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Comment

Mass technologies and ignorance in the society of knowledge[1]

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An advanced expression of culture and of social evolution, contemporary technology, which increasingly incorporates endless quantities of scientific knowledge, has acquired a decisive power on human existence and on the natural system supporting it. It has the ability, now demonstrated, to attain a vast improvement in the quality of life – if one can benefit from proper amounts of it – and to prolong life for decades. On the other hand, its results may also go in a totally opposite direction, either against ourselves or our descendants, or other populations. A similar theory is true for life-supporting systems. Technology may keep them in a good state as much as it may ultimately jeopardise them. These two things do not match, neither in space, nor in time. The considerable improvements technology has provided to us, in this part of the world, may contribute to worsen, already in current times, the life of other populations, as much as the enhancement in the quality and in the duration of life enjoyed by present generations may be paid by a worse existence for future generations, precisely because we have compromised these life-supporting systems.

Considering the dimension of the stakes, one may have to wonder whether we should fully commit ourselves to understanding thoroughly the power of science-driven technology; its origins, its long-term effects; what possibilities there are to govern it and harness it more effectively for human purposes. Or whether we should implement more democracy to govern technology and the science it incorporates, and at the same time, to attempt to guide technology towards new uses to improve the functioning of democracy, starting from the decision-making system within organisations. Finally, whether present technology and science, with their repercussions on life-supporting systems, are actually self-sustainable.

The tasks implied by this question – more practically, the technology and science policies that are to be devised and implemented – are currently opposed, in terms of ideas, by a reductive conception, improvidently appropriated by politics, of what a "society of knowledge" is; and by the underestimation of the immeasurable ignorance that presently surrounds technology and science in the attempt of understanding the consequences of their actions and creations. Whereas, in terms of real interests, hurdles derive from an economic improvement and a political use of scientific and technological knowledge, both interfering with its acknowledgement as a global public asset.

Many sources now guarantee that we live in a society of knowledge. Pundits say that the society of knowledge is one with unmatchable properties, and one never previously recorded. The society of knowledge, they say, is characterised by much more innovative novelties. Scientific and technological knowledge has allegedly permeated all the fields of the social structure. They also claim that politics is more and more governed by it: this is the time of policies "founded on evidence". Reforms of the health system, infrastructures, biotechnologies, energy policies, civil defence, environment: the choices related to these fields are designed and deliberated in the light of all the scientific knowledge available to us. As regards the economy, knowledge has become a productive factor, inextricably linked to the traditional factors – labour and fixed capital (machines, equipment) –, so that it provides momentum to them both. Thus, knowledge has acquired a primary-factor role in innovation, in the economic growth, in the international competitiveness of the enterprises and of the national economy.

Through the interaction with labour and capital in networks that extend inside and outside enterprises – involving also university research centres –, knowledge production has been industrialised, whilst the industrial production has become scientific-oriented. The once labour-intensive industries have become

[1] This article partly reproduces the introduction to L. Gallino, *Tecnologia e democrazia. Conoscenze tecniche e scientifiche come beni pubblici*, Einaudi, Torino 2007, pp. 3-21.

highly knowledge-intensive. This is true also for the production and distribution of services, addressed to families as much as enterprises: they also tend to be increasingly knowledge-intensive.

This brief repertoire of defining characteristics of the society of knowledge, taken from a number of statements, reports, articles by politicians and experts, sustains quite patently an economic and economist blueprint. This repertoire – it should be said at least as an approximation – does not seem to harm the idea of a society where scientific and technological knowledge is a common heritage. First of all, it allows us to establish that, among the defining characteristics it presents, only a few can be reported in the Italian society and economy, and even only to a limited degree. It is well known that the investments in R&D the Italian industry allocates rank among the lowest in the EU. Also in the number of patent applications (estimated, as usual, per million inhabitants) Italy ranks at the bottom of the European list, with the aggravating circumstance that three fourths of them present technological contents which are anything but high-tech. In terms of number of researchers and available resources, in the past few decades various important research institutes belonging to private enterprises have been downsized, or have closed down, according to the principle that research either produces results transferrable to the market in the short term, or it is not worth its costs. The public research system, after repeated and awkward attempts of reforms aimed at making it an enterprise, lies in a serious suffering state. The number of graduates in scientific and technologic subjects, still per million inhabitants, appears to be inferior to fifteen years ago, although it has shown some signs of recovery after 2003-2004. In the public sector, as much as in the private one, researchers are underpaid.

