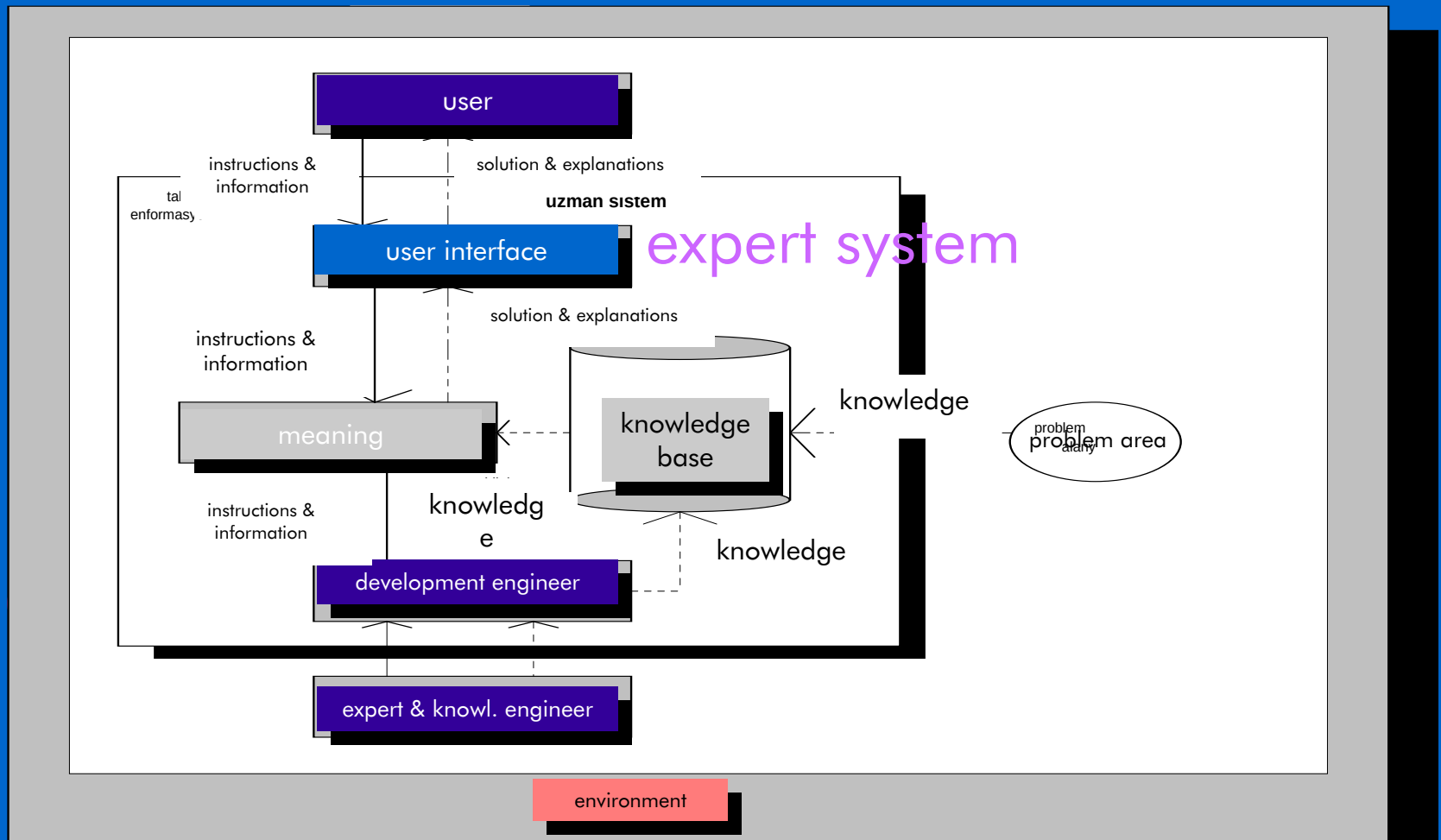


Office Automation System Model



Şekil 10- Ofis Otomasyon Sistemi Modeli

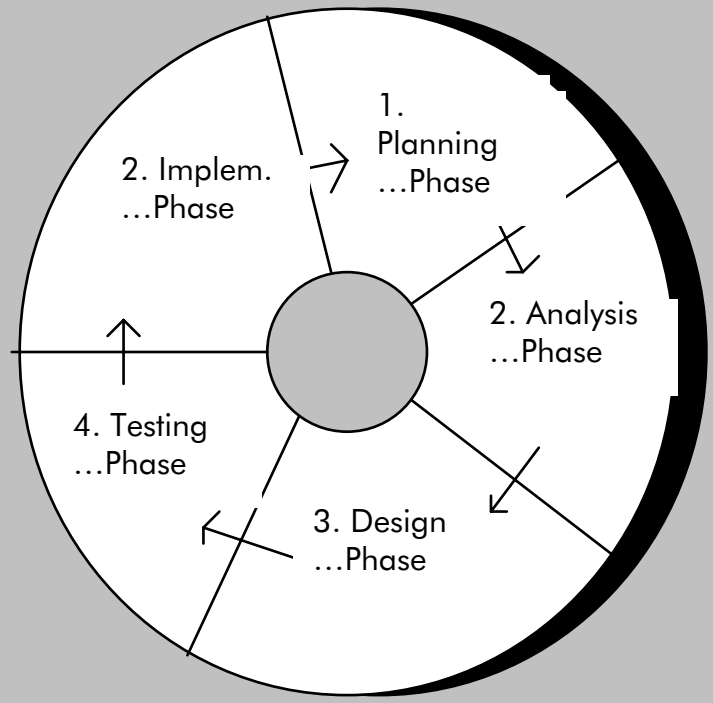
Expert System Model



Þekil 11 - Uzman Sistem Modeli

