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Science and the knowledge society in Europe

From the age of the "posts" to the knowledge society

It seems that in the 1960s, civilized Western society entered a new phase of its history, marked by a varied and widespread use of the prefix "post": post-industrial, post-modern, post-democracy, post-positivism, post-structuralism, post-Fordism, post-Marxism, post- or trans-humanism, and so on, not to mention their linguistic variations ("pre-post-modernism", "post-post-modernism", "post-scientific society"). All these different "post" expressions often end up flowing into an all-encompassing and all-explicative concept: that of "globalization" seen as «a multidimensional set of social processes that create, multiply, stretch, and intensify worldwide social interdependencies and exchanges while at the same time fostering in people a growing awareness of deepening connections between the local and the distant» (Steger 2003, p. 13).

There is no doubt that the nervous system of this new reality lies in the revolution that took place in Information and Communication Technology (ICT), in the rise of the "global network" and the "network society", «a society whose social structure is made of networks powered by microelectronics-based information and communication technologies» (Castells 2004b, p. 3). In fact, it really seems that, apart from the various denominations, the basic characteristic of everything recognized by this epoch of ours is the importance of information, regardless of the fact that we see in it a totally new aspect that molds a kind of society that has broken away from the past. And the heart of this new "information age" is without doubt linked to computers and the world-wide spread of the Internet, with all the well-known consequences that a vast literature has now amply illustrated and exalted (Masuda 1981) or demonized (Ellul 1990; Postman 1992). A series of changes derive from this that concern the field of economics (hence the term "information-based economy" – Machlup 1962, 1980, 1984; Porat 1977, 1977b): employment, quality of work and human capital, since economic well-being is derived not so much from the physical strength of traditional workers but from «ideas, knowledge, skills, talent and creativity» (Leadbeater 1999, p. 18). These also involve the spatial dimensions within which the new society organizes itself, that do not have the previous limitations linked to distance and place, now minimized by "electronic

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highways"; finally, another consequence is the possibility to have at one's disposal information and cultural products in a measure that was unimaginable before, since we can say that now we live in a "media-laden society" (Webster 2006, pp. 8-21).

According to a more comprehensive vision provided by the French philosopher Jean François Lyotard (1979), mainly centred on cultural changes and nevertheless able to encompass all the other various already elaborated "posts", post-modernism is first and foremost an analytical reflection and a critical stance regarding the notion of "modern", characterized by its most typically ideological manifestations, the most fundamental aspect of which relies on the "great narratives" (the metanarratives) to give some meaning to history and indicate the place that humanity occupies in it. In brief, it is the rebellion against the idea of a society and a history founded on a "project" and on its legitimizing power. Therefore, «simplifying to the extreme, I define *postmodern* as incredulity towards meta-narratives» (Lyotard 1979, p. xxiv). In a universe that is no longer seen in a compact way, it is not possible to conceive of a theory that embraces everything and is totalizing; instead, local limited concepts, language games and discursive formations each with its own rules and grammar are preferred. Also the enlightenment link between knowledge and science is swept away – taken up again in various ways in the context of European scientific philosophy: «knowledge [*savoir*] in general cannot be reduced to science, nor even to learning [*connaissance*]» (Lyotard 1979, p. 18). In this way, science ends up becoming a subset of knowledge, which in its turn constitutes a weakened knowledge reduced to a "set of denotative statements"; while knowledge «includes notions of "know-how", "knowing how to live", "how to listen" [*savoir-faire*, *savoir-vivre*, *savoir-écouter*]» (*ibidem*).

This is not the moment to make an assessment of this approach; rather it is possible now to underline the common character in all the "posts" encountered until now: the central position of scientific knowledge as an essential base of technological innovation. Without the prodigious growth of scientific knowledge (basic and applied) in fact, the information revolution would not have been possible and without this we would not have seen the rise of the society of information – the common premise both of the post-industrial society and the postmodern one.