In addition, the average education of the labour force – including the critical group of the 20 to 40 years old – continues to have a level many years inferior to the one of neighbouring countries. Enterprises look for a higher number of generic workers, rather than skilled workers, whereas the jobs offered to young people in workplaces which should be typical in a "society of knowledge", e.g. "call centres", are seemingly close descendents of the Fordist assembly line. Italian export, with a share considerably diminished in the total amount of the past few decades, is for the most part made of traditional commodities or Italian-made products. Considering such data, it appears premature to present the Italian society as a knowledge society, either completed or still in the making. But, at least, quoting those data is a good method to outline the paths to be followed, the shortcomings to be tackled in order to really achieve it.

However, it should be explored whether these paths are too narrow, if not blind. Indeed, they are totally inexistent in the definition of a society of knowledge built on the complementary notions of a more democratic technology, and of a democracy able to better exploit different aspects of technology for its own purposes. Another missing aspect is the idea that a society of knowledge should dispose of scientific technologies and/or of technological sciences, that should be presented as deliberately sustainable, so as to achieve a *sustainable society of knowledge*. Never have the mentioned features shown a reference to strategic relevance – with a view to draw democratic policies of technology and of science – which is today attached by various authors to the concept, ascribed to no less than Plato, of *ignorance*; here applied to what technology and science do not know, and referred primarily to the past and future effects of their material and immaterial breakthroughs.

The technical-scientific ignorance, which I suggest to call, for brevity, techno-ignorance, designates what the pundits – researchers, scientists, technicians, experts – do not know themselves, at the peak of their professional collective knowledge; not the ignorance widespread in the public, ignoring or supposed to ignore nearly everything about technology and science. It refers to two large areas: the area in which the techno-experts do not even know what they do not know (*a-specific ignorance*), and the area in which they have a notion, although vague, of what they do not know (*specific ignorance*).[1] These two areas of ignorance regard the past (when the unknown has already occurred) as much as the future (when the unknown is yet to come). Techno-ignorance is not to be mistaken for the usual notions of risk and uncertainty. Risk designates the probability, tested on a statistical basis, that something may happen to a determined population. It can be rightfully said, for example, that heavy smokers run a definite *risk* of contracting lung cancer, because medical statistics say that ten percent of them incur this kind of pathology. However, establishing who exactly, out of one hundred smokers, are those ten people that will contract cancer is still a subject of a considerable *uncertainty*, as the variable at stakes are countless and interdependent: age, gender, job, hereditary character, etc.

In order to illustrate the notion of techno-ignorance, a good example would be the now widely studied case of the chlorofluorocarbons (CFC). These chemical compounds were used industrially as refrigerants

since 1930. Still forty years later, experts (with a few unheeded exceptions) did not imagine that they were provoking a substantial ozone layer depletion. Experts could have discovered it through the means then at their disposal, yet they *could not know* they *did not know* that a possible effect of the CFC spreading into the stratosphere was damaging the ozone in the atmosphere. The later discovery of this effect, i.e. its unanimous acknowledgement by the scientific community, only occurred in the mid-seventies. Towards the end of that decade, governments took action to forbid the CFC use. As the industrial production can neither be stopped nor be replaced at once, the CFC use had to be downscaled over a decade. Sixty years had passed since 1930; but the thinning of the ozone layer still goes on today, eighty years later, and no expert can say whether, how and when it might slow down.

