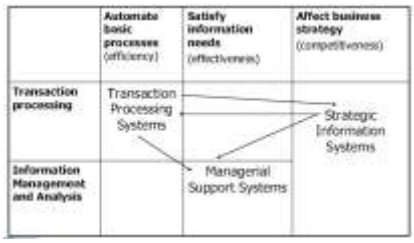
ICT, organization and strategy

Information Systems Design

Definition

- **Strategic information systems are those** used to support or shape the competitive strategy of an organization or specific strategic initiatives
- Strategic information systems enable and support the creation and appropriation of value

Type of systems



Goals of strategic IT

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

The influence of ICT on strategy

1. Improvement of strategic decision processes and decision processes for planning and control
2. Tool to **pursue the company's strategy**
3. Tool to **redefine the company's strategy**

ICT, strategy and.....organization

To what extent the impact of ICT on strategy involves/requires organizational issues/changes?

ICT supporting strategic decision making

The support of reporting systems and DSS

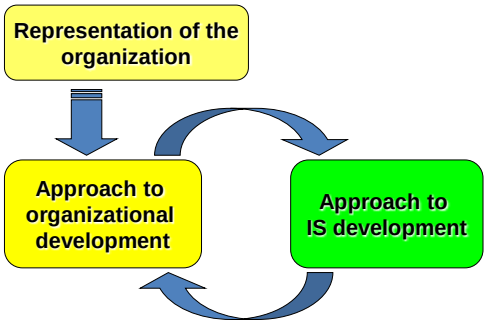
- Synthetic view of the business and market situation
- Simulations of future situations given a model of the environment and the company
- Mechanisms of control of the strategic variables

The influence of ICT on the organization

1. **Structuring/representation of the organization:** functional vs process-based;
2. **Span of time**: short (static vision) or medium-long (dynamic vision);
3. **Organizational boundaries**: organization (intra-organizational vision) or systems of organizations, networks, supply chain (inter-organizational vision).

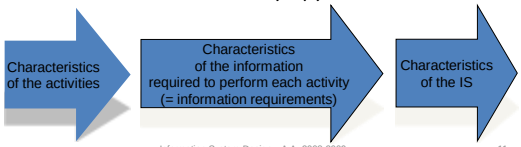
Structuring/representation of the organization

The organizational role of IS



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
- The idea behind the Anthony's pyramid



Anthony's pyramid: characteristics of business activities

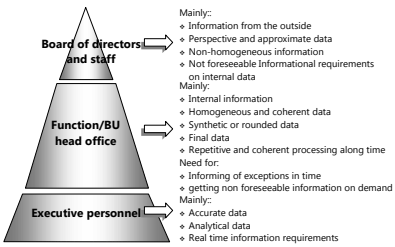
- Reference period
- Orientation to the outside/inside of the organization
- Discretionary power
- Repetitiveness
- Foreseeableness
- Organizational roles involved

The hierarchical representation (Anthony)

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

Information requirements



An Insurance company...

Book-keeping

Payment of insurance premium

Issue and management of ins. policies

Market forecasts

New product development

Profitability per agent

Profitability per product

A company belonging to the food industry

Manufacturing specifications

Orders filling

Sales forecasts

Control over production progress

Product specifications

Book-keeping

Sales analysis (product)

Finished goods warehouse

Sales analysis (product line)

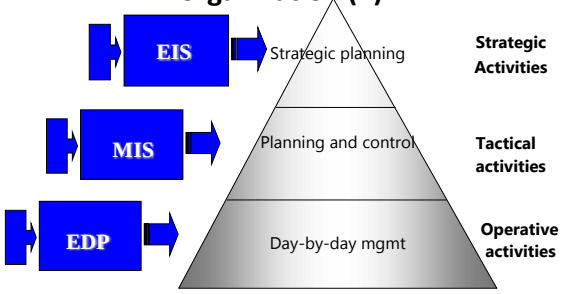
Creditors auditing

Bill of materials (product)