However, from a certain point onwards, scholars have preferred to talk about "the knowledge economy" (Mokyr 2002) and, more in general, of "the knowledge society" (see Webster 2006, pp. 28-9). This shift of attention avoids identifying knowledge as information, a danger which all theoreticians both of the "information age" (Lyon 1988) and of the "new paradigm of information" come up against (Castells 2004b); in this way, these concepts do not adequately put into light the most characterizing and specific aspect of contemporary society, that distinguishes it in a radical way from all that preceded it. Besides, this lack of distinction runs the risk of under-evaluating the

traditional centers of production of knowledge like universities and academic environments (Lyon 1988, pp. 107-108), that continue to have great importance, and also risks diminishing the relevance that basic knowledge (encoded and implicit – see Coniglione 2010, § 5.2) has for democratic participation in scientific choices, otherwise consigned to a restricted technocratic élite (see Coniglione 2010, ch. 2).

In its modern meaning, the term "knowledge society" was first used by Robert Lane (1966) (who spoke of the "knowledgeable society" to be more exact) and then Peter Drucker (1969), and was later taken up again by Bell (1973), even if in a way that was subordinate to the concept of the post-industrial society; however, it was Nico Stehr (1994; 2001, pp. 19-31) who gave it the autonomous dignity and the relevance that it has assumed today. He states that «present-day society may be described as a knowledge society because of the penetration of all its spheres by scientific and technical knowledge» and declares that he prefers this expression to many others to describe the characteristics of contemporary society (like those of "post-industrial society" and "information society"); and this is because «the transformation of the structures of the modern economy on the basis of knowledge as a productive force constitutes the "material" basis and justification for designating advanced modern society as a knowledge society» (Stehr 2001, p. 20).

The rise of the knowledge society implies first of all a profound transformation in the economy, since it is claimed that at the basis there is the birth of a "knowledge economy", where there is a shift from the importance that the input of a material nature has in the productive processes to the importance assumed by input that is symbolic or based on knowledge (Stehr 2001, p. 24). This can be seen in two ways: as the economy that incorporates more and more knowledge into the products that it puts on the market, since it can be stated that today we buy "frozen knowledge" (it has been calculated that the content of scientific and engineering knowledge of industrial products was about 5% in 1945, 16% in 2004, and will reach about 20% in 2020 – see MHLG 2004, p. 13); or as the economy in which knowledge becomes more like goods, and in which the economic activity is increasingly represented by production and the consumption of information, that is the «production of information in the form of goods» (Cini 2006, p. 370) and intangible goods produced by so called "affective labor", such as health services, "in-person services" or proximity services, associated with human contact and with the production and manipulation of affect (Hardt & Negri 2000, pp. 292-3). In this way, the production of material goods, centered on the factory as the place of creation of social wealth, and the conflict linked to it between salary and profit for the division of the surplus have become increasingly less important. The dematerialization of the universe of goods has profoundly changed the productive process, diminishing the need to employ workers and raw materials and attributing

more and more importance to "immaterial labor", based on information and communication technologies (*ibid.*, pp. 47-8, 289-94; Lazzarato 1996): a new kind of the accumulation of capital is emerging and supplanting the old fordist and taylorist system. This is "cognitive capitalism" (Gorz 2003), springing from the age of computerized information and from the growth of the network society, focused on by Manuel Castells (2004), and in the long run destined to supersede the old industrial capitalism in the same way as the latter supplanted the mercantile one: this is a third genus of capitalism, triggering a new "Great Transformation" analogous to the one Polanyi identified when the first industrial revolution took place in the eighteenth century (Moulier-Boutang 2007). Even where the production of material goods persists, it employs an increasingly reduced percentage of the human population (e.g. in agriculture) and there is an increasing tendency to substitute the work of humans with robots and computers.

Another characteristic of the knowledge economy is the speed with which knowledge is created. This is possible thanks to the formation of a new type of organization: knowledge-based communities comprising networks of people who «strive, above all, to produce knowledge and make it circulate, working for different organizations that are often also rivals» (OECD 2004, p. 14). This means that, along with traditional areas of research, productive systems of knowledge are on the increase, distributed through a set of new places and actors; there are more and more innovators who emerge in unexpected sectors, like users and normal people, involved in the production of knowledge in sectors like health or the environment (see OECD 2004, p. 24).

