

Futures of ELSA

SSS Science & Society Series on Convergence Research

Arie Rip

In his Editorial, and building on Peter Stegmaier's idea of convergence research (Stegmaier 2009), Frank Gannon offered a good diagnosis: "Politics is also pinning its hopes on convergence work as a means to reconcile front-line research with public opinion and societal expectations. A new crop of 'convergence workers' now organize joint meetings and debates between various stakeholders with the ultimate aim to allay public fears about research while making scientists more aware of society's expectations and reservations" (Gannon, 2009). Whether or not the hopes of politicians and spokespersons for science are realistic, this new crop of 'convergence workers' is certainly active, as the articles in the Science & Society Series on Convergence Research testify. "[P]hilosophers, ethicists and social scientists also join large research projects in the life sciences to provide the link between science and society, to advise and discuss with the researchers or to organize and engage in public outreach programmes." Gannon added "In doing so, these researchers are creating a new research field and new job opportunities at the interface between the life sciences and the social sciences as well as the humanities."

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Gannon saw their function in terms of "their growing importance for the public acceptance of research in the life sciences." This indicates a mismatch between the perspectives of the natural scientists and the social scientists and humanities scholars

who do not wish to function only as a lubricant between science and society. This is visible in many of the articles in the series. Jane Calvert and Paul Martin, for example, distinguish two types of 'convergence workers'—contributors and collaborators—and are critical of the contributors who merely limit themselves to serving the sciences as they are and/or accept that they somehow speak for society, that is, the public (Calvert & Martin, 2009). The important goal, as they see it, is to achieve 'mutual reflexivity', which will occur when scientists and social scientists/humanities scholars are truly collaborating.

My own experience, as a social scientist who is part of the research consortium for nanoscience and nanotechnology in the Netherlands (NanoNed; www.nanoned.nl), is similar: we are often positioned as mediators between nanotechnology and society, rather than being seen as scholars in our own right. Mediator roles are no doubt important, but the point is that there are different expectations on both sides.

Clearly, there is an essential tension, and one that is particularly salient in newly emerging sciences and technologies (NEST), which have to live on promises and by now accept that some consideration of ELSA (Ethical, Legal and Social Aspects) is in order (Swierstra & Rip 2007). This pattern can be understood because scientists are 'enactors', who push, and have to push, the value of their work and then consider society, which is often taken to mean 'the public', in terms of opportunities and barriers (Rip, 2006a). This is a 'concentric' perspective, starting with the project and adding layers of additional consideration. From such a perspective, a potential 'lack of acceptance' by publics becomes a

problem, whereas the real issue should be the appraisal of NEST by all of the relevant actors, including publics.

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This tension between the perspectives of scientists and social scientists has been identified before. Howard Newby, then Director of the UK Economic and Social Research Council, commented on it more than ten years ago: "The public's role [...] is reduced to that of hapless bystander or, later, the recipient of scientific advance and technological innovation which the scientific community believes it ought to want. If the public decides it does not want it, it is regarded as either ignorant or irrational" (Newby, 1992). This is the point at which the natural science community appeals to social scientists to help lubricate the public acceptability of science and technological change. Newby proposed an alternative: "I am seeking to demonstrate that social science is an integral, and not merely a marginal, activity in understanding the process whereby scientific excellence and technological innovation may lead to economic and social well-being. For this to be effective, social science investigation should not be restricted to the down-stream study of impacts and diffusion, but should be integrated into the study of the very processes themselves. Social and natural scientists have complementary skills, and mutual interests, together improving the

processes of technological innovation. This will involve a degree of multi-disciplinarity, if not inter-disciplinarity, which spans not only the social sciences, but transcends the two cultures."

Articles in this *EMBO reports* series have attempted to show that it is possible to transcend the two cultures and achieve mutual reflexivity. However, the tension cannot be addressed simply by undertaking transdisciplinary work. In the end, the tension originates from different views on how to achieve better science and technology in a better society (Schot & Rip, 1997). When enactors reduce this to the question of how to improve public acceptance, they miss opportunities to do better. This is where social scientists and humanities scholars can contribute but, if they focus on enhancing reflexivity, it might not lead to the desired changes. This criticism also applies to my own work. Reflexivity is important, but the balance between the efforts of social scientists and humanities scholars might have shifted too far in this direction. Instead, the primary consideration should be the ongoing coevolution of science, technology and society, and how to modulate it (Rip, 2002).

...strategic games [...] are being played around newly emerging technologies, in which being first is more important than going in the right direction. This has been called the regime of technoscientific promises...

