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Knowledge Societies: Value-free or Value-laden?[*]

„What is a cynic? A Man who knows the price
of everything and the value of nothing"
Oscar Wilde

Abstract

European policies have been oriented since 2000 by the so-called Lisbon Strategy aiming to transform the European Union into a successful knowledge based society. The cornerstone of this strategy is the establishment of a European Research Area allowing knowledge and researchers to flow freely through internal European Union borders. For such a strategy to be successful confidence and support between science and society should be the rule hence the Science and Society Action Plan in 2001 [1] and the Code of Conduct for Responsible Nanosciences and nanotechnologies Research in 2008 [2].

The expression „Knowledge Based Society" or „Knowledge Society", unknown a few years ago, has indeed now blossomed into many spheres and especially among policy makers and media. But what does-it mean exactly? We may figure out fairly enough what is behind „agricultural society" or „industrial society" or even „information society" but when it comes to „Knowledge Society" it seems that concepts, definitions, borders are not so clear anymore and if we find a definition for ourselves we may well find other people with other definitions.

Nevertheless, based on this concept many policy makers are developing policies aiming to create more knowledge, disseminate it further and favour its quick transformation through more-than-ever performing in-

[*] The paper is printed as submitted.

novation processes. What are the options offered to policy makers today and how will it impact policy making tomorrow? What are the consequences in particular for research and innovation policies? What are the values, if any, driving today the slow transformation of public policy making into more inclusive governance?

Knowledge Society sounds like something very rational. Therefore what might be expected for our values tomorrow? Is knowledge value-free or value-laden? Ultimately, will Knowledge Societies be value-free or value-laden?

These reflections will be illustrated inter alia by the discussion around the development of nanosciences and nanotechnologies at European level and notably the adoption, and further revision, of the Code of Conduct for Responsible Nanosciences and Nanotechnologies. They will be further highlighted by recent EC, ESF, OECD and UN debates on the changing interface between science and society.

References

[1] European Commission, "Science and Society Action Plan", COM (2001) 714, 4. 12. 2001

[2] JO L 116 du 30. 4. 2008, p. 46.

1 – European Union, Knowledge, Values

The concept of Knowledge Society has been strongly emerging with the century. Its success is notably due to its intuitive character rather than to a precise and agreed definition. It has been popularized in Europe thanks to the commitment of the Member States in Lisbon in 2000 to become the most successful Knowledge Society by 2010. In the „Lisbon strategy", growth is expected to be generated through Knowledge policies, i. e. education, research and innovation. Although the impact of this strategy is still to be assessed, indicators tend to show that not enough emphasis has yet been put on these Knowledge policies and that the strategy may not deliver the expected results. Many voices have been rising in the academic world but also among policy makers, industry, civil society, media, articulating different perceptions of what a Knowledge Society is / should be and how its emergence should / could be favoured. The debate is still open.

The European Commission has been exploring the concept through its research policy and notably through governance activities (CEC 2001 a, b). The

results up to now show the rising importance of the notion of 'value' in the debate at the interface between science and society. A number of questions can be raised regarding the expression and place of EU values in the future Knowledge Societies. In a first approximation one can say that EU values are encapsulated in the Charter of Fundamental Rights adopted by the Member States by proclamation in Nice in December 2000 (CEC 2000 b), as part of the first draft European Constitution. As such the Charter was not binding until the Constitution is adopted, but we know the fate of the first draft European Constitution… Nevertheless, compliance with the Charter of Fundamental Rights' provisions has been since December 2000 „the touchstone for Commission actions", as expressed by Commission President Jose Manuel Barroso and Justice and Home Affairs Commissioner Antonio Vitorino in an internal memorandum to all departments in March 2001.

Dignity, freedom, equality, solidarity, citizens' rights and justice, the six chapters of the Charter, have remained high on the political agenda. But will it remain so in a future that „foresighters" see dominated by scientific and technological knowledge? In the context of a Knowledge Society, will the „value of values" decrease, and be marginalised, or will it increase, requiring new governance modes in order to find a proper balance between competing values? Will Knowledge Societies be value-free or value-laden and what does it imply for all of us?