Regarding the places and the time of the beginning of the knowledge economy (even if the originating process was gradual and not marked by radical breaks) it is generally recognized that the place was identified as the USA in the immediate aftermath of the second world war: as a consequence of the technological competition between the USA and the USSR during the Cold War, the American governments understood the importance of R&D for national security, or more appropriately for military and economic edge over other nations. Technological edge decided the outcome of World War II and it was the "cold" weapon, together with diplomacy, explicitly employed by the USA and the USSR that determined and increased their control and influence over other nations.

We can place the actions of Vannevar Bush in this context; after overcoming the distrust that people first nurtured towards state intervention in financing scientific research (during the time between the two wars, private funding through philanthropic trusts was preferred), he supported the need to radically innovate the system of public research, basing it fundamentally on the university structures. In his historical report – *Science: The Endless Frontier* –he offered not only contingent solutions concerning specific objectives, but made «an extended and carefully reasoned justification of the

key role of basic science» (Geiger 1993, p. 15), and therefore for the research carried out in «colleges, universities, and research institutes», held to be fundamental for the economic, social and democratic development of the country. A real "new frontier" was announced for the American people, after that of the "old Far West": «It is in keeping with the American tradition – one which has made the United States great – that new frontiers shall be made accessible for development by all American citizens» (Bush 1945, ch. 1). The report is important also because it highlights the limits of private funding for research and therefore calls for strong federal commitment, that should have its own "national science policy". In fact, the report concludes with the proposal of the creation of an independent agency, the National Research Foundation, with the aim to «support scientific research and advanced scientific education alone», removed from the pressure to make research products immediately available for the market – as happens in industrial research.

It is thanks to these indications that very soon, in the subsequent political debate, proposals were put forward to set up a National Science Foundation (NSF – this term was preferred to the one proposed by Bush), created in May 1950, to add to the pre-existent agencies and institutions that were the main sources of funding for scientific research (the Atomic Energy Commission, created in 1946; the Public Health Service, already in operation for some time, for medical research; the Office of Naval Research, set up in 1946 that, together with the Army and the Air Force, had a particular role in financing university research; finally the Department of Agriculture) (see Geiger 1993, pp. 18 ff.).

A further step that was quite important for strengthening the link between research and technological development aimed at the market was driven by the rising competition between the United States and Japan, whose winning model was determined, amongst other things, by the integration of the politics of research with the politics of industry. This led the American administration to put into operation a series of measures to encourage the integration of university research and industry. Among these, the most famous is the so-called Bayh-Dole Act of 12 December 1980: it had been noticed that little use was made of university patents on the part of the federal government, who possessed the property as it was the funding body; therefore, with the aim of bringing the fruits of university inventions to society as a whole, thanks to this law, Congress allowed the universities and research bodies (both public and private) to exploit the results of the research carried out by their scientists for commercial aims, through special Technology Licensing Offices that acted as intermediaries between the inventor and the industries, with the use of federal or public funds. In this way, Congress and the NSF encouraged the co-operation of the university with industry, enabling them to manage the fruits of their research in an autonomous

way, and to create also numerous centers merging universities and industries, with the aim of exploiting innovations, especially in the field of biotechnologies and pharmaceuticals, the most likely to produce a remunerative economic return (Kenney & Patton 2009, pp. 1408-9).

These are all significant moments that strengthen the relationship between the production of knowledge and its commercialization, and between basic scientific research and its incorporation in productive processes. They lead to the formation of a society of knowledge in which the value of research and innovation is not only the most important factor of stimulus for growth, but represents in itself the most precious and widespread asset and the principal element of connection and exchange between human beings.

