

Political prayers lie on the growth's comeback to ensure financial incomes to be given out. For that science is seen by many essentially as a tool to provide techniques able to raise productivity, whatever the environmental or social consequences. For those reasons, and especially since the second half of the 20th century, public policy and investment have allowed unprecedented technical development and the economy of promises, the genuine aim of those efforts being hidden by the general concept of progress. Links between science and economical growth should be underlined and questioned.

We assume that everyone in this conference knows what economical growth is.

What is « science », especially modern science ? Science in a broad meaning refers to truth. Science looks for truth. If we follow Karl Popper's classical analysis, science is a dialectic between conjectures and refutations. Conjectures are theories and refutations comes from empirical theoretical or any other kind of objection. This simplistic way of describing science can be a little bit complicated with Kuhn's theory of paradigms. A theory is a paradigm; at the beginning of a given science, there are many theories and each one is defeating others, no one can be taken for grounded, therefore no progress is possible. A paradigm appears when some assumptions are naturalized and taken for granted, they are the basis on which many scientists can refine their observations. What Kuhn qualifies of "normal science" is paradigmatic science : a coherent set of laws, theories, experimental devices and apparatus, and some grounding achievements. Bourdieu's sociology or neoclassical economics are of this kind. Paradigms could be destroyed by an increasing numbers of anomalies. It is hard to achieve, as paradigms are partially incommensurable. Another characteristic of modern science is being highly specialized. Many imagine that there is a division of work and a "front" of research, being slowly pushed, as in a war. In reality science is also highly fragmented : different methods, different interests, incommensurable theories. There is no such thing like a unity that could be accepted by every scientists. Professionals scientists like to fight, everyone claims having the true science.

What are the links between growth and science? Knowing is a cognitive activity, with apparently no link to growth. There are many links in reality. First growth is an object of science: economy, statistics, economical geography etc. a great number of sciences are dedicated to growth. Science is also a tool for "improving" growth, organization, technology etc. in order to produce more. This is not a matter of "applied" science and "fundamental" science. Fundamental science is used to fuel growth, e.g. Google is financing quantum physics, trying to build a quantum computer, supposedly millions times more powerful than nowadays machines. Fundamental science is linked to applied science, even it is difficult to know where useful discoveries can happen. It is not possible to escape the question of choice : where research should be engaged, and where there's no hurry. Engaging resources means making a choice, and this choice is always justified, on various basis, including a hope for useful results. There is another link between applied science and fundamental science : the second one needs the first one to build the tools needed for research. As these tools could be very expensive, science is linked to capital, private or public, and therefore to growth: developed countries only could invest in "big science", for example, as they have huge quantities of capital.

Historically growth is also the root cause of modern science. Improving returns in agriculture allows more workforce to go in industry, then in tertiary sector. Science is a service activity, of tertiary sector. As any other activity of growth society, it is linked to a highly developed division of work. Modern science, as a professional activity, with its journals, its division of work etc. arose at the end of 19th century. The climbing part of tertiary sector in developed country leded many analysts and leaders to speak about "knowledge society" or "cognitive capitalism". Scientists are more than ever invited to propose solutions for growth, with dedicated infrastructures such as clusters, even if this cooperation has always been there, eg the example of James Watt and Matthew Boulton, inventor and seller of the steam machine.

Modern science produced a lot of knowledge – atoms, microbes, biology, spatial observation etc. Knowledge has never been so developed, quantitatively speaking. But modern science is a specialized body, therefore different problems arise, such as a tendency to have the monopoly of truth. Another consequence is that knowledge is highly fragmented. In small societies, everyone is more or less multi-skilled ; that's not the case anymore in modern societies. Synthesis is know problematic. Most people learn scientific results without experimenting it. Expertise often rely on a very limited number of people. Truth can be manipulated, for different reasons : economic or political interests, personal career and interests of the expert etc.

Modern science is also claiming being the only science. Before, there was religion or observation, but no so-called "experimental science", which refers to the power of manipulating nature, and industry. Modern science conceives itself as being the only true science, and modern civilization understands also itself as being the only true way of organizing societies. True because universal. This is ideology, for sure, and science can have a very strong ideological role, given that scientists are supposed to safeguard truth, or at least the better truth as possible, given the state of art.

We assume we all know the limits to growth : ecological, resources, anthropological ("buen vivir"), democratical and spiritual. There is a limit specific to science : new fields such as nanosciences and biotechnologies do not paves the way of a new step in the mastering of nature. They open on totally new

fields, with totally new laws – if there are any. Complexity is enormous, therefore applications are very limited and unsafe.

What are the consequences of degrowth, for science ?

First science is a powerful tool used to criticize growth society and its consequences. New indicators, ecology, geology, sociology, psychology are used in this direction. Second, structural effects. The link between GDP and progress is often weak, and at least complex, not linear. A degrowth perspective on science means less money, probably. The problem is where to cut: science (or education), big science (or social sciences) etc. ? Positively, degrowth, for science, means opening new fields of investigation, for a real progress, taking ecology, democracy, demography and so on into account. This implies to open science to civil society, to change science governance, going from a growth science to a degrowth science. Like in other professions there could be some training programs, allowing molecular biologists to go to agronomy for example. Obstacles on the way to a just and sustainable society have to be established and researched : this is a way in which the freedom of research can be used. Sadly its more often used in the direction of technology driven dreams such as spatial conquest. Non-growth private sector could help, when state is mainly driven by growth perspectives...

As modern science is a result and a tool of growth, many people, facing the critique of growth, fears of getting back to stone ages, with religious knowledge, being chased by animals, hardly trying to survive. Growth means indeed a linear history, with a beginning – but without end, as growth should be, in the modern model, a perennial state, not a mean to an end. One can see that in the UN classification. Modernity claims being the only one opening the way to progress. With growth comes knowledge, health, democracy and everything. So leaving growth is leaving everything. But reality is different. Growth means also growing bads, such as climate change or wastes. And many so-called “underdeveloped” societies know public debating, democracy understood as people making the law, different types of health care, ecological knowledge and so one. On the other hand developed countries are stressed by work, they have sometimes a lot of people in jail etc. Postcolonial and anthropological critique as deconstructed our vision of underdeveloped countries. Marshall Sahlins and others show that small size societies weren't necessarily neither “poor” nor “religious”. Discrimination could be less developed. Jared Diamond made a useful comparison between law systems, US and New Guinea, each one has advantages over the other. So this idea of “stone age” isn't scientifically based.

The question remain on how to decide what key priorities are. According to a degrowth scenario, scientists and citizens community must build democratic tools, such as citizen conventions and research modalities promoting non-scientists engagement, in order to allow science that benefit to all citizens. What is needed is transdisciplinarity, low tech orientations and social innovations in research.