Definition of Information System

https://bit.ly/PolitoSIA

SOftEng
http://softeng.polito.it

Version 3.0.0 – 23/9/2020

Licensing Note

Information system

Interrelated components working together to

collect, process, store, and disseminate

information to support

decision making, coordination, control, analysis, and visualization

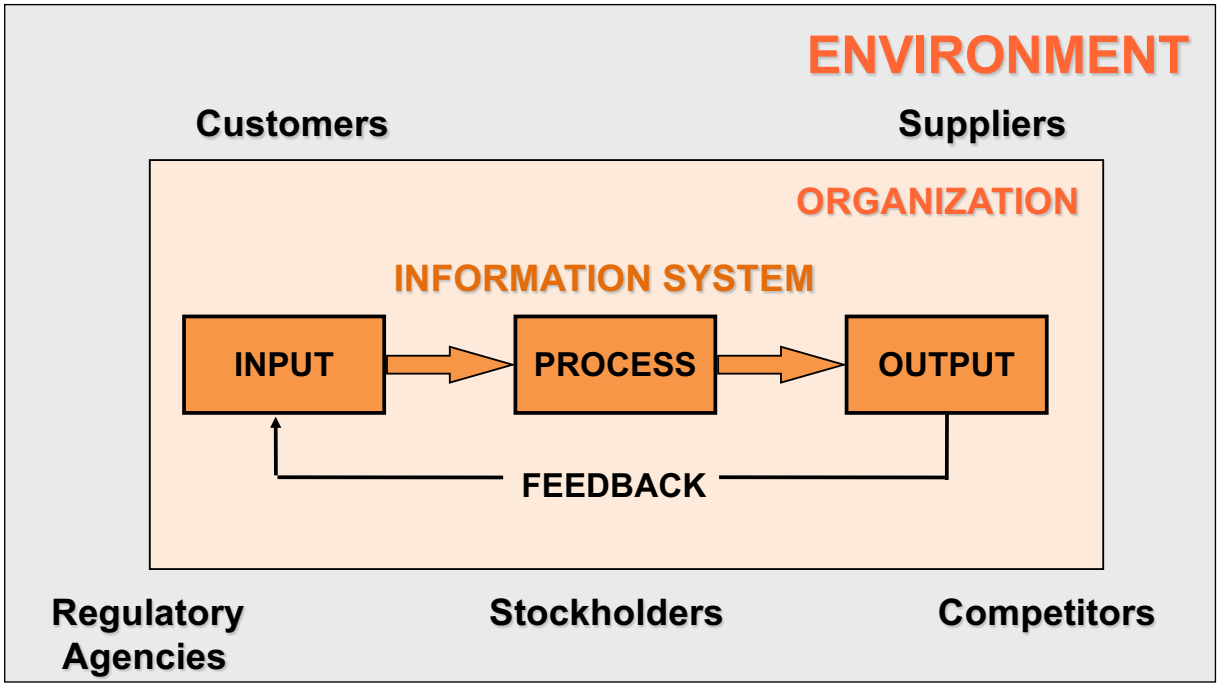
in an organization

Laudon and Laudon

Information system

- IS – Definition, larger scope
  - System to store and process information used by organizations
    - Includes paper, people, computers and software
- (CB)IS – Definition, reduced scope
  - Computer based system to store and process information used by organizations
  - Also known as CBIS (Computer based IS)

IS high-level functions



IS high-level functions

- Input
  - The capture or collection of raw data from within the organization or from its external environment
- Output
  - The distribution of processed information to the people who will use it or to the activities for which it will be used

IS high-level functions

- Processing
  - The conversion, manipulation, and analysis of raw input in order to support activities in the organization
- Feedback
  - Output that is returned to the appropriate elelement of the organization to help them evaluate or correct input

Data vs. information

- Data
  - Streams of raw facts representing events occurring in organizations (e.g. business transactions) or the physical environment before they have been organized and arranged into a form that people can understand and use
- Information
  - Data that have been shaped into a form that is meaningful and useful to human beings in processes such as decision making

Material vs. Immaterial

Production	€€€€€€€	€€
Reproduction	€€€€	€cent
Storage	€€	€cent
Transfer	€€	€cent
Transfer		⚡
Duration	Perishable	Eternal
Integration	Disconnected	Connected
Rivalry	Rivalrous	Non-rivalrous
Excludability	Maximum	Marginal
Return	Decreasing	Increasing

Adapted from: S.Quintarelli, "Capitalismo Immateriale" Bollati Boringhieri, 2019

Cost of memory

- RAM: 2.800$ / Gbyte
  - https://jcmit.net/memoryprice.htm
- Hard disk: 0.019$ / Gbyte
  - https://jcmit.net/diskprice.htm
- SSD: 0.080$ / GByte
  - https://jcmit.net/flashprice.htm

– As of September 2020

Internet of Things (IoT)