Europe facing the new challenges

For a long time now, there has been widespread awareness in the European Community of the importance that research has for economic development, generating from 25% to 50% of growth, and so contributing to the increase in the number of jobs and an improvement in their quality. The European Commission (EC) has been always aware of the tradition of excellence that it can boast of in that field (in 2000, one third of the scientific knowledge developed in the world came from its researchers) but, nonetheless, in recent times it has been more and more worried about the condition of the research and about the risk of an increase in the gap between Europe and the other technologically advanced countries, and in the long run of the postponement in the transition towards the knowledge economy.

In this framework, at the beginning of the 21st century the European Commission considered the instruments used by Europe to sustain R&D to be insufficient; these were substantially put into practice in various framework programs, that comprised only 5.4% of the total funds for non-military public research. The individual Nation States provide the rest of the money, in an inconsistent way, to fund research, and that is why «the European research effort as it stands today is no more than the simple addition of the efforts of the 15 Member States and the Union» (EC 2000b, § 5). The result is the fragmentation, isolation and segregation of the various research systems, discouraged from interacting by the divergences among the regulative and administrative systems in the various Member States.

In order to create a concrete European research policy, the Commission decided to request, by a Communication to the Council (18/01/2000), the creation of a European Research Area (ERA), the task of which is to set up an area with no frontiers for research and to introduce a series of measures and specific actions in order to increase employment and competitiveness. There are also some recommendations about the

more general aims useful to conceive of a science that takes into account the needs of politics and to tackle the questions about the relationship between science and society in a European dimension, taking into account the specific tradition that is based on a «combination of a market economy, a high level of social protection and quality of life and a number of principles, such as free access to knowledge» (EC 2000b, § 7.1). Thus the so-called Lisbon Strategy came into being, aiming to make Europe «the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion» (EC, 2000b, 5). The EU, aware of the radical global change in the economic and social field, has tried to put into practice a strategy aiming to increase investment in R&D to 3% of the GDP, in order to improve the policies in the field of ICT and investing more in human capital and at the same time fighting social marginalization (EC, 2000b, § 5 – see also EC 2001b, EC 2003b, EC 2005, EC 2006). The fundamental instrument used by the EU in order to reach this goal – besides the interventions that have to be put into practice by the single Member States – was the sixth Framework Programme until 2006 and the seventh from 2007 to 2013.

This strategy arose from the concerns about the real data concerning the European economic development of the last decade, especially in those fields with a "high intensity of knowledge" typical of contemporary society; that is, in the field of high technology, that is fuelled by scientific research and from investments for this aim (see Coniglione 2010, § 1.1.2). In fact, during the last decade, the EU has seen a progressive decline in the productive capacity and in the amount of exports in this sector compared to the new competitors that have appeared on the scene of globalised economy, such as China (Hong Kong included) and Asia (that includes countries that have seen greater development in recent decades – India, Indonesia, Malaysia, Philippines, Singapore, South Korea, Taiwan and Thailand). Only in Japan have things been worse than in Europe (see NSB 2008, figg. 0-10, 0-12; Eurostat 2009, fig. 4).

Taking into account the current state of the European economy and society, it is clear that the goals of the Lisbon Strategy have not been reached: the 2010 Eurostat estimates that the R&D expenditure in EU27 amounts to 2.00% of GDP, only little more than in 2000 (1.86%), the year when the Lisbon Strategy was conceived in order to increase this amount. Only Sweden (3.42%), Finland (3.87%) and Denmark (3.06%) are estimated to exceed the 3% target set by the Lisbon Strategy.

Before trying to understand the reasons for this, and before proposing some critical insights, it is necessary to highlight the most relevant aspects of the Lisbon Strategy concerning the implementation of the knowledge society.