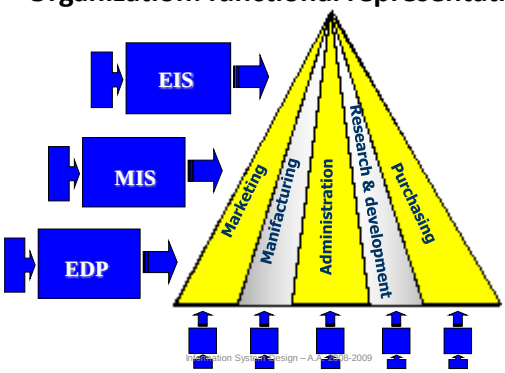
Analysis of new product point of reorder

Statistics and analysis on market competitors

IS and a hierarchical view of the organization (1)



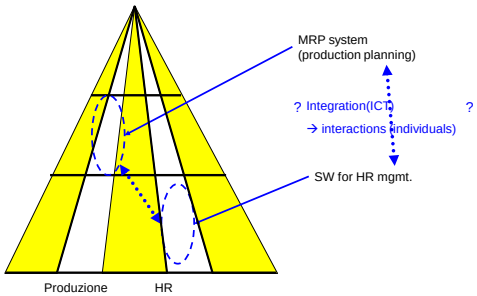
Organization: functional representation



Functional representation

- Based on the principle of "local optimization" (functional level)
- Organization as the sum of disjoined 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

Functional view and Anthony: implications



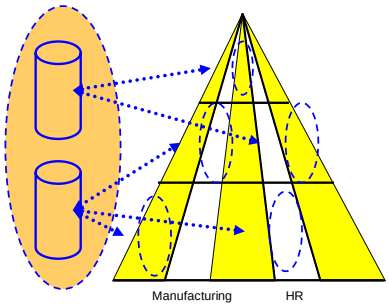
Functional view/Anthony →
A possible approach to IS development: "Best of Breed"

+ Extremely focused ICT (specialization)
- it's likely to face problems of technology integration → problems in managing the interactions beetwen 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 (entreprise application integration)

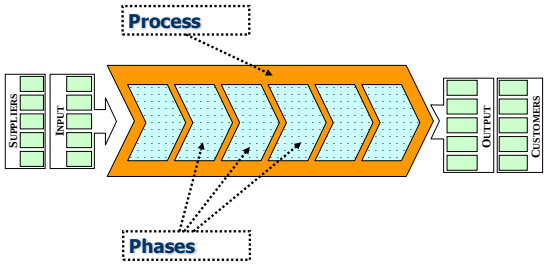
Best of Breed



The process-based view...

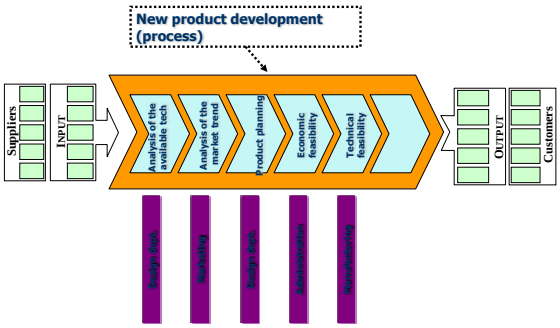
- Is not focused only on the efficient development of each activity, but also on their **co-ordination**
- Is a very **complex** goal to achieve and it requires an **in-depth analysis**...
- ...but it also "forces" the definition of the information requirements as a whole, thus allowing the design of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

Organization: a process-based view



Process analysis→ ICT as a lever for reengineering business processes

The exemplification of a process



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

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 esixisting process/es
4. Identify the ways ICT can support
5. Design and implement the new process/es

Two approaches to BPR

Hammer

«BPR is a in-depth re-thinking and a radical redesign of business processes aiming at achieving extraordinary improvements in company performances»

Davenport

More gradual approach: *Business process improvement*

- It's hard to radically redefine processes→ BPR is only an extreme solution!
- Incremental improvement of processes
- ICT→ lever for business process improvement

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 co-operating in a **integrated way** to achieve a commen goal
- The co-ordination of ach process belongs to a **process manager**

