

Shaping the Ethics of an Emergent Field: Scientists' and Policymakers' Representations of Nanotechnologies

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ABSTRACT

Nanotechnologies present significant new challenges for the study of technoethics. While they are surrounded by high expectations there is considerable uncertainty about their impact. Discussions about their likely ethical implications have often assumed that ethical issues and standpoints are relatively clear. The commonly held narrow utilitarian conception of benefits versus risks tends to overlook broader issues concerning the operation of power in problem definition, unimagined or unknown effects, and accountability. Drawing upon data from a recent UK-based study, this article examines how scientists' and policymakers' representations of nanotechnologies contribute to shaping thinking about the 'ethics' of this field. It suggests that their particular framing of the field is likely to constrain debate on a range of important matters in need of urgent deliberation, including the direction of current research efforts and whether the investments in particular lines of research are likely to bring about the promised economic and social benefits or have deleterious impacts. Overall, the study found that most of the respondents were optimistic about the perceived benefits of nanotechnologies and sought to distance their work from wider non-technical questions. Scientists and policymakers, it is argued, need to reflect much more upon their own assumptions and consider how these may influence the trajectory of technology development and public responses.

Keywords: Nanoethics, Nanotechnologies, Policymaker, Power, Risk, Scientists

INTRODUCTION

New and emergent technologies invariably give rise to questions about their 'risks' and 'ethics'. This is no less the case with nanotechnologies. Hailed by their proponents as constituting the

next Industrial Revolution, nanotechnologies are seen as poised to revolutionize almost every sector of industry. Notoriously difficult to define 'nanotechnology' involves the design and manipulation of material at the atomic or molecular level. However, among scientists, it is generally agreed that nanotechnology is neither a new nor a single technology; hence,

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the generally preferred pluralized term (Kjølberg & Wickson, 2007; Wood et al., 2007). The definitional ambiguity and multiplicity of the technologies poses a considerable challenge for those concerned with understanding their ethical implications. Assessing the implications of any technology or spectrum of technologies assumes that there exists some level of agreement among stakeholders about the nature of the technologies and their applications. According to a common conceptualization, the potentiality and novelty of nanotechnologies is seen to arise from their future convergence with other technologies, including biotechnologies, digital technologies and neurotechnologies. As the Royal Society and Royal Academy acknowledged, in their much cited 2004 report, *Nanoscience and Nanotechnologies: Opportunities and Uncertainties*, 'convergence probably presents some of the biggest uncertainties [about nanotechnologies], with respect to what is genuinely plausible and when new technologies might actually come into use' (RS/RAE, 2004: 54). Since the nature and timing of this convergence cannot be foreseen, one cannot be certain about the implications of nanotechnologies in the future. Nanotechnologies are surrounded by considerable expectations about what they will deliver but these expectations may not be fulfilled (at least within envisaged timelines) for a range of reasons—economic, political and social. The more radical visions of nanotechnologies (both utopian and dystopian) which shape many current debates deny the long term, incremental and unpredictable nature of most technology innovations (Wood et al., 2008). Technologies are likely to develop in directions unimagined by scientists or to be taken up and employed by 'users' in unanticipated ways. However, despite these definitional ambiguities and uncertainties, discussions about the ethical or likely ethical implications of nanotechnologies have often proceeded as though ethical issues and standpoints are relatively clear. Views range from those who confidently proclaim that nanotechnologies raise no novel ethical questions to those who see the implications as being potentially profound—often reflecting

commentators' different experiences and evaluations of past technology developments.

As key actors and stakeholders in the process of nanotechnology development, scientists and science policymakers play a major role in establishing the social definition of nanotechnologies, including their 'benefits' and 'risks'. Together, they develop the knowledge and the framework of expectations that shape future policy and action. In turn, the question of how nanotechnologies are publically represented shapes their future—the research and roles in which they will be engaged—and thus they can be seen to have a vested interest in particular portrayals of this field. They contribute significantly to the ethical framing of nanotechnologies through the particular visions that they bring to this field and through the ways they articulate the relationship between technologies and society in their publications and other forums. As cultural histories of science and technology reveal, technologies are always developed with particular users and uses in mind, albeit this may not always be explicit in research programs or policy decisions (Hård & Jamison, 2005). Given their social standing as producers of knowledge and their privileged access to the media and other public forums, scientists are strategically positioned to impose their definitions of the nature and significance of technologies. Likewise, policymakers play a key role in shaping the trajectory of technology development through their decisions affecting funding of research and the regulatory environment. However, scientists' and policymakers' current conceptualisations of nanotechnologies have been little researched to date.

Drawing upon data from a recent (and, to our knowledge, first) UK-based study involving surveys and interviews with scientists and policymakers who are involved in the nanotechnology field as researchers (of the science or of the toxicological and environmental impacts of technologies) or funders of research, respectively, this article examines how these actors' representations of nanotechnologies contribute to shaping thinking about the 'ethics' of this field. Specifically, it examines their

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