Here, I use ELSA as an entrance point to consider this challenge, and articulate possible futures for ELSA that also tell us something about future developments more generally. Peter Stegmaier is right to want to go beyond the traditional narrow confines of ELSA and to accept a range of "approaches, institutions, job-hybrids, biographies and practices" in what he describes as "doing society and genomics" (Stegmaier, 2009). This is a wonderful phrase, as it emphasizes that there is more at stake than increased reflexivity. However, Stegmaier does not discuss how the 'doing' will modulate the coevolution of science, technology and society. In this article, I do not address this general issue either (but see Rip, 2002, 2006b), rather I use it as the backdrop to a discussion of the present and future of ELSA.

One potential future is linked to the suggestion by Stegmaier that a new field might be emerging, together with the new professionals that he called convergence workers. Another future of ELSA that I discuss is linked to the open-ended character of NEST: promises of impacts and benefits are made, but there are many directions to explore, only some of which will be realized. This situation led Alfred Nordmann, in his report on *Converging Technologies for the European Knowledge Society*, to argue that a new type of science policy is in order (Nordmann, 2004, 2009): one that would not involve top-down decision-making perhaps with some consultation, but would draw on distributed competencies to assess ongoing developments and future options. ELSA competencies will be important in such a context.

Before outlining these two futures of ELSA, it is worth reflecting on the thrust of the other articles in this series. Each has sought to show that social scientists and humanities scholars can make a contribution to ongoing research and to reflection on research agendas. Indeed, the experiences that the various authors report are interesting and inspiring, although the outcomes are generally disappointing: a few modifications in research agendas and some increased reflexivity. There may be a link with the enactor position, in which reflexivity is a matter of prudence—that is, a way to better handle possible barriers to exploring new options. In any case, a telling remark came from a scientist participating in a study by Daan Schuurbijs: "It's good to think about what your research can deliver for society." [...] "Does it change my thinking? Yes. Does it change what I do on a daily basis? No" (Schuurbijs & Fisher, 2009).

This need not be a message of despair. Over time, and particularly when there are also external incentives, practices might change. I develop this in my first scenario for the future of ELSA. However, incentives for more reflexivity are only one part of the story. There are also the actual and possible interactions with the wider world, and the question of how to address and anticipate them.

It is possible to develop this in a manner that is complementary to the reflexivity approach. "Effects of scientific research occur through successive linkages in a chain, in which ever more

actors and broader worlds are involved. Responsibility for the final effects thus diminishes. But the linkages are not random: the first steps, say in contacts with certain industrial firms or government agencies, make some further steps easier, and others more difficult. Exploitation of research results can be facilitated, as well as hindered, depending on the networks in which the researchers move. [...] Scientists have developed some ability to chart relevant networks when pushing the promise of their findings or findings-to-be. But the charts are unbalanced, asymmetric, and there are often surprises in what actually happens. The competence of social scientists in understanding and tracing networks might be invoked, by following their lead; or social scientists might be hired to do such a job. This could be a sensible division of labour; I am myself involved in such 'jobbing' in the areas of biotechnology and micro-optics" (Rip, 1995).

This approach has been developed further, for example, by creating socio-technical scenarios that build on the 'endogenous futures' embedded in these networks and interdependencies (cf Rip & Te Kulve, 2008). To integrate all this in the scientific endeavour, a further step towards reflexivity is necessary. As I phrased it in the article which I quoted above: "if natural scientists are ever to become reflexive about their own research, about intended outcomes and unintended consequences, they must learn how to tell stories in which they themselves play a role (in contrast to the style of presentation with passive verbs, where no author is visible, and the laboratory world is taken to speak for itself). There is a hermeneutics of natural science, but it has been repressed (Markus, 1987). It is important to recreate it: not only for its own sake (being reflexive is better than not being reflexive), but also because it will make researchers more effective, as scientists and as citizens."

The first future of ELSA starts with the observation that scientists, and enactors in general, are stimulated to be more reflexive through external pressures and incentives, such as a code of conduct for responsible nanoscience and technology research proposed by the European Commission. Although codes of conduct have been formulated before, mostly in general terms, there is now increasing official interest in them—such as the code of

conduct for science that the UK Department of Innovation, Universities and Skills commissioned (<http://www.dius.gov.uk>). Although the formulation of these codes is often driven by concerns about the integrity of research—so that they tend to focus on behaviour—the code proposed by the European Commission, and those that are considered by some national-level funding agencies, also emphasize that the affects of the research and broader considerations should be taken into account. If this is translated into additional requirements on the submission of proposals, it will be a strong incentive to develop ELSA further. The code envisages broader changes, however, including that, “A general culture of responsibility should be created in view of challenges and opportunities that may be raised in the future and that we cannot at present foresee” (European Commission, 2008). At the same time, the present interest in formulating a code is a response, by enactors, to the pressure of credibility. This is also visible in the initiatives of chemical companies such as BASF (Ludwigshafen, Germany) and Evonik Degussa (Essen, Germany) to create a voluntary code of conduct for nanotechnology for themselves.

