

ICT and Organization

Information Systems Design

Goals of strategic IT

- **Creation of value**
 - Deploy IT to either drive down cost or increase customer willingness to pay
- **Appropriation of the value created**
 - Position the company to appropriate some of the value created

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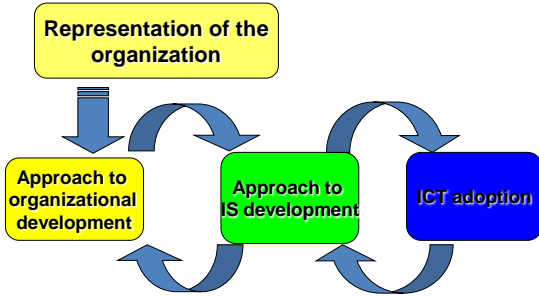
How to evaluate strategic alternatives: some hints

- profitability (≠ total sales!)
- imitability
- Economic feasibility
 - Are investements sustainable?
- Technological feasibility
 - Available ICT?
- **Organizational feasibility**
 - **People** → skills and organizational culture,
 - **organization** → structure
- Innovation extent
 - Risk
 - ...?

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The organizational role of IS



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The influence of ICT on the organization

1. Structuring/representation of the organization:

1. Hierarchical
2. Functional
3. process-based;

2. Reference period:

1. short term (static vision)
2. medium-long (dynamic vision);

3. Organizational boundaries:

1. organization (intra-organizational vision)
2. systems of organizations, networks, supply chain (inter-organizational vision).

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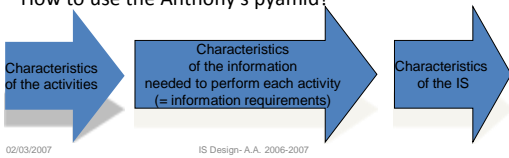
Structuring/representation of the organization

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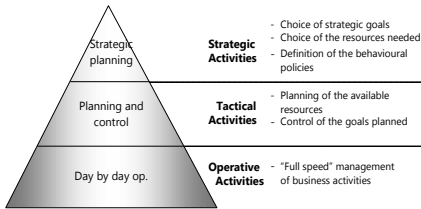
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Hierarchical representation by Anthony's pyramid

- The concept: the organization can be represented as a set of activities that can be divided in three subsets or levels:
 - Strategic activities
 - Tactical activities
 - Operative activities
- How to use the Anthony's pyramid?



The hierarchical representation (Anthony)



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Anthony's pyramid: characteristics of business activities

- Reference period
- Orientation to the outside/inside of the organization
- Discretionary power
- Repetitiveness
- Foreseeableness
- Organizational roles involved

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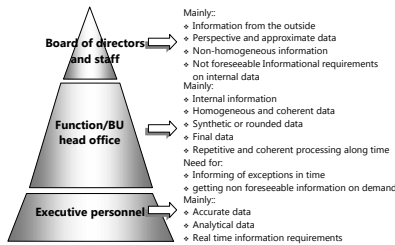
Characteristics of business activities

Activities	Reference period	Properties	Roles involved
Strategic	Long term	Scarce uniformity and structuring Orientation to the outside	Board of directors and staff
Tactical	Medium term	Repetitiveness Completeness Systematic	Functional/BU head office
Operative	Short term	Low discretionary power Easy to define the related procedures	Executive personnel

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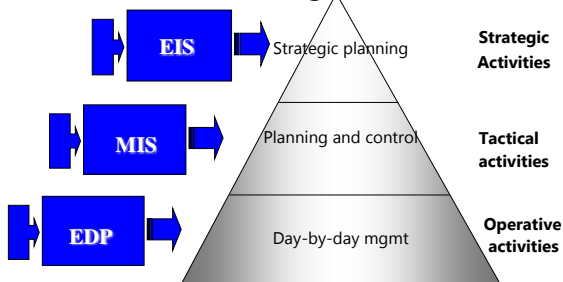
Information requirements



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Characteristics of the IS in a hierarchical view of the organization



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An Insurance company...

