



Newsletter Knowledge NBIC Project

www.converging-technologies.org

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The KNOWLEDGE NBIC newsletter aims to disseminate information on converging technologies among social scientists and become a platform for networking across disciplinary boundaries between natural and social scientists. Regular features will include an update on project and partner activities; reviews of interesting links; reports on events or publications; and short articles on relevant overarching themes. External contributions are welcome. Contact us at info@converging-technologies.org.

Editorial

The Knowledge NBIC project has entered its concluding phase. The research team is currently working on a report on knowledge politics in the field of converging technologies. The report reviews those regulatory activities and discourses that are emerging around converging technologies in different countries or for specific themes. The report will become available at the beginning of 2009, around the same time of the publication of the second NBIC issue of the journal *Innovation*; The European Journal of Social Science Research bringing out a selection of the papers presented at the project's second workshop organized in Brussels, on 6-7 May 2008. The project's fifth and final newsletter – to be published in April 2009 – will present an executive summary of the main project's findings.

The current issue of the KNOWLEDGE NBIC newsletter brings a report on the NBIC Brussels workshop, a report from Israel about biosecurity, a report about the converging technologies discourse in Austria as well as reflective piece on 'enabling knowledge'. Information on the project, as well as this newsletter in electronic form, is available on the project's Web Site at www.converging-technologies.org

Converging Technologies, Knowledge Politics: A Report on the May 2008 Workshop

Jacquelyne Luce, Zeppelin University

"...convergence is really putting us at the edge, onto the wall onto which we must climb. We must try to find out ways to tackle this interdisciplinarity and to make sciences much more understandable from one domain to another and to see how all these sciences have social-philosophical impacts and may change our way of understanding and living in our societies." These were some of the remarks with which *Elie Faroult*, the scientific officer for the Knowledge NBIC project opened the 'Converging Technologies and Knowledge Politics' workshop which was held in Brussels from May 6-8, 2008. This was the second workshop organized by the Knowledge NBIC project. It was organized around three main themes followed by a Round Table closing session and addressed the multiple spheres in which knowledge politics are being debated and enacted. Presentations by social science researchers, philosophers, individuals working in the areas of foresight and technology assessment, legal scholars and civil society organization representatives offered rich insight and posed provocative questions to the state of the art concerning converging technologies, knowledge politics and their interface.

Jack Smith of Science and Technology Foresight, Canada delivered a presentation on a foresight exercise aimed at defining Prospective Applications of Converging Technologies (PACT). Smith highlighted that one of the central goals of current Canadian innovation management is to develop an understanding of realistically attainable technological developments and to concurrently identify which of these developments might have significant societal impact. *Jacquelyne Luce's* (Zeppelin University) paper, 'Governing Converging Technologies: Emerging Perspectives from Industry, Government and Civil Society,' drew on interviews conducted within the Knowledge NBIC project to look at how challenges presented

by emerging technologies are being addressed by organizations differently invested in monitoring and intervening in their development. *Steve Fuller* from the University of Warwick and also a member of the Knowledge NBIC project team tackled the concept and practice of anticipatory governance, asking 'Are we shifting from a 'Precautionary' to a 'Proactionary' Knowledge Politics?' Fuller addressed the role of social science and humanities research with respect to potential 'public relations' activities and the integrated investment of SSH researchers in scientific developments.

Joachim Schummer, University of Darmstadt, critically analysed the rhetoric of converging technologies, examining in detail the discourses in early U.S. reports. He remarked that in looking for a bare consensus as to what converging technologies means it "seems to refer to a technological development that happens somewhere from the recent past to the recent future" and then continued to draw attention throughout his presentation to the temporality and spatiality embedded in discourses of converging technologies. *Karen Kastenhofer* of the Austrian Academy of Sciences looked comparatively at the discourses of various European institutions involved in deliberating on the impacts of emerging technologies and specifically the frames of "risk" and "ethics" that are employed. Looking closely at the language that has been used with the "technoscience" fields of agrobiotechnologies and medical biotechnologies she argued that while there may be convergences of technologies and sciences there is also potentially a divergence at the level of governance. *Francois Mali* from the University of Ljubljana explored the manners in which the interests of civil society are embedded within the concept of the precautionary principle and looked at resistance to and promotion of the principle drawing on examples from particular cultural-political contexts. *Piotr Stankiewicz* of Nicolaus Copernicus University drew on a case study of the governance of genetically modified organisms in Poland. In his paper he moves away from a discussion of possible means of governance to focus more specifically on modes of governance that are in fact enacted by different parties to a conflict. Stankiewicz looked at how potential risks are "hidden" within the debate, and may

be excluded from the definition of the problem at hand.