The first one is the close union of economics and research, by placing the field of education at the centre of the reforms and proposals to be put into action. This means

setting some goals in that field, including reaching a school drop-out rate of an EU average equal or lower to 10% by 2010; to halve the gender disparity among math, science and technology undergraduates; to increase by 2010 the UE average of participation in lifelong learning, to reach at least 15% of the adult active population (aged between 25 and 64). But the most important field for innovation is without doubt the University sector. So, in 2003, for the first time, the EU started to see it as a strategic sector for the creation of what was later called *human capital*: with the publication of the document titled *The Role of the Universities on the Europe of Knowledge* (EC 2003b), the university is seen as a central element for the parallel development of the Lisbon Strategy and the Bologna Process – in order to create a common and shared European area of instruction and training alongside the already mentioned ERA (see EC 2000b). The University is recognized for the first time as the place that stands at the centre of that virtuous mechanism, thanks to which it is possible to create and spread new knowledge: «Given that they are situated at the crossroads of research, education and innovation, universities in many respects hold the key to the knowledge economy and society» (EC 2003b, p. 5). That way, we must attribute to the European university in general, even in its great heterogeneity and with its numerous problems, the prerogative to spring from the Humboldtian model and to represent a greater union between research and teaching. As stressed in a later document, «the realisation of a knowledge society, based upon human capital, education, research and innovation policies, is the key to boost our growth potential and prepare the future» (EC 2005b, p. 5). From now on three key words enter the agenda of the European Commission: *education, research* and *innovation*, of which the relevance of human capital – the quality of which is measured by the percentage of the EU working-age population that have achieved tertiary education – is closely tied to the innovation performance (EC 2005c) and to the renewal of tertiary education through the development and the strengthening of the university system. Universities are seen as the engine of the new knowledge-based paradigm, even underlining the fact that they now are not fully capable of putting into practice their potential in the service of the Lisbon Strategy because of a series of limitation and critical points, including insufficient funds (and in any case at a lower level than those assured in the USA, Canada and South Korea).

The importance of the quality of human capital is highlighted by another aspect on which a subsequent document insists (see EC 2006b): the existence of rapid technological and economic change, followed by an ageing population; according to the EC, this realization necessitates a strengthening of *lifelong learning* strategies. In fact, the document states that the wealth and the variety of European education and training «can be seen as an important asset and something which makes it possible to react rapidly and efficiently to technological and economic change» (EC 2006b, p. 3).

However, giving importance to human capital means being aware that innovation has many facets and not only the one regarding technological products which we are more familiar with: it shows itself in many ways (service innovation, organizational innovation, and so on). Besides – and this is the most important thing – innovation must base itself on a solid education system that, in theory, should promote the creativity and talents of students from the very beginning of their careers: this is an important first indication that has always been highly privileged by the EU – 2009 was declared the year of creativity – and it is no accident that even in 2007, the EC made the clarification/recommendation according to which, in order to strengthen both research and innovation it is necessary to invest in human capital (EC 2007, p. 2).
Besides, the improvement of the quality of human capital has an economic effect that cannot be ignored. In fact, in many studies (see, for instance, de la Fuente & Ciccone 2002, Cingano & Cipollone 2009, Visco 2009, 2011) it has been verified that there is an appreciable and significant economic return from the investments in education and that is, obviously, proof of the need to invest more in human capital.

Also in the following documents (see i.e. EC 2007b), the EC stresses the issue of research and innovation, focusing on the importance of providing a valid support for the improvement of knowledge transfer (that involves the processes aiming to capture, collect and share both tacit knowledge and explicit knowledge) between public institutions of research and, industries, civil society, and so on. In particular, the EC highlights the factors that obstruct the application of an efficient knowledge transfer: legal barriers, the lack of incentive, and cultural differences between the market and the science community (see also EC 2006c) – which are serious obstacles both for European growth and for the creation of jobs. The EC, in this respect, states that in order to put into practice the activities regarding knowledge transfer, research institutions need sufficient autonomy to recruit *knowledge transfer experts* on a competitive basis.

Nevertheless, in a subsequent document the EC shows that it is aware that the investments in R&D are far from satisfactory: «Europe is still under-investing in research, and R&D spending – by both the public and the private sector – has generally stagnated over the past decadè (EC 2008e, p. 4). However, the weaker point of research policies and of the investments in R&D depends on the merely national dimension of the R&D activities, whose results on an economic level are not encouraging (too high costs and too low economic returns); that is why the EC recommends that member States do some cross-border collaboration, because otherwise, mobility, researchers' training and research development could be (and in fact they are) obstructed.

