

Carlo Batini

M12.1 - Economics of information - Introduction

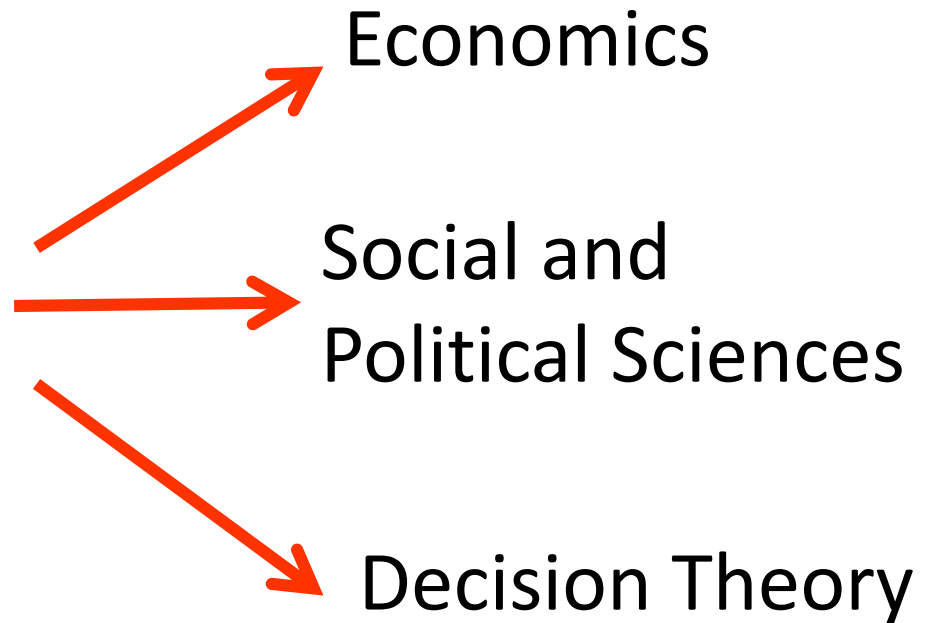
Origins of Information Value (Shannon 1948)

- Definition of **Information** in Shannon's **Communication Theory**

• **Information** conveyed by a message is proportional to the inverse of the probability of the message

Reactions in other Sciences

Communication Theory
Computer Science
Information Systems



Reaction of economists

- Information theory based upon the work of Shannon **has fascinated economists.**
- Perhaps the main reason for this has been that in his theory Shannon gave a measurement to a piece of information.
- Soon, difficulties arised →

Reaction in Social and Political Sciences

- Value of information lies in contributing to the **quality of life**

Reaction in decision theory - 1

- Considering just the **probabilities of outcomes** without considering their **consequences** is not adequate in describing the importance of **uncertainty** to a decision maker.

Reaction in decision theory - 2

For example, if

- losing all your assets in the stock market and
- having whale steak for supper

have the same probability, then the Shannon's information associated with the occurrence of either event is the same.

But, the **economic utility** is quite different!!!