The distinction between "thick" and "thin" bioethics was presented by *Adam Briggie* of the University of Twente who distinguished between politics for knowledge and knowledge for politics. Briggie identified a pivotal period in which a recognition that science and technology raises non-technical questions, and rather moral and political ones was the foundation for the emergence of new forms of advisory councils. He focused his analysis on the Cast Council / President's Council on Bioethics and the manner in which it has, he suggested, shifted the form of knowledge produced within and the role taken by Bioethics Commissions. *Kevin Burchell*, London School of Economics, drew on examples of public dialogue projects (e.g. ScienceWise) in the UK which are aimed at informing policy development, drawing attention to current professionalization of public dialogue formats. One of his interests was the manner in which the forms of engagement employed define the "public" who are meant to be participants in the dialogue, rendering "interested public" into stakeholders, and placing borders around the forms of "consensual" engagement envisioned. *Johann Evers*, *Michiel van Oudheusden* and *Joel d'Silva* from the University of Leuven presented a paper based on a current research project in the Flemish context which aims to create awareness among nanoscientists and technologists of the underlying assumptions which guide nanotech research and how societal considerations can be integrated into the research choices that they face. The project involved the shared creation and engagement with imagined scenarios in which nanoenabled technologies are integrated, followed by an analysis of the engagement dialogue itself. *Dorotheé Benoit Browaeys* presented some of the work that has been undertaken by VivAgora, a civil society organization in France that has been actively involved in organizing citizen involvement in discussions about emerging technologies, including nanotechnologies. She highlighted the limitations of particular activities with respect to the uptake of the results and the current actions to develop new strategies.

The workshop concluded with a round table discussion, moderated by Steve Fuller, in which

Elie Faroult, DG-Research, European Commission, *Arie Rip*, University of Twente, *Jack Smith*, Technology Foresight Canada, *John Crowley*, UNESCO and Yair Sharan, ICTAF, Tel-Aviv University shared key insights into the role that current educational, funding and governance initiatives have in shaping and defining knowledge production and knowledge politics. What is meant by the phrase “converging technologies”? How does this concept link to developments with respect to science policy and educational programmes (Sharan) and foresight activities related to supporting the development of knowledge economies (Faroult)? What can various institutions contribute to the analysis of science-society relationships and understandings of distributive justice (Crowley)? What shape does “ethics” take within discussions of converging technologies and how important might be a move away from “speculative ethics”? (Rip) If we think about prospective applications, which methodologies can assist us in defining the realisation of them? (Smith)

The workshop presented participants with a number of challenges with which to engage regarding what is meant by converging technologies, who and what are seen to be the “drivers” of CT programmes or developments, how to incorporate the plurality of approaches to governance within comparative or case study analyses, and how to address the complexities of contemporary knowledge politics. A selection of the papers presented will be published in a special issue of *Innovation*, edited by Liana Giorgi and Jacquelyne Luce, as a follow up to *Innovation*; *The European Journal of Social Science Research* 20(4), which reported on the first Knowledge NBIC conference held in May 2007.

Knowledge Politics and Converging Technologies in Austria

Liana Giorgi, ICCR

There is no endogenous Austrian discussion on NBIC and converging technologies. The discourse was introduced in Austria via the European Union and, more specifically, through the setting up in 2004 of the High Level Group on Converging Technologies. In that same year, Raoul Kneucker of the Ministry of Science and Research representing Austria at the High-Level

Group, organized a workshop on converging technologies entitled ‘Communicating Science: NBIC, A European Debate on Converging Technologies’ with the participation of Mihali Roco, Eric Drexler and Harry Kroto. That workshop was attended by several science policy-makers and STS scholars and raised awareness within Austria about the CT discourse in Europe and the United States.

