

From the economics of information to a knowledge society

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- Europe in the Middle Ages has created the university, which is the current model for higher education around the world. It has now lasted 800 years

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At the individual level:

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At the society level:

- **Economic benefits:** An educated workforce makes the introduction of new techniques possible. Among countries, there is a strong correlation between the level of education and the rate of growth.

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Interaction between the individual and the social level

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- **Perverse effects:** In an open society, where no one is prohibited to enter higher education, everyone wants to get as high a degree as possible. There may come a point where diplomas are no longer discriminating (everyone tries to be above average)

Striking the right balance is difficult. It has to be stressed, however, that nowadays the right to education is seen as a fundamental human right

Paradoxes of the modern world

What and how should we teach the young generation ? Right now, we feel as if we lived on two planets at once:

- virtual world vs. climate change
- man-made environment vs. ecological footprint
- abundance of consumption vs scarcity of resources
- primitive tribes vs Wall Street
- religions vs science
- extreme inequalities between countries and between individuals (wealth, education, life expectancy) in a general background of tremendous progress

A key to understanding

Changes have accelerated since 1950.

- The brain always was a consuming organ: music, tales, then books, movies, now TV, internet, video games. What does it consume ? Information !
- Computers have multiplied the means to generate, store, transmit and use information: it is an information revolution similar to the industrial revolution. Our way of life now relies on it:
 - industries (entertainment, finance)
 - science, engineering, medicine
 - social networks and communications
 - domotics and robotics
- Information is the motor which drives the changes.

Information as an economic good

Information has now all the characteristics of a standard economic good, like corn:

- *Producing* new information: R&D (public and private)
- *Appropriating* existing information: patenting genes or algorithms
- *Distributing* information: from information highways to wireless communications
- *Storing* information: from hard disks to the cloud
- *Retrieving* information: search engines

All this with decreasing costs (Moore's law).

An information-based vs a resource-based economy: the US vs. Saudi Arabia. Oil production may have already peaked, information production will never peak. The soft power of the US

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- From the economic point of view, information should not be market-driven: it has to be *regulated*.

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- But teaching and research should be *at the interfaces*: that's where the action lies.
 - mathematics and economics
 - brain and machines
- Students should be taught also about the society they live in, so that they can function as *citizens*, not only as engineers. This means the teaching of history, including history of ideas.

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 - See for instance the very public concern for those sections of society who cannot speak for themselves: the children, the very old, and the unborn (climate change)
 - And yet fairness has been given very little room in research, teaching, and political discourse these past fifty years, as opposed to efficiency

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- Who is "we" ? Who will act and how ?
- There is clearly a crisis of governance in the whole world (see the Copenhagen fiasco, and the way the Euro crisis unfolds). The only ones who seem to exert power are the markets, and I do not believe (for reasons well-grounded in economic theory) that they would give an answer anyone would like to the four questions. My (very slim) hope lies in developing the general sense of fairness to counteract the scramble for profit

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- Unfortunately, such persons do not exist. What kind of then of representative democracy for spaceship Earth ?

Towards a knowledge society

Three steps towards global governance:

- **Education:** We need citizens, who are aware of the problems and make their voice heard. If you have a high-school education, economics or finance are not beyond you, and *you can and should develop our own opinion*. The debate about nuclear energy, for instance, should extend to all citizens, because they are all carrying the risk.

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- **Research:** There should be as much research and as much attention paid to *fairness* (or *justice*, or *equity*) as there has been to efficiency (Pareto optimum) in the past fifty years. This should be done from a historical and practical point of view, as well as a theoretical one

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- **Firm governance:** The present mode of governance of corporations has many problems (limited liability, fiduciary responsibility of management to stockholders) which should be addressed. One should involve all stakeholders (not only the stockholders) in the governance, to internalize the negative externalities

Thank you