This article will support the view that the development of purely rational (or supposed to be so) institutions, policies and activities, such as those relating to science and research, may induce value dominant societies that may require profound governance changes.

I shall first sketch today's situation of science in society, wondering why science can be sometime as powerless in solving societal challenges as it can be powerful in understanding their roots, and I shall present various solutions that have been proposed, in recent (or more remote) times in order to 'repair societal cracks', be they related to safety, ethics or human rights, leading in some cases to 'patchy solutions' addressing inappropriately systemic issues.

Secondly I shall present a few ideas stemming from EC research on governance (notably in energy, agriculture and fisheries). Thirdly I shall reflect on the somehow paradoxical relation between present and future where much of our present is made of our perception of what tomorrow may bring and where our future strongly depends on our present ability to take value laden decisions.

This will be illustrated by EC activities on N&N, synthetic biology and other converging technologies.

In the concluding chapter I shall take up the discussion of the place of values in this rapidly evolving background and I shall present elements of what could be a new governance paradigm allowing a better incorporation of values into more rational societal choices.

2 – Knowledge and Societal Issues at the Turn of the Century

The David and Goliath story has been revisited number of times in history. Indeed, great powers may be stopped by much less powerful entities. It has been abundantly documented by academics, e. g. in economic and military fields (Badie 2004). These reflections could be inspiring as well when it comes to knowledge and societal issues.

2-1 Powerful Science, Powerless Science

Science knows a lot indeed and can achieve a lot through technology. Science and technology (S&T) together are showing everyday how they can impact our daily lives. It has become commonplace to say that there is today virtually no field of human activity and no place in the biosphere which is not affected by science and its technological outputs. Health, transports, energy production, education, culture, etc. have been revolutionized by S&T progress. New perspectives are now open to new revolutions thanks to the ability to manipulate matter at nanoscale or to manipulate life at gene level. Furthermore, the convergence of these sciences (and their technological avatars) with ICT and cognitive sciences may bring even more promises, e. g. anti-aging medicine (TA Swiss 2008).

Nevertheless, this golden medal has two sides. Past science and technology successes revealed along time some inconveniences, drawbacks or even failures. Health issues, moral issues and human right issues have been accumulating during the last may deliberately decades of the 20th century.

Philosopher Hans Jonas argued (Jonas 1975) that in the course of their development S&T are short-sighted, i. e. that they may tell the immediate consequences of their realisations but they do not have the power to foresee their ultimate, long term impacts. Indeed, setting aside dishonesty and legally rep-

rehensible behaviours, decision makers ignore aspects not directly relating to their own field of responsibility (e. g. bio-accumulation of toxic substances, CFC and ozone layers, tobacco, etc.) and they may ignore legitimately phenomenon not yet known by science itself (e. g. prion effect in mad cow disease). This is valid also for ethical issues. Organ transplant may indeed save lives, and they do, but at the same time they can induce organ trafficking in less favoured parts of the world. ICT progresses may allow huge data storage and hyper-fast calculations but this can prove detrimental to privacy of individuals. S&T progress can also be detrimental to human rights if their applications are not shared effectively in human society.

Science has therefore an ambivalent image in society: Science is not good in itself but only as good as society can make it good. In that case, values can be seen as a way to think the impact of short sighted S&T in the long term. They can be a link between science and society (Latour 1999).

2-2 Patchy Solutions for Societal Cracks

In liberal democracies, S&T have been used by policy makers mostly to concentrate power and get competitive advantages over competitors. This is the case for the EU in the approach underpinning the Lisbon Strategy but this is nothing new (CEC 1993). It is indeed the case for most industrial policies since the industrial revolution even if voices are rising to question this model (Krugman 1994). Science has benefitted from this approach as much as societies in a kind of symbiosis, and as long as progress has been benefitting society as a whole, through basic appliances for example or medicine, the belief in a never-ending science based progress has been largely shared by all strands of society. In the course of the 20th century, the „truth" value reached its zenith! S&T were efficient and societal progress was following, largely mechanically, S&T progress. A Nobel Price even rewarded the demonstration of the role of technological progress in economic growth (Solow 1960).

