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Organising Collective Responsibility: On Precaution, Codes of Conduct and Understanding Public Debate[1]

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Abstract: This paper makes a case for organizing collective responsibility through instruments beyond the regulatory system, such as codes of conduct and various deliberative assessment mechanisms within and outside the policy context. The paper reviews the requirements for implementing an ethics of co-responsibility, with a view to the challenges current and prospective developments in nanoscience and nanotechnologies impose on the regulatory systems of modern societies.

Keywords: Deliberation, precaution, public debate, code of conduct, nanotechnology policy

1. Organising Collective Responsibility

Individuals assume responsibility for the consequences of their actions if, and only if, they can intentionally direct those actions and reasonably assess the consequences, both intended and unintended. But the consequences of scientific discovery and engineering design often escape common means of assessment. It is frequently the case that neither scientific discovery nor the consequences of technological innovation can be traced back to the intentions of particular individuals. The consequences of technological innovation are usually the result of collective action or effects of societal systems, such as our market-based economy, rather than resulting from the actions of individuals. This situation is a challenge both for the academic discipline of ethics and for actual practice.

Science and engineering exist, in the first instance, within scientific and technological systems, but are then transplanted – by means of complicated transformations and usages – into system-specific logics of the economy, politics, and law. None of these system logics are traceable to the intentions of individuals, nor is the possibility of unintended consequences always assessable. Scientists who have knowledge which leads to applications which are then criticized by many in society may rightly point out that they in fact anticipated entirely different applications.

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2 The views expressed here are those of the author and may not in any circumstances be regarded as stating an official position of the European Commission.

Engineers who design products, processes, or systems that wind up actually being used in a variety of ways (guns that kill people as well as protect them, for example) make the same argument. Scientists and engineers may even claim that the possible applications of their work are not part of their occupational role responsibilities as scientists or engineers. (The scope of an ethics of science and engineering is actually rather different than an ethics of role responsibility limited to the roles of professionals in the scientific system.) What is required, it seems, is some transformed notion of responsibility beyond the simple multiplication of roles or the expansion of existing occupational role responsibilities to encompass intended or unintentional impacts on public safety, health, and welfare. Indeed, technoscientific applications may remain ethically problematic even in cases where scientists and engineers have the best possible intentions and users do not have any conscious intention to misuse or abuse. This situation constitutes the major ethical challenge we face today.

We need a new ethics of collective co-responsibility in order to respond to this problem. Such a collective ethics arises from reflection on the social processes in which technological decision making is embedded. That is, any new ethics must deal with the same substance as the old role responsibility ethics, namely with values and norms that restrict or delimit human action and thus enable or guide traditional decision making. In the new ethics, however, these values and norms will go beyond occupational roles and their allocation to particular individuals. In this essay I address four general features and requirements for the implementation of such an ethics (for a fuller discussion of this topic see Von Schomberg 2007).

1.1 Public Debate

Firstly, then, being co-responsible includes being personally responsive. It is clear that the norms of specific technical professions are, in isolation, insufficient because they arise from restricted perspectives. A true ethics of co-responsibility must be interdisciplinary and even inter-cultural in order to provide a standard of justice for evaluating and balancing conflicting occupational role responsibilities. If we fail to provide such an ethics, we inevitably continue to aggravate culture clashes and hostile responses to particular (globalized) technologies.

In my view, an ethics of collective co-responsibility should involve free (international) public debate in which all should participate. It is unethical and even unreasonable to make any one individual responsible for the consequences and/or (adverse) side effects of our collective (especially technological) actions. It is, however, ethical and reasonable to expect informed and concerned individuals to engage in public debate on such collective actions (subject, of course, to the particularities of each situation), or at least to make this a default position from which persons must give reasons for being excused. The moral obligation to engage in a collective debate which shapes the context for collective decision making rests upon everyone's shoulders. It is not just engineers who perform social experimentation; in some senses all human beings are engineers insofar as they are caught up in and committed to the modern project.