Information value in economics

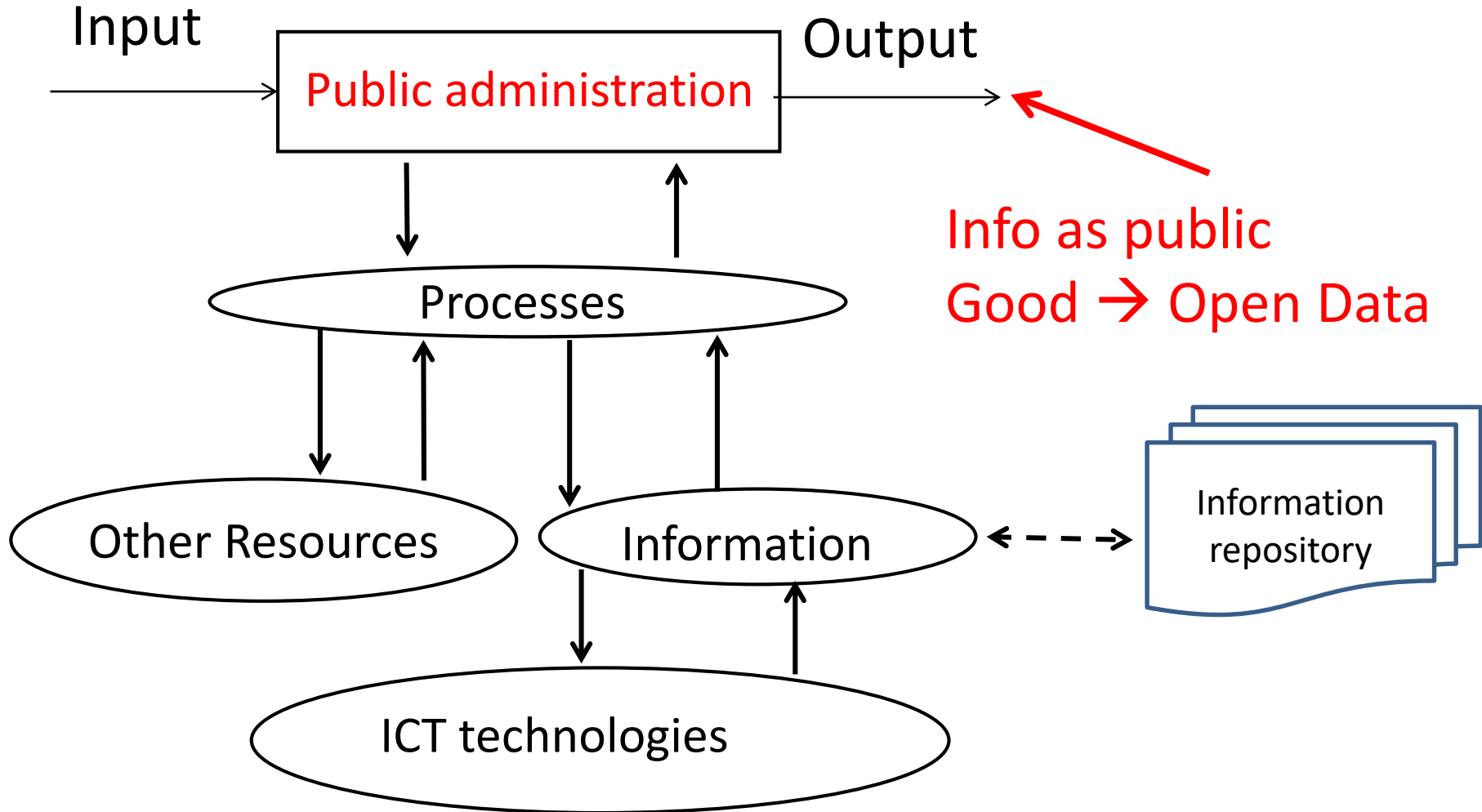
- Early studies in information value have been carried out in the area of information economics.
- Economists have investigated information value mainly from a mathematical perspective, by focusing in particular on classical problems of asymmetric information and game theory.