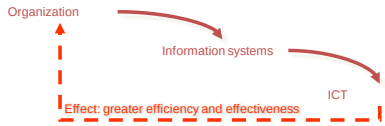
Process-based view: remarks (2)

- 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)

Span of time

Span of time – short term

- The traditional approach (**static**):
  - Business strategy
    - strategy of each area
    - Information needed in each area
    - ICT investments



- Hypothesis: short term
  - Improvements in terms of efficiency (e.g. book keeping) and effectiveness (e.g. design)

ICT supporting strategies

- **Every business function must pursue goals** which are consistent with the company's strategy
- Different strategies in the same sector: the example of banks
  - Advanced services for more dynamic customers
  - Lower services with incentives on the deposit rate

The alignment with strategic goals

- ICT supports the achievement of strategic goals
  - the IS area must have goals which are **consistent** with the company's goals
- **Who**
  - The management must define the tasks of the IS area
- **How**
  - Are investments in ICT consistent with plans of company's development?
  - Is the IS staff's culture adequate to the strategy evolution?

Strategic alignment: guidelines

- Define the critical functions to support
  - e.g. system for flight reservation: real-time response and management of concurrent accesses to the database of reservations;
- Define the general architecture of the system
  - centralized vs. distributed; who can have access to which data; …
- Specify the internal characteristics of the IS (technical
- and organizational)
  - technical: choice of hardware, type of connections, databases,
  - organizational: roles, tasks, planning and control procedures, …
- Verify that the IS is consistent with the other organizational variables

Strategic alignment: remarks

- Strategic alignment **is not a procedure to be carried out una tantum or periodically**, it's a continuous process
- The suggested actions aim at getting closer, with successive approximations, to the alignment between ICT and strategy
- The suggested actions are not to be carried out sequentially (but – rather – concurrently)

Span of time – medium/long term

- What happens when the Span of time 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

Span of time – medium/long term

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

➢ How to accomplish such an approach?
- Which are the opportunities provided by ICT?
- Is there any helpful tool/technique?

ICT as determinant in strategy

- 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)

ICT as determinant in strategy

ICT and structure of the sector

- **Suppliers**
  - If they have a high contractual power, they can impose high prices and reduce the company's profitability
  - ICT reduce the dependence on suppliers
- **Customers**
  - ICT increase their contractual power: lower prices and reduction of company's profitability
- **Competitors**
  - They can compete with price or promotion policies
  - ICT make it possible to create partnerships in order to avoid new entries

ICT and structure of the sector

- **New entries**
  - If the sector offers profit margins, it can attract new entries, who increase competitiveness and reduce market profitability
- **Substitutive products**
  - The threat of substitutive products increases the sector's internal tension

Porter – Millar's approach

- Identify the most critical **business activities**
  - how they contribute to the **cost of the product**
  - how they contribute to the generation of the **value of the** product
- Identify the possible competitive advantage deriving from the use of ICT
  - if it significantly reduces **costs**
  - if it increases value through **differentiation**
- **Choose one** of the basic strategies
- Models: value chain and information intensity matrixes (in the process and in the product)

The intensity of information in the process

- **Characteristics of the process:**
  - many customers
  - complex order with a lot of information
  - many direct suppliers
  - many orders with many components
  - articulated productive process
  - long work cycles

The intensity of information in the product

- **Characteristics of the product:**
  - mainly made up of information
  - requires information to be used
  - requires high costs for user's training
  - with many alternative uses
  - included in the production chain of a customer with a high information content

Porter-Millar's grid of information intensity

Venkatraman's approach (1)

- **Local automation**
  - automation of specific activites
  - no organizational impact
  - easily repeatable→ no competitive advantage
  - e.g.: CAD, warehouse management, book-keeping
- **Internal integration**
  - adoption of interfunctional systems (e.g. ERP systems or data warehouse)
  - both technical and organizational integration
  - it changes neither the external relationships, nor the basic characteristics of the product/service

Venkatraman's approach (2)