In order to tackle this negative situation, the EC has tried to apply a new approach, the already mentioned *joint programming*, that, involving the member States on a vo-

lunteer basis, could lead us either to the coordination of different national programs already existing or to the institution of new community programs; the aim of this is to increase the cross-borders research publicly funded in specific strategic sectors (see *ib.,* p. 10). In order to realize all this, some coordination measures are necessary between member States and EU and it is the insufficient coordination capacity and the lack of synergies between member States and the EC that obstruct the attainment of the goals of the Lisbon Strategy, especially in the scientific field. This problem was tackled by EC 2008f, in which the EC stated that the cooperation of the nations in the fields of science and technology can really contribute to stability, security and prosperity in the world only through the strengthening of the partnership between member States and the European Community.

This strategic framework for international cooperation on science and technology should be able, according to the EC, to strengthen the coordination actions between member States and the EC: the aim should be to create additional synergies between public authorities, industry and civil society, and also the capacity to facilitate the access to knowledge and to world markets, to exert a positive influence on scientific and technological activities programmed at a world level combining together the resources necessary to reach a critical mass and underlining the democratic values of the world information society (in particular freedom of speech and the right to access information); finally, all this should provide universities and European researchers with more chances to work with the best scientists and in the best research infrastructures of the world.

The emphasis on R&D does not mean that the EC is indifferent to the problem of social cohesion: the transition towards a knowledge economy does not mean the insecurity and the uncertainty of jobs. This demand is grasped through the idea of *flexicurity*, a combination of flexibility and security (EC 2007c). This concept tries to respond to two essential needs that the EU has to satisfy: those concerning the labour market (characterized by a faster technological development) and social patterns (engaged in favouring social cohesion, solidarity and social protection). The first factor, *flexibility*, is useful not only to face the fast change we are currently undergoing in the economic field, but also to improve the workers' capacity to change jobs during their lifetime (but on the basis of a strengthening of their skills and competences); while the second concept, *security*, is essential for workers in order to plan their future and careers. In connection with these needs, as we will see later, there is a double responsibility: on the one hand, in fact, the training has the task of providing the adequate tools so that workers can achieve flexibility and capacity of adjustment to the on-going change; on the other hand, we must recognize the enormous responsibilities of the political choices that will be realized in the social and working fields in order to guaran-

tee a less precarious working environment. In any case, according to the EC, only through promoting the knowledge-based economy (and this, in turn, is feasible only through research, technological development and innovation) is it possible to improve growth and employment (EC 2007d).

In the meantime, the growing awareness of the importance of a sustainable economy and the need to respond to the demands coming from society, concerning problems such as global warming and the depletion of natural resources, has motivated a turning point for the Lisbon Strategy, in the shape of the communication *GDP and Beyond* (see EC 2009), by which the EC called for the elaboration of indicators complementary to Gross Domestic Product (GDP): this is the coherent development of a commitment already undertaken in November 2007 with the conference *Beyond GDP*, held in Brussels and organized with the help of OECD and WWF. In fact, for long time now, the GDP has been seen as the fundamental magnitude of macro-economy and is still considered to be the main indicator of economic prosperity and of progress in general. It has traditionally responded to the need for the creation of new policies of growth and of identifying tools able to measure its efficiency. GDP is the indicator traditionally used to measure the quality of life and economic growth – it is the sum of the value of all goods and final services produced in a country during a fixed period of time. In short, GDP is generally considered to be the main indicator of economic prosperity and of progress in general.