Unfortunately, as we have seen it, scandals, accidents and dramas have eroded the faith in this simplistic view of the relationship between science and society.

Safety questions became a priority in the 90 s', following, e. g., thalidomide (60 s', medicine), Chernobyl (1986, energy), mad cow disease (80 s' and 90 s', food) or dioxin (1999, food) scandals. The reflexion on risk led to separate risk assessment from risk management, inducing the creation of national and

European independent safety agencies in charge of appraising and assessing the risks in various context of human activities. The European risk reflexion gave birth in Europe to the Precautionary Principle (CEC 2000 a) stating that scientific uncertainty should not be a pretext to inaction but rather a reason to adopt precautionary measures (safety research to close knowledge gaps, specific regulatory measures, etc.) (IRGC 2005).

Ethical issues may have started as early as the Manhattan project and its „successful" outcomes but they came up essentially because of in vitro fertilization and further genetic developments which made possible to change human nature or at least to influence the course of its evolution. Debate on property rights over existing or new life forms is not over yet. This ethical reflection developed in parallel to the risk one without much exchange, as if the quantifiable issues should not „pollute" the unquantifiable ones, as if the scientific „truth" should not be polluted with the unscientific „truth". Ethical committees were set up and specialists in ethics (ethicists) were asked to tell the „good" from the „bad" for policy makers and society (Tallacchini 2009).

With independent safety agencies and ethical committees, health and moral issues are supposedly under control. As for fundamental rights, the Human Right Committee of the UN is instructed to discern what is „right" from what is „wrong" in monitoring the implementation of the International Covenant on Civil and Political Rights by its State parties. Nevertheless, the Right to Benefit from Scientific Progress and its Applications has for the time being no practical application and cannot be opposed to any action undermining it (UNESCO 2009).

Although largely documented by academic literature under these three perspectives of safety, ethics and human rights, the question emerging from this complex picture is still (and more than ever): „Are we today in a position to solve the major societal issues ahead of us through these expert based, patchy solutions?"

3 – Values and Good Governance: Lessons from Science in Society Research

European Commission analyses have led to consider four main types of players at the interface between science and society: Public policy bodies setting rules and funding public scientific activities; Companies creating wealth through R&D and innovation; Research organisations generating new scien-

tific and technological knowledge; And ultimately, citizens (taken individually or grouped under various kinds of associations) as basic components of society and as such end users, if one may say, of all S&T progresses, directly or indirectly.

Along with these four main types of entities are various types of „mediators" between science and society such as trade unions, science museums, press, TV, internet, etc…

Taking as a simple definition of value „What really counts in life", i. e. what one is ready to fight for, it is obvious that, beside direct interests, the main values of these four main players are not necessarily converging.

Up to date, in liberal representative democracies, the major value of a policy maker is efficiency, i. e. achieving what institutions have been created for (which is enshrined in the constitution of Nations of their fundamental laws) with as few resources as possible. Protection and security seem to be the major services public institutions may offer. One can hardly talk about „value" for companies, unless it is in economic terms. Profit, in currency terms, is their interest as well as their value. The highest value for a researcher is freedom of research and the freedom of expression, his interests laying in the recognition of his work, be it through money or celebrity. Addressing values at citizens' level becomes something much more complex. Individual value systems are very culture-dependent. So much that there are as many systems as cultural settings and, one could say, as individuals. Nevertheless, as suggested in the introductory chapter, the European Charter of Fundamental Rights has been articulated around a number of values that can be considered as the main European values, i. e. values shared by all European citizens, whatever their activities.