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If such developments continue, the life of researchers will change. There will be an explicit need to show that broader considerations are taken into account when making choices—for example, about research to be done and networks in which to be involved—and relevant competencies will have to be developed or hired. Scientists, pragmatic as they are, will go for the latter option. The net effect will be that the rules of good laboratory practice will be broadened, requiring the consideration of ELSA. Therefore, business opportunities will emerge for a new breed of socio-humanistic consultants to serve the researchers. The latter can then follow the rules without having to check whether what they do is ‘responsible’. In other words, there will be a division of moral labour.

This is a realistic scenario. The idea of a division of moral labour is important because it leads to further questions about its character. Is it a productive division in its own terms and in terms of the perspectives of different actors? Is it a justifiable division, for example, should one accept the delegation of moral reflection? Evaluating such arrangements requires second-order ethics, which is close to political theory. For example, although one need not agree with the specific ideas of Philip Selznick, putting the question of a ‘moral commonwealth’ on the agenda is important (Selznick, 1992).

Stegmaier, in his introduction to the series, asked whether we were witnessing the embryonic stages of a new profession, and appeared to answer in the positive: “Can one actually make a career as a convergence worker—a mediator between science and society—and is there a job market for people with cross-competence? [...] Convergence workers have both a unique competence in dealing with processes of supreme complexities and a large mobility, as they are able to traverse intellectual and other boundaries. The society and genomics programmes might therefore have several effects: they will have an impact on policy decisions, create academic knowledge, meet the demands of the job markets and, potentially, create a ‘new’ profession to serve the needs of modern science governance” (Stegmaier, 2009). The various articles in this series testify that the authors are wrestling with their emerging professional roles.

There is a market for their services, and it is not limited to genomics. This market, in a broad sense, starts with the need for broader risk-assessment approaches: “Research for Frame 2 questions [broad risk assessment], however, require[s] a more holistic and transdisciplinary approach. This includes a strong social science involvement, the incorporation of stakeholder preferences, and intense reflections by legal and ethical scholars” (Renn & Roco, 2006). However, it will also include changes in governance. “A common feature of the politics of life areas [...] concerns the salience of a language of ethics and morality. Issues turned out to be strongly framed in normative terms such as ‘moral obligation’ or ‘responsibility’, the qualification of certain courses of action as being ‘ethically permissible’ or not, ‘moral’ or ‘immoral’ or imperatives to ‘relieve suffering’, to respect ‘human dignity’, ‘protect

human dignity’ or promote ‘animal welfare’. [...] We can therefore speak of an ethicisation and emotionalisation of governance that has taken place in the politics of life areas” (Gottweis, 2008).

Particularly when it comes to ethical questions, the supply side is crowded. As Ulrike Felt and co-authors note (Felt *et al.*, 2009): “Over recent years, ethics as a resource for science and technology policymaking has gained importance, with (bio-)ethics committees increasingly being established on national and supranational levels.” With regard to nanotechnology, a “new business of ethics” has been identified (Nordmann & Rip, 2009), insofar as ethicists and others have responded to the demand for nano-ethics with an oversupply of what is called ‘speculative ethics’. A further effect, and therefore another building block for a future of ELSA, is a push by suppliers: they argue for more—and more systematic—attention to the ethics of NEST, which then requires professional input.

Such a phenomenon is not limited to ethics: it has been noted that policy instruments create their own professional community to ensure their implementation and further development. A clear example is the emergence of a ‘carbon industry’ as “an increasingly organised sector of specialised businesses that provide service for the development and maintenance of emissions markets. The International Emissions Trading Association (www.ieta.org) was set up in 1999 to promote the worldwide development of emissions markets. Its members are specialized consultancies, banks, brokers, exchanges, risk managers, project developers, journals, conference organisers, news services and so on. Emissions trading gained additional momentum, not only as an environmental policy instrument, but also as a thriving service economy that started actively to advertise its products and lobby for the expansion of its market” (Voss, 2007).

Jan-Peter Voss also notes that the policy instrument is now carried by “a specialized social constituency” and that “the instrument becomes an end in itself.” The policy instrument, formulated in general terms, is reflexive mediation between science and society—the “doing society and genomics” as Stegmaier phrased it. There might well emerge a NEST-ethics industry; the signs are there.

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This article is part of the *EMBO reports* Science & Society Series on Convergence Research, which features Viewpoints from authors who attended the 'Doing Society and Genomics—Convergence and Competence Building' workshop organized by Peter Stegmaier for the Centre for Society and Genomics at Radboud University (Nijmegen, the Netherlands) in September 2008. We hope that this Viewpoint series will help to introduce our readers to the new multi- and transdisciplinary developments among the life sciences and the social sciences and humanities.