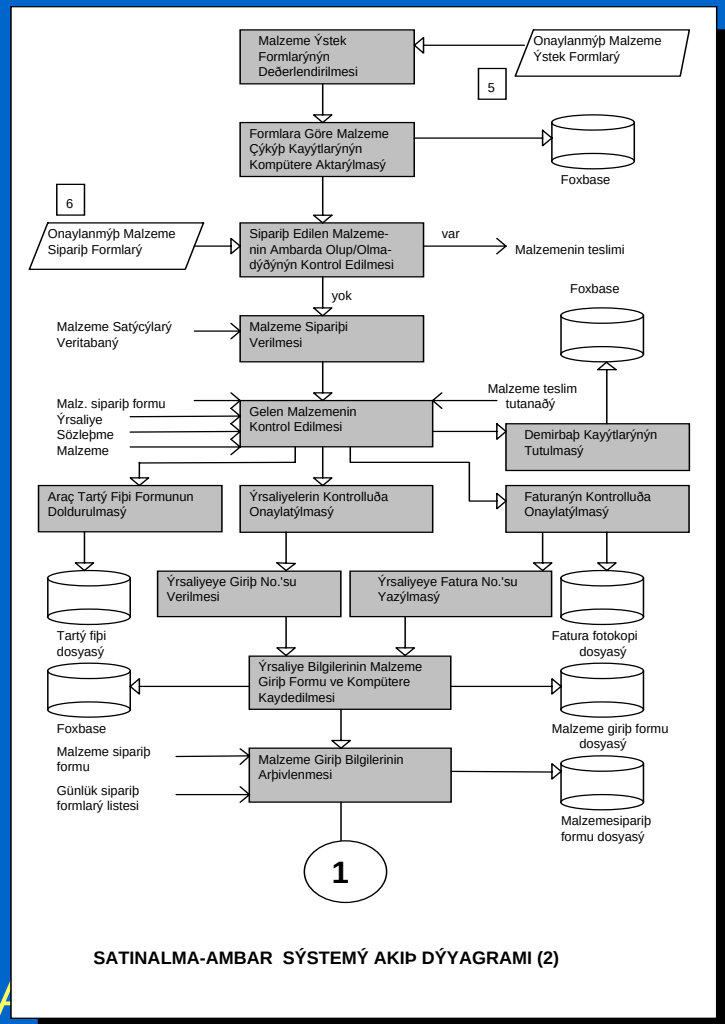
System Life Cycle Loop

system lifecycle loop



Information System Analysis

- Analysis of Current Structure & Processes
- System Development
- Testing The System
- System Implementation
- Feedback