Book-keeping

Payment of insurance premium

Market forecasts Issue and management of ins. policies

 New product development

Profitability per agent Profitability per product

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A company belonging to the food industry

Manufacturing specifications Orders filling

Sales forecasts Control over production progress

 Product specifications

Production specifications Book-keeping

 Sales analysis (product)

 Finished goods warehouse

Sales analysis (product line) Creditors auditing

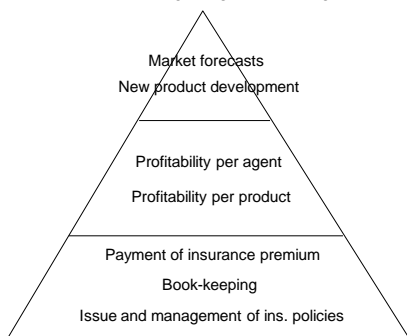
Bill of materials (product)

 Analysis of new product point of reorder

 Statistics and analysis on market competitors

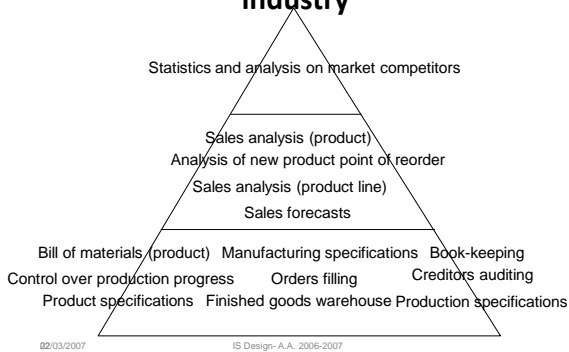
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An Insurance company... exemplification



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A company belonging to the food industry

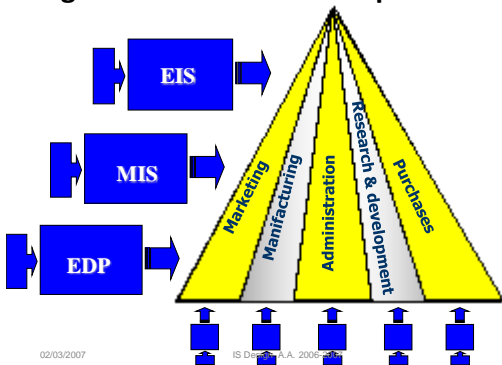


Functional representation

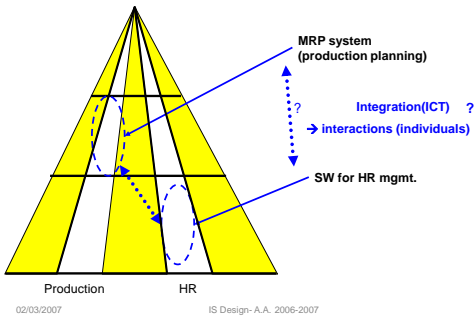
- Based on the principle of “local optimization” (functional level)
- Organization as the sum of disjointed sets of users
- IS as the joining of the IS of each function
- **Drawbacks:** lack of integration and therefore poor ability in quickly answering to market demands

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Organization: functional representation



Functional view and Anthony: implications



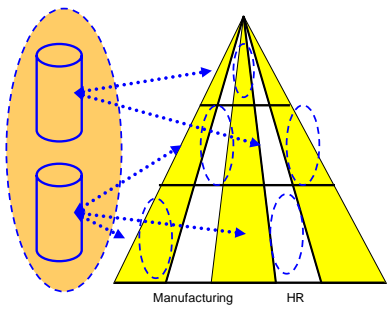
Functional view/Anthony → A possible approach to IS development: "Best of Breed"

- + Extremely focused ICT (specialization)
- It's likely to face problems of technology integration → issues in managing the interactions between the individuals
- If the organizational aspects of the IS are carefully planned and designed, then it's likely to have limited integration issues

Best of Breed

1. Plan the ICT of the whole organization
2. Identify the ICT available,
 1. Suitable for the functional specifications
 2. Easy (time/cost) to integrate → EAI (enterprise application integration)

Best of Breed



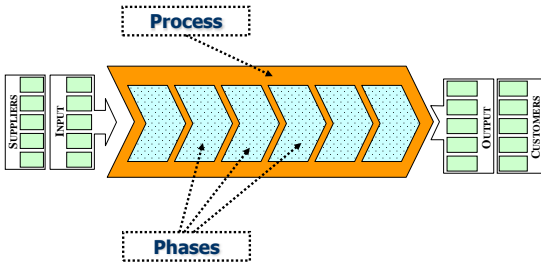
The process-based view...