There are several cases similar to CFCs. They should open up the door for public debate on the technical-scientific ignorance that presently surrounds the past and future consequences of the recent spreading of mass technologies, such as – among others – biotechnologies, the radio-technologies supporting mobile phones and the web. These are technologies rightfully considered by the majority of the population as global public goods. Certainly, they may have the potential to become so. But there is still the suspicion that, owing to the unknown consequences their use in the society of knowledge may imply, they could also carry the potential of turning into global public evils. The problem therefore lies in finding a way to fight the latter to let the former emerge. This would require an innovative approach to the production, spreading, evaluation and regulation of mass technologies.

The starting point should be the assumption that the mentioned technologies, through a spreading unprecedented in size and speed, have originated, in a relatively few years, processes comparable to a network of global experimentations to an unprecedented high degree. In this regard, the present procedures for the evaluation of possible consequences (to which current phrases such as *technology assessment*, *èvaluation des technologies*, *Technikbewertung* or *Technikfolgenabschätzung* refer) are basically inadequate. And this is true in methodological terms as much as in terms of a social-technical process from which regulating policies should eventually emerge. These are technologies that, in the EU only, involve millions of people, and as concerns Italy and the western European countries, the entire population. This vast-scale experimentations have received for some years a strong support, or a tacit consensus, from national governments and the EU Commission, mainly for economic reasons. In this case, the knowledge actually available to support decision-making concerns, at best, a scarce set of variables and, as regards the consequences, an insignificant time perspective.

The mentioned experimentations have been therefore carried out without anybody really knowing how people and – especially in the case of biotechnologies – how life-supporting systems may be affected by the medium-long term repercussions of the massive spreading of these technologies. The consequences that have already arisen are still unknown, as much as those that could arise in the medium term (a few decades), long term (a few generations), or very long term (many generations). Nobody can discover them, because the experts' work is covered by a veil of ignorance preventing them from formulating appropriate questions on the possible consequences occurred in the past, that nobody can trace, or the ones that might occur in the future.

A paradigmatic case, in this regard, is biotechnologies – more specifically genomics, the study of the gene structure and functions – applied to the production of genetically modified or "engineered" organisms (GMO). Several analyses carried out from the early nineties onwards, both by manufacturing companies and independent bodies, including national health institutes, as well as the *World Health Organisation*, have reached the conclusion that food comprising GMOs, including transgenic ones (in which the original DNA has been modified by inserting a DNA segment from another species) are not harmful neither to humans nor to animals, plants or the environment in general.

On the basis of such assumptions, many European governments, the British one in the forefront, as much as the European Commission and the European Parliament, have authorised, yet fixing some limits, the experimentation and, in many cases, the use of OGMs in agriculture, in food manufacturing and in forestry (in the latter case, planting genetically-modified trees). In addition, even in countries where the consensus from authorities has been particularly cautious and circumscribed, de facto time has made it irrelevant. Indeed, the manufacturing industry and the agriculture in the US and other countries produce and sell all over the world millions of tons of genetically-modified seeds and crops, and any containment policy will not ever be able to stop their effects on the original territories.

The public debate should focus more on the methods implemented to carry out those reassuring analyses on the effects of the GMO spreading; the methods adopted by authorities to disseminate the results of research; the limited perimeter within which the possible consequences to be assessed are searched for; the very short time horizon which the studies on GMOs are devised for. At methodological level, the worst shortcoming is to be found in the consolidated tendency of experts to interpret the lack of knowledge, or the impossibility of a demonstration, as the evidence that there are not negative consequences for certain biotechnology.[2] Ignoring the details of what one does not know, the ignorance in the field of unknown phenomena, are thus converted, from a condition that should suggest a rigorous application of the precaution principle, into an argument in favour of the acceleration of the industrial production and/or of the widespread marketing of GMOs.