The main motivation behind EC research at the interface between science and society has been to disentangle actors, interests and values in today's creation (and subsequent dissemination and uses) of S&T knowledge. What follows is a short assessment of recent research findings that dwell, perhaps not surprisingly, on „vital" elements such as energy and food[1]! And contrarily to the famous Berthold Brecht's „Zuerst kommt das Fressen, dann die Moral!" („Grub first, then ethics!") both are considered at the same level in that case!

[1] More results on http://ec.europa.eu/research/science-society/

3-1 Energy and Environment

Energy and Environment are of primary concern for the EC. Its Energy Package focuses very much on environment. It combines energy security, solidarity and efficiency and supports the 20-20-20 climate change proposal[2]. The strategy builds up energy solidarity among Member States and stimulates investment in more efficient, low-carbon energy networks.

Commission mainstream energy research tackles also issues of relevance to society, with clear socio-economic impacts. The overall approach has integrated already to some extent the need to take into account various perspectives in finding tomorrow's solutions (EUR 23911). The EC Sustainable Consumption and Production and Sustainable Industrial Policy (SCP/SIP) Action Plan addresses consumers as well as producers (CEC 2008a).

Based on previous findings, the Commission's SiS activities targeted specifically in 2007 reflections on SCP of energy, asking for hybrid workshops to be prepared jointly by a set of relevant actors among researchers, policy makers, citizens, ethicists and civil society organisations. This led to the support of a two-year project (DelibprocessSCP) co-ordinated by the UNEP / Wuppertal Institute Collaborating Centre of Sustainable Consumption and Production (CSCP, Germany)[3]. Its basic rationale underlines that although participation of civil society is considered crucial for the implementation of ambitious sustainability strategies, like the EU Sustainable Development Strategy, many implementation programmes and activities do not yet consistently involve players from this field – focusing more on business actors (ETAP[4]) or researchers (SCORE[5]).

DelibprocessSCP addressed this gap by actively involving Civil Society Organisation to identify research needs and designing elements of „deliberative processes" on SCP in the food, housing and mobility demand areas (responsible for 70 percent of environmental damage in the EU).

These 'deliberative processes' can be defined as „forums and mechanisms for involving stakeholders from civil society through information exchange, open discussions and continuous feedback on decision making on research

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2 Climate action and renewable energy package http://ec.europa.eu/environment/climat/climate_action.htm

3 DelibprocessSCP website: http://www.scp-dialogue.net/

4 ETAP website: http://ec.europa.eu/environment/etap/

5 SCORE website: http: //www. score-network. org/score/score_module/

agendas and political actions in the area of SCP". The project has succeeded in shaping a platform engaging notably civil society representatives. It remains now to be seen how sustainable the platform can be.

3-2 Agriculture and Fisheries

Interestingly enough there has been a good mobilisation on innovative ideas raised by EC activities on inclusive governance in the fields of agriculture and fisheries, i. e. primary production sectors undergoing difficult transformation processes. Four projects have been supported, two in fisheries sector (SAFMAMS, GAP 1) and two in agriculture (CRÊPE, FAAN[6]). How do their rationales contrast with the 'Knowledge Based Bio-Economy's' (KBBE) one as supported by the Commission?

The Commission describes the KBBE as playing „an important role in a global economy, where knowledge is the best way to increase productivity and competitiveness and improve our quality of life, while protecting our environment and social model" (REF??). It is a sector estimated in Europe to over € 1.5 trillion per year and employing more than 22 million people. The KBBE addresses notably the „increasing demand for high quality food, taking into account animal welfare and rural and coastal contexts and response to specific dietary needs of consumers".

The four projects indeed tested ways to embed the research process deep into the rural and coastal contexts and to come up with better advice for policy making. All four projects revisited the assumption traditionally accepted in related policy processes, (including at European level) by opening up the reflection to other types of stakeholders carrying not only other interests but also, and above all, other values. Fishermen have worked closely with researchers in SAFMAMS and GAP 1 and civil society organisations have been central to CRÊPE and FAAN projects.