- Is not focused only on the efficient development of each activity, but also on their **co-ordination**
- Is a very **complex** goal to achieve and it requires an **in-depth analysis...**
- ...but it also “forces” the definition of the information requirements as a whole, thus allowing the design of a **more efficient IS**

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Organization: a process-based view

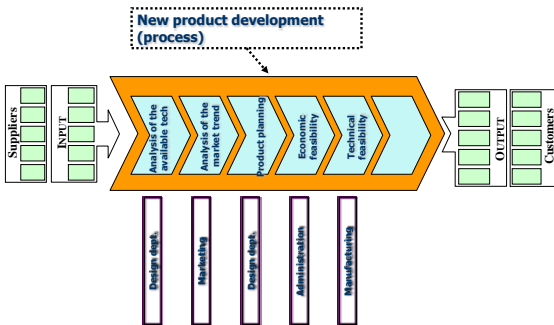


Process analysis → ICT as a lever for business processes reengineering

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The exemplification of a process



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Business Process Reengineering

- BPR is a technique of organizational innovation based on the concept of **business process**
 - Not only it changes the tools people work with but also **the way** of working
 - The focus is not on “**what**” the company does, but on “**how**” it makes business

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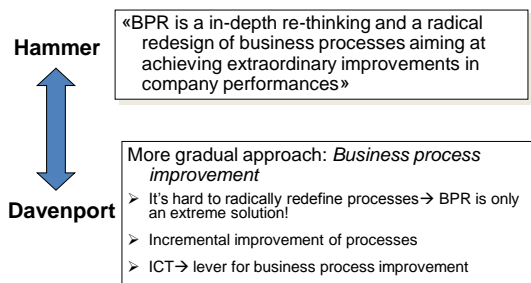
How to design a new process

1. Identify the goals of the organization and the related priorities
2. Identify the process/es that need(s) to be reengineered
3. Analyse and measure the existing process/es
4. Identify the ways ICT can support
5. Design and implement the new process/es

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Two approaches to BPR



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Process-based view: remarks (1)

- Focus on the activities and also on the **physical and informational exchanges** between the actors involved
- Organization seen as a whole of users which co-operate in a **integrated way** to achieve a common goal
- The co-ordination of each process belongs to a **process manager**

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Process-based view: remarks (2)

- 90's:
 - Innovation in the techniques for the organizational development → (BPR) Business Process Reengineering
 - Innovation in the computer-based systems available on the market (ERP systems)

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The reference period

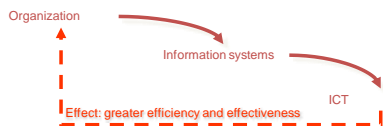
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Reference period – short term

• The traditional approach (static):

- Business strategy
 - strategy of each area
 - Information needed in each area
 - ICT investments



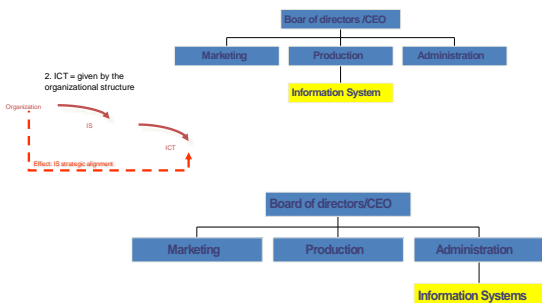
➢ Hypothesis: short term

- Improvements in **efficiency** (e.g. book keeping) and **effectiveness** (e.g. design)