But in the last decades, the GDP has been challenged more and more by the critics of a society only based on material values, proposed by markets and indifferent to the authentic dimensions of life, which render it worth living. The most well-known and influential criticism of GDP was expressed on 18 March 1968 by Robert Kennedy in a speech at Kansas University, three months before he was assassinated (see Kennedy 1968):

> We will find neither national purpose nor personal satisfaction in a mere continuation of economic progress, in an endless amassing of worldly goods. We cannot measure national spirit by the Dow Jones Average, nor national achievement by the Gross National Product. For the Gross National Product includes air pollution, and ambulances to clear our highways from carnage. It counts special locks for our doors and jails for the people who break them. The Gross National Product includes the destruction of the redwoods and the death of Lake Superior. It grows with the production of napalm and missiles and nuclear warheads.... It includes... the broadcasting of television programs which glorify violence to sell goods to our children. And if the Gross National Product includes all this, there is much that it does not comprehend. It does not allow for the health of our families, the quality of their education, or the joy of their play. It is indifferent to the decency of our factories and the safety of our streets alike. It does not include the beauty of our poetry, or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials... the Gross National Product measures neither our wit nor our courage, neither our wisdom nor our learning, neither our compassion nor our devotion to our country. It mea-

sures everything, in short, except that which makes life worthwhile, and it can tell us everything about America – except whether we are proud to be Americans.

For the first time, in a public and visible way, by highlighting all the partialities and distortions of an index that takes account of the worst things and neglects those that make life actually worth living, this accusation brought to the forefront of public opinion a subject that until then had been reserved for limited academic debates.

In 2009 the EC, putting to good use the conclusions of the aforementioned conference on GDP, proposed completing GDP with social and environmental indicators, by developing «a comprehensive environmental index and improve quality-of-life indicators. There is currently no comprehensive environmental indicator that can be used in policy debates alongside GDP. Such a single measurement for the environment would help foster a more balanced public debate on societal objectives and progress» (EC 2009, pp. 4-5). Of course, with this document, the EC does not mean to reject the validity of GDP, but proposes to integrate it with other indicators that must take into account factors that the GDP does not incorporate; the EC conclusions on this point are more than explicit: «Gross Domestic Product (GDP) is a powerful and widely accepted indicator for monitoring short to medium term fluctuations in economic activity, notably in the current recession. For all of its shortcomings, it is still the best single measure of how the market economy is performing. But GDP is not meant to be an accurate gauge of longer term economic and social progress and notably the ability of a society to tackle issues such as climate change, resource efficiency or social inclusion. There is a clear case for complementing GDP with statistics covering the other economic, social and environmental issues, on which people's well-being critically depends.» (*Ib.*, p. 10).

In conclusion, we cannot ignore the report commissioned by the French President Sarkozy and written by Joseph Stiglitz, Amartya Sen and Jean Paul Fitoussi (see Stiglitz, Sen & Fitoussi 2008, 2009, and 2010), and the communication entitled *Consultation on the Future "EU 2020" Strategy* (see EC 2009b), that has postponed the goals set by the Lisbon Strategy to 2020, casting shadows on both the Strategy results and on the political intention hitherto shown by member States, but in the meantime it also provides a continuation to what has emerged recently in the European scenario and to what maturated during the last decade, especially regarding the issue of the environment and a less economy-oriented measure of collective wealth. So, the priorities of the EC can be summarized in three key drivers: creating value by basing growth on knowledge (see also EC 2009c); empowering people in inclusive societies; and creating a competitive, connected and greener economy (see EC 2009i, p. 4). The first two drivers have been in many ways stressed in the past, but the third one is new and shows the new direction recommended by the European Commission to the European Community.