If we trace, for instance, the history of environmental challenges, we see that many issues which depend on the involvement of personally responsible professionals were first identified and articulated within the public sphere. Public deliberation does not itself primarily aim at creating reasonable consensus; rather, it serves, amongst other activities, to present different relevant issues to more or less autonomous systems and subsystems of society - that is, to politics, law, science, etc. The discourses of politics, law, science, etc. are then called upon to respond to such issues raised in public debate. An appropriate response by the appropriate subsystem to publicly identified and articulated issues constitutes a successful socio-ethical response. Conversely, responsible representatives of the subsystems are drivers for new debates when they publicize particular aspects of an issue that cannot be fruitfully resolved within the limits of specialized discourse. The continuous interaction between autonomous subsystem discourses and a critically aware public provides an antidote for frozen societal contradictions between opposing interests, stakeholders, or cultural prejudices. It also articulates a form of ethical reflexivity (Rip and Shelley-Egan 2010).

1.2 Organised Technology Assessment

Secondly, being collectively co-responsible involves developing transpersonal assessment mechanisms. Although the institution of public realm discussion and its interaction with the above-mentioned professionalized subsystems makes it possible for individuals to be co-responsible, these deliberations are in many cases insufficiently specific for the resolution of the challenges which technological development confronts us with – that is, they do not always lead to the implementation of sufficiently robust national or international policies. The assessment mechanisms need to be transpersonal, for example by going beyond an analysis solely informed by the possible intentions of use or misuse of applications by individuals. Therefore different kinds of specific deliberative procedures – for instance deliberative technology assessment procedures – must be established to complement general public debate and to provide an interface between a particular subsystem and the political decision-making process. The widely discussed consensus conference method is one example of such an interface between science and politics, but we may have to think about more permanent assessment mechanisms within the policy making context.

The implementation of ethics codes by corporations also constitutes an interface between the economic sector, science, and stakeholder interest groups, while national ethics committees are often meant to be intermediaries between legal and political system. Experiments with such boundary activities or associations have had varying degrees of success. They represent important experiments for enabling citizens to act as co-responsible agents in the context of technological decision making – indeed in a section below I will argue that the European Commission's recommendation for a code of conduct for the responsible development of nanosciences and nanotechnologies research is an example of how we could organise collective responsibility in this particular field.

1.3 Constitutional Basis or Change

Thirdly, collective co-responsibility may be based on fundamental constitutional principles or, eventually, entail constitutional change so as to incorporate relevant principles. The initiation of new forms of public debate and the development of transpersonal science and technology assessment processes may eventually require constitutional adjustment. Indeed, the adoption of specific deliberative principles in our constitutions must not be ruled out.

The implementation of the precautionary principle – which is inscribed in the European Treaty and which now also guides important international environmental deliberations (including Climate Change negotiations and the Biosafety Protocol) – is an example of a relatively recent constitutional change in the context of the European Treaty. This principle lowers the threshold at which governments may take action to intervene in the scientific or technological innovation process. The principle can be invoked if there is reasonable concern regarding harm to human health and/or the environment, in the light of persisting scientific uncertainty or lack of scientific consensus. The implementation of such a principle requires new and badly needed intermediate deliberative science-policy structures (Von Schomberg 2006, p. 35ff). It imposes an obligation of continuing to seek scientific evidence, and also enables an ongoing interaction with the public on the acceptability of plausible adverse effects and the chosen level of protection. The principle gives an incentive for companies to become more proactive and necessarily shapes their technoscientific research programs in specific ways. The principle is also reflected in the Commission's recommendation for a code of conduct and will have an impact on the organisation of research (see below).

1.4 Foresight and Knowledge Assessment

Fourthly, we need to institutionalise foresight and knowledge assessment procedures. The issue of unintentional consequences of scientific and technological developments can be traced back to, amongst other things, the limited capacity of the scientific system to know in advance the consequences of scientific discoveries and technological actions. Virtually all complex technological innovations of benefit to society are surrounded by scientific uncertainties and several degrees of ignorance. Instead of addressing the ethics of technology, then, it might be more appropriate to address the ethics of knowledge transfer between societal spheres (such as knowledge transfer between science and policy), given that quality of knowledge will, by and large, determine our success in using this knowledge within possible applications. At the same time, we constantly need forms of foresight (straightforward predictions about our future have been shown to be enormously imperfect) in which we evaluate the quality of our knowledge base and try to identify societal problems and new knowledge needs at an early stage. (Von Schomberg et al. 2005).

