

should be based on a critical assessment of the priorities in spending strategies. In a situation of tight budgets and huge development tasks ahead for the New Member States and the Candidate Countries, broadband access competes with education, road construction, tax reductions, etc. Therefore, benchmarking should take into account effects on the Lisbon objectives. When introducing new policies, an assessment of such effects is needed, followed by monitoring the effects, and subsequent revision of policies if necessary.

The title of *Stuart Macdonald's* (University of Sheffield, UK) presentation was "Government promotion of electronic business: a cynic's perspective". He deplored the lack of critical research on the impact of ICT. The over-estimation of the benefits of ICT leads policy makers to support any expansion of ICT use regardless of its actual usefulness. Research results that hint at poor efficiency gains, massive over-investment, and a decline in product and service quality are ignored. The paper was based on the analysis of a consultancy report which was supposed to evaluate Australian ICT policy programmes. A series of flaws in the report was presented which all had the effect of over-emphasising the benefits and success of the programme and of downplaying the problems involved. It was then shown that this is no isolated phenomenon.

### Conclusions

The lack of critical approaches might be explained by the fact that policy makers might not be interested in a critical review as the demonstration of missed objectives is a risk for themselves. It seems a good point in time now – when many policy programmes go beyond their first round – to develop measures for policy evaluation. Launching successful e-governance initiatives is becoming more important than ever in the light of the competition from Asian countries and the integration of 170 million comparatively poor people in the New Member States and in the Candidate Countries. Policy evaluations would help to concentrate policies on those issues where they are most effective and most in line with more general policy goals, such as growth and employment.

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## NanoEthics Conference

University of South Carolina, Columbia, SC, USA, March 2-5, 2005

### Conference report by Christopher Coenen, Parliamentary Office of Technology Assessment at the German Parliament (TAB)

At the beginning of this decade, a gap opened between the rapid progress being made in nanotechnology and the research into its ethical, legal, and social implications (Mnyusiwalla et al. 2003). This was followed by the emergence of an international community of nanoscience and nanotechnology scholars – with the University of South Carolina as one of its focal points (<http://nsts.nano.sc.edu/>) – and a growing body of literature on these aspects of research (Baird et al. 2004; Schummer 2004). There is also increasing interest in ethical and related issues arising from the "convergence" of new technologies, in which nanotechnology is deemed to play a crucial role. The US "NBIC" initiative on the convergence of nanotechnology, biotechnology, information technology, and cognitive science (Roco, Bainbridge 2002; Roco, Montemagno 2004) has attracted a remarkable degree of attention, while arousing irritation in Europe and the US itself (cf. Coenen et al. 2004). The thematic relevance of technological convergence has created a platform for debate on nanotechnology in terms of a "forum for exploring the future impact of all science and engineering" (Khushf 2004).

The program of the „NanoEthics“ conference at the University of Columbia reflected these recent developments in the debate: In the conference announcement nanotechnology was characterized as "the basis for a convergence of the physical and life sciences" with the potential to transform virtually all areas of human life, and likely to be associated with both great benefits and great risks. The goal of the conference was thus to explore the ethical and legal issues raised by nanotechnology and the larger conver-

gence of technologies. The titles of the sessions – since most of them were held in parallel, this report cannot cover all of them – reflect the wide range of topics discussed, namely:

*Situating Nano; Nano-utopia and Apocalypse; Codes, Principles, and Policy; Nano and the Public Good; International Perspectives on Nanotechnology; Managing Uncertainty; Regulating Nano; Grey Goo/The GMO Analogy; Nano Representations and Public Opinion; Framing Nanoethics; Nano and Privacy Issues; Nano, Patents, and Technology Transfer; Systems Theory, Complexity and Emergence; Nanomedicine; Transhumanism/Nanotechnology and the Military*