Applied to genetic engineering, the notion of the evaluation perimeter refers to the typology and the number of the variables taken into account and, at the same time, to the physical space covered by observation. Even more than in other fields, here emerges the narrowness of the horizons where usually the OGM evaluation occurs. As regards a single species of genetically-modified maize, for example, the variables to be examined may vary from a dozen to a few hundreds. At one extreme, the studies on this neo-maize will concern the resistance to frost and insects; whether it is toxic for a couple of animal species that are usually fed with large amounts of maize; the toxicity for humans who find this neo-maize in food stuff or eat meat from those animals and a few other variables. At the other extreme, the variables become countless: aside from the mentioned ones, research should be carried out to find, in these species and in several others linked to them, and for many generations, what happens to the immune system; to the formation of blood and liver cells; to the development of single organs; to the digestive apparatus, to the lung tissue, to reproductive organs, etc. And also what happens to the bacterial flora in human beings, to blood, liver, spleen and kidneys, to foetuses – that a reengineered DNA may reach through placenta – and so forth.[3] Quite obviously, in reality the majority of the research projects are carried out on a few variables, because each variable added to the field to be studied implies an increase in the necessary technical and human resources and the observation timing grows longer and longer.

Then, as regards the observation and experimentation perimeter intended as a physical space, an indicator of the ignorance (i.e. not-knowing) surrounding this subject is the decision by the authorities – actually made on many occasions in Great Britain and in France – to extend by some *dozens of metres* the area to be left unfarmed around experimental fields of genetically-modified maize, in order to prevent contamination to crops nearby. An eco-biologist would find it laughable, thinking that insects, microbes and wild animals (starting from field mice) are not confinable by their nature. Neither are pollens and seeds, as FAO reminded, when in 2005 it called for a moratorium on the marketing of genetically-modified trees, millions of which have already been planted in Europe, Asia and North-America, after experimentations whose perimeter is limited to the few square metres of a laboratory. [4]

An even more crucial problem is the time horizon. The GMO industry and market date back to the mid-nineties, and the observation of the possible consequences applies only to a slightly longer time span, and furthermore it applies only to a few species and a limited number of variables, as previously mentioned. But the systems of genes existing today descend from billions of years of co-evolution of millions of animal and vegetal species. Saying we are able to evaluate the overall consequences of the introduction into the environment of new gene structures such as the GMO ones, on the basis of banal criteria such as toxicity and noxiousness, over a period stretching from a few days to a few years, is equal to saying we are able to study the millenary thermodynamics of the oceans by observing what happens in your swimming pool. In broader terms, it should be acknowledged that not only GMOs, but – for similar reasons – biotechnologies in general, are actually surrounded by oceans of techno-ignorance.

Let's now analyse another mass technology. Still in the nineties, when mobile phones started to spread very quickly, worries were expressed about their possible negative effects on human health. Mobile phones function through radio frequencies, a sub-group of electromagnetic radiations, small amounts of which also exist in the natural environment. When it receives or transmits a phone call, the device generates all around it an electromagnetic field (EMF) with a diameter of 8-10 centimetres, large enough – if the phone is held near your ears – to deeply expose your brain, mouth and eyes to the EMF. This was the reason why many countries have seen a large number of families, doctors, biologists, consumers' associations and environmentalist NGOs expressing their worries about the fact that using a

mobile phone for many minutes or hours per day, over the years, may favour the rise of neoplasm forms in the brain, including the auditory nerve cancer, and in the nearby organs.