2. The responsible Development of Nanosciences and Nanotechnologies: A Historical Perspective

The formation of public opinion on new technologies is not a historically or geographically isolated process; rather, it is inevitably linked to prior (national and international) debate on similar topics. Ideally, such debates should enable a learning process – one that allows for the fact that public opinion forms within particular cultures and political systems. It is therefore not surprising that, in the case of nanotechnologies, the nature of public debate and its role in the policy making process is articulated against a background of previous discussion of the introduction of new technologies (such as biotechnology), or that specific national experiences with those technologies become important. In particular, the introduction of genetically modified organisms (GMOs) into the environment is an important reference point within Europe (but frequently absent in such debates in the USA).

This historical development of policy frameworks can be followed through the ways in which terms are used and defined: initially, definitions are often determined by the use of analogies which, in the initial stages of the policy process, serve to 'normalise' new phenomena. In a number of countries, for instance, GMOs were initially regulated through laws which deal with toxic substances. Subsequently such analogies tend to lose their force as scientific insights on the technology grows and distinct regulatory responses can be made. GMOs, for example, eventually became internationally defined as 'potentially hazardous', and, in the European Union, a case by case approach was adopted under new forms of precautionary regulation. This framework was developed over a period of decades, and thereby took into account the ever-widening realm in which GMOs could have effects (developing from an exclusive focus on direct effects to eventually include indirect and long-term effects). It is not, however, solely the scientific validity of analogies which determines definitions and policy: public interest also plays an important role. Carbon dioxide, for instance, has changed from being viewed as a gas essential to life on earth to being a 'pollutant'. (The latest iteration of this evolution came just prior to the Copenhagen summit on climate change in December 2009, when the American Environmental Protection Agency defined greenhouse gases as a "threat to public health" – a definition which has important implications for future policy measures.)

In the case of nanotechnology policy it seems likely that we are still in the initial phases of development. There are not, so far, any internationally agreed definitions relating to the technology (despite repeated announcements of their imminence), and nanoparticles continue to be defined as "chemical substances" under the European regulatory framework REACH. (Analogies are also made with asbestos, as a way to grasp hold of possible environmental and human health effects, but these are contested. There is no certainty that they will become the definitive way to frame risk assessments.) To cite one topical example, nanotechnology in food will not start its public and policy life with a historically blank canvas but will be defined as a 'novel food' under a proposal for renewing the Novel Foods regulation. (The Novel Foods regulation came into existence in the 1990s with foods containing or consisting of GMOs in mind.) Recent proposals for renewing regulation on food additives (after a first reading of the European Commission's proposal in the European Parliament in April 2009) have made this the first piece of regulation to include explicit reference to nanotechnology.

Public debate that articulates particular interests and scientific debate on the validity of analogical approaches to nanotechnologies will inevitably continue to shape the ways in which nanotechnologies are addressed in regulation and policy. The governance of the technology, as well as debate around it, has to be seen within its historical context. How did stakeholders behave in previous cases, and what can we learn from these cases with regard to nanotechnology? One answer to this question might point to a learning process around the governance of new technologies, and the development of a consensus that early involvement of both stakeholders and the broader public is of the utmost importance. The European Commission has responded to this with its adoption of a European strategy and action plan on nanotechnologies, which addresses topics from research needs to regulatory responses and ethical issues to the need for international dialogue. This strategy above all emphasises the 'safe, integrated and responsible' development of nanosciences and nanotechnologies.

3. The Code of Conduct for the Responsible Development of Nanosciences and Nanotechnologies

Policy development treads a fine line: governments should not make the mistake of responding too early to a technology, and failing to adequately address its nature, or of acting too late, and thereby missing the opportunity to intervene. A good governance approach, then, might be one which allows flexibility in responding to new developments. After a regulatory review in 2008, the European Commission came to the conclusion that there is no immediate need for new legislation on nanotechnology, and that adequate responses can be developed – especially with regard to risk assessment – by adapting existing legislation.