There was consensus among the participants, most of them humanists and social scientists from the US and Europe, about the necessity for an “upstream” development of technology that would consider social requirements and the public’s fears, and for close cooperation between nanoscientists and engineers on the one hand and humanists and social scientists on the other. *Michael Gorman* set forth a further refined concept of “trading zones” for nanotechnologies and NBIC and presented, together with *Ahson Wardak*, examples of such a cooperation. While these technologies are mostly promoted with reference to relatively uncontroversial goods (such as prosperity and health), some of the visions put forward in the US NBIC initiative (e.g., “enhancement” of human performance, a “new renaissance”) are more controversial. The same can be said about the possible effects of nanotechnology and NBIC convergence on security, personal privacy, and ecology. Various speakers (*Kevin Ausman*, *Lloyd Tran*, and others) presented the options for and obstacles to regulation in the field of nanoparticles and international and transnational nanogovernance. On the basis of publication statistics, *Calvin Shipbaugh* pointed to the increasing military interest in nanotechnology worldwide, particularly since 2001. Attractive options for military use are expected, such as in the areas of surveillance, “tailored effects” (also inside the body of the target), and “smart systems”. According to Shipbaugh, the study of the societal issues of nanotechnology should include military aspects, especially the consequences of the possible “offensive dominance” of a single state

and „catastrophic terrorism“. *Mark Gubrud* criticized the logic of technological research and development for the military, which often leads to the development of everything feasible without adequate consideration of the consequences for international security. Ethically problematic uses of new technologies mentioned here were new forms of “automated decision-making”, the use of fighting robots, and new techniques of body manipulation. *Jeroen van den Hoven* discussed issues of privacy with regard to nanotechnology. In his view, the development and use of nanotechnology could lead to radically new forms of surveillance and monitoring which are ubiquitous, invisible, and radically distributed. Nanotechnology in the form of writable nanoparticles and extremely small recording devices would take privacy discussions to the level of the design of materials, surfaces, and fabrics.

### **Political shaping of technology and the public**

Against the background of these controversial prospects, *Edward Munn Sanchez* argued that one crucial element of the significance of nanotechnology, particularly as part of NBIC, is that it produces a tension with the liberal idea that the state can be neutral about competing ideas of the “good life”. He described two, not mutually exclusive, options for assessing nanotechnologies and convergent technologies: (a) to pursue a procedural, deliberative approach that elicits much greater participation from all relevant stakeholders, including the public, and (b) to argue for a preferred particular concept of the good life that is compatible with liberal democracy. Within the same context, *Joseph Pitt* argued for a pragmatic theory of ethics in which the conception of the good life is not the result of a search for first principles, but of common sense, experience-based pragmatism, and forward-looking deliberations of well-informed citizens. According to *Rosalyn Berne*, the shaping of nanotechnology has hitherto primarily been driven by market forces, often understood as an international “race”, and strongly oriented towards military goals. Its potential to achieve humanitarian goals, prevent conflict, and further other narratives of the good life are often neglected.

Two central topics at the conference were (1) empirical findings on the public's views and on media coverage of nanotechnology and (2) reflections on the requirements for and the possible frameworks of a public dialogue on the risks and benefits. *Matthew Kearnes* and *Tee Rogers-Hayden* addressed the British efforts to engage different stakeholders, including the public, in the debate. *Rogers-Hayden* analyzed nano-governance in the UK against the background of the BSE legacy and the GMO controversy. In her view, British nano-governance has avoided the mistakes made with BSE and GMO: In the course of a general "deliberative turn" in British politics (with the goal of fostering a truly "participatory democracy"), an "upstream" multi-stakeholder approach was chosen, giving citizens the chance to participate in the shaping of nanotechnology and fostering a public dialogue. Other speakers showed how society's role in shaping nanotechnology and its convergence with other technologies might be framed to realize their potentials. *Valerie Howe* described this topic from a Canadian perspective and provided some specifics of Canadian technology studies. *Linda Goldenberg* presented a conceptual approach to mapping the public debates on different applications of the converging technologies, in which she pointed to the central role of man-artefact interaction (from outside the body via the skin to the cellular level). Modifications of the human body (and especially of the brain) evidently belong to the ethically most problematic topics of the debate. This is true both for temporary and (even more so) for permanent modifications (see also HLEG 2004).