Value of information as studied by economists

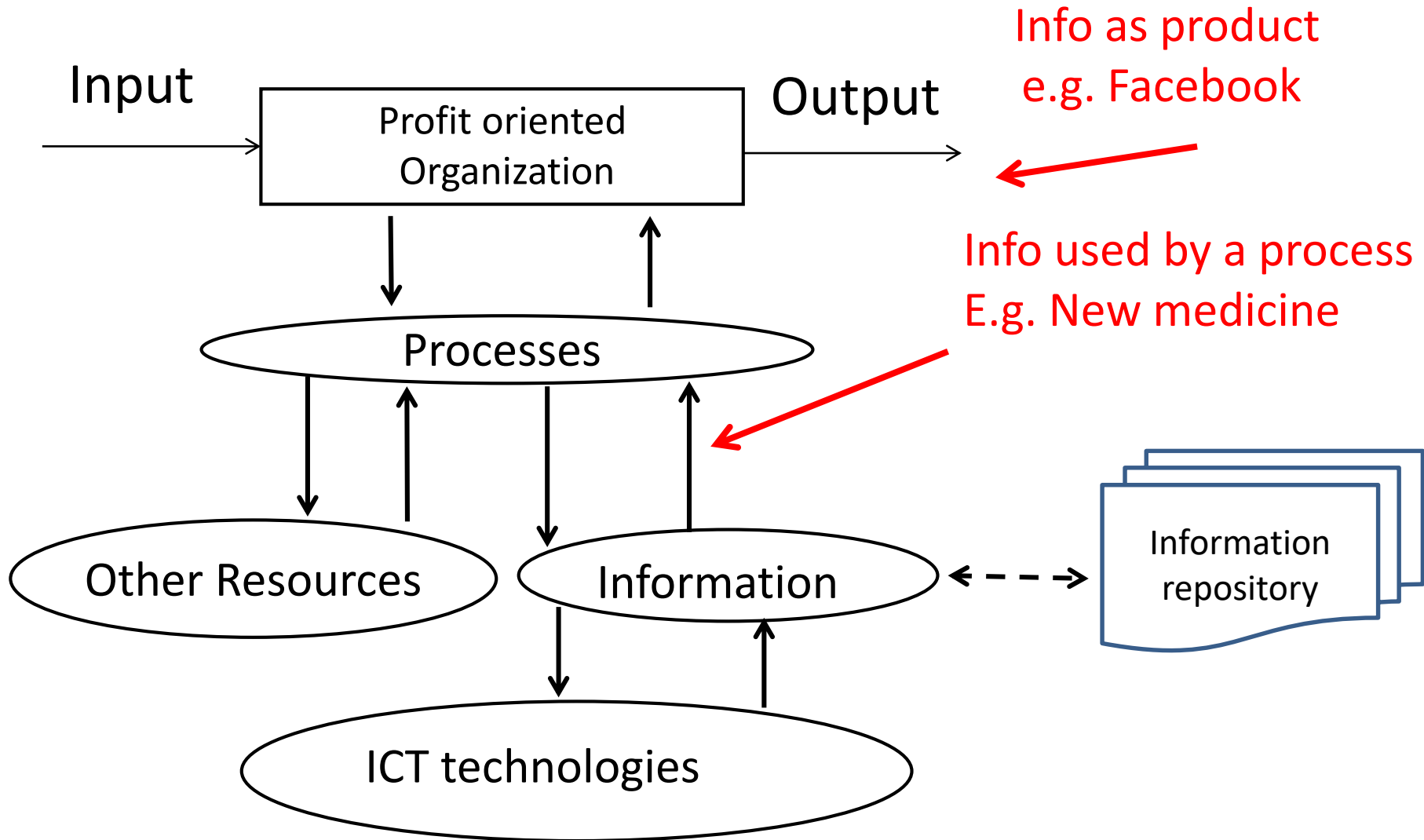
We focus on the value of information as studied by economists, accounting researchers, and management scientists.

Economics investigates human activities characterized by the phenomenon of **exchange**

Role of the Information System in an organization and related value - 1



Role of the Information System in an organization and related value - 2



Classification that we adopt in the following

Information as

- a **public good**, can be provided **for free** (or better, is **state financed**)
- an **information product**, that can be **sold** and **buyed**
- (as) **used in an information system** that satisfies requests coming from **business processes** of the organization

Value of Information as a product

Information production



- In economic theory, **production** implies that **valuable input** is allocated to the bringing forth of **valuable output**.
- The **input** is valued in terms of **comparative opportunities** of alternative outputs that could be produced in lieu of the output actually obtained.
- The **output** is valued in terms of someone's **willingness to pay** for it → Pricing

Information possessors and seekers

There are two actors in information markets:

- **possessors** (or **providers**) of information and
- **seekers** (or **consumers**) of information.

They are supposed to act **rationally** by **supplying** and **demanding** valuable information.

So, also information products are ruled by the **law of supply and demand**.