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The IS department (traditional approach)



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Reference period - medium/long term -

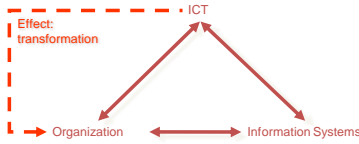
- What happens when the reference period changes? → (**medium-long term**)
- Several studies show **how ICT investments didn't achieve any significant improvement** in the organizational performance of companies
- The short-term vision **is not enough** to explain the contribution of ICT to company transformation and development

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Reference period – medium/long term –

- A more complete approach: ICT as a determinant in strategy



- How to accomplish this transformation?
 - Which are the opportunities provided by ICT?
 - Is there any helpful tool/technique?

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ICT as determinant in re-designing the organizational structure

- At the **company's level: impact on the value chain (Porter, 1985)**
 - Creation of new products/services made up of information
 - Integration of existing products/services with information contents
 - **Optimization of processes** (e.g. Production)



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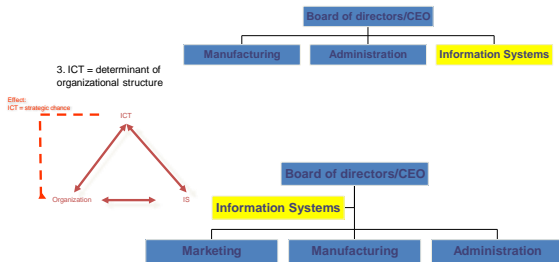
Hypothesis and limitations of the value chain

- The value creation can be measured by:
 - The cost of a specific activity/process
 - The time required for performing the activity/process
 - The overall quality of the activity/process
 - Measures????
- Issues
 - Ambiguity of the representation
 - Inadequate depth
 - Not generally applicable

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The IS department (innovative approach)

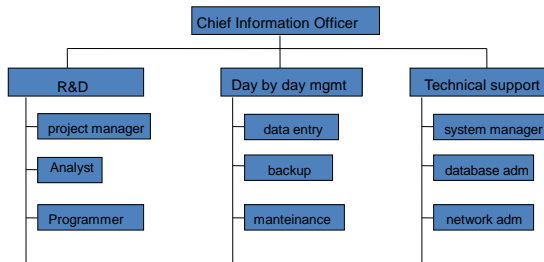


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Implications on the IS department structure

- Who does what in the IS department?



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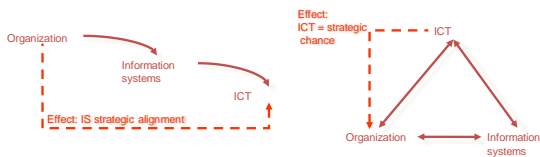
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Implications of strategic use of ICT on the IS department

- The **two approaches** to strategic use of ICT determine (are determined by) different requirements, **which ones?**

1. ICT = determined by organizational structure

2. ICT = determinants of organizational structure



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Organizational boundaries

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Organizational boundaries (1)

- At the **company's level: impact on the value chain**
 - Creation of new products/services made up of information
 - Integration of existing products/services with information contents
 - Optimization of processes (e.g. of production)

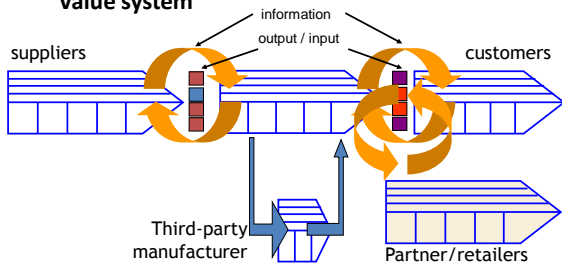


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Organizational boundaries (2)

- Dealing with the supply chain : impact on the **value system**



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Organizational boundaries (3) e-supply chain

- Phase 0: **stand alone organization**
 - ICT has no influence on external relationships
- Phase 1: **network set-up**
 - possible external collaborations are evaluated (e.g. suppliers, external manufacturers, resellers and retailers)
- Phase 2: **constellations of value chains**
 - Actual information sharing using extranet (external networks based on internet-based technology)
- Phase 3: **network with high extent of interconnection**
 - Group of partners being perceived as a whole (e.g. industrial districts and associations)