Various critiques were directed against the "strategy of hope and hype", used by the US government to keep the interest of decision-makers and the public: From the perspective of the "heuristics of fear" (Hans Jonas) and in the light of experience with social systems based on utopian thought, positive goals and societal visions seem to be less suited to promote technological development than are images of the future that are catastrophic enough to be repulsive, thereby stimulating strong reactions from the public and common efforts to shape a technology (*Alexei Grinbaum*). In the early stages of an emergent technology, even irrational concerns (like "Grey Goo") should be taken seriously and

attention paid to how these concerns become rationalized (*Mario Kaiser*). According to this approach, normative concerns and an open public discussion can trigger conceptual differentiation and facilitate the scientific "boundary work". According to the findings of various empirical studies, another risk of the strategy of hope and hype seems so far to have had less impact (*Daniel Thurs*), namely, the popularization of dystopian scenarios as an unintended consequence of the use of futuristic visions. However, the creation of hype seems to harbor another potential danger, namely a high degree of mistrust among the investors who have not forgotten how the Dot-Com bubble burst (*Lloyd Tran*). Such a strategy might perpetuate a dependence on public funding. Moreover, controversies over futuristic visions might overshadow real, incremental technological progress (*Arne Hessenbruch*). To avoid a polarization in both the "do nothing" and "precautionary" extremes, a balanced assessment of both the opportunities and risks is needed (*George Khushf*).

### The debate on futuristic visions

Within the context of NBIC convergence (and beyond it too), the futuristic visions of "transhumanists" and dystopian scenarios were analyzed and discussed during the conference. Besides the purely technical dystopia that is known under the name of "Grey Goo" and is based on the idea that self-replicating nano-robots could go out of control and destroy the world, other visions and fears were expressed and discussed. The main focus here was the enhancement of human bodies and minds as a result of converging technologies. Once again, it became obvious that the debate on "nanoethics" is heavily influenced by wide-ranging visions and fears of unfavorable societal change and of radical alterations of the human condition. Most of these hopes and fears seem to be irrelevant for "nanotechnology" in a narrow sense, but they are well-known from the ethical debates on biotechnology and neurotechnology, in which many people sought new moral thresholds for research and development. With the debate on the converging technologies and the new technofuturistic utopianism, that plays an important role in the US NBIC initiative (Coenen et al. 2004), an old question seems to be back on

the agenda: is humanity culturally mature enough to deal with very fast technological progress that radically changes both the social fabric and the natural parts of the human condition?

*Jean-Pierre Dupuy* characterized the US NBIC initiative as a truly “Promethean project” and a “distinctively metaphysical program” with the aim of turning man into a “demiurge” or the “engineer of evolutionary processes”. Referring to ideas of Hannah Arendt, Günther Anders, and others, he discussed visions of nanotechnology and NBIC convergence as the latest manifestations of a “rebellion against the given”, with the goal of overcoming “every given that is part of the human condition”. Nanofuturism sees death, for example, as a problem to be overcome and man as the maker of himself. If the visions of NBIC convergence come true, man will finally remake nature and turn it into an artificial nature known down to the last detail. But man as a demiurge must necessarily be ashamed of anything natural in the human condition. Because of this “Promethean shame” (Günther Anders), the human body appears to be a prison of the mind, and the earth a prison of humanity. As a result, hopes for a transhuman and extraterrestrial existence flourish. We should, therefore, reflect upon the question of how to handle “perfect knowledge” and how we can restrain from using it in ethically problematic ways.

While Dupuy suggested that nanoethics could be based on a concept of the human condition that differs from the ancient idea of “human nature”, other participants relied on this idea to criticize or to defend the visionary goals of the US NBIC initiative, of transhumanism and nanofuturism. The Swiss theologian *Martin Erdmann* attributed these goals to the gnostic tradition. In this perspective, transhumanism is just another example of the gnostic subversion of human nature as perceived in the Christian tradition. *Mihail Roco*, one of the key figures in the US nanotechnology and NBIC initiatives, disclaimed any relevance of transhumanistic ideas for the visionary goals of these initiatives and emphasized that enhancements of human performance must never lead to an alteration of human nature.

Various participants looked for reasons for the polarization of the debate and pointed to the ideological friction between “transhumanists” and NBIC enthusiasts on the one hand and “bio-

conservatives” on the other (*Martin Erdmann*, *Bert Gordijn* and others), to competing concepts of a “good life”, to the relevance of religious discourse in the US (*Joachim Schummer*), to messianistic qualities of nanofuturism à la Eric Drexler (*Andrew Garnar*), to problematic uses and misrepresentations of utopian and anti-utopian thought (*Christopher Coenen*), and to cultural-historical blind spots (*Michael Bennett*, *Jean-Pierre Dupuy*) in the debate on NBIC convergence and future nanotechnologies.