Both projects aimed to build scientific capacities or raise capabilities among the non-research partners in order to prepare them to be valuable partners in future co-operative research processes. At the same time, researchers opened

[6] SAFMAMS website: http://www.ifm.dk/safmams/; GAP 1 website: http://www.gap1.eu/; CRÊPE website: http://crepeweb.net/; FAAN website: http://www.faanweb.eu/Site/Home. html

up to other perspectives, and also to new horizons in terms of scientific advice (Roqueplo 1997; Sclove 2003).

In doing so, projects have analysed diverse accounts of the „environment in relation to methods, technologies, innovations and alternatives" (CRÊPE), trying to relate more closely research to societal values. Combined with other related research (Levidow 1997; Bailey 2002), this analysis could lead to suggest alternative solutions related to different understating of societal problems in the field of agriculture and fisheries. It can also, more upstream, identify further research relevant to rural and coastal developments and inform future research agendas.

These four projects are not finished yet and the processes through which the partners have been remain to be assessed. One finding, nevertheless, can already be reported: acculturation takes time. Opening up one's culture to other culture is not that natural and a learning process must take place between partners with different backgrounds before being in a position to produce new knowledge.

4 – Present, Futures: a Time Paradox

Time is indeed an issue and it is an issue that is taking more and more importance in policy making due to current rapid economic, environmental and social changes. We have to consider today various scales of time: months or years when it comes to the above acculturation, geological eras when science has to decide on climate change (GIEC 200 x) and, in between, generations when reflecting on present decisions and on our responsibility towards our children and grandchildren (Gosseries 2004).

Time is an issue in the process of change but we may not be fully conscious of its importance (van der Vlies 2009) which can be highlighted by the following time paradox: present and future are mutually and strongly influencing each other.

4-1 A Present Shaped by Tomorrow's Knowledge

Present situation is certainly made of memories and factual observations but it is also made of our perception of the future. In a context of slow societal change this perception may not be drastically different from the present but in case of rapid change, as is the case today, it can leave the door open to all kinds of possibilities and may generate strong tensions. The current discourses on

nanotechnologies, synthetic biology and other converging technologies contribute indeed to strengthen the idea that humanity as a whole has entered an era of dramatic change, both in terms of speed and implications.

Nanosciences and Nanotechnologies

Nanosciences and Nanotechnologies (N&N) have succeeded in the last 10 years to crystallise the attention of policymakers and civil society organisations. They are illustrative of societal controversies that science may generate from time to time. Indeed they carry lots of hope regarding potential benefits for human health, the environment and quality of life but at the same time they generate worries about risks to health and the environment, as well as for ethics and the respect of fundamental rights.

Many of these controversies are inherent to the research process and to the uncertainties at the border of scientific knowledge (Callon et al. 2001). Interactions of nanoparticles with humans and the environment are not completely understood and precaution is therefore required. Furthermore, nanotechnologies deriving from these types of research may lead to possible uses that are beyond acceptance by our society, such as human enhancement for example. It is therefore of the utmost importance for societal good that N & N research be undertaken in a framework conducive to scientific excellence and innovation while setting a pace favouring precaution and equal opportunities among countries around the world.

Therefore, further to the Commission's strategy (CEC 2004), and action plan (CEC 2005) for responsible N&N development and further to a specific opinion from the European Group on Ethics on nanomedicine (EGE 2007), the Commission adopted, on 7 February 2008, a recommendation to the Member States on a code of conduct for responsible N&N research (CEC 2008 b). The principles and actions included in the code of conduct stem from a public consultation held in 2007 that supported a precautionary approach. Member States have shown through the conclusions adopted by the Competitiveness Council on 26 September 2008 that they greatly share the Commission's commitment for responsible N&N. The European Parliament itself strongly supported the Code of Conduct in a resolution adopted in April 2009 while asking the EC to revise its position on regulatory aspects (EP 2009).