The role of markets

- Economists need to think of **markets** in terms of **demand** and **supply**. In this world of exchange the **only phenomena of interest** are those which can be measured by using **money**.
- This approach is useful in measuring amounts of **money spent in producing information products and services** and in measuring **what individuals spend in buying information** in the market place.

How can information be exchanged?

- As a **physical good**, e.g. a **book**
- As an **intangible service**, e.g. an **e-book**, or a **newspaper**, that **can be accessed and read** e.g. for a month.
- Information is so «fluid» that can be **both a good and a service**.

Both a good and a service

Uneven prices - 1



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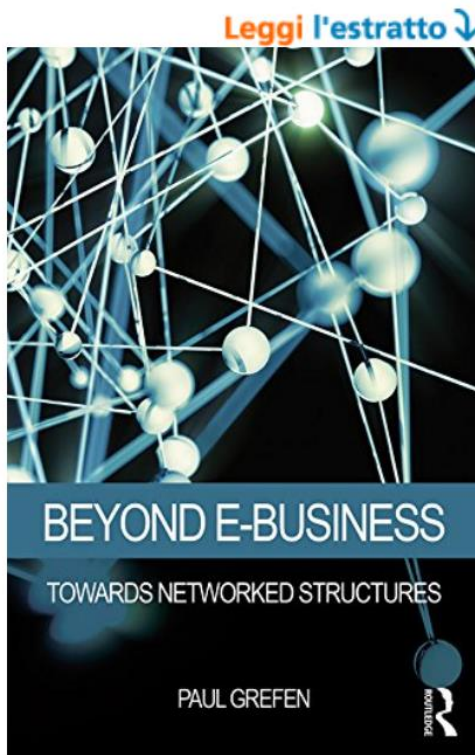
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Both a good and a service

Uneven prices - 2



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Value of Information as a product

Information value in the consumer
provider relationship

An historical perspective

In economics in the 18xxs, economist took value to reside either in physical nature itself or in the transformations enabled by human or animal labor power.

In the second half of the 18xxs value becomes relational and intangible.

From information as a product to digital information as a service

Value in use and value in exchange

Provider of information and consumer of information adopt two different **points of view** in the **economic exchange**, that from Aristoteles and Adam Smith are called

- **Value in use**, called also **Utility**, for the **consumer**, and
- **Value in exchange**, typically, the market price (minus cost), for the **provider**

Value in use

1. Value in use is typically modeled as a **mathematical or statistical relationship between Benefits and Sacrifices**
2. **There is a reasonable consensus on determinants of benefits and sacrifices**

Which benefits in case of info.?

- Monetary advantage

- Show this ticket and have a discount of 5 €

- Intangibles

Information is power!

- Information quality

- My name is Carlo Batini.
- Did you say Carlow Bertini?

- Epistemic benefits

Today, looking at Wikipedia, I understood that...

- Emotional benefits

I like all the poetry of Wislawa Szymborska, it touches me...

What Sacrifices?

- Price
- Effort (especially time, but also e.g. mental effort)
- Risk of failure

Subjective issues and need of profiling

1. There is a reasonable consensus on determinants of benefits and sacrifices, while
2. The value perceived and levels of relevance of determinants are considered highly subjective and related to:
 - information exchanged and
 - subject perceiver

E.g. Think to a book or an e-Book or else
think to NYT vs Wall Street Journal

Differentiated approach to Value in exchange and Value in Use

- The **information product value-in- exchange** should be studied using **'classical' economics methods**, Ex. Supply and Demand Laws
- The **value-in-use of information**, being related to **subjective perception**, should be studied using the **cognitive approach** which takes the **user**, the **use** and the **effects of the use** of information into consideration.

Detailed study

Course topics (mandatory)

- **Value of Information systems**
 - Discussion of approaches proposed
 - Information as an asset → Moody
 - Approach of Ahituv and related results → Ahituv
- **Scarcity, abstraction and codification** as drivers in modeling the value of Information → Boisot

Optional topics

- Value of business processes enabled by information technology innovation → Batini
- Value of information as modeled in the query load of a database → Even
- Cost benefit analysis of quality vs value of information → Heinirch