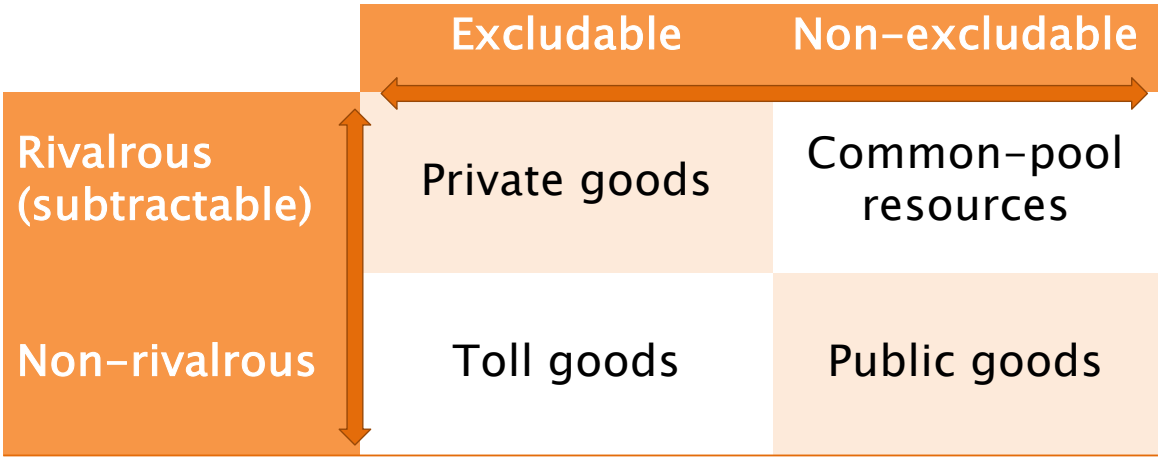
- The Internet of Things (IoT) is the network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment.

[Gartner]

Rivalry and Excludability

- Rivalrous goods, when consumed one party cannot be simultaneously consumed by others
  - Rivalrous: cars, parking slot, wood berries
  - Non-rivalrous: cinema, public park
- A good or service is excludable if it is possible to prevent parties who have not paid for it from having access to it
  - Excludable: cars, parking slot, cinema
  - Non-Excludable: public park, wood berries

Rivalry and Excludability



Diminishing returns

- Products or companies that get ahead in a market eventually run into limitations, so that a predictable equilibrium of prices and market shares is reached
  - Resource access (raw materials)
  - Market size
- Typical of bulk material processing

Increasing returns

- If a product or a company or a technology —one of many competing in a market— gets ahead by chance or clever strategy, increasing returns can magnify this advantage, and the product or company or technology can go on to lock in the market.
- Typical of high-tech industries

Increasing returns - factors

- Up-front Costs
  - R&D costs are large relative to their unit production costs
- Network Effects
  - Products need to be compatible with a network of users
- Familiarity and confidence
  - Products are complex, once users invest in training, they prefer to update skills for subsequent versions of the same product

Information Management

- Activity automation
  - Focus on productivity and substitution of work with technology
- Decision support systems
  - Get the largest amount of information available as a basis to take decisions
  - Evaluate in the quickest and most precise way a high number of alternative decisions

Information costs and benefits

- Information management has measurable costs
  - Hw and sw, personnell training, management
- It is more difficult to determine the nature of the benefits deriving from the IS investments
- Such benefits have different natures and more and more concern process automation and/or cost reduction
- Nowadays the reduction of transaction and decision cost represents one of the central aspects of IS investments

Information System vs Computer System

- Information System:
  - Hardware +
  - Software +
  - Technical knowledge +
  - Organizational knowledge
- Computer System: technical system related to the information system
  - only marginally focus of this course
- The goal is to design and evaluate the Information System (not only the computer system)

Organizations

- People
  - Managers, knowledge workers, data workers, production or service workers
- Structure
  - Organization chart, geography, groups of specialists, products
- Business function
  - Specific task performed in a business organization
- Business process
  - How activities are organized

Major business functions

- Manufacturing
- Sales & marketing
- Finance
- Accounting
- Human resources

- Software integrates all facets
  - Planning, manufacturing, inventory, sales, finance, accounting

Business process

- The unique ways in which organizations coordinate and organize work activities, information, and knowledge to produce a product or service

Organization vs. Enterprise

- Organization: control structure that manages processes
  - E.g. enterprise, army, church, public administration, football team, hospital, university
  - Includes: people, structure, and goal
- Enterprise: is a specific case of organization
  - Goods or services production, for profit

Common buzz about IS

- Technology:
  - The “latest version syndrome”
  - The “Modern Times syndrome” (emphasis on automation of often irrelevant operations)
  - The “Internet syndrome” (need of a web site)
  - The “App syndrome”
- Economy:
  - “it doesn’t interest me much / it is not relevant”
- Efficacy and ease of use:
  - “The user must learn how to use it and not resist the change”

References

- Bracchi, Francalanci, Motta, "Sistemi informativi d'impresa", McGraw Hill, 2010
- Laudon & Laudon, "Management dei Sistemi Informativi", Prentice Hall, 2010
- S.Quintarelli, “Capitalismo Immateriale” Bollati Boringhieri, 2019

References

- W.B.Arthur, “Increasing Returns and the New World of Business” in Harvard Business Review, July-August, 1996
  - https://hbr.org/1996/07/increasing-returns-and-the-new-world-of-business