As said in an EC publication presenting the Code of Conduct, „considering the long and detailed preparatory work that led to defining the code of con-

duct, the wide scope of the initiative and the fact that it has been adopted by one of the economies investing most in nanotechnologies worldwide, the code of conduct can very likely be considered the most advanced existing model of regulation and governance of nanotechnologies" (CEC 2009).

Nevertheless, today's code of conduct is not an end in itself but rather the beginning of a process, at European level but also beyond its borders, which should see all actors involved in N&N research join forces to ensure an efficient and responsible development and application of nanotechnologies worldwide.

Synthetic Biology

The EC has been funding already in FP 6 and FP 7 more than 20 projects intended to explore the concept of synthetic biology (NEST) and more recently to elucidate its ethical content (SYBHEL, SYNT-ETHICS[7]).

As for N&N[8], there is no internationally agreed definition for Synthetic Biology. „The fundamental idea behind Synthetic Biology is that any biological system can be regarded as a combination of individual functional elements – not unlike those found in man-made devices. These can therefore be described as a limited number of parts that can be combined in novel configurations to modify existing properties or to create new ones" (Danchin 2008).

Without entering the still ongoing debate between the various modern approaches in biology, it seems that Synthetic Biology could make it possible to design minimal cells or organisms (including minimal genomes), to identify and use 'biological parts' (toolkit) and to construct totally or partially artificial biological systems. Beside safety issues, Synthetic Biology can therefore raise a lot of questions with even more acuity than for GMOs (Rifkin 1998).

In May 28, 2008 President José Manuel Barroso asked the EGE for an Opinion on the ethical, legal and social implications that may derive from Synthetic Biology. In its position, grounded on the principles of respect for human dignity, individual autonomy, justice, beneficence and non-maleficence, freedom of research and proportionality, the EGE stated that '(…) the debate about the legitimacy of engineering new life forms has mainly focused on safety issues

7 SYBHEL website: http://sybhel.org/; SYNT-ETHICS website: http://synthethics.eu/

8 See progresses on
http: //www.iso.org/iso/fr/iso_technical_committee. html?commid=381983

and a work on the ethical, legal and social implications that may derive from this specific use of biotechnology is still missing…' (EGE 2009?).

The EGE suggests that the ethical position take into account biosafety (i. e. the risks to human health and the environment), biosecurity (i. e. terrorism or biological warfare), governance (referring in a rather technical way to production, distribution, registration), and justice (distributive, social, equal opportunities and intergenerational).

Converging Technologies

Synthetic Biology is already combining most advanced sciences and technologies and therefore can be understood as part of the broad field labelled „converging technologies" (or „NBIC technologies", i. e. technologies combining Nano, Bio, Info and Cognitive dimensions.

Converging Technologies pose a lot of questions of philosophical nature to mankind, virtually blowing all established concepts we have about human beings and their relation to nature and the universe (STOA 200?). This begins already to impact on people's consciousness (or subconsciousness?) and values. Should we use these converging technologies to enhance people performance (Roco 20 xx) or to better live together (Nordman 20 xx)?

Some people as Transhumanists[9] believe that the use of S&T to transform themselves into a new being is a Human Right (Hughes 2004). Indeed, the Right to Enjoy the Benefit of Scientific Progress and its Applications is part of the Universal Declaration of Human Rights! But I do not think that the legislator in 1948 understood this right, and wrote the Art. 15 of the International Covenant on Economic, Social and Cultural Rights (ICESCR), in this very peculiar sense. Indeed, Transhumanists' claims may even seem cynical when thinking to other human rights – for life, food or water – when one billion people all over the world cannot share the benefit of basic technologies.

Voluntarily on the short term or unconsciously on the long term, some experts think that we shall ultimately „merge with our technology" (Kurzweil 2000). In other terms, mankind should be enhanced or in any case, will be enhanced. The humankind evolution will reach a singularity point in time where it will simply disappear to the benefit of some new beings: sapiens. 2?

[9] http://humanityplus.org/

„Within thirty years, we will have the technological means to create superhuman intelligence. Shortly after, the human era will be ended" (Vinge 1993).