Like elsewhere in Europe, the Austrian CT discourse is constructed around that of the more clearly delimited field of ‘nano’ science and technology (NS&T). With an annual budget of circa 12 million Euro, the Austrian Nanotechnology Programme is small in comparison with the programmes of bigger countries, but quite significant in the Austrian context both for its scope and its strong preference for research carried out in collaboration with the industry. The Austrian Nano Initiative has since 2003 funded nine big collaborative projects (each with a budget of 2 to 4 million) and three major regional cluster networks.

In order to answer to concerns regarding the risks of nanotechnologies, in 2006 the Austrian Ministry for Transport, Innovation and Technology (BMVIT) commissioned two risk assessment studies on the subject. The first, carried out by the Institute for Technology Assessment (ITA) of the Austrian Academy of Sciences, provided an overview of the international risk assessment / regulatory debate on nanotechnologies; the second, carried out by the association NanoNet Research Cluster in Graz focused on nanomedicine. Both studies argued in favour of intensifying activities in the field and called for more raising awareness campaigns. Consequently, in 2007 ITA was commissioned with a three-year project on ‘Integrated Analysis of the Knowledge Base on the Environmental and Health Impact of Nanotechnologies’ (NanoTrust); in parallel, a centre on nanotoxicity is being set up at the Medical University of Graz in collaboration with NanoNet Styria. Further to this, all projects funded by the Austrian Nano Initiative are expected to carry out a preliminary safety and risk assessment at the beginning of their research.

Risk considerations and ethics do not figure

prominently in the discourse of scientists regarding converging technologies. This is not because these concerns are not recognized as important. The standard scientific answer to the question on the social and ethical implications of converging technologies is rather that risks are endemic to scientific research (and technological products) – and that this was never different. Ethical questions, especially, have less to do with the scientific method or technology but rather with its use. Any technology, in other words, can be put to ‘wrong’ use with detrimental consequences.

The advantage of this instrumentalist point of view is that it warrants the distance between the scientist, on the one hand, and society, on the other hand. This void is savoured by many scientists as a key aspect (or even the proof) of their autonomy. Against this background, becoming active in activities that have to do with raising awareness about scientific research, or with citizen deliberation about contentious issues, are not thought relevant. Younger scientists tend to be more positively inclined towards science communication, also because they are forced to engage in related activities through their research contracts. More generally, however, the science and society fields are experienced as separate domains governed by different rules of exchange and interaction. In the mind of the majority of Austrian scientists, risk factors and ethical concerns do not change this distinction.

Ethical concerns regarding converging technologies tend to overlap with those about nanotechnologies. According to the 2007 report of the Austrian Bioethics Commission on nanotechnology, the nanotechnology challenge has to do with the fact that particles at this level are known to have distinct characteristics that may be different than those of bigger particles of the same material. This also implies that they may have toxic implications that are not yet fully understood, thus not addressed by existing regulatory frameworks. Therefore, exploring these risks is a priority in general, and, in particular, for applications in the fields of medical diagnosis and medication. Nonetheless, nanotechnology, even if representing a new technological field, is not unusual with respect to the above type of ethical

concerns. This is because nanotechnology is not one single technology, but rather marks out a methodological approach. Risk and/or ethical issues will emerge, if at all, in relation to specific applications. In other words, any emerging risk factors or ethical issues will have to be inspected for each application individually.

Where does this leave the discussion about regulation? Is there or should there be new regulatory frameworks for converging technologies – whether at the level of research or at the level of application? Insofar as research is concerned, all nineteen Austrian respondents to our study agreed that this is neither possible nor desirable. The freedom of research is a public good to be protected as such. An open information policy regarding research results and their possible risks is equally important. What is far more complicated is the regulation of technology use and it is in this domain that we have seen the emergence of more detailed regulatory guidelines and procedures, such as on informed consent and the participation in medical tests. The problem here is identifying the appropriate time and frame of intervention.