The publicly-expressed worries have prompted several related research projects, involving wider and wider populations and substantially longer periods. One of the widest and most rigorous studies, according to experts, was carried out in Denmark and was published in late 2006. It involved 420,000 adults who had been using mobile phones for many years, including a certain number of people who had used those phones since 1982, and others who had used it for over a decade. Compared with the cancer cases recorded in the Danish national register, the mobile phones users present neither an increased risk of contracting a brain or central nervous system tumour, nor a higher risk of developing a neoplasm in the salivary glands or in the eyes, or to fall ill with leukaemia. In conclusion, there is not any evidence that mobile phones may cause cancer.[5]

The case may seem closed, or about to be closed. Actually, it is has never been this open – it has even grown more complex, if possible, and appears surrounded by ever vaster oceans of technological and scientific ignorance. It has been reopened and complicated, on one hand, by the extraordinary commercial success of mobile phones, whose number in the largest EU countries is approaching or overtaking the number of citizens; on the other hand, the rapid diffusion of Wi-fi (wireless internet connection) and WiMax (broadband wireless internet connection) technologies, whose networks cover today not only universities and airports, but entire cities. The simultaneous activity of millions of mobile phones and of millions of PCs and laptops connected to a wireless internet requires dozens of millions of antennas, transmitters, routers, parabolic antennas. The ubiquitous presence of these devices, and their uninterrupted functioning over the day, has caused a dramatic *million-fold increase* in the background level of electromagnetic radiations, in the cities, comparing only to ten years ago. It is this exponential increase in EMFs that has led to the concept of electromagnetic pollution or electronic smog. Evidently, it affects also the people not using mobile phones, whereas those using them multiply the dose of radiations absorbed, adding their individual contribution to the background level.

In contrast with what happened until not long ago, this time various groups of scientists – at least those who do not have direct or indirect relations with the international telecoms – have been taking action. Starting by highlighting how large is the area of "the unknown" about the effects of technologies based on electromagnetic radiations. In this regard, a significant event was the *Benevento Resolution*, signed by about thirty researchers, including a number of Italians, after a congress organised in February 2006 in Campania, Italy, by the International Commission for Electromagnetic Safety (ICEMS). It maintains that "more evidence has accumulated suggesting that there are adverse health effects from occupational and public exposures to electric, magnetic and electromagnetic fields, or EMF, at current exposure levels. What is needed, but not yet realised, is a comprehensive, independent and transparent examination of the evidence pointing to this emerging, potential public health issue."[6]

These scientists will hardly obtain what they call for – especially higher investments in independent research – without the support of civil society. To that purpose, innovative forms of relating society to science would be needed, a sort of new social contract, given the political and economic pressure science is exposed to.

You have probably heard it lots of times in Hollywood films, when a cop arrests the villain, they recite the typical Miranda warning: "You have the right to remain silent. Anything you say can and will be used against you in a court." A useful strategy may be to display a similar warning on your screen anytime you access the web. Still in the awareness that remaining silent through the web is almost impossible. Firstly, the identification code of your computer is automatically transmitted to the server of any website you are visiting. Secondly, to perform any operation on a website you need to insert a password you have chosen by yourself, yet it is inevitably associated to the personal data you had to provide to the website. This applies to the relations of a consumer with private economic operators (the e-commerce sector) and to the relations of a citizen with public administrations (the e-government sector). All of the operations performed in any website – such as sending an e-mail, buying a book, requesting a certificate, buying a train ticket, booking a seat in a theatre or a medical examination, reading a magazine, downloading a file, etc. – are all stored for months or years. The same happens to the payment methods you use. Obviously, there is not only the web in strict sense to memorise everything. There are also the credit card circuits and databanks, those of the national health system, the hotel chains, the companies providing surveillance or security systems, the banks, the insurance

companies, the police, the revenue authorities, the ministry of the Interior, the ministry of Justice, the municipalities – and a few dozens of other institutions.