Now the new "Europe 2020 strategy", put forward on 3 March 2010 proposes in essence to revitalize the Lisbon Program by proposing a «smart, sustainable and inclusive growth» that aims to react to the recent economic recession by relaunching the programme of development to enable us to come out it, by hypothesizing the possibility of a new economy. This must be smart, since it proposes to develop «an economy based on knowledge and innovation»; sustainable, because it aims at «a more efficient, greener and more competitive economy»; inclusive, as its objective is «fostering a high-employment economy delivering social and territorial cohesion» (EC 2010, p. 3). And among the objectives needed to reach in order to realize the afore-mentioned priorities, there is the return of the aim to reach 3% of GDP in investments for R&D, especially in the private field: a clear admission of the failure of the Lisbon strategy but also a renewed conviction of the fundamental need to invest in research and innovation. Besides, the strategy for 2020 also proposes to raise the level of school education (the objective is for 40% of young people to reach tertiary education, i.e. get a degree). A programme that is not lacking in optimism and that will try to maximise the strong points that Europe has traditionally been credited with: «Europe has many strengths: we can count on the talent and creativity of our people, a strong industrial base, a vibrant services sector, a thriving, high quality agricultural sector, strong maritime tradition, our single market and common currency, our position as the world's biggest trading bloc and leading destination for foreign direct investment. But we can also count on our strong values, democratic institutions, our consideration for economic, social and territorial cohesion and solidarity, our respect for the environment, our cultural diversity, respect for gender equality – just to name a few. Many of our Member States are amongst the most innovative and developed economies in the world. But the best chance for Europe to succeed is if it acts collectively – as a Union.» (EC 2010, p. 7)

Keep on trying once again, old Europe!

If we try to make an assessment of the history of the last decade – characterized by the effort to put into practice the Lisbon Strategy – we can only note a negative result: the goals set by the Lisbon Strategy (to make Europe the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion, aiming to increase the investments in R&D to 3% of the GDP, creating new and better jobs, and so on) have not been reached for several reasons. The main one is, surely, the lack of political commitment on the part of most of the member States that, with some exceptions in the North of Europe, have not made sufficient investments in education and research. If this can be justified in the light of the present economic crisis, it is also true that most member States have not been able to make the necessary efforts to reach, even

approximately, the goals set by the conference of 2000. In our opinion, a particularly serious shortcoming was the lack of far-seeing investments in what is the main resource of all the complex socio-economic systems: human capital and research.

The impression that we get, giving a comprehensive look at the EC documents and at the many reports and studies commissioned by the EU, is a sort of enlightened vision of Europe's future – elaborated more or less by many studies and specialist scholars – which is not matched by an equally enlightened policy by the national States. It is as if the relative absence in the EC of the need for a direct relationship with the electorate and with concrete national needs – inevitably tied up with many mediations of interests, lobbies and social parties, besides cronyism and local interests aiming at the achievement of a consensus that is immediately operable and short-lived – protects Europe from the immediate conditioning of local interests and so can give her the chance to "think in general", to outline optimal strategies that are rationally planned.

However, these noble drives are not matched either by the will to put them into practice or by the real conviction of the single member States, of their urgency. Until we manage to build a bridge between a kind of "powerless Jacobinism" orientated in an enlightened way, and the effective capacity to touch the realities of the single member States, every initiative in the field of knowledge and research will be only the expression of good intentions and an ideal of "beautiful souls". From this deficiency, already diagnosed and well known, the new European Constitution should save us.

Will "old Europe" succeed this time – accomplishing the ambitious goals planned by the agenda of *Europa 2020* – in its effort to keep up with countries who are guiding the knowledge economy? Will it effectively manage to orchestrate a unitary, collective policy rather than falling victim to the egoism of the individual nations? What is more, will Europe be able to counteract the powerful influences from global corporations and from the international and often obscure power of finance lobbies, realizing a true "green economy", i.e. the new economic order necessary to this end? In short, will the actions follow the beautiful words?

We can only hope that the patient will not die before the doctors decide to carry out the treatment, and that Europe could still have another chance in the new decade that has just begun. At the end of the day, it is not too late to keep on trying once again, learning from the mistakes of the past and treasuring the experiences already made. Keep on trying, old Europe!

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Science and the knowledge society in Europe

With the 2000 Lisbon Strategy and subsequently with Barroso's 2010 program, the EU has set for itself the ambitious objective of becoming a "society of knowledge" and thus becoming one of the most advanced areas of the world. The key element of this strategy is the funding of scientific and technological research, and the EU has consequently encouraged the member states to increase funding up to 3% of their GDP. After the failure of the expectations for the last ten years, it is now time to seek the causes of this failure and to single out the critical problems that have arisen from the attempt to implement such a "society of knowledge" in order to avoid the previous mistakes and another failure.

Key words: science, society of knowledge, Europe