Like the United States, Austria is characterized by the absence of a legislative framework, solid institutionalized technology assessment structures, and consultation processes in the biomedical field. In the nanotechnology field, the approach taken instead consists in the delegation of the monitoring task to scientific institutions through project contracts. Along similar lines, the European Union has opted for setting up committees at various levels and commissioning them with the task of coming up with guidelines for a Code of Conduct. Whether such mechanisms will suffice for creating the critical mass of expertise and for solidifying procedures of knowledge transfer, critique and reflexive evaluation remains to be seen.

Enabling Knowledge

Nico Stehr, Zeppelin University

Many observers are convinced that the gap between powerful agents who harbor expert skills and the knowledge of laypersons has dramatically and irreversibly widened recently. On the other hand, it is evident that social deference, the unquestioned respect and taken-

for-granted authority, to the knowledge of major professions (teachers, doctors, lawyers), has declined since the 1960s, at least in modern Western society. With the rising tempo of new information, a growing cleavage between those who directly participate in the process of knowledge production and the lay public becomes apparent. As the larger public sphere is excluded, the asymmetry between expert knowledge and the public is seen to have serious consequences for the nature of civil society.

Decreasing cognitive proximity increases the political distance from science, for example, by restricting public reflection on both the anticipated and unanticipated transformations of social and cultural realities that would result from the application of new knowledge. The scientific community shares responsibility for this diminishing intellectual proximity, since the preferred self-image of science as a consensual enterprise, is conflicting with both its public role and its own internal struggles regarding research priorities including the generation of data and their interpretation.

However, on both political and moral grounds, many groups, constituencies and institutions must be consulted before decisions are made about issues that affect the regulation of new knowledge and, therefore, indirectly the development of science and technology. It would be misleading to think that the loss of contact and considerable scientific illiteracy found in modern societies signals the possibility of a dramatic collapse in public support for science. It is more accurate to speak of a state of precarious balance affecting the autonomy and dependence of science in modern society. Loss of close intellectual contact between science and the public is perfectly compatible with both a diffuse support for science in modern society and the increase of legal and political efforts to control the impact of science and technology.

The conditions under which differing groups make sense of specialized knowledge vary considerably. Thus, rather than treating the relationship between expertise and the public as a series of fixed events involving individual, isolated actors, we need to think of that interaction as being mediated by cultural identities and changing conceptions of the social benefits of science and technology. In an age

of knowledge politics, with efforts to regulate and police new knowledge and technical artifacts, it no longer make sense to view the public as naively resistant to new capacities to act. We must, instead, see them as cautious, uncertain and curious about the possible consequences of new information. Nonetheless, without some element of impersonal trust exhibited by ordinary members towards experts, expertise would vanish.

Two models for dealing with scientific knowledge claims can be identified. The one that resonates with much of the previous discussion and asserts a steep gradient of knowledge between science and society is the model of instrumentality. Science speaks to society and does so not only with considerable authority but also with significant success while society has little if any opportunity to talk back. The alternative approach to the social pathways of knowledge is the capacity model. The capacity model views the practical influence of science as a process driven by the impact of ideas on society and its actors. The capacity model is also associated with the possibility that people may critically engage scientific knowledge using local knowledge resources and thus make science accountable to the public.

The evolvment of modern societies as knowledge societies increasingly extends to the democratization and negotiation of knowledge claims. We are slowly moving from what has been the case of expert rule to a much broader, shared form of knowledge claims governance.

Scientific knowledge is both more malleable and accessible than has been suggested in the classical perspective. Furthermore, the new sociology of scientific knowledge has shown that the production of scientific knowledge is in many ways very similar to other social practices. The boundaries between expertise and everyday knowledge are much less fixed and more robust than has often been surmised, especially in observations lamenting the growing distance between expert knowledge and the public's knowledge.

Biotechnological Research in an Age of Terrorism Report of the Israeli Steering Committee

Summary by Yair Sharan, ICTAF, Tel-Aviv University

When we think about knowledge politics surrounding emerging technologies we tend to associate related regulatory and monitoring activities with those actions motivated by concerns about the social and ethical implications of new technologies. There is, however, one other important motivation for 'controlling' technologies and that is their possible abuse by terrorist organizations.

