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On Identifying Plausibility and Deliberative Public Policy

Commentary on: "Negotiating Plausibility: Intervening in the Future of Nanotechnology"

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Abstract The identification of plausible epistemic approaches in science as well as the social problem definitions with which scientists implicitly work is essential for the quality of a deliberative public policy. While responding to the Nanofutures project, I will reflect on the essential elements of such a policy.

Keywords Deliberation · Public policy · Nanotechnology · Plausibility

The Nanofutures project of the Center for Nanotechnology in Society at Arizona State University (CNS-ASU), which Cynthia Selin frames in her paper in terms of "negotiating plausibility," marks a considerable step forward in efforts to address technological developments in a timely and responsible manner (Selin 2011, this issue). Indeed, there are ever more diverse, often contradictory—yet all plausible—sets of technological options associated with a science base surrounded by controversy. Particular developments in the nanosciences add to the already well-known cases of this kind, ranging from climate change and genetically modified organisms (GMOs) to the health effects of endocrine disruptors and the intake of cocktails of pesticide residues. Selin's paper brings up an important overall-issue: how to make transparent the decisions to be made, and to do so in the context of anticipatory governance. Identifying the plausibility of particular epistemic approaches underlying scientific controversy, precedes establishing the plausibility of such approaches within scientific and public discourse on which Selin focuses. The quality of democratic deliberation is dependent of whether we adequately identify plausible epistemic approaches before it may become associated with particular public and stakeholder's views.

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Identifying Plausibility

One can distinguish, within the thought tradition of philosopher Charles Sander Peirce the plausibility of knowledge claims from the predictability of individual statements in the context of scientific discourse (Von Schomberg 1993). For instance, epistemic discussions in science can be characterized as discussions triggered by controversies arising from the acquisition of new scientific knowledge, whereby scientific methods and the fundamental understanding of the nature of the subject matter often become subject to dispute themselves (Von Schomberg 1993). In such cases, the authorities within scientific disciplines are mutually challenged in terms of which discipline can claim to offer the best solution to the problem in question. Recent examples of epistemic discussions in science include the debates between molecular biologists and ecologists on the risks of GMO's, the debate on climate change as either being induced by human interventions or as caused by natural cycles, and the debate between K. Eric Drexler and Richard Smalley on the plausibility of molecular nanotechnology and engineering (Drexler 2003; Smalley 2003).

Typically, epistemic discussions induce public debate long before any scientific closure on the issue is to be expected and provide a significant challenge for developing reasonable public policy. Which group of scientists should policy makers believe and should endorse? Plausible, epistemic approaches on the acquisition of knowledge in science are associated with problem-definitions, which in turn frame (although, often, only implicitly) policy approaches. Unidentified and unacknowledged epistemic debate can result in unbalanced public policy: the until recently not uncommon "wait and see" character of public policies of nation states on climate change, or the concentration on the promises and blessings of all kinds of new technologies provide examples whereby public policy takes sides prematurely in a scientific debate that is still unfolding.

It is therefore of utmost importance to be able to identify such epistemic discourses and knowledge gaps within the various plausible options on the table in order to be able to have a more robust outlook on potential technological solutions—and in order to keep open the possibility for alternative developments. The CNS-ASU Nanofutures project is a contribution towards the possibility that alternative developments might remain in sight for possible public policy responses and towards enabling democratic choices at early stages of technological development. However, the use of "naïve product scenes" (which are, as Selin outlines them, "short vignettes that describe in technical detail, much like technical sales literature, a nano-enabled product of the future,") may not overcome the often too narrowly conceived problem definition scientists implicitly work with. Social scientists could do some heuristic work by spelling out these problem definitions. For example, the "product scene" of a disease detector (a device which would enable disease detections before symptoms emerge) is probably based on a problem definition that it is a medical imperative that any "disease" *needs* to be identified, irrespective of available treatment and irrespective of whether the individual in question would define himself or herself as ill. As a result this problem definition may sidetrack preventive approaches based on adopting particulars lifestyles. Moreover, problem definitions scientists implicitly work with often correspond to a centuries old, general standard list of fundamental human needs (which represent overarching problem definitions) to which new technologies are supposed to provide answers in a given future: food and energy supply, human health, security and, for half a century, also "the environment." The case of nanotechnology is in no way different, especially if one considers the public reasons for its funding. Because of its enabling and diverse character, it is suggested by scientists that it might open a future with very efficient solar energy, nanorobots cleaning blood vessels, water sanitation solutions for the "third world," etc.