The first studies on the "end of privacy" caused by the web, carried out mainly from a legal point of view, appeared in the late nineties already.[7] Later on, huge developments have been recorded in the web extension as much as in the integration of information technologies with audio and video technologies, and in the number of users. The original role played by the internet and the web as a communication means without borders has eventually been joined by the role they play as very entangled channels collectors and distributors of personal information gathered, besides the access of users themselves, through a multitude of other means: radiofrequency identification tags (RFID: microchips transmitting information on the carriers); e-passports; fingerprints readers; global positioning systems; the omnipresent mobile phones (whose presence can be traced also when they are in stand-by); software to prevent the download of restricted files (Digital Rights Management); surveillance systems installed in private and public areas. A contribution has been provided also by the increase in the e-commerce for goods and services, and the proliferation of blogs, the exchange of pictures and video clips, the associative networks, the "wiki" methods that allow users to actively modify a text on the web – anything that is currently and generically referred to as Web 2.0.

These developments have led to the birth of two industries with opposite purposes. The first deals publicly with data mining from the web and from the databanks or circuits that are somehow linked or – with a little help from experts – linkable to it. Obviously, data miners do not limit themselves to using Google or Yahoo, even though through these search engines is now simply possible to access, without violating any restricted website, a huge quantity of information. Miners do explore any possible database that may have a homepage on the web and see what they can take from it. If it is well protected by firewalls, they check whether some inbound or outbound channel – or some other hub or junction in the web – is casually leaking some "informative liquid". The information taken from the web and from different databanks and circuits is then filled with some other value by comparing and tabulating data. This is the action that is potentially most detrimental to privacy. For example, anyone may be happy with showing their medical record to their doctor or partner; perhaps they would be less happy in learning that it winded up, even partially, in the hands of their employer or insurer.

The main clients of this new mining industry are evidently large companies, which exploit data to build analytical profiles and sub-groups of potential consumers, so as to devise more and more focused advertising initiatives. In a secondary position, there are governments that in any case operate on their own, even massively, as data miners and tracers, usually alleging they do so for national safety or tax reasons. Finally, whoever can turn to a data mining company to learn – for a few dozen dollars each, US price, while in the EU is yet to be fixed – any type of information, such as titles, education, travels, readings, civil status, income, propriety, food habits, and any problems with alcohol or drug, political views, etc. of anybody. To start with, only a few data are necessary: name, postal code and year of birth, even approximate. What about the timing needed to receive the complete file? Two or three days. These are the methods used to experiment the implementation of the total surveillance society and of the rights denied or damaged in any sector of the social life. The operators in the data mining industry defend themselves maintaining that in the past only the well-to-do could afford to collect much information regarding other people. And now this is virtually affordable by everyone.

The second industry, which sees the involvement of university departments in many countries, was born from the will to make life hard for the first one. It carries out research on the information systems able to guarantee the secrecy of the information transferred via the internet, the inaccessibility of the stored personal data, and their anonymity when they are to be used by legally authorised bodies, as are statistical data. Therefore it puts at everyone's disposal the software technology devised for that purpose developed by state-run and private bodies, and also by individuals (if it is not too costly), intended to guarantee the privacy of their users' data.

The hypothesis that the web is paving the way to the total surveillance society is commonly objected. If an issue arises, politics and legislation will supposedly tackle it. The enforcement of the current legislation should be promoted more effectively. National bodies dealing with this issue are already in place, as the Data Protection Commissioner in Italy (*Garante per la Protezione dei Dati Personali*). Further action will be taken to train users to be more cautious in accessing the web. In any case, state-run databases are suitably protected, etc. Unfortunately, these are objections that neither address properly the

issue, nor seem to consider the history and the evolution of the web. Only in the country where the data mining has mostly developed, the US, a legislation protecting the digital personal data has been in place from the outset. A piece of that legislation is the *Health Insurance Portability and Accountability Act* of 1996, which allows data access to perform marketing surveys, but prohibits any reference to the identity of the people. Who knows what the employers think about it, as in the US they are able to access the medical record of any employee or applicant in a couple of days, at most. On top of that, a law is always local, whereas the web is global by its very nature.