Rather worryingly, other voices are heard that, far from rejoicing, send alarming messages: „Our most powerful 21st century technologies (robotics, genetic engineering, and nanotech) are threatening to make humans an endangered species," wrote Bill Joy, a computer scientist.

At that stage, safety issues above may seem futile in comparison to the ethical and human rights one posed by the mere extinction of human species as promoted by Transhumanists or feared by so-called Techno-Luddites. Values, in this context, take a completely different significance. They are not simply preferences that can be accommodated. Their defence becomes a matter of life and death, for individuals or for a species.

4-2 A Future Shaped by Today's Values

Future perspectives of S&T progress may therefore generate today very strong societal tensions, be they relating to safety, ethics or human rights. This situation does raise a number of pressing questions. What should we do, as a society? What objective should we pursue? How should we guide our action? Who should act? And how urgent is it?

As a matter of timing, it seems that the appreciation of the urgency of the situation is not really shared equally among all stakeholders. This has been amply demonstrated in Copenhagen in December 2009 at the occasion of the COP 15 where the parties could only agree on a non-binding agreement to limit global warming. Obviously islands threatened by sea rising, emerging economies still lagging behind and developing at full speed and industrialized countries whose ecological footprint is largely beyond what the Earth can support could hardly listen to each other.

All over the world, activists have succeeded in mobilising millions of people for „face to face" or virtual meetings and deliberations on the web.[10] Debate is getting polarized between „believers" and „non-believers" in climate change (See the so-called „climate-gate"!) although the reality of the phenomenon is scientifically established since many years: „An increasing body of observations gives a collective picture of a warming world and other changes in the climate

[10] See http://www.avaaz.org/en/; http://www.wwviews.org/

system… There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities." (IPCC 2001).

If there is today no dissenting view from any scientific organisation, political decisions are still far from what would be considered reasonable and appropriate.

The case of global warming is illustrative of the many difficulties to find solutions between parties when high interests and values are at stake. It shows that our global human society does not have collectively the right governance tools at hand (unless considering that crisis management can be an alternative). Citizens' feel today that their aspirations are not heard and their values not taken into account, that policy makers are alienated from them, and that no proper governance mechanisms are in place. This can only make the situation worse. Democracy after all is a consensus between people and for people. It is implemented through governance processes that should reflect people aspirations and values. This idea seems to be (re)emerging. Examples.

Sustainability Today

Sustainability is an interesting example. In the sixties and seventies, only a bunch of „doux rêveurs" was blowing the whistle, warning about pollution. It has taken several decades to elaborate a theory of ecology and corresponding good practices. The idea of sustainability appeared with the Brundtland report (Brundtland 1987), and was mainly considering the environmental aspects. The concept has expanded further to social and economical aspects. Today, „Sustainable Development (SD) is an overarching objective of the European Union. The aim is to continuously improve the quality of life and well being on Earth for present and future generations".

The EC is today developing a SD Scoreboard. It will monitor how the EU is progressing towards the key objective of SD, e. g. to respect the limits of the planet's natural resources for environmental sustainability. Scientists are invited to join forces to identify thresholds values for key pollutants and renewable resources in order to inform public policies and private decision-making.

Wellbeing Tomorrow?

As exemplified with environmental sustainability, the issue of measure is becoming central to policy making. There is an urgent need revisit the way to monitor activities, measure their impacts and to compare these measures with

agreed benchmarks and thresholds (CEC 1993, 1997, 2001). Reflections on SD have shown that present indicators were far from being sufficient to correctly assess situations and policies in economic, environmental and social terms. Unfortunately, as Albert Einstein said once, „Not everything that counts can be counted and not everything that can be counted counts". How therefore can we focus on what count through what can be counted?

This question is keeping busy many stakeholders in this debate. In November 2007, the European Commission, European Parliament, Club of Rome, OECD and WWF hosted the high-level conference „Beyond GDP"[11] with the objectives of clarifying which indices are most appropriate to measure progress, and how these can best be integrated into the decision-making process and taken up by public debate.