In a panel discussion on “NBIC convergence”, following his overview of recent trends in nanotechnology and NBIC convergence, *Mihail Roco* mentioned a number of political activities in the USA, Japan, South Korea, Switzerland, France, Taiwan, EU intended to clarify the opportunities and uncertainties of technological convergence and to promote its further development. *Alfred Nordmann* pointed to European sensitivities concerning the topic of “human enhancement” and to other differences between the US and Europe in regard to the futuristic NBIC visions. *George Khushf* emphasized that the style of the US NBIC report (Roco, Bainbridge 2002) is problematic for many humanists and social scientists. Although some of the visions of human enhancement and man-machine interfaces might appear to be frightening, the humanities and social sciences should not shy away from them, but prepare themselves for the discussions to come.

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## **Informatisierung der Arbeit: gesellschaft im umbruch**

**Darmstadt, 27. - 28. Januar 2005**

**Tagungsbericht von Bettina-Johanna Krings und Ulrich Fiedeler, ITAS**

### **1 Einleitung**

Die Tagung ‚Informatisierung der Arbeit: Gesellschaft im Umbruch‘ wurde zusammen vom Institut für Sozialforschung (ISF) in München, der Kooperationsstelle Wissenschaft und Arbeitswelt in Darmstadt und der Technischen Universität (TU) Darmstadt organisiert. Sie fand im Rahmen des Projekts ‚Kooperationsnetz Prospektive Arbeitsforschung‘ (KoprA) statt, das vom Bundesministerium für Forschung und Bildung (BMBF) gefördert wird und einen Teil der Förderinitiative ‚Zukunftsfähige Arbeitsforschung‘ darstellt.

Die Veranstaltung schloss eine erste Stufe der Diskussions- und Vernetzungsphase im

Projektdesign ab und sollte gleichzeitig der Startschuss für eine zweite Phase sein. Themen dieser ersten Phase beschäftigten sich – wie der Titel der Tagung schon ankündigte – mit dem Einfluss digitaler Informations- und Kommunikationstechnologien auf die Arbeitswelt. Dies ist keineswegs trivial, wenn man bedenkt, dass etwa bei der Hälfte aller Arbeitsplätze in Deutschland Computer zum Einsatz kommen.

Die These, dass diese Entwicklung derzeit zu grundlegenden Veränderungen in der Gesellschaft führe, wurde der Tagung zugrunde gelegt. Die Intention der Organisatorinnen und Organisatoren spiegelte sich in dem Wunsch wider, diese gesellschaftlichen Entwicklungen nicht als ‚Getriebene einer rasanten Entwicklung‘ zu erleben, sondern Perspektiven einer humanen Gestaltung des Informatisierungsprozesses zu erarbeiten. Aus diesen Gründen sollte die Tagung Theorie und Praxis miteinander verbinden. Ausgewählte Beispiele aus der Praxis sollten einen Eindruck darüber vermitteln, wie sehr die Digitalisierung auf die Arbeitsprofile verschiedenster Branchen und deren zukünftige Gestaltung einwirkt.

Die Tagung war über zwei Tage in Plenar- und elf zum Teil parallel verlaufenden Diskussionsforen organisiert, so dass die folgenden Ausführungen keinen umfassenden Einblick in die Tagung geben können.

### **2 Informatisierung der Arbeit, Gesellschaft im Umbruch**

Den inhaltlichen Auftakt der Tagung bestritten *Andreas Boes* und *Sabine Pfeiffer* vom Institut für Sozialforschung (ISF) in München, die seit vielen Jahren zu diesem Themenfeld arbeiten. Der Begriff ‚Informatisierung‘ beziehe sich zunächst auf die Veränderungen durch die Informations- und Kommunikationstechnologien, die die Bedingungen nicht nur einen quantitativen, sondern vor allem für einen qualitativen Wandel der Erwerbsarbeit herbeigeführt hätten. Die Entstehung des Informationsraums ‚Internet‘, die veränderten Raum- und Zeitstrukturen, die Standardisierung von Kommunikationsstrukturen – um nur einige Stichpunkte zu nennen – würden seit Beginn der 1990er Jahre als Indizien für einen grundlegenden Wandel der Verfasstheit von Arbeit beobachtet und als tiefgreifender gesellschaftlicher Wandel interpretiert.