As regards the security of state-run databases, it is worthwhile to note that a journal specialised in the computerised defence of privacy, the "Journal of Privacy Technology", published by the Faculty of Information Technology of the Carnegie Mellon University of Pittsburgh, has launched in late 2006 a competition for the best article on privacy. In order to guide applicants, the announcement listed *over fifty subjects* an article could possibly deal with, and nearly each one of them concerned a vulnerability point of data circulating on the web. Firewalls are only one of these points. Despite being useful, they cannot be the only instrument to safeguard the fundamental set of civil rights underlying the privacy concept. And, more in general, data protection software cannot be either. The development of the total surveillance society should be fought firstly at the level of technology and science policies. A similar conclusion was reached also by a survey carried out by the Office of Technology Assessment of the European Parliament on ICT and privacy relations in seven countries (six EU members and Switzerland), published in late 2006.[8]

The primary purpose of such a kind of policies – to go back to the technologies referred to in the paragraphs above and to the mass physical, biological and social blind experiments they have carelessly originated – should be to restructure the area of technical and scientific ignorance that surrounds them. The aim should be learning what is still unknown, and assessing what long-term consequences the new discoveries may have on a range as wide as possible of properties in human beings and in life-supporting systems.

Translated by Massimo Caregnato

Notes and references

[1] The study on the factors and the consequences of "what is not known", that the German term *Nichtwissen* designates better than the Italian '*ignoranza*' (in English, 'ignorance') is a fast-growing area in the sociology of the scientific knowledge. The definition above refers to works such as S. Böschen, I. Schulz-Schaeffer (edited by), *Wissenschaft in der Wissengesellschaft*, Westdeutscher Verlag, Wiesbaden 2003; S. Böschen, P. Wehling, *Wissenschaft zwischen Folgenverantwortung und Nichtwissen. Aktuelle Perspektiven der Wissenschaftsforschung*, VS Verlag für Sozialwissenschaften, Wiesbaden 2004.

[2] For this and other criticism to genetic technologies cf. S. Albrecht, *Freiheit, Kontrolle und Verantwortlichkeit in der Gesellschaft. Moderne Biotechnologie als Lehrstück*, Hamburg University Press, Hamburg 2006, p. 131 onwards.

[3] This list of variables is taken from the *Open Letter by Independent Scientists* presented at the Joint International GMO Opposition Day, 8 April 2006. The notes to the letter list approximately fifty scientific publications regarding the evaluation of the effects of GMOs on different fields: food, medicine, agriculture. Also cf. Institute of Science in Society & Third World Network, *The Case for a GM-Free Sustainable World*, Penang 2003; D. Caruso, *Intervention. Confronting the Real Risks of Genetic Engineering and Life on a Biotech Planet*, Hybrid Vigor Press, New York ?? 2006. Still cautious in the evaluation, even though circumscribed to the possible harmfulness of GMO food, and yet full of doubts is the report of the Food Safety Department – World Health Organization, *Modern food biotechnology, human health and development: an evidence-based study*, Geneve 2005.

[4] This was also maintained in the *Report of the Eight Meeting of the Parties to the Convention on Biological Diversity* (CBO), United Nations Environment Programme, Curitiba, March 2006, p. 268 onwards.

[5] J. Schüz (from the Danish Cancer Society) et al., *Cellular Telephone Use and Cancer Risk: Update of a Nationwide Danish Cohort*, "Journal of the National Cancer Institute", vol. XCII, no. 23, pp. 1707-1713.

[6] International Commission for Electromagnetic Safety, *Benevento Resolution – La deliberazione di Benevento*, www.icems.eu/docs/Resolution_OCT19_06.pdf. Published online on 16 September 2006.

[7] Cf. C. Sykes, *The End of Privacy. The Attack on Personal Rights at Home, at Work, On-Line, and in Court*, (1999).

[8] European Parliamentary Technology Assessment, ICT and Privacy in Europe. Experiences from technology assessment of ICT and Privacy in seven different European countries, final report, Strasbourg, 16 October 2006.

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