- **Redesign of business processes**
  - revision of operating procedures, information flows, ICT support
  - notable organizational impact

- **Redesign of external relationships**
  - transformation of the relationships with customers and suppliers
  - eCommerce, eProcurement, integrated warehouse management, distant collaborations, …
- **Redefinition of business**
  - ICT takes to the creation of collateral businesses (new products or services compared to the "traditional" activity)

Venkatraman: guidelines

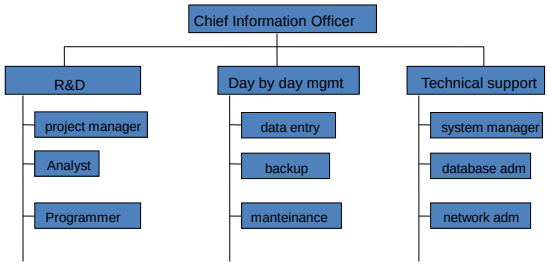
- Position on the scheme the main information systems of the company (ERP, CRM, production, warehouse, orders, …)
- Position the systems of the direct competitors or the firms of the sector → comparative analysis
- Select systems which require changes and evaluate the feasibility of the projects in terms of:
  - total expenses
  - organizational impact
  - commitment of the management

Porter and Venkatraman: remarks

- **Porter's approach may be difficult to apply** (particularly in SME) because it requires the systematic analysis of the company and its processes
- **Venkatraman's approach is more topical because it** evaluates the opportunity to apply **Business Process Reengineering and clearly refers to the possibilities** offered by **Internet-based technologies**

Implications of strategic use of ICT on the IS department

- **Who** does **what** in the IS department?



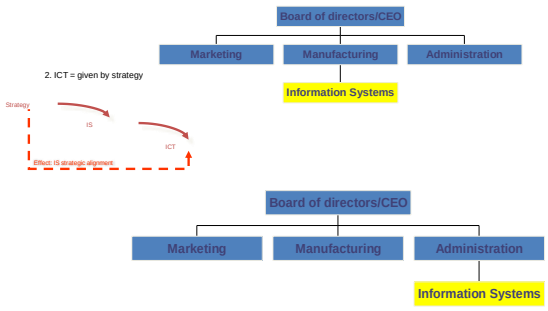
Implications of strategic use of ICT on the IS department

- The two approaches to strategic use of ICT determine differente requirements

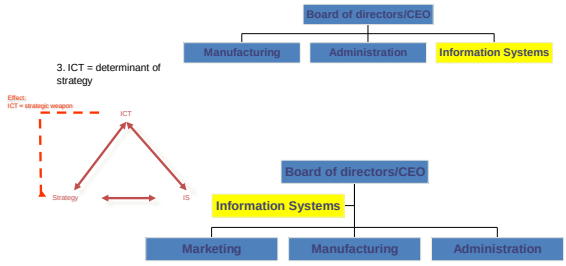
2. ICT = determined by strategy

3. ICT = determinants of strategy

The IS department (traditional approach)



The IS department (innovative approach)



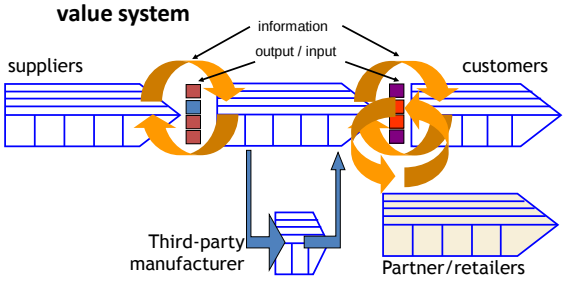
Organizational boundaries

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)

Organizational boundaries (2)

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



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)

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, responsabilities and resources
  - **ICT**: focus on local automation, not on inter-functional relationships → likelyenfasi su automazione locale, non sulle relazioni interfunzionali → likely lack of integration
- **Process-based view**
  - Co-ordination and integration of business units, focus on the strategic goals of the organization
  - **ICT**: integrated, modular computer-based systems (ERP)

To sum up: span of time

- **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)**

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**)