The terrorist attacks of 9/11 and the wave of anthrax envelopes sent through the U.S. mails later that same year raised the awareness of the public to the threat of unconventional terror, in general, and of biological terror, in particular. Policy makers realized that the use of biological weapons created a new and potent danger. Forecasts predict that biotechnology will advance dramatically in the 21st century and that terrorists will exploit the burgeoning availability of related information to obtain biological weapon capabilities.

In 2004, the U.S. National Research Council (NRC) appointed an expert committee to examine the issue of biotechnological research in the age of terror. The US activity inspired other states to follow its steps. The Israeli 'Committee on issues in biotechnological research in an age of Bioterrorism' published its report and recommendations in March 2008.

In their report the Israeli committee members draw a distinction between biosafety and biosecurity. Biosafety is concerned with the possible implications of biological agents and research on public health. Biosecurity has more to do with the threat posed by the use of research for terrorist activities. A problematic research area and the target of monitoring activities is the so-called 'dual-use' biological research, that is, research that is carried out for military purposes but also with generic applications. The committee's recommendations are as follows:

Recommendation #1. Awareness, consciousness and education.

The committee recommends an ongoing effort to raise awareness and understanding of the risks associated with the biological threat in general, and with dual-use biological research in particular, among the Israeli life and medical sciences R&D community.

Recommendation #2. Legislation

Given that the creation of new legislation takes time, the Committee recommends that Israeli secondary legislation on biosafety is used as a model for ministerial executive orders and procedures designed to prevent the seepage of organisms, material and information to potential terrorist elements. In parallel, specific longer-term legislation targeting biosecurity should be formulated.

Recommendation #3. Oversight and supervision mechanisms

Local responsibility for the enforcement of biosecurity should be delegated to existing institutional biosafety committees for the academic sector and special central safety and security committees for biomedical laboratories. National biosecurity policy, procedures and enforcement should be overseen by a National Biosecurity Council (NBC) to be appointed by the Ministry of Health.

Recommendation #4. List of Dangerous Agents

The committee believes that there should be an itemized core list of dangerous agents. Not all biological agents should be placed in this category. The initial core-list should include a minimal list of well-known pathogenic or toxic agents, and additional agents could emerge continuously at any time, or be produced artificially in the research labs.

Recommendation #5. Oversight of Information Generated by Dual-Use Research

The Committee recommends the establishment of a system to oversee and approve dual-use research projects, by an internal mechanism based on the judgement by the academic community itself.

Recommendation #6. Consideration of Biosecurity Issues by Funding Agencies

The committee recommends that the Israel Science Foundation and other governmental research foundations require, as part of their approval process, biosecurity approval from the institution in which the research is conducted. In the case of non-academic laboratory research, similar certification should come from the chairman of the Central Safety and Security Committee of relevant ministry.

Recommendation #7. Oversight of Importation and Sale of Dual-Use Biological Equipment

In addition to existing export regulations, the Committee believes that it is necessary to establish a system to oversee the Israeli import of dual-use biological laboratory equipment and biological agents, as defined by the (export) risk list maintained by the MITL Export Authority, as well as the sale of these items in the local market. This applies especially to the sale of used equipment.

Recommendation #8. National Responsibility for Biosecurity

The establishment of a biosecurity regime and its enforcement should be assigned to the Ministry of Health which has both primary responsibility for public health and the requisite scientific knowledge and professional experience. It is especially important that the Ministry of Health establishes, as soon as possible, a National Biosecurity Council. The Chairman and members of the council should be appointed by the Minister of Health in consultation with the head of the National Security Council and the Academy of Sciences.

Recommendation #9. Budget

The committee recommends that the government allocates a budget for the operation of this biological security system at the national and institutional level.

Recommendation #10. Implementation of committee's recommendations

The report is to be submitted to the Interministerial Committee for Science and Technology with the request to approve the recommendations and assign implementation

responsibility to different agencies and ministries.

During the next years it will be important to monitor the field of biosecurity as this might impact on regulatory activities targeting new emerging technologies more generally.