On 20 August 2009, the European Commission released its Communication „GDP and beyond: Measuring progress in a changing world" (CEC 2009). The Communication—a direct outcome of the Beyond GDP conference—outlines an EU roadmap with five key actions to improve our indicators of progress in ways that meet citizens' concerns and make the most of new technical and political developments. The Commission intends to report on the implementation and outcomes of the actions put forward by this Communication by 2012 at the latest.

In 2008 an OECD/UNECE/Eurostat working group had also produced a report on measuring SD, and at national level, also in 2008, the French President Nicolas Sarkozy asked a high level expert group to come up with ideas to „improve the unsatisfying present state of statistical information about economy and the society" (Stiglitz 2009).

5- Values and Knowledge Governance in Knowledge Societies

The purpose of this paper is neither to find solutions for the problems of tomorrow Knowledge Society nor to decide what are the „right values" or what should be the „right knowledge", but to draw the attention on the need to reflect on the governance tools that should be set in place now in order to appropriately do so in the future.

[11] http://www.beyond-gdp.eu/

Quoting Albert Einstein again: „Any intelligent fool can make things bigger, more complex, and more violent. It takes a touch of genius, and a lot of courage, to move in the opposite direction." So let's move ahead in the right direction.

Knowledge does not exist just by chance and therefore is value laden. Knowledge produces impacts on us and on our environment and those impacts are aligned with the values that presided to knowledge generation. Societal deliberations are therefore of utmost importance.

On Values and the Knowledge Debate

Hundreds of books have been written aiming to clarify what knowledge is. There is no agreement up to now. It seems that the „elephant in the room" has not yet been seen in its entirety and he will perhaps never be! In answer to Socrates asking him what science was, the young mathematician Thećtetus listed a number of activities, putting side by side geometry and shoemaking. What would be the answer today, more than 2400 years later?

As Pierre Wagner wrote summing up two millenniums of reflection: „We see that to the diversity of philosophical conception of science corresponds an equal diversity of answers to the question: what are we to expect from the philosopher, what can he teach us about science? What is his position regarding science? What is his task, what is the sense of his activity: to found science? To critic it? To comment it? To celebrate it? To merge in it? To decide on its limitations, its methods or its objects? To assign its goals? To orient it? To analyse its discourses in order to determine the sense of its statements? … To denounce the illusions that it gives birth to? Assess its effects? […] To try to solve ethical, political or social problems it raises? […] To be inspired by certain theories in order to construct „visions of the world"?"

Adding to these questions on the role of the philosopher, Pierre Wagner continues with questions about philosophy and science: „Is philosophy itself a science? Is it a kind of knowledge or another type of activity? What is left today of the relation of science to a certain wisdom?" (Wagner 2002; translated by the author)

If there are many different answers to these questions it is certainly that there are many perspectives oriented by many sets of values. Will we be wise enough to respect and take advantage of this diversity?

On aims and means of knowledge governance

While the debate on knowledge and society is going on, policy-makers have today the urgent responsibility to put in place the means of an informed societal dialogue focussing on knowledge generation, dissemination and use, acknowledging the importance of values in the process.

Science is a wonderful institution that can (and indeed does) serve many purposes. It has today more than ever a specific responsibility towards society in helping to resolve the grand challenges ahead of us such as climate change, poverty, resource depletion and health.

This requires governance mechanisms that bring together a diverse range of actors with different types of knowledge and different types of values. These actors should pool experiences and better focus their respective efforts towards finding solutions that respond to the views and needs of society as a whole and citizens taken individually.

The European Commission has already engaged in schemes allowing to take on board different values in research processes such as co-operative research (Stirling 2006), citizens conferences, public engagement in research and more recently Mobilisation and Mutual Learning Action Plans supporting science in society activities. Every stakeholder should open up to other perspectives and values. This is a sine qua non condition for an efficient and responsible European governance, i. e. safe, ethical and respectful of human rights.

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