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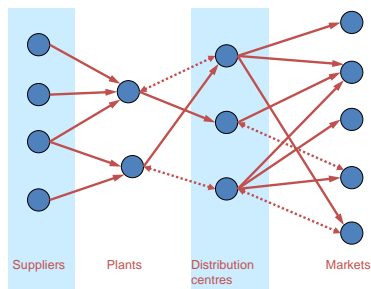
Organizational boundaries (4)

- Supply chain: the **actors**
 - **Suppliers**, organizations geographically distributed which provides with inputs,
 - **Plants**, the places in which the product transformation takes place,
 - **Distribution centres**, the places where products are received, stored and picked up for the delivery,
 - **Markets**, the places which products are addressed to.

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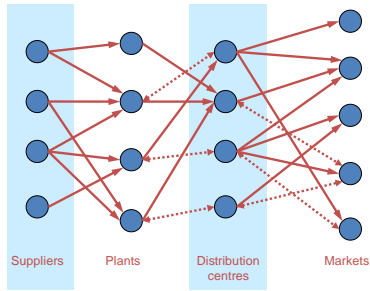
Organizational boundaries: supply chain (1)



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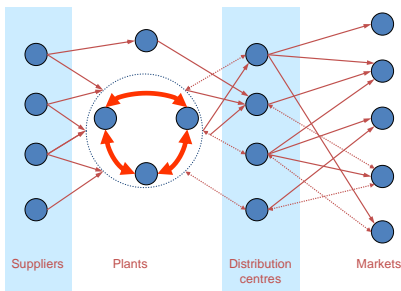
Organizational boundaries: supply chain (2)



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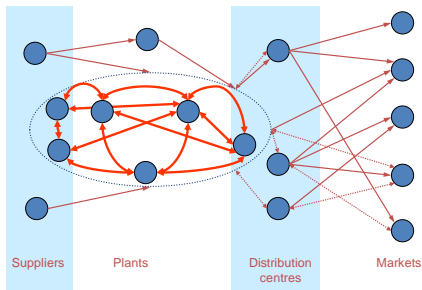
Organizational boundaries: supply chain (3)



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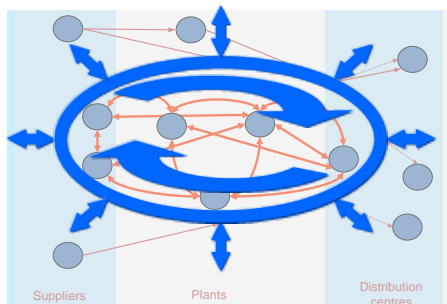
Organizational boundaries: supply chain (4)



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Organizational boundaries: supply chain (5)



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To sum up: organizational structure

- **Functional view**
 - Workforce and tools are grouped by their affinity to a specific activity: it's easy to define tasks, roles, responsibilities and resources
 - **ICT**: focus on local automation, not on inter-functional relationships → likely lack of integration
- **Process-based view**
 - Co-ordination and integration of business units, focus on the strategic goals of the organization
 - **ICT**: integrated and modular computer-based systems (ERP)

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To sum up: reference period

- **Static vision (short term)**
 - **ICT** don't determine any significant organizational change, instead they improve information management locally
 - Benefits from **ICT**: mainly **efficiency and effectiveness**
- **Dynamic vision (medium-long range)**
 - **ICT** contribute to the overall improvement of company performance by its **transformation (e.g. BPR)**

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To sum up: organizational boundaries

- **Value system**

- From the influence on the intra-organizational processes (**value chain**) to the interaction with external entities (customers, suppliers and partners)
- **Supply chain**: physical, information and financial flows

- **Integrated network**

- Alliances and partnerships between companies belonging to the same industry in order to
 - exploit common competencies and economy of scale
 - increase their bargaining power (e.g. **industrial districts**)

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