While in the absence of a clear consensus on definitions the preparation of new nano-specific measures will be difficult, and although there continues to be significant scientific uncertainty on the nature of the risks involved, good governance will have to go beyond policy making focused on legislative action. The power of governments is arguably limited by their dependence on the insights and cooperation of societal actors when it comes to the governance of new technologies: the development of a code of conduct, then, is one of their few options for intervening in a timely and responsible manner. The Commission states in the second implementation report on the action plan for Nanotechnologies that "its effective implementation requires an efficient structure and coordination, and regular consultation with the Member States and all stakeholders" (CEC 2009, p. 10). Similarly, legislators are dependent on scientists' proactive involvement in communicating possible risks of nanomaterials, and must steer clear of any legislative actions which might restrict scientific communication and reporting on risk. The ideal is a situation in which all the actors involved communicate and collaborate. The philosophy behind the European Commission's code of conduct, then, is precisely to support and promote active and inclusive governance and communication. It assigns responsibilities to actors beyond governments, and promotes these actors' active involvement against the backdrop of a set of basic and widely shared principles of governance and ethics. Through codes of conduct, governments can allocate tasks and roles to all actors involved in technological development, thereby organising collective responsibility for the field (CEC 2008). Similarly, Mihail C. Roco has argued that rather than monitoring in detail the interactions among stakeholders, "it is more efficient to support various parties to play their roles in the overall system, encourage partnerships, and facilitate mechanisms for interactions and conflict solving" (Roco 2008, p. 25).

The European Commission Code of Conduct also views Member States of the European Union as responsible actors, and invites them to use the Code as an instrument to encourage dialogue amongst "policy makers, researchers, industry, ethics committees, civil society organisations and society at large" (CEC 2008, recommendation number 8 to Member States, p. 6), as well as to share experiences and to review the Code at the European level on a biannual basis.

4. Applying the Precautionary Principle

As argued above, the responsible development of new technologies must be viewed in its historical context. Some governance principles have been inherited from previous cases: this is particularly notable for the application of the precautionary principle to the field of nanosciences and nanotechnologies. This principle is firmly embedded in European policy, and is enshrined in the 1992 Maastricht Treaty as one of the three principles upon which all environmental policy is based. It has been progressively applied to other fields of policy, including food safety, trade and research.

The principle runs through legislation that is applied to nanotechnologies, for example in the 'No data, no market' principle of the REACH directive for chemical substances, or the pre-market reviews required by the Novel Foods regulation. More generally, within the context of the general principles and requirements of the European food law it is acknowledged that "scientific risk assessment alone cannot provide the full basis for risk management decisions" – leaving open the possibility of risk management decision-making based in part on ethical principles or particular consumer interests.

In the European Commission Code of Conduct, the principle appears in the call for risk assessment before any public funding of research (a strategy currently applied in the 7th Framework Programme for research). Rather than stifling research and innovation, the precautionary principle acts within the Code of Conduct as a focus for action, in that it calls for funding for the development of risk methodologies, the execution of risk research, and the active identification of knowledge gaps. Under the Framework Programme, for example, an observatory has been funded to create a network for the communication and monitoring of risk. The NANOCAP consortium – featuring deliberation among European NGOs and Trade Unions – similarly made a number of suggestions of further building blocks for a precautionary approach.

5. Outlook: Deliberative Approaches to the Policy Making Process

Deliberative approaches to nanotechnology should not be reduced to an exercise in public debate. While such debate is important, the responsible development of nanosciences and technologies also requires deliberative approaches to the technology assessment mechanisms of the policy process (such as cost-benefit analysis, foresight exercises and risk assessments). Scientific and public controversies often remain inconclusive when there is a lack of consensus on the normative (ethical) basis of such assessment mechanisms. In the development of nanotechnologies, there is not yet a shared understanding of how we might define the acceptability of possible risks, or of how we would weigh them against possible benefits.

Moreover, in the context of scientific uncertainty and production of knowledge by a range of different actors, we need knowledge assessment mechanisms which will assess the quality of available knowledge for the policy process. We are currently forced to act upon developments while at the same time being uncertain about the quality and comprehensiveness of the available scientific knowledge and the status of public consensus. A deliberative approach to the policy-making process would complement and connect with deliberative mechanisms outside policy. The outcomes of ongoing knowledge assessment should feed into other assessment mechanisms and into deliberation on the acceptability of risk, the choice of regulatory frameworks or the measures taken under those frameworks. Knowledge assessment following the result of foresight exercises would then be important tools in setting out arguments for the necessity and nature of future legislative actions.