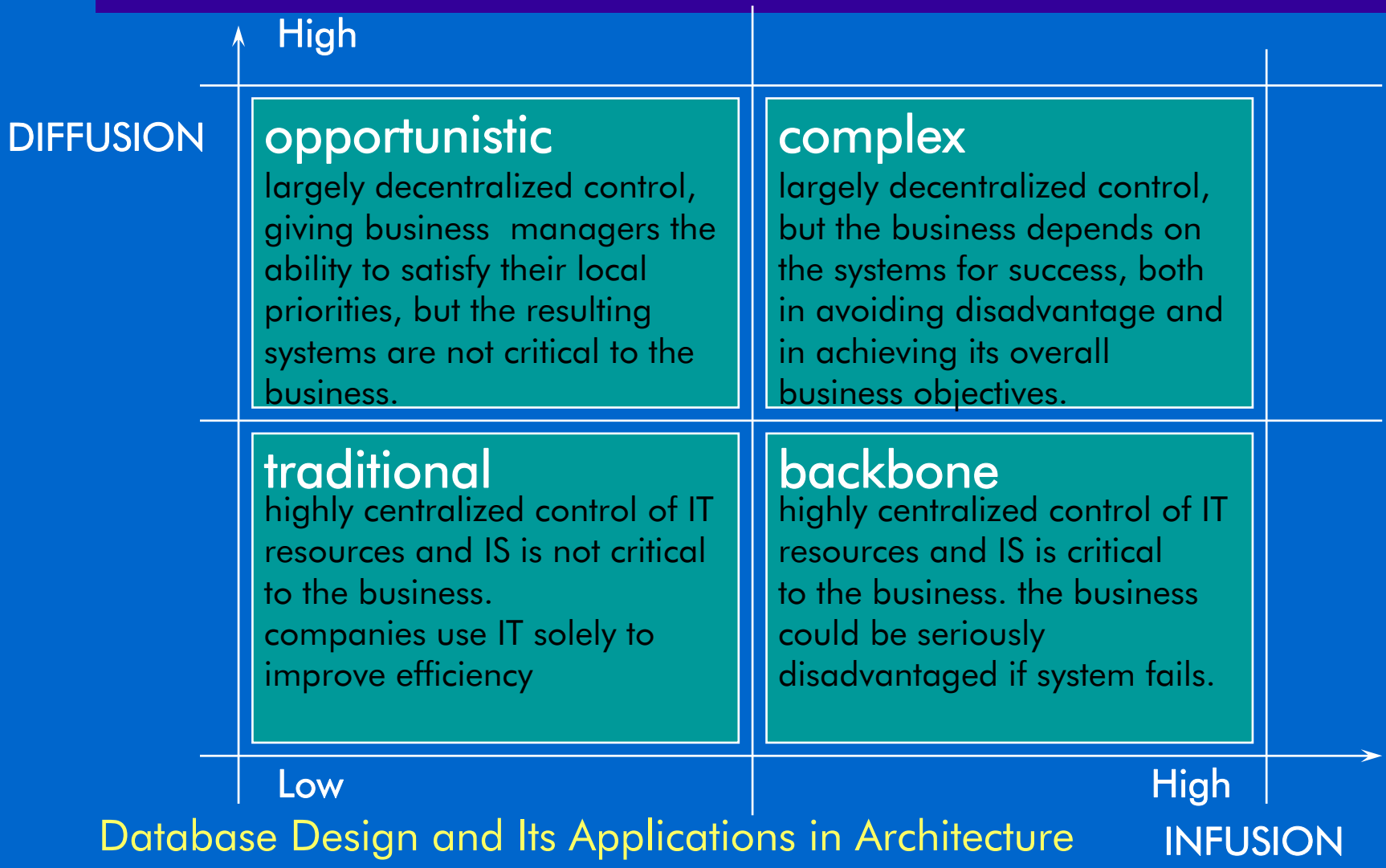
Eras of Information Systems

	DP	→	MIS	→	SIS
Nature of Technology	Computers	→	Distributed Proc.	→	Networks
	Fragmented	→	Interconnected	→	Integrated
	Hardw.Limitat.	→	Softw.Limitation	→	People/Vision L.
Nature of Operations	Remote from users, controlled by DP.	→	Regulated by management services	→	Available and supportive to users
Issues in system development	Technical issues (programming, project manag.)	→	Supporting user needs (inform. management)	→	Related to business strategy
Reasons for using technology	Reduce costs (espec.admin.) (techno.driven)	→	Support business (espec.managers) (user driven)	→	Enable the business (business driven)
Characteristic of system	Regimented Operational (internal)	→	Accommodating control	→	Flexible / Strategic (external)

Two concepts related to IS/IT

- Diffusion
  The degree to which IT has become dispersed throughout the organization and decisions concerning its use are decentralized.
- Infusion
  The degree to which an organization becomes dependent on IS/IT to carry out its core operations and manage the business

Patterns of information systems



Steps of system analysis study

1. OBTAINING REQUIRED INFORMATION RELATED TO COMPANY AND INVESTIGATING THE PROBLEM FORMULATION AND SCOPE OF STUDY SUGGESTED BY THE COMPANY

2. REFORMULATION OF THE PROBLEM STATEMENT AND SCOPE OF STUDY AFTER EVALUATING THE INFORMATION GATHERED from MEETINGS WITH COMPANY EXECUTIVES

Steps of system analysis study

3. DEVELOPING THE ANALYSIS PLAN CONSIDERING THE OBJECTIVES, RESTRICTIONS OF STUDY AND DETERMINING ANALYSIS TOOLS TO BE USED