The link between options, which may only look plausible at a particular stage of development in science and technology, and for particular ways of social problem solving, is a perplexing one. For instance, it seems obvious that the world food problem is principally not a technological problem but a political-economic distribution problem. Yet, the increase of land use for biofuels may well cause a situation whereby a political-economic solution could become increasingly less likely, if not impossible, before it ever arrives at a world policy level in an historic time period in which this type of solution still *is* an option. Putting the public's attention—and with its hopes and/or fears—primarily on an accelerated form of innovation by technological means, is therefore irresponsible.

In order to help mitigate this, the methodology used in the Nanofuture project could benefit from a prior analysis of potential relationships between types of plausible technological pathways and particular social problem-definitions, rather than starting with "naïve product scenes," and thereby methodologically ignoring the underlying problem definitions. It is also important to make an analysis of the links between technological pathways and social problem definitions and how they may well receive the support of particular stakeholders or boost particular ideologies within public policies. A process of "negotiating plausibility" eventually means reaching consensus on such problem definitions. Minimally, policy makers could help to avoid continually funding developments which are later shown to be fictious; but more constructively, policy makers could create deliberative forms of decision making on the problem definitions themselves and place them in a wider perspective.

Deliberative Public Policy

The Nanofutures project adopts both a foresight[1] and a deliberative approach, which is commendable. It is, however, 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. The deliberative foresight approach can also improve the quality of the decision making process and help to identify knowledge gaps for which one would need to go back to science. A part of this potential "quality" gain gets lost when one limits deliberation to stakeholder or public deliberation, although these constitute necessary components. An immediate normative deficiency of stakeholder deliberation is that the involved actors do not necessarily include the interests of non-included actors [see the work by Michiel van Oudheusden (2011), and David Guston (2011), this issue]. That said, foresight exercises that envision the possible consequences of a particular technology need to be progressively embedded in public policy in order to make a real qualitative step forward.

Public policy cannot rely on stakeholder and or public deliberation as such, since epistemic debate 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 policy makers deal unreflexively with public debate induced by epistemic debate, an improper politicising effect inevitably occurs and translates into an irrational struggle concerning the "right" data and the "most trustful and authoritative scientists" in the political arena. Interest groups can pick and choose the experts which

[1] Interactive foresight approaches include participatory methods to "think, debate and shape" the future and is fed by prospective analysis.

share their political objectives. A functional deliberative approach, apart from public and stakeholder deliberation, includes a deliberative extension of the science-policy interface. Such an interface institutionalises particular deliberation based on normative filters such as notions of proportionality and precaution (or as is required in the European Union, implementation of the precautionary principle in policy frameworks), various forms of impact analysis, such as sustainability impacts, cost-benefit analysis, environmental policy impact analysis, etc., 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 are in themselves results of public and policy deliberation and enable consensual decision making at the public policy level. Although democratic societies have these deliberative filters in place, they need to be consciously applied and be subject to public monitoring. Currently there is a procedural gap, especially, when it comes to identification of knowledge gaps and the assessment of the quality of the available knowledge. A deliberative form of "knowledge assessment" at the science-policy interface is needed to facilitate a qualified knowledge input (Von Schomberg et al. 2005; Von Schomberg 2007).

At the same time, policymakers have to ensure that science policies are consistent with other public policies: the challenge is not just to focus on the conditions for good and credible science but to make knowledge production, dissemination and use a key factor for virtually all public policy goals. So, how about a couple more Nanofutures projects?

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