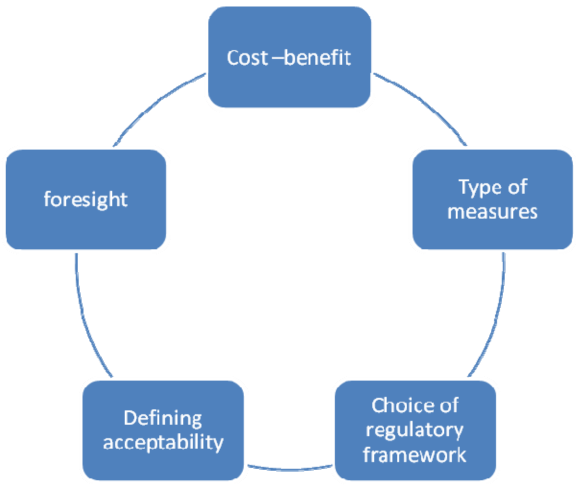

Figure 1: A non-directional cycle of assessment mechanisms within the policy making process fed by knowledge assessment processes.

It is important to note that the reason for this approach is not limited to the normative rationale of a more democratic and transparent decision making process. A deliberative approach to policy can also improve the quality of the decision making process and help to identify knowledge gaps for which we would need to go back to science. A part of this potential "quality" gain gets lost when we limit deliberation to stakeholder or public deliberation, although these constitute necessary components. An immediate normative deficiency of stakeholder deliberation is that those involved in the deliberation do not necessarily give a voice to the interests of actors who are not included. That said, deliberative foresight exercises need to be progressively embedded in public policy in order to make a real qualitative step forward.

In policy, we cannot rely on stakeholder and/or public deliberation as such, since epistemic dissent in science is immediately mirrored by stakeholder and public dissent in society. Policy makers are equally challenged by dissent in science as by dissent among stakeholders and the public. If we deal unreflectively with public debate (very often induced by scientific debate), politicisation inevitably occurs and will bring about an irrational struggle concerning the "right" data and the "most trustworthy and authoritative scientists" in the political arena. Interest groups can pick and choose experts who share their political objectives. In contrast, a functional deliberative approach includes – aside from public and stakeholder deliberation – a deliberative extension of the science-policy interface. Such an interface institutionalises deliberation based on normative filters such as notions of proportionality and precaution (or as we have in the European Union, the requirement to implement the precautionary principle in policy frameworks); various forms of impact analysis (such as sustainability impacts, cost-benefit analysis, and environmental policy impact analysis); the application of particular consensual norms or prioritisation of norms (for instance that health and environment takes precedence over economic considerations); and the application of normative standards for product acceptability. These normative filters should themselves be the result of public and policy deliberation and will enable consensual decision making at the public policy level. Although democratic societies have deliberative mechanisms in place, they need to be consciously applied and to be subject of public monitoring. Currently I see a procedural gap, especially, when it comes to identification of knowledge gaps and the assessment of the quality of the available knowledge.

The NANOPLAT project developed a case that a more permanent form of deliberation is necessary for enabling such a process of ongoing collective responsibility. The consortium developed an online tool for deliberation on consumer products, which might serve as a starting point for this ongoing process. The argument of the NANOPLAT consortium for the necessity for permanent forms of deliberation is also reflected in the recent Communication of the European Commission (CEC 2009):

> "The existence of diverse forums indicates a need to monitor the debates at national, European and international levels, for instance with support from future FP7 activities, in order consistently to convey messages from public debates to policy makers." (CEC 2009, p. 6)

and

> "Implementing a more direct, focused and continuous societal dialogue; and monitoring public opinion and issues related to consumer, environmental and worker protection." (CEC 2009, cited from the conclusions of the Communication, p. 11)

Any such discussions, however, also need to take into account the sheer scale of the numbers of nanomaterials expected to hit the market: Choi et al. (2009, p. 3030 ff) calculated that, merely for the 190 nanomaterials currently in production, the cost of risk assessment would amount to between $249 million (with optimistic assumptions about hazards) and $1.2 billion (in the case of an approach fully consistent with the precautionary principle, this would take 34-53 years to fully implement). If a case for case approach consistent with the precautionary principle is taken, the capacity of regulatory bodies and the feasibility of control will soon become highly questionable given a likely flood of new nanomaterials. The question of the capability of regulatory systems is pertinent both at the micro-level of regulating identifiable risks and the meta level of governance systems. Alfred Nordmann, in particular, has pointed out such possible shortcomings and peculiarities of regulatory approaches to nanotechnology. The framing of public policy will, yet again, be dependent on the ways that public interests and scientific insights are articulated in the years to come (see for extensive further reflections on the role of public debate on nanotechnologies based on the 4 projects cited here: Von Schomberg and Davies 2010).

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