4. APPROVAL OF THE ANALYSIS PLAN BY THE EXECUTIVES OF THE COMPANY

Steps of system analysis study

5. PREPARING THE DETAILED ANALYSIS SCHEDULE AND ARRANGING THE APPOINTMENTS FOR THE PERSONS TO BE SURVEYED.

6. SYSTEM ANALYSIS REALISATION PHASE

Steps of system analysis study

7. EVALUATION OF INFORMATION GATHERED IN SYSTEM ANALYSIS REALISATION PHASE

8. DRAWING THE PICTURE OF EXISTING INFORMATION SYSTEM, INDICATING THE PROBLEMS AND RECOMMENDATIONS FOR SOLUTIONS WHICH WILL BE BASED ON AT FOLLOWING PHASE

Basic dimensions of IT in BPP

Hardware

- Personal computers (PC)
- Local area networks (LAN)
- Wide area networks (WAN)
- Mainframe
- Global networks (Bitnet, Internet)

Software

- Database software
- MIS software
- Decision support software
- Artificial intelligence s.
- Office automation software

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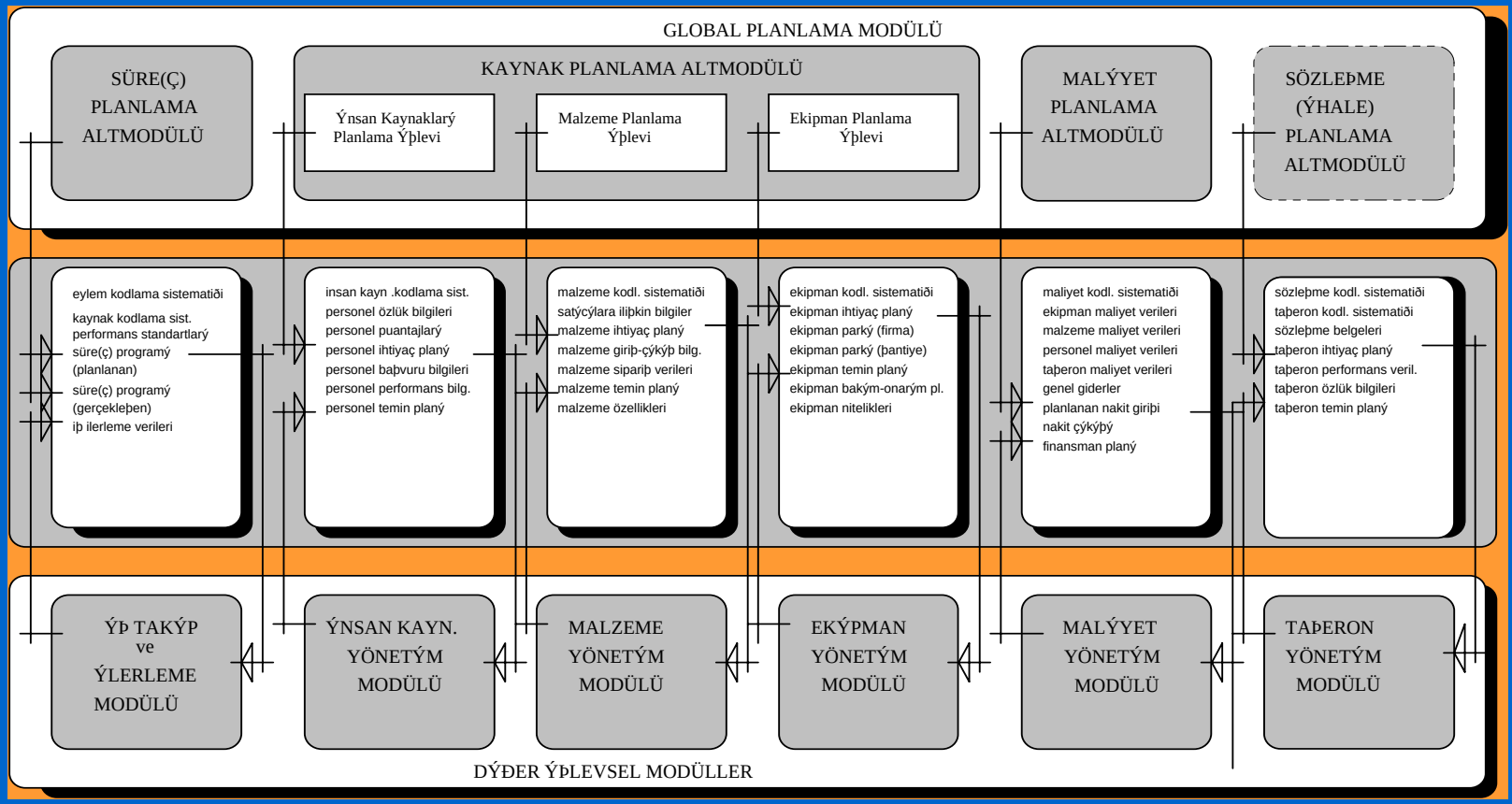
Data flow among the functional components