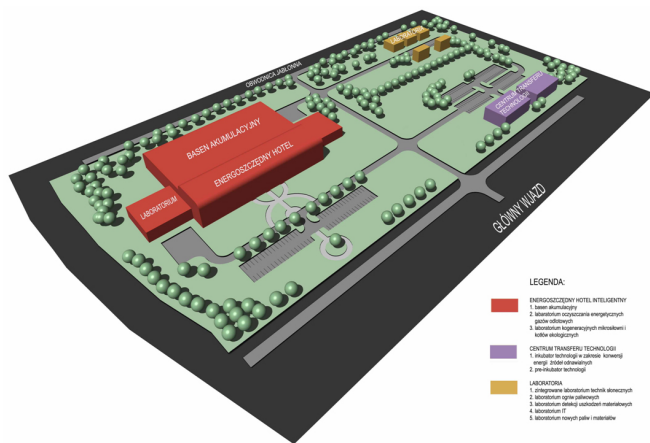
Converging Technologies and Neurosciences – Brazil 2008

The discussion about “NBIC” is taking hold in various countries. In Brazil, note was taken of the publication of the 2002 report *Converging Technologies for the Improvement of Human Performance*, but also the ensuing European debates. Esper Abrao Cavalheiro, a neuroscientist based at The Centre for Strategic Management and Studies (CGEE; www.cgee.org.br), began taking an active role in the conversation a few years ago. He draws attention to a translational distinction, preferring to use the phrase *convergência tecnológica* (technological convergence) in contrast to *tecnologias convergentes* (converging technologies) in order to emphasize the directed and purposeful “nature” of the convergence that is taking place, yet at the same time addressing the key questions sparked by the so-called NBIC debates. Esper Cavalheiro recently organized two events on the topic, in which Knowledge NBIC project partner Jacquelyne Luce participated. The first was a symposium at the CGEE in Brasilia at which Jacquelyne Luce and Jordi Aguilo (Spain) were invited to present their perspectives on CTs with special emphasis placed on their distinct disciplinary locations within the social and natural sciences respectively. The symposium brought together a mixed audience of researchers conducting future studies and foresight exercises, policy advisors and politicians, students and scientists. The second event was a panel on the relationship between converging technologies and neurosciences at the NEUROLATAM I conference in Buzios. Speakers Esper Abrao Cavalheiro, Roberto Lent, Jordi Aguilo and Jacquelyne Luce addressed questions that are emerging at the interface of the two domains and especially in light of industry or commercial applications. The audience of mostly graduate students in the neurosciences were invited to think about the

possible frameworks for encouraging convergence in the process of knowledge production, potential applications at the interface of converging technologies and neurosciences (implantable devices, prostheses, etc.), ethical deliberation processes and challenges to current science and technology governance frameworks.

A New Energy Centre in Poland

The KNOWLEDGE-NBIC Partner – Foundation for European Scientific Cooperation (FEWN) located in the Jablonna Municipality, at the border of Warsaw, together with the Polish Academy of Sciences, the Technical Sciences Division and relevant R&D institutes, launched a project to construct a new Research/Technology Centre to foster research and application of renewable energy and the conversion of energy technologies. The idea of the project is based on the KNOWLEDGE-NBIC findings with respect to the convergent technologies paradigm. The research centre's scientific and architectural concepts are completed. The project has applied for funding to the Mazovia regional authority which is supported by EU Structural Funds.



Interesting Reading

The United States President's Council on Bioethics has recently published a 550-page essay volume on the usefulness and applicability of the concept of 'human dignity' for bioethics. Several authors advocate the use of human dignity understood as 'humanity' in bioethics. The report is entitled Human Dignity and Bioethics (2008) and can be downloaded from the Council's web site or ordered in print form.

A critical assessment of the report was published in The New Republic. Steven Pinker, a well-known cognitive scientist, criticizes the use of 'human dignity' in bioethics in an essay entitled 'The Stupidity of Dignity: Conservative Bioethics' Latest Most Dangerous Ploy' (TNR, 28 May 2008).

The next newsletter

The next newsletter of the KNOWLEDGE NBIC project will be published in April 2009 in the form of an executive summary of the project findings.

Comments and feedback

We are very happy to receive feedback on this newsletter. Do not hesitate to contact us if you have comments or ideas about what you would like to see covered by the newsletter, or indeed if you would like yourself to write a contribution.

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