Of course, the professionalized ELSA and the NEST-ethics industry are embedded in broader developments (Rip, 2002). There are patterns to be seen in these developments, which should be identified and assessed—and may lead to attempts at modulation. This is a larger challenge than addressing the ELSA of NEST, and analytical and diagnostic instruments might be developed by sociologists, economists and political scientists. Taking the larger developments into account allows me to outline another future for ELSA.

I start with a notable pattern: the strategic games that are being played around newly emerging technologies, in which being first is more important than going in the right direction. We have called this the regime of technoscientific promises (Joly *et al.*, 2009; see also Felt *et al.*, 2007, Ch 2). Features of this regime, which have drawn critical attention from the side of ELSA, include, "The creation of a fiction in order to attract resources—financial, human, political, etc—viz that the emerging technology (biotechnology in the 80s, nanotechnology now) 'will solve human problems' (health, sustainability, etc) through a wide range of applications. The credibility of this cornucopian conception of technoscience is partly based on the 'naturalisation' of technological advance, which is seen as almost a self-fulfilling prophecy (if enough resources are provided and effort is made). [...] It draws on an uncertain future, and derives its force from the uncertainties. Upstream solutions are thus promised for downstream problems, without having to take the details and socio-political dynamics of the downstream problems into account" (Felt *et al.*, 2007).

Interestingly, this phenomenon of open-ended promises was used in an alternative way in the recommendations of a European expert group charged with discussing so-called converging technologies and formulating a European response to the apparent pushing of such technologies by the USA (Nordmann, 2004). The convergence is

of so-called enabling technologies such as nanotechnology, biotechnology and cognitive sciences. "Since enabling technologies are not dedicated to a specific goal or limited to a particular set of applications, they tend to be judged by the visions that go into them rather than by the results they produce" (Nordmann, 2004). So, there is both the space to articulate visions and an actual need to do so. The 2004 report recommended agenda-building exercises with widening circles of participation, expanding the concept of 'technology platforms' and allowing public/social goals to shape directions of technological development. Looking back five years later, Nordmann (2009) still finds the proposals valuable, but emphasizes that the idea that the European 'knowledge society' can and should shape itself in relation to converging technologies should be seen as a collective experiment, rather than a goal that will be achieved if the right instruments can be found.

In the vision of collective experimentation put forward by Nordmann, there is a role for ELSA: it continues to be a form of reflexive mediation, but now as part of the larger attempt to work towards better technology in a better society. ELSA activities will be a service to the ongoing coevolution of NEST and society, rather than a specific enactor. Of course, this evolution will not resolve the essential tension that I described in the introduction, but it will shift its shape and location away from an almost exclusive focus on enactors to become more distributed. This is fitting in a world of distributed innovation and distributed governance, but it does create problems for professional ELSA because it will be more difficult to build and maintain the necessary competencies.

I have identified two futures for ELSA. They are scenario exercises in the sense that they highlight specific developmental trajectories and reduce complexity in order to see to what such developments might amount. It is not certain—and perhaps not desirable—that

a new field and profession will emerge from these changes; yet, there are definite signs, including scholarly and professional interest, overlapping community building, and support for ELSA studies and activities in their own right. In fact, there are good reasons to work towards some degree of institutionalization of ELSA as a requirement for responsible development and as a recognized field, even though this might lead to a NEST-ethics industry. The tension would then be between ELSA having a role in distributed governance and at the same time becoming institutionalized.

There is another tension. Scholars, intellectuals and other reflexivity actors, including some of the consultants, through their activities, will contribute to the coevolution of science, technology and society; hence, they are agents. In addition to their concrete contributions, they will also—already by having such a role—work towards creating recognition for the importance of ELSA and related activities. In this sense they are similar to moral entrepreneurs: they have an interest in working towards change for the better. This is clearly visible in the articles in this series, and seems to be shared by many people in the emerging ELSA communities, including myself. As Becker (1963) emphasized, moral entrepreneurs turn into moral custodians—or move away—when their change mission is accomplished. Many current ELSA agents are definitely reluctant to become moral custodians. However, just talking to others about better technology in a better society is not enough.

I have presented general considerations about reflexive action that are not specific to ELSA. There is an interesting precedent. In the science and society movement of the 1970s (Rip, 1999)—in which many ELSA scholars have their roots—moral entrepreneurship was explicit. Several of its members later took up positions with some responsibility in science and technology institutions and in policy-making, and this has had effects. More free-floating ELSA scholars should therefore be complemented with ELSA agents who become part of institutions, and will be enabled and constrained by them. I should develop a further ELSA future around this possibility.

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Arie Rip is Professor in Philosophy of Science and Technology, University of Twente, the Netherlands.
E-mail: a.rip@utwente.nl
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